

EDUCATING THE NEXT GENERATION OF PROFESSIONALS IN THE AGRIFOOD SYSTEM

# D2.8: Annual case development report, year 4

WP2 - Action research facilitation



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 771738 The present Deliverable reflects only the author's view and the Research Executive Agency is not responsible for any use that may be made of the information it contains

#### **Document Information**

Grant Agreement	771738 <b>A</b>		Acronym		NextFOOD	
Full Project Title	Educating the next generation of professionals in the agrifood system					
Start Date	15/03/2018		Duration		48	
Project URL	https://www.ne	xtfood	d-project.eu	<u>./</u>		
Deliverable	D2.8: Annual ca	se dev	velopment re	eport, year 4		
Working Package	WP2 – Action re	searcl	h facilitation			
Date of Delivery	Contractual	30/04	4/2022	Actual		30/04/2022
Nature	R - Report etc.		Dissemina	ation Level	P٠	Public
WP Leader	Norwegian Univ	ersity	of Life Scier	nces (NMBU)		
Authors	Kristiane Brudev Hofgaard Lieblei Timar; Line Lind Anna-Maria, Pa Woxblom; Jan Rastorgueva, F Bhattacharya, A Anupama Augus	roll, Ma in, Tor ner, K apado Moud Paola Anshur stine; (	arie Henriks Arvid Brela (atherine Fly poulou Elis (rý, Chiseng Migliorini, man Das; N Claudia Roja	en Bogstad, L nd; Anamaria (nn and Christ savet, Zafeiri ga Emmanue Charlotte F Virginia Belsa as	utga Sup toph iou I M Prelo anti;	art Lenaerts, Geir buran and Adrian Knöbl; Krooupa Georgia; Lotta ukosha; Natalia prentzos; Ritam Manju S. Nair,
Contributors	Anna Marie Nicolaysen, Vebjørn Egner Stafseng, Åsmund Lægreid Steiro; Alin Teusdea and Adrian Vuscan; Krystalidou Evdokia, Lymperopoulos Aristotelis, Navrozides Manolis, Papageorgiou Maria; Tomas Johannesson, Malin Juter, Line Djupström Michael Öhman and Hagos Lundström; Reinhard Neugschwandtner; Lamberto Lamberti and Suzana Madzaric; Osvaldo Salazar, Andrés Muñoz, Ricardo Pertuzé, Gabriela Lankin, Francisco Nájera.					

#### **Document History**

Version	Issue Date	Stage	Changes	Contributor
0.1		Draft		
0.2		Draft		
1.0		Final	Review	



#### Table of Contents

E	kecuti	ve su	ımmary	13
1	Ca	ase 1:	Norwegian University of life sciences, NMBU	22
	1.2	ID c	card	22
	1.3	Exte	ended summary	27
	1.3	3.1	Research results since the previous reporting	27
	1.4 repo	Acti rting	ions taken and data on the development of the case since the	last 31
	1.4	4.1	Actions taken since the previous report	31
	1.4	4.2	Students' responses, learning and competence development	35
	1.4 de	4.3 velop	Teachers' and other stakeholders' perceptions of the overall procesting the case towards the Nextfood approach in education	ss of 92
	1.5	Cor	ncluding remarks	.107
	1.5	5.1	On the case development since the previous reporting	.107
	1.5	5.2	An assessment of accomplishments after 4 years of Nextfood	.109
2	Ca	ase 2:	: University of Oradea, UNIOR	.116
	2.2	ID c	card	.116
	2.3	Exte	ended summary	.118
	2.3	3.1	Research results since the previous reporting	.118
	2.3 re	3.2 portin	Actions taken and data on the development of the case since the	last .121
	2.4	Stu	dents' responses, learning and competence development	.123
	2.4	4.1	Methods of data collection and analysis	.123
	2.4	4.2	Results	.127
	2.4 de	4.3 velop	Teachers' and other stakeholders' perceptions of the overall proces bing the case towards the Nextfood approach in education	ss of .144
	2.5	Cor	ncluding remarks on the case development	.156
	2.5	5.1	On the case development since the previous reporting	.156
	2.6	Ref	flections towards the end of the Nextfood project	.158
	2.6 (e: pre	6.1 xperie ocess	What has been accomplished to shift from theory to phenome ence) in agri-food and forestry systems as the starting point for the lear s?	enon ning .158
	2.0 the de	6.2 e <i>de</i> velop	What has been accomplished to shift from <i>transmission of knowledgevelopment of</i> key <i>competences</i> needed to support sustain pment in agrifood and forestry systems?	<i>je</i> to able .159
	2.6	6.3	What are the prerequisites for making a successful shift?	.159
	2.0 tra	6.4 Insmi	What is your concrete advice on the shift from simple knowle ssion to the development of key competences?	edge 160



	2.6	6.5	What is your main challenge?	160
	2.6 tha	6.6 It ma	What are the three best ideas from the workshop for how to dea in challenge?	al with 161
	2.7	Арр	pendices (UNIOR)	162
3	Ca	se 4:	ISEKI-Food association	163
	3.2	ID o	card	163
	3.3	Ext	ended summary	166
	3.3	8.1	Research results since the previous reporting	166
	3.4 repor	Actiting.	ions taken and data on the development of the case since th	e last 168
	. 3.4	.1	Actions taken since the previous report	168
	3.4	.2	Students' responses, learning and competence development	171
	3.4 dev	l.3 velop	Teachers' and other stakeholders' perceptions of the overall proc bing the case towards the Nextfood approach in education	ess of 185
	3.5	Cor	ncluding remarks on the case development	189
	3.5	5.1	On the case development since the previous reporting	189
	3.5	5.2	Reflections towards the end of the Nextfood project	192
4	Ca	se 5:	American Farm School / International Hellenic University	195
	4.2	ID o	card	195
	4.3	Ext	ended summary	198
	4.3	8.1	Research results since the previous reporting	198
	4.4 repor	Acti	ions taken and data on the development of the case since the	e last
	4.4	l 1	Actions taken since the previous report	200
	4.4	.2	Students' responses learning and competence development	202
	4.4 dev	I.3 Velon	Teachers' and other stakeholders' perceptions of the overall proc	ess of 210
	4 5	Cor	actuding remarks on the case development	218
	4.5	: 1	On the case development since the previous reporting	218
	4.5	. 2	Reflections towards the end of the Nextfood project	210
5	с. Са	,. <u> </u>	· Skoaforsk	224
0	5.2	ID c	card	224
	5.3	Fxt	ended summary	227
	5.3	8.1	Research results since the previous reporting	227
	5.4 repor	Acti	ions taken and data on the development of the case since the	e last
	.5.0	. 1	Actions taken since the previous report	232
	5.4	.2	Students' responses learning and competence development	235
	5.4	1.3	Teachers' perceptions of the overall process of developing the	200
	tov	vards	s the Nextfood approach in education	258



	5.5	Coi 274	ncluding remarks on the case development since the previous reporting
	5.5	5.1	On the case development since the previous reporting274
	5.5	5.2	Reflections towards the end of the Nextfood project278
	5.6	App	pendices (Skogforsk)
6	Ca	ase 7	: University of South Bohemia
	6.2	ID (	card
	6.3	Ext	ended summary
	6.3	3.1	Research results since the previous reporting
	6.4 repoi	Act ting.	ions taken and data on the development of the case since the last
	6.4	1.1	Actions taken since the previous report
	6.4	1.2	Students' responses, learning and competence development
	6.4 de	1.3 velop	Teachers' and other stakeholders' perceptions of the overall process of bing the case towards the Nextfood approach in education
	6.5	Co	ncluding remarks on the case development
	6.5	5.1	On the case development since the previous reporting297
	6.5	5.2	Reflections towards the end of the Nextfood project298
7	Ca	ise 8	: University of Gastronomic Science
	7.2	Cha	apter 1 ID card MAFS
	7.3	Ext	ended summary
	7.3	3.1	Research results since the previous reporting
	7.4 repoi	Act ting.	ions taken and data on the development of the case since the last
	7.4	1.1	Actions taken since the previous report
	7.4	1.2	Students' responses, learning and competence development
	7.4 de	1.3 velop	Teachers' and other stakeholders' perceptions of the overall process of bing the case towards the Nextfood approach in education
	7.5	Co 321	ncluding remarks on the case development since the previous reporting
	7.6	Cha	apter 2 ID card MOG
	7.7	Ext	ended summary
	7.7	7.1	Research results since the previous reporting
	7.8 repoi	Act ting.	ions taken and data on the development of the case since the last
	7.8	3.1	Actions taken since the previous report
	7.8	3.2	Students' responses, learning and competence development
	7.8 de	3.3 velop	Teachers' and other stakeholders' perceptions of the overall process of bing the case towards the Nextfood approach in education
	7.9	Coi 337	ncluding remarks on the case development since the previous reporting



	7.9	9.2	Reflections towards the end of the Nextfood project	.338
8	Ca	ase 9:	University of Calcutta and Welthungerhilfe, UoC and WHH	342
	8.2	ID c	card	
	8.3	Exte	ended summary	
	8.3	3.1	Research results since the previous reporting	344
	8.4 repor	Acti	ons taken and data on the development of the case since the	last 345
	8.4	1.1	Actions taken since the previous report	
	8.4	1.2	Students' responses, learning and competence development	346
	8.4 de	1.3 velop	Teachers' and other stakeholders' perceptions of the overall proce ing the case towards the Nextfood approach in education	ss of 354
	8.5	Cor	ncluding remarks on the case development	.357
	8.5	5.1	On the case development since the previous reporting	.357
	8.5	5.2	Reflections towards the end of the Nextfood project	358
9	Ca	ase 10	D: SEKEM Development Foundation	.361
	9.2	ID c	card	.361
	9.3	Exte	ended summary	.364
	9.3	3.1	Research results since the previous reporting	.364
	9.4 repor	Acti rting	ons taken and data on the development of the case since the	last 369
	9.4	1.1	Actions taken since the previous report	369
	9.4	1.2	Students' responses, learning and competence development	.373
	1.2 de	2 T velop	eachers' and other stakeholders' perceptions of the overall procesting the case towards the Nextfood approach in education	ss of 390
	9.5	Cor	cluding remarks on the case development	.396
	9.5	5.1	On the case development since the previous reporting	.396
	9.5	5.2	Reflections towards the end of the Nextfood project	.399
1(	) (	Case	11: CIHEAM Bari	.404
	10.2	IC	D card	.404
	10 be	.2.1 Iongii	The action learning activities included a total of 9 learners ng to the post-graduate students' category.	s, all 405
	10 Tu	.2.2 rkey.	Countries of origin: Egypt, Lebanon, Morocco, Serbia, Tunisia 405	and
	10	.2.3	Gender: Female – 8; Male – 1	.405
	10	.2.4	Age categories: 20-25: 6 students; 25-30: 3 students	.405
	10 stu	.2.5 Idies	Considering the background, 8 students are having an agricu background and 1 food technology	ltural 405
	10 stu	.2.6 Idies	Considering the background, 8 students are having an agricu background and 1 food technology	ltural 405
	10.3	E	xtended summary	407
	10	.3.1	Research results since the previous reporting	.407
		- Nia		0



10.4 Ac reporting	tions taken and data on the development of the case since the last
10.4.1	Actions taken since the previous report408
10.4.2	Students' responses, learning and competence development410
10.4.3 of develo	Teachers' and other stakeholders' perceptions of the overall process ping the case towards the Nextfood approach in education
10.5 Co	ncluding remarks on the case development431
10.5.1	On the case development since the previous reporting431
10.5.2	Reflections towards the end of the Nextfood project432
11 Case 1	2: University of Kerala435
11.2 ID	card435
11.3 Ex	tended summary437
11.3.1	Research results since the previous reporting437
11.4 Ac reporting	tions taken and data on the development of the case since the last
11.4.1	Actions taken since the previous report439
11.4.2	Students' responses, learning and competence development441
11.4.3 of develo	Teachers' and other stakeholders' perceptions of the overall process ping the case towards the Nextfood approach in education
11.5 Co 45	oncluding remarks on the case development since the previous reporting 7
11.5.2	4.2 Reflections towards the end of the Nextfood project458
12 Case 1	3: University of Chile
12.2 ID	card
12.3 Ex	tended summary472
12.3.1	Research results since the previous reporting472
12.4 Ac reporting	tions taken and data on the development of the case since the last
12.4.1	Actions taken since the previous report474
12.4.2	Students' responses, learning and competence development482
12.4.3 of develo	Teachers' and other stakeholders' perceptions of the overall process ping the case towards the Nextfood approach in education
12.5 Co	ncluding remarks on the case development500
12.5.1	On the case development since the previous reporting
12.5.2	Reflections towards the end of the Nextfood project504
13 Refere	nces507
14 Append	dices
Appendix 1: N	IMBU - Course Schedule510
Appendix 3: L	INIOR – Force Field Analysis511
Appendix 4: L	NIOR – Final Evaluation of the Product + SWOT Analysis512



Appendix 5: UNIOR - Evaluation Professional Skills
Appendix 6: AFS - Observation Log
Appendix 7: AFS - Reflection Log
Appendix 8: AFS – Interview Guide
Appendix 9: AFS – ALSs Participant Sociodemographic Characteristics
Appendix 10: AFS – Detailed information on the Learning Sets' Visits
Appendix 11: AFS – Tables with Force Field Analysis
Appendix 12: Skogforsk – Agenda – meeting 1-5539
Appendix 13: Skogforsk – Learn - contribute
Appendix 14: Skogforsk – Self-assessment of competences
Appendix 15: Skogforsk – Course Evaluation
Appendix 16: Skogforsk - Reflection documents - meeting 1-5 learners
Appendix 17: Skogforsk – Reflection documents – meeting 1-5 teachers
Appendix 18: Skogforsk – Reflection documents – final learners
Appendix 19: Skogforsk – Reflection documents – final teachers
Appendix 20: UNISG - The 1 <sup>st</sup> Workshop for planning MAFS558
Appendix 21: UNISG - Questionnaire
Appendix 21: Course Program Details
Appendix 22: Some outcomes from the final report and students presentations567
Appendix 23: Self-Assessment of Competences (from D2.1 Action Research Protocol) 
Appendix 24: Instructions for data analysis – Text_2.1 (Amendment to D2.1 Action Research Protocol)
Appendix 25: Instructions for data analysis – Numerical data (Amendment to D2.1 Action Research Protocol)



## Table of Figures

Figure 1: The Nextfood predefined coding tree	38
Figure 2: Chart of codes overlapping with 'observation'	63
Figure 3: Chart of codes overlapping with 'reflection'	71
Figure 4: Chart of codes overlapping with 'visionary thinking'	76
Figure 5: Chart of codes overlapping with 'participation'	80
Figure 6: Chart of codes overlapping with 'dialogue'	84
Figure 7: Chart of codes overlapping with 'systems thinking'	88
Figure 8: Chart of coding overlapping with 'facilitation'	91
Figure 9: Word cloud of students' reflection documents	131
Figures 10: Word trees of the words "teacher" and "facilitator" ("professor	" and
"facilitator")	133
Figure 11: Word tree of the verb "to observe" ("a observa")	135
Figure 12: Word tree of the verb "to understand" ("a intelege")	137
Figure 13: Word tree of the verb "to consider" ("a considera")	138
Figure 14: Word tree of the verb "to enjoy" (a se bucura).	138
Figure 15: Word tree of the verb "to succeed" (a reusi).	138
Figures 16: Word tree of the verb "to imagine"	140
Figure 17: Word tree of the word "group"	142
Figure 18: Word tree of the verb "to participate" (a participa)	142
Figure 19: Word tree of the verb "to get involved" (a se implica)	142
Figure 20: Word tree of the verb "to discuss" (a discuta)	144
Figure 21: Outcomes supporting and hindering forces, cycle 3 Reflection Worl	kshop
	168
Figure 22: NextFood Coding Tree	174
Figure 23: Hierarchical map: What are the guestions I would like this competit	ion to
help me find an answer? (4 initial questions) (n=12)	174
Figure 24: Hierarchical map: What are the competences I'd like to train and im	prove
significantly by participating in this competition? (4 initial questions) (n=12)	175
Figure 25: Hierarchical map: What are the knowledge and skills we need to su	upport
sustainable development in agrifood and forestry systems (4 initial questions) (	n=12)
	176
Figure 26: Hierarchical map to the question: What are the knowledge, skills	s and
attitudes (competences) we need to support sustainable development in agrifoo	d and
forestry systems? (5 final questions) (n=10)	176
Figure 27: Hierarchical map: What experiences and competences do I bring	to the
competition to make it a success (4 initial questions) (n=12)	177
Figure 28: Hierarchical map: Which of the experiences and competences that I br	ought
to the competition contributed the most to the learning community? (5 final ques	tions)
(n=10)	177
Figure 29: Hierarchical map: Which competences did I train/improve significan	tly by
participating in this competition? (5 final questions) (n=10)	178
Figure 30: Students' Self-Assessment of the 5 Core Competences Start and E	End of
competition	179
Figure 31: Age and gender of forest owners and forest officials	225
Figure 32: Learners' experiences as active forest owners - number of years	226
Figure 33: Learners educational background	226
Figure 34: Timeline - the Skogforsk case (meeting program in appendix 11)	234



Figure 35: Timeline and various types of data collected in the Skogforsk case......236 Figure 36: One of the facilitators introduces the core competences to the group of Figure 37: Learning how and what to observe. (Photo: Lotta Woxblom) ......249 Figure 38: Reflection sessions at the first (September 2021) and final meetings Figure 39: Dialogue about visions. (Photo: Lotta Woxblom)......250 Figure 40: Participants talk about how to best manage this forest stand. (Photo: Lotta Figure 41: Dialogue about learning at the last meeting. (Photo: Lotta Woxblom)....253 Figure 42: Dialogue about learning at the last meeting. (Photo: Lotta Woxblom)....254 Figure 43: Word cloud showing the learners evaluation of the course meetings.....256 Figure 44: Learner's evaluation of the course meetings on a scale from 1 to 10.....256 Figure 46: Learners understanding of the case study......257 Figure 48: Comparison of how each of the five course meetings were graded by Figure 49: Word cloud showing the evaluation made by the members of the Skogforsk Figure 50: Question from one participant - does anyone know what this is? Link to site with tool for identifying and reporting forest damage online - posted by one in the Figure 51: One of the participants posted a picture of a large pine tree. This picture Figure 52: Screen shot from Teams-meeting with NMBU-team, illustrates the Figure 53: The word cloud generated from the reflection documents submitted by the students. This cloud shows how the students wanted to learn different aspects and Figure 58: Hierarchical map compared by the number of coding references for the first Figure 59: Hierarchical map of 2nd part of final self-assessment questionnaire......415 Figure 62: Word cloud on question 1 ......417 Figure 66: First visit to the case studies fields (farmer left and agronomist right)....480 Figure 68: Third visi to the case study fields (farmer in the left and agronomis in the 



#### Table of tables

Table 1: Self-assessment of competences 2021	3
Table 2: Average scores of self-reported competence development among students	
(the scale used was 1 (Novice) - 9 (Expert). N=17)125	5
Table 3: Outcomes Planning Workshop Cycle 4168	3
Table 4: Students' Self-Assessment of the 5 Core Competences Start and End o	f
competition	)
Table 5: Average scores of self-reported competence development of the Learning	J
Sets' students. The scale used was 1 (Novice) - 9 (Expert). N=7203	3
Table 6: Learners' expectations at the beginning of the course and their reflections a	t
the end of the course	
Table 7: Learners' thoughts on their own contribution to the learning process at the	è
beginning of the course	)
Table 8: Average scores of self-reported competence development among participants	3
during a course cycle in the Skogforsk-case. The scale used was 1 (Novice) to S	)
(Expert) N=10	3
Table 9: Summary of how the learners formulated their understanding of the differen	t
core	7
Table 10: Average scores of self-reported competence development among teachers	3
during a course cycle in the Skogforsk-case. The scale used was 1 (Novice) to 9	)
(Expert) N=3259	)
Table 11: Teacher's expectations and thoughts about their own contributions at the	)
beginning of the course	)
Table 12: Average scores of 9 student's self-assessment - competences at the star	t
and end of the course. The scale used was 1 (Novice) $- 9$ (Expert). (n = 9)290	)
Table 13 Initial and final questions	ĺ
Table 14 Core-competences of the students, results of the 1-year Master Program	۱
"Master in Agroecology and Food Sovereignty"	2
Table 15: Core-competences of the students, results of 1 week course "Agroecology	/
and Food Sovereignty" - MOG	ĺ
Table 16: Average scores of self-evaluated competence development among	J
students. The scale used was 1 (Beginer) - 10 (Efficient). N=14350	)
Table 17: Results of self-assessments, SEKEM, Biodynamic course	ĺ
Table 18: Results of self-assessment, SEKEM, Entrepreneurship course	2
Table 19: t-test core competences	3
Table 20: Question 1419	)
Table 21: question 2419	)
Table 22: question 3419	)
Table 23: Question 4419	)





## **Executive summary**

In this document, we report on the activities and outcomes in 12 Nextfood cases. The cases have reported these outcomes according to a revised template provided by the WP2 team at NMBU. The template covers both the descriptive elements of each case, and the reporting of the case development process and case research in the final cycle of the Nextfood project. A section was added to include the cases' reflections on case development during the whole project period. The filled templates, i.e. the individual case development reports from the cases, form the basis of this document.

#### Research results since previous reporting

The following summary is based on the cases' own summaries of their research results. For more detail on the results, see each case's individual Case Development Report below.

#### Case 1: Norwegian University of Life Sciences (NMBU)

The NMBU case revolves around a full semester course which is the main course in the Master of Science in Agroecology. The course reported on lasts for five months and is called "Agroecology: Action Learning in Farming and Food Systems". In the last cycle, the students developed as autonomous learners, became more aware of their own competences, and gained a more holistic view on their own learning and role as agroecologists. Training of the core competences, and reflection on experience in particular led students to new understanding and feeling empowered to create change. The students developed in all five core competences, and in facilitation and systems thinking. This development was closely linked to the students' participation in real-life casework and groupwork, where they had the opportunity to practice these competences.

Observation was practiced in class and in casework, and linked to the training of participation, systems thinking and reflection. The practice of reflection came through as helpful for personal and group development, while a visionary thinking exercise was an "eye-opener" and inspired the students. Participation in group- and casework helped to build the other core competences, and both participation and dialogue required personal commitment. Systems thinking was also developed through casework, where students faced complex real-life situations. Moreover, systems thinking was beneficial to the students' personal development and to groupwork. The students' facilitation competence was developed during the course, most importantly when students organized a visioning workshop, like the one they had practiced in class, with stakeholders in food system cases. It appeared that the development of each competence was intertwined with one another.

The teachers and facilitators had an overall positive experience in facilitating action learning for the students. New measures implemented in the course were casework



group facilitators, individual meetings between teachers and students, weekly teacher reflection sessions, and running farm and food casework sequentially. The individual meetings and weekly teacher reflections were in general considered positive add-ons to the course, while group facilitators and running farm and food casework sequentially posed some challenges and should be discussed further.

The agroecology course at NMBU is continuously revised and improved through teacher reflections and following suggestions for change. As such, the course is in progress towards making the two overarching and six essential shifts to implement the Nextfood model. While NMBU is already well experienced with action learning and its implications, the team still faces some challenges and continues the work of building on the supporting forces and reduce the hindering forces for making the shifts.

#### Case 2: University of Oradea (UNIOR)

The UNIOR course on food innovation involves students from both university and high school. The course reported on lasts for ten months and is called "Students and farmers taking food innovations from idea to market". In the last cycle, the findings showed that students were positive to visioning exercises and using their imagination. All the students who were exposed to the new approach and learning environment improved their skills and competences. The teachers learnt how to organize reflection sessions and support students in writing reflection documents. Moreover, they managed to create a safe learning environment for innovation and reflection to happen amongst the students. Their stakeholders were at first not convinced about the use of reflection documents and sessions, but later understood the value of it when they were planning the next cycle together with the teachers. They also reported that the stakeholders learnt to collaborate with high school and university students. Besides, they improved their relationships with stakeholders through cooperation, as stakeholders met students who they could later employ, and stakeholders got the chance to develop pedagogical skills and skills related to the action learning approach

UNIOR maintained the same number of meetings and field trips, and content of theoretical courses, but changed their methods and tools of teaching and learning to enable training of the five core competences. The Nextfood project apparently helped high-school students to choose direction for their future career. Some students started the course as high school students and ended it as university students, indicating that the initial introduction to the approach at high school level inspired them to continue with that approach to education.

For UNIOR, the supporting forces outscored the hindering forces and concluded that they made progress in all the essential shifts. The involvement of teachers and the change from being teachers to being facilitators was challenging. Moreover, the Covid-19 pandemic posed challenges.



Furthermore, UNIOR reported that two new courses were established with the purpose to further bring on the activities and experiences related to the five core competences. The dissemination of their course to partner universities had led to a new collaborative project of action learning. Moreover, the inclusion of young colleagues as facilitators or project team members had potential to help spread the action learning approach.

#### Case 4: ISEKI-Food Association

The ISEKI case reported on the student competition "FoodFactory-4-Us", which is an international student competition for teams of master students that lasts for four months. In the last cycle, the students referred to more skills in the end of their module in comparison to the beginning. The students gained more experience in problem solving, creativity, innovation, communication, and collaboration through teamwork. They also increased their confidence and level of proficiency in the core competences.

Regarding supporting and hindering forces, the support and interest the mentors had in the students was a supporting force when present, and a challenge when missing. When invited experts interacted with the students in addition to presenting their topics and showed interest in the Nextfood approach and core competences, it was a supporting force. It was a challenge when some students had poor internet connection which would reduce the opportunity for using online tools.

#### Case 5: American Farm School (AFS)/International Hellenic University (IHU)

The AFS/IHU Nextfood based their case in the last cycle on the implementation of Action Learning Sets (ALS), an action learning methodology they applied, for selected students in their final year of the undergraduate programs "Food Science and Technology" and "Agricultural Technology". The ALS module lasted for six months. The module helped students to engage in pursuing their learning goals. They saw a positive increase in all competences in the self-assessment. However, they noted that more time was needed for further competence maturity in the students. The student involvement improved in most cases. AFS reported that the ALS methodology was appropriate for implementing the shifts. All participants saw how important it was to engage in multi-stakeholder communication, and they received positive feedback by all stakeholders.

A general supporting force was the willingness and motivation by all participants who wanted to continue engaging in multi-stakeholder settings. Moreover, the learners' development acted as a supporting force. The lack of an institutional vision and financial resources to support the shift to action learning was seen as a challenge. Poor research skills of students could potentially be another challenge. Furthermore, the stakeholders' limited knowledge and understanding of sustainability issues could be seen as a hindering force. Similarly, professors' limited understanding of competence-based teaching and learning could be hindering progress in the shifts. Another challenge was the dominant hierarchies that placed students in a passive learner role.



#### Case 6: SKOGFORSK

The Skogforsk vocational course for forestry professionals is aimed at creating a higher understanding about logging techniques, strategies, and methods to enhance biodiversity in production forests. The module span over five months, with one meeting each month. In the last cycle, learners gained insight into the use of competences and saw how they could be useful to situations in daily life and to reach their goals. They became open to new thoughts and appreciated field visits and gaining different perspectives of forestry. Moreover, a sense of a learning community was created, and the learners were inspired to consider new ideas for forestry. All in all, it seemed that the learners were satisfied with the course meetings. Learners saw the course as different from traditional courses and learning as a time-demanding process.

Furthermore, Skogforsk depicted how the teachers in their case learned more about their learners, i.e. the forest owners' thoughts and goals, and how they as teachers and experts could create an arena for dialogue and motivation among the learners. The teachers' self-assessment showed progress in the competences of observation, visioning, and dialogue. Teachers gave the meetings higher scores than the learners did.

The learners, i.e., forest owners, also acted as hosts of visits for the whole group of learners, and they appreciated to visit each other's forest sites, gaining new perspectives. Moreover, they used a digital communication platform for sharing that helped dialogue and knowledge transfer, and to remind the learners about the course in between the monthly meetings. Several qualities such as a welcoming attitude and curiosity were essential to create an atmosphere for co- and peer-learning. The teaching team's interest in their learners helped create such an atmosphere where everyone felt safe to contribute. In addition, it was noted that the diversity of people in the group contributed to peer learning. Experts and researchers from Skogforsk complemented each other in terms of knowledge, competences, and experiences, and were used to act as facilitators from before. Important factors to succeed as a facilitator was to build trust, hear everyone, include the quieter participants, and use understandable language. Addressing core competences regularly but not so explicitly worked well.

As traditional learning was the norm, it required that teachers explained the value of the approach and motivated the learners. This was a challenge in the limited time they had with their learners. Skogforsk also questioned how to motivate learners to train the competences, as their learners seemed more interested in knowledge and exchange of experiences than practicing skills and competences. Another challenge was to create an open climate in a group of people with diverse perspectives. Moreover, it was a challenge to see all the individuals, making sure everyone was heard.



The use of digital tools for communication required that all participants had access and could participate in using them, which was a potential challenge. Another challenge was to have the participants commit to written assignments at home. They tried to solve this by including the written assignments during the physical meetings instead and reduce the amount of work the participants had to do at home. Furthermore, they saw the process for preparation of activities and motivating learners as time and energy demanding and could thus be a challenge with limited resources.

#### Case 7: University of South Bohemia (USB)

USB reported on the first part of the course "Development of sustainable farming systems". In the last cycle, the students learned to understand the competences better. Both students and stakeholders appreciated the approach, despite the time it took them to adapt. Teachers and stakeholders mentioned that adaptation of the Nextfood approach became easier each time they repeated the process. The multi-actor approach was positive for communication and enriched the course content.

The shift to co- and peer learning included accepting the new role of teachers and stakeholders as facilitators. The hierarchical structure of institutions in the Czech Republic affected the communication competences of students and some stakeholders and thus posed challenges. Moreover, insufficient training of communication skills, lack of institutional support, technical issues, logistical challenges with on-farm projects, the additional workload and time demand for facilitators and experts with an untraditional course on side of facilitators, and the work with coordination of external stakeholders were challenging.

#### Case 8: University of Gastronomic Sciences (UNISG)

The UNISG case reported on a newly initiated master's program in Agroecology, "Master in Agroecology and Food Sovereignty" lasting for 12 months, and a one-week course called "Agroecology and Sustainable Agriculture" which is part of a master's in Gastronomy. The students in the newly established master's course got experience with action learning and competence development, combining theory and practice. The course was successful in preparing agroecologists who could act as facilitators of change. They experienced a good collaboration between students, teachers, and stakeholders, and the students were excited by the diversity of course activities. Some students found new ideas for their future career. For the one-week course, real-life experiential learning was more efficient than using the online format in demonstrating different rural realities. The students appreciated the course facilitation of the professors.

Shifting to a diversity of learning arenas, for the master's course, a supporting force was the provision of university facilities and relationships with stakeholders. For their one-week course, the use of physical action learning was a main supporting force. For



both courses, possible restrictions due to Covid-19 was a potential hindering force. Shifting to co- and peer learning, for the master's course, a supporting force was the close contact and co-designing with guest professors. A hindering force was interpersonal issues between students. For the one-week course, the students' interest in the course and the presence of two facilitators with appropriate skills acted as supporting forces, while the short time span of the course was a hindering force.

Shifting to diversity of learning sources, for the master's course, a supporting force regarding this shift was the access of different learning sources, while hindering forces was the selection of sources and finding balance between them and the learning objectives of the course. For the one-week course, previous experience through past cycles was a main supporting force, and no hindering forces were identified. Shifting to a diversity of teaching aids, for the master's course, the availability of teaching aids was a supporting force. A hindering force was the selection of teaching aids and finding a balance between those and the learning objectives of course. For the one-week course, previous experience through past cycles was a main supporting force, and no hindering objectives of course. For the one-week course, previous experience through past cycles was a main supporting force, and no hindering forces were identified.

Shifting to diversity of assessment methods, for the master's course, a supporting force was that the different assignments for assessments were part of the co-design process with professors. The students' (lack of) willingness for different assessment methods within the same discipline was seen as a challenge. For the one-week course, again the previous experience through past cycles was a main supporting force, and no hindering forces were identified. Shifting to learning facilitator, for the master's course, having a staff that was ready and willing for the approach as a supporting force, while the lack of facilitation skills was a hindering force. For the one-week course, the availability of two facilitators was a supporting force, while lack of time and full schedules of the professors were seen as potential hindering forces.

#### Case 9: University of Calcutta (UoC)

The University of Calcutta (UoC) reported on a newly established one-month online certificate course for Food Entrepreneurs for bachelor's degree holders. The students were exposed to new ideas that helped them shape their future business ideas. Moreover, the students learned about building core competences, which could be important to their future business endeavours. The response to the new module was positive, and the learners were eager to learn new things such as visioning. A main obstacle was to have the course online, something which hindered peer learning and experiencing real-life cases. It came through as important to plan the course well, to set aside enough time to train the competences.

#### Case 10: SEKEM

The SEKEM case reported on the practice-oriented "Biodynamic Agriculture Course" for undergraduate students, and a novel "Entrepreneurship Program" for persons involving in start-ups related to agriculture. In the last cycle, the experiential learning



was new to the students, and a supporting learning community was developed. The students enhanced their knowledge background about agriculture and the projects they involved in and became better prepared to establish their own projects in the agricultural field. The entrepreneurship program provided opportunities for the participants to develop their start-ups' visions and plans. By the end of the course, they had five start-ups in the incubation face, with the participants developing their ideas.

The approach was new to the teaching staff, but they were enthusiastic about it and learned to adapt. The students' feedback and reflection were valuable for the teachers. Stakeholder cooperation was good, and the stakeholders understood the value of the practical training. The teaching methods allowed students to engage more in farming activities through observation and practice.

The learners' development acted as a supporting force to the implementation of the approach. Moreover, a supporting force was the opportunity SEKEM had for the students to spend two weeks on a farm belonging to the institution. With this, they had a real-life case study easily available. Challenges were pertaining to the planning and organization of the course activities. A concrete example was the extra administrative work needed to compensate for lectures lost and time spent when students went on a two-week long field visit. Another challenge was the big number of students, which had increased compared to previous years.

Other challenges with applying the Nextfood approach was that students were not familiar with such type of education. It was also difficult for some of the teachers and instructors to apply the approach and develop as facilitators. Some of the participants in the Entrepreneurship Program had traditional business ideas and were not open and flexible to adopt innovative ideas. The Covid-19 pandemic and following measures was another challenge.

#### Case 11: CIHEAM

The CIHEAM case reported on the six-month course "Mediterranean Organic Agriculture". In the last cycle, the educational approach was new to the students, and they went from confusion in the beginning to later embracing the competences. The students' level of interaction with stakeholders increased during the course, and it was inspiring that they seemed happy with this interaction. The teachers improved the ability to facilitate experiential learning, and the stakeholders valued the opportunity to meet students and get positive energy and new ideas into their projects. Working with action learning online was challenging, however it was useful to learn about how to adapt the approach to an online setting.

Case 12: University of Kerala (UoK)



The UoK case reported on their one-month "Certificate Course on Agroecology: Action Research and Education", which provide post-graduate students an opportunity to practice the Nextfood model through action learning and training in the core competences. In the last cycle, students achieved learning goals such as enhanced knowledge, competences, experience in interdisciplinary research methods, and gained awareness of agroecology and sustainability issues. The initial questions asked to students at the beginning of the course helped them to think about their own competences, hence becoming more aware about their competence level. It appeared that peer learning helped to develop the co-creation of knowledge, creativity, and action research knowledge. UoK described that a transformation took place in the students through reflection on relevant topics. The students' self-assessment showed an increase in all competences which was also reflected in their learner documents.

The teachers went through the iterative process of experiential learning and gained the skill of facilitation. This helped redefining the learning space and completing educational activities. The reflection documents seemed to help improving the quality of educational activities. The stakeholders, i.e., farmers, guided students in field participation, and this enabled forming relationships between farmers and students. The farmers provided students with practical knowledge of farming. Both students and farmers found it an inspiring and useful experience.

UoK progressed towards the shifts by refining the curriculum of their course, and through thorough planning and sharing of responsibility among teachers, mentors, and farmers. As the students improved in all competences, the efforts to make the shifts were effective. Furthermore, preparing documents for stakeholders and reflective learner documents helped students reflect and get insights into the Nextfood approach.

Shifting to a diversity of learning arenas, the received support from the university administration, and open-mindedness and ability to joint decision-making were supporting forces, while Covid-19 restrictions and hostile climate were hindering forces. Shifting to co- and peer learning, the guidance by mentors and the diversity of students were supporting forces, while group conflict and drop-out of a student were hindering forces.

Shifting to a diversity of learning sources, the adaptive capacity of learners was a supporting force, while differences in academic background and knowledge level was a hindering force. Shifting to diversity of teaching aids, the technical know-how of teachers was a supporting force, while time and resource constraints were identified as hindering forces.

Shifting to a diversity of assessment methods, the originality of reflection documents which made the assessment meaningful was a supporting force, and the lack of criteria to assess these was a hindering force. Shifting to learning facilitator, teamwork was a



supporting force, while lack of acceptance for the new role of teachers among colleagues was a hindering force.

#### Case 13: University of Chile (UCH)

UCH joined as a new case in the Nextfood project in May 2021, and here report on the implementation of the pilot course "Linking agroecology with society" which lasted for four months. In the course, the students came to recognize and value diverse types of knowledge, and they used "dialogue of knowledge as a tool to understand the reality of the field" (UCH\_CDR\_2022). They realized the importance of developing context-specific knowledge, by using the skills of observation, dialogue, and participation. Furthermore, they saw reflection as a process to link experience with theory. The students became more engaged when writing case study reports, as they saw an opportunity and responsibility in giving relevant recommendations to stakeholders. Students were interested in the approach, but more importantly they were enthusiastic about the opportunity to interact with stakeholders in real-life situations.

For UCH, the Nextfood Toolbox was useful in the process of moving towards the new educational approach. Both the teaching team and students were motivated for implementing the new approach, and they in general experienced an inspirational learning environment. It was easy to get stakeholders participating in the course.

Hindering forces were the limited time and allocated resources from the institution, and the universities' focus on research before teaching that made it a challenge to gain accept for the novel approach. Besides, challenges were related to the loneliness of academic work, and the mindset of students and teachers resisting new approaches to education.



## 1 Case 1: Norwegian University of life sciences, NMBU

Authors: Kristiane Brudevoll, Marie Henriksen Bogstad, Lutgart Lenaerts, Anna Marie Nicolaysen, Geir Hofgaard Lieblein, and Vebjørn Egner Stafseng

Contributors: Tor Arvid Breland and Åsmund Steiro

### 1.2 ID card

#### Course title, level and language

Agroecology: Action learning in farming and food systems (PAE302)

Level: Master's course

Language: English

#### **Course learning goals**

These are the course's five learning goals:

- 1. Have knowledge of farming and food systems
- 2. Can handle complexity and change
- 3. Can link theory to real-life situations
- 4. Are good communicators and facilitators
- 5. Are autonomous learners.

In order to reach these goals, the development of five core competences is considered vital:

- 1. **Observation** is the competence of carefully examining situations in the "world out there" with which you are confronted before you make any judgements about the situation. This has the intention of an unbiased examination.
- 2. **Reflection** is a process of exploring and examining ourselves, our perspectives, attributes, experiences and actions and interactions. It helps us gain insight and see how to move forward. It increases our ability to link our own experiences to theory and to personal development.
- 3. **Participation** is the competence of participating in work in the field, not as a distant observer, but rather with personal commitment and dedication in interaction with different stakeholders.
- 4. **Dialogue** is a process which helps us notice the nature of our thinking. Dialogue increases our capacity to move into and toward difficult issues in a welcoming fashion. It expands our capacity to listen and to become aware of the piece of the mosaic that might be missing from our own and the collective understanding.



5. **Visionary thinking** is the process whereby we activate our insight and imagination, connect with our values and sense of purpose and create mental images of a desired future state. Being able to engage a group in creating a shared vision can heighten the possibility for breakthrough solutions and unite and provide the link between diverse people, interests, and activities.

These five core competences and five learning goals guide the course's teaching activities during the semester. The students are further encouraged to continuously reflect on them, but to also recognize and develop their own learning goals.

#### Host institution(s) and course leader(s)

Norwegian University of Life Sciences (NMBU)

#### Course leaders and contributors (per 2021) are:

Geir Lieblein

Tor Arvid Breland

Anna Marie Nicolaysen

#### Facilitators/contributors:

Vebjørn Egner Stafseng Åsmund Steiro Kristiane Brudevoll Marie Henriksen Bogstad

#### Nextfood researchers:

Kristiane Brudevoll Lutgart Lenaerts Marie Henriksen Bogstad

#### Timeline of the activities covered in this report

The PAE302 course started in mid-August and finished in mid-December 2021. Please have a look at appendix 1 for a copy of the course schedule.



#### Learner categories and number per category (demographics)

Male: 5

Female: 16

Total: 21

Consented to participate in Nextfood: 17

Age	Number
18-24	7
25-30	6
31-35	5
36+	1

Nationality	Number
North America	3
Europe	16
Asia	2

Study background	Number
Environmental/development studies	8
Agriculture/biophysics	8
Food/gastronomic science	3
Landscape architecture	1
Business	1

Single degree: 7

Double degree: 14

#### Stakeholder categories and type of involvement

#### Farm system casework (August 23rd – October 1st)

4 male farmers on 4 organic dairy farms in the region surrounding the University. All farms were family farms.

The farmers welcomed the students to their farms on three occasions during the semester.

The aim of the casework was for the students to explore the current reality (what is there), develop a desired future vision (what can be), and finally suggest a plan of action (how to get there). The students worked in groups of 4-5.



The course leaders recruited the farmers before the start of the semester and informed them of the project, but the students were themselves responsible for planning how they spent their time during the visits –according to the casework manual provided by the teachers.

#### Food system casework (October 11th – November 26th)

The Agroecology team at NMBU established a collaboration with an NGO working with sustainable food systems. This NGO runs a project for sustainable high school canteens, and as a part of this they have established a pilot project testing out free school meals. The NGO collaborates with the regional governmental office and through the collaboration with the University, the NGO and the regional government, the Agroecology students worked in groups on four high schools to explore the sustainability of their canteens in relation to the free school meal-pilot.

As for the farm system casework the students worked in groups of 4-5 to explore the current reality of a chosen food system, with the aim of developing a shared vision and an action plan for how to get there. The students visited the high schools three times during a period of approximately six weeks. The case groups were to work with two main questions: 1) Food provision: How can high school canteens in the county increase the share of organic, healthy, and local food in a sustainable way? 2) Learning arenas: How can these canteens be developed as arenas for learning?

#### The main stakeholders were:

4 NGO representatives (one per school and student group)

1 regional governmental manager (working with the project coordination)

Canteen workers and chefs at the respective schools

High school principles

Other administrative staff at the high schools

The students were themselves responsible for establishing contact with other potentially relevant stakeholders at the schools, for example, social workers, student representatives, local farmers, etc.

#### Shortlist of learning arenas

Farm casework:

- Organic dairy farms
  - o Farmer/stakeholder interviews
  - Observation walks
  - Farm work



#### Food system casework:

- High school canteens
  - Stakeholder interviews
  - $\circ$  Participation in activities
  - $\circ$   $\;$  Local farms in the food system surrounding the school
- Visioning workshop

#### Other:

- Classroom topical lectures
- Farm visit to nearby organic farm
- Online Agroecology forum
- Lessons with guest/external lecturers
- Reflection sessions (student- and teacher-led)
- Group work (student-led and facilitated)
- Individual meetings with core teachers
- Presentations in class
- Literature seminars
- Observation walks
- Session on visionary thinking
- Session on dialogue



### 1.3 Extended summary

#### 1.3.1 Research results since the previous reporting

#### 1.3.1.1 Students', teachers' and other stakeholders' experiences and learning

The students' personal learning goals aligned well with the pre-defined learning goals of the course. They did not change much throughout the semester, but towards the end they came through as slightly more focused on the knowledge about how to understand and act upon farming and food systems, rather than simply on the knowledge about the systems per se. Reflection appeared as important to reach the goal of becoming autonomous learners, as it helped students to become aware of their own learning process.

The students' view on competences needed for sustainable development were similar at the beginning and end of the semester, however, competences for communication and collaboration appeared as most important at the beginning, while competences for how to learn seemed more important at the end. Knowledge of a larger diversity of topics and of systems appeared more important at the end.

From the beginning to the end, the students' view on what competences they had to contribute with in the course had changed. While experience and knowledge of farming and food systems were put forth in the beginning, skills in communication and collaboration turned out to be more useful. The results indicated that students became more aware of their own competences and contributions. It appeared that the students developed skills in communication, facilitation and collaboration were developed, and group work appeared as an arena for this.

The results show that students went through transformative learning of some degree during the course. The training of the core competences had led to new levels of understanding and realizations and could thus be said to hold transformative power. Reflecting on experience helped students to transform experiences into knowledge, and furthermore, course experiences led students to feeling empowered to create change.

Regarding competence development, students' self-assessments showed a significant increase in all competences. The development of observation was linked to the training of participation, systems thinking and reflection. Real-life casework provided students with situations to practice observation in and doing an observation exercise (the transect/observation walk) was useful to prepare for using observation in case visits.

Writing the reflective journal and reflection document came through as essential, and structured reflection activities and assignments in class were in general helpful to develop reflection as a competence. Group work was an important arena for



developing this competence, and reflection helped both personal and group development. Furthermore, reflection helped develop systems thinking and understanding of situations.

Visionary thinking was a novel and interesting competence to students, and for some it became useful to their personal life. The visionary thinking exercise in class was an eye-opener as it stimulated creativity and inspiration to create change in the students. The students gained further experience with visionary thinking in their casework, and as such developing this competence was related to participation. Visionary thinking was also related to facilitation, reflection, systems thinking, and dialogue.

Participation as a competence was built during the students' casework in farming and food systems, which included systems inquiry of the given cases. As such, participation related to the development of systems thinking. Moreover, it appeared that participation in real-life cases helped students build the other core competences, and this intertwinement contributed to their learning process.

The dialogue competence was also developed mainly in relation to the students' casework, as students communicated with their peers in their case groups and with stakeholders on case visits. Practicing dialogue was challenging and required personal commitment. The introduction of dialogue as a competence in class helped students understand the usefulness of dialogue, also as an alternative to discussion and debate. The students' development of dialogue was clearly related to participation, but also to systems thinking and reflection.

Students developed systems thinking skills as they visited cases and were faced with complex real-life situations, and as such relates to the competence of participation. It was helpful for the students that they had the chance to visit the cases several times, and that they got to go through a systems inquiry first in a farming system and then in a food system. The application of soft systems methodology and tools such as rich picturing supported students' ability to deal with "the challenge of the whole". The students also saw the benefit of systems thinking to work with personal development and groupwork, seeing themselves and the groups as complex wholes. Reflection and observation were closely linked to systems thinking, in how they helped develop a holistic view of a situation or system.

For the students' development of facilitation as a competence, the visioning workshop in the food systems casework appeared as the most important contributor. Also, when acting as facilitators in this workshop with stakeholders, the students realised the usefulness of the methods practiced in class, such as for dialogue and visionary thinking, as they saw how it worked with others. Facilitation required personal commitment from the students, and reflection and self-awareness when dealing with complex situations.



Teachers were inspired by seeing how the students involved actively in the learning activities. Moreover, they found it interesting to observing students' development throughout the semester and were impressed by the changes observed. This inspired the teachers to continue working with the Nextfood approach. While seeing the benefits and functionality of the approach, teachers also saw challenges. One challenge was how to deal with the reluctance of some students to engage in the novel approach to learning. Another was how to ensure good collaboration with external stakeholders, as they most often have busy schedules and are unfamiliar with action learning. As such, these two challenges represent the more general challenge of how to communicate the teaching philosophy behind the Nextfood approach, both to students and external stakeholders.

Weekly teacher reflections enabled the team to share experiences and develop a shared understanding of the course. These sessions also allowed for the growth of new ideas on how to develop the course further. Furthermore, the teachers appreciated to have individual meetings with students, as it gave them better insight in the students' learning and development.

## 1.3.1.2 Outcome of the case development process, including effects of making the essential shifts

The agroecology course has since its very beginning revolved around real-life cases as a basis for the students' learning activities. This year, most students were open to the action learning approach and trying out methods and arenas for learning that were new to them. Compared to 2020, the agroecology course was more 'back to normal' in 2021. Four major interventions were done in the course in the fall of 2021:

- Each student group got an assigned facilitator (an alumni of the course) for their casework
- Core teachers had individual meetings with students three times during the semester
- Teachers, facilitators, and researchers had weekly reflection sessions about the course
- The farm and food casework projects were organized sequentially instead of running them in parallel

The introduction of casework group facilitators gave the teaching team more insight into the student groups' process and progress in their projects, but it was also questioned whether the presence of the facilitators benefitted the students' learning. The monthly individual meetings with between teachers and students allowed the teachers to come closer to the students and follow their learning and development as agroecologists. Having weekly teacher reflections was also a positive add-on for the case development, as it allowed the teaching team to develop shared understanding of the course. The sequential organization of farm and food casework allowed students more focused work. However, this also posed challenges regarding when to introduce tools, concepts, and competences.



#### 1.3.1.3 Supporting and hindering forces for implementing the Nextfood model

Regarding the shift to a diversity of learning arenas, case visits on farms and in food systems supported the teaching. Moreover, the students' appreciation of these trips and interactive classroom sessions supported this shift. A challenge for this shift was when and where to introduce theory in the schedule, and another to find relevant stakeholders who were ready for the approach.

The shift to co- and peer learning was supported by the notion that students expressed appreciation of the learning community. They also appreciated the tools they got to work on group dynamics. A challenge was the difference in students' participation, commitment, and energy for the tasks given. Moreover, it was challenging when some students dominated more than others, or a student group struggled to find a good group dynamic. This was related to the challenge when students faced conflicts in their group work, and the teachers were unsure of how to best facilitate conflict management.

The shift to a diversity of learning sources was supported by the students' creative use of technology for feedback in class, and moreover, students' feedback helped improving the literature seminars throughout the semester. However, it was also a challenge to make students understand how to conduct literature seminars. Another challenge was what learning sources to provide for the students to support them in group work.

A challenge for the shift to a diversity of teaching aids was the confusion around the use of a digital platform for learning. No supporting forces were detected, however, the teachers noted that it was important to consider what teaching aids were most beneficial to work with a given topic. Moreover, the timing of introducing teaching aids was important to attract the students' attention.

The shift to a diversity of assessment methods was challenged by the students' lack of abilities to give peer feedback, and teachers noted this was something to work on. It was questioned by the teachers whether the current assessment strategy of the course was optimal, or if there were other ways that would take up less of teachers' time and still be beneficial to the students learning.

Supporting forces for the shift to learning facilitator, were the introduction of weekly teacher reflection sessions and monthly individual meetings with students. Moreover, the student presentations of casework in class gave teachers the opportunity to facilitate and guide students in their process. Having casework group facilitators gave the teaching team more insight in the student groups and their process. Challenges for this shift were pertaining to the facilitate the students in their casework. Another challenge was to find a balance between giving the students freedom in their own learning process and making them use the tools presented in the course.



## 1.4 Actions taken and data on the development of the case since the last reporting

#### 1.4.1 Actions taken since the previous report

#### 1.4.1.1 Planning

After the third cycle the NMBU team conducted a reflection workshop with an external facilitator in March 2021. The outcomes from this workshop formed the basis for the planning of the next cycle (fourth cycle of Nextfood), and a planning workshop was hosted internally in the team in August 2021.

What came out of the reflection workshop is summarized in bullet points below:

- Students' expectations and learning goals vs. ours: (How to) facilitate enthusiasm about our learning goals?
- To «practice what we preach»
- Better time management (less ad hoc activities)
- Improve group dynamics in the team
- How to address Covid-related challenges?
- More communication with the students (feedback)
- How to structure the students' casework projects (farm and food system inquiries)?

The team addressed these issues and collaboratively came up with the following action steps, to improve the course for the next cycle:

#### Action steps:

• To host individual meetings between students and core teachers.

To answer to the identified need for more communication with the students, support and guidance, the team decided to arrange monthly one-on-one individual meetings with students. The aim of these 30-minute meetings was to prompt the students to reflect on what they wish to get out of the master program, but with an open agenda, and to build trust between the teachers and the students. These meetings were not for data collection, due to their trust-building function.

- To provide the student casework groups with each their own facilitator (not from the core teaching team) to follow up the casework process and support the students in their groupwork. Hold 1 hour long weekly meetings.
- To formalize and regularize teacher reflection by arranging weekly, 1 hourlong reflection sessions to reflect upon and debrief last week's course activities. Minutes will be a part of data collection for Nextfood.
- To improve time management by pre-scheduling meetings (e.g., reflection sessions) and work to reduce ad hoc activities.
- To re-structure the students' casework projects by reverting to an 'old' model of running the projects sequentially rather than parallel. The students would



first work with farm systems, conducting three visits and producing a stakeholder document, before they start working with their food systems case.

With regards to covid-related challenges and online learning, this cycle, the activities at NMBU have almost been back to normal. However, the team have still had to make slight adjustments to restrictions and hybrid learning. Normally, the students in the NMBU course visit a biodynamic farm at the beginning of the course, which includes a week of farm work and introduction to the approach and the core competences, in addition to social activities and informal interactions with both peers and teachers. During both the third and the fourth cycle, this has not been a possibility due to covid-restrictions, unfortunately.

To support the follow-up of the action steps, the responsibility was distributed between the core teaching team, the Nextfood researchers and the course contributors.

#### 1.4.1.2 Implementation

The course at NMBU has been running for several years and thus the schedule, content and process is somewhat static in many regards. Of course, there are always adaptations to accommodate, but the core of the course remains year-by-year, which makes the implementation of the activities to some extent habitual for the core teachers. Notwithstanding, the course is in continuous development, and as mentioned above, this cycle, the course focused on four main 'interventions':

- Facilitators per student group in the casework
- Individual, monthly meetings between teacher and student
- Regularized teacher reflections
- Sequential casework structure

With regards to the students' facilitators, four members of the NMBU team –who have previously taken the Agroecology course– were assigned the role of facilitator for a student group in the farm casework and a different student group in the food casework. The facilitators had weekly meetings with their student groups and participated in classroom activities related to the casework. The aim and purpose of the facilitators was to guide the students in the process of conducting systemic inquiries and to provide feedback when needed. Some of the meetings and facilitated work in the classroom were added to the schedule from the start, and some were added upon students' request. The facilitators tried to develop instructions for how to interact with their groups and kept in regular contact with each other to share experiences and reflections.

The individual meetings between students and core teachers were added to the schedule to ensure consistency. With a few exceptions the meetings were held as planned.



As mentioned above, the teacher reflection sessions were pre-planned and added to the team's calendar after the planning workshop. These sessions were also, with few exceptions, held according to schedule.

To accommodate the shift from classroom to a diversity of learning arenas the students at NMBU partake in two real-life, participatory casework projects during the semester - one in a farm and one in a food case. This year the students started with the farm casework, where four organic dairy farms had been recruited to participate as project cases. The students followed a casework manual, developed by the course leaders, to conduct a systemic inquiry - to find out "what is there", create a vision for the future ("what can be") and action plan for the case at hand ("how to get there"). On the farms neither teacher nor facilitators are present, and the students are themselves responsible for completing the necessary tasks related to the developed casework manual (for an example of such a manual, please visit the Nextfood Toolbox on www.nextfood-project.eu). The only planning done by the course leaders is the initial contact with the farmers/stakeholders and scheduling dates for three case visits. In the food case, the process is slightly different, as the cases are bigger, and thus more follow-up is needed by the course leaders. This year the food cases were four Norwegian high schools, who are all a part of a pilot project for free school meals as a part of the county's effort to improve the sustainability of the school canteens. For the students the process was much the same as for the farm case, but with increasing complexity and more stakeholders.

Additionally, we accommodated the remaining shifts accordingly:

#### From lecture hall to a diversity of learning arenas

The students conducted two casework projects, in addition to visiting a nearby farm during the initial week of the course. Classroom activities on campus were mainly in rooms with a "flat structure", i.e., not traditional lecture halls. In addition to lectures, both from core teachers and external contributors, the students participated in the Agroecology forum online, they had literature seminars, and presentations in class. Moreover, they participated in teacher- and student-led reflection sessions, observation walks (on campus and during the casework), and group work (in class and in-field). During the casework the students took part in on-site activities and contributed to working on the farm as well as in the high school canteens in the food systems. New to this cycle at NMBU were individual meetings with core teachers, which also seemed to be a valuable learning arena for the students.

#### From lecturing to co- and peer learning

To support peer-learning most classroom activities involve the students in some way. The course consists of several reflection sessions, where the students follow the IGP model of individual, group, and plenary reflections. During the course the students are also provided the opportunity to facilitate these sessions themselves. Moreover, the students' casework projects aim to facilitate co- and peer learning in that the students are themselves responsible for the progress of the work. Here they must work together



to ensure that the quality is up-to-par. To support this, the course consists of lessons in group work, as well as sessions to map personality types and learning styles, to optimize collaboration. This has also been the case in the fourth Nextfood cycle.

#### From syllabus to supporting literature/a diversity of learning sources

#### From textbook to a diversity of teaching aids

The course at NMBU includes external lectures, literature seminars, digital tools, and other written material to diversify learning sources and teaching aids. In literature seminars the students work together with a selection of relevant articles and practice reading scientific publications. External lecturers, including extra-university lecturers, are invited to hold seminars or lessons on topics adhering to the students' work. Furthermore, the students use digital and visual teaching aids, such as MIRO.

#### From written exam to a diversity of assessment methods

The students are assessed based on their participation and attendance in the course activities, their written reflection document, the two stakeholder documents produced in the casework, as well as a final oral exam.

#### From lecturer to learning facilitator

To address the shift from lecturer to learning facilitator, the NMBU course aims to have a non-hierarchical structure between teacher and students, as much as possible. This cycle, the groups in the casework were provided each their own facilitator to support the case inquiry. In addition, the teachers had monthly individual conversations with the teachers, to alleviate potential stressors and insecurities regarding the learning process. Furthermore, the course consists of collaborative sessions, with a minority of lecturer with linear knowledge transmission.

A copy of the course schedule can be found in appendix 1.

#### 1.4.1.3 Reflection

Reflection consisted of three parts: individual teacher/facilitator reflections after course activities, weekly teacher reflection sessions, and a final reflection workshop after the course had ended.

Individual teacher/facilitator reflections took place immediately or shortly after individual course activities. After a course activity (for example, a group work session with students), the responsible teacher or facilitator would reflect individually on the following three steps: What did I experience? What did I feel/think about this? What did I learn from this? When two persons shared responsibility for a course activity, they sometimes chose to share their individual reflections with each other. One teacher and



all four facilitators kept a reflection log from these individual reflections and used those to share their reflections with others in the weekly teacher reflection sessions. These written individual teacher/facilitator reflections were not collected as data. Due to time pressure, not all course activities were reflected upon individually by the responsible teacher(s)/facilitator(s).

Thirteen teacher reflection sessions were held, most of them with one week in-between and covering all course activities that took place since the preceding teacher reflection session. All teachers and facilitators took part in the reflection sessions unless they had other responsibilities to attend to. A Nextfood researcher who did not have the role of teacher or facilitator in this cycle, attended the sessions and took detailed notes. When she was not available, one of the Nextfood researchers who also had the role of facilitator took detailed notes while participating in the reflection session. The reflection sessions were structured by the order of course activities. Starting from the first course activity since the preceding reflection session, up until the last course activity before the ongoing reflection session, all course activities were gone through and the individuals responsible for the respective course activities would share their reflections on those with the group. If a need for further action or change arose, the group would discuss this, with input from reflections on other experiences if relevant.

A final reflection session with all teachers, facilitators and Nextfood researchers was held after the course had ended, and was split up in two parts, one on 14 December 2021 and another one on 6 January 2022. The workshop started with a presentation of the suggested guidelines and desired outcomes for the workshop, and an overview of the themes that had come out of the previous cycle's reflection workshop as well as which outcomes of that workshop had been implemented in the current cycle. The group then agreed on which topics to reflect on, in which order, and in which part of the workshop. Next, Nextfood researchers presented a summary of the data collected during this cycle of the course. The summarized data were used to recollect what had happened. This presentation was followed by individual reflection which was then shared in plenum. Like that, a recap of case activities, of weekly teacher reflections, of final evaluation session with students, of evaluations per session/course activity, and the three major interventions in this cycle were reflected upon. The Nextfood researcher who did not have the role of teacher or facilitator in this cycle, participated in the workshop and took detailed notes.

#### 1.4.2 Students' responses, learning and competence development

#### 1.4.2.1 Methods of data collection and analysis

The 2021 PAE302 class were introduced to the Nextfood research project on the first day of the course. 17 of the 21 students consented to being a part of the project and consent forms were collected. The students were at the beginning of the semester asked to fill out a self-assessment of competences and to answer four questions about their contributions and expectations for the course. The same exercises were also conducted at the end, where they assessed their competence development and answered five final questions about their experience in the learning community. This year the students were also asked to complete an individual reflection on learning



goals towards the end of the course. These reflections were prompted by three questions: "My main goal in this course is..."; "Which core competences and learning goals are my favourite, and why?"; and "What additional goals do I have for myself in this course?". The purpose of asking these initial and final questions is to gain an understanding of the students' comprehension, contribution, and motivations, while also enabling them to reflect and engage in their own learning process.

Finally, the students were asked to write reflection documents, contemplating and reflecting on their learning development throughout the course. Templates and instructions for the data collected can be found in Appendices 23 and 24.

At the end of the course the students participated in a reflection workshop where they addressed some of the five final questions as well as the question 'What does such an approach in education require from students and teachers?'. Notes from this workshop were collected by two separate note-takers and analysed using content analysis – coding for the core competences and "interesting phrases". The data from these codes were clustered into reports for further analysis. Mostly, the findings from these reports were used to triangulate other results, but also to say something about the requirements of the Nextfood approach, as addressed in chapter 3.3.2.2.

The students also participated in a final course evaluation workshop – addressing positive and negative aspects of the course. They were additionally asked to fill out evaluation forms both mid- and end- semester, which were collected and uploaded to NVivo. The students' responses to the evaluations were initially coded according to what parts of the course they referred to, e.g., "casework", "topical lectures" or "reflection sessions". These clustered data were approached inductively and condensed into bullet points, to triangulate the other findings. The evaluations were particularly useful in assessing the successfulness of this cycle's "interventions"/accommodations to the shifts.

The researchers used a physical anonymization key, and the collected data were thoroughly anonymized accordingly. All the data, except the self-assessments, were analysed qualitatively using the data analysis software NVivo (QSR International 2020). These qualitative data were categorised by data sets. The analysis followed the recent amendments to the Nextfood research protocol, found in Appendices 23 and 24. The researchers used content analysis with a deductive approach, by coding according to the pre-defined coding tree, in addition to codes that have emerged inductively in analysis of past cycles of this case.

The data was analysed by a team of three researchers and inter-coder checks were conducted continuously throughout the process of analysis. All coders tried to keep rigorous track of their process and document interpretations and rationales in a coding logbook. To ensure reliability of the results, the reflection documents were all coded


by two researchers each. Data sources such as student evaluations were used for triangulation where applicable.

The self-assessments of competences were analysed quantitively by running a paired, two-tailed t-test according to the amended research protocol instructions for numerical data, see Appendix 24.

#### 1.4.2.1.1 First week (day) & last week (day) of the course

#### 1.4.2.1.1.1 Student's understanding, contributions, and expectations

The four initial questions and five final questions were collected in order to, as mentioned, gain an understanding of the students' expectations, motivations and contributions to the course, but these data also say something about the students' learning development and outcomes when compared to each other. As such, the analysis of these questions was done to triangulate and to a certain degree verify findings from the qualitative content analysis of the students' reflection documents and individual reflection on learning goals. In addition to the already developed coding tree with the core competences, the questions and reflections on learning goals were coded for "learning goals", "view on competences needed for sustainable development" "recognition of own competence" and "transformation". The latter to say something about whether the students seemed to have undergone a change during the course, based on what they write in their responses to both initial and final questions. The clustered data were compiled as reports and analysed by one researcher per report, mainly to answer the questions pertaining to chapter 3.2.2.1 of this case development report.

The reliability of the results from the qualitative analysis of the clustered data for the above-mentioned codes, are to a large degree subject to the interpretation and views of the researchers.

#### 1.4.2.1.1.2 Self-assessment of competences

To track the students' development of the core competences, a self-assessment was conducted at the beginning and at the end of the course. The students were asked to fill in a questionnaire where they ranked their level of competence mastery on several statements related to each competence on a scale from 1 (Novice) to 9 (Expert). The full version of the questionnaire is located in Appendix 25.

These scalings were analysed by conducting a bivariate analysis and running a paired, two-tailed t-test comparing the mean scaling per competence at the start and end of the course.



## 1.4.2.1.2 Students' final reflection document (individual)

As a part of the students' final course assignments, they write individual reflection documents where they are asked to demonstrate their abilities to link relevant theory to practice and to use experience from the course to do so. These documents thus contain valuable insights into both how the student experience the learning process and which educational activities they deem to support their competence development. The anonymized reflection documents were uploaded to the NVivo "master file", each individual document as one unit of analysis. The reflection documents were coded according to the predefined coding tree (Figure 1). Additional codes have also emerged throughout the duration of the project, and as such the documents were also coded for "peer-to-peer learning", "group work", "systems thinking", "autonomous learning" and "skills". Also, the code "Noteworthy quotes" was used for segments that stood out to the researchers for one reason or the other. During the initial coding of the reflection documents several inter-coder checks were conducted to ensure consistency when applying the codes.

The next step entailed further analysis of the clustered coding reports and was conducted by three researchers. The data was condensed by writing up a rationale per coding report, with the student learning research questions in mind (in line with the case development report structure). Also, during this step internal discussions and check-ins within the research team were held.



Figure 1: The Nextfood predefined coding tree

## 1.4.2.2 Results

1.4.2.2.1 How do students experience such a learning process with respect to:

# 1.4.2.2.1.1 learning goals?

The five learning goals pre-defined by the faculty behind the course 'Agroecology: Action learning in Farming and Food systems' are:



- 1. Have knowledge of farming and food systems
- 2. Can handle complexity and change
- 3. Can link theory to real-life situations
- 4. Are good communicators and facilitators
- 5. Are autonomous learners

From analysing and categorizing the students' responses to the four initial questions, inductively but all the while aware of the pre-defined learning goals, the students' learning goals pertained to the topics of:

- *Knowledge and experience of farming and food systems.* Ten students described goals pertaining to knowledge and experience, including knowledge of ecological and agroecological approaches to agriculture, needs and wants of farmers, nutrient cycling, resilience thinking, soil biology, practical knowledge of farming practices. Including both theoretical and practical knowledge, the responses can be related to the pre-defined learning goal 1.
- Systems thinking, complexity and change. Ten students described goals pertaining to systems thinking, complexity and change, including how to understand actors in a food system, manage complexity and chaos, gain a holistic understanding of sustainability, use systems thinking (and link it to agroecology), analyse systems, make a transition in food systems, examine a situation as a whole, and understand interconnections in farming and food systems. As these responses pertained to systems thinking, ways to understand complex situations and how to deal with them, as exemplified below, they can be related to the pre-defined learning goal 2.

"I would like to learn and be able to utilise systems thinking and become competent at this. From my initial impression, I have found systems thinking a fascinating approach to research and to understanding how processes intertwine and affect each other. I believe that through learning how to use such a framework correctly and in the most efficient manner, both for problem-solving and analysing, it would be a great help for perceiving problems in a more comprehensive manner. Through being able to identify and explore the various processes through this lens, I believe it could make me a better, more thorough problem-solver."

Student\_431\_beginning of semester\_2021

"I'd like to improve my ability to navigate and deal with complexity and "chaos", including working more systematically and organized in a clear way, and being able to consciously shift perspectives. I resonate a lot with the "gap between knowing and doing" as something I that I experience often in my life: that I have a lot of ideas that aren't realized as I' unsure how to go about the process of realizing it."

Student\_439\_beginning of semester\_2021

- Linking theory and real-life, closing knowing-doing gap. Six students described learning goals related to linking theory and real-life, including how to balance theory with sensory and practical inputs, link experiences to theories and concepts, turn knowledge into action, and bridge the gap between academia and society. The responses pertained to linking theory and real-life and how to



move from knowing to doing, and thus relates to the pre-defined learning goal 3.

- Communication and collaboration. Ten students described learning goals pertaining to communication and collaboration, including how to influence consumers' food habits, facilitate groups, gain interpersonal skills and tools, engage in participatory methods, gain general communication and collaboration skills, skills in dialogue, understanding value of group work, and take about intercultural exchange. As the responses reflected goals pertaining to communication and collaboration, also including facilitation, it can be related to the pre-defined learning goal 4.
- Autonomous learning. Five students described learning goals pertaining to autonomous learning, including how to link previous experiences and understanding to new learning, gain knowledge of own strengths and weaknesses, create and follow a work schedule, learning how to learn, learn from action, learn and innovate. The responses concerned the students' own learning process and how they could progress in that and can as such be related to the pre-defined learning goal 5.

"The competence of learning to learn or taking responsibility for my own learning is something I want to develop. I'd like to develop my intuition and inner navigation system as to following my curiosity and approaching learning in a creative way from multiple perspectives."

Student\_439\_beginning of semester\_2021

- Becoming an agroecologist and agent of change. Eight students described goals pertaining to becoming an agroecologist and/or agent of change, including how to facilitate and support change of agriculture and food systems, apply agroecological perspectives, understand one's own role in the transition of farming systems, become an agroecologist, contribute to food sovereignty, design sustainable agrifood systems, innovate new systems or improve current ones, and develop the ability to act. These goals could be related to the predefined learning goals 2 and 3, as "how to deal with" and "linking theory to real-life" both could imply action. However, these links are less explicit than in the above categories of "Systems thinking, complexity and change" and "Linking theory and real-life, closing knowing-doing gap".
- Competence development. Eights students described goals pertaining to competence development, including how to use and prioritize the competences of observation, reflection, dialogue, creative thinking, critical thinking, visionary thinking, and how to work on agroecology projects. Of these, four out of the five core competences were mentioned, but participation was missing. Creative thinking could be related to visionary thinking, and critical thinking could be related to reflection, however, they could also be defined as separate competences. One student noted:

"My reflection abilities, and the ability to make links between different experiences and theoretical knowledge as well as thinking broadly and outside of the box. I need to reflect more often on that I see or learn; and be more critical – developing my critical thinking."

Student\_438\_beginning of semester\_2021



The statement above also demonstrates how the goals were linked in the students' descriptions; developing reflection and critical thinking was here connected to linking theory and experiences. Below is a statement that answers to the pre-defined learning goals 1, 2, 3, and 4, which can indicate that the student's own learning goals are coincidentally aligned with the pre-defined learning goals. However, it can also mean that the students have adopted the pre-defined learning goals as their own.

"I would like to be more competent with systems thinking, unbiased observations and deep reflections like we talked about in class today. I would also like to understand nutrient cycling in natural and agriculture systems much better than I do right now, because I think it's really interesting, but I tend to only focus my energy on social aspects of food systems. I want to be more competent turning my knowledge into thoughtful and meaningful action, I would like to work on my confidence as an action-oriented person in this world of many issues and "wicked problems." I would like to improve my communication and teamwork skills because I believe a lot in the power of collective/cooperative knowledge development."

Student\_434\_beginning of semester\_2021

As the students are introduced to the five learning goals, the core competences, and becoming an agroecologist and agent of change from the very beginning of the course, it is likely that their responses to the initial questions were already coloured by the course introduction. In conclusion, the results presented above indicate that the students' described learning goals at the beginning of the course aligned well with the pre-defined aims and goals of the course, which they had already been introduced to.

The learning goals that came forth from the four initial questions are clearly overlapping with the findings from analysing and categorizing the responses to the assignment "Individual reflection on learning goals", which the students responded to later in the semester. That assignment more explicitly addressed learning goals, and thus the responses to a larger extent mentioned the pre-defined learning goals. In the analysis, the following categories identified:

- On systems thinking, complexity and change, including how to master systems thinking, understand aspects of agri-food systems, understand complexity, structure, and functioning, understand and deal with complex real-life situations, think systemically and holistically, be a good systems thinker, find sustainable solutions for systems, be prepared for the future. 8 students described goals pertaining to this category, and they link well to the pre-defined goal 2.

"For the learning goals, the most interesting one for me is the increased ability to handle complexity and change. I think that is very important because real-life situations are complex and I really enjoy having this complexity brought into academia. That makes me feel like we are being better prepared for the future. The future is certainly unknown to all of us but it is important for us to be resilient individuals that are ready to tackle any challenges that come on the way. I definitely think this course has made me more resilient than a more conventional course in food systems would."

Student\_435\_individual reflection on learning goals\_2021



*Linking theory and real-life, closing knowing-doing gap,* including how to gather knowledge and experience, know how to act in situations, understand and apply action learning, learn about agroecology through action, how to link theory and practice/real-life situations, and be academic without detaching from outside academia. Six students mentioned learning goals pertaining to this category, which can be linked to the pre-defined learning goal 3.

"My main goal in this course is to stay committed to closing the "knowing-doing gap." I feel excited and inspired by the nexus of food and culture, and what that means for people's sovereignty and empowerment. I want to continue learning about agroecology through the lens of action and effort in contributing to sovereignty and empowerment."

Student\_434\_individual reflection on learning goals\_2021

"Linking theory to real-life situations is somewhat blurry for me. I'm just starting to realize the need for developing my ability to move consciously between different perspectives, zooming in and out between theory, the general and the abstract, and the particularities, the specific real-life situations. I feel like I have a lot to learn about this, and in particular being able to move into the particularities of a case and dive into specifics without feeling lost or getting lost. However, I also need to practise looking at our case and seeing the bigger picture and linking it to the theory, or finding the "theory" within the case."

Student\_438\_individual reflection on learning goals\_2021

- Communication and collaboration, including improve ability to work in groups, how to handle diversity of views and personalities, collaborate and contribute, learn from peers, facilitate (in participative approaches), divide between personal and professional relationships, work affectively, create safe space for stakeholders. Ten students described learning goals pertaining to this category, which can be linked to the pre-defined learning goal 4.
- Autonomous and life-long learning, including how to understand and develop oneself, be open to learning, apply what is learned, involve emotionally, trust the learning process, increase self-awareness. Eight students mentioned goals pertaining to this category, which can be linked to the pre-defined learning goal 5.

"Autonomous learning is also very interesting to me, as I feel it revolves around motivation and driving forces within. Being driven by honest curiosity and joy feels important to be able to do quality work and keep the inner motivation and an attitude of inquiry. It also connects to the compassion and emotional investment that is also needed."

Student\_438\_individual reflection on learning goals\_2021)

"My goal in this course is to flourish and continue to build myself to become an autonomous learner and more aware of herself, the other humans, the world, and the complexity of this everything."

Student\_442\_individual reflection on learning goals\_2021

- Becoming an agroecologist and agent of change, including how to define agroecology, see oneself as (competent) agroecologist, see role needed for change, how to use skills for change, integrate systems thinking and visionary



thinking to trigger change, become empowered to create change, to transition to sustainable farming and food systems. Nine students described goals pertaining to this category.

- Competence development, including how to understand and develop the core competences, how to use them in daily life and in gaining knowledge about farming and food systems, apply methods and tools in projects, summarize and work with information. Nine students described goals pertaining to this category.

As demonstrated above, in the students' responses to the "Individual reflection on learning goals", goals pertaining to the pre-defined learning goals 2-5 were easily identified. The pre-defined learning goal 1, on knowledge of farming and food systems, was little focused on and did not come up as a category in the analysis. This could be a result of the course's focus on competence development and that students are encouraged to identify and acquire the knowledge needed for any given situation, rather than focusing on knowledge in itself. However, it could also be that the descriptions of learning goals pertaining to the pre-defined learning goal 1 were more integrated in other goals, and therefore not detected as a category by the researcher. Goals pertaining to competence development and becoming agroecologists/agents of change still came through as important. It is the notion of the researcher that the responses were more focused on "how to understand", as in how to understand agrifood systems, and "how to do", as in how to act in agrifood systems, rather than simply on "what is". Thus, one could say that the pre-defined learning goal 1 was integrated in other goals, and could perhaps be said to have developed into "Have knowledge on how to understand and act upon farming and food systems".

Autonomous learning. In their reflection documents, ten students described parts of the learning process that the researchers coded for the pre-defined code "autonomous learning", as it related to the course goal of becoming autonomous learners. The following inductive analysis revealed that the link between reflection and autonomous learning was drawn by six of the students. For example, some pointed to the power of reflection to deepen their understanding and create meaning, and to generate own knowledge, as exemplified by the statement below:

"This semester, I found that reflection is the most empowering competency I have to apply in a learning experience. By reflecting, I generate knowledge that is completely my own".

Student\_434\_ reflection document\_2021

Further, the increased awareness of one's own learning process through reflection was by another student linked to personal development and direction:

"The reflection process, writing this document and the sessions in class, the emphasis on reflection has generally increased my awareness of my own learning, strengths and weaknesses, preferences, tendencies and driving forces. In this way it has led to some personal development as well as made me aware of what I need to learn more about – where to go next"

Student\_439\_ reflection document\_2021



Two students mentioned how reflection throughout the learning process could be a way to narrow the knowing-doing gap, and thus be a foundation for change. Another student stated how they took confidence and ownership in the learning process through reflection, while another mentioned how learning from both inside and outside is part of being an autonomous learner:

"This semester will have highlighted the importance of involvement, of critical thinking, of the primacy of the experience over the theory, of the importance of self-confidence in order to initiate change. Now I understand better what it takes to be a life-long autonomous learner, as I am to learn both from inside (myself) and from outside throughout my entire learning journey, and during my whole life."

Student\_446\_ reflection document\_2021

Four students mentioned that what they learned in the course, such as methods to explore the future and other tools, were useful to other areas of life outside of the course learning arenas. The course was described by one student as an opportunity to train autonomous learning, by deepening the understanding of one's own learning process and applying tools in different situations. This may again be linked to the competence of reflection, which comes forth as crucial to gain a deeper understanding of one's own learning process.

One student equaled that of being an agroecologist to that of being an autonomous learner, i.e. to know how to learn about a system:

"I imagine myself as an agroecologist in the same way that I might imagine myself as a musician (figure 5). [...] A good agroecologist considers both theory and the actual phenomena on a farm to comprehend a system with its unique and emergent properties. A musician doesn't know every song, but she knows how to learn a song. She's an autonomous learner."

Student\_434\_ reflection document\_2021

Another student explicitly addressed the learning goal of autonomous learning, and stated that they failed to reach that goal in the course, but still saw potential to become an autonomous learner in other settings. However, most students who depicted autonomous learning in their reflection documents indicated having developed in that regard.

Thus, as it appeared that reflection helped to develop awareness of the learning process and deepen understanding, it seemed that reflection as a competence was essential for the students to become autonomous learners. That students reported increased confidence in knowing how to learn and apply knowledge and tools, reveals that the students were on their way to become autonomous learners. Accordingly, one can argue that the students developed as autonomous learners through the course experience, and that reflection was essential for this development.



# 1.4.2.2.1.2 view on competences needed for sustainable development?

**Beginning of the course.** From analysing and categorizing the students' responses to the four initial questions, their views on competences needed for sustainable development were categorized under the topics of (listed according to number of students under each category):

- *Communication and collaboration,* including self-awareness, understanding of others, skills for communication and collaboration, dialogue, openness to learn from others, facilitation, how to change mindsets, need for patience and resilience, thinking skills. 13 students mentioned competences pertaining to this category.
- Systems thinking, complexity and change, including being able to see interconnections and relationships of elements, identify key issues and stakeholders, have a holistic view, understand challenges and systems, have skills to examine and deal with complex situations. 11 students mentioned competences pertaining to this category.
- Transdisciplinary knowledge, multi-dimensional perspective including need to integrate different perspectives and disciplines, have insight into being farmer, to be able to work together holistically, knowledge on power dynamics, how to understand and integrate social, cultural, economic, environmental dimensions of systems, place-specific knowledge, and communication skills to cater for multi-dimensional needs. 11 students mentioned competences pertaining to this category.
- Action learning and core competences, including action learning to understand multiple dimensions of systems, use of core competences and being curious and eager to learn, to be creative and take action. Ten students mentioned competences pertaining to this category.
- *Knowledge and skills,* on biology and ecology of natural and agricultural systems, food systems, sustainable development, agroecology, and principles for production. Seven students mentioned competences pertaining to this category.

**End of the course.** From analysing and categorizing the students' responses to the five final questions, the students' views on competences needed for sustainable development were categorized under the topics of (listed according to number of students under each category):

- Autonomous learning, action learning, core competences including skills for (action) learning, awareness of learning process, to adapt and access necessary knowledge for transition, willingness to learn, learning without preconceptions, how to action plan for the future, using core competences to grasp and deal with complexity and change, help stakeholders, to learn about and enhance the approach used. Nine students mentioned competences pertaining to this category.
- *Transdisciplinary knowledge, multi-dimensional perspective,* also related to how to deal with the complexity of systems, including integration of multiple perspectives and knowledges, communication for transdisciplinarity, and applying both hard and soft sciences. Eight students mentioned competences pertaining to this category.



- Knowledge, of context-specific systems, elements in systems, interconnections, historical insight, traditional, scientific, current trends, social and biophysical world, local communities. Eight students mentioned competences pertaining to this category.
- Systems thinking, complexity and change, including holistic thinking for tackling complex and messy situations, Soft Systems Methodology as tool to act purposefully, understanding of human activity systems, knowledge about systems, systems' functioning and interconnections, use of core competences to capture the whole of a system, competences and skills for systems inquiry, analysis and transformation of systems. Seven students mentioned competences pertaining to this category.
- Communication, facilitation, collaboration, social and self-awareness, including skills to enhance dialogue among stakeholders, openness, collective ownership to ideas, ability to connect, introspection, curiosity, collaboration and networking skills, skills to empower stakeholders to make change, interpersonal skills, self-awareness. Seven students mentioned competences pertaining to this category.

Similar categories were drawn from both beginning and end responses. While competences for communication and collaboration appeared as most important at the beginning of the semester, competences for how to learn seemed more important at the end. Although knowledge appeared more important at the end, the knowledge mentioned in the beginning was pertaining more to ecology, biology and biophysical aspects, while in the end it was pertaining to a larger diversity of aspects and to systems. The differences in ranking of the equivalent categories drawn from the responses to the four initial and the five final questions may indicate that a change happened in view on competences needed for sustainable development. However, this may also be a result of the fact that the researcher coded the data from the four initial and the five final questions sequentially and did not have a set structure to compare them by. In addition, there are overlaps between the categories, and the number of students under each category do as such do not speak for its own. It was not always clear to the researcher whether the students referred to knowledge, skills, competences, or something in between. Moreover, while responses of 16 students to the four initial questions were deductively coded for 'view on competences needed', only 13 of the responses to the five final questions were coded for the same, and as such gave a less rich foundation for the further inductive analysis and drawing conclusions on what the students' regarded as important competences in the end.

In the final student reflection session, the students were asked to reflect (individuallygroup-plenary) on what knowledge and skills are needed for sustainable development. In terms of knowledge, they mentioned indigenous, transdisciplinary, contextual, and evidence-based knowledge; knowledge about participatory and experiential learning, systems thinking, meta-thinking, laws, how to bridge the knowing-doing gap, abolitionist theory, and personal aspects of sustainability. These responses align well with the responses categorized under 'knowledge' and 'transdisciplinary knowledge, multi-dimensional perspective' from the end of semester above. Regarding skills, they mentioned communication and dialogue, collective thinking, facilitation, non-



judgmental optimism combined with Critical Creative Thinking (CCT), system thinking, transdisciplinarity, interpretation and understanding (cross-culture), creativity in connecting pieces of information, open-mindedness, self-awareness, adaptiveness, empathetic listening, and asking good questions. The skills mentioned here corresponds to the responses categorized under 'communication, facilitation, collaboration, social and self-awareness'. However, as with the individual responses to four initial/five final questions categorized above, in the final student reflection the knowledge and skills mentioned were often overlapping, and not always distinguishable as either knowledge or a skill. (Final student reflection session\_2021)

## 1.4.2.2.1.3 recognition of own competences and competence development?

In the beginning of the semester, the students altogether mentioned a diversity of competences that they thought would be useful to the course. From analysing and categorizing the students' responses to the four initial questions, their recognitions of own competences were categorized under the topics of:

- *Field experience;* including farm work and understanding of farmers' situations, food system work, grassroots food activism, climate and environmental projects. 12 students mentioned competences pertaining to this category.
- Knowledge and understanding; of farm ecosystems, environment and nature, interconnections and ecosystems functions and connection to human activities, biogeochemical cycles and processes in nature, agroecological methods, cultures and different perspectives, multi- and interdisciplinarity, power relations, food and health perspective, alternative education models, holistic view of farming and food systems, humanity as part of ecological cycles, see bigger picture and connections, trends in natural resource and agricultural management. Ten students mentioned competences pertaining to this category.
- *Personal qualities*; including flexibility, creativity, curiosity, passion, motivation and desire to learn, mindful, visionary, philosophical, active listening, deconstructing own biases, value diversity of perspectives, open-mindedness, self-confidence, calmness, training in Zen coaching, idealism, relentlessness, adaptability, determination to help farmers and improve agrifood and forestry systems, empathy, kindness, enthusiasm. Nine students mentioned competences pertaining to this category.
- Communication and collaboration experience; including language skills, report writing, group work experience, social skills, trying to understand and mediate dialogue. Six students mentioned competences pertaining to this category.
- Four students mentioned research methods, including qualitative and quantitative research methods; four students mentioned *analysis skills*; three students mentioned experience with participatory methods; two students mentioned skills in *observation*, two students mentioned *critical* and *multiperspective view*; two students mentioned designer and creative skills for problem solving; one student mentioned reflection abilities; and one student mentioned a social sciences-background to complement other backgrounds.

By the end of the semester, the students reflected on which competences they had contributed with in the course. From analysing and categorizing the students'



responses to the five final questions, their recognition of what they had contributed with were categorized under the topics of:

- Communication and facilitation, including the ability to listen, focus on needs, set boundaries, non-violent communication, creating safe space, include opinions of all, experience with diversity of people and perspectives, active listening, asking the right questions to find common understanding, positivity and humor for connection, language skills for translation and cultural understanding, facilitate dialogue, encourage to share perspectives, report writing and layout, and understanding of people's behavior. Eights students mentioned competences pertaining to this category.
- *Personal skills and qualities*; including being a sensible, sensitive, and kind person, having patience in casework, trying to see others' perspectives, being reflective and open, philosophical. Five students mentioned competences pertaining to this category.
- *Systems thinking*; including contribution as a systems inquirer, core competences for systems thinking, seeing structures that need reforming, ability to think holistically and see the big picture, to recognize interconnections, being creative and system-thinking oriented, and the ability to converge thinking. Four students mentioned competences pertaining to this category.
- *Farming experiences* was mentioned as useful by two students, and experiences in other fields such as *activism, NGOs, and hospitality business* were regarded as useful by three students. Two students noted that farming experiences was less useful than imagined.
- Three students also mentioned *Critical thinking* and questioning conventions, one mentioned *Leadership experience* as useful for group work, two mentioned *Organizing and planning abilities*, one mentioned structure and coherence in casework and report writing, one mentioned the ability to go into *theory*, and one mentioned *Visionary thinking* competence to define common goals and get people on the same page.
- One student noted that they brought little in comparison to their peers and learnt a lot from them, while another student felt they had no useful experiences or competences to contribute with.

While it at the beginning of the semester appeared that field experience and knowledge and understanding of farming and food systems were regarded as competences the students would contribute with in the course, it seemed that skills in communication and collaboration were regarded as more useful in the end. Interestingly, field experience went from being regarded as useful by 12 students at the beginning, to only five students in the end, also with two students mentioning that farming experience was less useful than imagined. Also noteworthy was that knowledge of different aspects related to farming and food systems came through as important for ten students based on their responses to the four initial questions, this did not even come up as a category from the responses to the final questions. These results may indicate that the students became more aware of their own competences and what they could contribute with during the course. It also points to the notion that the students had different expectations to the course in the beginning, and that these changed as the course went by and they realized what the course was all about. However, as for the previous chapter, the results are affected by the fact that the researcher coded the



data from the four initial and the five final questions sequentially and did not have a set structure to compare them by. Moreover, it was sometimes difficult to discern between different aspects of knowledge, skills, and competences in the students' responses, and thus not easy to categorize.

By the end of the semester, the students also reflected on which competences they had developed in the course. From analysing and categorizing the students' responses to the five final questions inductively, their recognition of what competences they had developed were categorized under the topics of:

## Core competences

- Four students mentioned *Observation*; including seeing without making judgements, understanding the need to spend time on it.
- Nine students mentioned *Dialogue*; including active listening, in group settings, effective communication with peers, significant competence for student, understand importance of it, how to engage in it, share thoughts in group, patience and openness to do things differently, being an active participant.
- Eight students mentioned *Reflection*; including use it constructively in work, reflect on experiences and knowledge, trained during sessions, journal, writing document, changed way of reflecting; not answer too quickly, ask relevant questions, taking notes, journaling, appreciation and critical thinking.
- Three students mentioned *Visionary thinking* (439, 442, 444); including mentally let go of constraints of current situation, shift into mindset of openness and creativity, gained confidence in competence, empowered by visioning; having hope and ideas.
- One student mentioned *Participation*.

# Other competences

- System thinking; including inquiry into messy situations and wicked problems, new lens and perspective to approach task, understand and analyze complex systems, balance and empathize with different stakeholder views, see big lines, holistic understanding, deal with whole, complexity and change, awareness of big picture, ability to take multiple perspectives. Seven students mentioned competences pertaining to this category.
- Communication and facilitation; including how to lead workshop and visioning process, express oneself clearly in group and presentations, writing and speaking, communicate more easily about feelings and thoughts, being active participant in meetings, speak confidently, give constructive feedback, motivate and inspire others, argue based on academic foundation, read and understand scientific articles, academic writing. Seven students mentioned competences pertaining to this category.
- Gaining confidence, learning about oneself; aspect of personal development, enable talking and share ideas, courage to speak up in public, in leading workshop and visioning process, less afraid of reactions, knowing possibility to learn, progress and evolve from situations, evolve as human being, trusting process, take action and try; mindset, more confident, learning about oneself through listening and reflection. Five students mentioned competences pertaining to this category.



- Two students mentioned *Group work*, including navigating group dynamics, let go of expectations, embrace process, teamwork benefit when solving wicked problems; two students mentioned *Problem solving*, including to recognize needs, adapt one's role, work to help a situation, taking time to get a full picture, putting away assumptions, build clear and realistic understanding; and one student mentioned *Organizing skills*, including the ability to structure (thoughts, work, documents, time).

When analyzing the reflection documents and coding for 'core competences' as a top code, the researchers looked for statements that described competences more in general. In the further analysis of this data, the researcher detected the following which should be seen in relation to the categories listed above, and to the sub-sequent chapters treating the competences more in detail.

Above all, it appears that communication, facilitation, and collaboration was developed, and eight students claimed having developed in such skills and competences. This corresponds well to the categories *Communication and collaboration* and *Group work* presented above, where respectively seven and two students mentioned competences pertaining to those categories.

Group work in the case projects was mentioned by one student as an arena for practicing all core competences, and for two students it acted as an arena for communication, facilitation, and collaboration skills. For one student, group work provided the opportunity to practice interview skills and dialogue, and thus also the competence of participation.

One student described how the class session on teamwork and conflict resolution had made them realize the importance of communication as a skill in any enterprise or relationship. The same student reflected on how communication in group work had been challenging and pointed to both different mindsets and levels of language proficiency as a source of misunderstandings:

"The continuous misunderstandings, especially within the food case group, could at times lead to animosity and antagonism. This was often due to semantic barriers, which also were affected by mindsets, opinions, and other various interpersonal factors. It made me realise the importance of the group being on the same line of understanding, but also how important it was to communicate in a way to get everyone to that point of understanding. In trying to optimise the time we spent working as a group, I realised that we, by accident, managed to skip some important points in regard to actively listening to each other and to others' ideas, agreeing to a tasks without actually knowing what the task required, and in the end, actually losing time we could have spent in a more effective manner to moving in different directions."

Student\_431\_reflection document\_2021



Facilitation skills were regarded as important to group work, to enable group reflections and create a safe space to share:

"Something which helped the process move along more smoothly, apart from the group member with a good facilitation proficiency, were the group reflections we had, alongside the check-in and check-out's we had once per session. These helped align us as a group and adjust to the needs of the individual that day, be it feelings of lethargy, disconnect, confusion, or external stress. Having that space to share was especially useful when we had grievances on how the process was carried out, or if one member felt lost."

Student\_431\_reflection document\_2021

Two students mentioned how language skills as a native speaker allowed closer communication with stakeholders, but also more work for the person with those skills, who took more responsibility for the communication and facilitation. One student reported to have increased understanding of this responsibility and how those components influence dialogue.

The competences and skills developed in communication and facilitation was by two students mentioned as significant for agroecologists, to help empower stakeholders and access both power and creativity of individuals and groups.

By training communication skills in the course, it seems that students gained better self-confidence, and also helped to obtain a holistic view and more complete understanding of a situation or problem:

"More or less consciously, this semester I trained my expression skills, in writing and speaking and now feel like I can communicate more easily. I'm less afraid of others' reactions and it's easier to put words on my thoughts. This new learning process nurtured my self reliance and bettered my self assessment skills. How I address my problems changed and it seems easier taking the time to grab a global and full picture as much as possible, putting away assumptions to build a clear and realistic understanding."

Student\_442\_reflection document\_2021

Two students described having developed competences that made them more ready to deal with real-life, messy situations, and one mentioned having developed the skills necessary to become an agroecologist. Three students reported that they became more aware of their abilities and competences, of the need to cultivate skills in addition to knowledge, and to develop as life-long learners. One student mentioned how student-led reflection sessions contributed to becoming aware that skills in active listening and dialogue were foundational to action learning, and also of the need to flicker between being an analyst and facilitator. As exemplified below, the students mentioned the development of understanding, knowledge and tools/skills in conjunction:

"Therefore, the understanding of food systems, the acquisition of mental and practical tools on how to address complexity, the competences developed in relation to social dynamics



through introspective work equipped me to face the challenges of real life situations differently. Moreover, even though I am still a beginner in this field, I feel that I have nevertheless acquired some basic tools to orient myself in different types of messy situations and to navigate them."

#### Student\_430\_reflection document\_2021

"I now believe that if knowledge is very important to support sustainable development, skills are substantial in the sustainable shift process. Knowledge without the tools to apply it correctly is not sufficient."

Student\_442\_reflection document\_2021

One student referred to "experiential understanding" of farming systems and reported that the theoretical knowledge they gained was grounded in the phenomenon of a farm (Student\_434\_reflection document\_2021). Another student reported having gained "ownership of the core competences", indicating that these would enable them to contribute to the sustainable shift (Student\_442\_reflection document\_2021).

From further analyzing the material coded for 'peer to peer learning' in the students' reflection documents, it appeared that students developed social skills through communication with peers in group work. This is in accordance with the findings above. Communication with peers enabled one student to observe and become aware of people's behaviours, and dialogue came forth as a key element to peer learning as it allowed for intercommunication and personal skills. As another student noted:

"While the variety in the team members' backgrounds, their personalities and work methods made the task very challenging at first - not to mention the horizontality of the group structure and the room for interpretation of the case study guidelines that added to the difficulty - this process was also an eye opener for me to the value of team diversity and its potential to enhance groups' ability to address complex or wicked problems (see definition in figure 4) by building on each other's skills and knowledge, as well as making the work more effective and more efficient. It is important to underline, however that successful dialogue is a key element to the process is as it allows for better intercommunication and interpersonal skills"

Student\_445\_reflection document\_2021

Moreover, four students seemed to internalize knowledge and increase their understanding from working with others. Communication with peers led to changes in perception, and to shared understanding of situations. It also helped to create context of the casework:

"Conversely, I was surprised at how quickly I could learn new things from my peers questions and recalling of their own experiences in connection with the farmer's realities. In creating context and stories around these new nuggets of knowledge and theory, I felt it easier to retain the information. At the end of the day, when we came together as group in the farm case work to reflect on what is there – we often remembered, fixated on, or understood different elements. The diversity of perspectives (inclusive of the farmer's) was not only efficient in understanding the richness of the situation, but also an interesting phenomenon in revealing that everything we see is filtered through our own 'window on the world'."

Student\_433\_reflection document\_2021



Two students mentioned how the course helped to see the value of peers as a source of learning. As noted by a student:

"We had one group member who was particularly good at facilitating conversations, making note of other members being left out of the conversation or members speaking over each other. I found their facilitating efforts particularly beneficial as I felt seen and heard when they made room for me to present my ideas and comments to a group full of strong opinions. Moreover, I found that from observing them and their approach to facilitating dialogue, I could learn a great deal about what efficient facilitation looked like and how one could effectively manoeuvre through complex situations and group relations. Through this observation, it became even clearer to me that good communication is a prerequisite for good facilitation."

Student\_431\_reflection document\_2021

Five students noted how they gained new perspective of themselves from working with peers. For example, for one student group discussions helped demystifying personal assumptions, for another to changing perspective on own interests, and for yet another realizing they should not be too hard on themselves. One student noted how the course was a collaborative process, and how working with peers demonstrated the power of collaboration:

"One might think that these reflections would make me question my dream of being a teacher (or some sort of knowledge-transfer facilitator). I'm as motivated as ever, actually, because of this semester's experiences in teamwork, shared reflections, and knowledge cocreation. I have been living a learning journey that has been an incredibly collaborative process, because so much of what I've learned was through experience, and consistently interacting with my group members, meeting with core teachers and having casual conversations with my friends. I am grateful to the angst I felt during the public speaking and active facilitation during the casework for showing me what I have to work on; I am even more grateful to the spaces of co-creation with my peers for showing me how empowering collaboration can be. A rich example is the student-led reflection sessions, for which we reflected in groups and in plenary. I always came away from those sessions with a bucket of new things to think about."

Student\_434\_reflection document\_2021

For three students, peer learning also seemed to give way for a multicultural and transdisciplinary learning setting.

#### 1.4.2.2.1.4 transformation?

It is not evident from analyzing the material coded for 'transformation' and 'transformative learning' in the reflection documents that all students reached transformation during the course. However, while the researcher did not try to determine the degree of transformation, it can be drawn from the reflection documents of 11 students that transformation took place.

*Power of competences.* For half of the students, it appeared that training of the core competences in the course led to new levels of understanding. For three students, the session of dialogue and the experience of active listening was seemingly impactful and opened up for new perspectives and realizations about conversations. One student



also mentioned how dialogue led to a transformation of group work, by allowing them to feel listened to and understood, and improving their assertiveness. Another student reported powerful experiences when exploring the capacity of imagination, to liberate their mind from barriers, and yet another realizing the need to connect with their creativity to create a good vision. For three students, reflection apparently led to new insights and realizations, also about one's own reasoning. A reflection session in class led one student to realize the importance of personal involvement in the course, and other messy situations:

"While being in class and reflecting in silence, I realized that what I was supposed to do as a student was more than just seating in a corner, grasp all that I could from the teachers' speech and leave out the class. I was supposed to involve myself as a person, and not just as a student. Suddenly, my entire person was summoned to be part of the course, to connect with the cases emotionally, to relate to my weaknesses and my strengths in a way that was new. When reflecting on what competences and tools I would further use in the future after this course, I could not lie to myself, or avoid asking one part of myself, because I have the feeling of having "emotionally involved" (Dreyfus and Dreyfus, 1980) myself in the course, throughout the class sessions, the groupworks and the individual learning tasks. [...] The course has helped me to unravel my own feelings and therefore to be more open to them. Now, I can see that my reflection upon open-mindedness has deepened my understanding of what to be openminded means: I should be open to others' specificities, culture, ideas, knowledge, but also to be open to my own specificities, ideas, emotions, needs and innermost knowledge. It is an efficient way of better connecting to the messy situation, its wicked issues and to be able to flicker from one perspective to another while feeling involved in it. Because to be emotionally involved does not allow me to look at the situation from outside, just as a simple observer."

Student\_446\_reflection document\_2021

*Experiential/action learning* was described by four students as having power to transform experiences into knowledge, by how reflection on experience led to a wider and deeper understanding. As exemplified below:

"Experiential learning necessitated the presence of my whole self. In what was a very intense and rewarding process, I came to internalize knowledge through action learning and interpretation with theory, regular reflection with myself and peers, lots of teamwork, and visioning for the future. Despite being someone who excelled on-paper in the old-fashioned pedagogical style used from primary schooling through university, I can assuredly say that I have never felt such a robust accumulation of knowledge and feeling of competence. [...] Not only have I expanded my understanding and knowledge of agroecology, farming and food systems, but of myself."

Student\_433\_reflection document\_2021

Three students noted that *facing real-life situations* in the casework helped to integrate and orient themselves in messy situations, and involving more deeply in the learning process:

"I circle back to the knowing-doing gap to recognize the relationship between knowing and doing for purposeful action. As I moved through the semester, action-learning in our case studies, I came to understand that there's also a strong element of feeling to be had. [...] I feel that as a potential change actor and a master's student, I have been really benefitting from allowing my feelings to be involved in the things I am coming to know."



## Student\_434\_reflection document\_2021

*Life-long learning/New direction for future.* It seemed that the course allowed and encouraged students to explore future possibilities, in terms of which direction to take. Two students reported to have been equipped with tools for future challenges and having developed a fundament for working transdisciplinary and co-creatively to create change.

*Personal growth.* One student described how the class environment allowed to them to open up, feel comfortable and be vulnerable, and through that realizing that self-confidence and vulnerability could go hand in hand. Another student depicted how an exercise in class helped to see themselves in new ways:

"The Diversity Icebreaker<sup>1</sup> allowed me to think about myself in new ways, and not just in group work. As soon as I started naming myself to be a creative, visionary thinker, I have embodied it in my personal life. My capabilities feel stronger as I have the self-assurance and validation that I possess such talents. In this way, enacting these reductionist color dichotomies between myself and others, I actually was able to understand myself as more complex and vibrant, and less-definable than before."

Student\_433\_reflection document\_2021

Yet another student reported how the assignments of four initial and five final questions were useful to become aware of their own development through the course, indicating that a transformation happened:

"Answering the question 'What are the knowledge and skills we need to support sustainable development in agrifood and forestry systems?': I was able to notice a real shift in my perceptions. Indeed, now I have a better comprehension, and a real ownership of these core competencies that will enable the sustainable shift to happen. Writing this assessment raised my awareness on how much I have evolved since august. After I finished this assessment I decided to read the first assessment we had to write on the semester, the questions being quite similar. The way I answered in august differs greatly than how I would answer now. It's stunning how we've been empowered by this course to become active stakeholders in the sustainable shift. Now I can envision future with more clarity and optimism, the 'agroecology' and 'sustainability' terms are better approached and I can perceive how much they are complex and how much they have a lot of implications, socially, environmentally and economically speaking."

Student\_442\_reflection document\_2021

*Empowered to create change.* Four students reported that the course experiences made them feel more ready to deal with complexity and change in the transition to more sustainable agrifood systems. One student noted how group work and casework led to an understanding that they should be flexible and ready for change. The quote below, where a student describes learning about themselves and their innermost

<sup>&</sup>lt;sup>1</sup> The diversity icebreaker is a test mapping individuals' personality traits and team-working characteristics, providing a common framework of reference for collaboration and improving group dynamics in (especially) diverse constellations of people.



values through the course experience, indicates that a deeper transformation took place in the student:

"This experience in PAE302 has pinpointed some of my weaknesses, my strengths, my doubts and my innermost values. I learned a lot as a person, as a student, as a friend, as a woman-assigned individual, as an agroecologist. I could not have wished for a more fruitful experience. [...] I now know that my emotions are also contributing to creating my future reality if I use them as a fruitful foundation for visioning. This semester will have highlighted the importance of involvement, of critical thinking, of the primacy of the experience over the theory, of the importance of self-confidence in order to initiate change. Now I understand better what it takes to be a life-long autonomous learner, as I am to learn both from inside (myself) and from outside throughout my entire learning journey, and during my whole life. The PAE302 course will have proved me that the most important knowledge is the one that comes from my own experience, and that relevant theory and methods are only there to guide my own intuition through the messiness. The phenomenon is what is teaching me the reality of the situation, and I should always remember this. [...] This course will have "created urgency" (Mendéz et al., 2016) within me: the one to become a "driver of change" (Mendéz et al., 2016), in order to make our farming and food systems more sustainable. I am more than ever looking forward to taking action."

Student\_446\_reflection document\_2021

One student reflected on how the course in its essence was about "*learning to learn*", as described in the section about autonomous learning in chapter **Error! Reference source not found.** Learning goals (Student\_434\_reflection document\_2021). This also came forth as depicting a transformation in the student, as in becoming an autonomous learner.

Understanding of agroecology and the agroecologist. Four students mentioned how the course provided them with a new and deepened understanding of what agroecology is, and what it means to be an agroecologist. Reflection and the theory of learning from both inner and outer worlds was mentioned as building this understanding. Moreover, the lecture on farmers field schools made one student realize their role as agroecologist to be a facilitator, and for another student the casework provided the ground to understand that role.

*System thinking.* One student described having changed to a more systemic perspective on group work, from seeing pieces and parts to seeing the whole, and thus also involving themselves as a whole person and organizing the group as a whole, to see the work as a whole. Another student described how case visits provided the ground for understanding the complexity of systems, and changed their view on how to deal with them:

"When reading again my notes from my journal, I find it interesting how at the beginning of the case, I used the terms "clear answer and solution" regarding how to optimize the farming system. I did not understand the complexity of the systems at that time, as in my mind we had to figure out a specific and clear problem to be resolved with a clear methodology. Through our visits, I realized how there is not such things as a clear answer in complex systems such as [farm]'s one. This system is very complex, with so many different variables interacting with each



other - the cows, the fields, the feed, the manure, the weather, sickness, [farmer] and so many others. I now understand the meaning of the wicked problems we saw in class, that are much more than just complex problems. [...] It is not easy to deal with such problems. If we oversimplify them, then the potential solution we could come up with won't be actually effective because it would not address the problem in its whole. System thinking is thus an interesting way of dealing with those issues and the challenge of whole. Instead of oversimplifying the situation itself, we simplify our thinking. I had trouble at first understanding the difference, but after having gone through the whole methodology of Soft System Methodology<sup>2</sup>, I feel it starts to make sense in my mind. I can now understand the extent of agri-food systems' complexity, which the first primordial element to acknowledge in order to improve them."

Student\_438\_reflection document\_2021

In their responses to the five final questions, four students described experiences that come forth as transformational. Having made realizations during the course, one student described having realized that agricultural systems are human activity systems, while another claimed to have learned about themselves through improvement in listening and reflection, and yet another having changed their area of interest in food systems:

"This course has helped me to find out more about what direction I want to go towards further in this master programme regarding courses and master thesis, and also after the master programme. It has also helped me to see what I'm most interested in, which has sometimes been surprising. I think my interests develop as I learn. I thought in the beginning that I was mostly interested in the agricultural and the environmental part of agroecology. Now I find that the social dimension and working with different people have been tremendously interesting, and I've found the consumer side of food systems to become more interesting for me."

Student\_439\_end of semester\_2021

One student changed their main goal for the course, from gaining practical knowledge on farming and food systems, to become a good learner by understanding and developing the core competences.

In the final reflection session with students, one student mentioned how their understanding of the course description had changed since before the course, which indicates that a transformation of understanding happened during the course. (Final student reflection session\_2021)

While it appeared from the analysis of the students' written assignments that 11 students had gone through changes or 'transformations' of qualitative significance, it is questionable whether this is a reflection of the students' actual development, or their effort to demonstrate development throughout the course for the sake of evaluation.

<sup>&</sup>lt;sup>2</sup> Soft Systems Methodology (Checkland and Poulter 2006) is a tool to understand complex and diverse situations that are regarded as problematic. The aim is to bring about feasible and desirable change.



Although it is hard to conclude on to what extent the students went through a transformation or had transformative learning experiences during the course, the results presented above illustrate how students' course experiences helped them change perceptions, realize something new, approach a deeper level of understanding, and determine their future direction. Action learning, facing real-life situations and the use of core competences appeared as important to reach these new understandings and becoming agents of change. It is the notion of the researcher that for an experience to be 'transformational' or 'transformative', it should affect the person in question on a 'deeper level'. As such, for the course experiences to be transformative, they should have the potential to change the students' values. It is difficult, if not impossible, to draw any conclusions on whether the students' values were affected by the course experiences. However, the reported changes in perceptions, understandings, realizations, and personal directions might point to that direction.

## 1.4.2.2.2 To what extent does the education enhance the students' competences of:

The students' self-assessment of competences showed a significant enhancement of all the core competences, as illustrated in the table below. The highest increase was seen in Visionary thinking, directly followed by Dialogue. Participation was the competences with the highest overall score, with 6,8 points, i.e., the level of "competent performer". Overall, the students evaluated their own competences to the level of "competent performer", developed from the average starting level of "advanced beginner".

	2021, all s did not res	2021, all students (n=17). 1 student did not respond to both start and end		
Competencies	First day	Last day	Change	Sign.
OBSERVATION	4,2	6,1	2,0	***
Carefully observe a situation in the field	4,2	6,1	1,9	***
Create a comprehensive overview of a complex situation	4,1	6,2	2,1	***
Allow for examination of the whole situation before drawing conclusions	4,2	6,1	2,0	***
PARTICIPATION	5,1	6,8	1,6	***
Recognize values and goal conflicts of different stakeholders in society	5,1	6,6	1,5	***
Participate in work "out in the field" with commitment and dedication	5,0	7,0	2,0	***
Empathise with the goals and feelings of stakeholders in the field	5,3	6,6	1,3	**
VISIONING	3,5	6,1	2,6	***
Have basic knowledge of factors that stimulate and block creativity in individuals	3,7	6,3	2,6	***
Understand the processes that enhance a group's ability to identify today's critical challenges and envision a desired future	3,4	6,0	2,5	***
Able to inspire change by helping a group develop and align around a shared vision	3,4	6,0	2,6	***
REFLECTION	4,8	6,6	1,8	***
Awareness of the role of reflection in personal learning and development	5,3	7,1	1,7	**
Connect situations in the field to theory related to farming and food systems as well as to personal growth	4,6	6,1	1,6	**
Connect experiences and theory to own personal development	4,8	6,8	2,0	***
Ability to embrace self-guided learning	4,6	6,3	1,6	*
DIALOGUE	3,9	6,5	2,5	***
Understand the differences between debate, discussion and dialogue	4,1	6,9	2,9	***
Can introduce a group to the purpose and guidelines for dialogue	3,4	6,2	2,8	***
Can identify and formulate questions which stimulate a dialogic approach	3,9	6,1	2,3	***
Can appreciate and explore a variety of perspectives and be able to identify and challenge the assumptions behind your own and a group's thinking	4,4	6,6	2,2	***
Average	4,3	6,4	2,1	
Levels: $1-2 = $ novice; $3-4 = $ advanced beginner; $5-6 = $ competent performer; $7-8 = $ proficient performer; $9 = $ expert				
All average changes are in positive direction				
Levels of statistical significance: * means p<0.05, ** means p<0.01 and *** means p<0.001, n.s. means not significant.				

#### Table 1: Self-assessment of competences 2021



## 1.4.2.2.2.1 observation?

In the students' individual reflections on learning goals, observation was not often mentioned. But when it was mentioned in that data set, the results were very similar to those from the students' reflection documents. More specifically, in the individual reflections on learning goals, one student mentioned that observation is a competence that they would like to develop further. Another one appreciated how they had improved observation during the course. Yet another one mentioned that observation needs to be accompanied by appropriate time for reflection. In the results from the analysis of the students' reflection documents below, those findings return. Moreover, analysis of the students' self-assessments at the beginning and end of the course, show a significant increase in the average values for observation from the beginning until the end of the course (from scale 4.2 until 6.1). This means that students on average assessed their competence level for observation higher at the end of the course level for observation higher at the end of the course level for observation higher at the end of the course.

Analysis of the students' reflection documents provides insights into which course activities the students find helpful (or not) in building the competence of observation, how students describe building that competence throughout the course, and which other competences the students relate observation to.

While only one student mentioned the exercise of observing a painting as a **course activity** that helps to understand and build observation, three students mentioned that the session in class during which observation was explained as useful to understand the competence beyond a common-sense understanding, and thus was a good start to learn to really observe.

Although the course activity Eating Observation was part of the course this cycle too in order to train observation early on in the course, students did not mention this exercise in their reflection documents. The students' course evaluations can set light on why students might not have included Eating Observation in their reflection documents. In the course evaluations students mentioned that the Eating Observation exercise came at a busy time. One students found it "irrelevant to other work in the course at th[at] moment" (student\_436\_course evaluation\_2021), and another one found it interesting but not helpful. Students also mentioned that they were left with ethical doubts after the exercise and that its organization and structure could have been better. Nevertheless, students did find it a helpful exercise for writing in the future. In that regard, one student mentioned "I am aware of the importance and it is definitely a must in the course" (student 444 course evaluation 2021) while another one wrote that it was a "[g]ood exercise to test the understanding of the previous lecture on qualitative methods and a smart way to engage with an interesting article" (students\_anonymous\_course evaluation\_2021). It is thus hard to guess why students ended up not mentioning the Eating Observation exercise in their reflection documents and whether or not it contributed to their building of the competence of observation.



The visits to both the farm case and the food case were mentioned by fourteen (all but three) students as course activities that helped them in training observation. Also, the self-assessment of competences showed a significant improvement in "carefully observing a situation in the field" from the beginning until the end of the course. For the farm visits, especially the first farm visit was considered useful to build the competence. But one student mentioned that they felt that they didn't get enough time to observe and analyse results during the farm casework. Approximately half of the students describe the transect walk on campus at the start of the course as a useful exercise to learn to engage all senses, and more than half of the students elaborate on how the transect walk on campus was a good preparation for observation during the first farm case visit, given that they also did a transect walk during that visit and had already learned from experiencing and reflecting on the transect walk on campus. Two students specifically mentioned that they didn't manage to observe well during the transect walk on campus, but that they understood what they did wrong during the reflection on that exercise in class, and thus improved their observation during the transect walk on the farm. One student describes this competence building as follows:

"I felt this observation [i.e. transect walk on the first farm visit] went smoother than the first one [i.e. transect walk on campus] we did during the first week of class, where my mind was having such a hard time focusing on my surroundings, as my thoughts were going all over the place in my head. Through this first walk, I learnt to observe through all five senses, and not just through my eyes. The discussion we later had in class made me realize that I tended to observe what I know or am interested in. Being aware of this bias for this walk at the farm was of great help, as I tried my best to absorb all elements around, acting like a sponge instead of like an osmosis filtration device (where only some particles of interest can get through). I think I was able to have a better overall view – but I must admit that I still got distracted and dived in my thoughts from time to time. Each time it happened, I acknowledged my thoughts and gently came back to observation, like I would do during a meditation session."

Student\_438\_reflection document\_2021

The last sentence of this quote also indicates that the student gradually built the competence further by learning to observe their own thoughts as well.

Students **describe how they build the competence of observation throughout the course** in their reflection documents. This process of building observation has different steps. While all students describe observation as observing the outer world, for example what they see during a transect walk, seven students described observation as realizing their own assumptions, as observing without judging or assuming. One student describes this as follows:

"Another way of handling these types of situations later was to realise in situ that I was assuming something and suspending these assumptions. By doing so, my approach changed. I was able to grasp the whole situation better rather than seeing only the parts."

Student\_432\_reflection document\_2021

This is aligned with a significant average increase in the competence level for "allowing for examination of the whole situation before drawing conclusions" from the students'



self-assessment of competences (4,2 at the start of the course and 6.1 at the end of the course). In that regard, seven students mention that they started to observe their own thoughts and feelings, which shows that they started to observe the inner world as well. For example:

"I have come to understand the competence of observation not as non-judgement, but as being aware of my inner reactions or judgements when they arise. I'm not sure that it is possible to be completely non-judgemental and neutral as I think we always understand things into a context of what we already know. Thus for me I think of observation as both observing my inner world of reactions while observing the external world. Suspending judgement or being aware of my judgements is what I feel makes a difference, because when I become aware of my judgements I can choose to question them and not automatically take them for truth to be."

Student\_439\_reflection document\_2021

Another student didn't get to this level of observing during the course and realized that while reflecting on their competence level. That student stated that they therefore would like to build the competence further in the future.

Five students described a third step in building observation, namely that they started to observe human interactions, and two other students mentioned that they started to observe their own (re)actions in a group. Three students who learned to observe human interactions, mentioned that observing others' feelings is crucial to understanding the system of which those people are part, thus relating this next step in observation to the competence of systems thinking. One student applied observing human interactions during group work to learn from peers, and so used their learning in observation to learn from peers and for building of other competences, for example facilitation:

"We had one group member who was particularly good at facilitating conversations, making note of other members being left out of the conversation or members speaking over each other. I found their facilitating efforts particularly beneficial as I felt seen and heard when they made room for me to present my ideas and comments to a group full of strong opinions. Moreover, I found that from observing them and their approach to facilitating dialogue, I could learn a great deal about what efficient facilitation looked like and how one could effectively manoeuvre through complex situations and group relations. Through this observation, it became even clearer to me that good communication is a prerequisite for good facilitation."

Student\_431\_reflection document\_2021

This shows that students who build the competence of observation throughout the course, use this increase in competence level to build other competences. One student mentioned specifically that it was very motivating to start learning from observation and then reflecting. Three students pointed out that observation and reflection engaged more senses and parts of their brain than when reading a book or sitting in class, and therefore enhanced their learning. For example:

"No formal essay or textbook on a farm could convey the set of impressions, feelings and information that I perceived while being there through my own senses and personal background. I believe that, being inside a situation, engaged more parts of the brain than the



logic-dominated prefrontal cortex, contributing to deeper and more holistic understandings and long-lasting memories."

Student\_430\_reflection document\_2021

This indicates that students experience the building of the competences observation, reflection and systems thinking as intertwined. Indeed, ten students elaborated on the necessity of complementing observation with reflection in-between and during case visits to grasp *what's there*, and eight students stated that observation is necessary to gather a wide range of valuable information that can inform systems thinking. The need for reflection to observe well and thus start seeing parts of and linkages in the system, can be illustrated by the following quote:

"In trying to strictly observe, I asked myself, 'Why am I not feeling anything? What am I supposed to be understanding?' And the answer is that I didn't need to be asking these questions at all. Observation serves as an exploration of the elements; in foraging for connections and meta-analysis, I was leaving the assigned realm. In retrospect, the purpose of the original exercise was discerning what is "observation" and what is "thinking about your observations" and in reflection on these experiences, I have finally been able to exercise this competency (Nicolaysen & Lieblein 2021). In later observation walks and in further practice, I hold much greater capacity to toe this line – and not step over it."

Student\_433\_reflection document\_2021

When describing how observation contributes to systems thinking, eight students mentioned how observation helped them to draw a rich picture of a case, or as one student put it in their description of the process of developing a rich picture:

"Through observation I was able to see the connections between these biophysical, economic, and social dimensions. Moreover, define them as constant variables within a farming system. Observation proved to be an approach that enabled me to better grasp the whole, not just the parts."

Student\_435\_reflection document\_2021

This is another example of how students experience observation as useful to develop systems thinking. Moreover, the averages of the self-assessments of competences from the beginning and the end of the course showed a significant increase for "creating a comprehensive overview of a complex situation" as well (from scale 4.1 to 6.2). When linking this to their learning process, five students mentioned observation as key to enable them to acquire and internalize knowledge on farming and food systems, with or without referring specifically to Kolb's learning cycle.

"Within inherently intricate agri-food systems comprised of diverse elements such as people, economics, products, values, and ecosystems, observation is useful in seeing that things are meaningful in the way that they are phenomenon existing within a greater reality. This allows us to identify phenomenon and see how they effect or are affected by the whole. A holistic knowledge of the system requires that we can take it for what it is, zoom in, out, and see the butterfly effects taking place in the constant movement of it all. This allows us to act according to the true needs for sustainability, as opposed to our own biases and worldviews."



Student\_433\_reflection document\_2021

Further illustration of how observation was experienced as part of and contributing to their learning process, was given by five students who also mentioned participation to allow for more (intense) observation during their case work. For example:

"I realized, that as a farm system is a human activity system it is important to see the farmer or the stakeholders in interaction with the various elements of the system, and not only gather information through interviews or dialogues. I felt that through participating in the farm work we were able to see the farm system from "the inside" and put ourselves "in the shoes" of our farmer, which helped me empathize with our farmer to a greater extent."

Student\_439\_reflection document\_2021

This indicates that while observation followed by reflection helps to build the competence of systems thinking. Participation helps to build the competence of observation.



Figure 2: Chart of codes overlapping with 'observation'

A query in NVivo that checks the overlap of coding for observation and codes, (presented in figure 2 above) confirms the findings from the analysis of the reflection documents, namely that students experience that training observation is intertwined with training reflection and systems thinking, and that they perceive of participation in casework as a good way to train observation. Indeed, the query result shows that data coded for observation showed most overlap with coding for participation, followed by systems thinking and reflection. In summary, one could say that students train observation most during participation in casework, that they use those observations to understand the system they study during their case work (and thus train the



competence of systems thinking), but that this is only possible with regular reflection on observations.

#### 1.4.2.2.2.2 reflection?

In their responses to the "Individual reflection on learning goals", reflection came up as important for half of the students. For two students, the competence came through as necessary to situate oneself in the field of agroecology, and to identify values, interests, and purpose in life. Along with visionary thinking, reflection helped to handle complexity and change in a flexible way, and reflection in dialogue sessions and groups helped to realize the diversity of ideas and perspectives that a group of people can generate together:

"The sometimes rigid dialogue frameworks used during plenary group sessions have helped me realize how much can come up in terms of different ideas, perspectives and understanding from what seemed to be a common simple question at first. With only five minutes of individual reflection and another eight to share our reflections it felt like we came up with way more ideas than if we had spent 15mn on our own, probably more stock in our reflecting silos."

Student\_432\_reflection document\_2021

Reflection was by one student described as a quite familiar concept, while being new to another. For yet another student, reflection was a missing component in previous education, and found it satisfying to reflect during the agroecology course:

"It is only when starting this degree that I realized that while doing my last bachelor I actually stop being interested in the world and stop reflecting about my surroundings and my experience. It was quite stunting to see how much I had trouble reflecting in August compared to now. I realize how reflecting is a skills that needs to be trained to be improved. I find it also very satisfying to reflect, we can come up with so many meaningful ideas and insights just from within ourselves. It is very gratifying for me to reflect, it is a bit like feeding my brain."

Student\_438\_reflection document\_2021

The statement above indicates that the student went through a transformation with regards to reflection, finding satisfaction in developing ideas and insights. Reflection was also by another student pointed to as having transformative powers, in the sense that it could reveal hidden elements to observations and thus give a deeper understanding of situations. One student linked reflection to being an autonomous learner and described it as important to retain and understand in depth what is learned.

From analyzing the students' reflection documents, the points above are further strengthened and expanded on, and all students described their competence development in reflection to some extent.



Reflective journal and reflection document. Writing the reflective journal and reflection document came forth as essential assignments for more than half of the students to practice and improve their reflection abilities. Three students reported that they were overwhelmed by the messiness of their reflections from throughout the semester, and chose to see it as a complex system to deal with the difficult task of writing the reflection document. For one student, not only did system thinking help to write the reflection document, but also vice versa; the writing helped to "connect the dots", learning from experiences in the course and linking it to theory. One student described how writing in the reflective journal had a positive effect both personally, on mental health, and on the process of the casework as it improved the understanding of dealing with complexity in a healthy manner. Another student saw the reflection document as a tool to use for later studies and life in general. These findings align well with the selfassessment of competences, as presented in table 1 above, where one of the subcompetences "connect situations in the field to theory related to farming and food systems as well as to personal growth" increased significantly. One student noted how writing by hand was powerful for the reflection document, as they could see their previous thinking and ideas also when it had been crossed out and not deleted as it would have been on a computer. For one student, the assignment required patience, and feedback from teachers was valuable to the process. In addition to developing the competence of reflection through the assignment, for two students it also gave an opportunity to improve structure and clarity of communication. The assignment of writing the reflection document was obviously a challenge, but a challenge to learn from:

"The reflection process, writing this document and the sessions in class, the emphasis on reflection has generally increased my awareness of my own learning, strengths and weaknesses, preferences, tendencies and driving forces. In this way it has led to some personal development as well as made me aware of what I need to learn more about – where to go next. Reflection feels like a necessary competence when dealing with complexity – to be able to see clearly and 'clean up' thoughts by questioning them and exploring multiple perspectives. Reflection was something I thought of as one of my strengths coming into the course, but I realized I have never done reflection or reflective writing in a structured way with a specific goal of enhancing my learning process. I feel like I have developed my competence of reflection to some extent in this way, but I also see the need for me to develop this competence further and to use this competence more actively throughout all parts of a work or learning process."

#### Student\_439\_reflection document\_2021

"When I look back to august and compare my notes in the journal, it's stunning how the words are better used and which level of thinking I can now reach: ideas flourish, perception is better illustrated, questions pop up."

#### Student\_443\_reflection document\_2021

Reflection to deal with oneself and group work. For more than half of the students, reflection was pivotal to learning about oneself in relation to others and about group work, and it was seen a way to make sense of and deal with different situations. These findings align well with the self-assessment of competences, where the sub-competence "connect experiences and theory to own personal development" increased very significantly. Reflecting on oneself in relation to others in group work enabled six students to better understand group dynamics and helped coming to



agreements and making decisions by converging their thinking. One student saw reflection as helpful to create collective intelligence and shared understanding of phenomena. This illustrates the importance of reflection both for introspection and as a competence to facilitate group work. Reflecting together as a group it became evident to students that every person has a unique perspective, as exemplified by the statement below:

"At the end of the day, when we came together as group in the farm case work to reflect on what is there – we often remembered, fixated on, or understood different elements. The diversity of perspectives (inclusive of the farmer's) was not only efficient in understanding the richness of the situation, but also an interesting phenomenon in revealing that everything we see is filtered through our own 'window on the world'."

Student\_433\_reflection document\_2021

By reflecting on group work, one student could increase the understanding of their own role, and that helped putting aside personal needs and take responsibility for the group. For another student, reflection helped to propose ideas in groups, and for yet another it enhanced the ability to support their arguments and share within the group.

One student described how they often went into being judgmental if they forgot to reflect in group work. Another depicted how the lack of dialogue and reflection in group work was harmful to the process, and how the situation improved when they were used in the group:

"Thinking back on this part of our group work, I realized I was missing more dialogue and reflection which I believe would have helped us greatly. It would have helped us both personally and collectively in dealing with stress and stepping back and getting an overview and shared understanding. I think our communication suffered because we started acting from stress and thus prioritized dialogue and collective reflection less. However, me managed our conflicts fine in the end through that exactly, having a dialogue and reflecting upon these differences and this group dynamic. We agreed that it is important to learn to balance the "take and give" between personal learning needs and the need of the group, and that we must learn to trust each other and let go of some ideas and personal needs and just make the best of the situation."

Student\_439\_reflection document\_2021

The cooperation checklist was mentioned by one student as useful to reflect on the group work process, as it resulted in deciding on more structured meetings, putting more time and energy into reflection, and to understand and learn from the casework.

*Reflection for individual development.* While the practice of reflection was helpful to deal with oneself in relation to group work, five students also reported that they developed individually. Reflection helped one student to explore their direction for the future, for another to gain confidence, and for yet another to explore personal assumptions and become aware of one's needs for learning. One student reported that reflection on their own thoughts led to being less pessimistic. Another student noted



that the course helped to unravel and be more open to feelings and emotions, and through that an efficient way of connecting to messy situations. These findings are supported by the self-reported increase of the sub-competence "awareness of the role of reflection in personal learning and development".

While reflection was described as having many personal benefits, it also came through for one student that it was a challenging practice that required energy. For another student, reflection was difficult when personal issues demanded their attention. Yet another student reported how reflection was both a "blessing and a curse", and that they rarely used it voluntarily.

Reflection leading to new understanding. Through practicing reflection, more than half of the students came to new and deeper understanding of their experiences. Five students reported that in casework, reflecting on assumptions helped to meet stakeholders and situations with an open mind, and as such helped to develop an understanding of the whole situation. Three students noted that in general, reflection helped to build understandings of situations, stepping back from first impressions, and one student mentioned that reflection helped to understand new concepts and theories. These findings are further backed by the self-assessment of the subcompetence "connect situations in the field to theory related to farming and food systems as well as to personal growth".

While reflection led to increased understanding in general, it also increased the understanding of *systems thinking and dealing with complexity*. For five students, reflection helped to develop system thinking, enabling evaluation of complex situations, and gaining a holistic perspective, as exemplified below:

"This reflection on the diversity of farming systems, became even more evident during class sessions when other groups were presenting their farm work. (...) These observations made me see the nuances within farming systems that I had not seen before. Additionally, they made me see the differences in the questions the farmers are asking. That is when I realized how complex these farming systems are. Every single farm is different depending on the geographical locations, and human factors."

## Student\_435\_reflection document\_2021

"Part of what helped develop my ability to handle complexity and change is the way reflection was embedded into our learning. When problems are wicked and situations are messy, there is no clear solution to be had, and (as offered by the blind men and the elephant metaphor) any solution is specific to the perspective you take. I've come to believe that undertaking the challenge of the whole necessitates reflection, not only on system parts and their interconnections, but the nature of coming to know about the system: the epistemology. Wicked problems involve beliefs, identities, values - facets that give them a subjective quality. Understanding the roots of how and why you know what you know is one way to move in the direction of a holistic understanding."

Student\_434\_reflection document\_2021



"Also, as I think about the situation now, I found this teaching method favoring individual and group reflections fundamental as a future agroecologist who would need to take important decision despite the complex challenges."

Student\_443\_reflection document\_2021

Six students mentioned how reflection was helpful to understand and develop in the action learning approach. This is supported in the self-assessment by the increase in the sub-competence "ability to embrace self-guided learning". The self-assessment results on this sub-competence is further backed by the following.

*Exercises where reflection as a competence was developed.* The dual learning ladder was by one student mentioned as important when reflecting on the learning process. For another student, doing peer review of a peer's reflection document seemed to help in reflecting on oneself and one's own learning process. One student reported that reflection sessions in class of great help, and that it triggered thoughts in ways that most likely wouldn't have happened otherwise. The reflective process was further described by one student as evolving, from trying to answer teachers' questions to asking their own questions.

Reflection sessions by the IGP (individual-group-plenary) model in class was mentioned by three students as important, challenging, and at the same time giving space for meaningful sharing and idea generation. As one student noted:

"Thinking individually before answering a question in a group setting became a very important thing to me. I experienced how this personal space allowed me to come up with better answers. I also saw the different perspectives from my groupmates without being influenced by them and directing my thoughts from the beginning. Nevertheless, if I were given too much time to think on my own, I found myself diving too deeply into one thought. After, it became harder to let go my ideas and get interested in other people's thoughts when coming back to the group sharing phase. It was enriching to hear about everyone's perspectives but very hard to come to a common understanding which considered everyone's ideas."

Student\_432\_reflection document\_2021

Practicing reflection was seen by one student as essential to realize the need for reflection. This supports the course structure where reflection is introduced as an activity to practice in class, and not only encouraging the students to do so by themselves, as they might not see the need until they have actually practiced it.

Two students mentioned how student-led reflection sessions were seen as a space for co-creation, transdisciplinarity and collective intelligence, converging ideas and sharing knowledge.



Regarding *facilitation of reflection*, it was mentioned that professors' interactions with the class in reflection sessions helped to share openly. Three students noted how they were guided into sharing their understandings and generating own formulations, to come up with a diversity of answers.

*Reflection and participation.* One student described how reflection was only possible due to motivation, and that motivation was gained through participation; by feeling emotionally involved in a situation. Another student noted that reflection on experiences from casework helped to see themselves and the project as meaningful to each other:

"In reflecting on my experiences of the case work and the experience of my role within it, I was able to understand how the project is not only meaningful to me, but how I am meaningful to it. As I'm now in the process of performing meta-reflection, I've been able to discern that this experience of initial reflection did and will enable me to inform subsequential experiences with knowledge and meaning that has now been concretized."

Student\_433\_reflection document\_2021

*Observation and reflection.* The observation walk<sup>3</sup> as an exercise combining observation and reflection, was mentioned by one student to help discerning between observation and "thinking about observation". For another student, the reflection session after the observation walk allowed the practice of both competences, and helped students understand the necessity of reflection. To yet another student, the exercise helped realize that the brain's processing of observations is complex:

"The observation walk and then the description of the observation and reflection processes helped me realise that the absorption of sensory information by the brain, its interpretation and the understanding we make of it are very conglomerate and it's challenging to take the process step by step."

Student\_442\_reflection document\_2021

One student reported that taking time to reflect on observations and the thoughts about the observations helped to see relationships between parts better, and thus improved understanding. As such reflection in conjunction with observation might also be connected to developing the competence of systems thinking.

Regarding *visionary thinking*, one student described how the ability to reflect helped to identify factors that stimulated and blocked creativity, and that the visioning exercise in class was complemented by reflection.

*Reflection as empowering.* For three students, reflection was seen as empowering, helping to generate new insights, own knowledge, and direction for work. For another

<sup>&</sup>lt;sup>3</sup> Observation walk and transect walk are synonyms for an exercise practiced in the course



students, it was described as a core competence for agroecologists to transform observations and assumptions into knowledge.

"I arrived at this understanding after journeying through PAE 302: Action-learning in farming and food systems, for which my learning path wove through my inner and outer worlds and offered the opportunity to look at the situations around me...and to then look again. Reflection became more habitual, and the way that I learned became more incorporated. [...] As the deeply personal process between having an experience and connecting it to bigger ideas outside of itself, reflection informs my learning as much as any experience, textbook, or lecture does. This semester, I found that reflection is the most empowering competency I have to apply in a learning experience. By reflecting, I generate knowledge that is completely my own."

Student\_434\_reflection document\_2021

Two students noted how reflection, on learning activities and situations in general, served the goal to become an agroecologist. Reflection was by one student described as a foundation for action and change, and as such a way to narrow the knowing-doing gap. As exemplified below:

"As a matter of fact, the reflections that arose from the different learning activities such as lectures, seminars, reflection sessions, the diverse outside the class experiences and, not least, introspection, while having distinct purposes, such as deepening my understanding of different topics or as a vent, served the goal to form me towards becoming an agroecologist."

## Student\_430\_reflection document\_2021

"As I am becoming an agroecologist, it is a good reminder of how essential it is to keep looking with curiosity at every encountered situation, without a judgemental mindset and too many assumptions. Our reflection can be the foundation for change, as we can decide to scrutinize any thought or any situation with different eyes. [...] The reflection process is about examining our thoughts and our ideas to serve our actions in a positive way, and this means taking the time to do so. By taking the time to frame my reflection throughout this learning journey, I can act and become a driver of change. My reflection process is therefore a way to narrow 'the knowing-doing gap' (Pfeffer and Stutton, 2000), because I therefore connect the experience and what I have learned from it to agroecological and personal knowledge, in order to take action in the future. This is how I see my reflection experience: it is a fruitful fertilizer to build up meaningful actions, in my near and distant future as an agroecologist"

Student\_446\_reflection document\_2021

However, it was also mentioned by two students that as reflection do not provide tangible results, it is challenging to recognize its outcomes. Another student expressed that they felt a resistance towards the educational approach used in the course, and that this also affected the level of reflection for that student:

"In retrospect, I have realised that my mind and preferred academic approach might be too set in its ways to completely embrace the more innovative, alternative teaching methods promoted in the course. Moveover, I believe this disconnect is what has contributed the most to getting me stuck on the lower parts of the dual learning ladder, and being reluctant to take the further steps upwards and tap into the internal learning world of personal visioning and reflection (Lieblein, 2007)."



(Student\_431\_reflection document\_2021



Figure 3: Chart of codes overlapping with 'reflection'

Figure 3 demonstrates what other codes that were coded for in the same segments of texts that were coded for 'reflection'. Here, it appears that in over 50 segments of text coded for 'reflection', 'systems thinking' was also coded for. In the analysis, as elaborated on above, it appeared that reflection helped to develop system thinking and understanding of situations. The link between participation and reflection was not as clear. However, as the code 'participation' was used for all situations where students described situations they participated in, whether in casework or group work, it is not surprising that this also coincided with when the competence of reflection was trained. From the analysis, there was no doubt that group work had been an important arena for competence development in reflection, and that the practice of reflection had been helpful for group work and vice versa. The link between observation and reflection was also evident, although not to the same extent. While transformative learning was not identified as a category in the inductive analysis of text segments coded for 'reflection', it was clearly evident from the analysis of segments coded for 'transformation' that reflection was essential for transformative learning and transformation. Although it is interesting to see what codes that coincide with each other, it is not possible to conclude based on the chart only what competences and elements of the course that support each other, and if they are connected -how they relate. However, the chart may act as a foundation for further discussion of the coding process, and of the connection between elements of the learning process.

## 1.4.2.2.2.3 visionary thinking?

In their individual reflections on learning goals, seven students named visionary thinking as a particularly interesting or relevant competence and five students stated being interested in building the competence further and learning more about it. Amongst the students who found visionary thinking a particularly interesting/relevant



competence, one student mainly appreciated the competence to "handle and play around with changes and chaotic complex situations in a flexible way" (student\_432\_individual reflection on learning goals\_2021). Another one described it as a way to notice your own interesting and original ideas, "seeing things clearly and feeling that they are possible" (student\_433\_individual reflection on learning goals \_2021). Yet another one stated that visionary thinking, together with communication and facilitating are relevant to "deepen my understanding of people, differentiating interests and worldviews, the power of emotions, driving forces and values" (student\_439\_individual reflection on learning goals\_2021). This means that students regard visionary thinking particularly relevant for their personal (inner) life. Yet one student mentioned visionary thinking as a particularly relevant competence for sustainability, that may help to reach "a farm and food system transition" (student\_443\_individual reflection on learning goals\_2021).

Also, in the reflection documents, five students wrote about how visionary thinking had turned out to be a competence for their personal life, for example:

"While in August I felt lost on which direction to take in the future, the learning during these months, in conjunction with the introspective work, has provided me with methods on how to explore the future and a compass on the direction to take. A visionary exercise on my own future allowed me to avoid converging thinking through scenario planning and to use diverging thinking instead. I believe that my vision has been affected by my experiences during the past months."

Student\_430\_reflection document\_2021

It is inspiring to see that some students used visionary thinking in their personal life and analysis of the students' reflection documents provided more detailed insights into which course activities the students find helpful (or not) in building the competence of visionary thinking, how students describe building that competence throughout the course, and which other competences the students relate visionary thinking to.

The first **course activity** that students describe when writing about the process of building the competence of visionary thinking, is the visionary thinking exercise in class. For many of them, this first introduction to visionary thinking was a real eye-opener. One student wrote the following:

"I was amazed by what I was capable of creating in my head. I couldn't believe how easy it felt in the deep state of relaxation, to liberate my mind of its logistical barriers and just imagine. My peers shared my disbelief, and subsequent pride in our abilities. I still think it was one of the most personally powerful experiences I've had to date."

Student\_433\_reflection document\_2021

This does not only indicate how amazed students were after the exercise, but also how visionary thinking experiences can create a sense of pride, a sense of ability to change. This is key in a course that aims for students to become change agents. While doing that exercise themselves, students thus experienced how visionary thinking can


stimulate creativity in individuals. At the same time, they felt able to inspire change. This eye-opening experience and the further building of the competence through the course, might be an explanation as to why the students' self-assessments of competences showed the highest increase for visionary thinking from all competences when comparing average scales at the start and end of the course, namely a significant increase of 2.6. One could assume that when a first exercise to train a competence is an eye-opener and creates a feeling of ability to change, that students will feel that they have learned something enlightening with that competence, and thus rank it much higher at the end of the course than at the beginning. Moreover, the sub-competences *"have basic knowledge of factors that stimulate and block creativity in individuals"* and *"able to inspire change by helping a group develop and align around a shared vision"* both had a significant increase of 2.6 scales as well, which confirms students' learning on how to stimulate creativity through visioning, and their strong feeling of ability to inspire change after the exercise.

The next exercise on visionary thinking in class was a guided visioning workshop in group in which students envisioned the canteens they were working on in their food casework. After envisioning their canteens, the students reworked the visioning script they had developed for their case work. For at least half of the students, this was a valuable next step in building the competence. One student wrote in that regard:

*"I feel like I gained deeper understanding of visioning during this group work session and our trying and failing, what makes it work and not, what supports visioning and hinders it."* 

Student\_439\_reflection document\_2021

While the first exercise in class was an eye-opener, this second session in class helped build their competence to facilitate a visioning session themselves, which is a large next step in competence level for visionary thinking. Thus, students built the competence further, as confirmed by the average self-assessments of the sub-competence *"understand the processes that enhance a group's ability to identify today's critical challenges and envision a desired future"*, that increased significantly with 2.5 scales from the start to the end of the course.

Thirteen students mentioned visionary thinking when describing their farm casework. This is surprising given that students were not introduced to visionary thinking until after the farm case work was over. While three students mentioned this explicitly in their reflection document, it also indicates that students recognize aspects of visionary thinking when they reflect on their participation in the farm case after having been introduced to visionary thinking. Indeed, students are of the opinion that they should already have been introduced to visionary thinking before the start of the farm case because they believe it would have enriched their case work. But a couple of students then reflect on how they built the competence throughout the course and doubt that they would already have been able to build visionary thinking early in the course. Moreover, three students mentioned negative experiences with visionary thinking during their farm casework. Those three students were part of the same group for the farm casework, and mentioned that the farmer's negative or even depressed attitude



towards the further of his farm blocked potential for visionary thinking, in part due to their group's inability to not take the farmer's negative attitude as central to their soft systems analysis.

All students mention visionary thinking when they reflect on their food case work. This is logic, given that they are strongly encouraged to do a visioning workshop with stakeholders in their food casework, and that all groups did that in this cycle. Two students from the same food casework group mentioned that their visionary thinking workshop was cancelled, but that they nevertheless adapted and learned from that process.

While only two students reflected on how they **built the competence** throughout the course, with one of them calling it *"an integrated skill"* (student\_430\_reflection document\_2021) towards the end of the course, four students mentioned that they would like to build the competence further or use it more in the future. This might be due to visionary thinking being introduced last in the course and not being trained from the beginning until the end of the course. But the students' self-assessments of competences at the start and end of the course show on average the highest increase for visionary thinking, with a significant difference of 2.6. This indicates that although students would have liked to train visionary thinking even more during the course, they also perceive it as the competence they have built most throughout the course. Moreover, the large increase in the self-assessments for visionary thinking can (partly) be attributed to students having gained a better or different understanding of what visionary thinking is during the course. This is described in the following quote:

"The things we thought we knew at the beginning of the course took another level of understanding by the end of the course. I remember filling up the self-evaluation on our skills and competences at the beginning of the course and now, at the end of the course. The meaning of skills like 'have basic knowledge of factors that stimulate and block creativity in individuals and groups' changed. These changed by experiencing activities like the visionary exercise in class complemented by the reflection session where we had to come up with the characteristics of a good atmosphere for creativity to take place. I became more aware of the different phases in the learning process. A time was allowed to lay out ideas without being judgemental and then we would move on to evaluate those ideas and make a quality decision (Figure 3.). This tool gave me space to think."

Student\_432\_reflection document\_2021

Here, the student also describes how reflection after visionary thinking helped them to better understand the entire learning process. Indeed, five students mentioned that visionary thinking needs to be complemented by **reflection**, especially to enable one to understand complexity. Thus, students believe that building the competences reflection and visionary thinking can help to build the competence **systems thinking**.

When reflecting on the visioning workshops they conducted during their food case work, ten students related visionary thinking to **facilitation**, creating **dialogue** and a non-hierarchical situation of **trust**. One student wrote



"I realized that the role that I prefer to take is more passive than some of my group mates, and we balanced each other out well. When it came to facilitating two visionary workshops, I was challenged but determined to step into more of an active communicative role."

#### Student\_434\_reflection document\_2021

This quote shows that the visioning workshop helped building the student's competence of facilitation. But most students describe the necessity of facilitation, dialogue and trust for a visioning workshop to be inspiring and successful. For example:

"For the second case, we mainly used facilitation through the visionary workshop. To practice those methods detailed in the previous section, I think it is important to create a relationship of trust so that they are open to it to create an efficient learning and working space. So, I think it is important to be transparent about the process and clearly explain the objectives of this method. It's important because it's an activity that requires energy and frustration when you're debating to agree."

#### Student\_437\_reflection document\_2021

The students also wrote that it is rewarding to see the results of facilitating a workshop (be it participants' enthusiasm, or the timeline produced). The following quotes speak for themselves in that regard:

"This sharing of ideas and validation of creativity was a testament to this awareness that we all have the capability to conceive exceptional visions, so long as we intentionally set ourselves up to do so. Experiencing this for myself, and then facilitating it for others, gave me the confidence and trust that this really truly has power. I felt, and still feel, that this a competency that needs to be spread in order to understand what we really want our futures to look like, without getting bogged down in the humdrum of daily life and logistics. This is what we need to conceive of sustainable solutions and societies."

#### Student\_433\_reflection document\_2021

"Some stakeholders even continued developing their ideas on their own after the workshop; the head of the canteen looked very excited as she showed us the sports department teacher's powerpoint presentation of the multifunctional greenhouse they had come up with during the convergence session of the workshop. This experience filled me with pride as we were completely taken by surprise by the amount of positive engagement and involvement we were met with at [Name] high school, and how it culminated in inspiration and will for change in the stakeholders we collaborated with."

Student\_431\_reflection document\_2021

Some students nuance this rewarding feeling after facilitating a workshop. Five students mentioned missed opportunities and that they could have facilitated better. This indicates that while reflecting on the whole experience at the end of the course, students are able to see what they could have done better, which is an important part of the learning process as it might help them to build the competence further in the future.



But the rewarding feeling when seeing the results of facilitating a workshop, motivated three students to follow up in practice on a vision, outside their course activities. In addition to students using visionary thinking in their personal life mentioned earlier, the fact that students also followed up on visions with stakeholders, can be a testimony of how visionary thinking can create a feeling of ability to create change and thus contribute to the course's goal for students to become change agents.



Figure 4: Chart of codes overlapping with 'visionary thinking'

A query in NVivo that checks the overlap of coding for visionary thinking and other codes, (presented in figure 4 above) confirms the findings from the analysis of the reflection documents. The code visionary thinking shows most overlap with participation. This is due to the fact that students mostly describe visionary thinking in relation to their case work, especially the food case work. The code 'By students' in the figure above refers to the code 'facilitation by students' (as the code facilitation had subcodes 'by teachers' and 'by students'), and the strong overlap between the codes visionary thinking and 'facilitation by students' is another testimony of the fact that students train visionary thinking most while facilitating a visioning workshop for stakeholders in their food case work. As mentioned, it is during that process of preparing, implementing and reflecting on a visioning workshop with stakeholders, that students get to the next level of competence for visionary thinking. In their reflection documents, five students mentioned that visionary thinking needs to be complemented by **reflection**, especially to enable one to understand complexity. This is confirmed by reflection and systems thinking being the following two codes with which the code 'visionary thinking' overlapped most.

# 1.4.2.2.2.4 participation (engagement)?

In the individual reflections on learning goals, only one student named participation as a particularly interesting or relevant competence, two students were interested in building the competence further and learn more about it, two other students mentioned



that building participation is necessary for sustainability (outer life), and none of the students mentioned participation as relevant for their personal (inner) life. These findings are surprising given that several students did mention participation as a relevant competence in their reflection documents (see below). The students' self-assessments of competences showed a significant increase in the competence when averages from the start and end of the course were compared. With an average ranking of 5.1 at the start of the course —the highest of all competences at the start—students already perceived themselves as competent performers in participation at the start of the course and thus might have had less room for improvement than for the other competences.

Analysis of the students' reflection documents provided more detailed insights into which course activities the students find helpful (or not) in building the competence of participation, how students describe building that competence throughout the course, and which other competences the students relate participation to.

Farm case work and food case work were mentioned by all students as **course activities** that helped them build participation. This is an obvious finding, given that it is during the case work that students really participate in *the world out there* and participation can be trained. In the comparison of students' average self-assessments of competences at the start and end of the course, the part *"participate in work 'out in the field' with commitment and dedication"*, was the part of participation that students improved the most on (a 2.0 increase, significant). Analysis of their descriptions of participation in the case work reveals that students found participation useful for a variety of reasons, namely

- To link to all **senses**, and so deepen learning (one student)
- To discover one's own **assumptions**/prejudices (four students)
- To discover one's own **knowledge gaps** (one student)
- To discover that the **tools** learned work in practice (four students)
- To understand more parts/aspects/details of the complex system (six students)
- To gain insight in stakeholders' values/world views (two students)
- To build **trust** with stakeholders (four students)
- To get to know different perspectives in relation to the system under study (seven students)
- To **connect/get in touch** with multiple/more stakeholders (six students)
- To build the **group** (through sharing experiences and time) in a way that benefits group work during case work. (two students)
- To get more insight or trust in the **future** (personal future). (three students)
- To link to **emotions**, and so deepen learning (six students).

These different reasons for which students find participation useful, indicate that through participation, students build other competences, such as **observation** and **dialogue** (For example by linking to all senses, discovering assumptions, that tools work in practice, and by gaining insights in stakeholders' world views); **facilitation** (for



example through connecting with new stakeholders, build trust with them); **systems thinking** (for example through gaining insights in stakeholders world views and get to know different perspectives in relation to the system under study); and **visionary thinking** (for example by getting more insight and trust in the future). Moreover, the self-assessments of competences showed a significant increase in *"recognizing values and goal conflicts of different stakeholders in society"*. This confirms the finding that students find participation useful to gain insights in stakeholders values/world views and to build trust with stakeholders. The self-assessments of competences also showed a significant increase in *"empathising with the goals and feelings of stakeholders in the field"*. This can be explained by the fact that students had on average ranked their competence level for this aspect of participation already at 5.3 at the start of the course, which is the highest ranking at the start (together with *"awareness of the role of reflection in personal learning and development"*, an aspect of reflection that also got ranked 5.3 on average at the start of the course).

Students also reflected on how participation and its intertwinement with other competences contributed to their **learning process**. The following quotes illustrate this:

"No formal essay or textbook on a farm could convey the set of impressions, feelings and information that I perceived while being there through my own senses and personal background. I believe that, being inside a situation, engaged more parts of the brain than the logic-dominated prefrontal cortex, contributing to deeper and more holistic understandings and long-lasting memories."

Student\_430\_reflection document\_2021

"When this kind of relationships occurred, I could observe the value of collective intelligence as a form of emergent property of the social system. Nevertheless, I think that in these situations the risk of groupthink trap is more likely to occur, as it can happen that "preserving the group, or individuals' relationships with it, is placed ahead of the purpose of the group", Armson, (2011, p. 92)."

Student\_430\_reflection document\_2021

"I was overestimated this theory-based courses: we assume that action come after knowledge but it's more the other way around. Action and observation allow to ask the good question. Which is a really hard task but much more stimulating. This previous experience of learning has been less successful as I didn't have as much motivation, and I wasn't as much focused on reflecting than in this course. Indeed, like I've said previously in this paper, I felt emotionally involved in this course because of its participatory nature. This feeling allowed me to be more receptive to learn more about what I was seeing. The reason why reflection was possible was because of this motivation."

Student\_437\_reflection document\_2021



With regard to deepening learning through participation or case work, several students refer to the learning ladder<sup>4</sup>. Six students elaborated on how participation followed by **reflection** deepens learning, including learning about the learning process. For example

"I happened to read again some paragraphs in one of the course text books, and realise how, after direct experience and reflection, the same words assume now a wider and deeper meaning and have been incorporated as part of my knowledge."

#### Student\_430\_reflection document\_2021

""2nd order" thinking came into play when I noticed how I felt vulnerable and confused by phenomenological and action-oriented approaches to learning in the farm case. I felt lost without a model-based, theoretical understanding of a farm system to lean on when I interacted with the case study. I also did not understand how to balance real-world phenomena as a starting point for learning with my existing and intuitive knowledge. At first, these seemed like contradictory ways of knowing, so I spent a lot of time reflecting on how to reconcile the two."

Student\_434\_reflection document\_2021

A few students described how participation in casework did have a negative impact on the learning process, at least at the start. One student mentioned feeling fearful and ill-prepared at the first farm visit because classmates knew more about farming systems. That student then describes how they learned from that, how that experience through reflection made them understand the ontological re-reversal and how it contributed to understanding the value of peer learning. Three students mentioned that there was not enough time to capitalize on their participation for their learning process. One student described that they did not learn as much about farming as they had hoped for:

"I didn't feel that I had the time, energy, know-how, or direction to scale out my understanding of a single farm to general knowledge about farming. In other words, I didn't learn about individual disciplines that have to do with farming, such as the details of organic agricultural practises and nutrient cycling. While I may not have acquired new knowledge of farm system **parts**, I did acquire knowledge about farming **systems**."

Student\_434\_reflection document\_2021

Another student specified that they found the time to observe, analyse and use the provided tools insufficient during the casework, while another student simply called time a limiting factor.

<sup>&</sup>lt;sup>4</sup> Lieblein, G. et al. (2007) Educational Perspectives in Agroecology: Steps on a Dual Learning Ladder toward Responsible Action. NACTA Journal.





Figure 5: Chart of codes overlapping with 'participation'

A query in NVivo that checks the overlap of text coded for participation and other codes, (presented in figure 5 above) shows that the code participation has most overlap with systems thinking, followed by observation and dialogue. This can indicate that students mostly describe participation in case work when elaborating on how they did a systems inquiry of their case (the main goal of the case work), and that they used observation to gain insights into the system. Additionally, students used dialogue with stakeholders and during groupwork while doing case work —i.e. while participating in the case— to collect data for their systems inquiry.

# 1.4.2.2.2.5 dialogue?

Based on the analysis of students' reflection documents, self-assessments, and individual reflection on learning goals, the students' dialogue competence was cultivated mainly in relation to their casework activities. Both, in terms of their collaboration with peers in the case groups, but also in communication with stakeholders on the farms and in the food system. Still, four students explicitly mentioned how they found dialogue challenging and at times difficult, and generally it seemed like practicing dialogue required personal commitment from the students. One student stated that it required accepting criticism and self-questioning, while another spoke of how dialogue necessitated courage and vulnerability – both introspectively and in relation to others. In this regard, one student spoke of how the good atmosphere in the class enabled them to open up and be vulnerable ("to hide my protective shell"). They attributed this to the fact that trust was built up in class through listening to each other without interruptions, "making fun" or judging. Moreover, this student found particularly the session on characterizing a good listener to be an eye-opener in how to facilitate good collaboration (Student\_432\_reflection document\_2021). Actually, almost all students voiced an appreciation for dialogue to build trust between individuals and that it was important to use it to create a safe space when working



together. One of the students elaborated on how the establishment of trust –through dialogue– in the group work enabled a foundational change in the group dynamic:

"Moreover, this dialoguing time embedded trust and created a safe space to share. It became the foundation for a new energy to rise. This shift in our teamwork triggered a shift in my own perception of the group and its dynamic as well."

Student\_446\_reflection document\_2021

As the students experienced the positive unifying effects of dialogue internally in the groups, they also realized how dialogue could bring people and ideas together and foster community building in a broader sense, as one student stated:

"One of the most important takeaways from this course was the power in a team, facilitated through dialogue, active listening, exploration of our personal learning and communication styles, and a prioritization of collective ownership. The confidence I have in creating things as a community would not have been possible without experiencing this first-hand."

Student\_433\_reflection document\_2021

Seven students wrote in their reflection documents about how being introduced explicitly to dialogue as a competence in class helped them understand its importance and gave them a common framework to guide them in their endeavours throughout the course. The students were able to practice dialogue when interacting with peers and others outside the class environment, which further helped them to build proficiency. Learning about dialogue, and especially active listening, also influenced how students communicated with people in their personal life, as exemplified below. This student spoke of developing an increased awareness, which was helpful in heated conversations:

"I have become more aware on how to communicate in my personal life, both with friends and family, though here it is much more comfort surrounding the conversation. However, I have seen that implementing several of the key points of dialoguing when the conversation heated up, helped me greatly to keep the conversation on a satisfactory level. Several times I have caught myself thinking about this phenomena shortly after the conversation."

Student\_431\_reflection document\_2021

Another student explicitly stated how they felt "reignited" when they were introduced to dialogue as a sustainability competence and could clearly imagine the potential benefits if "we all practiced this with each other" (Student\_433\_2021\_reflection document). As such, through working together in groups in the casework, the students realized the need for dialogue as a (sustainability) competence –both by using it, but also lack thereof. The below presented quote, from one of the student's reflection documents is a testament to how dialogue as a competence is powerful both in teamwork and in research. This student emphasizes how the group managed to collect a lot of information in their casework, and how they made sense of this material by utilizing their diverse backgrounds, and thus learned more collectively than they would have done on their own. This experience enabled the student to really understand the



potential and usefulness of dialogue, which further led to an in-depth analysis of oneself, and developed their ability to communicate better, in line with their learning goals.

At the end of both the Farming Case and Food Case work, we had created work that none of us would have been able to do on their own. To gather and make sense of that amount of information would take us separately years of research. Even then, we most likely would not have been able to see everything we saw as a group. Through dialogue we managed to solve issues that would emerge as a property of our diverse backgrounds. Moreover, we managed to balance each other and collectively learn more than we would have been able to as individuals for the given amount of time.

Seeing this, I became more open to communicating and engaging in dialogue. I noticed that when I would not engage in dialogue, but rather in debates, a process which would leave me with too little energy to spend on the content of the course. In order to solve this, I had to ask questions directed to my inner world. I came up with a new strategy which included the increase of my ability to be influenced. When I started adopting that, I was much more curious on what others had to say. This led to a cycle of even more engagement in and enhancement of dialogue (Figure 8).

During this course, I was somewhat able to challenge myself in this direction. One of the most important things for me as a learning goal was to be able to be a better teammate and to increase my capacity to work in a group. Through training the competency of dialogue, I also advanced in the course learning goal of being a better communicator.

Student\_435\_reflection document\_2021

Moreover, this quote supports the findings from the self-assessment data about how the students found themselves to have increased their ability to understand the difference between dialogue and debate. The above-mentioned student witnessed the value of dialogue in the groupwork which in turn also made them become more open to engaging in dialogue in general. They presumably experienced how the use of debates instead of dialogue was unproductive and draining, and thus managed to develop a strategy involving self-questioning and curiosity.

Henceforth, based on the students' reflection documents, they arguably appreciated the course's stepwise introduction to dialogue. The students were able to learn about dialogue and train it through exercises in class, which according to one student helped them to practice the competence with intention and awareness through for example a "talking stick" exercise. This student also mentioned how being introduced to the principles of dialogue early in the course helped the group work, and others spoke of how practicing dialogue with peers in the classroom was important to build self-confidence. In the casework, the students could put into practice what they had learned in class and thus experienced how dialogue was useful in communicating and establishing trust with stakeholders in the field –and in co-learning with peers– as also illustrated in the quote from student 435 above. Notwithstanding, one student also experienced how language proficiency could be a barrier when practicing dialogue, as many stakeholders they met (and also some peers) were less proficient in English than themselves.



Nonetheless, using the dialoguing tools from class benefitted the collaborative casework process and dialogue helped teamwork within the group and in communication with stakeholders. As one student put it; dialogue helped their group to "navigate through our diversity and learn from each other in group processes" (Student 436 reflection document 2021). However, another student wrote about how the dialoguing framework that they tried to apply in the groups at times could be paralyzing. They spoke of how the group members felt obliged to always follow these rules and they "overdid the dialoguing", which again hindered progress in the work, as they were afraid to step on someone's toes (Student 441 reflection document 2021). Nevertheless, as the students' understanding of the competence evolved, they also realized how the competence could be practiced even more often and purposefully in future group work -to better align individual interests. This too corresponded with the self-assessment data. In addition to "understanding the difference between debate, discussion and dialogue", the students' self-assessments indicated a profound increase in their ability to "introduce a group to the purpose and guidelines for dialogue", which speaks to how the students utilized the dialogue framework in their casework.

By conducting a coding query in NVivo it was possible to chart what codes coincide and overlap with "dialogue", and the results are presented in the figure 6 below. Based on these query results, dialogue most often overlapped with the code "group work", which is unsurprising based on what the students wrote in their reflection documents, as already exemplified. Collaboration with peers in class activities was emphasized as an important arena for practicing dialogue by almost all students. Also, "participation" and "systems thinking" corresponded with dialogue, which can easily be explained by the students' elaborate use of dialogue techniques in the casework; to communicate with stakeholders and in gathering information about the systems at hand.

One student wrote in their individual reflection on learning goals document: "Dialogue is key to facilitate the process of connecting diverse people, their knowledge, divergent interests, ideas and efforts in a constructive way" (Student\_445\_individual reflection on learning goals 2021), and this illustrates the link between systems thinking abilities, facilitation, and dialogue. Not only can dialogue be an appropriate tool for collecting different views on an issue and finding holistic solutions, but it can also be a way to bring these -at times- diverging attitudes and interests together in a unifying way. When it comes to collaboratively conducting a systemic inquiry in their casework projects, the students realized the usefulness of dialogue when wanting to align their understanding and collect information from multiple perspectives, as already mentioned. Moreover, seven students saw dialogue as crucial when wanting to understand complex and "messy" situations and as a powerful tool for finding collaborative solutions and shared visions. Four students also specifically emphasized how they found dialogue particularly useful when facilitating, and they linked it explicitly to their experience with facilitating a visionary thinking workshop with their stakeholders in the food casework.



Moreover, there is a clear connection between reflection and dialogue. This is also exemplified directly by four students, as highlighted in the below statement, where the student found that they were able to develop their dialogue mastery via reflection:

"Within group work, I easily find myself being too attached to my ideas and pushing them forward to a level where it is difficult to have a dialogue but rather a debate. Through the process of reflection, I have managed to recognize that and become more aware when that is happening. Because of that, dialogue has become a competency I'm interested in developing further."

Student\_436\_individual reflection on learning goals\_2021

This speaks to the findings also presented in chapter 3.2.2.2.



Figure 6: Chart of codes overlapping with 'dialogue'

# 1.4.2.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

The process of the course's casework projects followed that of increasing complexity, as the students started with a farm system inquiry –conducting three visits to one farm –and continued sequentially with a food system case, also here conducting three visits. As the casework evolved, the students had the opportunity to practice the competences more than once, and moving from the farm to the food case, the students brought with them experiences in the first case onto the next. Thus, they got to conduct a systemic approach more than once. Four students clearly voiced in their reflection documents that they appreciated this cyclical and iterative process of the casework as an arena to develop systems thinking abilities. Being able to visit the cases several times helped them with understanding the complexity of each system and doing the projects one after the other gave them the opportunity to practice the entire systems



inquiry process again. This, in turn made them acknowledge the benefits of action learning and the learning cycle, as illustrated in the statement below:

"Moreover, the cyclical nature of the project, with the groups returning several times to the farm, was also very valuable to my learning process. As each visit was placed with a sufficient amount of time in-between, I had time to fully process all my initial inputs and reflect on these—individually, but also with my group and course mates. This allowed me to gain a comprehensive overview of what was actually taking place on the farm, not only in terms of human interaction and farming practises, but also on the supra-system level and in regard to how various external factors had an impact on how the farming system would be operated."

Student\_431\_reflection document\_2021

More specifically, almost all of the students mentioned how using soft systems methodology and tools such as rich pictures contributed to them developing their systems thinking proficiency. Composing rich pictures seemed to be of particular importance to students in developing their systems thinking abilities as its "clarity and power" is "invaluable in conveying the complexity and messiness of a situation more than any word", regardless of its child-like resemblance, as one student wrote in their reflection document (Student 430\_2021). Completing the rich picture in collaboration with the farmer/stakeholders in the casework also helped to collect value-laden information about the farm system.

"The feedback and discussion with the farmers on the underlying themes that we had identified in the rich picture was also important to dig deeper into the farm system."

Student\_430\_reflection document\_2021

Moreover, four students wrote about how practicing the core competences with intention in the casework projects highlighted the importance of the competences as sustainability competences –as they helped them understand the complex systems at hand. Also, in relation to the casework, one student spoke of how they learned to conduct systemic inquiries and compared this specifically to the metaphor of "learning how to fish", in terms of how they acquired competences and methods applicable to systems analysis of a diversity of complex systems.

"Learning a single system is like getting a fish. Learning how to understand a system, with its emergent properties an all, is like learning how to fish."

Student\_434\_reflection document\_2021

This metaphor can also be related to how a couple of students spoke of second and third order reflection on experiences. I.e., on the process of learning how to learn. Learning about their personalities, learning styles and the learning process seemed to help the students understand themselves as complex wholes. Especially, three students related the process of writing the reflection document to practicing systems thinking and improving their abilities to "deal with the challenge of the whole", as they used the framework presented in class to guide their work. Moreover, it seemed like writing the reflection document prompted these students to see how they had



developed their abilities to handle complexity throughout the course. As one student put it: "The writing of this document has included a lot of inner turmoil and procrastination." (Student 439 Reflection document 2021), while another wrote:

"This assignment, being as emotionally and cognitively laborious as it was, has enabled me to reflect holistically on the entire course and more specifically on certain experiences, and allowed me to put into some words the values I gained. Not only have I expanded my understanding and knowledge of agroecology, farming and food systems, but of myself."

Student\_433\_reflection document\_2021

By the same token, writing the reflection document, but also the continuous focus on reflection throughout the course, led to a personal development in one student and prompted them to realize how reflection is an essential part of dealing with complexity:

"The reflection process, writing this document and the sessions in class, the emphasis on reflection has generally increased my awareness of my own learning, strengths and weaknesses, preferences, tendencies and driving forces. In this way it has led to some personal development as well as made me aware of what I need to learn more about – where to go next. Reflection feels like a necessary competence when dealing with complexity – to be able to see clearly and "clean up" thoughts by questioning them and exploring multiple perspectives. Reflection was something I thought of as one of my strengths coming into the course, but I realized I have never done reflection or reflective writing in a structured way with a specific goal of enhancing my learning process. I feel like I have developed my competence of reflection to some extent in this way, but I also see the need for me to develop this competence further and to use this competence more actively throughout all parts of a work or learning process."

Student\_439\_ reflection document\_2021

Presumably, the methodology in class, guided the students' inquiry both in the casework and when writing the reflection document, serving as a kind of 'toolbox'. Working in groups, composed of different personalities, learning styles and backgrounds was challenging for the students, but peer-to-peer interaction and collaboration seemed to have enabled them to see phenomena from different perspectives, hence acknowledging the complexity of different systems. For example, the diversity icebreaker<sup>5</sup>-exercise conducted in class gave the students a common vocabulary when navigating challenges in groupwork, and one student stated that this helped them understand themself as a multifaceted whole. In the casework the students experienced first-hand the importance of starting with the phenomena, and how they could –from sharing their experiences– gain a multi-perspective understanding of the case system. I.e., engaging in real-life casework, interacting and dialoguing with stakeholders and peers, seemed to improve systems thinking abilities in the students.

<sup>&</sup>lt;sup>5</sup> The diversity icebreaker is a test mapping individuals' personality traits and team-working characteristics, providing a common framework of reference for collaboration and improving group dynamics in (especially) diverse constellations of people.



"I have found ways to comprehend the complex system through new methods such as observation walks, qualitative and quantitative research, and dialogue. Other methods such as Rich pictures, and themes helped me to deepen the understanding, and further, these were used as tools to share our perspectives with stakeholders. Dialoguing with stakeholders to understand their belief systems, values and experiences, enabled us to interpret their worldviews. Furthermore, seminars and plenary sessions with core teachers enhanced our learning experience. Challenges within the group were observed during the farm system case study, and a new approach of virtual collaboration was practices to overcome the challenge in the food system case study."

Student\_444\_reflection document\_2021

This also speaks to the findings presented in chapter 3.2.2.2.1 in how the observation competence is closely linked to systems thinking abilities and grasping a holistic view of a situation or a system. Eight students stated that observation is necessary to collect a wide range of perspectives that can inform systems thinking, and half of the student population spoke of how observation helped them to draw a rich picture, which has already been coupled with understanding "the whole", in the paragraphs above. The connection between observation and systems thinking is further supported by the self-assessment data, as also exemplified in chapter 3.2.2.2.1. Here there was a significant increase in the "creating a comprehensive overview of a complex situation"-category of observation.

As already touched upon, and based on an interpretation of one student's comprehensive reflections and their ability to draw parallels between systems thinking methodologies, learning and other parts of the course, it seemed like using soft systems methodology in the caseworks and reflecting upon the experiences in the reflection document improved the student's ability to deal with the challenge of the whole. However, compared to other students' reflection documents with less comprehensive abstractions it seemed like the understanding of the methodology and the self-directed implementation of it (outside mandatory class activities) varied between individuals.

Furthermore, it seemed like reflection was the one competence most directly linked with systems thinking and dealing with the 'challenge of the whole'. One student spoke of how participation alone was not enough to enhance their systems thinking proficiency, but that participation (in the casework) coupled with reflection was essential for their learning.

"In brief, I learned more from reflecting on the process of using soft-systems thinking and methodology during the casework, rather than from its application as activities in the casework."

Student\_440\_reflection document\_2021

Arguably, as also supported by the findings related to observation as a competence, the students have developed first-hand experience with how understanding "the



challenge of the whole" of a phenomena/situation/system, constitutes real-life experience "in-the-field", combined with reflection.

Another student emphasized how "undertaking the challenge of the whole necessitates reflection", not only on the system at hand, but on the epistemology, "the nature of coming to know about the system". This student wrote that wicked problems have a subjective quality -by involving "beliefs, identity, values", and thus "understanding the roots of how and why you know what you know is one way to move in the direction of a holistic understanding" (Student 434\_2021\_reflection document). Thus, some students found that learning about systems thinking had a personal effect on them and acknowledged the applicability of the methods also in their future. Nevertheless, the fact that some tasks would be assessed as a part of the course requirements added pressure to the activities and could potentially negatively impact students' learning. This could for example play out in how the students wanted to "do it right" and follow the step-by-step process (of systemic inquiry) to a tee, which in turn might have inhibited their learning as they gave the individual tasks too much significance - e.g., the rich picture. One student described this as overthinking it, and how they in retrospect whished that they had just 'went for it' (Student 441 2021 reflection document).



Figure 7: Chart of codes overlapping with 'systems thinking'

To say something about the overlap between systems thinking abilities and the core competences a coding query in NVivo was conducted as seen in the above figure 7.



This showed that the code "systems thinking" had the most overlap with "participation", followed by "observation" and "reflection". Thus, supporting the idea that the casework projects are crucial aspects of the course in terms of developing the students' ability to deal with the challenge of the whole, which is supported by the already presented findings. Notwithstanding, "dialogue" and "group work" are also mentioned to almost the same degree, meaning that communication and collaboration are important to see an issue from different perspectives. A couple of students spoke about this in their reflection documents, showing to how developing systems thinking abilities was a collective effort, which in turn necessitated a focus on dialogue and collaboration. Through reflection as a group, one student experienced how a

"...diversity of perspectives (inclusive of the farmer's) was not only efficient in understanding the richness of the situation, but also an interesting phenomenon revealing that everything we see is filtered through our own 'window on the world'"

Student\_433\_reflection document\_2021

Along the same lines, a second student wrote about the groupwork being challenging due to the many different backgrounds of the team members, but that the process of working together also made them realize "the value of team diversity and its potential to enhance groups' ability to address complex or wicked problems". In this regard, though, they underlined that "successful dialogue is a key element to the process as it allows for better intercommunication and interpersonal skills" (Student\_441\_reflection document\_2021), thus supporting the above findings.

#### 1.4.2.2.2.7 facilitation?

Another learning goal in the course at NMBU is for the students to become 'good communicators and facilitators and facilitation is a competence that has been given increased attention over the duration of the Nextfood project – now being included as a core competence.

For last cycle's students, the visioning workshop in the food casework was perhaps the most important contributor to the development of the facilitation competence. Not only did this workshop enhance facilitation proficiency, but it also seemed to highlight the efficacy of the other competences, systems thinking methodology and the action learning approach, as the students could witness how the methods used worked on others than themselves. Some students also mentioned how facilitating the visioning workshop had an emotional impact on them, and in general this was a good learning experience, bringing feelings of confidence, mastery and hopes for the future, as illustrated in the quote presented below.

"I felt like the experience of holding the visioning workshop was a very great learning experience. It felt active and it felt efficient in terms of contributing with something that truly has an impact in such a short amount of time (although it did take some time to prepare in our group). I felt like we helped to empower the participants and widen their horizons and awareness. I gained more confidence in my role as a facilitator, and the confidence that I, or we, have a lot to contribute with. I feel like I started to see that we really have gained some competences in facilitation, communication, dialogue and people skills. I think our



understanding of visioning and creativity was fundamental in making the workshop a success: our ability to convey and transmit the aims and potential of visioning as a tool, and the necessary mindset. This experience made me start to envision opportunities for what I can and want to work with in the future as well. The idea of being able to hold workshops and create spaces where various stakeholders can come together and access both their individual power and creativity, and that of the whole group, is very exciting to me."

Student 439\_reflection document\_2021

In general, it seemed like the students found the course structure to enable and encourage them to actively engage in the role of facilitator. Through the casework, but also activities such as literature seminars and student-led reflection sessions, the students were given opportunities to facilitate. Moreover, the casework groups were arenas for practicing facilitation, especially since they had to work collaboratively to develop plans of action and sustainability solutions in the systems at hand. One student wrote about how they realized being a "facilitator of change" is not about providing answers, but about "navigating in systems, where people are at the centre of actions". This student emphasized how they had learned about others' and their own personality traits through groupwork and how this gave way for "deeper reflection on myself as a facilitator and on what basis I interact with the world" (Student 436\_2021\_reflection document) –ascribing to how facilitation and group work is related strongly to reflection and systems thinking. Some students added to this by explicitly referring to how they used reflection to improve their facilitation proficiency. Nevertheless, facilitation –and the participation in the course and casework in general - required personal involvement and commitment from the students. They found that facilitation required reflection, self-awareness and a "new consciousness" when dealing with complex issues, while also leaving room for failure and self-assessment. As the course went on, and there were more and more opportunities to practice facilitation, the students also understood the competence better and were able to develop their mastery of it, which also illustrates the efficacy of the learning cycle and the sequential and iterative character of the students' casework projects, as highlighted by Student 439:

"I find that the role of a facilitator has made increasingly more sense to me as the course has progressed, and that I lacked some understanding and clarity of our role at the time during the farm casework."

Student\_439\_reflection document\_2021

What is more, in their reflection documents and individual reflections on learning goals, one student described how facilitating the visioning workshop in the food case made them realize their role in the case system, which was a "big release". In bringing people with different perspectives on the system together, this student understood that their role was that of a facilitator, not an advisor – "they [the stakeholders] have the knowledge, we [the agroecologists] have the tools" (Student\_437\_reflection document\_2021). Moreover, facilitating the visioning workshop prompted feelings of accomplishment, pride and confidence in the students, and a couple also spoke of how it motivated them in their work moving forward. In this regard, it was important for the students to take ownership of the process in the casework, to engage stakeholders



and facilitate co-creation during the workshop. They had to create "a professional environment for ourselves and external stakeholders to participate in", as student 436 (2021) wrote in their reflection document.



Figure 8: Chart of coding overlapping with 'facilitation'

As with the other competences, a coding query was done in order to say something about the overlap between the facilitation competence and other codes. According to number of coding references "facilitation" had the most overlap with "participation" and "visionary thinking", supporting the fact that students spoke of how hosting the visionary thinking workshop in the food casework was a good way to practice the competence, and how they through this developed their facilitation proficiency. Also, the experience of facilitating the visioning workshop helped the students realize the importance of being context-specific when practicing facilitation, and that dialogue and facilitation is intrinsically linked to visionary thinking.

"This sharing of ideas and validation of creativity was a testament to this awareness that we all have the capability to conceive exceptional visions, so long as we intentionally set ourselves up to do so. Experiencing this for myself, and then facilitating it for others, gave me the confidence and trust that this really truly has power. I felt, and still feel, that this a competency that needs to be spread in order to understand what we really want our futures to look like, without getting bogged down in the humdrum of daily life and logistics. This is what we need to conceive of sustainable solutions and societies."

Student 433\_reflection document\_2021

Students also spoke of how they used different strategies in the groups in order to improve efficacy and group dynamics, which in turn improved their facilitation competence. Likewise, they linked "observation" to facilitation in the way that it is



important to observe others (i.e., peers) when facilitating a collaborative process in group work. As presented in the quote below, this student found especially their teammates abilities to facilitate useful in developing their own. Here, observation and peer learning became important aspects in enhancing this students' facilitation proficiency.

"Another point where the positive effects of dialogue was made clear, was in how we as a group spoke with each other. We had one group member who was particularly good at facilitating conversations, making note of other members being left out of the conversation or members speaking over each other. I found their facilitating efforts particularly beneficial as I felt seen and heard when they made room for me to present my ideas and comments to a group full of strong opinions. Moreover, I found that from observing them and their approach to facilitating dialogue, I could learn a great deal about what efficient facilitation looked like and how one could effectively manoeuvre through complex situations and group relations. Through this observation, it became even clearer to me that good communication is a prerequisite for good facilitation."

Student 431\_reflection document\_2021

This quote also represents how the students found dialogue and facilitation to be closely linked competences. Besides, through their experiences in collective reflection sessions they also highlighted how active listening and dialogue are essential components of learning and facilitation.

# 1.4.3 Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education

#### 1.4.3.1 Methods of data collection and analysis

As already mentioned earlier in the report, during the fourth cycle of the Nextfood project at NMBU the course leaders decided to implement more teacher reflection session and scheduled weekly reflection session with the whole team of course teachers and facilitators. Some of the teachers also kept a reflection log and did brief post-session reflection. From the teacher reflection sessions one Nextfood researcher took notes, which were collected as data. The material was uploaded to NVivo for content analysis and initially coded deductively based on a set of codes aligned with the research questions and thus with the sub-sections of this case development report. Reports per code were then analysed further using an inducive approach. The teachers also held a reflection workshop consisting of two parts at the end of the semester – to sum up the course.

#### 1.4.3.1.1 Teacher reflection document

The teaching team at NMBU did not write reflection documents, but instead held weekly reflection sessions where detailed notes were collected as data and analysed in NVivo according to codes pertaining to each of the six essential shifts, "challenges", "hindering forces", "supporting forces", "inspiring experiences" and "requirements". The codes were clustered, and their respective reports formed the basis for further analysis – analysed by one researcher per report. Throughout the analysis process, internal discussions and check-ins were conducted, to ensure reliability of the findings.



# 1.4.3.1.2 Course reflection focus group/interviews

As a final activity in the course the students participated in a reflection session, facilitated by one of the core teachers. Two Nextfood researchers took detailed notes. These notes were collected as data to say something about students' experiences, as described in chapter 3.2.2.1, but also to address to the question "What such a change requires from teachers, students and institutions", as in chapter 3.3.2.2 below. The outcome from the student reflection workshop contributed to nuance the findings from the teachers' reflections. Students also participated in a teacher-led course evaluation workshop, where they were to answer the questions:

- 1. "What are the three things I really liked about this course, that I found useful, inspiring and fascinating?"
- 2. "If I were in charge of the next course that starts in August 2022, what three things would I do differently?"

The students wrote their responses to these questions on pieces of paper, which were collected as data and transcribed (scanned, re-written in word-files and uploaded to NVivo). However, these were not rigorously coded, as the responses were very short. Mainly, these were used for triangulating the other findings from teacher reflection sessions and workshop, and student reflection focus group. Combined, these data were particularly useful to say something about case development in chapter 4.1, and to assess the successfulness of the implementation of last year's interventions/action steps.

#### 1.4.3.2 Results

# 1.4.3.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

Four major interventions were done in the course in the fall of 2021. Those were to include facilitators of group work, individual meetings with core teachers, weekly teacher reflection sessions, and organizing the farm and food casework projects sequentially instead of running them in parallel. (Teacher reflection\_December\_2021)

#### 1.4.3.2.1.1 From lecture hall to a diversity of learning arenas

The agroecology course revolves around real-life cases as a basis for the students' learning activities. Farming and food systems act as the main action learning arenas, and thus dictates the need to introduce other learning arenas. In addition to case visits "in the field" of the farming and food cases, the students have weekly interactive classroom sessions to exercise reflection and the other core competences. The course also includes literature seminars, field visits, presentations, and guest lectures, all aimed at supporting the students' casework process.

Compared to the previous cycle in 2020, where the course's learning arenas had to be adapted to strict regulations due to the Covid-19 pandemic, this final Nextfood year was more "back to normal". The whole course was run physically, and the students



could visit cases and come to class sessions on campus as previous years. There were, however, restrictions in the beginning of the course that resulted in taking the traditional 4-day introductory field trip with the whole class out of the schedule. At that trip, students have in previous years had the opportunity to prepare and practice visits to farms, that have acted as an introduction for how to do a systems inquiry. In this cycle, since the 4-day trip could not be conducted, the students went on three case visits, one more than the regular two. The schedule was designed accordingly, and the introduction to and preparation for field visits was different from a "normal" year.

#### 1.4.3.2.1.1.1 Supporting forces and how to build on them

From teacher reflection sessions, it appeared that the one-day farm visit early in the course was a concept that benefitted teaching (Teacher reflection\_S01\_2021). It seemed that the students were interested, and that the key message, of going to the field and then reflect in class, came through. In the dialogue session, the students seemed to appreciate the horseshoe set-up of the classroom (Teacher reflection\_S03\_2021).

It was beneficial to have one from the teacher/facilitator team to visit the farmers, both to explain the approach, and also to stress that students should include farmers in their systems analysis (Teacher reflection\_S04\_2021).

The session on group dynamics, where the students worked with a cooperation checklist as a tool for group work, seemed useful and appreciated by the students (Teacher reflection\_S09\_2021).

The students' appreciation of field trips and interactive classroom sessions thus emerged as supporting forces for including a diversity of learning arenas in the course.

Another supporting force was that, with time, it appeared that students developed an ability to balance the focus on structure (details and steps) with the more unstructured idea and vision generating process. It was mentioned that it is the students who should keep the right balance, while the teachers should define what that right balance is (Teacher reflection\_S12\_2021).

Moreover, it appeared useful for students to have a session on a model of systems thinking before going into casework. It was noted that students should understand they are part of systems, and not supposed to just go out and measure numbers (Teacher reflection\_S13\_2021)

Regarding building on the supporting forces, the classroom set-up was important for learning, and it should be considered what set-up is most beneficial to each session



(Teacher reflection\_S03). Other areas to consider are whether it is possible to be more outdoors, when to sit in a horseshoe set-up, the need to spend more time to share in small groups, change the small groups during sessions, and after each session allow everyone to sit in silence and think through what they heard (Teacher reflection\_S03\_2021).

The dialogue session could made be longer, as the students appreciated spending time on it, and it built safety and connection. Students suggested to include more about body language and vary the group size (e.g. 2 by 2), and also to include tips on how to build on what the other person said. Essential to make this session successful appeared to be the physical set up of room, and asking at end of the session what could be improved (Teacher reflection\_S03\_2021).

It appeared to be a need of the students to present their farm visits experiences shortly after the visits, before having the reflection session and further linking the findings to theory, thus, this should also be considered in the future (Teacher reflection\_S05\_2021).

## 1.4.3.2.1.1.2 Hindering forces and how to deal with them

One challenge identified was when and where to place theoretical sessions in the schedule. It was regarded as important to not overdo theoretical sessions in the classroom (Teacher reflection\_S04\_2021). Thus, long theoretical sessions might become a hindering force when including these in the diversity of learning arenas.

Another challenge was regarding farms as learning arenas, and the question of finding farmers who are ready to interact with student group. A question that came up was when the faculty do not know a farmer well and send students off to them, what is at risk? Thus a following question was whether it is necessary to only involve farmers who know the educational approach well in the future (Teacher reflection\_S08\_2021). It was mentioned that the course affects students differently compared to a more traditional lecture/theory-based course, and that with students' participation and involvement in real-life cases, there are many things that the teachers do not have an overview of. This could be seen as a challenge; however, it could also be a good experience for the students' to prepare for later work life (Teacher reflection\_S11\_2021).

Comparing this cycle's structure of the course to a normal year with the 4-day trip in the beginning, the students did not get to prepare properly before the first farm case visit. This might have affected how ready the students felt to go to the farms, and it should be considered giving more time for preparation in groups in the classroom. Also practicing rich picturing before the first farm visit could be beneficial (Teacher reflection\_S02\_2021). The casework on farms as a learning arena should be a semisafe space for students to try out things, where they learn how to navigate a process and include stakeholders through participation and their own learning process.



Moreover, the students should be made aware that they are entering a learning arena where they learn together with farmers (Teacher reflection\_S04\_2021).

#### 1.4.3.2.1.2 From lecturing to co- and peer learning

Teachers noted that from experience, students figure out how to work together without facilitators as long as they have the tools to do so. (Teacher reflection\_S06\_2021). As such one could say it is best that they learn how to do peer learning themselves, through experience, together as peers in groups.

In previous years, students have taken part in organizing a dissemination event where they present the findings from their food case projects to a wider public. This was not done this year. The teachers reflected that the event could collide with other tasks and put more pressure on the students. However, it could also be a good occasion for students to practice and develop organizational skills (Teacher reflection\_S07\_2021), and as such take part in forming their learning activities.

#### 1.4.3.2.1.2.1 Supporting forces and how to build on them

A supporting force for co- and peer learning was that the students expressed a wish to continue the learning community after the course was over. It was noted that the teachers should contribute to make this possible (Teacher reflection\_S11\_2021).

Moreover, the students seemed to appreciate the session on the cooperation checklist and group dynamics. Having this session after the farm case could be positive since the students then already had experiences with group work, and thus had seen the need for working on group dynamics. However, the session could also have been implemented before the farm case to establish good collaboration for that project (Teacher reflection\_S09\_2021; Teacher reflection session December).

One student mentioned to a teacher that it was good to not be with likeminded people only, thus indicating a positivity towards having a diversity within the group of peers (Teacher reflection session December). In addition, it appeared that the student groups learned from each other, and that their process improved with each additional group having the responsibility for class sessions (Teacher reflection\_S03). A student group's check in resulted in an agreement on giving each other more freedom and place (Teacher reflection\_S03), further indicating positive outcomes of co- and peer learning.

#### 1.4.3.2.1.2.2 Hindering forces and how to deal with them

From teacher reflection sessions, it was noted that it was a challenge to adapt from lecture-based education, especially for some students who came from a more traditional education system (Teacher reflection\_December\_2021).



Another challenge for co- and peer learning was when students were away due to illness or for other reasons, that the rest of the group was held back in their work (Teacher reflection\_S05\_2021). It was a challenge to divide tasks among group members, and create balance in the group, understanding that all do not have equal energy or competence for the tasks at hand; that they are a group of diverse students, and how to structure group work based on that. In the past cycle, several students had private issues and were absent a lot (Teacher reflection\_S13\_2021).

Teachers noted that it was a challenge when a student was dominating in a group, by for instance talking much and spending much of the groups' time (Teacher reflection\_S10\_2021), thus indicating the issue of finding balance in the group dynamics. In a group where the students had not worked together during the farm visit due to such imbalance, escalated to a conflict and resulted in one student having to leave the group and the class, and taking the course individually. Taking the course individually was seen as suboptimal in a course where peer learning is key (Teacher reflection\_S05\_2021). The teachers spent a lot of time reflecting on whether this was the best solution. However, the teachers noted that it was little time to solve conflict given the course length, and agreed it was right decision to have the student taking the course individually (Teacher reflection\_S08\_2021).

It was some uncertainty among the teachers of how to facilitate conflict management in the student groups, which potentially could act as a challenge for co- and peer learning. A consideration would be to take a course or somehow build competence in the facilitator team on conflict management (Teacher reflection\_S08\_2021).

Functioning of the student groups is crucial for co- and peer learning in the casework, and thus needs to be facilitated. It could be considered to implement a few sessions on group dynamics. The Ice Breaker-session did not ring through this year, perhaps was that due to sitting individually and not in groups (Teacher reflection\_December\_2021)

The students were missing structure on how to work together before they began the casework, to be able to test the methods and tools for collaboration systematically. One suggestion to deal with this challenge was to have a "mock" team meeting, where the facilitators could act as challenging group personalities and the learners could give critique (Teacher reflection\_S02\_2021).

From the evaluation forms, students seemed to score self-led activities high, putting value to what they did themselves. The generally lower scores for teachers' sessions could be related to an 'us against them'-mentality (Teacher reflection\_December\_2021). This could potentially act as a challenge.



#### 1.4.3.2.1.3 From syllabus to supporting literature/a diversity of learning sources

The agroecology course has no fixed syllabus but encourages students to seek out relevant literature and knowledge on their own. What the students need to learn depends on their previous knowledge, as well as their casework process. To facilitate the students' own search for literature and to provide relevant sources of reference for their casework, literature seminars are held to practice reading, presentation and discussion around scientific articles and theories. To ensure relevance of the suggested literature, the teachers went through the list of articles for the literature seminars (Teacher reflection\_S03\_2021).

#### 1.4.3.2.1.3.1 Supporting forces and how to build on them

In a student-led session, a student group used mobile phones to interact and receive feedback in the classroom session. The responses came up directly on the screen, and it seemed to work well (Teacher reflection\_S10\_2021). Student feedback – through interaction with teachers or in the mid-term evaluations – were beneficial for the improvement of the content and process of the literature seminars throughout the course.

## 1.4.3.2.1.3.2 Hindering forces and how to deal with them

From the teacher reflections it appeared that there was a challenge to make the students understand how to conduct the literature seminars, and thus a need to give clear instructions; to point the direction of what type of questions to ask and give a clear structure for the process of developing those questions (Teacher reflection\_S04\_2021).

Another challenge was regarding group dynamics, and how to provide the right tools and learning sources to support them in group work (Teacher reflection\_S06\_2021). Similarly, it was noted an importance of showing that there are tools and resources for casework, but at the same time not to make too large an exercise out of it (Teacher reflection\_S09\_2021).

#### 1.4.3.2.1.4 From textbook to a diversity of teaching aids

Regarding the use of teaching aids to communicate the learning approach and the relation between theory and reality in classroom lectures, teachers noted that there was a need to consider whether one should draw on the board or use a digital presentation. Also, whether using one or the other teaching aid; the importance of keeping a balance between the image and oneself as presenter, to open up for asking questions (Teacher reflection\_S01\_2021). Teachers also noted that it was important that learning activities do not become rituals, and that students must be made aware of the importance of giving clear presentations and giving room for feedback. (Teacher reflection\_S09\_2021). Teaching aids should be introduced at the right time to attract the students' attention (Teacher reflection\_S09\_2021).

1.4.3.2.1.4.1 Supporting forces and how to build on them No supporting forces were identified for this shift.



## 1.4.3.2.1.4.2 Hindering forces and how to deal with them

One challenge regarding teaching aids that came up in teacher reflections, was the use of the online digital platform for learning. It appeared that the students were unaware of its importance for their learning process, as they were not updated on the posts and changes made in the schedule. It was stressed that the teachers/facilitators must help in this, to make it clear for the students how the platform works, and that they need to learn using it. One option would be to have a session on how to use the platform (Teacher reflection\_December\_2021).

#### 1.4.3.2.1.5 From written exam to a diversity of assessment methods

Throughout the agroecology course, the students are evaluated on their participation in the learning community, casework group reports, individual reflection documents, and an oral exam. Moreover, the students do self-assessment, individual reflection on learning goals, peer-review of reflection documents, and feedback to group presentations, but these act more as assessments to help the learning process and are not used for grading the students. A question among the teachers is whether the students' participation in the course should be graded in the same way in the future, or if it should rather be a pass/fail course. Since the assessment is qualitative it takes a lot of time, and changing to pass/fail would save a lot of work for the teaching team. (Teacher reflection\_December\_2021)

# 1.4.3.2.1.5.1 Supporting forces and how to build on them No supporting forces were identified for this shift.

#### 1.4.3.2.1.5.2 Hindering forces and how to deal with them

Regarding the students' abilities to give feedback to each other's work, both when working individually and in groups, teachers noted that the feedback given could be more constructive. Students should learn to give giving feedback in three parts; appreciative, critical, and answering questions posed by the presenters (Teacher reflection\_S09\_2021).

#### 1.4.3.2.1.6 From lecturer to learning facilitator

An essential part of make the agroecology course a success, is to ensure good facilitation of the students' learning process. In the past cycle, two measures were implemented with regards to facilitation; one was to include casework group facilitators where each student group had an assigned facilitator, and another to have monthly individual meetings with core teachers. A weekly teacher reflection was implemented, where teachers and facilitators could reflect on the course, the facilitation process, and the measures taken regarding this shift.

The physical set-up of the classroom was very important for the facilitation of sessions, as it affected the energy in the group (Teacher reflection\_S01\_2021). Teachers should be aware and follow up on students who seem to not go that well with the rest of the class (Teacher reflection\_S01\_2021) This is also connected with the question of how



to facilitate acceptance of the approach and process for students who are not aligned with the rest of the student group (Teacher reflection\_S03\_2021). While paying attention to the individual students, it was noted as important that teachers answer to the whole class, and not to individual students. Also, teachers should redirect students when they seem to lose track of assignments in class. It was regarded as important to ask students at the end of sessions what could be improved (Teacher reflection\_S03\_2021), to include their views in the course development. Moreover, teachers/facilitators should follow up and do as promised in class (Teacher reflection\_S01\_2021).

## 1.4.3.2.1.6.1 Supporting forces and how to build on them

The weekly teacher reflection sessions were regarded as a positive add-on by the teachers and facilitators, and it was agreed that it should be a continued practice in upcoming courses. Teachers stressed the importance of keeping a good structure and enough time for teacher/facilitator reflection, and that it should be considered to extend the session from one to two hours. Another point was to keep space at the end of each session to look ahead to the coming week, keeping in mind that reflections should lead to action. (Teacher reflection\_December\_2021)

The monthly individual meetings with students gave the teachers a better understanding of the student group, as they got a better insight into the students' personal issues and development (Teacher reflection\_December\_2021). The impression was that the students also appreciated it, and it was agreed that the individual conversations should be a mandatory element of the course in the future (Teacher reflection\_S13\_2021).

When student groups presented their plans for farm case visits, it was a good opportunity to help them on the way when they had misunderstood theory. Interesting questions came up that allowed for explaining theory based on practical challenges (Teacher reflection\_S04\_2021), and as such the students' presentations made it easier for the teachers to facilitate the learning of linking theory and real-life experiences.

A positive outcome of having casework group facilitators in the course, was that it gave insight into the students' process, and a possibility to give them direction. A concrete example of this was when two students from one group were discouraged of difficulties in their casework. It was noted that a conversation with facilitators might have given them a different perspective and new direction for their work (Teacher reflection\_S13\_2021). For the facilitators it was positive to be in a group of facilitators, to discuss challenges and what role to take. The role was described as to connect students and teachers, back the teaching team, share former experiences of being and process students. clarifying tasks for the students (Teacher reflection\_December\_\_2021).



Two PhD-students of the faculty, who were also facilitators of student groups, participated in one reflection session with the students. Teachers said that it contributes to building a learning community and to "flatten" the hierarchy, and that it was a nice experience (Teacher reflection\_S04\_2021). Students expressed a wish for the teachers and facilitators to be more actively involved in reflection sessions (Teacher reflection\_December\_2021). The teaching team discussed whether it was feasible to combine facilitation of and participation in sessions and noted that most reflection sessions are focused on the students' experiences. It could be considered to have teachers involve in the reflection sessions in the literature seminars, as done in earlier years. However, that was also a question of the teachers' capacity, and of to what degree the teachers should integrate with and get to know the students. (Teacher reflection\_December\_2021)

#### 1.4.3.2.1.6.2 Hindering forces and how to deal with them

While being good at group work is not explicit in the learning goals, it is there in between the lines, and facilitation of it is as such very important. Regarding facilitation of group work, it came through from the teacher reflections that the most important task is to provide the students with tools to work on group dynamics (Teacher reflection\_S06\_2021). Teachers mentioned that they have been wondering about the group work challenges for a long time. One idea that came up was to work on the competence of facilitation and group work in literature seminars. Another was to ensure that some of the activities in the course contribute to the learning environment (Teacher reflection\_S06\_2021). When it comes to case groupwork facilitation, it was noted that one should either facilitate group work well, or not at all (Teacher reflection\_S08\_2021). However, it was also noted that extra facilitation of that process should still be included, but only at essential moments of the casework process. The session on group dynamics was seemingly appreciated by the students. However, one could consider to have that session earlier in the course (see chapter 1.4.3.2.1.2 on co- and peer learning for more on this point). (Teacher reflection\_S09\_2021)

Regarding the implementation of facilitators for the student groups, the teachers and facilitators questioned if it was a good idea and whether it was taken too fast from (Teacher reflection S08 2021; thought to action Teacher reflection\_December\_2021). It took time and resources to have a facilitator for each group, and as there were no guiding template for the process it was also difficult for the facilitators to know what their role was supposed to be. One potential problem mentioned was that the students could think they would get a good grade if they simply followed the facilitators' advice. Still, the implementation of group facilitators could be seen as a pilot, and an action to learn from. Teachers noted that the further discussion of this measure should touch upon how close the facilitators should be to students, and how much space students should have to figure things out for themselves. Moreover, that they should communicate to students that they cannot facilitate everything for them; that the learning process is more about bringing the inside out than the opposite. To succeed with having group facilitators in addition to the teachers, a clear description of the facilitator role and manual for how to deal with different situations could be developed. Training of the facilitators could also be considered (Teacher reflection\_S08\_2021). It was noted that two important moments when



students might be in need for facilitation, was when working on group dynamics and when gathering up information and writing their documents. (Teacher reflection\_December\_2021)

Teachers noted the challenge and importance of enabling the students to talk from experience, to have situated conversations (Teacher reflection\_S10\_2021). Similarly, it was a challenge to enable students to understand how to write the reflection document, to make them follow the instructions; start with experiences, then reflect and include theory. One could consider giving examples of how to write reflectively in smaller pieces. The checklist and the five final questions came up as helpful for writing reflection documents. (Teacher reflection\_S13\_2021). It was also noted as a challenge to make the students understand the importance of writing in their reflective journal. An idea to tackle this was to consider having silent moments for students in the classroom for writing in their reflective journal, to help them start (Teacher reflection\_S03\_2021).

To keep a balance between teacher/facilitator/psychologist/health worker, in a role where student talks about personal problems, was also described as a challenge. It was noted that teachers have a bigger responsibility when they ask students to do check-ins and individual reflections on their learning process. Teachers/facilitators do not have competence to deal with mental health issues, and thus have to know when to refer to others. (Teacher reflection\_S06\_2021; Teacher reflection\_S08\_2021). In the past cycle, one teacher who has been central in creating social events for the class was not present. This was related to the challenge of creating a safe learning environment and building the learning community (Teacher reflection\_S06\_2021).

Another challenge that came up was that students are too 'free' in how they do things. Teachers noted that the students should not only draw on things they already know from before, but that the teachers should attract their attention towards new tools, and facilitate their learning by introducing tools at right point in time. In addition it was seen as necessary to keep students on track and tell them to not spend time on activities outside of the manual for casework. (Teacher reflection\_S09\_2021)

One challenge for the teaching team was the big workload in organizing and planning the casework. It was noted as unnecessary that teachers/facilitators organize practical things for the students, and that they perhaps could take a bigger part in organizing and planning. (Teacher reflection\_S07\_2021)

Changes were made in the schedule several times, and it was a challenge to make the communication of those changes reach the students. An idea on how to deal with this was to go through the schedule with students, explain the changes, and open up for questions. (Teacher reflection\_S07\_2021)



Another challenge mentioned in teacher reflections was how to deliver a topic to a diversity of students with a diversity of backgrounds; to students who have difficulties understanding topics they are not familiar with from before. 'Just in time learning', i.e. presenting theory and tools just when needed, was mentioned in this regard. Another idea was to organize a peer-learning day for students to present from their individual backgrounds, to make a common ground for learning. (Teacher reflection\_S06\_2021)

The session on systems thinking in action learning/research was intensive, and the teacher had a good experience with it, but it appeared to be a demanding process for several students. Having the session on agricultural policy one the same day was probably too much, and it was noted that it might have been better with more time to reflect on the systems thinking session instead of having another lecture on a different topic. Teachers mentioned that this was also drawn from the individual conversations they had with students, that they need time in between, to adjust to all the new; the setting, the people, the educational approach. (Teacher reflection\_S04\_2021)

#### 1.4.3.2.2 What such a change requires from teachers, students, and institutions

Based on analysis of students' reflection documents, teachers' reflections and the focus group discussion with students at the end of the course, insights can be gained in what such a change requires from teachers, students and institutions.

From teachers, such a change requires:

 Being a good trainer/facilitator, particularly for building the core competences amongst students, but also of the group dynamics. According to the students, this also involves reciprocity between teachers, students and stakeholders, which can only happen when there is a non-hierarchical structure and when teachers hear and respond to students' reflection and ideas and are active themselves as participants while facilitating. During the focus group discussion at the end of the course, students mentioned the following:

"Mutual exchange in terms of getting feedback from the teachers. Less of an hierarchical structure. A feeling of reciprocity between all parts, not only between students and teachers, also amongst students and between students and stakeholders. That gives us a purpose, you feel you are giving something back."

Focus group with students\_2021

In this regard, teachers also reflected on whether or not they should also contribute to a good learning environment (with social activities), to make the threshold for students low to point out what they are struggling with.

• But students also mentioned that teachers should balance which questions from the students to answer and which not. One student reflected on this as follows:



"When answering questions during the reflection session, the teachers would never give us a proper answer. How surprising! Don't they have a key to share with us? Instead, we were openly sharing our understandings, our reflections, to come up with an answer that is shared, constructed altogether thanks to a mindmap. We need to encourage students to explore their own attitude toward the compelling issues of our time and then to move on to a next step of action' (Mendéz et al, 2016) is said in one of the course's books, and that implies a questioning phase that our teachers elicit in the classroom. It also resonates with Einstein's famous quotation: 'no issue can be solved with the same level of consciousness that created it'. I believe that not giving a unique answer or offering a unique path to comprehension is a way of inviting students to look 'inwards' and 'outwards' in order to find solutions. And as we are to deal with wicked problems such as solving sustainability issues within farming and food systems, we need to stimulate our creativity and look for innovative answers. Those answers can only be formulated with a whole new consciousness, that is aware of the wickedness of the situation."

Student\_446\_reflection document\_2021

- Understanding that it takes time for students to internalize the approach and give students clarity, for example about the paradigm shift.
- Communicating well to farmers what to expect from students' case work (e.g. number of visits) to avoid misunderstandings or expectations that are very different from the aim of the students' casework.
- Taking out students who cannot collaborate in group. This finding is very specific to this cycle, given that one student was taking out of the group work early in the course because teachers did not see possibility for that student to collaborate in group within the timeframe of the course. Student who were part of the group of which that particular student was taken out, mentioned this requirement for teachers in their reflection documents.
- Flexibility and adaptability, embracing change, self-awareness

From students, such a change requires:

- Self-awareness, self-confidence, humility and being OK with being wrong
- Overcoming initial confusion / enduring being confused for some time. In other words: "Being aware of th[e] wickedness" (student\_442\_reflection document\_2021)
- Embracing change, stepping out of comfort zone and try new tools, being adaptable
- Being open minded and non-judgemental, ready to discover one's own assumptions and knowledge gaps. In other words: *"Encourage difference to increase collective intelligence"* (student\_437\_reflection document\_2021)
- Self-organizing and learning autonomously
- Linking experiences to emotions and all senses, and then reflect, to deepen learning.



• Being a good/active listener, being a good communicator-facilitator (dialogue). This relates to what was mentioned earlier under requirements for teachers, namely

"Mutual exchange in terms of getting feedback from the teachers. Less of an hierarchical structure. A feeling of reciprocity between all parts, not only between students and teachers, also amongst students and between students and stakeholders. That gives us a purpose, you feel you are giving something back."

Focus group with students\_2021

- Having enough time
- Daring to communicate/facilitate/interact
- Being emotionally involved in a balanced way, keeping analytical distance. (how to balance emotions and motivation)
- Being willing to work (a lot) in group

From the data analysed, we found very little on what such a change requires **from institutions**, namely

 Making the right infrastructure available (e.g. horse-shoe set-up must be possible in classroom)

This might be due to the fact that this course gets sufficient support from NMBU as an institution and that therefore, institutional support is taken for granted by students and teachers and subsequently reflected little upon.

#### 1.4.3.2.3 Teachers' perception of the greatest challenges to achieving such a change

Based on the teachers' reflections their views on main challenges are manifold, but speak to issues relating to time management, inter-personal communication and sensitivity when facilitating reflection. For example, conducting teacher reflection sessions has been strongly emphasized during the last cycle at NMBU. However, it was found that setting off enough time for weekly reflection sessions was a challenge, and that in order to enable thorough, high-quality reflection more time than what was allocated is needed. Additionally, it was emphasised that better facilitation of the teacher reflection sessions was a necessity as well.

Moreover, the teachers found that building a supportive and safe learning community can be challenging at times. It is important to build trusting relationships with students, but still there is a need to find a balance between fostering these relationships and keeping a distance –as there is still a certain hierarchy between students and teachers to consider. As one teacher put it "we still have to evaluate them" (teacher reflection session December 2021). This cycle, and the previous one, the NMBU classes were not able to travel to an off-campus farm at the beginning of the course for "teambuilding" activities due to Covid-restrictions. Normally, the semester starts with a visit to a biodynamic farm about an hour from campus, and here students and teachers



stay for a few days, getting to know each other and being introduced to the course, action learning and the competences. This is usually a highly appreciated activity, which helps to build relationships and cohesion in the class, and which has been highly beneficial for the learning community. Perhaps especially the functioning of the casework groups. The teachers reflected on how the lack of this visit impacted the class community this year, particularly in relation to students' group dynamics. In the same regard, the teachers stated that a safe learning community is an important prerequisite in the implementation of the Nextfood approach, to avoid the students feeling overwhelmed. According to the teachers' reflections is seems like more casual social interaction is needed to build a supportive class community, however, this demands a certain effort from the teachers. Finding out how to balance this can be a challenge and can potentially put teachers in a difficult position.

In the same regard, the teacher reflection sessions also highlighted how diversity in the student group can be a challenge, in addition to handling issues that may arise due to conflicting interests. One challenge is having the students work so closely with each other in the casework and in all the collaborative tasks in the course. Working in groups can be challenging for many students and their experience with cooperation differs. As such, mediating internal group conflicts can be a challenge for the teachers – balancing between what is "normal" or "healthy" conflict and what is damaging and counterproductive behaviour to be dealt with otherwise. Students often also have very different expectations, motivations and understanding, and handling this can at times be quite difficult for the teachers. The action learning approach requires high involvement from the students, and therefore dissatisfaction can easily affect the learning environment.

"The difference between our programme and others is that if students are not satisfied with the course/approach, it affects the learning environment a lot in our programme."

Teacher reflection\_S13\_2021

Further, the course content and structure can serve to be too much for some students, and a challenge is then for the teachers to know how to deal with that when they don't have the tools to address for example mental health issues (if that be the case). This is also linked to another challenge mentioned during the teachers' reflection sessions, which is the sensitivity required when facilitating student reflection and handling potential repercussions from reflective activities. I.e., that there seems to be a certain risk associated with focusing so much on "introspection" (reflection), as it could potentially trigger mental health issues in students. With regards to reflection, it can also be challenging to make the students understand the concept, and many of them felt overwhelmed and stressed out due to the course –based on what came out of the teachers' communication with them ad hoc and through individual meetings.

On a different note, there are also challenges related to the collaboration with externals in the students' casework projects and the planning and preparation of this. There are many uncertainties when working with external stakeholders, and it creates certain dependencies that might leave the teachers/university at a disposition when



planning/moving ahead. It can also be difficult to be well enough prepared for the casework, having cases (farms, schools, institutions etc.) in place in good enough time. Moreover, it is according to the teachers difficult to balance expectations between farmers/stakeholders and students in the casework, as these might vary. Sending out students to externals whom teachers are unfamiliar with also comes with a certain risk. In relation to this, teachers stated that it is important for students to have sufficient time to prepare the casework, which again connects to the challenge of time management.

"Another thing: When students go to the farmers, they also interact with farmers who maybe are not ready to interact with such a group. This came about with a farmer who is in a difficult situation. We also take a risk there. We don't know the farmers well enough and we send a group of students to them which ask very critical questions and want them to envision the future."

Teacher reflection\_S08\_2021

The final challenge mentioned in the teachers' reflection sessions is clear communication and definition of expectations. Based on the experience with student group facilitators from the teaching team this fall, it became evident the need for clarity in communicating what is expected from students, but also what they can expect from the teachers/facilitators.

"[One of the teachers]: Maybe we are unclear in our communication of what our expectations are, especially regarding how much time students use in order to do a good job and learn a lot.

[One of the facilitators]: I also wrote that there was unclarity in how we were introduced to the students and what they could expect from their facilitators. I cannot remember that we have done that."

Teacher reflection\_workshop\_December 2021

# 1.5 Concluding remarks

#### 1.5.1 On the case development since the previous reporting

#### 1.5.1.1 The most useful and inspiring experiences (supporting forces)

The most inspiring for the teachers when working with the Nextfood approach is to see how the students become engaged and involved in the learning activities. Some students are initially surprised, but most are open to try out new learning arenas, teachings aids, and not the least to be assessed in various new ways.

It is very interesting to follow students through the semester and observe their development in the competences and change in confidence level.

This year teachers were able to come closer to the student's learning and development as agroecologists through monthly individual meetings between teachers and



students, as well as through facilitation of group casework. These experiences were shared among teachers in weekly reflection sessions.

Running the casework projects sequentially made it possible for the students to work more focused on each of the cases. When students facilitate workshops with stakeholders and present their work towards the end of the course, it is impressive to see how much change that can take place in a few months. This change inspires the teachers to work with and develop the Nextfood approach.

#### 1.5.1.2 Main obstacles/challenges encountered (hindering forces)

Despite several years of working with and developing the Nextfood approach, there are challenges to be dealt with. Some students may hesitate to participate in new ways of doing activities, what may require additional efforts to help them understand the main features of action learning.

Working with external stakeholders, such as farmers and municipal officers/actors in the food system, as part of the learning community is vital but also often represents a challenge. Most of the time, they have busy schedules, and to reach them with our information about the task and our teaching philosophy is not always easy. If the stakeholders are better informed, the students' experience may be enhanced.

In general, it is a challenge to communicate the teaching philosophy, both to external stakeholders and students, and this could be due to a clash between expectations and the educational reality of the Nextfood approach. Students come from their educational backgrounds and external stakeholders most likely have a different understanding of what it means to have students explore their farm/food system as a case.

The sequential casework also involved some challenges, especially regarding when to introduce the respective tools, concepts, and competences. Ideally concepts and tools should be introduced exactly when the students need them, but scheduling this throughout the semester is a challenge. There are also individual needs among the students, as to when they need the information, prior to or after the learning activity.

1.5.1.3 Lessons learned from the inspiring experiences and from dealing with the challenges Individual meetings with students and enhanced facilitation of group casework made it easier to follow the progress of the students in order to improve facilitation of their learning.

Weekly reflections in the teacher team enabled a shared understanding of the course as a whole and functioned as a platform for sharing the experiences from interactions


with students and case groups. These sessions paved the ground for new concrete ideas for how to improve the course.

When it comes to the interaction with external stakeholders, it is important to allocate sufficient time for making the cooperative agreements. Physical meetings on the stakeholder locations will be immensely helpful to create a shared understanding of what all parties can expect from each other with respect from the casework.

#### 1.5.2 An assessment of accomplishments after 4 years of Nextfood

### 1.5.2.1 What has been accomplished to shift from theory to phenomenon (experience) in agrifood- and forestry systems as the starting point for the learning process?

At NMBU the course in Agroecology: Action learning in farming and food systems, has been action-oriented and experiential from before the start of Nextfood, and brought with it many lessons learned for how to implement this type of educational approach.

At NMBU, open-ended cases in both farming and food systems are the 'starting points for learning'. The aim of this master's course is to reduce the distance between society and academic disciplines, as well as the 'knowing – doing gap'.

For many years reflection is a competence that has been introduced and cultivated in the Agroecology course at NMBU. From the start of Nextfood – and prior – the course has contained bi-weekly reflection sessions – with the purpose of enabling the students to examine and learn from their experiences in the field. As already mentioned, the NMBU course is already based on real-life case inquiries in farming and food systems. The classroom is transformed into a diversity of learning arenas, where theory is not the starting point, but is drawn in on demand to support reflection on observations and experiences from casework. The action learning approach is reflected in the students' participation in field excursions, attendance in arrangement of public meetings, meetings with experts and guest lecturers, performing presentations of plans and results of field visits, writing client documents for stakeholders, writing commentaries on literature, and peer reviewing on students' writings.

One example that illustrates this shift in the NMBU case is the excursion to a nearby farm and taking that experience as basis for drawing and explaining a farming system model, including relevant concepts. Moreover, students are encouraged to read theory when it is needed in their casework, thus using theory to support understanding of experience. The students are encouraged to departure in their experiences and previous knowledge and build on that to determine what more knowledge is needed; therefore, what the students need to learn depends on cases they explore and what they already know. The supporting literature is revised every year to fit needs of current edition of course and what type of casework students will take part in.



In the third cycle, the shift from theory to phenomenon (experience) was strongly affected by the Covid-pandemic. The course normally starts with the 'Fokhol experience', whereby students and teachers spend almost an entire week at Fokhol farm and students go to nearby farms in groups. In the third and fourth cycle, this was not possible. However, even though Covid put a stop to the Fokhol experience also the fourth cycle, the rest of this semester was next-to-normal. This cycle, the casework was (again) divided into a sequential structure, with the farm case preceding the food case, as the two differ in complexity. This gave the students the opportunity to practice the methods of systemic inquiry and the core competences in two rounds of casework, which the students seemed to appreciate.

# 1.5.2.2 What has been accomplished to shift from transmission of knowledge to the development of key competences needed to support sustainable development in agrifood and forestry systems?

To improve how competence development is cultivated at NMBU, minor adjustments have been made over the years of participating in the Nextfood project. This mainly due to the fact that NMBU have been implementing the shift from traditional – linear – lecture-based education to competence training for a long time already. However, before the first cycle of Nextfood, it was decided to implement a pilot mentor-program to better follow-up the students throughout the course, and to provide support and guidance underway. Second-year Agroecology students were recruited to be mentors in the pilot program.

In general, at NMBU the students practice the core competences of reflection, observation, participation, dialogue, facilitation and visionary thinking through the farming and food systems inquiries (casework) and sessions in class. For instance, reflection is practiced through weekly reflection sessions and the writing of reflection documents. The regular reflection sessions, not only serves the purpose of extracting learning from experience, but also in enabling the students to develop their competence proficiency by reflecting on the course activities and the competences themselves. Moreover, reflection is used to critically examine sources of information, enabling students to discern between valid and invalid sources. These reflection sessions are initially led by the core teachers, however, towards the end of the course, the students are asked to lead the class reflections themselves. The purpose of this being to develop their mastery of – especially – reflection and facilitation.

Overall, during the course the students are introduced to several exercises for training the core competences, such as the previously mentioned reflection sessions and casework projects, in addition to visioning sessions and guided imagery, observing a person eating, transect/observation walks, and rich picturing, dialogue sessions and "talking stick" exercises, literature seminars, reflective writing etc. Furthermore, the teachers at NMBU are (still) optimizing the transition from 'transmitters of knowledge' to facilitators of learning. An example of this is that traditional lectures are replaced by short introductions followed by facilitated, student-active processes.



#### 1.5.2.3 What are the prerequisites for making a successful shift?

Based on the experiences in the NMBU Norway case, it has been found that the prerequisites for making a change towards a "full-fledged" Nextfood approach can be summed up as listed below – focusing on three elements of: Communication, understanding, confidence and motivation; Learning arenas, planning and resources; The human dimension.

Communication, understanding, confidence and motivation

- Good communication
  - With students (before the course and in plenary, during group facilitation and in individual meetings in the course)
  - With all others involved
- To elaborate "all others involved" could mean stakeholders, teachers, institutional actors etc. At NMBU, experiences with external, interdisciplinary communication have been successful to a varying degree in terms of internalization of the action learning approach, however, communication with them is nonetheless found to be essential.

The goal is for this communication to lead to an enhanced understanding of action learning, and its central role in sustainability education.

- **Understanding** of action learning (students, teachers, stakeholders, institutions)
  - As a **necessity** in sustainability education
    - Ontological reasons
    - Epistemological reasons

Moreover, focusing on a rich learning environment – training competences instead of teaching them – enabling the use of all senses, will fuel motivation to engage in the learning process as well as to support students' ability to attain information, skills and knowledge.

- As a **purposeful, stepwise process** and what it entails at each step
- As a process of **continuous reflection** on
  - Phenomena ('content') and actions ('process') in relation to relevant theory
  - Own learning process

Arguably, when one has this understanding of action learning, it will lead to a:

• Confidence in action learning and motivation for trying it out

However, there is a reciprocal and interdependent relationship between understanding and motivation – enhancing one will inevitably strengthen the other. Understanding will lead to motivation for trying it out, but the "action" in action learning is also a prerequisite for increased understanding.



#### Learning arenas, planning and resources

As for the prerequisites for learning arenas, planning and resources, one needs:

- Good cases for action learning arenas
- Complexity and need for change
- **Stakeholders** committing to the process of co-learning and being good communicators
- Thorough **planning** (e.g., matching of theoretical inputs and exercises in class with specific case study tasks: "**just-in-time-learning**"; dimensioning and temporal distribution of **workload**)
  - To clarify, thorough planning is more important in an action learning course like this so that there is "just-in-time learning". The theoretical learning and exercises should be in synchrony with what the students are learning in the casework. This is what they need in the systems inquiry process.
- Manual and financial **resources**
- Suitable **infrastructure** (e.g., room facilities allowing dialogue and group processes

#### The human dimension

Finally, an important prerequisite is the human dimension of action learning, i.e., one's:

- Ability to **improvise** 
  - Despite all efforts in planning, you need to be flexible when facilitating action learning. Things happen outside one's control weather, accidents, a pandemic... There are certainly always things overlooked in the planning.
  - Acknowledgement of
    - The **diversity** among students (personality, learning style, backgrounds, interests, working capacity)
    - The need for strategies to deal with it

It is impossible to have a good overview of everyone's personalities and traits. But it is important to not be taken by surprise when students react unexpectedly to something that we think has been well explained.

- Focus on **group dynamics** and **facilitation** of the participatory action learning process
- Patience and generosity among all parties involved
- Related to the ability to improvise, patience and generosity among all parties involved, is a prerequisite. Despite all expectations, things happen.

### 1.5.2.4 What is your concrete advice on the shift from simple knowledge transmission to the development of key competences?

There are a few key elements that should be embedded in an action learning course for it to truly enable the shift towards competence development. These are to:

• Organize the course as a **learning cycle** with a real-life case at the "experiential centre". The students should explore their case with curiosity and with the aim of finding out "what is there and what does it mean?", "where do we want to go?" and



"how do we get there?". As such, it is crucial to introduce activities and tools for conducting exploratory systemic inquiries – while also providing experiential examples. In the NMBU case the students are subjected to a "trial farm system" where they visit a farm and go through the motions of conducting a systemic inquiry together with the teachers.

Further, one should focus on exercising all the core competences, which are important at every step of the learning cycle.

- Observation (e.g., observation walk, eating observation exercise, rich picturing)
- Reflection (weekly reflection sessions, student-led reflection, reflection log-writing, reflection document assignment)
- Participation (casework projects and groupwork exercises)
- Dialogue (dialogue session introducing guidelines, exercises in practicing dialogue, e.g., "talking stick" exercise)
- Systems thinking (introducing systems thinking theory, such as "Soft systems methodology", in addition to other tools that can inform a systemic inquiry, such as Field theory and Force field analysis, stakeholder analysis, conceptual modelling etc.)
- Visioning (session on visionary thinking, facilitating first-hand experience with visionary thinking through "Guided imagery" or another visioning exercise)
- Moreover, teacher not only students should also practice the core competences, especially reflection. In the NMBU case, it has been highly valuable for the teachers to conduct regular reflection meetings. To follow up what comes out of these meetings, minutes and notes should be collected and summarized for further action to be taken.
- Another advice is in relation to the assignments the students are given throughout the course, which are duel in their purpose both as a bases for assessment, but also as a learning activity. Students produce stakeholder documents in their casework, as well as "learner documents" or reflection documents. Additionally, they hold an oral exam at the end of the course to communicate the things that cannot be interpreted or disseminated through text.

#### 1.5.2.5 What is your main challenge?

Based on the final reflection workshop in the NMBU case, the main challenge identified and presented was:

In the core agroecology course, how to create a balance between:

- Action/Experience and Theory/Reflection
- And between the focus on
  - Content (the ontology) vs.
  - Process (methodology, epistemology)

While further discussing this challenge in the team after the workshop, alternative formulations of the challenge came up:



- How to create a dynamic interaction between experience and theory?
- How to create a balanced connection of experience and theory?

One could also see this challenge as more of an oscillation or flickering between experience and theory, rather than finding a balance. However, enabling oscillation from one to the other would also imply finding a certain balance between the two.

In the case of agroecology, finding a balance between experience and theory is also linked to finding a balance between seeing the parts and seeing the whole of a situation or system. Neither seeing the parts and forgetting to see the whole, nor vice versa, would give a holistic view of the situation.

The challenge came up several times in teacher reflections during the past cycle. The concern was that students were unable to have situated conversations when discussing theory in class sessions, as it seemed they both started and ended in theory, forgetting to link theory to their experiences. On the other hand, it seemed that in relation to casework, the students often stayed in their experiences and forgot to link it to theory. Moreover, it was a question of whether the schedule design provided a good foundation for finding this balance of experience and theory, and whether it was possible to change it.

### 1.5.2.6 What are the three best ideas from the workshop for how to deal with that main challenge?

From discussing how to deal with the main challenge, both ideas that came up in the final reflection workshop, ideas from the weekly teacher reflections, and ideas that came up on the spot were considered. It was mentioned that one thing to keep in mind when considering changing the course set-up, was the degree to which teachers should lead the students towards a pre-defined goal versus keeping an open space for autonomous learning. With reference to professor in pedagogy Gert Biesta, it was noted that the role of the teacher should be to catch the attention of the students and guide them, following a libertarian rather than authoritarian form of education. Further, the way of communicating with students was brought forth as essential, to build trust and create a safe learning environment.

The following ideas were discussed (ideas that came up in the workshop in *italics*, and related ideas in sub-sequent points):

Address for the students the complexity of translating what is observed in practice into theory

- The activity where students in the beginning of the semester go to a farm together with a professor and afterwards gather in the classroom to reflect upon the experience and discuss theory, was mentioned as successful in keeping a



balance and drawing links between experience and theory. It was questioned whether it could be feasible to include more of such whole-day activities.

- To have the students present their findings after case visits in two parts:
  - First, a debrief session where students describe their observations and experiences mainly
  - Then, a reflection session where students are encouraged to link their observations and experiences to theory
- To have focused dialogues, as reflective conversations, with the purpose of linking theory to experiences and vice versa

Listen and dialogue with student needs / Clear communication / Create good relationship and build trust inside the group

- To have individual conversations with students, and use this opportunity to follow up on the students' progress towards the learning goals (including the ability to link theory to experience or *real-life situations*)
- To have more structured individual reflection, in the form of time set aside in the schedule for the students to sit in the classroom and write in their reflective journals. Here the students are encouraged to connect their experiences to theory, and it would also act as an opportunity for them to identify 'holes' in their knowledge.

Communicate well the plan and the learning goals / Clear communication

- To ask the students to develop a rationale behind student-led reflection sessions, to give an answer to *why* the focus on given questions, and relating them to the learning goals
- To use the assignment "individual reflection on learning goals" at an earlier stage or several times throughout the semester, encouraging students to become more aware of their own progress

Peer learning within the student group – to build on the different sets of competences that the students bring in

- To encourage peer learning within the student groups, where the students could benefit from each other's knowledge base and theoretical understanding in relation to their casework



### 2 Case 2: University of Oradea, UNIOR

Authors: Anamaria Supuran and Adrian Timar

Contributors: Alin Teusdea and Adrian Vuscan

### 2.2 ID card

#### Course title, level and language

Title: Students and farmers taking food innovations from idea to marketLevel:OtherLanguage:Romanian

#### Course learning goals

- To acquire sufficient knowledge and experience in order to develop innovative food products
- To develop competences such as: reflection, visioning, observation, dialogue, participation, critical thinking, problem solving, group-work
- To encourage co-learning within the course and improving the "learning to learn" skills

#### Host institution(s) and course leader(s)

Institution:	University of Oradea		
Leaders:	Lect.dr. Adrian Timar		
	Assoc.prof. dr. Anamaria Supuran		

#### Timeline of the activities covered in this report

Timeline:Course start: 26.11.2020Course end: 30.09.2021

#### Learner categories and number per category (demographics)

Learners: 12 (4 high school students, 8 students)

- Number of students starting the educational activity (male and female): Total of 12 students; 9 females and 3 males
- Number of students passing the educational activity All the 12 students have passed the educational activities.
- Educational background of students (high school, bachelor, master, PhD) High school students: 4 Bachelor students: 6 Master: 2



• Number of students with more than three years of experience in the field/business University students: 8

#### Stakeholder categories and type of involvement

Representatives of companies (part of the students' working groups, hosts of field trips)

Representatives of state institutions (part of the students working groups, hosts of field trips)

#### Shortlist of learning arenas

Laboratories, didactic farm, bakery, restaurant, classrom, virtual platform



### 2.3 Extended summary

#### 2.3.1 Research results since the previous reporting

#### 2.3.1.1 Students', teachers' and other stakeholders' experiences and learning

The teachers have learnt how to organize properly the reflection sessions and how to support their students with writing their reflection documents. Even if the stakeholders were not convinced about the efficiency of these reflection documents and sessions, at the end of the course they understood their value when it was to plan the third cycle.

As other student from the faculty to benefit of the activities and experiences related to the 5 core competences and to certify in the same time their importance, it was decided to introduce two new disciplines for the first year students: Life Skills and Career Guidance.

The stakeholders learnt to work together with the high school and university students and even if they didn't feel comfortable at the beginning, they were finally very satisfied about the co-learning process within the group. They also learnt how to fill in some documents and how to use a digital microscope and a spectrophotometer. In the same time, they had the chance to acquire pedagogical skills when asked to present the component of different equipment or the operation process of the respective technological lines.

The students were very content and in the same time surprised with the introduction of visioning exercises and they surprised how many details (related to the food product to be developed) have identified by using their imagination. More than this, the activities were organized in a pleasant and comfortable atmosphere that created the premises of a safe environment where innovation and reflection could take place.

### 2.3.1.2 Outcome of the case development process, including effects of making the essential shifts

The most important outcomes of the case development process are presented below:

An updated version of the first cycle that maintained the same number of meetings (18 meetings) and field trips (2 visits) and the content of the theoretical courses but it changed the methods and tools of teaching/learning so that the acquisition/deepening of the five core competences to be more efficient and effective.

The result of the course brought the development of 4 new food products that were presented in different student competitions (e.g. Innovativa and Ecotrophelia, CEEPUS Summer school in Poland)



During the second cycle there was a decision at the level of the Department of Food Engineering to include 3 new disciplines for the first year students (Food Science and Technology) that had in view the development of specific competences and career guidance for students. The three disciplines are named: Career Coaching (4 credits) and Life Skills (3 credits), and Entrepreneurship in Food Industry (3 credits).

The dissemination process of the course to other partner Universities brought us in the position of taking part in a future project that had in view the implementation of action-learning approach in Serbia, within the University of Nis.

The inclusion of other young colleagues in the project either as facilitators or members of the project team contributed to the formation of other colleagues in the action learning approach and also in working with statistical instruments such as NVivo.

The high-school students had the chance to work together with university students and at the end of the course they could decide if their future career could be related to the food industry. During the three years there have been students that have started the course as high school students and ended it as university students. One of the outcomes in this case was that the Nextfood project acted also as a career orientation instrument for the high school students emphasizing the importance of selecting and continuously supporting certain high school students on making the right decision in the future career.

All the students have been exposed to a new learning approach and environment that made them improve skills like: communication, reflection, visionary thinking, team-working, observation, dialogue, visioning, problem solving, critical thinking and digital skills.

An important outcome was the strengthening of the relationships with the companies and state institutions that were materialized in re-signing the cooperation contracts between the Faculty of Environmental Protection and their companies.

Other outcome was that the stakeholders could identify very well-prepared students and they could be hired at the end of their studies.

The stakeholders also had the chance to develop pedagogical skills besides those related to the action learning approach.

Important outcomes of the second cycle have been the publication of two scientific papers:



- USE OF ROSEMARY AND RED ONION EXTRACT IN DEMI SMOKED SALAMY. Annals of the University of Oradea, Fascicle: *Ecotoxicologie, Zootehnie şi Tehnologii de Industrie Alimentară*, ISSN:1583-4301
- USE OF NATURAL EXTRACTS FROM PRUNUS SEROTINA IN TEXTILES AS DYES, Annals of the University of Oradea, Fascicle: Environmental Protection, ISSN 1224-6255

#### 2.3.1.3 Supporting and hindering forces for implementing the Nextfood model

The application of Force Field Analysis represented a way to clarify sensitive subjects around the implementation of the Nextfood approach within the Romanian case named: **Students and farmers taking food innovations from idea to market** 

At the beginning, it was performed an assessment of the present situation by identifying the challenges that appeared in the first cycle and the issue that requested a solution for the second cycle. Thus some of the challenges that persisted were those related to the pandemic situation, the involvement of the teachers in project, the change from teacher to facilitator and many others.

The objectives of the analysis were represented by the six shifts we needed to perform in the second cycle, that is From lecture hall to a diversity of learning arenas; From lecturing to co- and peer learning; From syllabus to supporting literature/a diversity of learning sources; From textbook to a diversity of teaching aids; From written exam to a diversity of assessment methods; From lecturer to learning facilitator.

The second step was to identify the driving forces that could support us in making these shifts and the hindering forces that could block the whole process.

The last step of the analysis was to evaluate these forces according to their importance and assign them a score from 1 (the weakest) to 5 (the strongest).

According to Appendix 2 representing the Force Field Analysis, it is obvious that the supporting forces sum up a higher score than the hindering forces, fact that leads to the conclusion that all the six shifts have been accomplished.



#### 2.3.2 Actions taken and data on the development of the case since the last reporting

#### 2.3.2.1 Actions taken since the previous report

#### 2.3.2.1.1 Planning

The planning process of the second cycle was a continuous process by looking at what went well and what went wrong from the facilitators and stakeholders point of view. After the final evaluation of students that took place in October we planned to have two months in order to review all the collected documents from the students and stakeholders and to discuss on the changes that we needed to make in the second cycle. However, the initial plans couldn't be respected because of the Covid restrictions imposed by the Romanian government on the whole territory.

Given the fact that many challenges were connected with the organization of the faceto-face meetings and bring together the high school students and university students, the first decision made was to organize 3-4 meetings per month and to start the course at a later stage in March and finish it in September. Thus, we could avoid the different schedules of the high school students and university students. Other decision had in view the partner vocational schools that we brought in the first cycle. Unfortunately, we needed to give up on our collaboration with the vocational schools that are from the countryside for two reasons: the bureaucracy in the case of minor students (many documents to be signed by the parents – for transport from home to Oradea; for the visits, etc) and also because of the pandemic situation which determined our government to impose restrictions on the free travel among localities or in other cases there have been restrictions related to the time that people can spend outside their house (e.g. after 6 o'clock pm we were not allowed to be on the streets).

As a consequence of these decisions and also due to the pandemic situation, the number of the participants decreased to 12 (8 university students and 4 high school students). The team of facilitators suffered also little changes: the stakeholders that were representatives of the two companies where the visits have been organized in the first cycle were replaced with other persons from other companies.

As regards the structure of the course, there were no significant changes as regards the theoretical content provided to the students but some of the practical activities were changed and they all had in view the development of the five core competences: observation, dialogue, participation, visioning and reflection.

Small changes have been made in the content of the course: such as the introduction of a theoretical course in food packages from an environmental perspective that supported some practical activities on biodegradable and environmentally-friendly materials that can be used in food packages and the usage of new teaching/learning methods and tools (e.g. visioning exercises, new serious games, etc.) meant to motivate and stimulate the participation of the students.



Because in the first cycle, there have been some imbalances in the representation of each competence in the organized activities, such in the case of visioning, the teachers and stakeholders decided to include at least 3 activities representative for each competence. After looking at the content of the course, there have been adapted or designed new methods and tools of teaching/learning to support that could stimulate the acquisition/development of the five competences. Besides these five competences, the team of teachers and stakeholders also agreed to include activities that could also stimulate other competences such as: co-learning, critical thinking, problem solving and digital skills.

#### 2.3.2.1.2 Implementation

The second cycle was intended to start in November-December and for this reason a series of actions were taken at that moment. In November we succeeded to organize the visits to the companies of interest for this cycle (Bicaci bakery, didactic farm of the faculty, Silena SRL- a self-catering restaurant) and in December we uploaded the first theoretical courses on-line that were also accompanied by the collection of data on self-assessment of competences and the answers on the four questions at the beginning of the course. However, due to the pandemic situation we had to postpone the face-to-face meetings until March when we re-initiated our activities. Thus, from this moment all the meetings were organized face-to-face and all the practical activities were delivered in the same manner until the end of the course.

Due to the pandemic situation, the implementation team (made of 4 persons -2 teachers and 2 stakeholders) decided to bring the students groups even in different days, so that to avoid the risk of contamination.

The food products that were designed by the four teams of students are different from those designed in the first cycle and they are: halva with pumpkin seeds and lavender, relaxing drink with wild cherries, wine made of hybrid grapes and corn flour bread.

#### 2.3.2.1.3 Reflection

The reflection process during the second cycle was organized almost similarly with what the process in the first cycle.

After each on-site meeting, the students were asked to reflect for up to 5 minutes to what went wrong, what went all right and what they would have changed if they were teachers/facilitators. The information collected from the students during these sessions were very valuable for the facilitators because they could organize the following sessions better and they could also adapt specific activities to the learning styles of the students.



As regards the teachers and stakeholders, they also organized reflection sessions at the end of each on-site meeting to discuss the information received from the students but also their own opinions regarding the developed activities. More than this, these sessions represented a supporting factor for the new facilitators who needed feedback on the way they performed. At the end of the course, the reflection workshop was organized and many of the problems that appeared during the course were discussed in order to be corrected or removed for the next cycle. Of course, the positive aspects of the course were also discussed and they represented encouraging factors for the next cycle. Many insights recorded during this workshop were considered when planning and implementing the second cycle.

All the teachers and stakeholders involved in the organization of the course agreed that the implementation of the second cycle will be much easier because there is a better understanding of each stage of the course and how some certain learning methods/tools operate when applied to students.

# 2.4 Students' responses, learning and competence development

#### 2.4.1 Methods of data collection and analysis

#### 2.4.1.1 First week (day) & last week (day) of the course

#### 2.4.1.1.1 Student's understanding, contributions, and expectations

The course is designed and implemented by a team of 6 persons, where four core facilitators are mainly responsible for supporting the students' learning process, planning and re-planning the course, while the other two persons are mainly responsible for driving the research activities connected to WP2 in Nextfood.

From the very beginning, the students, teachers and stakeholders were asked to give their consent as regards the collection of data during the different stages of the Nextfood project. Thus, the organizers designed and offered a standardised consent template to all the participants during the first meeting which was signed by all of them.

At the beginning of the course, the students were asked to provide answers on four questions related to their understanding of the course topics, their contribution potential, competences they would like to train and their expectations to the course, summarized in the answers to the following questions:

• 1. What are the knowledge, skills and attitudes (competences) we need to support sustainable development in agrifood and forestry systems?



- 2. What experiences and competences do I bring to the educational activity to make it a success?
- 3. What are the questions I would like this educational activity to help me find an answer to?
- 4. What are the competences I'd like to train/improve in this educational activity?

The four questions were sent to the students by e-mail and the learners answered to them as a home assignment, Thus, they could take the time to reflect on the questions and answer to them in a written form.

At the end of the course, the students were asked again to answer to the five questions that could give a glimpse on the students' understanding, contributions and expectations at the end of the educational activity. The questions were sent by e-mail and the answers have been collected in a written form.

- 1. What are the knowledge, skills and attitudes (competences) we need to support sustainable development in agrifood and forestry systems?
- 2. Which of the experiences and competences I brought to the educational activity contributed the most to the learning community?
- 3. What questions did this educational activity help me find an answer to?
- 4. Which competences did I train/improve significantly in this educational activity?
- 5. What are the questions I am now asking myself?

In the same manner as in the case of the 4 initial questions, they have sent to the students by e-mail and their answers have been collected in a written form.

After their collection, two teachers read all the documents and started to categorize the answers in different categories (according to positive or negative answers/attitudes, types of competences) and make comparisons with other collected data (comparisons with the initial questions in order to track changes/transformations that the students perceived they encounter during the course; comparison with the reflection documents to check if the two sets of data support one each other).

#### 2.4.1.1.2 Self-assessment of competences

At the beginning and the end of the course, the facilitators together with the students organized the self-assessment of students' competences

The questionnaire was designed by the NMBU team and included 17 questions that had in view the five core competences (observation, participation, visioning, reflection and dialogue). For the core competences of observation, participation and visioning there have been allocated 3 questions per competence while for reflection and dialogue a set of 4 question per competence has been allocated.



The questionnaire was sent to students by e-mail and they were asked to fill it by taking into account the rank scale from 1 to 9 (1, 2- Novice, 3,4 – Advanced beginner, 5,6 – competent performer, 7,8 – proficient performer, 9 - Expert).

To analyze the data collected from the students, it was applied a t-test.

Compotonco		Difforonco	Significanco
Table 2: Average scol 1 (Novice) – 9 (Exper	res of self-reported competence developr t). N=17)	nent among students	. (the scale used was

Competence	Average scores		Difference	Significance
	Start	End		P value
Observation	5.6389	7.2778	+1.6389	<.0001
Participation	6.0000	7.5000	+1.5000	<.0001
Visioning	4.3056	6.0556	+1.7500	<.0001
Reflection	5.1042	7.0208	+1.9167	<.0001
Dialogue	4.5833	5.8125	+1.2292	<.0001

Results of a paired, two-tailed, Student t-test.

**Reflection.** The development of the reflection competence presented the most significant increase starting from a mean value of 5.1042 at the beginning of the course and reaching to 7.0208, meaning that there was an increase of 1.9167 with p < 0.0001.

**Visioning.** A significant increase of 1.7500 was also recorded in the case of visioning starting with a mean value of 4.3056 (the lowest value) at the beginning of the course and reaching a mean value of 6.0556 with p=0.0001.

**Observation.** The observation competence recorded an increase very close to that of observation of 1.6389 starting from a mean value of 5.6389 and ending with a mean value of 7.2778.

**Participation.** The next position is occupied by the participation competence which recorded an increase of 1.5000 starting from 6.0000 at the beginning of the course to 7.5000 (the highest) at the end of it.

**Dialogue.** The only competence that recorded a lower increase of 1.2292 was that of dialogue. Even so, the increase is still significant because it started from a very low mean value of 4.5833 and ending with a mean value of 5.8125.

#### 2.4.1.2 Students' final reflection document (individual)

The reflection documents of the students represent valuable documents for the methodological process when it is about planning or re-planning different stages of the course so that the students be able to successfully acquire and develop the five key competences promoted by the Nextfood project.



For this reason, starting with the first meeting of the course, the students were informed about the need as each student to write the student's reflection document under the form of a diary and it was stressed the importance of this document for the teachers who were going to analyse these documents at the end of the second cycle. The teachers brought in front of the students different paragraphs collected from the students' reflection documents from the first cycle to exemplify how these documents should be written. The students were encouraged to asked questions if something was unclear or just to check the correctness of their understanding.

After the first meeting the teachers provided the students other several samples of diaries and recommendations on how to write such a document. All these supporting documents have been sent by e-mail. More than this, the students were encouraged to ask further support/feedback on how to write the reflection document during the face-to-face meetings in case it was needed.

As in the previous cycle, the documents collected from the students were firstly made anonymous, each student receiving a code of the following type LRD\_S01\_2020 (Learner Reflection Document – Student01\_2020), they were coded according to a **pre-defined coding tree** based on the five core competences of Nextfood project. Because there were many references in the reflection documents regarding the co-and peer learning among students an additional node was added named **co-learning.** It was also performed a reliability check by one of the members of the team (Lect. dr. Alin Teusdea).

After coding was accomplished, a series of visualization instruments have been used, such as: **word tree** and **word cloud** to make further connections with other data collected from the students, such as with the answers provided by the students for the initial and final questions and with the data from the competence self-assessment questionnaire.

Thus, it was decided that some specific words relevant for the five key competences that were repeated in several reflection documents to be analyzed by using the **word tree** function of Nvivo. There was a real interest in detecting the contexts in which the respective words appeared and in finding the recurring themes and phrases that surround the word.

**The word tree** was used in the case of some relevant verbs for each of the five core competences (to participate, to imagine, to realize, to observe, to discuss) but some other analysis have been made for the words "facilitator" and "group" that could give additional information to support different transformations.



The **word cloud** was applied to all the files containing the students' reflection documents given the fact that it is a word frequency query used **to help us find commonly used words and phrases**.

The word clouds represent graphical representations of word frequency that give greater prominence to words that appear more frequently in a source text. The larger the word in the visual the more common the word was in the document. There have been excluded all the words that had less than 6 letters, given the fact that Romanian language has many connectors and short words that were not relevant for analysis of the competences.

The choice of introducing visualization tools in the analysis was supported by the fact that they represent an excellent first step, as our brains prefer visual information over any other format.

#### 2.4.2 Results

#### 2.4.2.1 How do students experience such a learning process with respect to:

#### 2.4.2.1.1 learning goals?

The answers to the first question regarding the knowledge and skills needed to support the sustainable development in the agri-food sector reveal a multitude of ideas. When speaking about knowledge, the students consider that knowing: chemistry, biochemistry, consumers' behaviour, microbiology, sensorial analysis, food additives and ingredients, food safety, food toxicology, animal and vegetal raw materials, food canning, food preservation, food biotechnologies, residues, equipment in food industry, food packages, is of a great importance for their future career. Having no knowledge in these disciplines could affect their possibility to get hired or to perform at a certain workplace. They also mention a variety of soft and hard skills such as: learning ability, adaptability, engagement, communication, networking skills, resilience, self-reflection, teamwork, time management, empathy, ability to take criticism, presentation skills, digital skills, critical thinking, problem solving, innovation and creativity, using equipment, technical skills that are vital nowadays in the case of almost any job. Having all these skills will ensure them a swift adaptability on the present-day competitive labour market and it would create the premises of getting a job faster than others or a better job from the very beginning.

The answers to the second question that refers to the experiences and competences that the students bring to the course include examples such as: field trips, sensorial analysis of food products, ability to select ingredients and to prepare food products, taking part in different food-related competitions, local and regional fairs and exhibitions, capacity to work in teams and make presentations, capacity to write reports and even scientific papers.

For the third question, the answer varies from general questions such as: how to make bread, cheese and products and pastry meat, how to learn by practice, how to work in mixed groups to more specialized ones: how to generate new product ideas and



recipes, how to monitor the use of additives, how to test and examine different food samples, how to evaluate the nutritional value, colour, flavour, texture of food, how to design a food package, how to introduce a food product on the market.

The competences and skills that the students would like to train mentioned in the fourth question were: communication, team work, participation, making decisions, problem solving, critical thinking, reflection, creativity, observation, visioning, dialogue, empathy, presentation skills and digital skills.

According to the answers to the final questions, the practical activities included in the course covered all the stages of designing a food product and they admitted that they could work efficiently on the task they had to do. Even if there were students who at the beginning of the course wanted to learn something else, they admitted that this happened because at that moment they had no idea what kind of product they would like to do.

The reflection documents of the students also reveal that they succeeded in practicing extensively competences like: reflection, participation, visioning, observing, group work and critical thinking and they were content with the final result of the project considering it a very good experience. The several mentions of different activities meant to develop the five key competences are an example that can support this statement.

"This time we had to make the sensory analysis of the plant products. Although I'm not a fan of these products, I'm glad we didn't have to deal with unpleasant odors. Again we had to use our observational sense and complete the respective sheets. The activity was relatively identical with a previous one only that the products were different. We really appreciated the presence of the head of Consumer Protection Office at our meeting who gave us a demonstration of sensory analysis as it takes place in the case of a control made by a Consumer Protection officer. It can be seen that he has a lot of experience that he shared with us sometimes in a funny way through the events he told us. Most of all, I appreciated the tips and tricks that you can't find in the literature or in the textbooks. From my point of view, only personal experience and knowledge gained over time matter in this situation. In addition, he proved to be a very good psychologist, managing to decipher the behavior of the economic agent in case of a control. Being at the middle of the course I can say that the knowledge and skills (communication, team work, reflection, participation) that I developed during this time will help me in my future career." (LRD S8\_2021)

#### 2.4.2.1.2 view on competences needed for sustainable development?

The data provided by students by answering to the four and five questions applied at the beginning, respectively at the end of the course, show that the activities they consider necessary for their future careers are related to how to learn by practice, how to generate new products/recipes, how to test and examine different product samples, how to evaluate the nutritional value, colour, flavour, texture of a food product, how to develop a food package or how to introduce a product on the market. Considering the



activities developed within the course, most of them were already covered, and thus, we may consider that even the competences and skills that derive from them have been developed and enhanced in such a manner that their sustainable development can be assured.

The interpretation of data in the case of the competence self-assessment questionnaire reveals that the most relevant increase is recorded in the case of **reflection** with a difference of 1.9167 from the beginning to the end of the course. The next increase is that of visioning with a difference of 1.7500 being followed by observation in the case of which there is a difference of 1.6389. The next position is occupied by participation with a difference of 1.5000. The lowest increase is recorded in the case of 1.2292.

The analysis of the competences within the self-assessment questionnaire applied at the beginning and at the end of the course shows that the most significant increase is recorded in the case of **reflection**, fact that can be explained by the multitude of reflection moments organized at the end of each face-to-face meeting or the several supporting documents delivered to the students with the scope of helping them in writing the learner's document or understanding why this competence is so important for the learning process.

The next competence that also has a significant increase is that of **visioning**. If in the first cycle, the visioning competence recorded the lowest increase, after re-planning the course (for the second cycle) by introducing more visioning exercises, the result is satisfactory especially if we consider that at the beginning of the course the mean was the lowest of 4.3056. This very low mean shows that the students didn't experience in the past activities based on visioning and thus they scored themselves very low. During the course, the teachers put at the core of the course itself several visioning exercises such as: imagining the ideal food product; imagining the new food product at the beginning and in the middle of the course; watching a movie up to a certain point, after which the students had to imagine the follow up. Thus, we may conclude that the students evolve very well from the beginning till the end of the course.

The next significant increase is in the case of **observation** and it remains to observe that the means at the beginning and at the end of the course are almost the highest in comparison with those for other competences. These results confirm the fact that Romanian students are good observers due to the passive role attributed to them during the time by our educational system. More than this, many practical activities organized within the course had in view the observation of different details related to the equipment in factories, sensorial analysis of food products, experiments with microscope with video camera and spectrophotometer, making different comparisons, etc.



**Participation** recorded a satisfactory increase during the course given the fact that the evaluation recorded the highest means both at the beginning and at the end of the course. The high mean at the beginning of the course can be explained by selecting the best high school and university students to take part in the course. Due to the Covid situation the number of participants decreased drastically and the teachers were forced to select the best students who were previously involved in other activities such as conferences, competitions and cooking events. Thus the degree of participation of these students was very high from the very beginning. Their evolution during the course was also a positive one and this happened due to the numerous activities where participation and co-learning were very important.

**Dialogue** seems to record the lowest increase and even the means at the beginning and at the end of the course were the lowest. The analysis of the data collected by applying the competence self-assessment questionnaire shows in this case that even if the students were capable of understanding the difference between debate, discussion and dialogue, they were not capable to formulate questions that could stimulate a dialogic approach or challenge the assumptions behind the group's thinking (partly due to the age difference between the high school students, master students or even stakeholders).

#### 2.4.2.1.3 recognition of own competences and competence development?

By applying the four questions at the beginning of the course and the five questions at the end of it, the teachers could notice that most of the competences that the students mentioned that they would like to train at the beginning of the course such as: communication, team work, participation, making decisions, reflection, observation, creativity, visioning, time management were recognised at the end of the course as being practiced and developed due to the activities included in the course.

One document that reflects extensively the competence recognition and development remains however, the students' reflection document.

The students' reflection documents represent a very important mirror in which the students can identify the competences they have, the level of proficiency when using them, the development of these competences and the transformation processes that determined the improvement of some certain competences.

Thus, during the course, they were able to better understand what each competence represent, what its role is and how it can be improved in time. More than this, they became aware of the importance of these competences and they started to write about them in their reflection documents either in a positive or a negative manner besides other aspects of the course.

According to the word cloud from NVivo the most frequent words written in red are: workshop, meeting, product/s, analysis. The next category in black refers to:



sensorial analysis, colleagues, project, facilitator. The next category refers to: laboratory, information, properties, course, subjects, stages, questions, teachers, groups, lavanda, aspects. The last category connected the previous ones are – texture, learn/learning, exercitii, experience, questionnaire, ingredients, faculty, activity, packaging, seeds, bioactive.



Figure 9: Word cloud of students' reflection documents

All these words, make us believe that the focus of the students were the meetings that included the practical activities, the project to be developed and the reflection workshop mentioned several times in the learners' reflection documents. The next category of words reveal the importance of the facilitator who guided the whole process. The word cloud also reveals us some of the competences, such as: observation (sensorial analysis), participation and co-learning (colleagues, group work), reflection (to be happy, to realize, to consider, to understand). Going to the next level, it is noticed that other elements are added: learning arenas (laboratory, faculty, company) which represented the most important ones, different types of information needed for the project: information, properties, subjects, questions, aspects that in a way speak about observation on one hand (aspects, properties) and about dialogue (questions and subjects) on the other hand. The last category includes words that refer to the learning process (learn/learning, exercises, questionnaires, activity) but also to some details requested from them during their activity (texture, ingredients, bioactive) that can lead us to the visioning exercises. As it is noticed there are not so many references made to the methodological aspects of the whole process (excepting for the questionnaire) but more on the way the activities took place.

#### 2.4.2.1.4 transformation

The transformation recorded in the case of the students can be considered partly synonymous with the progress reflected by the analysis of the data collected from the self-assessment of the competence applied at the beginning and at the end of the course. The data shows that for each competence there is a significant increase during the course.



This increase is also backed up by the information provided by the reflection documents of the students. Several of them mention transformations as regards the higher level of knowledge they have at the end of the project, the feeling of insecurity they have at the beginning of the course which is transformed gradually into confidence due to the acquisition of experience and knowledge, the security they feel when working in mixed groups.

"Although during my student years I participated in many competitions in which I presented products created by me together with my colleagues and teachers and consider that I have enough experience regarding the stages of product development, I was curious to see the form in which this information and stages will be presented. I have started to get used to this new approach of learning through direct experimentation and I can say that it suits me very well. Many times at the end of a meeting, I regret that I did not have the chance to enjoy such an approach during the 4 years of student life. Maybe I would have been more motivated to learn more for certain subjects that I didn't like at the time." (LRD\_S10\_2021)

"I felt the experience gained as a result of the previous workshop so I was much more familiar with the organoleptic and sensory aspects, easily establishing certain characteristics that at first seemed difficult to identify and perceive, especially for pumpkin seeds." (LRD\_S7\_2021)

Reflection is the competence that has recorded the greatest increase score according to the data collected from the students' self-assessment of competences and it has one of the greatest number of references in learners' reflection document as the word cloud indicates (reflection workshop). This can be explained that the students were asked to reflect a lot in different situations and on multiple subjects. Thus, they encounter a transformation until the end of the project.

Participation is the second competence mentioned by the students maybe because many students felt a lack of confidence in their own knowledge and experience (especially in the case of the high school students) but also because the activities included in this course requested a high level of participation from the students.

"This time we felt that we were truly a team, helping each other and learning from each other. We have come a long way together and we have managed to overcome all the difficult moments, lack of information or experience. But most of all, I appreciate our colleagues from the involved companies. Without him, I don't think we would have learned that much." (LRD\_S8\_ 2021)

Other type of transformation was recorded in the case of the students that considered the facilitators as resource persons. The learner's documents reveal the fact that they were not very content with changing this situation. However, they have finally understood the reason behind this change.



"Today was a rather frustrating meeting for me because every time I had a question or unclear situation I could not caask the teacher but only my teammates or we had to look for the answer on the net. It seemed to me that this rule is time consuming and it would have been much easier to address the teacher. However, I understood that in this project, the teacher is in fact a facilitator and his role is no longer to teach and provide information for every question. In addition, we noticed that they started talking less and less, leaving us to intervene, to dialogue and to get involved in the proposed activities." (LRD\_S9\_ 2021)

Other important transformation was that in the case of visioning. The simple introduction of a few activities that involved the visioning process helped the students to understand better the product they were going to create. They could visualize it and give it a mental form, colour, smell, taste, nutritive qualities, etc. The introduction of visualization techniques represented a great success that was easily observable from the data collected.

"At the end of our last meeting, I was pleasantly surprised by the introduction of the imagination exercise because I had never experienced anything like this before in college. In addition, I really hoped that we would have more such exercises.

"To my delight, today we had a new exercise, through which we imagined the product we want to create. This time the teachers urged us to imagine what the product looks like now and how we think it might look in a few months. We had to see with our mental eyes all those details that could have changed the original image we had formed about the product. Thus, new details appeared that we did not think of initially - if we can easily produce it in any kitchen or we need equipment." (LRD\_S10\_2021)

An important transformation that represented a continuous process was the change of the role of the teacher into that of facilitator. The process itself was a difficult one for teachers being used to speak a lot in the classroom and give detailed information to the students. It took time for them to change this situation and to give a voice to their students. A change can be noticed even in the mind of the students as long as if we analyze the word trees of the words "profesor" (teacher) and "facilitator" (facilitator) we may notice that there are more references to the word "facilitator" that to that of "profesor" (teacher).



Figures 10: Word trees of the words "teacher" and "facilitator" ("professor" and "facilitator")





## 2.4.2.2 To what extent does the education enhance the students' competences of:2.4.2.2.1 observation?

Most of the references made to this competence in the students' reflection documents are around some certain activities that involved the use of observation, such as: the field trips (Bicaci bakery and didactic farm of the Faculty of Environmental Protection) when the students had to observe details about the equipment, methods of making bread, wine, dairy products so that they could fill in successfully the observation sheets. Similar observational activities were those when monitoring different processes or raw materials with the microscope and when undertaking the advanced sensory analysis for different products in the lab. All the materials developed for the students (observation sheet, sensorial evaluation sheet) were made in order to enhance the observation skills of the students. More than this, by applying the observation sheets or sensorial evaluation sheets for several times, it was expected as the students to enhance their capacity to observe details from one activity to another. The observation process while the students were visiting the didactic farm and the bakery can be identified in many reflection documents:

"I visited the Faculty's own bakery line and the dairy product line that interested me the most. I found out how they work and what role the components play." (LRD\_S2\_2021)

"At this workshop we talked about the impressions I was left with after the visits to the Bakery in Bicaci. I talked a lot with colleagues in my team about what I noticed in these units in terms of specific production process, equipment, production capacity. Some colleagues caught things that I did not realize related to the organization of the entire production activity." (LRD\_S3\_2021)

In the same manner, the students mention for several times the sensorial analysis that they performed



"In this workshop we completed an observation sheet with the sensory properties of raw materials of vegetable origin: corn flour, wheat germ, lavender, wine, wild cherries and lupine. Things went as in the previous meeting, the only difference consisted in the analyzed products." (LRD\_S5\_ 2021)

A visual map of all the situations mentioned above can be seen in the tree of the word "am observat" (to observe).



Figure 11: Word tree of the verb "to observe" ("a observa")

By correlating the data from the reflection documents with those from the analysis of the self-assessment of competences which revealed a significant increase in the case of observation, it can be stated that the Romanian students recorded an enancement of the observation competence (even if the the means at the beginning and at the end of the course are almost the highest in comparison with those for other competences).

#### 2.4.2.2.2 reflection?

The interpretation of data in the case of the competence self-assessment questionnaire reveals that the most relevant increase is recorded in the case of **reflection** with a difference of 1.9167 from the beginning to the end of the course, fact that can be explained by the multitude of reflection moments organized at the end of each face-to-face meeting or the several supporting documents delivered to the students with the scope of helping them in writing the learner's document or understanding why this competence is so important for the learning process. This increase is also reflected by the learners' reflection documents due to the several mentions of the reflection moments organized at the end of each on-site activity but also by the multitude of reflection sessions and documents delivered during the course.



The learner's reflection documents include many references regarding the competence of reflection especially at the beginning of the course when the students were not familiar with practicing this competence. Their documents reflect their worries and fears regarding the possibility of not being able to write valuable reflection documents.

"Even though I find it difficult to write this journal because I do not enjoy doing it, I decided to comply especially as the teachers explained to us the importance of this document for analyzing our progress throughout the course. I understand that this document will help them to continuously improve the format of the course and to make the process of acquiring some competencies as efficient as possible. So here I am writing in this document about the first day of class that took place today." (LRD\_S10\_ 2021)

"We had a feeling of insecurity when, in addition to the course itself, we were asked to answer some questions and complete a questionnaire that covered 5 competencies. We didn't really understand in the first phase why we have to do this, but everything became clear when the teachers explained their importance to us." (LRD\_S10\_2021)

"I started writing in this diary even though I don't really know how to do it. It is true that the teachers explained to us what style we should approach but I do not feel very comfortable writing my thoughts and what I feel about certain situations and people." (LRD\_S11\_ 2021)

Many students mention in their diaries the support offered by the facilitators (information on how to write the diary, examples in the classroom or sent via e-mail) which is helpful make them feel more confident.

The reflection moments trigger some forms of revelations regarding the factors that influence the success in any career that is knowledge, the right competences (creativity, innovation) and high-performance equipment:

"I understood that the success of such a business requires the provision of highperformance equipment and highly inspired bakers. I was left with very pleasant impressions after this visit and more and more determined in the process of successfully completing the proposed project." (LRD\_S1\_2021)

"I understand that this course is an experimental one that it was created recently and can undergo changes depending on the information we provide. It seems like a complicated thing because so far no one has asked us at the end of each course what went well and what didn't, or what we would have liked to change in that activity. I think that maybe this course will change something in the traditional teaching methods of college or high school teachers." (LRD\_S9\_2021)



"What made me very happy was the fact that this course will not be a traditional one but will be one that involves learning through practical activities in which we will have to get involved throughout the course." (LRD\_S7\_2021)

but in the same time they express the hope the students have as regards the continuation of the course or at least the introduction of several methods/activities within other disciplines.

"At the end of the course I can say that it was a special and challenging experience not necessarily because of the knowledge presented with which I was already familiar but also because of the way this information was introduced to us, the methods and teaching tools used and the focus the whole learning process per student. I hope that this diary that I have completed throughout the course will be an important tool for teachers in their work to identify what worked well and what did not so that they can make the appropriate changes for the next cycle. I also hope that this course will not disappear but will be able to be organized in the future or at least parts of it to be mastered by other professors in the faculty." (LRD\_S10\_2021)

"Towards the end of the course I felt that I had contributed in an original and active way to the elaboration of the innovative ideas presented within the formed teams and to the proposal of new project themes." (LRD\_S1\_2021)

Below there is a selection of verbs that can support the revelations mentioned above, such as: "understand" (a intelege) in the context of "I understood that" (am inteles);



Figure 12: Word tree of the verb "to understand" ("a intelege")

"To consider" (a considera) in the context of "I understood that" (Am inteles):





Figure 13: Word tree of the verb "to consider" ("a considera")





Figure 14: Word tree of the verb "to enjoy" (a se bucura).

"Succeed"(a reusi) in the context "I succeed to" (am reusit sa).



Figure 15: Word tree of the verb "to succeed" (a reusi).



#### 2.4.2.2.3 visionary thinking?

The learners' reflection documents speak about visioning as something new that they didn't have the chance to experience in schools or in other learning environments. Many documents reveal the fact that visioning is an appreciated competence when used in several sessions in which the students had to imagine a new food product in order to establish the topics of the future projects (at the beginning of the course)

"Today I imagined the ideal food for the first time and I must say that it was something sweet, good-looking, healthy, although not everything that is sweet is healthy and nutritious." (LRD\_S11\_2021)

or the sessions in which they had to imagine their food product at present (with the basic information that they acquired until that moment)

"We also did an exercise in which we imagined the possible ingredients that we could use to create a product as innovative as possible and we also imagined what the product color, smell, taste, texture and shape would look like." (LRD\_S4\_2021)

and in the future (considering the product as an ideal food product).

"The exercise of visualizing at present and in the future of the product related to my project, namely Corn flour bread addressed in this course, was for me a pragmatic vision on the strategy of improving the food product both from the point of view of current market requirements and in perspective, given that trends in this category are closely correlated with those that have been manifesting for several years in the entire food industry: healthier products and with a preference for those without additives and preservatives." (LRD\_S1\_2021)

The reflection documents also include notes on the role of the facilitator when performing a visualizing activity:

"For this, the facilitators took us into the world of imagination and asked us in a relaxed atmosphere to close our eyes and imagine the ideal product." (LRD\_S10\_2021)

"Other exercise was that through which we had to imagine our own product that we want to develop, giving details about color, size, smell, texture, ingredients, taste, etc. Although at first it seemed to me that we were being asked to do something impossible, the steps that the facilitator led us through helped us to successfully complete this exercise." (LRD\_S7\_2021)

Due to the fact that the present cycle included more visioning exercises, there are also references made to them:



"This meeting involved several activities that combined watching a movie featuring equipment used in the food industry (bottling juices, wine, bakery, sweets) with the role of a person working with this equipment. The film was presented to us only halfway after which the facilitator stopped it and we were asked to imagine what the continuation of the film was." (LRD\_S7\_2021)

Given the fact that reflection and visioning are considered the triggers of innovation when designing the new food products, the emphasis with which they were practiced during the course can be connected with the analysis of the statistical data offered by the analysis of the self-assessment of the questionnaires. The results showed that the greatest increase in the students' competences were exactly in the case of reflection and visioning. Other data is offered by the analysis of the word tree in Nvivo in the case of the word "to imagine":



Figures 16: Word tree of the verb "to imagine"



Thus, they can be considered the driving competences that led us to four successful new food products.

#### 2.4.2.2.4 participation (engagement)?

Participation appears in most of the reflection documents of the students especially when expressing the satisfaction of accomplishing something:



"At this meeting I listened to the discussions within the group but I also had an active involvement. I think that the role of collaborator suited me better, not having the necessary patience to listen without intervening. I felt that I had an important role to play in the group, and I realized that the cumulative involvement of each of the members of the work teams can create a multitude of ideas and solutions to the problems identified." (LRD\_S2\_2021)

"The part that again supposed our involvement was the determination of total antioxidant capacity and determinations on the spectrophotometer." (LRD\_S7\_ 2021)

but also when presenting particular situations when participation was requested by the nature of the activity:

"We also played a game called the tree of knowledge where each of us contributed with ideas." (LRD\_S10\_ 2021)

In the case of participation, there is a change in the attitude of the students towards it. If in the first cycle there have been mentioned different fears and challenges that the students had regarding the activities that involved participation, this time we observe a change in students' attitude considering participation a normal situation. The students' attitude is mostly positive as regards participation and this can be explained that many of the activities involved pair work and group work. It is obvious that the presence of other members in the group make the student feel in the comfort zone because the space within the group is a secure one. One other possible explanation can be the pandemic situation that kept the students away from school and after a difficult time of isolation, the students felt the need to get involved and engage actively in all the activities propose din the course.

Two of the words that were relevant for "participation" analyzed with the word cloud function of NVivo were "group", "to participate" and "to engage" and the results show that most of the time the students took part in different activities as members of different groups.





Figure 17: Word tree of the word "group"



Figure 18: Word tree of the verb "to participate" (a participa)



Figure 19: Word tree of the verb "to get involved" (a se implica)



"Although I knew all these stages very well, I was constantly involved in what I had to do, especially since the proposed products were new to me as well." (LRD\_S10\_2021)

"During the meeting I received a script and I was given roles to play. But in order to be able to do this, we had to discuss with each other what we had to do because we didn't know much." (LRD\_S11\_ 2021)

The word cloud shows the interconnections of these three selected words with the situations in which they have been used and also the multiple ways in which they were used. The selection of the three words was made in accordance with the frequency with which they were used by the students in their reflection documents.

#### 2.4.2.2.5 dialogue?

The dialogue is the competence that recorded the lowest increase in the data collected from the analysis of self-assessment of competences and this result can be correlated in a way with the lowest number of references of the word "dialogue" in the reflection document of the students. From the very beginning of the course, when the selfassessment was applied it was noticed a difficulty in formulating questions that could stimulate a dialogic approach or challenging the assumptions behind the group's thinking (due to the age difference between the high school students, master students or even stakeholder). It seems that the situation remained pretty unclear until the end of the course as long as the results were not satisfactory.

However, the reflection documents mention many situations in which the group members are involved in discussions that involve asking questions, accepting criticism and being open-minded.

"The teachers allocated an hour for a product so that we could talk openly and in detail about it. There were also criticisms of our product (hybrid grape wine directly reproductive), but most were positive comments." (LRD\_S10\_ 2021)

"Until the end, there were intense discussions and exchanges of questions. I like that these workshops are very engaging and everyone gets involved in discussions where ideas and opinions are exchanged." (LRD\_S5\_ 2021)

"In the end, we were asked to have a dialogue with each other, to present arguments for and against, and to agree on some statements." (LRD\_S7\_ 2021)

These idea is also supported by the analysis of the word tree "to discuss" in Nvivo which proves to be used extensively by the students.





Figure 20: Word tree of the verb "to discuss" (a discuta)

These results could also be a matter of bad understanding of what dialogue and discussion mean. Many reflection documents indicate the synonymy between discussions and dialogue but also the process of asking questions as being part of the dialogue.

However, the questions referring to dialogue from the competence self-assessment questionnaire posed an understanding challenge to the students because they didn't realize all the implications of the dialogue. Filling in the questionnaire as a home assignment and having no person to make clear/give more info on the questions from the dialogue section, is also one cause for the poor result recorded for this competence.

#### 2.4.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

The reflection documents written by the students do not reflect the "systems thinking" but there are references made to the way the knowledge and experience accumulated with every meeting was added to the present knowledge as new layers one upon the other or in circles closing different loops that represent certain fields of study.

## 2.4.3 Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education

2.4.3.1 Methods of data collection and analysis

2.4.3.1.1 Teacher reflection document


As in the previous cycle, there have been collected the facilitators and stakeholders' reflection documents and they were analyzed taking into account the five core competences of Nextfood project: reflection, dialogue, observation, visioning and participation.

The teachers and stakeholder taking part in the course were asked to write these documents for the further analysis and comparison with the data collected from the students that could be valuable for the planning process of the course. It was stressed the importance of this documents in connection with the students' reflection documents.

They have also received supporting documents and several examples from the teachers and stakeholders' documents from the first cycle so that they could understand better the writing style they should use and also the information important for the further analysis of these documents.

At the end of the course, the reflection documents of the teachers and stakeholders have been compared with the reflection documents of the students. Thus, the references made to specific activities found in the students reflection document were compared to those found in the teachers and stakeholders' documents. These comparisons were necessary in order to understand if the teacher/facilitator implemented correctly the respective activities and the results expected by the teacher/facilitator was met also from the student's point of view.

## 2.4.3.1.2 Course reflection focus group/interviews

It wasn't conducted a focus group/interview.

# 2.4.3.2 Results

The reflection documents gathered from facilitators and stakeholders offer many information regarding the planning and implementation of different activities where observation was important, such as: the field trips (Bicaci Bakery, didactic farm of the faculty, Silena SRL., a self-catering restaurant), the organoleptic analysis of some food products and when working with the microscope and spectrophotometer.

"After the analysis of the data from the first cycle, I was convinced that we need to introduce more targeted activities in the case of observation because it was not enough just to notice that the students were good observers. In the same context appeared the idea of creating support materials for these activities, so that we could have a documented approach/analysis for this competence". (TRD\_T14\_2020)



The selection of the three locations to be visited have been chosen carefully because each location offered valuable information to the students: the students that worked on the project corn flour bread had the chance to observe how bread is produced in a bakery, those groups that had as projects different types of drink (relaxing drink with wild cherry and the wine) could see how they can be produced by using certain methods or technological lines and the visit to a restaurant supported all the students in becoming familiar with a kitchen where new food products can be created.

"After the first two meetings with the students when they decided what kind of product they would like to develop, I phoned my contact persons from the companies where we intended to organize the field trips. I explained them the importance of visiting their facility and they were very open to receive us." (TRD\_T13\_2020)

Other aspect mentioned in these documents was the importance of the observation sheets that students had to use with different occasions. They were meant to help the students to focus on the most important aspects of the learning process and to overcome the differences in knowledge among students. Other role identified attributed to these sheets was to support the learning process even at a later stage when the students could have forgotten part of the information observed.

"The students felt comfortable with filling in the observation sheets because they were aware that during the process some of the information might be lost. I will even propose as the product documentation file to include also these observation sheets" (SRD\_T16\_2020)

The teachers also appreciate the seriousness with which the students are focused on the completion of the sensorial analysis and they are satisfied with the observed information provided by students.

"I was pleasantly surprised how the students were working within the group when they had to complete the observation sheet. They were really serious about their work". (TRD\_T14\_2020)

The same explicit focus of the students was mentioned in relation to the activities in which they had to use the microscope and spectrophotometer.

# Participation by the teacher/stakeholders

If in the first cycle the greatest worry reflected by the teacher and stakeholder's documents was that the students will not actively participate in the activities but they will prefer to be rather observers, in the second cycle the same documents reflect the detailed process of planning the activities so that each student to be involved equally.



For this reason, the facilitators together with the stakeholders proposed a set of activities for which the pair-work and group-work were central.

"Last year my greatest concern was that the students will not participate in the activities of the project and it proved that I was wrong. However, in order to overcome such a situation, my colleagues and I decided to introduce only activities that will ask the students to get involved continuously. One of the solutions was to develop many group activities because I noticed that they felt more secure." (TRD\_T13\_2020)

The documents also mention that the facilitators that took part in the first cycle suffered a mental transformation themselves when identifying, selecting and designing new teaching/learning tools and methods. They were all in accordance with the development of the 5 core competences. This fact revealed that the previous experience obtained in the first cycle acted as a factor of change in the second cycle.

"In this cycle it was so easy for me to identify activities that I considered appropriate to develop the participation competence of the students. I felt as if something has changed, maybe it was my perspective or even the mind-set. "(TRD\_T13\_2020)

# Visioning by the teacher/stakeholders

Due to the analysis of the learners' reflection documents, the teachers and stakeholders decided to introduce more activities based on visioning, especially that the conclusion of the first cycle was that visioning and reflection represented the drivers of innovation.

Thus, the reflection documents of the teachers mention the introduction of at least 3 exercises of visioning during the course and the most suitable time to perform such exercises was considered to be the beginning and end of the course.

"Today we have decided to introduce an equal number of activities for each competence so that we shouldn't encounter a disbalance in their representation as it was last year. I am very curious to see if this solution it will work better." (TRD\_T13\_2020)

The same documents show that if the teachers were aware of the importance and impact that the visioning exercises have upon the students, the stakeholders (even if explained) were sceptical that such exercises will really help the students and have a real impact on the positive development of the course.



"The meeting today was frustrating from my point of view because I couldn't reach a common agreement with the other facilitators working at the University. They want to introduce imagining activities but I really do not understand their point. Why should I waste a lot of time for imagining different things?" (SRD\_T15\_2020)

At the end of the course, however, there are stakeholders that admit they didn't realise the huge impact visioning have had upon the students.

"Being at the end of the course, I must admit that I was wrong when saying that imagining things is not productive. It was really productive and more than this, the students didn't even realise that they were really learning and co-creating" (SRD\_T15\_2020)

# Reflection by the teacher/stakeholders

The reflection documents of the teachers from the second cycle do not mention anymore the initial "struggle" with organizing the reflection sessions at the end of each activity because they already have the supporting documents, capacity and experience to support the students in their process of reflection. The fact that all the documents needed (how to write a learner's documents, the questions asked at the end of each meeting) are already designed and they just need to explain them, give them a sense of comfort.

"As I expected the planning process for the second cycle seems to be easier because we already have most of the materials and activities. We just need to do some fine tuning now." (TRD\_T14\_2020)

It is not the same situation in the case of the stakeholders who are new persons in the second cycle. They really felt tired and demotivated to write a reflection document even if they know the importance of this document for the whole teaching-learning process or to give several explanations to the students on how to perform during the reflection sessions.

The same documents explain the fact that they paid a lot of time to reflection and they could have done something else related to the courses.

"I understand very well the importance of this document especially for analysing data at the end of the cycle but I need to be honest that I don't enjoy it at all due to the time it takes to write it." (SRD\_T15\_2020)



# Dialogue by the teacher/stakeholders

The competence of dialogue is mentioned several times in the reflection documents because it was noticed a kind of confusion or lack of understanding from the students part as regards the difference between communication, debate and dialogue but also as regards the capacity of the students to identify and formulate questions that could stimulate the dialogue within the group. The teachers and stakeholders spent a lot of time to explain to the students the differences between communication, debate, monologue and dialogue and they admitted that it was not an easy task to fulfil.

"Today it was very difficult for me to admit that there were students who couldn't understand the explanations offered on what dialogue, monologue and debate is. I felt it as a failure but I really need to be perseverant." (TRD\_T13\_2020)

Other issues mentioned by the documents were also the fact that the students didn't know what the guidelines for a real dialogue were or how to explore a variety of perspectives within the group.

"Today I tried again to discuss the issue of dialogue and the most important guidelines for a real dialogue. I even proposed a scenario and the students had to interpret their role. This time it seemed easier to them to understand the rules of dialogue." (TRD\_T13\_2020)

In some situations even the stakeholders felt uncomfortable in the position of a team member given the age difference, social position and level of knowledge among the members of the team. However, this situation changed until the end of the course due to the multitude of activities in which the members of the team had to learn together, to cooperate and communicate one with each other.

"After the meeting organized today, I am not convinced I want to continue and be involved in students' teams. There is a significant age difference between me and them but also a noticeable difference in the level of knowledge we have. I don't feel that I can communicate properly with them." (SRD\_T15\_2020)

# 2.4.3.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

# 2.4.3.2.1.1 From lecture hall to a diversity of learning arenas

# 2.4.3.2.1.1.1 Supporting forces and how to build on them

As in the first cycle, the facilitators together with the stakeholders who took part in the course decided to include different learning arenas that were appealing to the students. Based on the results of the first cycle, it was decided to continue with face-to-face sessions when the situation allowed even when the infection rate was sometimes very high.



From the data collected during the introductory workshop where the students were questionned about the supporting and hindering forces as well as on the learning arenas, it was concluded that we should maintain part of the learning arenas present in the first cycle but also include new ones that could better support the learning process. Thus, the learning arenas ranged from the usual lecture hall, laboratories, didactic farm of the faculty, field trips in specific locations (Bicaci bakery, Silena SRL-restaurant) to virtual environments that supported us in the transmission of documents (theoretical courses in digital format, instructions, supporting documents, questionnaire, quizzes, literature) or keeping the contact with the students.

In addition to these learning arenas, the students were also present in the conference hall of the Academic Library (for competitions) found in the main campus, the didactic farm (to work with two technological lines of producing dairy products and bread), the canteen of the university and Silena restaurant where they could prepare the food products under the guidance of a chef.

# 2.4.3.2.1.1.2 Hindering forces and how to deal with them

One way to deal with the pandemic situation was to postpone the beginning of the course until the moment when we could organize on-site meetings.

Thus, from the moment of organizing the introductory workshop on the main shifts to necessary to embrace the action learning approach, we waited for a few weeks until to start the course on-site due to the restrictions regarding face-to-face meetings. We made the compromise of postponing the beginning of the course because both teachers and students were convinced that the on-site learning is more valuable than on-line learning when speaking about the action-learning approach.

The pandemic situation made us organize several meetings where we invited only one working group at a time instead of four in order to avoid the contamination risk of the students and staff. Even the visits in different locations were organized in small groups of students.

## 2.4.3.2.1.2 From lecturing to co- and peer learning

## 2.4.3.2.1.2.1 Supporting forces and how to build on them

Even in the second cycle, the students remained at the core of the teachers' and stakeholders' preoccupations. Thus, based on the reflection documents from the previous cycle, the teachers designed and implemented several activities that were based on pair-work, group work, mixing the established groups that ensured the coand peer-learning process. The existence of a stakeholder with experience in each group as well as of students in the final years or at the Master programme made this process more efficient and obvious in the same time. The reflection documents of the students in the second cycle abounds in observations where there are mentioned



several activities in which the high school students learnt how to use the microscope with video camera or spectrophotometer from the Master students, or when the stakeholders supported its team with knowledge about HACCP or presented the functioning principles of different technological lines.

In the same manner, the teachers' and stakeholders' documents mention how the stakeholders acquired pedagogical skills and became more familiar with making presentation, adapting their vocabulary and ways of expressing themselves so that they could be easily understood by both high school and university students.

More than this, the students were allowed to contribute to the organization of different events – competitions, cooking sessions, work in the lab.

Even the process of continuously asking questions to the teacher was diminished due to a strategy included by the facilitators which consisted in following some steps before addressing the questions to the facilitators.

One other supporting force was the capacity of involving the stakeholders in all the stages of the course and due to their diversity (VET teachers, representatives of companies, state institutions, other universities) we could have a multiple perspective upon the course.

## 2.4.3.2.1.2.2 Hindering forces and how to deal with them

There were situations at the beginning of the course when the teachers noticed elements of frustration among students when they had to learn from their colleagues and not from the teachers. This situation made them feel insecure and uncomfortable. However, during the course the situation changed and they understood the importance of this switch. During this time, the teachers explained to the students the need to become independent learners or to co-operate within the group. However, the students were continuously monitored and in case difficult questions came up or the answers found by the students were wrong, the facilitator intervened to solve the problems.

# 2.4.3.2.1.3 From syllabus to supporting literature/a diversity of learning sources *2.4.3.2.1.3.1 Supporting forces and how to build on them*

The topics included in the courses (18 topics) were selected carefully by the teachers and stakeholders since the first cycle and they were in accordance with the stages that a product must follow from the stage of idea until it is released on the market.

The theoretical information related to the 18 topics was sent in digital form to the students, being accompanied by specific literature (digital/printed). The students were



also encouraged to study in the academic library and they have got recommendations on scientific papers, books, catalogues, databases, etc.)

#### 2.4.3.2.1.3.2 Hindering forces and how to deal with them

One obstacle that remained since the first cycle is the impossibility of the department to change the syllabus due to certain limitations imposed by the Ministry of Education or to introduce the course as it is in a study programme. However, the methodological part regarding the action learning approach can be embraced by any teacher who would like to make a real change in the teaching/learning method.

# 2.4.3.2.1.4 From textbook to a diversity of teaching aids

#### 2.4.3.2.1.4.1 Supporting forces and how to build on them

In the second cycle there have been used several teaching aids, ranging from texts in digital format (word or ppt.), worksheets, quizzes, evaluation sheets, projects to using innovative technologies like smartboards, videos illustrating technological processes, mobile applications (whatsapp groups) that supported the communication among the students and platforms (Microsoft Teams) where the students could find resources or upload different materials. During the course, a serious boardgame (e.g. Simplycycle – on the importance of choosing the right materials for packages) was used and in the laboratories students had access to specific equipment such as: microscope with video camera, spectrophotometer and technological lines.

The role of all these teaching aids was to make the learning process easier, more interesting, dynamic and efficient.

#### 2.4.3.2.1.4.2 Hindering forces and how to deal with them

One obstacle is the lack of time that should be allocated by the facilitators to develop new methods, instruments and supporting materials for their course (questionnaires, quizzes, observation sheets, etc.). However, all the teachers involved in the project were actively involved in this process and shared their materials with other colleagues from the faculty.

# 2.4.3.2.1.5 From written exam to a diversity of assessment methods

# 2.4.3.2.1.5.1 Supporting forces and how to build on them

In the second cycle, the facilitators gave up on the four questions (2 on content and 2 on the activity) addressed to the students at the end of each meeting because the they could understand what went all right or not by discussing these aspects during the reflection moment organized at the end of each meeting. However, all the other stages of the evaluation process included in the first cycle were also present in the second one.



There was also a mid-term evaluation under the form of project presentation followed by a session of questions proposed by the facilitators but also by the students. The students' activity was continuously formally or informally assessed when participating in the face-to-face sessions, conferences or food contests and lately in the on-line environment.

The final evaluation consisted in: a written test (9 questions + SWOT Analysis, see Appendix 3) applied not individually but per group and an oral presentation of the projects followed by questions and assisted by an external evaluation committee. The written evaluation sheet included questions related to the eco-innovating aspect of the product, if the package is ecological or suitable for industrial production, what is its nutritive advantage, if it contains allergens and what organoleptic characteristics could have, followed by the SWOT Analysis of the product.

The evaluation performed by the Evaluation Committee was based on a methodology that had in view: GDPR, chance equality, environmental protection, sustainability, community oriented, professional performance, free access and creativity. The evaluators were external being invited either professionals working in specific companies or representatives of the state institutions such as the Director of the Agency of Consumer's Protection. The evaluators graded the project of each team and also their products. The first stage consisted in the evaluation of each product from a technical point of view while the second stage was related to the insertion on the market and within the community of the respective food products according to general European rules. The grades were between 1 and 5 (1=the lowest score; 5=the highest score) as it can be seen in Appendix 4. According to the results collected from students and the decision of the Evaluation Committee, the projects with the highest score were the relaxing drink with wild cherries, halva with pumpkin seeds and lavender, wine made of hybrid grapes, corn flour bread.

One additional compulsory element before entering the evaluation process was as each group to present a documentation file for the respective food product including all the docs filled in along the course (observation sheets, quizzes, questionnaires, swot analysis, budget, etc.)

The most appreciated aspect of evaluation was the existence of an external Evaluation Committee that could judge neutrally each project presented by the teams.

## 2.4.3.2.1.5.2 Hindering forces and how to deal with them

One hindering force was the difficulty in inviting external evaluators due to the pandemic situation, fact that could be prevented by accepting their participation even on-line.



# 2.4.3.2.1.6 From lecturer to learning facilitator

# 2.4.3.2.1.6.1 Supporting forces and how to build on them

The change of position from lecturer to that of facilitators was not on easy process not even in the second cycle. However, this time we selected young teachers that were more willing to change something in the way they delivered their courses or labs. It was kept the rule as the floor to belong to the students and stakeholders and not to the teachers. A method name 3B4ME (three before me) was introduced so that the students not to ask the questions directly to the facilitator but to try to find the answer from other sources (to ask the colleagues in the group, to ask the stakeholder and to look for the answer in books, on internet, etc.). Only if these three sources are not reliable enough they should ask the teacher. The students got used with this rule and little by little they succeeded in becoming independent learners.

# 2.4.3.2.1.6.2 Hindering forces and how to deal with them

The main challenge was to allow time to teachers to change their traditional way of teaching, and not to talk too much during the activities. For this reason, the teachers were recommended specific literature on what is a facilitator, what is its role and how to act in the classroom. After reading the literature, there have been organized group discussions on how to continue and how to act in front of the students.

As regards the students, at the beginning of the course there was an obvious resistance from their part as regarding questioning the teachers. They even expressed their frustration of being obliged to find the answer from different sources that they don't trust or to get an answer later that they need. However, they were monitored by the facilitators while they looking for the right answer and in case the process was very difficult or the answer was not satisfactory, the facilitators intervened to correct the situation.

# 2.4.3.2.2 What such a change requires from teachers, students, and institutions

In order to perform all the shifts mentioned above it is needed a common effort from both teachers and students that are directly involved in the educational process but also from the institutions that organizes such courses.

Thus, a first step is to identify the colleagues that are willing to get involved in such an educational endeavour which means: being a facilitator (guiding the students), teacher (delivering information), researcher (collecting, processing and interpreting the collected data). The data showed us that it is not easy as a teacher to perform all these tasks alone but in collaboration with other colleagues due to the huge amount of information that must be analysed, processed and interpreted. More than this, the activities of a teacher are diverse and sometimes one person doesn't have all the competences and information to do them all. Some of the most important activities were: to organize specific activities that can develop/improve the key competences. For instance **observation** of different aspects in the food production process, or the organoleptic analysis of the food products; **team work**, **communication**, **problem solving**, **critical thinking** and **visionary thinking** have been developed by



introducing smart board games such as Simplycycle; to introduce reflection moments at the end of each activity (for students and facilitators); to organize reflection workshops with the students involved but also with the stakeholders and the teachers/facilitators; to allow additional time to explain the students how to fill in the requested documents (e.g. especially for the reflection document) and explain them the importance of these documents for the whole educational process; to have a continuous collaboration with the facilitators, stakeholders and teachers when planning and implementing different activities; to plan and re-plan the activities according to the data collected from the students and stakeholders.

On the other hand it is also important to have motivated students and stakeholders that will get involved in all the proposed activities. It is also vital as always include the stakeholders in the planning and re-planning process of the course to have a complete image of the educational process in which action learning process is central.

#### 2.4.3.2.3 Teachers' perception of the greatest challenges to achieving such a change

One of the greatest challenges is considered the introduction of the action learning approach at the level of the whole faculty due to the resistance of most of the colleagues to change. Most of the colleagues that were invited to take part in the project or just to assist some of the activities admitted that the change is not easy to perform, especially if one person has used certain teaching methods for years. More than this, the change to action learning approach means spending a lot of time on looking for suitable teaching methods and tools so that the theoretical content of the course to be relevant for the students. This searching activity for methods and tools is mentioned in all the reflection documents of the teachers and stakeholders.

"At the beginning I didn't know where to start from because I had no ideas what kind of methods and tools to use. The first reaction was to look for them on google and I was happy to find different guides and suggestions on how to implement action learning in the classroom. It was a difficult process to select the needed information because most of the resources didn't refer exactly to activities in the field of food industry" (TRD\_T13\_2020)

Other aspect of the same problem can be considered the support or non-support of the institution as regards the introduction of this approach at the level of the faculty.

Only due to the valuable results both regarding the evolution of the students within the course (proved by the analysed data) and the involvement of stakeholders, it was possible the introduction of two disciplines related to the development of competences and career orientation. However, it is difficult to make other changes due to the inflexibility of the Romanian educational system which mainly controlled by the Ministry of Education.



Other challenge can be the lack of money to organize the practical activities – trips, lab analysis, competitions, etc. because most of the time they are invested in other directions. For this reason, the teachers need to find funds by themselves due to the co-operation with the partner companies, which means extra time and extra effort from their part.

# 2.5 Concluding remarks on the case development

# 2.5.1 On the case development since the previous reporting

# 2.5.1.1 The most useful and inspiring experiences (supporting forces)

The most useful and inspiring experiences collected from the reflection documents of the students and teachers revolved around the co- and peer-learning process that took place with several occasions during the course. The high-school students had the chance to learn from their older colleagues – that is from the university students and stakeholders involved in each group. In their turn, the stakeholders learnt from the students how to use different modern equipment and they taught them what HACCP is and the components of different technological lines. But the stakeholders also learnt how to be a facilitator and how to acquire pedagogical skills. And finally, the teachers always took into account the suggestions and perspectives of the stakeholders that derived from their vast experience when the course was planned and re-planned.

The evaluation process was also an inspiring experience due to the fact that the Evaluation Committee consisted in external professional who were impartial and didn't know anything about the four projects in advance. The evaluation process brought new perspectives on the four projects due to the observations, suggestions, encouragements and critics made by the members of the Evaluation Committee.

The introduction of new practical activities that had in view the competence of visioning represented a moment of revelation for all the participants –students, stakeholders and facilitators. These activities represented the driving force for the creative side of the four projects and triggered innovation.

# 2.5.1.2 Main obstacles/challenges encountered (hindering forces)

The most important obstacles/challenges encountered during the second cycle when speaking about students were related to social distances and lockdowns that disrupted for short periods of time our activity but also due to the limited time available in working with high school and university students given their busy and different schedules. One other challenge was to make the student feel comfortable in participating in several dialogue sessions and to make them aware of what dialogue really means.

When speaking about facilitators, the new comers felt the same difficulty in giving up on the control and old practice and two questions naturally emerged: "how to teach



other teachers"- passing/transferring the existent information from the Nextfood project and adding new methods and tools and "how to become a facilitator?".

Other challenge was related to the implementation of the Nextfood approach within the faculty, because the Board of the Faculty didn't want to support and approve it until there were no sufficient data and results to certify the efficiency and benefits of this approach. Thus, a first step was the introduction of two new disciplines (at the end of the second cycle) that even if they do not refer explicitly to the Nextfood approach, being named Life Skills and Career Guidance, they contain elements of it.

2.5.1.3 Lessons learned from the inspiring experiences and from dealing with the challenges Placing the students at the heart of our preoccupations, we continuously succeeded to keep them motivated during the course. All the practical activities were designed in such a way that they should cover at least the 5 core competences promoted within the Nextfood project.

Organization of several workshops for newly- coming colleagues and stakeholders in which the usage of visioning and reflection were practiced helped us in continuing the activity and getting new input regarding the course.

Having individual or group discussions with the leaders of the institution about the benefits and the results recorded in the first two cycles of this kind of education led to the introduction of two disciplines for the first year students – one referring to Life skills that approaches the core competences from Nextfood and the other one referring to Career Guidance for the students.

## 2.5.1.4 Plans for how to move forward into the next cycle

The third cycle was planned by looking again to the data collected during the second cycle and the decision was to keep all the activities as in the second cycle, the only new element being represented by the introduction of some supporting documents and additional sessions within which the facilitators to explain better what dialogue is and how a student can become aware of this competence. These explanations will be given in specific contexts so that the understanding process to be easier.

Because the pandemic situation continued during the third cycle, there was a decision to keep the same number of the students (12) but other reasons behind this decision was the efficiency with which the facilitators worked with a decreased number of students.

There was also a change regarding the facilitators. Two of the facilitators present in the second cycle due to high involvement they had in the project became members of



the project staff since October 2021 and one of them is also a PhD student. Her activities and age shows that the project sustainability is ensured due to possibility of her to become staff member of the faculty. This also shows the success of the Nextfood project as regards the career orientation of the young specialists in the project.

During the third cycle, the facilitators together with the Master and PhD students also published two valuable ISI scientific papers

(Phytochemical Composition of Different Botanical Parts of Morus Species, Health Benefits and Application in Food Industry, Adriana Ramona Memete, Adrian Vasile Timar, Adrian Nicolae Vuscan, Florina Miere (Groza), Alina Cristiana Venter, Simona Ioana Vicas, *Plants* 2022, *11*(2), 152; https://doi.org/10.3390/plants11020152

On Overview of Bioactive Compounds, Biological and Pharmacological Effects of Mistletoe (*viscum album* I), Eva Kleszken, Adrian Vasile Timar, Adriana Ramona Memete, Florina Miere (Groza), Simona Ioana Vicas, Pharmacophore, ISSN: 2229-5402, IMPACT FACTOR: 2.16, USA CODEN: PHARM7)

based on the investigations and analysis the students have performed while developing their products. Thus, we plan, that even if the first and second cycles ended, to invite the facilitators and the students to try publishing their own results.

# 2.6 Reflections towards the end of the Nextfood project

# 2.6.1 What has been accomplished to shift from theory to phenomenon (experience) in agri-food and forestry systems as the starting point for the learning process?

The teachers had the chance to enrich their knowledge as regards the new actionlearning methods and tools and improve their skills in organizing and delivering such experiential activities.

The discussions with our partners (stakeholders, teachers, partner universities) on common problems, the reflection moments organized after every activity improved our perspective on what is needed to be done from one cycle to another. One opportunity that came up after such discussions was to take part in a future project that had in view the implementation of action-learning approach in Serbia, within the University of Nis.

Other implication for teachers/facilitators was to improve their course planning strategy and to be able to use different tools during this process (e.g. learning to work with



NVivo software, to share our own experiences within the working groups, the learn together with the other members of the Nextfood project about new tools and methods and to be continuously supported by the NMBU team).

# 2.6.2 What has been accomplished to shift from *transmission of knowledge* to the *development of* key *competences* needed to support sustainable development in agrifood and forestry systems?

The students have been exposed to a new learning approach that made them improve skills like: communication, reflection, visionary thinking, team-working, observation, dialogue, problem solving, critical thinking and digital skills. They also had the chance to work in the same group with the invited stakeholders that could put all their experience/input in their common activities.

During the course, the students have learnt how to write a reflection document, how to fill in different questionnaires and observation sheets.

The high-school students had the chance to work together with university students and at the end of the course they could decide if their future career could be related to the food industry. During the three years there have been students that have started the course as high school students and ended it as university students. One of the outcomes in this case was that the Nextfood project acted also as a career orientation instrument for the high school students emphasizing the importance of selecting and continuously supporting certain high school students on making the right decision in the future career.

Other important outcomes were the introduction of two new disciplines in the curriculum of the first year students named Career Coaching (4 credits) and Life Skills (3 credits) that are based on the development of action-oriented learning skills and include most of the activities that have been included in the course.

# 2.6.3 What are the prerequisites for making a successful shift?

The prerequisites for making a successful shift were:

- To have motivated students that would like to attend and finish the course
- To have different types of partners ranging from VET schools, food companies, state institutions, NGOs, other universities
- To have the capacity to involve the stakeholders in all the stages of the course; finding the right motivation for stakeholders
- To identify the teachers that could make the switch to the position of facilitator



- To have teachers/facilitators able to identify, adapt and design new action learningrelated teaching methods and tools that can support the learning process
- To have teachers/facilitators able to put into practice these methods and instruments in different practical activities such as organoleptic analysis of food products; evaluation of the developed food products, observation sheets, etc.
- to have an experienced partner that can support you along the way (NMBU in our case)

# 2.6.4 What is your concrete advice on the shift from simple knowledge transmission to the development of key competences?

The advice on the shift from simple knowledge transmission to the development of key competences can be:

- To identify the colleagues that are willing to get involved in the collection, processing and interpretation of the collected data
- To collect all the documents from students, teachers and stakeholders (questionnaires, short interviews, reflection documents, etc) for a diversity of perspectives
- To make a thorough analysis of the documents collected from the students, stakeholders and facilitators
- To organize specific activities that can develop/improve the key competences. For instance observation of different aspects in the food production process, or the organoleptic analysis of the food products; Team work, communication, problem solving, critical thinking and visionary thinking have been developed by introducing smart board games such as Simplycycle.
- To introduce reflection moments at the end of each activity (for students and facilitators)
- To organize reflection workshops with the students involved but also with the stakeholders and the teachers/facilitators
- To allow additional time to explain the students how to fill in the requested documents (e.g. especially for the reflection document) and explain them the importance of these documents for the whole educational process
- To have a continuous collaboration with the facilitators, stakeholders and teachers when planning and implementing different activities.
- To plan and re-plan the activities according to the data collected from the students and stakeholders

# 2.6.5 What is your main challenge?

The main challenge on a long turn will be "How to keep all partners (internal and external, Nextfood partners) connected in order to continue?" given the fact that



all these partners had a great contribution to the proper implementation of the actionlearning based approach in the Romanian course.

# 2.6.6 What are the three best ideas from the workshop for how to deal with that main challenge?

One of the best ideas collected during the workshop was the creation of "a global network on action learning in agrifood and forestry systems" that could help all the practitioners to find materials and instruments to work with, to collaborate with others and to post different achievements.

Other idea referred to how to convince the institutions and the policy makers of the usefulness of this educational approach so that the model can be implemented on a larger scale for a longer period of time. Thus, the push must be not just from below but also from above, including a pressure that is coming from the students involved in the activities of the project.

The third idea, on how to keep the network continue, was the new Erasmus programme. Some intensive programmes on action learning approach could be organized for students and thus, new partners from other institutions/countries could take part in them.



# 2.7 Appendices (UNIOR)

- Force Field Analysis (Appendix 2)
- Self-Assessment of Competences (Appendix 25)
- Final Evaluation of the Product + SWOT Analysis (Appendix 3)
- Evaluation of Professional Skills (Appendix 4)



# 3 Case 4: ISEKI-Food association

Authors: Line Lindner, Katherine Flynn and Christoph Knöbl

# 3.2 ID card

# Course title, level and language

Course title: *FoodFactory-4-Us* – NextFood Case 4 Supply Chain Innovation Competition

Level of the course: Master Students from food(related) studies

Language: English

# Course learning goals

The learning goals for students participating in FoodFactory-4-Us are:

- Improving problem-solving skills: Each team of students will work on a real, food industry-based problem in sustainability and therefore improve specific knowledge and competences.
- Improving cooperation and teamwork skills: All students will improve group cooperation skills and awareness of the importance and benefits of teamwork in a competitive environment.

# Host institution(s) and course leader(s)

Host Institution: ISEKI-Food Association (IFA)

Course leaders: Line Friis Lindner, Katherine Flynn, Christoph Knöbl

# Timeline of the activities covered in this report

# Cycle 4: Initial planning

- 17 May 2021: online planning workshop with the advisory board and selection of the competition topic.
- June-July 2021: Design and development of training material (learning outcomes, contents), definition and planning of the online trainings. In parallel, development of final rules, procedures, timing of the competition as well as dissemination materials.

# Cycle 4: Implementation

- 1 August 30 September 2021: Opening of the call for student teams.
- 30 September 2021: Deadline for applications, Advisory Board evaluates team applications
- 11 October 2021: Acceptance of the teams



- 13 October 2021 13 January 2022: Complimentary online trainings:
  - Introduction to the Competition 13 OCTOBER 2021
  - Student Presentation 28 OCTOBER 2021
  - "Virtual Visit" 16 NOVEMBER 2021
  - Project Review WEEK of 29 NOVEMBER 2021
  - Student Suggestion 15 JANUARY 2022
  - Soft Skills 13 JANUARY 2022
- 16 January 2022: Deadline for submission of project reports
- 17 25 January 2022: Evaluation of the project reports by the advisory board
- 27 January 2022: Final Virtual Conference

# Cycle 4: Reflection and planning again

• Planned 9 March 2022: Cycle 4 online reflection workshop with participation of the advisory board.

# Learner categories and number per category (demographics)

When we closed the call for teams in September 2021, 6 teams (with a total of more than 22 students) applied to the competition. After evaluating the incoming project proposals, 5 teams were accepted (19 students of which 11 were female and 8 male). 1 team (with 3 students) dropped out (by not handing in their final report) and at the end of the competition there were 16 students of which 8 were female and 8 male.

# Stakeholder categories and type of involvement

# Industry mentors

In cycles 1-3, we asked students to indicate a faculty advisor when applying to the competition and encouraged students to ask their advisors for support during the development of their projects. In cycles 1-3 we had little contact with the faculty advisors, but asked them to fill in an evaluation form which very few of them did. In cycle 4 we took the step to include industry mentors instead for faculty members asking students to indicate the name of an industry mentor at the application stage. We also prepared an invitation letter students teams could use for inviting mentors explaining their role, the competition topic and student projects, and action-leaning in the online trainings. Furthermore, we invited the industry mentors to a short informative and interactive online meeting where we practiced observation and told them about the core competences and how we train them with the students.

# **Advisory Board members**

The Advisory Board is composed of 3 persons from academia, 1 from an industry association and 2 case facilitators. They participate in the planning and reflection workshops, select the team applications, and evaluate the teams' project reports and presentation slides before the Final Conference and their presentations at the Final Conference.

# External experts

At the Student Suggestion online training, we invite external experts, from academia or industry, to present a topic that was suggested by the students as a best practice related to the topic of the competition in the introductory online training. When we



contact these external experts, we explain what the competition is about, how and why they were selected, and how we do action-learning with the students. We practice student-led reflection at the Student Suggestion training after the external experts have given their presentation and ask students in groups to formulate a question to the experts. In the groups, students are together with members of other teams and they are asked to appoint a facilitator, a presenter and a timekeeper. We invite the external experts to join the Final Conference.

Also at the "Virtual Visit" we invite experts related to the competition topic. In cycle 4, we invited a coffee plantation owner from Kenya to speak about an initiative on supporting short food supply chains.

# Shortlist of learning arenas

- Online trainings:
  - Online plenary sessions (in Zoom) where the students listen briefly to the facilitators' introduction and instructions; to other students' experiences in the agrifood industry; and to external experts' work.
  - Breakout rooms (in Zoom): Students engage in group work with students from other teams to reflect on input they received in the plenary sessions; to agree on questions to be given to experts, to prepare a short presentation.
- Parallel group work:
  - Over the duration of the competition, students work independently in their team preparing their project.



# 3.3 Extended summary

# 3.3.1 Research results since the previous reporting

# 3.3.1.1 Students', teachers' and other stakeholders' experiences and learning

When comparing students' assessment of the experiences and competences they bring to the competition at the start and end of the competition, it is worth noting that students largely give reference to experiences they had before entering the competition and that they refer to these both in the initial and final questions. In the beginning of the competition, students mention skills related to large networks and contacts established through experiences, but also more specific learning experiences gained from working with non-profits, farmers, or in the agrifood industry. Also, they refer to personal values such as curiosity, enthusiasm, inspiration, and awareness about and willingness to help those actors or give something back to actors students learned from through these experiences. At the end of the competition, students still refer to personal values such as creativity and innovation, but they also refer to problem-solving skills, collaboration skills such as dialoguing, group discussions, and team work. This could point to the conclusion that participation in the competition gave students more experience in problem-solving, creativity and innovation, but also collaboration skills through teamwork. As regards students' expression about the competences they trained or improved, students mentioned skills on building and maintaining networks and here especially communication and presentation skills. Skills for navigating in a changing world were personal traits such as confidence and the core competences of visionary thinking, reflection and dialogue.

Other stakeholders, such as the external experts and the advisory board, were not asked to fill in evaluations. In previous cycles, we asked participants after the reflection workshop to fill in a teacher evaluation form, however, as the reflection workshop only takes place after the deadline for handing in the case development report, such findings are not documented here.

# 3.3.1.2 Outcome of the case development process, including effects of making the essential shifts

The main change during the implementation stage was the requirement of student teams to select an industry representative to mentor the project work during the competition and to identify a challenge and solution related to the topic of supporting and developing short food supply chains. This shift was decided at cycle 3 reflection workshop and concerned mainly the shift from lecturing to co-and peer-learning.

# 3.3.1.3 Supporting and hindering forces for implementing the Nextfood model

By requiring student teams to have an industry mentor instead of an academic mentor accompanying them throughout the competition, contributes to the building of a variety of learning areas. In students' reflections after the Project Review, it could be seen that students appreciated the support and interest of their mentor: *"I am also impressed in how much our mentor cares about us, discusses our ideas and participates to the meeting !"* (40552332); and *"Seeing, that our mentor is so immeresed in this project, I* 



*want to do even more.*" (40552332). While not all industry mentors are active and engage with their student teams and participate in the online trainings, this will remain a challenge.

Moving further towards peer-learning, in every online training, random breakout groups are set up in which students work with members of other teams having to identify a common question, having to lead a reflection session among students, or having to agree on a topic they would like to learn more about, to give a few examples. The online tool MIRO was introduced in one of the first online trainings to spur interaction and creativity in the student breakout groups, however, several students joined the training on their mobile phone or had bad internet connection which made working in this tool difficult and we decided at an early stage to not use MIRO but only the breakout rooms for oral discussion.

A variety of assessment methods are used ranging from evaluation of the report and presentation, but also attendance at online sessions and participation in completing evaluations. Furthermore, students give each other feedback during i) student presentations of their experience and ii) student elevator pitches of their team project.

To improve the shift from lecture to learning facilitator, the suggestions from the cycle 3 Reflection Workshop were to invite experts to not only present but also interact with students. The experts were identified by the student groups in the introductory online session. The collaboration with these external experts, also education practitioners, proved interesting and fruitful due to their genuine interest in the NextFOOD model and the core competences.

3.3.1.3.1 What such a change requires from teachers, students, and institutions Data to answer this question is from the Reflection Workshop which has not conducted at this point (18 February 2022).

3.3.1.3.2 Teachers' perception of the greatest challenges to achieving such a change Data to answer this question is from the Reflection Workshop which has not conducted at this point (18 February 2022).



# 3.4 Actions taken and data on the development of the case since the last reporting

# 3.4.1 Actions taken since the previous report

# 3.4.1.1 Planning

6 members of the Advisory Board attended the cycle 4 planning meeting in May 2021. Here, the NextFOOD approach was introduced then brainstorming a topic for the competition by spending 3 minutes in individual silent reflection and 5 minutes in pair discussion. Three topics were discussed in plenary (Sustainable packaging for safety and security of local and seasonal foods, Developing and promoting short food supply chains, and Make the SDGs our business) and the short food supply chain topic was agreed for cycle 4.

The essential shifts were addressed by reviewing the conclusions of the cycle 3 Reflection Workshop which

1. showed that shift 5 (From written exam to a variety of assessment methods) and shift 3 (From syllabus to supporting literature/variety of learning sources) needed the most work (ranked 8 and 8.1 out of 10, respectively), and

2. indicated eight hindering and five supporting forces, shown in figure 21 below, for pushing these shifts towards more action-oriented learning,



Figure 21: Outcomes supporting and hindering forces, cycle 3 Reflection Workshop

The Planning Workshop closed with a silent session of 10 minutes while participants wrote their concrete ideas for pushing the two shifts closer to a 10 in the cycle 4 competition. In the 20-minute plenary that followed, these ideas were presented, discussed, and consolidated into two concrete plans for shift 5 and four for shift 3, as shown in table 3 below.

shift 5: From	Include	Perhaps	
written exam to	student	overcome	
a variety of	assessment	student desire	



assessment methods	of peer's work. Perhaps have each team 'grade' the 1st student presentation	to grade other teams harshly by informing that highest and lowest grades are removed		
shift 3: From syllabus to supporting literature/variety of learning sources	Ask to students to provide a short bibliography at the end of their report.	Ask students to provide/present an article. Or lead a literature session.	Provide more supporting literature and/or sources	Closer connection with citizens and society needs instead of theoretical literature

# 3.4.1.2 Implementation

To push the five shifts away from top-down learning and towards action-oriented learning, suggestions from the cycle 3 Reflection Workshop and ideas from the cycle 4 Planning Workshop were reviewed. (Five not six shifts because shift 4: From textbook to a diversity of teaching aids has never applied to our case as we never used any textbooks.) In the cycle 3 Reflection Workshop, all five shifts were reviewed while in the cycle 4 Planning Workshop, the focus was on the two shifts with the lowest scores.

**To improve shift 1: From lecture hall to a diversity of learning arenas** suggestions from the cycle 3 Reflection Workshop were reviewed. This shift received the mid-point ranking, 8.3, and suggestions to improve the shift included bringing i) industry and ii) student experience to the learning arena.

- Industry participation was ensured by requiring student teams to have an industry mentor where in the past an academic mentor was required. A session on 'Virtual Visit' included, as in past cycles, an industry visit.
- Student experience was included as in cycle 3 with a session on 'Student Presentations' where each team shared an experience in the field.

**To improve shift 2: From lecturing to peer learning** the cycle 3 Reflection Workshop again provided inspiration. This shift received the 2<sup>nd</sup> highest ranking, 8.5, and suggestions to improve it included incorporating exchange of knowledge among students not only on the same team but also among the teams.

 Random breakout groups in which students worked with members of other teams began in the first session where student groups decided a topic and speaker that they would like to learn more about. This exercise also addressed a suggestion for shift 3 – that is to involve students in planning of the course. Random breakout groups were used in four of the six sessions.



**To improve shift 3: From syllabus to supporting literature/variety of learning sources** the cycle 4 Planning Workshop was crucial. This shift was ranked 2<sup>nd</sup> lowest, 8.1, and therefore reviewed not only at the end of cycle 3 but again at the start of cycle 4. Suggestions for improvement included i) asking students to provide a bibliography or to present an article in an online session and ii) having teachers provide supporting literature or connections with citizens and society instead of literature.

- Students provided a 'bibliography' of their interest when in session 1 they worked in random breakout groups to decide on an article, presentation, or report that they would like to know more about including a suggestion for who to contact to learn more. A selection of these suggestions was the focus of a later session, the 'Student Suggestion'.
- Teachers stressed connections with society when, for the first time, it was required for student teams to work with a mentor in industry rather than one in academia.

**To improve shift 5: From written exam to a variety of assessment methods** the cycle 4 Planning Workshop was again crucial. This shift was the lowest ranked, 8. Suggestions for improvement included increasing the weight of student participation throughout the course on the final evaluation and encouraging students to evaluate each other.

- The winning team was initially (before NextFOOD) decided based on review of a written report and of PowerPoint slides. In cycles 1 and 2, evaluation expanded to include points for quality of communication/presentation at the Final Conference. In cycles 3 and 4, evaluation expanded even more to include points for attendance at online sessions and participation in completing evaluations. Now, 11% of a team's points comes from their participation.
- Students give each other feedback but this does not count towards the final evaluation. Feedback is on i) student presentations of their experience and ii) student elevator pitches of their team project.

**To improve shift 6: From lecture to learning facilitator** suggestions from the cycle 3 Reflection Workshop were reviewed. This was the highest ranked shift, 9, yet there were suggestions for improvement including inviting experts to not only present but to interact with students.

 In two sessions, 'Virtual Visit' and 'Student Suggestion', we had participation of industry and/or academic experts and, in both sessions, random breakout groups meant students worked together (also addressing shifts 2 and 3) to prepare questions and comments for the experts. Following, a guided interactive session led to a true conversation among the students from different teams and the invited experts.

# 3.4.1.3 Reflection

A 30-minute teacher reflection was continued after each of the six online sessions, though it was not always possible for all three teachers to participate in each reflection.



Here, teachers reflected silently for 10 minutes on three questions then shared answers in a 20-minute plenary.

Teacher reflections showed that teachers spoke often about "students", suggesting that the experience of the teachers was influenced by how they thought the students experienced the session and that teachers felt comfortable after four cycles of the course.

# 3.4.2 Students' responses, learning and competence development

# 3.4.2.1 Methods of data collection and analysis

Data from students was collected throughout the cycle from the planning workshop through to the online trainings, however not including the reflection workshop which is scheduled for 9 March 2022. More specially, the following data was collected:

- Learner evaluation begin:
  - 4 initial questions (qualitative)
  - Self-assessment of competences (quantitative)
- Student reflection documents (qualitative) after online trainings:
  - R1: Student Presentation (n=7)
  - R2: Virtual Visit (n=6)
  - R3: Project Review (n=5)
  - R4: Student Suggestion (n=3)
- Learner evaluation end
  - 5 final questions (qualitative)
  - Self-assessment (quantitative)

All data as firstly anonymised. Student reflection documents were imported into NVIVO for coding according to the so-called coding tree referred to in instructions for analysis provided by the WP2-leader. Qualitative data from the learner evaluations (begin and end) were imported into NVIVO and coded inductively. Qualitative data from the learner evaluation begin (4 initial questions) was coded according to the classification of skills in D1.1 Inventory of Skills and Competencies.

One person (Line Lindner) coded all qualitative data. All quantitative data was analysed using different statistical methods in Excel by two persons (Katherine Flynn and Christoph Knöbl).

## 3.4.2.1.1 First week (day) & last week (day) of the course

3.4.2.1.1.1 Student's understanding, contributions, and expectations

Data to the 4 initial questions was collected through an online questionnaire (FoodFactory-4-Us: Short Food Supply Chains - Learner evaluations | ISEKI-Food Association). Action-research was introduced to the students in the first online session – the introductory session – and students were given 9 days to complete the evaluation (4 initial questions). The sample size was 12 respondents.



data to the 5 final questions was collected through the online questionnaire (FoodFactory-4-Us: Short Food Supply Chains - Learner evaluations | ISEKI-Food Association) which students were asked to fill in after the Final Conference. Filling in the Learner Evaluation End was a prerequisite for teams to receive a Certificate of Attendance if all team members had filled in the form. 12 participants filled in the learner evaluation end, but 40412911 did not submit replies and 40132912 supplied the same questions as 40122912. Thus the sample size (11.2.2022) was 10 participants.

# 3.4.2.1.1.2 Self-assessment of competences

Nineteen students began the cycle 4 competition and 15 of them completed the Self-Assessment Start and 14 did the Self-Assessment End. Rankings were calculated in Excel and supported by and ANOVA followed by a Tukey-Kramer post hoc test to show differences in the rating of the five core competences.

# 3.4.2.1.2 Students' final reflection document (individual)

Students were asked to fill in student reflection documents (R) after the following online trainings:

• R1: Student Presentation (n=7)

At the Student Presentation session, one team member from each team shared an experience they had connected with the competition topic, be it from internships, company visits etc.

- **R2: Virtual Visit** (n=6) Students "visited" 4 initiatives supporting or developing short food supply chains by watching short videos:
- Now Africa Initiative Coffee (live presentation followed by Q&A session)
- Short Fish Supply Chain in NE England
- Hungarian Cherries From family cherry farm to Association of National Interest Representatives of Small-Scale Producers
- Ghent en Garde- Policy in Ghent Belgium to strengthen SFS

Before watching the short videos, students were reminded of the competence of observation and encouraged to take notes on "what do I observe that is most interesting to me?" and "how can I relate these observations to my project"?. After the "visits", the students were put into random breakout groups, asked to choose a facilitator, timekeeper and a rapporteur, to take 3-minutes silent reflection and 7-min group discussion to agree on 1 most interesting point about each visit; and to prepare a 1-min summary for the rapporteur. Thereafter, in the second reflection session, students were again in break-out groups asked to choose a timekeeper and facilitator and then in 5-min to individual silent reflection looking at the interesting points on the MIRO board followed by 5-min group discussion.

• R3: Project Review (n=5)

At the project review, facilitators organized short online meetings individually with the teams where they gave a preliminary presentation of their project



and facilitators gave feedback on the content, the slides and the way in which the presentation was given (speech, speed).

# • **R4: Student Suggestion** (n=3)

At the Student Suggestion online training, two external experts had been identified by the students themselves in the introductory training as a best example of short food supply chains and a topic they would like to learn more about. Thus, the facilitators were able to contact the experts and they accepted the invitation to join the Student Suggestion training. Thus, first the external experts from the SKIN project gave a 15-min presentation on 'Social media for interactions with customers within the short food supply chain: the case of the SKIN project'. This was followed by 8-10 minutes break out groups to prepare questions (1 question per group) and a 10-min Q&A with the external experts. In the second session, students watched a 8-minute video on the "Fish Forever" project initiated by EDF and RARE. While watching, the students were encouraged to find one 'experience/observation' in the video that made an impression on them. After watching, students silently reflected on the 'experience/observation' in the video and discussed for 15-20 minutes in random break-out groups discussing your impressions followed by 5 minutes group presentations.

Thus, after these four online sessions, students filled in so-called "student reflection documents"<sup>6</sup> consisting of 6 questions:

- 1. What, exactly, did I see and hear? What exactly happened and what did I experience (reflecting both on the content and the process of the online training)?
- 2. What did I feel/think about it?
- 3. What did I learn?
- 4. What are the questions I am asking myself?
- 5. What will I do to find the answers?
- 6. What are the implications for my own development?

Students were already at the introductory online training in October 2021 introduced to reflection and encouraged to keep a reflection log. Students' written student reflection documents were anonymized and imported into NVIVO for coding according to the so-called coding tree referred to in instructions for analysis provided by the WP2-leader.

<sup>&</sup>lt;sup>6</sup> Workshops hosted by the WP2 NMBU team Tuesday September 15 2020 and Thursday September 24 2020.





Figure 22: NextFood Coding Tree

Thus, data from the student reflection documents were coded into transformative learning and competences (including the 6 core competences) with formulations triggering codes (1) where participants explicitly mention they practiced a competence or learned about a competence; (2) where participants describe their own actions or experiences related to the competence/transformative learning (without explicitly referring to it); (3) where participants describe others' actions or experiences related to the competence/transformative learning to it); (7)

# 3.4.2.2 Results

# 3.4.2.2.1 How do students experience such a learning process with respect to:

# 3.4.2.2.1.1 learning goals?

To answer how students experience the learning process with respect to the learning goals, we analysed Q3 of the 4 initial questions, where students mentioned that they would like the competition to help them find answers to general questions related to sustainability; topical questions related to the competition topic (supporting and developing short food supply chains); project-related questions; and personal questions.



Figure 23: Hierarchical map: What are the questions I would like this competition to help me find an answer? (4 initial questions) (n=12)

Within the category General questions related to sustainability, the questions were broad ranging from food security, and hunger, to more specific questions about

<sup>&</sup>lt;sup>7</sup> From Instructions for data analysis prepared by NMBU (2020)



opportunities for sustainable food industries. Within the category topical questions, students ask questions such as "How can collective action be a part of the solution in the food bank system in my area?" (40232101); "Is it possible to create a proper system that will develop short supply chain?" (40522332); or "How much do people actually know and how much they want to/ need to be educated about short supply chains /food quality" (40552332). Project-related questions are about participation in FoodFactory-4-Us related to realization of the project. And personal questions (only 1) is about "I wish to understand myself more than any other answers. Also wish to know more about other participants, to sort out our differences and similarities" (40112911). After the competition, students were asked what are the questions they are now asking themselves. Here, students mentioned firstly project-related questions; followed by topical questions related to the competition topic (supporting and developing short food supply chains); personal questions and finally general questions related to sustainability.

That students were no longer looking for answers related to sustainability and for topical questions related to the competition topic (supporting and developing short food supply chains) may mean that we covered these topics well in the competition through the online trainings.

Students' initial responses to the competences they would like to train suggest skills for navigating in a changing world and especially the core competences reflection, visionary thinking and observation, and problem-solving skills. Skills in building and maintaining networks were also mentioned often and here especially communication and presentation skills. Finally, collaboration skills were mentioned often and here especially the interaction, participation, and teamwork.

1. Navigating in a changing world	5. Building and maintaining ne	2. Collaboration	8. Sector-specific skills
			4. Digital and technical

Figure 24: Hierarchical map: What are the competences I'd like to train and improve significantly by participating in this competition? (4 initial questions) (n=12)

# 3.4.2.2.1.2 view on competences needed for sustainable development?

When looking at students' assessment of the skills and knowledge needed to support sustainable development in agrifood and forestry systems in the beginning of the competition, some students pointed to the need to obtain knowledge and information about the food system and of understanding the food system, the actors and their needs and challenges in order to support sustainable development. As one student put it: *"I think we should understand the things that are important to food systems, in order to support sustainable development of them. I think we should know the wants* 



and needs of the consumers and producers and the ways in which they work together." (ID 40212102). Furthermore, some students pointed to awareness about sustainable consumption and production, problem-solving skills and critical thinking.



Figure 25: Hierarchical map: What are the knowledge and skills we need to support sustainable development in agrifood and forestry systems (4 initial questions) (n=12)

At the end of the competition, students' answers to the same question was more oriented towards skills related to interpretation and negotiation of sustainability such as knowledge about sustainable development and thinking sustainably, while also collaboration skills were rated highly and linked to understanding others as a prerequisite for supporting sustainable development.: *"To support sustainable development in agri-food and forestry systems, we must be able to work together; understand the views of others; find ways to reach a collectively-beneficial solution; find new ways of innovation; and much more. This can be done through visioning, reflecting, and dialogue."* (40212102).

7. Interpretation and neg	ogiait 5. Building and maintaining net	works 1. Navigating in a shanging wo	rlei 4. Digital and
	2. Collaboration	8. Sector-specific skills	3. Systems-p

Figure 26: Hierarchical map to the question: What are the knowledge, skills and attitudes (competences) we need to support sustainable development in agrifood and forestry systems? (5 final questions) (n=10)

The competition theme – Supporting and developing short food supply chains – aims for students to develop innovative and sustainable solutions supporting the overall objective of the competition. During the learning process, students are exposed to various examples or best practices of the competition topic (for instance watching videos of community actions developing short food supply chains) but also through their own work and through other students' work. They engage in discussions with other students where they critically reflect on what they have observed, and they are through their projects finding solutions to problems facing the food sector. Thus, the exposure to the topic of sustainability may have raised students' awareness of it while having improved their skills in problem-solving and thinking critically.



## 3.4.2.2.1.3 recognition of own competences and competence development?

To the question of what experiences and competences do I bring to the competition to make it a success (4 initial questions), several students gave reference to specific experiences in the agrifood and forestry sector (some students had experiences at industry-level with the industry they used as industry mentor others mention FoodFactory-4-Us as an experience in the agrifood and forestry sector) and placed that in relation to skills they learned from that experience. Here students mention skills related to large networks and contacts established through experiences, but also more specific learning experiences gained from working with non-profits, farmers, or the industry. Also, skills in navigating in a changing world are mentioned often and here especially curiosity, enthusiasm, inspiration, awareness about and willingness to help those actors or give something back to actors students learned from through their experiences (figure 27).



Figure 27: Hierarchical map: What experiences and competences do I bring to the competition to make it a success (4 initial questions) (n=12)

At the end of the competition, there were more focus on problem-solving skills, creativity and innovation; and also to collaboration skills and those related mainly to dialoguing, group discussions, and team work. This could point to the conclusion that participation in the competition gave students more experience in problem-solving, creativity and innovation, but also collaboration skills through teamwork.

2. Skills			1. Experiences	
l	2.1 Navigating in a changing world	2.2 Collaboration	2.5 B	
l				

Figure 28: Hierarchical map: Which of the experiences and competences that I brought to the competition contributed the most to the learning community? (5 final questions) (n=10)

At the end of the competition, students were asked to reflect on their contribution to the learning community (5 final questions). Students referred largely to problemsolving skills, creativity and innovation; and collaboration skills which were related mainly to dialoguing, group discussions, and team work (figure 28).





Figure 29: Hierarchical map: Which competences did I train/improve significantly by participating in this competition? (5 final questions) (n=10)

Furthermore, qualitative data from the learner evaluation end (5 initial questions (n=10)) showed that students trained skills on building and maintaining networks and here especially communication and presentation skills; while also mentioning skills for navigating in a changing world were personal traits such as confidence and the core competences of visionary thinking, reflection and dialogue (figure 29).

# 3.4.2.2.1.4 transformation?

When looking at the competences students expressed they would like to train or improve at the start of the competition, these were very much related to the core competences reflection, visionary thinking and observation, but also to problem-solving skills, communication (presentation skills) as well as networking and collaboration skills such as interaction, participation, and teamwork. At the end of the competition when asked about the competences they did train or improve, students emphasised some of the skills they mentioned in the beginning namely reflection and visionary thinking; but they emphasised the skill of dialoguing and also personal traits such as confidence. This shows that not only did they train or improve certain competences, and even those they had mentioned they would like to train, but they also became more confident in using these competences.

# 3.4.2.2.2 To what extent does the education enhance the students' competences of:

Nineteen students began the cycle 4 competition and 15 of them completed the Self-Assessment Start, ranking themselves in the five core competences. Their average ranking was 5.3 + 2.2. They rated themselves highest in Reflection and Participation, 5.6 and 5.3 out of 9, respectively. The lowest average rating was in Observation at 4.8. An ANOVA followed by a Tukey-Kramer post hoc showed no significant difference in the rating of the five core competences, p=XXX (figure 30).

One team of three students did not complete the competition, thus 16 students did complete and of these 14 did the Self-Assessment End. Here, students rated themselves significantly higher in each of the five competences than they did at the start of the course.





Figure 30: Students' Self-Assessment of the 5 Core Competences Start and End of competition

Student t-test	Average scores			Significance
Competences	Start	End	Diff	P value
Observation	4.8	6.2	+1.39	< .01**
Participation	5.5	6.5	+1.01	< .05*
Visioning	5.3	6.5	+1.14	< .001***
Reflection	5.6	6.4	+0.77	< .01**
Dialogue	5.3	6.3	+1.06	< .001***
*p-value < .05, **p-value < .01. ***p-value < .001				
Results of a paired, two-tailed, Student t-test				

Table 4: Students' Self-Assessment of the 5 Core Competences Start and End of competition

## 3.4.2.2.2.1 observation?



Students trained in Observation beginning in the first session of the course when we introduced all competences and did an exercise in observing a painting, writing what you see, and sharing in plenary. Shortly after, student completed the Self-Assessment Start and rated their observation skills at 4.8 +/- 1.9 (n=15/19). After the first session, no further exercises were dedicated to observation. Nonetheless, students rated themselves higher in the Self-Assessment End at 6.2 +/- 1.5



(n=14/16). Student t-test shows significance at p<0.01 from their Start rating.

It was found that the competence of observation was triggered in the Student Reflection after the Student Presentation online session, where one student for instance wrote: "There were presentations and thought processes delivered from other people's experiences in various domains of internships or exposure" (40412911). Another student wrote "I saw and heard a well organized session in which teams each presented an experience they had with short food supply chains. Most presenters had some sort of accompanying slideshow to go along with their talk. After each presentation, we used the MIRO board for critical friend reflection. This consisted of constructive feedback on each presenter. I saw and heard from fellow competitors and organizers from across the world" (40232101). Here the latter student explains and describes thoroughly what he/she experienced in the session, while the very last sentence yet is an appreciation of the contributions from fellow students and facilitator's organization, which shows that the student tries to see the whole pictures.

## 3.4.2.2.2.2 reflection?



Students were introduced to Reflection in the first session of the course but did not do any guided exercise. They rated themselves at 5.6 +/- 2.2 (n=15/19) for Reflection in the Assessment Start. They did a guided reflection exercise in session two about the presentations of other teams and after session two, they completed their first of five reflection documents – one after each of the course sessions. Also guided reflection was organised during sessions 3 and 5, Virtual Visit and Student Suggestion. After the competition, the average Reflection rating increased to

6.4 +/- 1.6 (n=14/16), significant at p<0.01 from the Start rating. This was among the lower increases in score but Reflection did finish among the competences with the highest rankings. The small increase may be in part because students rated themselves high in Reflection at the start of the competition and, although a lot more time was spent on Reflection than in previous cycles, and they rated themselves higher at the end, it was not enough to show a large increase. Another consideration is the relative difficulty of Reflection, which perhaps students did not grasp at the start (hence they rated themselves high) but did grasp at the end, in part because much time was spent on it, and thus they rated themselves better but not tremendously so.

From the student reflection after the Student Presentation online session, it was found that the majority of students' responses triggered the code reflection. Some responses were directly related to the structure of the training – listening to other students' presentation, acting as the critical friend and listening to others' feedback, like: *"I felt like it was enlightening to hear about all of the projects the teams are working on. I thought it was helpful to do the critical friend feedback. This feedback ensure that the other teams were listening while you were presenting. Seeing the feedback for my own presentation let me know that other teams were interested in what I had to say. " (40212102) and <i>"I felt included in the discussion because of the MIRO board usage, and also felt valued because their was time for questions/discussion. I felt that I learned a great deal from the diversity of thought and experiences represented"* (40232101). These quotes show that the students reflected on certain aspects of the training,


actions they did or experienced, which had an impact on the learning experience. Whereas other reflections were more topical and broad, like: *"I felt overwhelmed by the amount of work and initiatives, and society is moving towards a more sustainable and caring approach. Farming and agriculture are now becoming a profession rather than just an activity"* (40412911) or *"I learned that there is no right way to help the farmers and be sustainable. Every small step and every experience will count in this journey of moving towards shorter supply chains."* (40412911). These latter quotes show more of a change in mindset after the learning experience, a reflection on higher-order issues and actions of not just other people but also themselves can have an impact.

Also student reflection documents after the "Virtual Visit" mainly triggered the code reflection and were largely related to the content of the visits, the differences among them and reflections on their own project and the solutions they were approaching. Below some examples of observation and reflection: "I saw 4 different firm, operating in different sector . we visited 4 farms , it was good we went from Africa , Europe to America. it was interesting to see our each country and farm work.i saw the food innovation, this session was a eye opener" (40542332); "The contrast of the Hungary Cherry farm to the other videos war evident: This was one closed family ecosystem, whereas the others where community ecosystems (e.g. the Uganda farm: school + farmers connections, education)" (40552332); "I learned about short food supply chain in other countries. All of the presentations were new to me. It was nice to learn about operations that I am not familiar with. It gives me more knowledge which can be useful in my project and overall education." (40212102); and "I am asking myself how short food supply chains like the ones we learned about, can be related to my team's short food supply chain. Can some of the problems solved in those chains be useful to solving issues in our chain?" (40212102). Here students describe one the one hand the peculiarities of each of the distinct practices shown to them and they try to see them in a larger perspective and how they can use the learning for their own projects.

Reflection was triggered from the Project Review by statements such as "The advice given on the technical part of the presentation was evident (next time resolve issues). The advice on the content of the presentation was very helpful. As it was not clear, if, and to what extent we might have gone out of scope or to broad with our proprosal" (40552332) and "I learned a few things to change about our presentation that will improve it. Adding pictures, more details on certain slides, etc. Also, I learned some things I can do better to improve my speaking and presenting skills." (40212102).

The student reflection documents after the Student Suggestion training also mainly triggered reflection: "It was a great experience, that the authors of the paper followed the invitation (they can be very proud, so much data is put very comprehensively into this research paper. Moreover it still gives hints into further directions for research in the future)" (40552332); "We learn a lot about responsible enterpreneurship at Audencia and seeing the video contribution on the fishermen in the Philippines highlighted the importance of involving the whole community into the project, the level of engagement by all parties was fascinating (giving the hardship they faced...)" (40552332). Here the student links learning at his/her home university (responsible entrepreneurship) to the learning experience in the training, and highlights the issue of community involvement and engagement as a solution or a way for moving forward.



### 3.4.2.2.2.3 visionary thinking?



Visionary thinking was introduced very briefly in the first session and only returned to in the last session. Students rated themselves at mid level for Reflection in Self Assessment Start, 5.3 + 2.2 (n=15/19). In the final session, Soft Skills, we did a very long and thorough Visioning exercise in preparing an elevator pitch. In Self Assessment End, students rated themselves among the highest for Visioning, 6.5 + 1.5 (n=14/16), and the difference between the Start and End ratings was among the most

significant at p<0.001). This may be in part due to the short time span between the Visioning and the completion of Self Assessment End but may also be due to student appreciation of the Visioning exercise; it is one that students mention in their comments in the chat and orally in the sessions and this was also the case in cycle 3.

One response from the "Virtual Visit" triggered the code reflection and visionary thinking: "by implementing knowledge I learned from here, some of them could be used for empowering my village people, like the intercrop cultivation, food management system, i think this practice could have very much big impact in my society" (401529119). Here the student is specifically reflecting on certain inspiring actions that could be applied in his/her own project solving societal problems in the long run while also activating his/her own insights and actions to be taken (i.e. "by implementing knowledge I learned from here"...).

The student reflection documents after the Student Suggestion training also triggered the code visionary thinking: "How can I make such a project idea not only environmentally sustainable, be an responsible enterpreneur but also make the concept appealing to investors (economically viable) ?" (40552332); and "Think outside the box for information gathering. (not just thinking of investors in an economic sense but also just about social philontropists, who might be successful business men/women too)." (40552332). Here the students are trying to activate their own desired actions to reach a certain goal by asking questions of where they want to be.

### 3.4.2.2.2.4 participation (engagement)?



Participation was introduced in the first session and participatory exercises were a part of that session and every session after. Nonethess the significand of the student self assessment of improvement in participation was the lowest, rated at 5.5 +/- 2.2 (n=15/19) in Start and 6.5 +/- 1.4 at End (n=14/16), significant at p<0.05. This relatively low improvement may reflect the lack of specific exercises on improving or acitively "doing" participation in our course.

Students' reflections from the project review triggered participation as several students referred to the team spirit expressing their desire to implement the feedback given *together* with their team: *"The situation with the technical issues was a little distressing, however, now I am proud that we as team acted together and still delivered smoothly."* (40552332); *"To find the answers, I will work with my team to implement the suggestions and I will work on speaking m slides more fluidly."* (40212102); and *"Get together with my team and draw a plan which we will follow to meet our objectives and* 



and address short comings from the first presentation." (40532331). Also, the role of the industry mentor in the teamwork was mentioned, who was also invited to the project review: "I am also impressed in how much our mentor cares about us, discusses our ideas and participates to the meeting !" (40552332); and "Seeing, that our mentor is so immeresed in this project, I want to do even more." (40552332). While the former quotes show students' engagement in the session, listening carefully to the feedback given and with the desire to implement and improve on certain aspects, they also show that students are dedicated to make improvements as teams and not individually. The latter quotes emphasis the appreciation of the industry mentors' participation and interaction with them as teams.

The student reflection documents after the Student Suggestion training also triggered the code participation and here the appreciation of interaction, engagement and learning from other students from other teams: "\* *The longer this competition carries on, the more I am looking forward to discuss about the given subjects with the other students in the breakout room,[...] in particular,he is very engaged in this challenge.*" (40552332).

### 3.4.2.2.2.5 dialogue?



Dialogue was also introduced in the first session as part of the overview of the five core competences. Similar to Participation, Dialogue was also a part of the exercises in every session of the course. Here however, unlike Participation, students rated their improvement in Dialogue among the largest improvements, rating themselves at 5.3 + 2.1 (n=15/19) for Start and increasing to 6.3 + 1.5 (n=14/16) for end, significant at p<0.001. This begs the qustion why two competences which received the same attention from teachers were viewed differently by students. This might

imply that that Dialogue implies discussion with peers while Participation implies discussion with teachers during course sessions and, from that point of view, the student responses reflect the course focus on student interaction. In this sense, students' responses indicate on the one hand the appreciation of interaction with other students from other teams (see data coded for participation). For instance, in the student reflection after the Student Presentation online session, some responses were directly related to the interaction with other students: "I felt like it was enlightening to hear about all of the projects the teams are working on. I thought it was helpful to do the critical friend feedback. This feedback ensure that the other teams were listening while you were presenting. Seeing the feedback for my own presentation let me know that other teams were interested in what I had to say. " (40212102). Also students' reflections on the project review where some of the industry mentors participated indicate their appreciation of the interaction with the mentor: "I am also impressed in how much our mentor cares about us, discusses our ideas and participates to the meeting !" (40552332); and "Seeing, that our mentor is so immeresed in this project, I want to do even more." (40552332).



### 3.4.2.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

We found in the responses to the question "What questions did this competition find an answer to? (5 final questions) that students found answers to project-related questions. As one student put it, "*The competition helped me think about how a solution for one organization can be applied to multiple areas*" (40232101). This shows students ability to being open to other and new solutions and how such solutions can be applied to other organisations, and thereby their ability to seeing their own role in a larger perspective, and in order to efficiently manage the future challenges.



# 3.4.3 Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education

### 3.4.3.1 Methods of data collection and analysis

### 3.4.3.1.1 Teacher reflection document

This case development report does not entail data from the reflection workshop as this has not taken place at this point in time (scheduled for 9 March 2022).

Data is based on teacher reflection after online trainings, where we continued a 30minute teacher reflection after each of the six sessions, though it was not always possible for all three teachers to participate in each reflection. Here, teachers reflected silently for 10 minutes on three questions then shared answers in a 20-minute plenary. We collected 12 teacher reflections in cycle 4 and word clouds from the three questions are shown below.



Q3. If I were to do it again, what would I do differently and why?

In both Q1 and Q2, teachers spoke often about "students", suggesting that the experience of the teachers was influenced by how they thought the students experienced the session. In Q1 "positive" was the most common word, showing the comfort of the teachers after four cycles of the course. The number one word "maybe" in Q3 further suggests that teachers are mostly satisfied after each online session as suggestions for what to do differently often contained this qualifier word.

In addition, a qualitative content analysis of the teacher reflections showed that teachers' experience as facilitators and with the organisation of the online trainings now after 4 years gives them comfort and stability which, for the teachers, contribute to a positive and friendly learning atmosphere. Teachers reflect naturally on the organisation of the session, the sequence and set-up, but also the interaction with and among students, but also on tools used (e.g. breakout rooms and MIRO), as well as students technical (or lack of) capacities for interacting with others. When reflecting on how they think the students experienced the sessions, teachers focus mainly on the level and type of engagement (number of questions, use of chat, type of questions), but also to some extent the difficulties of interacting with some teams as they do not turn on their camera, do not express if they have problems with online tools, and also their own appreciation of their contributions seen in the light of the instructions given beforehand. Teachers' responses to what they would have done differently deal mainly



with the organisation of the different online trainings: less use of interactive tools, less virtual visits, inviting more external experts live; and more time or alternative settings for giving students the opportunity to give and receive feedback from each other considering time as a constraint.

### 3.4.3.1.2 Course reflection focus group/interviews

This case development report does not entail data from the reflection workshop as this has not taken place at this point in time (scheduled for 9 March 2022).

### 3.4.3.2 Results

A Force Field Analysis was not carried out. The answers to the below questions are based on the suggestions of the reflection workshop cycle 3, ideas from the planning workshop cycle 4, and actions for implementation during cycle 4.

3.4.3.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

### 3.4.3.2.1.1 From lecture hall to a diversity of learning arenas

### 3.4.3.2.1.1.1 Supporting forces and how to build on them

At the cycle 3 reflection workshop, it was suggested to improve the shift by including industry in the competition and to bring student experiences into the learning arena. To accommodate these suggestions, at the cycle 4 planning workshop, it was decided to include industry participation into the implementation of the competition by requiring student teams to have an industry mentor instead of an academic mentor. Furthermore, it was decided to focus on industry visits at the 'Virtual Visit' training. From cycle 3, we integrated a training session called "Student Presentations" where one member of each team shared an experience related to the competition topic. Students' reflections after the Project Review where also, in some cases, the industry mentor: *"I am also impressed in how much our mentor cares about us, discusses our ideas and participates to the meeting !"* (40552332); and *"Seeing, that our mentor is so immeresed in this project, I want to do even more."* (40552332).

### 3.4.3.2.1.1.2 Hindering forces and how to deal with them

The industry mentors were invited to all online trainings and a few participated in the project review. Furthermore, a short 30-min session was organised only for the industry mentors explaining the NextFood model and the core competences, practicing also observation with them, and explaining their role as mentors to their teams. However, only 2 out of 5 turned up. Teachers' reflections after the project reviews showed generally a satisfaction with teams' performance and interaction with their industry mentor.



### 3.4.3.2.1.2 From lecturing to co- and peer learning

### *3.4.3.2.1.2.1* Supporting forces and how to build on them

To improve the shift from lecturing to peer learning, the suggestion from cycle 3 Reflection Workshop was to include incorporating exchange of knowledge among students not only on the same team but also among the teams. This suggestion was accommodated by organising random breakout groups in which students worked with members of other teams. For instance, at the introductory online session, student groups were asked to identify a topic and speaker that they would like to learn more about. Random breakout groups were used in four of the six sessions.

### 3.4.3.2.1.2.2 Hindering forces and how to deal with them

In order to spur interaction and creativity in the student groups working in the breakout groups, they were introduced to the online tool MIRO in the introductory online session for gathering ideas. However, this turned out to be difficult for several students to work with either because they joined the sessions from a mobile device and not a laptop or because several students gathered in front of only one device. Thus, it was decided early on to not use MIRO but only the break-out rooms for discussion.

### 3.4.3.2.1.3 From syllabus to supporting literature/a diversity of learning sources

### 3.4.3.2.1.3.1 Supporting forces and how to build on them

To improve the shift from syllabus to supporting literature/variety of learning sources, the suggestions for improvement included i) asking students to provide a bibliography or to present an article in an online session and ii) having teachers provide supporting literature or connections with citizens and society instead of literature. To accommodate these suggestions, students provided a 'bibliography' of their interest when in the introductory online session they worked in random breakout groups to decide on an article, presentation, or report that they would like to know more about including a suggestion for who to contact to learn more. Furthermore, the suggestion to connect with society was accommodated with the requirement of student teams to work with a mentor in industry rather than one in academia.

### 3.4.3.2.1.3.2 Hindering forces and how to deal with them

Similar hindering forces as described under 3.3.3.2.1.1.2.

### 3.4.3.2.1.4 From textbook to a diversity of teaching aids

### 3.4.3.2.1.4.1 Supporting forces and how to build on them

this shift was not dealt with in the reflection and planning workshops as it appears not relevant to the case being an extracurricular activity with little focus on teaching aids.

### 3.4.3.2.1.5 From written exam to a diversity of assessment methods

### 3.4.3.2.1.5.1 Supporting forces and how to build on them

To improve the shift from written exam to a variety of assessment methods, in the cycle 4 Planning Workshop it was suggested to increase the weight of student participation



throughout the course on the final evaluation and encouraging students to evaluate each other. To accommodate these suggestions, in cycles 3 and 4, evaluation of teams not only include evaluation of the report and presentation, but also attendance at online sessions and participation in completing evaluations. Furthermore, students give each other feedback during i) student presentations of their experience and ii) student elevator pitches of their team project.

### 3.4.3.2.1.5.2 Hindering forces and how to deal with them

Throughout the cycles, it has remained challenging to encourage students to fill in evaluation forms and self-assessments in the beginning and end of the course despite the fact that we connect assessment to participation.

### 3.4.3.2.1.6 From lecturer to learning facilitator

### *3.4.3.2.1.6.1* Supporting forces and how to build on them

To improve the shift from lecture to learning facilitator, the suggestions from the cycle 3 Reflection Workshop were to include inviting experts to not only present but to interact with students. Thus, in two sessions, 'Virtual Visit' and 'Student Suggestion', there was participation of industry and/or academic experts and, in both sessions, random breakout groups for students to work together preparing questions and comments for the experts. Following, a guided interactive session led to a true conversation among the students from different teams and the invited experts.

### 3.4.3.2.1.6.2 Hindering forces and how to deal with them

The experts that were identified by the student groups in the introductory online session led to the successful invitation of the experts to give a presentation on a topic suggested by the students. While the students were in random breakout groups, facilitators had the opportunity to explain the NextFood model and training the core competences to the experts. They were very interested in the model and also of the interaction among the students, and also expressed their interest in joining the Final Conference and staying in contact with us. We also sent them more materials about the competition and about the NextFood Toolbox.

3.4.3.2.2 What such a change requires from teachers, students, and institutions Data to answer this question is from the Reflection Workshop which has not conducted at this point (18 February 2022).

3.4.3.2.3 Teachers' perception of the greatest challenges to achieving such a change Data to answer this question is from the Reflection Workshop which has not conducted at this point (18 February 2022).



## 3.5 Concluding remarks on the case development

### 3.5.1 On the case development since the previous reporting

### 3.5.1.1 The most useful and inspiring experiences (supporting forces)

This section is based on the suggestions of the reflection workshop cycle 3, ideas from the planning workshop cycle 4, and actions for implementation during cycle 4.

As regards the shift from lecture hall to a diversity of learning arenas, the data from the cycle 3 reflection workshop, suggested to include industry in the competition and to bring student experiences into the learning arena. Thus, at the cycle 4 planning workshop, it was decided to include industry by requiring student teams to have an industry mentor instead of an academic mentor. Furthermore, it was decided to focus on industry visits at the 'Virtual Visit' training rather than lab visits and to incorporate a training session called "Student Presentations" where one member of each team shared an experience related to the competition topic.

To improve the shift from lecturing to peer learning, the suggestion from the cycle 3 Reflection Workshop was to foster the exchange of knowledge among students from different teams which was accommodated by organising random breakout groups in which students worked (i.e. did student-led reflection) with members of other teams. While facilitators did not join the students in the break-out groups, some of the student reflection documents that students suggest that students appreciated the interaction with other team members. As one student put it, after the Student Suggestion session: *"\* The longer this competition carries on, the more I am looking forward to discuss about the given subjects with the other students in the breakout room,[...] in particular,he is very engaged in this challenge."* (40552332).

To improve the shift from syllabus to supporting literature/variety of learning sources, at the reflection workshop cycle 3, it was suggested to let students provide a bibliography or to present an article in an online session and letting facilitators provide supporting literature or connections with citizens and society instead of literature. Thus, in the introductory online session, students in random breakout groups were asked to commonly decide on an article, presentation, or report that they would like to know more about.

The shift from written exam to a variety of assessment methods was dealt with in the cycle 4 Planning Workshop where it was suggested to increase the weight of student participation throughout the course on the final evaluation and encouraging students to evaluate each other. Thus, since cycle 3 and also in cycle 4, students' report and presentations are evaluated but also attendance at online sessions and participation in completing evaluations is part of the final evaluation. Furthermore, students give each other feedback during i) student presentations of their experience and ii) student elevator pitches of their team project.



To improve the shift from lecture to learning facilitator, the suggestions from the cycle 3 Reflection Workshop focussed on more interaction with facilitators. Thus, participation of industry and academic experts was followed by breakout groups for students to work together preparing questions and comments for the experts.

### *3.5.1.2 Main obstacles/challenges encountered (hindering forces)*

Interaction and inclusion of industry mentors in the implementation of the competition was sought by inviting them to all online trainings and a few participated in the project review. Furthermore, a short 30-min session was organised only for the industry mentors explaining the NextFood model and the core competences, practicing bservation with them, and explaining their role as mentors to their teams.

In order to spur interaction and creativity among the student groups working in the breakout groups, the online tool MIRO was introduced to teams in the introductory online session for gathering ideas. However, this turned out to be difficult for several students to work with either because they joined the sessions from a mobile device and not a laptop or because several students gathered in front of only one device. Thus, it was decided early on to not use MIRO but only the break-out rooms for discussion.

Throughout the cycles, it has remained challenging to encourage students to fill in evaluation forms and self-assessments in the beginning and end of the course despite the fact that assessments are connected to participation. Especially getting students to fill in the learner evaluation end (with the 5 final questions and self-assessment end) proves difficult. This may be partly because some students are disappointed not winning the competition, and partly because it is a time-consuming activity.

3.5.1.3 Lessons learned from the inspiring experiences and from dealing with the challenges Data to answer this question is from the Reflection Workshop which has not conducted at this point (18 February 2022).

Data from the teacher reflections show that facilitators succeeded in inviting experts and industry representatives (to the Student Suggestion and Virtual Visit) and having them live presenting and ready to answer questions in these sessions. This heightened interaction and gave students a feeling of being present, dealing with real challenges and being able to ask questions and interact directly with these peers.

### 3.5.1.4 Plans for how to move forward into the next cycle

FoodFactory-4-Us will continue after the end of the NextFood project but within another EU-funded H2020 project, FairChain. At the Cycle 4 Reflection Workshop, which will take place 9 March 2022, representatives from the FairChain project have been invited to be members of the Advisory Board. FoodFactory-4-Us will run three times (2022,



2023 and 2024) within FairChain. Collection of data as we have done during the 4 cycles in NextFood as part of action-research will be continued and so will doing action-learning with students in the online sessions. The content of the reflection and planning workshops may be adapted, combining these even, and focus less on the shifts but more on the data collected to feed into the planning of the next cycle.



### 3.5.2 Reflections towards the end of the Nextfood project

## 3.5.2.1 What has been accomplished to shift from theory to phenomenon (experience) in agrifood- and forestry systems as the starting point for the learning process?

Introduction of the 3 online trainings Student Presentation; 'In the Field' / Virtual visit; and Student Suggestion that all involve the learners in the preparation or take as a point of departure learners' experiences. That means, they have a stake in the learning process. In the Student Presentation online training, one student from each team gives a pitch on an experience (internship/visit) to a company/farm where he/she dealt with the topic of the competition. At the Virtual Visit Online Training, in the early cycles we "visited" online (by video/recording) company sites, laboratories or project initiatives and students could pose questions. At the Student Suggestion online training, students agree (in groups with other team members) on a best practice example they would like to know more about suggesting e.g. the author of an article/lead of an initiative. As organizers, that means contacting the proposed experts and inviting them to talk about their best practice example and the students can ask questions, enabling also bringing the NextFOOD approach closer to other teachers.

# 3.5.2.2 What has been accomplished to shift from transmission of knowledge to the development of key competences needed to support sustainable development in agrifood and forestry systems?

all the core competences are practiced with the students:

- Dialogue: at the Project Review, each team meets individually (to keep their solution a secret and thus keep the spirit of a competition) for 30 minutes with 2 or 3 members of the Advisory Board in order to review progress and pose questions. Teams come to the Project Review with some slides/reflection document outlining their project.
- Reflection and observation: students train the competence of reflection and observation in all online trainings where they receive input (from other students, external stakeholders)
- Visioning: In the Soft Skills online training, there is a practical session on the "elevator pitch". Students identify what is essential to explain their project in under 1 minute and they tell this to the group. Soft skills e.g., giving a strong presentation, are the focus.
- Facilitation: in the Student Suggestion online training, in break-out groups, students are asked to assign roles (facilitator, timekeeper and presenter), discuss their reflections and present these.

### 3.5.2.3 What are the prerequisites for making a successful shift?

- Building a learning environment with the students, making sure that they feel comfortable and safe to share experiences, opinions with facilitators and other students.
- Engagement with stakeholders: In the first cycles, each student team is accompanied by faculty members and in cycle 4 they were accompanied by a member from the industry. Furthermore, there is the advisory board, and we invite external stakeholders. It is important that everyone understand what their roles are. But that also requires that we let the process be open. Sometimes that leads to the



process going into a different direction than anticipated, but that is also a strength of the action-learning process.

- Letting go of control
- Being confident of own competences as facilitator being capable of transferring those to others. That requires constant learning and competence building. Each competition has another topic which requires adaptation to the topic in which session the students can build these competences.
- Well-functioning technical equipment for breakout rooms, group work etc. The digital tools are a prerequisite for it to work. It is definitely something that they need to learn in action-learning.
- Staff resources

## 3.5.2.4 What is your concrete advice on the shift from simple knowledge transmission to the development of key competences?

Give much more room to the training of the competences, with students as well as stakeholders: explain from the very beginning what are the competences, and give concrete, every-day examples. The students come from very different countries so every-day examples are important. core competences are trained in small groups and students are encouraged to keep a reflection log. Furthermore. The wider stakeholder community train the competences: meeting with industry mentors explaining them what the competences are and train them (observation and reflection). And as facilitators, do a short reflection session after each session – as practicing the competences is important for the facilitators too, not only for your work, but also for us as individuals.

### 3.5.2.5 What is your main challenge?

- Motivating stakeholders to appreciate the training of the competences.
- Visualizing the competences
- Finding a balance between control and improvisation and to make the parties involved comfortable about that balance.
- Going online

## 3.5.2.6 What are the three best ideas from the workshop for how to deal with that main challenge?

We selected these three best ideas:

- How can we use the resources from the NextFood project to support how we interact with stakeholders? Would it be possible to recruit stakeholders via a NextFood stakeholder 'pool' or perhaps bring several stakeholders from different cases together (online) to share their experiences?
- Can you find some companies that are ready to make a long-term commitment with the course? Different student teams can work on the same complex task for several years, and different teams build upon each others achievements.
- Highlight experiences (witnesses) from other disciplines successfully working with similar methodology such as industrial designers.

All three ideas highlight the importance of working with, on the one hand, a group of teachers that are familiar with action-learning and, on the other hand, to work with a



pool of industry representatives that are willing to support the students and to open up their companies and let students seek answers and solutions to challenges they, and other similar companies, are looking to solve.



## 4 Case 5: American Farm School / International Hellenic University

Authors: Krooupa Anna-Maria, Papadopoulou Elisavet, Zafeiriou Georgia

Contributors: Krystalidou Evdokia, Lymperopoulos Aristotelis, Navrozides Manolis, Papageorgiou Maria

## 4.2 ID card

Course title, level and language Title: Food Science and Technology Level of the course: Undergraduate, Final Year Project Course language: Greek

Title: Agricultural Technology

Level of the course: Undergraduate, Final Year Project

Course language: Greek

### Course learning goals

### Aim:

The aim of the course was to engage actors in the agricultural chain and students in an action-based, multi-actor educational activity on sustainability issues and production methods by utilising the methodology of Action Learning Sets (ALS).

### Learning Goals:

- 1. To identify and deal with real farm problems
- 2. To identify and examine how farmers and students perceive their participation in the action learning sets.
- 3. To develop core competences related to real life, professional conduct and sustainable development
- 4. To identify and examine the perceived barriers and opportunities in communication in a multi-stakeholder setting
- 5. To develop the skills needed for research and organization of a thesis

### Host institution(s) and course leader(s)

Host institution: International Hellenic University (former ATEITH)

Course Leaders:



- Dr Aristotelis Lymberopoulos,
- Dr Maria Papageorgiou,
- Dr Manolis Navrozides

### Timeline of the activities covered in this report

Timeline of the activities				
Planning period	June 2021– August 2021			
Implementation of research protocol/material	June 2021– August 2021			
Data collection	September 2021 – February 2022			
Data Analysis	February 2022			

For a more detailed schedule of the learning sets' visits please see Appendix 9.

### Learner categories and number per category (demographics)

For a detailed presentation of the learner demographics please see Appendix 8.

Students			
Age	22-25		
Gender	Female: 5	Male: 2	
Course titles	Food Science and Technology Agricultural Technology		
Level of studies	Undergraduate		
Study year	Final Year		

For a more detailed schedule of the learning sets' visits please see Appendix 9.



### Stakeholder categories and type of involvement

For a detailed presentation of the stakeholders' demographics please see Appendix 8.

	Professors		Advisors		Professionals	
Gender	Female: 1	Male: 2	Female: 1	Male: 1	Female: 2	Male: 5
Age	53-69		46-53		26-53	

### Shortlist of learning arenas

- Food technology lab
- Animal genetics and reproduction lab
- 2 sheep Farms
- Vegetable production greenhouse
- Oregano production field



### 4.3 Extended summary

### 4.3.1 Research results since the previous reporting

### 4.3.1.1 Students', teachers' and other stakeholders' experiences and learning

The ALS processes allowed students greater opportunity to engage with their learning goals. Student participation patterns indicate the need for more time allocation that will lead to competence maturity.

The multi-stakeholder settings were much appreciated by all participants identifying the need for good communication practices. They all reported challenges and positive aspects with an overall positive emphasis on the process and the products of the project.

Comparison of the means of the students' competence in the self-assessment questionnaire indicated positive differences in all competencies identified by the self-assessment rubric. The largest increase was identified in the dialogue competence.

# 4.3.1.2 Outcome of the case development process, including effects of making the essential shifts

The outcomes of the case development process indicate a successful direction toward the shifts indicated by the Nextfood Approach. The Action Learning Set (ALS) methodology that was deployed in this learning cycle was considered the most appropriate methodology for the shifts discussed since it was designed to involve a deep immersion into phenomena and real-life circumstances as well as a multistakeholder environment throughout. The essential shifts affected student performance, competence development and mentality. It also affected professor perception of how important multi-stakeholder learning environments are for reaching learning goals. Finally it provided opportunities for networking and engagement for other stakeholders.

### 4.3.1.3 Supporting and hindering forces for implementing the Nextfood model

The most pertinent hindering forces reported and observed are:

• The lack of Institutional vision and financial resources to support the shift to action-based learning, especially regarding the immersion of students in real-life situations, that requires visits to external stakeholders

• Poor research skills on the part of students

• Limited knowledge and understanding of sustainability issues on the part of all stakeholders

• Limited understanding of competence based teaching and learning on the part of professors

• The dominant hierarchies developed in most cases that placed students in a passive-learner role.



On the other hand, important supporting forces are:

• The positive experience reported by all stakeholders who were engaged in the project

• The emerging pertinent perception on the part of all participants of how important it is to engage in multi-stakeholder communication

• The fact that student involvement improved in most occasions, as the ALS cases developed

• The willingness and motivation reported by all participants to engage in multistakeholder settings in the future



# 4.4 Actions taken and data on the development of the case since the last reporting

### 4.4.1 Actions taken since the previous report

Since the previous report, the AFS and IHU have reconsidered the implementation of the Nextfood approach in a major way. That is, the adjustment of curricula and the inclass presence of the AFS team had been sufficient in the previous 2 cycles so that the collaborating professors gained significant insight into action-based learning. During this implementation cycle, we decided to work with a smaller number of students and to apply action-based more "in-depth", in a standard, multi-actor environment. Thus, we decided to employ the Action Learning Set (ALS) methodology. Action learning is described as a continuous process of learning and reflection that happens with the support of a group or a set of colleagues, working on real issues, with the intention of getting things done" (McGill & Brockbank, 2004: 21). Action learning sets in comparison to traditional instruction is an educational process where people form small groups to work and learn together by tackling real-life issues and through reflection (Walia & Marks-Maran, 2014:2).

The process incorporates collaborative learning where group participants join set meetings with the intention to resolve problems (Smith & O'Neil, 2003) placing emphasis on "learning to learn through a formalized network of shared experiences and personal reflection" (Currie et al, 2012: 267). Action learning sets have been used within a variety of educational settings that reported positive results (Taylor et al., 2002; Richardson et al., 2008; Stewart, 2009; Brook, 2010; Currie et al., 2012).

### 4.4.1.1 Planning

The planning period for the shift to ALS methodology took place during the summer months (June – August). During this time, we found the farmers that were going to collaborate, the students and the research topics they would cover and prepared the implementation protocol and material.

Our planning took into consideration the shifts from theory to phenomenon, in that the settings that the ALSs would take place were on farms/professional environments and that the topics to be discussed would be decided, at large, by the farmers. This ensured that students would get in touch with real-life farming challenges and that they would practice competences related to real-life contact and communication. The shift from lecture room to real-life situations was ensured in the same manner.

### 4.4.1.2 Implementation

In our case ALSs were organized in the following way:

A set of stakeholders was selected for each ALS case. Each set comprised of the facilitator, student(s), advisor, farmer(s)/professional(s) and an observer. There were five such ALS cases that met 5 times in the duration of the learning cycle. As mentioned above, the implementation of ALSs took place between September 2021-February



2022, largely on farmer/professional sites. However, in the cases where the farms were located in areas far from Thessaloniki, we decided that some of the ALSs would take place on-line. During the on-line sessions all participants were present as they were on site. However, the topics of conversation were inevitably more theoretical and lacked the real feel of the professional environment. During these sessions, the topics tended to be more theoretical and academic. Nevertheless, the facilitators took care to include the farmers and divert the conversation to the real-life implications of the session topics.

The students were continually encouraged to use a variety of learning resources and to come into contact with other organisations that served their research questions. For example, students who were on the laboratory experiment on the use of cannabis protein in the production of bread, were encouraged to contact hemp- protein providers, carry out cost analysis, research on the hemp-protein quality parameters, carry out an organoleptic evaluation of the end products and contact companies that use hemp-products. This helped them gain a holistic view of their project outside the borders of the laboratory and academic institution.

One of the major challenges in the implementation was the collection of reflection logs. The activity of reflection per se did not suffer at all since the whole ALS setting is by large a reflection exercise. However, written reflections were only collected from students and professors, while the farmers and advisors were given the opportunity to reflect on the ALS experience during the individual interviews at the end of the ALS set. The data collection tools (Reflection log, Observation log and Interview guide) that were used during data collection can be found in Appendices 5-7. During the learning sets visits one of the researchers took up the role of the facilitator of the process managing time, facilitating questioning, ensuring that all group participants get the opportunity to express their opinions, ask challenging questions and summing up the interactions.

One interesting aspect of implementation was the embedded pilot of testing the Nextfood Framework of Impact. In each ALS case, during the two last sessions, participants were guided into a group discussion on indicators that would suggest that the project was successful. This had some interesting implications since all the participants got into the mind-set of thinking about indicators of impact in their project. We believe that this helped them in aspects of systemic-thinking development and in focusing on learning goals and real-life conditions. It also helped participants realise that every stakeholder may have some different interests in a project but still work on common goals.

### 4.4.1.3 Reflection

Teacher reflections were part of the implementation strategy. Written reflection logs were given at the end of each ALS session to all group participants. There they had the opportunity to reflect on the ALS session and to plan for the next one. The reflection logs were collected some time before the next session. For a detailed presentation of



the reflection log questions see Appendix 6. Another formal reflection opportunity was given at the end of the ALS set they participated in, where they reflected on the activity as a whole and to think of the possible impact it had on their teaching, the students and the farmer(s).

### 4.4.2 Students' responses, learning and competence development

### 4.4.2.1 Methods of data collection and analysis

Four different types of student data were collected from the implementation of the ALS approach in this cycle of activities. Namely, student reflection data, observation data, interview data and self-assessment questionnaire data. Additionally, consent forms including participants' rights and providing written permission for handling and analysing data and for taking photographs were signed during the first learning sets' visit.

All students participated in five ALS sessions. During each session a member of the research team collected observational data using a structured form (see Appendix 5). Structured observations served as a means to collect data on ALS participants' engagement and interactions as well as other pertinent non-verbal behaviours within the sessions. After the end of each session, students were asked to complete a reflection log guiding them to reflect on their experiences, engagement, and the development of core sustainability and other competences and skills gained through their participation in the session (see Appendix 6). Students also completed the "Self-assessment of competences" questionnaire as described in D 2.1 (Action Research Protocol) on the first and last ALS sessions. After the end of the course of ALS activities, individual semi-structured interviews were held with students following a pre-developed topic guide aiming to further explore their participation experiences and the impact of participation in the development of competences and other related skills. All research data was transcribed to facilitate analysis.

### 4.4.2.1.1 First week (day) & last week (day) of the course

### 4.4.2.1.1.1 Student's understanding, contributions, and expectations

As described above, data on students' understanding of the concepts and practices related to sustainability, their contributions to and expectations of the ALS process were collected through the student reflection logs, interviews, and research observation logs.

Data generated from these sources were analysed thematically using the Nextfood coding tree. Analysis was assisted by the ATLAS.ti software, which was used to organise the text, facilitate the activities of searching and retrieving, selecting, organising and comparing segments of data.

The criteria identified by Lincoln and Guba's (1985) were utilized to tackle issues of validity and reliability. The researchers (3) who participated in the learning sets were



involved in it throughout its duration. Therefore, we managed to familiarise ourselves with the field and also develop some sort of more personal contact with the participants and eventually build their trust in us.

During the first learning set it was made clear to the participants that their anonymity would be honoured and that their responses could offer a very valuable input to the research. The criterion of persistent observation was met as the researchers were engaged with the research since its beginning. It has also to be noted that the use of the ATLAS.ti software assisted in identifying the most important themes and patterns and making them central thereby seeking further exploration of them.

The technique of the triangulation has been applied in the research since 3 researchers were involved in the data collection and data analysis. The peer debriefing technique was also applied during the data analysis phase. The role of the devil's advocate was played by fellow researchers and among the 3 researchers who analysed the data separately and then discussed and challenged each other's views on the coding procedures and personal interpretations of the data. Finally, observation logs were kept by the researchers throughout the process of the research. Additionally, notes and memos related to the data analysis have been archived in the ATLAS.ti software.

### 4.4.2.1.1.2 Self-assessment of competences

Students' competence self-assessment was primarily conducted using the "Selfassessment of competences" questionnaire which was completed twice; on the first and last ALS sessions. Students were asked to rank their level of core competences on several items using a scale from 1 (Novice) – 9 (Expert). Table 1 below presents a comparison of the means from the first and the final week of the ALS sessions. Students' questionnaire responses were analysed using a paired t-test assisted by the Statistical Package for the Social Sciences (SPSS). Comparison of the means indicates differences in the competences identified by the self-assessment rubric. The largest increase was identified in the dialogue as a competence, which may be due to students' involvement in the final year project and their participation in the discussions with all learning sets participants.

Table 5: Average scores of self-reported competence development of the Learning Sets' students. The scale used was 1 (Novice) – 9 (Expert). N=7.

	Average	Significance		
Competences	Start	End	Diff	P value <sup>1</sup>



	4,95	6,38	+1,43	<.0001***
Observation				
Participation	5,19	6,57	+1,38	<.0001***
Visioning	5,33	6,80	+1,47	<.0001***
Reflection	6,00	7,28	+1,28	<.0001***
Dialogue	6,39	7,89	+1,50	<.0001***

\*: p-value < .05, \*\*: p-value < .01, \*\*\*: p-value < .001

### 4.4.2.1.2 Students' final reflection document (individual)

After each visit students were asked to keep a visit log/reflection log. Student's reflection log template can be found in Appendix 6.

### 4.4.2.2 Results

### 4.4.2.2.1 How do students experience such a learning process with respect to?

### 4.4.2.2.1.1 learning goals?

The ALS processes allowed students greater opportunity to engage with their learning goals. That is, learning goals were not set entirely by the institution. Instead, they were defined on a session to session basis, in a co-creative process, after multi-stakeholder group conversations. Thus, students were able to break down their learning goals and their project goals in smaller manageable chunks that were easier to reach.

"(...) I mostly remember that I left the session with a pleasant feeling owing to all that had been discussed, mainly with regards to organising materials [for my thesis] and the information that I obtained which I would not have had the chance to get if I hadn't participated in the session." (ALS B, student A)

It was also mentioned often that students were able to achieve their learning goals in a timely manner. That is, ALSs helped them organise their time according to goals and subgoals for the dissertation production as they were set by the professors in collaboration with the students. Even though the time commitment needed for the ALSs was mentioned as a minor challenge, the outcome was regarded as very positive with regards to goal setting and goal achievement.



Comparison of the means of the students' competence in the self-assessment questionnaire indicated positive differences in all competencies identified by the self-assessment rubric. The largest increase was identified in the dialogue competence.

### 4.4.2.2.1.2 View on competences needed for sustainable development?

The cycle activities began with a thorough explanation of the concepts of the Nextfood approach to all stakeholders. The first ALS session was devoted to a discussion on concepts of sustainability, how it is related to their project, the core competences, why they are important to sustainable development and how they will be trained through action-based learning. It was observed that these concepts were quite novel for the students. They seemed to understand them fairly well but their participation patterns (observation logs) may indicate that they need time and exposure in order to assign meaning to them and to go through stages of competences. This was also confirmed by student reflection logs and observations logs of the first sessions. It is important to stress that gaps in sustainability competences discussed by the students are to be attributed mainly to the educational system. In the following quotations the students report that their involvement with the learning sets laid the ground for developing the needed competencies.

"The thing that I found the most useful was becoming familiarised with concepts that I did not know beforehand." (ALS A, Student)

"I think that in the forthcoming sessions, after obtaining more information on the issues discussed and becoming more familiar with the process and other participants, I may be able to contribute more actively to the discussions." (ALS A, student)

"I also feel that gaining more knowledge on the issues discussed through the session can help me to participate more in the discussions. (ALS B, student)

"I expect that my participation will improve in the next sessions as I get to know the other participants and the concepts discussed better." (ALS D, student)

However, it could be said that students have identified the value of multi-stakeholder settings and good communication practises for addressing sustainability issues.

"Certainly, a personal competence that I need to develop is my ability to communicate with people whom I do not know, and my ability to trust others." (ALS B, Student)

"My communication skills need to be developed. But I feel that this will happen once I spend some more time with the group." ALS D, student)



### 4.4.2.2.1.3 Recognition of own competences and competence development?

"As I mentioned in my previous log, conversation and listening skills, and the exchange of views within a group are the main skills that I have been developing through my participation in the sessions." (ALS B, Student B)

Emphasis is still given to knowledge. Skills and competences may be difficult to grasp as tangible and workable dimensions of personal development. This may be because of their abstract nature and the overall emphasis of the educational system and the farmers on comprehensive subject knowledge. For example, here we see a student trying to reflect on their competence development. They do report skills development but they can't name specific skills. Instead they refer to the subject knowledge and interest.

"The session was totally effective for the development of my personal skills as all issues were discussed between people who have a particular interest in and extensive knowledge on these topics, as well as with the farmer themselves." (ALS C, student)

The same student also commented that learning sets' involvement laid the ground for developing the needed competencies for engaging to future effective collaborations with the farmers:

"The knowledge gained through this session could help me to manage and prevent possible pathogen infections on similar plants in the future, as well as in having effective collaborations with producers as a professional". (ALS C, student)

Most students expected that they would improve their participation competences in the sessions once they became more familiar with the concepts and the processes of the ALSs.

The most prominent competence they refer to is communication, teamwork and participation as they were defined by the Nextfood project approach.

"I believe that during the course of the sets I will be able to develop my communication / interaction skills and collaboration competences." (ALS A, Student)

### 4.4.2.2.1.4 Transformation?

By large, students reported that the ALSs helped them gain significant insights into the reality of their profession that could be very useful in their future professional life by embedding the learned competencies and knowledge gained from the reading of the literature into practice.



For example, one student reports clearly that the experience ALSs had transformed their frames of reference and their thoughts about specific issues.

"I saw, listened, and learnt about a particular cultivation in person and by experience, and I was able to engage in a different way of thinking about the issues discussed". (ALS B, student A)

In the same ALS, the other student comments:

"What made a particular impression on me was how the tomato plants had deteriorated within a month, since the last session took place, despite the organic pest management methods used." (ALS B, student B)

This transformed their perception of responsibility involved in supporting a farmer with their cultivation. In this ALS the farmer faced total destruction of their cultivation and this had a detrimental effect on the students' psychology. What they had experienced was the fact that despite one's best efforts a farmer may have to take the difficult decision to abandon their cultivation because it would have been more expensive than profitable to fight an infestation. This showed them the importance of being very accurate in time and methods and of becoming more psychologically resilient in order to deal with possible failures.

Another student reports how the ALS sessions complemented their existing knowledge and how to integrate sustainability issues in their thinking.

"Through this session I received information on the use of specific herbicides, which were known to me through using them in other cultivations, for the protection of oregano plants. Moreover, I learnt about other possible ways of managing the fungal disease affecting the oregano plants which are more sustainable and friendly to the environment." (ALS C, student)

This means that they are expanding their thinking and their frames of reference.

Two of our students mentioned that the most important aspect of their ALS participation was that it made them sure that they cannot commit to continuing with a career in agriculture (ALS B, student interviews). It was possible for them to see this after they got to experience first-hand the realities of the profession. These students felt that the daily challenges, the systemic conditions and market forces that farmers face are extremely complicated and amount to real hardships in the financial conditions of farmers. The fact that they were unsure of their personal interest in the field made them believe that they would be unable to face these challenges and felt quite pessimistic about possible change. However, as they say, they have gained significant skills in communication and an appreciation for multi-stakeholder knowledge sharing which will follow them in whatever career path they follow.



### 4.4.2.2.2 To what extent does the education enhance the students' competences of:

### 4.4.2.2.2.1 Observation?

The ALSs made it possible for students to observe real life circumstances in a way that was unknown to most of them. In the beginning and end self-assessment questionnaires, there was a difference of 1.43 values on the novice-expert scale after the end of ALSs. This signifies a marked change in students' perceived capacity to observe real-life circumstance in the direction of felling more competent.

One student comments after witnessing the destruction of the tomato crops:

"(It struck me) How by making various small mistakes in a cultivation, the whole cultivation can be destroyed [referring to the producer losing all of his tomato plants due to tuta absoluta]". (ALS B, Student A)

And another student talking about the ALS session where they were present in an artificial insemination session within the farm:

"It was very interesting as we put together an artificial vagina and were able to witness the whole [artificial insemination] process step-by-step." (ALSD, student A)

The overall experience regarding observation may be reflected in the following statement:

"What I found really helpful was that we were able to see in person things that we only knew theoretically through our studies.

### 4.4.2.2.2.2 Reflection?

The competence of reflection was worked on extensively throughout the ALSs. As mentioned before, the ALS is largely a group reflection activity and each student was asked to reflect on their experience individually after each session. Our results show that students felt that they developed on this front considerably by the end of the sessions and this was also evident in the quality of their reflections as the sessions progressed. As the ALSs progressed, reflections in logs tended to be more insightful and more specific in their answers.

There was also a marked perceived development in the reflection competence observed in the beginning and end self-assessment questionnaires. That is, students scaled up on the novice- expert scale by 1.28 values.



### 4.4.2.2.2.3 Visionary thinking?

Unfortunately we were not able to identify specific instances of visionary thinking within the student reflection logs in terms of envisioning the future of their field. This may be due to the way that the question was formulated in the logs. That is, the question was referring to the way they could use the knowledge gained in the future. Here, we see an interesting answer from a student who seems to have gained important insights into the mentality of the people they worked with. In this sense, they comment on how they will conduct themselves in the future as a professional:

"I will be more careful in the future with what I say and do in a professional meeting or interview as I realised how difficult it is for professionals in the field to entrust their animals to someone, which is understandable as professionals have invested both financially and emotionally in the building and development of their farms.

### 4.4.2.2.2.4 participation (engagement)?

On the whole, students' contributions to the project product were academic. They honoured their commitments to the stages of development of their research projects and, with a few exceptions, followed through with the requirements set in each session. Regarding the process of the project, they showed willingness and commitment. However, in general their engagement and participation in the conversations stayed relatively low throughout. We observed that the professors took centre stage in the sessions and monopolised the relationship with the farmer. That is mainly attributed to the fact that students predominantly take the role of observer-learner and professors the role of demonstrator-teacher. This didn't seem to change in the ALS setting.

"I believe that each group member had their own role in the session and that as the purpose of these sessions is educational, it is not expected from us to advise the producers but merely to express our views based on our knowledge thus far. Therefore, I am overall pleased with my participation, and I wouldn't make any changes". (ALS B, student A)

This dynamic was observed in the relationship with the farmers as well. They felt as if they were participating in the project in order to help the students learn and not in order to gain from the relationship. For example, in a farmer interview the interviewer asked whether they felt that they gained something important from their participation. The farmer answered:

"No. I do this for the students, it is important. And I have had students with me in the past. They learn a lot in the farm" (ALS B, farmer interview).

In one occasion, a student reflects on this but still feels unable to overcome this challenge:

"Perhaps us, students, could participate a bit more, but I haven't thought of a way in which this could be achieved." (ALS B, Student B)



### 4.4.2.2.2.5 Dialogue?

Dialogue was one of the competences that was worked on intensively during the ALSs.

Participants, by large, engaged in mindful listening and the facilitation process ensured that each participant's views were heard adequately. This resulted in fruitful conversations and, as also seen above, a heightened perception of the importance of communication. Students also comment on being able to appreciate the viewpoints of others:

"I could gain a more holistic perspective on the issues discussed, and view them from multiple perspectives." ALS B, student A)

and

"I saw, listened, and learnt about a particular cultivation in person and by experience, and I was able to engage in a different way of thinking about the issues discussed". (ALS B, student A)

### 4.4.2.2.2.6 Dealing with "the challenge of the whole" (systems thinking)?

The ALS environment and process, involved elaborate discussions on the projects' impact on different levels and systems (e.g. market value, possible opportunities etc.). This helped students escape form the narrow academic perception of their research projects and think of what the projects meant in a wider sense. Students also had ample opportunity to discuss with the professionals and the advisors about factors and forces that effect the farms. Especially in one of the ALS cases, the professionals were highly sensitive to social issues and were very eager to talk about sociological and market forces with the other participants and the students.

Students who participated in the ALSs often comment on how the multi-actor setting helped them gain insights into how the system works. Characteristic examples of this are:

"(...), I learn new things and obtain new information from each session. Apart from the new information, the interaction with other participants, the team spirit, being in the tomato farm and greenhouses and the producer and challenges that they are facing, all contribute towards gaining new knowledge and a more holistic idea of the broader field." (ALS B, student A)

and

"I was able to learn new things by combining knowledge previously gained through my studies with real-life issues and challenges faced by farmers." (ALS B, Student A)

4.4.3 Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education



### 4.4.3.1 Methods of data collection and analysis

Apart from students, the other stakeholders involved in the ALSs consisted of university professors, agricultural professionals (farmers, farm managers, veterinarian, lab technician) and agricultural advisors. All stakeholders were asked to complete reflection logs after the end of each of the five ALS sessions in which they participated and to take part in individual semi-structured interviews after the end of their participation in the project.

### 4.4.3.1.1 Teacher reflection document

As described above, participating university professors completed five reflection logs (one after each ALS session) prompting them to reflect on the process of the session (engagement, interaction, participation), on outputs (knowledge gained, competences developed) and on the potential challenges encountered through their participation experiences.

Data from reflection logs were analysed qualitatively using a thematic analysis approach and the main Nextfood coding tree. Analysis was assisted by the Atlas.ti software. The criteria identified by Lincoln and Guba's (1985) were utilized to tackle issues of validity and reliability.

### 4.4.3.1.2 Course reflection focus group/interviews

Individual interviews with university professors, agricultural professionals and advisors were conducted after the end of ALS activities. Interviews took place either face-to-face or remotely (via Zoom) and were transcribed verbatim, ready for analysis.

Interview data were analysed using the same approach and methods as described above (section 4.3.2.1).

### 4.4.3.2 Results

A Force Field Analysis was also utilised to analyse the available reflection logs data, whenever this was possible. However, the data did not always indicate pros and cons and the results presented below also reflect documentation on researcher observation logs and experience as ALS facilitators. Overall tables including positive and negative elements identified through the Force Field Analysis can be found in Appendix 10.

4.4.3.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

### 4.4.3.2.1.1 From lecture hall to a diversity of learning arenas

### 4.4.3.2.1.1.1 Supporting forces and how to build on them

Our central concern when designing and accommodating the ALS methodology was to encourage group participants to find solutions to real-life farming challenges. The following analysis arose from data coming from different stakeholders namely



teachers, advisors and professionals. The advisors who contributed to the sessions brought the applied/business perspective to the students' project that could be used to the students' future professional development.

During the sessions, apart from exchanging ideas, participants had the opportunity to get accustomed to the working environment. One professor commented on one of the tomato greenhouse ALSs:

"I felt that the meeting which took place as part of the Nextfood programme was successful as it was conducted at the greenhouse in Vasilika and the producer, having an understanding of the participants' backgrounds, discussed about their issues and challenges, mostly those relating to fungi and insect infestations of the crops, and gave us samples to analyse for the identification of pathogens, and also accepted our scientific explanations on the use of both biological and chemical options for controlling tuta absoluta infestations, which constitute a major problem in all tomato production greenhouses". (ALS B, PR)

Professors also commented that farm visits worked to the students' benefit as it provided opportunities to identify problems in the field, discuss them with their professor and the advisor and suggest economically and environmentally sustainable solutions:

"The identification of problems [experienced by producers] will lead to the identification of solutions which will be to the producers' benefit, which is the ultimate goal for good crop production and, therefore, economic sustainability". (ALS B, PR)

"We all agreed that the best course of action would be for the fungi infecting the plants to be identified so that targeted solutions to the specific fungi can be proposed, instead of the producer using broad spectrum fungicides that are much more expensive". (ALS C, PR).

### 4.4.3.2.1.1.2 Hindering forces and how to deal with them

Hindering forces to be considered in the diversification of learning arenas are mostly related to financial resources and available professional networks. In the ALS cases, we had to travel several times and cover considerable costs. This was made possible through the NF project. However, when the project is complete these resources will no longer be available. This can only be dealt with on an institutional level, with allocating resources to such activities. Also, Institutions as well as professors need to develop ties and relationships with suitable professional environments that can act as action-learning grounds for multi-stakeholder activities.

Also, it was mentioned several times by professors and students that the ALSs demanded extra time that was not readily available. All participants concluded that this time was worth giving in the end. On the part of professors they commented that it gave them satisfaction and that they should give this amount of time to all their students



considering the results of the project (e.g ALS A, PR). On the part of students, they comment that investing this time allowed them to organise their projects in a way that saved them time in the end (e.g. ALS A, S)

One interesting hindering force that emerged from a student comment demonstrates how the learning arenas that are chosen have to be representative of a general reality. That is, one of the farms that was exemplary in their use of best practices, state-ofthe-art technology and infrastructures. The student comments:

"What I personally found to be tiresome was (...) that some things were repeated multiple times during the discussion and were not necessarily accurate representations of the reality of other farmers and farms" (ALS D, student)

A table containing Force Field Analysis for the shift from lecture hall to a diversity of learning arenas can be found in Appendix 10.

### 4.4.3.2.1.2 From lecturing to co- and peer learning

### 4.4.3.2.1.2.1 Supporting forces and how to build on them

As the sessions progressed group participants had the opportunity to develop relationships, understand each other's needs, exchange views and ideas and gain a mutual understanding of the topic. Group discussions allowed for clarifications and led to a more holistic understanding of the dissertation topic. One of the participating professionals commented:

"Constructive exchange of ideas and opinions (and examination of new perspectives) allowing for the issues discussed to be clarified and holistically examined". (ALS A, PL)

Positive atmosphere during the learning set sessions generated more engagement among group participants.

### 4.4.3.2.1.2.2 Hindering forces and how to deal with them

Students were more hesitant to voice their opinions during the initial sessions. Their contributions, when they emerged, developed over the following learning sessions.

The professors assumed a more dominant role. They often adopted a "protective" role over the students so that they would not feel "exposed". One professor commented:

"I felt that the role that I assumed during the meeting was more dominant than it should have been. This might have resulted from a sense of feeling obliged to the students (...) for putting them through this "adventure". (ALS A, PR)



This dynamic was observed in most cases. However, it was a dynamic that may have hindered student participation in the process and thus the peer-learning process. The facilitators in many occasions attempted to deal with this by asking students to raise their opinions and in some occasions to put students directly into contact with the farmer. However, these attempts were not always successful, although it needs to be noted that during the final sessions students were more eager to participate in the discussions. A possible explanation for that could be that the students' felt more confident as they became more familiar with their topic.

A table containing Force Field Analysis for the shift from lecturing to peer learning can be found in Appendix 10.

## 4.4.3.2.1.3 From syllabus to supporting literature/a diversity of learning sources *4.4.3.2.1.3.1 Supporting forces and how to build on them*

It was reported in the ALS observation logs that most students were observed to engage in meaningful and constructive conversations that allowed them to exchange ideas they found in the literature. Brainstorming between participants during the discussions inspired students to look for more related bibliography on the topic under investigation after appropriate prompting by the teachers. Students, in most cases, needed considerable support in searching sources and particularly in using research search engines. However, all the teachers were supportive on this front and encouraged their students to further their research. This opportunity was taken up by all students who were willing to leave the security of the textbook and to respond to the demands of their project.

Building on this positive motivation and on the experience of previous learning cycles would mean emphasising more and earlier in the study programs, the importance and value of research skills.

### 4.4.3.2.1.3.2 Hindering forces and how to deal with them

Professors commented that students need to further develop their searching skills to be able to identify related bibliography and use information that is relevant to their thesis topic.

A significant hindering force for this is the language barrier. Most scientific material is in English and many students are not competent enough in second languages (ALS D, PR). This could be overcome if Institutions make English language lessons widely available and obligatory. Also, professors should take extra care to clarify terminology in English that is specific to their subject. Another hindering force related to language was mentioned by a student (ALS C, S) when she mentioned that she had trouble understanding the articles that they were given to read because the language was too complicated and "scientific" for her level. The professor offered extra support for



deciphering the information and helping to decode the useful material. This seemed to work well.

A table containing Force Field Analysis for the shift from syllabus to supporting literature/ a diversity of learning sources can be found in Appendix 10.

### 4.4.3.2.1.4 From textbook to a diversity of teaching aids

### 4.4.3.2.1.4.1 Supporting forces and how to build on them

Using a diversity of teaching aids was an important part of the development of the ALS projects, since they were research projects that would conclude with the production of a thesis. The professors involved as well as the researchers, supported students in searching data bases and in distinguishing between useful and valid scientific material. It should also be noted that one of the professionals (the farm manager) stressed the importance of varied sources of knowledge and of continuing to research throughout one's professional life. (ALS D, PL) This signifies the value given by successful professionals on the diversity of knowledge sources and could be considered as a supportive force for this shift.

### 4.4.3.2.1.4.2 Hindering forces and how to deal with them

Students have reported in the past that it is a source of insecurity to leave the textbooks and venture in a vastly growing research pool. Research articles are often confusing; with difficult language and students feel unconfident about their validity (ALS D, S). They seem to need considerable support in this domain and the amount of this support means time and effort resources for their professors.

Dealing with this shortcoming is in most cases a matter of exposure from early in their academic career. That is, students are only made familiar with research methods and skills in a serious manner when they write their dissertations and this might be too late. If they follow a structured research skill program from earlier on they would be able to produce better assignments, become more confident researchers and bring more knowledge to the learning environment.

### 4.4.3.2.1.5 From written exam to a diversity of assessment methods

### 4.4.3.2.1.5.1 Supporting forces and how to build on them

The learning sets methodology provided the professors with the opportunity to assess their students' work in advance and provide feedback and possible issues for the improvement of their dissertations.

"I feel that I had the chance to share my thoughts and plans for the structure of the students' dissertation, which is something that I usually share with students after they send the first draft of their dissertation and see my comments on it". (ALS A, PR)



While the formal assessment didn't change, since students would be assessed for their dissertation quality, professors had a chance to assess student competences on the field. As seen above, professors also had a chance to support their students throughout the process of producing the dissertation.

This signifies the importance of a well-structured mentoring scheme that will keep students in contact with each other and with professors during their studies. While a mentoring scheme exists in IHU, it is underused by students and professors state that they are allocated a very big number of students so that they would not be able to give proper attention to them even if they came into contact with them (ALS A, PR).

### 4.4.3.2.1.5.2 Hindering forces and how to deal with them

A significant hindering force for alternative assessment methods is a very set tradition on assessment. That is, students are expected to be assessed purely on assignments and exams and give very little attention to attendance and participation. Professors, on the other hand, find this arrangement convenient since they deal with very large numbers of students and alternative methods require a lot of individual attention. Both students and teachers seem to be reluctant to change this even though there is flexibility on the part of the Institution and each professor has considerable freedom on this.

A table containing Force Field Analysis for the shift from written exam to a diversity of assessment methods can be found in Appendix 10.

### 4.4.3.2.1.6 From lecturer to learning facilitator

### 4.4.3.2.1.6.1 Supporting forces and how to build on them

In general, teachers felt that there was good communication among the group participants and that they acted supportively during the sessions. As the ALSs progressed students became more able to express their thoughts.

The professors assisted their students in the learning process allowing them to form their own opinions on what happened in the field and encouraging them to participate in the provision of possible solutions.

"The students found out first-hand that the parameter of final profit is of utmost importance to producing greenhouse tomatoes or any other fruit/vegetable. If market prices are below the profit margin, it is not feasible to have effective plant protection". (ALS B, PR)

### 4.4.3.2.1.6.2 Hindering forces and how to deal with them

Acting as facilitators, teachers through the experience they gained from the ALSs realised that they should allow more time especially at the initial stages of the learning sets to the students to familiarise more with their topics. They commented that this


initial time allocation for familiarisation with the topic could probably lead to enhanced student participation.

"I think that in the future I should invest more time in explaining to my students the broader context of their research projects. Up until now I have mostly focused on the research process itself". (ALS A, PR)

#### 4.4.3.2.2 What such a change requires from teachers, students, and institutions

In action learning students are given the opportunity to be in charge of their own learning. This requires a change in mentality both in teachers and students but also emphasises the need for continuous student training. The teacher is the one responsible to create a learning environment that allows action learning to flourish and then take the role of the facilitator and offer several checkpoints for students to develop their understanding. Students must be given time to practice and develop their skills and receive appropriate and frequent feedback.

As reported above, The ALS methodology turned out to be an effective method since it produced rich reflections, positive participant feedback and marked changes in perceived competences as seen in the self-assessment questionnaires.

Reflection is an important teaching aid, and it is much appreciated as a method of translating experience into learning because students have the opportunity to think about their experience, analyse it, evaluate it and eventually learn from it. However, it needs to be noticed that Greek students and professors need to develop further their reflective skills. Training in the reflection competence needs to be considered and provided initially to the professors and as they become competent reflectors, they can support student's reflection skills development.

On an institutional level, successful employment of the action-learning methodology requires first of all a shared vision and the provision of the necessary infrastructure to support such a vision. Additionally, teacher training in action-based learning techniques and sustainability issues is of paramount importance. Finally, dissemination of the Nextfood results over workshops aiming to motivate other University professors to engage in the action-based learning model is a proposed institutional strategy.

#### 4.4.3.2.3 Teachers' perception of the greatest challenges to achieving such a change

Teachers' greatest perceived challenges, as reported in previous cycles' focus groups and workshops include mostly:

- 1) Institutional barriers
- Loss of institutional farm and limited access to fields and animals
- Limited infrastructures
- Limited funding for resources



- Lack of institutional vision with regards to the shifts
- Professional development depends on factors other than the quality of teaching
- Large number of students that doesn't always allow for individual time and support
- 2) Limitations in time given other professional requirements
- 3) Lack of training

(focus group with academic staff, 2020 & final workshop minutes, 2022)

### 4.5 Concluding remarks on the case development

#### 4.5.1 On the case development since the previous reporting

#### 4.5.1.1 The most useful and inspiring experiences (supporting forces)

By far the most inspiring element of the ALS activities was the participants' perception of them as a supportive setting with a positive atmosphere that promotes good communication. So, the willingness of participants to engage the rich products of this engagement were strong motivating factors for continuing the transition to actionbased and multi-actor learning environments. As seen above, this was documented both by students and professors in their reflection logs and is also evident in the ALS observation logs.

#### 4.5.1.2 Main obstacles/challenges encountered (hindering forces)

Within the challenges that we faced we believe that the most pertinent ones that we would like to work on further are:

The group dynamics regarding the weak participation of students and the dominance of the professors in the ALS process. This dynamic stems from strongly held traditions of hierarchy but need to be challenged for a transition to action-based learning.

Second, is the perception of the farmers and professionals that they do not have any practical gains from their engagement with Universities and research activities. Even if they perceive their engagement as positive, they also indirectly take the role of instructor for students, with no real benefit for their business. The ALS activities were designed with this challenge in mind in that the sets were centred around a challenge posed by the professionals. However, the distinction between academia and real economy are so pertinent in the minds of professionals that they continued to feel that they had no practical gains.

Finally, there was considerable challenge in shifting the mindset of participants from knowledge to competences and to maintaining a mindframe of sustainability in the conversations. As mentioned above, this may be due to poor conceptions of sustainability at large. However, it is understood that a solid and up-to-date knowledge base is of the utmost importance to professionals, professors and students.



#### 4.5.1.3 Lessons learned from the inspiring experiences and from dealing with the challenges

The challenges that we faced point towards the need for more time investment to engage professors in reflection and perhaps even challenging their role as instructors supporting a facilitation mindset. Flexibility and adaptation are key to this and any transition needs to be supported actively throughout the process involving all participating actors. It is also crucial to find and cultivate common motivators that will ensure all participants' engagement.

#### 4.5.1.4 Plans for how to move forward into the next cycle

The Nextfood transition experience has given us valuable insights into the factors that need to be taken into account, on a personal and institutional level, in order to provide effective education supporting sustainable development. It has given us insights into the hierarchy of needs that need to be covered, the attitudes and mindsets that need to be challenged and adapted and the active involvement and networking that need to take place.

We plan to further the Nextfood legacy into the future by capitalising and disseminating the results of past activities and by using the NF experience in future educational projects. This will be done by enriching and adapting the knowledge, skills and competence framework that are considered central to sustainable development.

#### 4.5.2 Reflections towards the end of the Nextfood project

# 4.5.2.1 What has been accomplished to shift from theory to phenomenon (experience) in agrifood- and forestry systems as the starting point for the learning process?

A radical shift from theory to phenomenon requires a radical shift in organization, mindset and teaching methodology on the part of large University Institutions. Turning to inductive learning means that students need a comprehensive sum of first hand, real life experiences that will serve as the basis for theoretical learning during a course. In the case of Greece this was made possible by means of participating in a funded project and only for a relatively small number of students. Specifically, during the course of the Nextfood project, our efforts to make this shift were twofold:

1. Collaborating with an Institution that hosts a great number of students (typically from 80-200 students per module) we needed to see if and how this could be done in the lecture room. We attempted this by enriching teaching methodology with action-based techniques in various modules and by adopting the multi-actor approach in these modules. Students were introduced to different professionals in their field of study, they were given the opportunity to discuss real life issues and opportunities and they were asked to actively participate in the educational activities individually and in groups. The engagement that was required of them was quite intimate and personal and in most cases it was very novel both for the teachers and the students.



2. Implementing the ALSs included a complete shift from theory to phenomenon which could only be done with a small number of students, teachers, advisors and farmers. ALSs accomplished a complete immersion of students in the challenges of their sector and their active engagement in dealing with these challenges. We also accomplished the creation of a working relationship between all the actors involved. This relationship took center-stage throughout the duration of the Learning Sets and the dynamics that evolved formed the learning experience by large.

# 4.5.2.2 What has been accomplished to shift from transmission of knowledge to the development of key competences needed to support sustainable development in agrifood and forestry systems?

Since the beginning of the NextFood project, we have made a great effort to bring competences in the forefront of the courses of IHU. In the Greek educational system at large the development of skills and competences are not part of formal training and traditional knowledge transmission is the primary means of educational activities. The competences entered the vocabulary of our course curriculum design by actively trying to think of action-based activities that would address them directly. In our collaboration with the IHU teachers, we started to work on the core competences and introduced them to the students through the lectures. By the second year, the questionnaires were introduced, where students had to reflect on the development of their perceived level of competences and this helped them to frame their educational experience in these terms. Skills and competences were further introduced in our vocabulary when speaking with the farmers, teachers and advisors during the Learning Sets. This was done in the context of competences needed by students to enter the profession and to meet sustainable development demands, possible competences needed by farmers to meet these demands and competences needed by the teachers in order to deliver action-based learning methodologies.

#### 4.5.2.3 What are the prerequisites for making a successful shift?

A successful shift requires changes to be made by all parts of the system. That is, the Educational Institutions and their teachers, the students and the farmers/professionals.

On the part of institutions there is a need to develop Institutional/Departmental vision that includes action-based Learning and Sustainable Development. For example:

- 1. Strategies to address bureaucratic barriers
- 2. Commitment to the shift to action-based learning and sustainability

Also, institutions need to commit to investing in adequate infrastructures, to allocate resources and to take specific actions that will facilitate action-based learning. For example:

- 1 Re-establishment of institutional farms
- 2 Update technologies and equipment



- 3 Suitable teaching rooms
- 4 Properly equipped lab rooms
- 5 Allocation of adequate time and monetary compensation for professors
- 6 Resolution of personnel shortages
- 7 Ongoing teacher training & Assessment
- 8 Continuous evaluation of curricula and inclusion of more modules on issues of sustainability (e.g. precision technologies)
- 9 Include courses on management/communication
- 10 Enhance communication between departments (e.g. department of technology and department of agriculture)
- 11 Synergies with individual farmers, farmers' associations, agrifood enterprises, national and international research institutes, and with all the providers and members of food supply chains

On their part professors need to:

- Evaluate and update course syllabi
- Emphasise on competence development and soft skills interventions during course implementation
- Enhance personal knowledge on sustainability issues and take steps to include it in courses
- Identify students' needs
- Facilitate learner-cantered learning with an emphasis on collaborative production of knowledge
- Build trusting relationships with students
- Enhance student motivation and engagement
- Seek students' feedback
- Allocate sufficient time for student support
- Improve teaching skills
- Cultivate trust among stakeholders, by creating effective learning loops between scientists, farmers, and students

On the other hand, students need to:

- 1) Increase active participation
- 2) Use of fruitful reflection on learning experiences
- 3) Establish their academic commitment early and envision vocational prospects
- 4) Make proper use of all the available resources
- 5) Step out of their comfort zone by taking risks, asking questions, taking initiatives
- 6) Participate in extra-curriculum activities

And finally, other stakeholders need to:

1) Host students with the aim of familiarizing them with the field and offer them the opportunity for learning in real-life settings



- 2) Be open to new collaborations with academics/advisors for farm issue resolution
- 3) Participate in networks with academics in order to provide an accurate picture of the needs of the current market
- 4) Keep updated on new developments in the field
- 5) Receive training in new technologies
- 6) Receive training in issues relating to sustainable development
- 7) Participate in research projects
- 8) Sponsor research activities
- 4.5.2.4 What is your concrete advice on the shift from simple knowledge transmission to the development of key competences?
  - a) University departments should take steps to disseminate Nextfood results and the work done by professors who use action-based learning methodologies
  - b) Provide teacher training on sustainability competences
  - c) Create opportunities for professional farm visits & arrange for multi-stakeholder learning experiences
  - d) Provide practice and training on the competences (e.g. Why are they important? How can we conduct fruitful reflection? How are competences transferred to different situations? How to participate effectively in a group?)
  - e) Student Assessment should be based more on activities that require student participation (e.g. group presentations/projects, photo novella, real-life problem solving etc.) This could help students to begin to see themselves as active agents of the system

#### 4.5.2.5 What is your main challenge?

The main challenge identified was the motivation of teachers to engage in action-based learning. Teachers are key players in the process since they are the link between students, professionals and professional settings and even if all other pre-requisites are in place, their personal motivation is crucial for a shift to be successful.

## 4.5.2.6 What are the three best ideas from the workshop for how to deal with that main challenge?

During the final workshop we had valuable feedback from our project colleagues in facing this challenge. Three of the most promising ideas in terms of feasibility and sustainability were:

 To create a national and/or international network of action-based professors or to encourage professors to join an existing one. This would provide professors with new ideas, feedback and motivation to continue with good practices and to adopt new ones. It would also create social capital within the professional cycles of teachers.



2. To provide teacher training in order for teachers to feel competent in action-based learning, since competence and motivation are very often inter-dependant. Within the teacher training program there should be an element of showing evidence of the effectivity of the approach.

#### And finally,

3. The degree of action-based learning implementation should be part of the existing teacher assessment procedures. A related idea was that students should be able to take part in teacher assessment when they graduate as well so that they feel less intimidated by the procedure. However, as we have reported before, teacher assessments should be taken into account if this could be effective. If they are taken seriously, this would create an institution-wide statement of the importance of action-based learning and an extra motivation for all teachers to become mobilized in this direction.



### 5 Case 6: Skogforsk

Authors: Lotta Woxblom

Contributors:

Project leader: Tomas Johannesson

Training manager: Malin Juter

Expert in nature conservation: Line Djupström

Researcher: Lotta Woxblom

Service (arranging coffee, lunch and practical arrangements): Michael Öhman and Hagos Lundström

### 5.2 ID card

#### Course title, level, and language

#### Course title

Towards a profitable and sustainable forestry chain – increased quality and number of micro-habitats for enhanced biodiversity

Level

Vocational course for forest owners and forestry officials

Language Swedish

#### Course learning goals

The course is based on an ecological and biological theme. Focus is on how to manage production forests in a way that benefits economy as well as nature conservation.

In this cycle our learners were a group of private forest owners interested in finding strategies and methods to increase quality and number of micro-habitats in their forests. The course was developed within the Nextfood project and the learning goals to a great extent depend on what the participants, i.e., learners as well as teachers, wanted to learn and their contributions to the learning process (Tables 6, 7 and 11).

#### Host institution(s) and course leader(s)

Host institution Skogforsk

#### **Course leaders**

Tomas Johannesson (project leader), Malin Juter (Training manager), Line Djupström (expert in conservation, nature conservation) and Lotta Woxblom (researcher)

The Skogforsk team = steering group for the case



One or two persons from Skogforsk office service were responsible for arranging coffee and lunch and to put up a tent when we did not have access to a building where we could have lunch etc.

#### Timeline of the activities covered in this report

• Pre-planning started in spring 2021

Discuss and decide possible categories of learners, planning of course layout (number of meetings, dates for meetings, suggested themes for the meetings). Contact the forest owner's association to introduce the project, offer the course to members of their association, recruiting of learners.

Implementation

Course-period: September 2021 – January 2022 (1 meeting/month).

• Reflection and planning along the way

#### Learner categories and number per category (demographics)

N.B.

In this report

- Learners = forest owners and forestry officials
- Teachers / facilitators = members of the Skogforsk team (excl. researcher)

#### Forest owners' association - members and officials

Forest owners (members)	8
Forestry officials	2

#### Skogforsk:

Course leader	1
Expert on nature conservation	1
Training manager	1
Researcher	1



Figure 31: Age and gender of forest owners and forest officials





Figure 32: Learners' experiences as active forest owners – number of years.



Figure 33: Learners educational background.

#### Stakeholder categories and type of involvement

At Skogforsk our learners often are the same as our stakeholders i.e., organizations and persons working in the Swedish forest value chain – from plants to logs at industry gate.

Our main learners in the case described are a group of private forest owners, all members of a forest owners association. As mentioned in the section above, also two forestry officials employed by this organization were included in the group.

#### Shortlist of learning arenas

- In-field meetings where all participants met in a forest owned by one of the learners. Each meeting lasted for four hours (incl. lunch), and the program included information and dialogue on certain topics, in most cases combined with training of one or more of the core competences.
- A chat app called Supertext was used as a source for knowledge exchange and contact between meetings. Over 200 posts were made during the course period.
- Phone-calls were used to up-date learners that missed one of the meetings. These calls, made by the project leader lasted between 10 and 30 minutes.



### 5.3 Extended summary

#### 5.3.1 Research results since the previous reporting

Skogforsk is running a case aiming at a higher understanding about strategies and methods to increase quality and number of micro-habitats in production forests. Our case is conducted as a vocational course for private forest owners and forestry officials The course ran over a period of five months with a total of five physical meetings (4-5 hours each). Various forest sites were our main learning arenas, and we had the opportunity to meet at a different site at every meeting; one of Skogforsks' test sites and four private forest properties. This gave opportunity to find different themes adapted to the characteristics of the forests visited and we could focus on various types of questions, show good examples, and discuss different problems. On every meeting we also focused on practicing one or two of the competences.

#### 5.3.1.1 Students', teachers' and other stakeholders' experiences and learning

There are many examples in the reflection documents that confirm that the learners appreciated visiting various properties and hearing different forest owner's thoughts about their forest. The course meetings have created a community, and several learners mention that through dialogue and exchange of experiences with other forest owners they have gained new insights. In several cases, they have also been inspired by other learners and the course leaders and found ideas that they might consider implementing in their own forests. A visit to a forest site where the original plan was overturned by a storm addressed that it is important to be aware of various risks, e.g., pests and weather conditions and to create a plan to try to diminish risks or to deal with problems when they occur. The learners also achieved concrete examples of how the competences could be combined with other tools, e.g., how visionary thinking and various decision support tools could help the forest owner to formulate goals and to identify actions needed to reach their goals.

During the last meeting a couple of the learners commented on the process they had been a part of; this activity did not feel like "following a course", referring to the design of a traditional course where you expect to listen to teachers. A few of the learners also pointed out that learning is a process and that it takes time to digest all new impressions and to understand that they really learned something and what they learned.

Teachers' expectations and learning goals at the beginning of the course included to learn more about how private forest owners think and what their goals for their forest properties are, as well as how they as teachers or experts, could create good conditions for dialogue and to motivate the learners to think about nature conservation in their forest management. According to both teachers and learners' reflection documents these goals were fulfilled during this course period.



Learners' reflections on the core competences reveal that for many of them these are seen as concrete tools that are useful in various situations. For many of them some or all competences are used in their everyday life – at work or in private situations and some mentioned that they have become more aware of this during this course. The layout of this course also made the learners open their thoughts and become more aware of how they communicate.

The learners often refer to more than one competence in the same context, i.e., the competences are combined to give many perspectives at the same time – a picture of the whole. Several answers also revealed that many of the learners had received another view of the competences than most of them were used to.

Teachers' self-assessments at beginning and end of the course period show that there is a significant progress (on average) in their competence's observation, visioning and dialogue.

After each course meeting, all participants (learners and teachers) filled out a questionnaire to evaluate and indicate their satisfaction with the meeting by assigning a score from 1 to 10. All meetings received grades on the upper part of the scale, teachers score on the average a little higher that the learners. All participants were also asked to mark words or expressions that they thought best described the day in a tick list. Most chosen words for learners as well as teachers were "interesting" and "great conversations".

# 5.3.1.2 Outcome of the case development process, including effects of making the essential shifts

We have adapted the course to our learners – content as well as level of take-home assignments. Focus has been on creating an including climate where everyone wants to participate and feel that they both learn and contribute to other people's learning.

During this course cycle, we have used different learning arenas, in-field meetings, the Supertext app as a source for knowledge exchange and contact between meetings and finally phone-calls to up-date learners that missed one of the meetings.

The forest owners participating in the project have offered their forests as meeting spots. This type of learning arena has several benefits - the landowners we visited have been forced to engage before the visit and we have visited environments that everyone feels comfortable in and can relate to when it comes to their own challenges as landowners. From the reflection documents of the learners, we could see that everyone appreciated to be able to visit each other's forests and listen to each other's views on their forests.



The Supertext app was used for sharing documents, asking questions, posting pictures from everyday situations or observations linked to the theme of previous casemeetings. This helped fostering a (short) dialogue and further knowledge transfer. Observations illustrated by photos, acted as proof of an increased understanding and knowledge of the subject. The app helped learners, and us in the Skogforsk team to be reminded of the case – to keep the dialogue between meetings.

To help to keep up motivation and include everyone in the process even if she/he had missed a meeting, the project leader phoned to update the person on what was discussed at the last meeting and to collect thoughts about the course and on the problems discussed.

The Nextfood model is expected to give an added value to the learning process for the learners as well as for the Skogforsk team. Important factors to succeed in creating an atmosphere that co- and peer-learning will be natural, is a welcoming attitude without prestige or ranking. All participants, learners as well as teachers need to be curios and have a desire to learn and to exchange experiences. It is also very important to be able to build trust in the group. Everyone in the present Skogforsk-team have an open mind – are curious and want to learn from the forest owners and officials and have a desire to contribute with own experiences and expert knowledge. By showing our learners that we are interested in their thoughts and questions, we succeeded in creating a good and inviting atmosphere, where everyone felt they could contribute. The fact that the group included people at a wide age span, gender-mix and with different educational and professional background and varying experience in forestry, contributed to peer learning.

In our team we could benefit on that most of the experts and researchers at Skogforsk are used to act as facilitators in different situations. It was also positive that the team consisted of individuals with different knowledge, competences, and experiences. In addition to the expert of nature conservation, one of the facilitators have practical experience from working as a machine operator and another have a background as teacher. This gives credibility to the team. Important factors to succeed as a facilitator is, as mentioned before, to be able to build trust within the group and to make sure that everyone is heard, to highlight those who are a little quiet and to support them by including them in dialogues and activities. By using a language that learners understand and can relate to - creating understandable metaphors for the competences regularly by listening and asking questions about the forest and try not to be so explicit when introducing or training the competences have turned out to be a good way.



#### 5.3.1.3 Supporting and hindering forces for implementing the Nextfood model<sup>8</sup>

Among the challenges or hindering forces are the fact that traditional learning for most people is the norm. This requires that the teachers can explain the value of the current model and to motivate the learners to participate in the learning process themselves.

To be able to have an open climate a group consisting of people coming in with different roles could be a hindering force that hamper the dialogue. This was true for our case where the topic of the course currently is the subject of a rather polarized debate in the media and politics. Including private forest owners with a special interest in biodiversity and conservation together with forestry advisors whose main role is to buy wood for the industry is something we need to think about how to handle in the future.

Using different digital tools, in our case e-mail and apps require that all learners have access to a computer or mobile phone and a stable internet connection. Even if a majority in Sweden own a computer and/or a mobile phone, not everyone is willing to download a certain app or use the computer. In some cases, the facilitators need to be prepared to give support to single learners. Another challenge when using digital tools is how to make sure that everyone is participating in what's happening on the app. Not everyone is comfortable with using an app to communicate.

Even if written exams are not applicable to the Skogforsk case, being part of the Nextfood project has requested that we collected different kind of data, e.g., student reflections and self-assessment documents. Our experience from previous cycles (with machine operators as learners) is that it was very difficult to make the learners complete course evaluations and self-assessment forms and submit them to us. In this case cycle we have tried to minimize the number of take-home assignments and included some written exercises in the meetings.

An important challenge when facilitating a course meeting is to see every individual in the group and to make sure that everyone is heard. During the process the teachers have become better at including all learners and to make sure that everyone is involved – to pose questions and actively give the word to individuals that have been quiet on previous meetings.

It has also been a challenge explaining the approach and the added value of being aware of how and when the learners use the core competences. In this case we didn't have much time together with our learners. Even if the course ran over a period of five months, we only met once every month. This placed high demands on the facilitators to be able to introduce and explain the value of the concept and the importance of the competences in an understandable way already from the beginning.

<sup>&</sup>lt;sup>8</sup> Supporting and hindering forces for implementing the Nextfood model are summarized in table 7.



It has been a challenge to motivate the learners to train the competences. All were mainly interested in getting new knowledge and to exchange experience on forest management and nature conservation with experts and other forest owners.

Making good preparations for this kind of activities and keeping learners motivated require much more time and energy, compared with most traditional learning situations (i.e., making a traditional schedule, booking a lecture hall and inviting lecturers etc.). This is something we need to bear in mind when planning future courses with this approach.



# 5.4 Actions taken and data on the development of the case since the last reporting

#### 5.4.1 Actions taken since the previous report

We have implemented most of the learnings from the previous cycle (that could not be finished because of the Covid19-situation during 2020).

Basic requirements when planning the new cycle were:

- we should be able to meet.
- our learners should join the course because they were interested to participate.
- everyone should sign a contract where they commit to follow the course from start to end and to fulfill the assignments given.
- important to set the dates for all meetings right from the start.
- be flexible have a plan B that could be activated within short notice.
- build trust include time for small talk, so that the participants have a chance to get to know each other.
- well organized good driving directions, include warm lunch and coffee and somewhere to sit (preferably indoors or under a tent).
- keep it simple.

Content of each meeting was based on pre-defined learning goals from the learners and the available learning arenas. One or two competences were in focus on each meeting and exercises to train these were planned.

We also had prepared digital documents (using Microsoft forms) to make data collection as efficient as possible, for the learners as well as for the researcher. Time required for homework was minimized and written reflections were made at the end of every meeting. To inspire learners as well as teachers to practice structured reflections outside course-meetings everyone got a small notebook.

At the first meeting the Nextfood-model and the core competences were introduced. It was pointed out that all competences could contribute to the learning process during this course as well as in their everyday lives.

Our intention when planning the course was to "keep it simple", i.e., to make the learners become aware of the competences and to connect these to real life contexts and situations.



#### 5.4.1.1 Planning

This course was facilitated by a team of four persons, together forming the steering group of the Nextfood case at Skogforsk. Three facilitators were responsible for facilitating the students' learning process, while one person mainly was responsible for the research activities connected to WP2 in the Nextfood-project.

The overarching plan for this cycle was made in spring 2021. Dates for all coursemeetings were set and a host company for the case-study was contacted. This time we decided to invite a group of private forest owners and forestry officials employed a forest owners association as our learners.

First the production manager at the forest owner's association was introduced to the Nextfood-case and then the person responsible for member contacts distributed an invitation to participate in the project to a group of forest owners within a suitable geographic area. We had decided that a group of about 10 forest owners and some officials would be a good size. The persons that had signed up for the course were then contacted by the training manager and we all met for the first meeting in September 2021.

Ahead of each course meeting, members of the steering group met to plan the meeting in detail; agenda and program content based on what learners had written in the questionnaire "learning / my contribution" as well as practical arrangements. Even if we did not have structured reflection sessions between the meetings, we considered our own experiences from previous meetings and course evaluations from all participants when planning upcoming meetings.

In four of the five meetings, the program was based on information from the forest owner we were going to visit. As a basis for planning, the forest owner sent maps and a forest management plan and suggested interesting sites and questions to discuss at the meeting. Then the project leader and expert from Skogforsk decided on spots to visit and together with the training manager made an agenda for the meeting.

The last meeting was originally planned to be at the Skogforsk office in Uppsala. Our plan was to wrap up the course-period and we had also invited a couple of colleagues to give short presentations on topics that had come up during previous meetings. Because of the covid19 situation we had to make changes, and also the last meeting also was an outdoor activity.

#### 5.4.1.2 Implementation

Each meeting had a predetermined theme, depending on the characteristics of the forest site we were going to visit. On every meeting we also focused on practicing one or two of the competences.



On the first meeting the Nextfood-model and the competences were introduced to the participants. Topics and focus competence(s) of each of the meetings are shown in Figure 34.



Figure 34: Timeline - the Skogforsk case (meeting program in appendix 11).

Each meeting started with a cup of coffee, a sandwich and time to for small talk. The project leader then introduced the program before we walked together to several sites with interesting topics to look at and talk about. At lunchtime we went back to the place where we started, and lunch was served. After lunch we either went to look at a few more sites of interest or stayed inside to continue our dialogue about what we had observed during the session before lunch. Before wrapping up each meeting all participants sat down for 15 minutes and individually answered a few reflection questions on a prepared document. These documents were collected by the researcher before final coffee was served.

To keep the dialogue going between meetings we used a chat-app. This tool helped learners, and the Skogforsk team to be reminded of the case and to pose questions and share knowledge. Learners who had missed one of the meetings, were called by the project manager on the phone. This way everyone was included in the process even if she/he had missed a meeting and it helped keep their motivation.

#### 5.4.1.3 Reflection

As mentioned in section 3.1.2, a 15-minute reflection session for both learners and facilitators were included in every meeting. The reflection documents were prepared in advance, handed out and collected by the researcher at the end of the meeting. In addition, a final reflection document was given as a take-home assignment after the last meeting. Reflective questions were not the same for the two groups of respondents i.e., learners and teachers.



Even though we did not have any structured reflection sessions within the Skogforsk team during the course period, we included reflections and learnings from previous meetings when planning the upcoming meeting. This way we could make use of our experiences to develop coming activities.

We have not yet been able to arrange a final reflection session over the process within the Skogforsk team.

#### 5.4.2 Students' responses, learning and competence development

#### 5.4.2.1 Methods of data collection and analysis

N.B.

Data was collected from all participants, i.e., forest owners, forestry officials and members of the Skogforsk team (researcher excluded).

Coding and data-analysis was made by the researcher of the Skogforsk-team.

All data has been anonymised and each learner has been assigned a number (1-10). These are used in the result to label quotes from different respondents.

Content analysis (according to Nextfood-document *Instructions for data analysis - Text*) was used to code (on basis of the pre-defined coding tree), analyse, and interpret common patterns from the qualitative data collected:

- Learning goals and own contributions (initial) digital questionnaire (appendix 12).
- Reflection documents (individual) written (appendices 15-18).
- Phone calls between meetings project leader called and took notes.
- Supertext app posts were documented by researcher.

Data expressed as numbers was analysed using 2-paired t-test (according to Nextfood-document *Instructions for data analysis – Numerical*):

Self-assessment – at start and end of course - digital questionnaire (appendix 13).





Figure 35: Timeline and various types of data collected in the Skogforsk case.

After each meeting all participants fulfilled an evaluation of the course meeting.

• Evaluation of course – digital questionnaire (appendix 14).

This evaluation-questionnaire included qualitative as well as numerical data, presented as descriptive results (diagrams, and word clouds).

#### 5.4.2.1.1 First week (day) & last week (day) of the course

At the beginning of the course, all participants, learners, and teachers, were given two take-home assignments – digital questionnaires:

- Learning goals and contributions
- Self-assessment of competences

#### 5.4.2.1.1.1 Student's learning goals and contributions

Two questions were included:

1. What do I want to learn? (e.g., I have been thinking about this..., what effect does it give if I..., could it be done like this...)

2. What can I teach to the other participants? (e.g. this I know a bit about..., this usually makes it easier..., I did like this and it turned out well...)

These questions were followed up in some of the reflection documents during the course meetings and in the final reflection document.



#### 5.4.2.1.1.2 Self-assessment of competences

The template from the Action Research Protocol was adapted to fit the subject of our course and our learners.

Self-assessment was conducted at the beginning of the course as well as part of the final data collection after the last meeting.

#### 5.4.2.1.2 Student's evaluation of each course meeting

After each meeting all participants received an e-mail with a link to a digital evaluation questionnaire. In the questionnaire respondents were asked to indicate their satisfaction with the meeting by assigning a score from 1 to 10. They were also asked to choose words and expressions from a tick-list that they thought described the day and to give own comments.

The questionnaire also included a few questions about project goal, goal of case study and the learners understanding of the core competences. Response options for these questions were YES, NO or DOUBTFUL.

#### 5.4.2.1.3 Students' reflection documents at meetings (individual)

Reflection was trained at every meeting. Before the final coffee break, everyone got 15 minutes for individual reflection on a few questions on certain themes that varied between meetings:

- Learnings from the meeting.
- Visionary thinking and the use of this competence.
- Inspiring and interesting learnings from the meeting.
- Core competences understanding and how they are used.
- Core competences as tools for learning.

Questions were answered in a prepared document handed out and collected by the researcher.

To follow up and examine the learners' thoughts and understanding about the different competencies, the reflective questions on the fourth course meeting (appendix 15) focused on the core competences. The respondents were asked to reflect on the competences and to describe the meaning of the competences to them and to think about a context when they had used the competences and to reflect about if there was an added value in using the competence in that situation.

To encourage a structured reflection also outside course-meetings, everyone got a small notebook at the first meeting. This notebook was supposed to be a reminder and an inspiration to write down their thoughts. Using the book was voluntary and they were not expected to report how the book was used or what they wrote.



#### 5.4.2.1.4 Students' final reflection document (individual)

The final reflection document was conducted as a take-home assignment to be responded within one week.

The themes of the questions were:

- Learning how did you learn, was the knowledge absorbed in a different way compared to if we had offered traditional teaching instead.
- Core competences as learning tools.
- Learnings during the course period.
- New questions that appeared during the course.
- Reflections did you practice?

#### 5.4.2.1.5 Phone-calls between meetings

Some of the participants missed one of the meetings. To update on what happened during the last meeting, the project manager contacted these persons on the phone. The purpose of these calls was to keep in contact, to update the person on what was discussed at the last meeting and to collect thoughts about the course and in each case on the problems discussed. This helped to keep up motivation and to include everyone in the process even if she/he had missed a meeting. The phone-calls were documented in short notes which were sent to the researcher.

#### 5.4.2.2 Results

#### 5.4.2.2.1 How do students experience such a learning process with respect to:

#### 5.4.2.2.1.1 learning goals?

In the final reflection document the learners were asked to tell why they had signed up for this course. The overarching reason was a wish to learn more about forestry and nature conservation. Half of the learners mentioned that they are new as forest owners. Some of the respondents also pointed out that they are interested in learning about alternative methods to manage their forests.

A majority of the respondents also wrote that they were attracted by the opportunity to exchange thoughts and discuss with other forest owners. Some of these also pointed out that the combination of experts/researchers and other forest owners was appealing.

The fact that it was organized by Skogforsk made me extra interested, I thought that researchers stand a little alongside the political debate about the forest and can provide more fact-based knowledge. (Respondent 6)

As mentioned in section 3.2.1, all participants were asked to fill out a form where they should specify what they wanted to learn and what their contribution to the learning activities could be. During the reflection session at three of the meetings the learners were asked to write down what they learned during the day and which of these findings was most inspiring. The learning goals and contribution to learning were followed up



in the final reflection document. The learning goals and the outcome of the course are summarized in tables 6 and 7, respectively.

Analysis of these documents reveals that we have been able to catch most of the learning goals of the participating forest owners and forestry officials.

There are many examples in the reflection documents that confirm that the learners appreciated visiting different properties and hearing that particular forest owner's thoughts about her or his forest – thoughts about management, alternatives for different stands and what problems he or he encountered.

The course meetings have created a community and several mentioned that through dialogue and exchange of experiences with other forest owners they have gained new insights. A few of the learners also mentioned that they became aware of that they actually have a veto in their own forest and claim to have gained more self-confidence, which will help them in their dialogue with e.g., forestry officials.

I will bring with me that I can become better at making demands when ordering harvesting assignments. (Respondent 2)

In several cases, learners have also been inspired by other learners and the expert and found ideas that they might consider implementing in their own forests. A few easy measures could make a difference without consuming very much, time or costs, e.g., that removing spruce to favour broadleaved trees alongside forest roads helps the road dry out and creates a better diversity, i.e., gives benefits for economy as well as nature conservation.

Inspiring to see how bright it is in the deciduous forests and that they are created – I will search for places in my own forest that could get brighter.

(Respondent 6)

I learnt that it is possible to create environmental benefits by managing very small surfaces. (Respondent 2)

A visit to a forest site where the original plan was overturned by a storm was another interesting example that shows that even if it not always turns out as planned, it is still possible to take actions that in the end will give a positive result. One of the learners reflected on the need to have respect for what problems can affect a forest owner, i.e., pests, weather, and wind, etc. and that it is important to be aware of these risks to be able to create a plan to, if possible, diminish the risks or to handle them when they occur.

Also, information about and demonstration of some available decision support tools was appreciated. Together with visioning about the forest these tools could help the forest owner to formulate goals and to identify actions needed to reach their goals.



It was useful for all participants to listen to the reflections from the forest owners about the joy of owning land and their thoughts on how they want to use their forests. The dialogue between forest owners and between forest owners and forestry officials also gave a better understanding of difficulties experienced by forest owners (the decisionmaking process, the perceived demand and stress that comes with the ownership).



What would I like to learn?	What did I learn during the course?
Consideration and nature conservation	The importance of deciduous trees for
Natural value - what is included?	· inland waters
Balance aesthetic / human / practical with what nature itself "feels best" about.	· biodiversity
Which tree species promote biodiversity?	· variation and light
Save right - do, right?	· forest roads
Decision support	· edge zones
What tools are available for planning?	The station with NO and NS was an eye opener
Increased diversity and production	About regeneration in established forest
Yield for various tree species.	How to think about soil preparation etc.
Various nature conservation methods linked to economic values.	I have a "veto right" as a forest owner - the forestry plan can be revised (have a dialogue with an advisor)
Soil preparation or not?	How much do I "have to" do in my forest?
Continuity forest vs clear-cutting	What the economic model looks like for delivery timber.
Remove bark beetle trees - what happens to the remaining forest?	Information about biotopes available on the Swedish Forest Agency's website.
Which mixture of tree species should be sought?	There is no right or wrong in how the forest can be used.
Felling of larger areas - what to think about?	Awareness of risks and thus more inclined to assess risks in own forest.
Restoration of wetlands in connection with harvesting.	There are so many different values (á la carte) in a forest - not only forest production generates economic value.
Natural regeneration in gaps - when and how?	It is OK to have different views on the forest estate - how active do I want to be, different goals, how to reach the goals etc.
Costs for alternative methods?	To clarify, find and formulate my own vision of my forest ownership.
Forest owner competence	It is good to have an experienced mentor.
How do I become a better customer of forestry services?	We have different goals in life and the goals can change over time.
Forestry - recreation	Everything is not as black and white as I thought before.
How to educate public to understand why we do as we do in the forest - how to communicate?	
Silviculture to preserve berries and mushroom forest - how?	
New perspectives and experiences	
Practical tips, perspectives and experiences from research and several different landowners.	

Table 6: Learners' expectations at the beginning of the course and their reflections at the end of the course

Theoretical and practical knowledge.



Table 7: Learners' thoughts on their own	contribution to the learning proces	s at the beginning of the course
0	01	0 0

What could my contribution be?	What was my contribution?	
My experience on:	Observations and reflections today and in the past.	
Forest owners' thoughts and expectations.	Market valuation of land and forestry properties.	
How to handle authorities	Information about continuity forestry.	
Lessons learned when I tried different ideas and methods.	Experiences that can help others.	
Contact with those who carry out the work - ask, twist, and turn.	Supporting ideas about biodiversity.	
Asking for help from others when you are unsure.	Hopefulness!	
My knowledge	Encourage to say yes to one's own visions even if they deviate from norms.	
Communicate interesting findings from an ongoing		
course.	To help lift the gaze from something that is probably mostly instrumental goals and consider whether it also leads to more intricate goals or whether it might rather lead one away from them.	
Valuation issues - the forest's share in the market value, generational change, and land surveying.		
New perspectives		
I can pose questions that helps seeing things from new angles		

It is also interesting to mention that during the last meeting a couple of the respondents commented on the process they had been a part of; "*this activity did not feel like following a course*", referring to the design of a traditional course where you expect to listen to teachers telling you a lot of facts and then you go home and read a textbook.

Probably five traditional lessons would have contained more facts, more examples, and more background, but the examples in these visits have given me a basic map to start from. It has aroused curiosity and new questions that I must seek the answer to myself.

(Respondent 6)

A few of the learners pointed out that learning is a process and that it takes time to digest all new impressions and to understand that they really learned something and what they actually did learn.

Learning is a process, I can't point to anything in particular, but the participants' different approaches and goals with their properties are always interesting.

(Respondent 1)

I think I need more time in and around my forest to understand what I have learned. The most exciting thing is that it was not in my mind during the meetings that we were attending a course to learn.

(Respondent 3)

The same respondent also expressed that it can be difficult to see how they have contributed to other people's learning.

I have a hard time understanding what my contribution was!

(Respondent 3)



#### 5.4.2.2.1.2 view on competences needed for learning?

From the reflection documents we see that the core competences could be seen as concrete tools that are useful in different situations. The respondents also meant that the competences are related and often complement each other.

I like these core competences; they are concrete tools and concepts - they can be directly linked to the concrete.

(Respondent 1)

The competences belong together. I see observation as a prerequisite for both dialogue and reflection, and for me reflection is an element in a constructive dialogue. And a vision that is not rooted in observations and reflection sounds like empty chatter in my ears.

(Respondent 6)

For many of the learners some or all competences are used in their everyday life – at work or in private situations and some mentioned that they have become more aware of this during the course.

In my everyday life, observation, reflection, and vision are most important when I work alone. In the group, the dialogue has been very rewarding as everyone has had interesting posts. I can use all this knowledge also in my work, which I became more aware of during the course. I think the competences are useful to me because a prerequisite for development is that you sometimes stop and see the current situation to make an active change. If you do as you have always done, you also get the result you have always got. It may be ok if that result is what you want.

(Respondent 2)

The layout of this course also made the learners open their thoughts and become more aware of how they communicate.

I think that the competences have contributed to opening the group's thoughts and creating a framework. I think that this group is very good at it and that it is natural. For me using the competences is a natural part of my regular work, but of course everyone's efforts and commitment have affected me.

(Respondent 9)

## 5.4.2.2.1.3 recognition of own competences and competence development? **Self-assessment of competences**

At the beginning and at the end of the course all participants conducted a selfassessment questionnaire. Average scores of the self-assessments are shown in table 8.

Table 8: Average scores of self-reported competence development among participants during a course cycle in the Skogforsk-case. The scale used was 1 (Novice) to 9 (Expert) N=10.

	Average scores			Significance	
Competences	Start	End	Diff	P-value	
Observation	4,4	5	0,58	<0,05*	
Visioning	4,27	4,5	0,23	NS	
Reflection	5,12	5,5	0,38	NS	
Dialogue	5,02	5,5	0,27	NS	



It was difficult to draw any strict conclusions about the development of the learners in this group from the self-assessments. For many of the respondents the rankings sometimes increased (but in most cases not enough to fit into the criteria of another level of competence), and for some their ranking indicated a lower value than from the beginning. One reason for this could be that the interpretations of the different levels vary among the respondents and even for the same person when fulfilling the assessment, a second time. Perhaps the results had been more reliable if we had included a session about these levels at the first course meeting. Another contributing explanation to the non-significant results on group level could be that this is a small and very heterogeneous group with respect to age, educational background, and experience i.e., factors all expected to have some influence on skills in this kind of competences.

However, it is possible to get an understanding of the development of the competences when combining the assessments with information from the reflection documents and observations during the meetings.

A few conclusions from the self-assessments are presented here and findings from reflection documents are presented in section 3.2.2.2.

#### **Observation**

At the end of the course, on average, the students ranked their competence of observation higher than at the beginning of the course. The largest increase was reached when it comes to the questions about the ability to carefully observe a situation in the field from an ecological perspective closely followed by the ability to observe from a logging perspective. This is in line with the focus of the course where the main topics were nature conservation and forest management. Most of the learners already from the beginning assessed that they were competent performers when it comes to creating a comprehensive overview of a complex situation and have stayed at that level. Two of the learners have increased their ability going from novice and advanced beginner to competent performer. A few of the learners seem to have overestimated their abilities to allow for examination of the whole situation before drawing conclusions and reported a small decrease in their average score for observations during the course.

#### **Reflection**

According to the self-assessment there is no significant increase in the learner's ability to reflect. Even if the awareness of reflection as a core competence has increased for most of them, they do not assess that their ability to reflect has increased during these months. Most of them ranked themselves as advanced beginners or competent performers already from the start.

#### Visionary thinking

The questions used to assess the competence of visionary thinking are:



- Have basic knowledge of factors that stimulate and block creativity in individuals and groups.
- Understand the process that enhance a group's ability to identify today's critical challenges and envision a desired future state.
- Ability to inspire change by helping a group develop and align around a shared vision.

These questions could be perceived as having a theoretical, instead of a practical view. The respondents are asked to assess their knowledge of the theory behind visionary thinking instead of measuring the individual's ability to create one's own visions. This could be one reason for the somewhat confusing assessment of levels of this competence. These questions are relevant for students who will prepare for a professional life, but perhaps not for the categories of learners in the current Skogforsk-case.

#### Dialogue

No conclusions could be drawn from the self-assessment of this competence. In the reflection document a few of the learners mention that they have become aware of that there is a difference between dialogue and discussion and most of them recognize dialogue as an important competence.

#### 5.4.2.2.1.4 transformation?

When analysing the reflection documents – from each meeting and the final document – it is obvious that some of the respondents focused on what they learned in terms of forestry and nature conservation. While others also mentioned their own development in the core competences. The variation doesn't necessarily mean that some has not developed their core competences. This could be seen from quotations given in the section about students views of competences needed for learning.

Some of the reflections upon the question "What will you bring with you from this course?" could be used to illustrate participants development and/or transformation.

When signing up for this course I had a hope in the older way of teaching - that someone would tell me to "do this way". In the beginning it was a disappointment and I wondered if this was worth "wasting" time. As time went on, it gave me hope, joy and a greater belief in myself and what I stand for in the issue of forestry!

(Respondent 3).

I have learnt how to clarify, find, and formulate my own vision of my forest ownership.

(Respondent 5)

I may not have learned as much about forest management and environmental considerations as I thought I would, but I have learned a lot about "forest people" (forest owners, the forest owner's organisation, Skogforsk and the forest industry in general).

(Respondent 7)

#### A few of the learners also commented on the model:

For me, learning is a process that takes place gradually regardless of method. I have a hard time specifying in what way my learning is different due to method.

(Respondent 10) 245



I recognize the thought in the model, maybe I am blind to the effect, but I always think like this - observe, reflect, and exchange thoughts with others.

(Respondent 6)

Some of the respondents' mentioned visioning as a competence they will continue developing.

I will formulate a vision for some part of the forest, there are several forests on our farm so I can start with "everything within sight".

(Respondent 6)

There is an increased curiosity among the learners, and many mentioned that they also feel more self-confident as forest owner in contact with, for example, timber buyers and other actors.

Some of the forest owners from this group will probably keep in contact and have a dialogue around different issues and any of the forest owners are open for taking advise from each other.

When the course has been going on for a while and you have created relationships with the group, it becomes more fun, and I think everyone contributes more to the conversations.

(Respondent 2)

In the final reflection document the last question was on the competence reflection – if they had used the notebook (a tool to help them practice structured reflection) that they got on the first meeting. It was interesting to see that some had used the book to write in and for some the book worked as a reminder to reflect (even if they didn't write in the book).

I use the notebook mostly for different events but also more structured and I practice more on that. (Respondent 3)

Strangely enough the notebook has influenced me. The book speeds up my thoughts, it lies on the desk as a physical reminder of what I have been through in the course. The feeling of having gained contact with new knowledge is fascinating, the first thought is that I have not understood it before, "where does it lead?". Right now, the book is a driving force, it makes me think about what decisions I have to make for the farm. It is placed behind the computer, and I see it daily but feel no need to write anything in it.

(Respondent 6)

Some respondents already have a special book or another tool that could be used for reflection while others are used to reflecting in their mind.

I will start using the technology but will do so in OneNote which I love to use.

(Respondent 2)

I already have another notebook where I can write down thoughts at the end of the working day to reflect a little, but it is on a more personal level and not linked to learning.

(Respondent 9)

The only thing I think has influenced me has been the reflection, it has probably made me able to think about things that were said at the meetings and adjust my opinion in comparison with if I did not reflect.



(Respondent 4)

My vision of leaving a forest with straight trunks with high timber quality has, after the dialogue with the group, made me now reflect more on environmental benefits and I can now see a crooked half-rotten tree as valuable.

(Respondent 8)

5.4.2.2.2 To what extent does the education enhance the students' competences of: I have become more aware of the core competences and how I can use these in my everyday life as well. (Respondent 2)

From the reflection documents it can be concluded that this citation is true for most of the learners.

All competences were introduced at the first meeting and at each meeting we focused on one or two competences that were included in exercises when we focused on the topic of that particular meeting.



Figure 36: One of the facilitators introduces the core competences to the group of learners at the first meeting. (Photo: Lotta Woxblom)

To follow up and examine the learners' thoughts and understanding about the core competences, respondents were asked to reflect on the competences and to describe the meaning of the competences to them (table 9).

Table 9: Summary of how the	learners formulated their	understanding of the different core
-----------------------------	---------------------------	-------------------------------------

OBSERVATION	REFLECTION	VISIONARY THINKING	DIALOGUE
to have an open mind	to draw own conclusions from what has been observed	to build a plan / act based on my conclusions	to listen, be responsive and open-minded and able to share views, knowledge, and thoughts



without prejudices	take time to think and perhaps put it in other contexts	to create a desired target image of how you want something to be in the future	mutual learning, together with other people get new insights
to be able to take in the whole	to think about what something you have experienced, read etc. means	a target image, a dream image - which I believe can be fulfilled	to talk / communicate on equal terms, on the same wavelength
to listen and be responsive	put together and see new aspects with the help of previous observations	give shape to a thought, put into words the image of a possible development	a dialogue gives more and creates respect and understanding
activate multiple senses to observe			difficult, it easily becomes debate
form an opinion about the current situation			

Several answers to the reflective questions about the competences revealed that many of the learners had received another view of the competences than most of them were used to.

It took some time to understand the benefits of the competences, but I will try to work more based on them in different contexts, I have also found that I do it a bit in my ordinary work but will develop it more. (Respondent 3)

#### 5.4.2.2.2.1 observation?

To observe, you need knowledge, you need in some sense to know what to look for. (Respondent 7)

On the fourth meeting we had special focus on training the competence observation. This was done by visiting "unknown" forest sites where all participants were instructed to focus on observing what they saw and experienced when walking by themselves in the forest. The instructions were to walk through the forest on their own without talking to anyone. After for 10 minutes the group gathered and had a dialogue about what each of the participants observed.

After this exercise one of the learners concluded that it was very good to be encouraged to train and become aware of the benefits of this competence. To notice similarities and differences when comparing this forest to their own.







Figure 37: Learning how and what to observe. (Photo: Lotta Woxblom)

It was valuable to listen to other participants and reflect on what they had observed in the same forest area.

(Respondent 2)

In the reflection document from this meeting, all respondents could give relevant examples of different contexts where they had used the competence observation, often in combination with reflection in different situations or context in their private lives. For a few of the learners, it was a deliberate act to use the competence observation in that particular situation.

5.4.2.2.2.2 reflection? I do my reflections in my mind.

(Respondent 4)

I have probably always reflected and analysed quite a lot, but I do not always think that I do. It was good to highlight the core competences, for me it has meant that I have realized that it is useful to sometimes actually write down these thoughts and share them with those concerned.

(Respondent 2)



Figure 38: Reflection sessions at the first (September 2021) and final meetings (January 2022).



This is how two of the learners think about reflection and the notebook.

I have a hard time reflecting on "standing foot". Normally I am a fairly reflective person, but I need some setting time. Sometimes I have picked up the book afterwards. It was also a good format to have in your pocket so there have also been some other notes from forest walks.

(Respondent 7)

I was happy to get a small notebook in a practical format with an invitation to write in. Thoughts thrive on paper because they are consolidated and have a value that makes you think that maybe I should take this and discuss further with someone else anyway!

(Respondent 9)

Reflection is always needed and more so, the book is a good reminder and a tool!

(Respondent 3)

This group of learners consisted of mature persons with experience, and from the reflection documents it is possible to recognise that most of them are used to reflect in different ways – written or in their minds, while a few of the participants mentioned in the final document that they have started or will start to do a more structured reflection.

5.4.2.2.2.3 visionary thinking?

I think that with a vision comes the opportunity to make relevant decisions - if I have a picture of the goal, it is easier to find the way.

(Respondent 6)

On the second meeting we focused on training the competences visionary thinking and dialogue. The learners were asked to vision the future state in their own forests *"What would their own property be like in 5, 10, 15 years – helicopter view".* First individually and then in a dialogue in small groups.



Figure 39: Dialogue about visions. (Photo: Lotta Woxblom)



Most of the learners mentioned that they appreciated having a dialogue in a small group to share their visions.

It was good to have a dialogue in small groups to hear other people's ideas, but this makes it harder to come to a decision.

(Respondent 8)

If you express your thoughts in a group, you often come to conclusions that you may not have thought of when other people's thoughts come in.

(Respondent 9).

In the reflection document at the end of that meeting the learners were asked to reflect on their thoughts about visioning – how was it, in which contexts or situations do you think this competence would be useful, and what is the added value of using it?

Visioning was perceived as a tool helping to create their own image. It was useful to think and put words to the plans and if the visions are written down, it will be easier to set a real goal. This competence could be implemented in most contexts and situations – in everyday life as well as in work. Some of the respondents also found that it would be good to vision together with their family and discuss the future of the forest.

Visioning helps the self-esteem in decision-making.

(Respondent 5).

Visioning provides openings for new "daring" visions, which create hope.

(Respondent 3).

The learners of this group are perhaps more mature than younger people, e.g., students and most of them recognized visioning as a competence they already use.

Today's exercise felt quite easy, as I have had a vision for the property for many years.

(Respondent 1).

We have done this before, but not with the future perspective so clearly and not with so many alternative solutions.

(Respondent 6).

Familiar - me and my siblings "drop" a lot of ideas about the future - both possible and impossible projects. However, my vision is very much linked to knowledge, otherwise I will be too "locked in". (Respondent 7).

Among the added values of visioning mentioned, are that it is easier to see the whole picture and get a helicopter view, reducing the risk of making mistakes if you think first and then do. Visioning together with others gives more perspectives and an increased understanding for everyone involved which is good for collaboration.

*I* would need to learn to frame the visions, to get a better grasp of what is realistic and suitable to build on - which visions are in the unrealistic direction and then should be scrapped (or put on ice).

(Respondent 4).



Knowledge about how you want to manage your forest is extremely important to get a result you are proud of as a forest owner.

(Respondent 2)

However, visionary thinking could be a challenge as, having a vison calls for action.

I have a hard time formulating my visions, to put them into words. It feels like a formulated vision requires follow-up, that clarity can become a problem if you have to change direction. I see the point and have to take it as a challenge, to sharpen my thoughts by putting into words what I want to happen.

(Respondent 6)

#### 5.4.2.2.2.4 participation (engagement)?

It has been inspiring to participate in the dialogues - that everyone is involved and contributes. Joy over a "consensus", openness within the group.

(Respondent 1)



Figure 40: Participants talk about how to best manage this forest stand. (Photo: Lotta Woxblom)

Participation was not really an issue in this group of learners. Of course, some individuals talked more than others and it is important that facilitators notice this and invite the quiet ones by asking questions etc. However, one observation at the end of the course, was that the learners who were quiet in the beginning, were not so quiet anymore.

A good way to get everyone to participate was to divide the learners into smaller groups to have a dialogue on a specified theme.

The fact that the forest owners experienced that they are faced with the same kind of problems – everything from forest management to generational shifts – and have similar knowledge gaps, helped creating a climate where everyone felt included and motivated to participate actively in the meeting.


Also, the conversations along the walks to and from different forest sites were mentioned as valuable and is a sign of participation – the interest in talking to other forest owners about common issues.

The learners also have participated to a various degree with posts and conversations in the Supertext app.

Supertext has been useful because mainly the staff from Skogforsk have been able to share interesting articles, but this could also have been done via e-mail.

(Respondent 6)

#### 5.4.2.2.2.5 dialogue?

The difference between discussion and dialogue. I have not thought in those paths – I am probably mostly a person who engages in dialogue.

(Respondent 8)



Figure 41: Dialogue about learning at the last meeting. (Photo: Lotta Woxblom)





Figure 42: Dialogue about learning at the last meeting. (Photo: Lotta Woxblom)

A proof that the competence dialogue was used during all meetings is that the learners felt that they have been able to say things that not everyone agrees with, without having to defend themselves. It is obvious that there are many different views on forestry and how you could do.

Meeting like-minded people was a relief - not have to defend ourselves even if we did not think alike. (Respondent 3)

I have learned things during the course through open inviting conversations between course leaders and participants. We all have different experiences, opportunities and difficulties that are interesting to take on. Useful when everyone is involved and is listened to. I have gone home after each meeting and looked at my forest a little differently.

(Respondent 2)

Dialogue gives an added value when creating a forest management plan or talking to representatives of the Forest Agency.

(Respondent 4)

#### 5.4.2.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

In the reflection documents the learners often referred to more than one competence in the same context, i.e., the competences are combined to give many perspectives at the same time – a picture of the whole.

Some mentioned that using different competences often contributes to a holistic view that help identify possibilities. By training visionary thinking it is also possible to see that decisions made today affect a future that is far away.



The idea of the long-term perspective, that my decisions today make a difference for a future that I will not be part of.

(Respondent 6)

Listening and talking to other forest owners and forestry officials gave a new perspective, and a better understanding of the complexity in forest management.

I have heard the thoughts of other forest owners about how they want to use their forest and about the need and relief to reflect together with others. Through this, I gained a further understanding of the (sometimes) difficult decision-making process and responsibility and the perceived demand and stress over ownership and management in addition to the joy that exists among all participants.

(Respondent 10)

After attending a course with regular teaching, it seems easy to manage the forest - just look at tables and calculations and then action. With this model, you better realize that there is no right or wrong in the way you work, but it becomes more difficult to decide on the appropriate measure when you get so many different insights.

(Respondent 8)

In the final documents the learners were asked to reflect on how they thought they could find answers to new questions that occurred during the course period. Among the ideas mentioned are to look for knowledge and support on websites, e.g., Swedish Forest Agency and Skogforsk as well as various forum in social media. Strengthened by the course, a few also mentioned that they could ask and have a dialogue with colleagues, other forest owners and forestry professionals.

Have a sensible dialogue with my "opponents". Sit down and reflect.

(Respondent 5)

#### 5.4.2.2.3 Students evaluation of the course

To capture how the learner's perceived facilitation and their own participation in each meeting, they were asked to choose words or expressions (positive and negative) that they thought best described the meeting day from a tick-list. The word cloud in Figure 43 is a summary of the words ticked on the evaluation questionnaire after each of the course meetings. All participants were positive to the meeting days. Expressions like "I listened to others", "I learned something new", "others listened to me", "open climate" and "great conversations" are chosen by a majority of the respondents.





Figure 43: Word cloud showing the learners evaluation of the course meetings.

In the evaluation questionnaire the learners also have indicated their satisfaction with the meetings by assigning a score from 1 to 10. As could be seen in Figure 44 the course-days were graded on the upper part of the scale (score 6-10).



Figure 44: Learner's evaluation of the course meetings on a scale from 1 to 10.

To get an idea of how the learners thought the Skogforsk team managed to explain goals of the project and the case study they were asked to answer two questions about this. Results are shown in Figures 45 and 46.





Figure 45: Learners understanding of the project goal



Figure 46: Learners understanding of the case study

There was also a question with purpose to find out if the participants thought that the explanation of competences seemed reasonable or not. From the diagram in Figure 47 we can see that some were doubtful after the first meetings, but already at the third meeting all learners had adopted the explanations given.





Figure 47: Learners understanding of the competences.

## 5.4.3 Teachers'<sup>9</sup>perceptions of the overall process of developing the case towards the Nextfood approach in education

#### 5.4.3.1 Methods of data collection and analysis

N.B.

Data was collected and analysed according to the same methods for both learners and members of the Skogforsk team.

Methods for data collection and analysis are described in section 3.2.1.

Force Field Analysis was not conducted. Instead, content analysis was used to code and analyse the text to identify teachers' perceptions from the qualitative data collected, i.e., teachers' reflection documents. A coding tree with main branches representing each of the six shifts addressed in the Nextfood project was used.

All data has been anonymised and each respondent has been assigned a number (11-13). As there are only three teachers participating in this case study, the quotations of the teachers are not labelled in this report.

<sup>&</sup>lt;sup>9</sup> In this case report TEACHERS include project leader, training manager and expert from the Skogforsk team.



#### 5.4.3.2 Results

### 5.4.3.2.1 Teachers learning goals and contributions, self-assessments, and course evaluations

A short summary of teachers learning goals and contributions, self-assessments, and their evaluation of course meetings are given in this section.

#### Self-assessments

At the beginning and at the end of the course all participants conducted a selfassessment questionnaire. Average scores of the self-assessments are shown in table 10.

Table	10: A	verage	scores	of sel	lf-reporte	d c	competence	develop	ment	among	teachers	during	а	course
cycle i	n the	Skogfo	rsk-case	e. The	scale us	ed	was 1 (Novi	ice) to 9	(Expe	ert) N=3.				

	Average		Significance		
Competences	Start	End	Diff	P-value	
Observation	4,8	5,8	1	<0,01**	
Visioning	5,3	6,1	0,8	<0,05*	
Reflection	6,1	6,8	0,7	NS	
Dialogue	6,1	6,9	0,8	<0,01**	

For the teachers there is a significant progress (on average) in the competence's observation, visioning and dialogue. The teachers ranked their own level to reflect as competent performers or proficient performers already from the start.

#### Expectations and contribution

Teachers' expectations and thoughts of their own contributions at the beginning of the course are shown in table 11.

Table	11:	Teacher's	expectations	and	thoughts	about	their	own	contributions	at	the	beginning	of	the
course	<i>).</i>													

What would I like to learn?	What could my contribution be?
What is needed to increase knowledge and motivation to think about nature conservation in each step of their forest management?	Knowledge of natural values, how to find them and why they are important.
What can be done in practice?	What works and what cannot be done with forest machines.
How do different forest owners think about personal goals and about how to manage their properties?	Core competences that are important for learning.
How to create the best situation for dialogue?	Create motivation by inspiring and listening to the needs of knowledge that are expressed.
How does everyone get involved?	How to create trust in a group.

Teachers' evaluation of course meetings



In the evaluation questionnaire teachers have indicated their satisfaction with each meeting by assigning a score from 1 to 10. As could be seen in Figure 48, from the teacher's perspective the course-days are graded between 8-9.



Figure 48: Comparison of how each of the five course meetings were graded by teachers and learners.

All participants (learners and teachers) were asked to mark expressions or words (positive and negative) from a list that could be used to describe the day. The word cloud in Figure 49 is a summary of the words ticked by the teachers on the evaluation questionnaire after each of the course meetings.



Figure 49: Word cloud showing the evaluation made by the members of the Skogforsk team.

### 5.4.3.2.2 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

N.B.

In this section also some quotations from the learner's reflection documents that support or address challenges on each of the topics below have been included.

#### 5.4.3.2.2.1 From lecture hall to a diversity of learning arenas

During this course cycle various learning arenas were used:

- In-field meetings
- Supertext app knowledge exchange and contact between meetings
- Phone-calls to up-date learners that were absent on last meeting

Skogforsk normally offers short courses for professionals and most of the time we meet our learners and other stakeholders at a forestry district office or in the forest. During



this cycle different forest sites have been our main learning arenas. In addition, we have also used a chat app called Supertext which has worked as an arena for learning that contributed to co- and peer learning.

### 5.4.3.2.2.1.1 Supporting forces and how to build on them

In-field meetings - forest sites

When planning a course, excursion, or out-door conference members of the Skogforsk team are free to find learning arenas best suited to the purpose of the activity.

Meeting in a forest site instead of a lecturing hall gives the opportunity for all participants to use several senses to take in and experience the topic studied in real life. This helps creating a multidimensional memory and a better understanding of complex issues discussed.

I believe that knowledge "landed in both body and mind" when using so many of our senses at the same time.

(Member of the Skogforsk team)

In this case we had the opportunity to visit one of Skogforsk test sites close to Uppsala as well as different private forest properties. Thereby, we have been able to meet at different sites at each of the five meetings. This gave opportunity to find different themes adapted to each of the forests visited and we could focus on various types of questions, show good examples, and discuss different problems.

It was really supporting that all forest owners wanted to be land hosts and that they also have been willing to travel to a new learning arena every time.

The opportunity to visit multiple learning arenas, most of them belonging to the learners themselves have several benefits. One is that we had access to a variety of environments with different characteristics. By visiting other private properties, the learners could relate to their own situations and challenges. It was also positive that the forest owner visited was included and engaged in the activities, both before and during the meeting. Also, all participants needed to prepare for the meeting in advance, e.g., by studying the map and planning the trip, which mentally lead them into the case study.

Visits to the various forest owners were great. It made everyone think and reflect on their own situation as landowner and gave the course a personal touch with concrete dilemmas.

(Member of the Skogforsk team)

#### **Supertext**

Also, the Supertext app can be considered as a learning arena for knowledge exchange. In this case study, the app was used for sharing links and documents,



asking questions, posting pictures from everyday situations or observations linked to the theme of previous case-meetings.

Posts with photos of observations, questions, and short reflections when walking in their own forests, show that the learners used the core competences and are willing to share their thoughts with the group of learners and the Skogforsk team also between meetings. More than 200 posts were made during the five months of the course. Figure 50-52 show a few examples of posts made during this period.



Var ute i skogen idag och hittade många tallar som såg ut så här, någon som vet vad det är ? Det var inte på min mark men väldigt många som var drabbade.



Figure 50: Question from one participant – does anyone know what this is? Link to site with tool for identifying and reporting forest damage online - posted by one in the Skogforsk team.



Figure 51: One of the participants posted a picture of a large pine tree. This picture generated a few conversations about old trees and wood quality





Dagens möte med våra norska vänner. Där framkom bland annat att vårt svenska case har en hel del gemensamt med caset i Calcutta. Även där lär sig forskarna mycket från praktiken.

Figure 52: Screen shot from Teams-meeting with NMBU-team, illustrates the connection of the Skogforsk-case to the overall Nextfood-project.

The app is a learning arena that helped fostering a (short) dialogue and further knowledge transfer, acting as proof of an increased understanding of the subject. The app helped learners as well as the Skogforsk team to be reminded of the case – to keep the dialogue alive also between meetings.

"You write down a couple of lines and get a response from several group members".

(Member of the Skogforsk team)

I think the app had quite a significant impact on the fifth competence, i.e., participation. From time to time, we have all been reminded that we are involved in a project. The posts have included wide subjects as well as more specific questions or thoughts. When the mobile announced a new post, you quickly connect your thoughts to the case study and the issues included.

(Member of the Skogforsk team)

Also, some of the learners have commented on the benefits of having the forest and the Supertext-app as learning arenas:

I appreciate all the time in the forest as we have seen new things that you can bring to your own forest to reflect on.

(Respondent 6)

Supertext has contributed both to knowledge sharing and to reminding us about the project - good atmosphere and a sense of activity in an easier way than if we had used group e-mails as a communication tool.

(Respondent 9)

### 5.4.3.2.2.1.2 Hindering forces and how to deal with them

<u>Covid19 – again</u>

In the previous cycle of the Skogforsk-case, the major hindering force was that we could not meet with our learners because of the Covid19-situation. When planning this last case cycle, we all agreed that, for us to succeed in running a full cycle, it was important that we could meet our learners in real life (not on Zoom or Teams) and that we should meet in the environment we wanted to talk about, i.e., at different forest sites.



In this last cycle we had planned our meetings with this in mind and met outside. The Covid19-situation seemed to be a little bit better during the autumn 2021, and we were once again allowed to have meetings indoors. Our plan was to have the last meeting at the Skogforsk-office in Uppsala to sum up the course and had invited a few colleagues to have a seminar on topics that had been mentioned during our previous meetings. However, the Covid-situation posed problems once again, and made it impossible for us to meet indoors.

To be prepared for this situation, we made sure to have a plan B already when we discussed the agenda of the last meeting. So instead of cancelling this meeting, we were able to redirect the meeting to one of our forest owners and adapt the program to that site.

During these years we have developed a good team and thanks to that, (and the plan B), it was possible to re-plan with short notice. We started by chatting on the Teams app to decide what and how to do. Everyone knew her/his responsibilities, i.e., who should contact the forest owner, cancel the guest lecturers, send driving directions and invitations to participants and to make practical arrangements (coffee, lunch) etc.

#### Supertext app - different expectations on how to use

Even if most of the learners have appreciated the app as a quick way of communication and exchange of knowledge, a few of them thought that it could have been used in a more efficient way. This indicate that we did not fully succeed in explaining the purpose of the app and how it was intended to be used. Different types of posts show that purpose of the app was perceived in different ways.

In addition to a social tool to keep our group together through cheers and Christmas greetings, etc., it could have been even more of a tool to e.g., link to various fact-based reports and research results about our previous joint reflections in the field.

(Respondent 5)

Supertext can be good when you are not seen / heard if the users stick to the topic and do not flutter around with private input.

(Respondent 8)

#### 5.4.3.2.2.2 From lecturing to co- and peer learning

The model used within the Nextfood-project is expected to give an added value to the learning process for all participants, learners as well as teachers.

#### 5.4.3.2.2.2.1 Supporting forces and how to build on them

#### Attitudes

Curiosity, a desire to learn and exchange experiences, openness, a welcoming attitude and no prestige or ranking are all factors supporting good conditions for co-and peerlearning. It is also very important to be able to build trust in the group.



Everyone in the present Skogforsk-team have an open mind – are curious and want to learn from the forest owners and forestry officials. They also have a desire to contribute with own experiences and expert knowledge.

By showing the learners that we are interested in their thoughts and questions, the team succeeded in creating a good and inviting atmosphere, where everyone felt they could learn and contribute.

We have been clear that there is no ranking, prestige, or stupid questions. This mindset has created openness and honesty among most of the participants.

(Member of the Skogforsk-team)

Very good conversations in the forest and many questions show that there is a good climate for dialogue in the group.

(Member of Skogforsk-team)

#### Composition of the group

The group of learners consisted of active and curious forest owners with a desire to learn. Their unique situation as owner of a certain forest created involvement and recognition within the group. Everyone was eager to listen, exchange experiences and contribute with ideas to other forest owners.

Another supporting factor was the composition of the group of participants, including the profiles of Skogforsk team members. The group included people at a wide agespan, gender-mix and different educational and professional backgrounds and varying experience in forestry. In this case this was an important contribution to the concept of co-and peer-learning.

I think the biggest understanding for many of the participants was that there are so many ways of looking at various opportunities and challenges and that we as humans prioritize so many different goals.

(Member of the Skogforsk-team)

Together we have been in the proximal developmental zone and in this way, we learned from each other. It is a bit like learning from siblings, parents, or a friend by following them in a context where they feel at home and experiencing together. You do not possess the knowledge yourself, but together with the course participants, knowledge will mature.

(Member of Skogforsk-team)

In this group there was an exciting interaction between everyone's background and experiences that made us all develop at some stage.

(Member of Skogforsk-team)

From the reflection documents of the learners, we could see that everyone appreciated to be able to visit each other's forests and listen to each other's views on these.

Hearing stories, experiences, and lessons from people, I have slowly also come to know more personally has made it in some way go deeper. It's not just something a lecturer says, it's information that real forest owners have been through.

(Respondent 4)



We have learned by sharing thoughts at meetings. Since then, those thoughts have been present and someone has looked up an article that they have known about before and now want to try in this group. Or another report that you come across afterwards because you have your mind open to those questions. (Respondent 9)

#### 5.4.3.2.2.2.2 Hindering forces and how to deal with them

#### Traditional learning is the norm

The learners in our case have experience of and are used to traditional learning situations, where they are the receivers of knowledge or instructions. This requires that the teachers can explain the value of the current model and to motivate the learners to participate to the learning themselves. Also, the use of other learning arenas, e.g., a forest site where teachers as well as learners are standing in a ring on the ground experiencing the same environment helps breaking this norm.

Unconsciously, many still react as good schoolchildren and turn to those who correspond to the teacher. But in a ring, it is easier to see that everyone is an expert on what they are interested in.

(Respondent 9)

#### Professional roles

The topic of this course has recently been and still is the subject of a rather polarized debate in the media and politics. This means that questions about how we should use our forests can sometimes be delicate to discuss.

In this case our learners were a group of forest owners with special interest in alternative forest management methods and nature conservation and two forestry officials employed at the forest owner's association. The officials participated in their professional role as advisors and their main task is to buy wood for the forest industry. This sometimes put them in a difficult situation, as they need to act as professionals and according to mandates from their employer. This problem was expressed by one of the officials, and also one of the learners addressed this in the final reflection document, as something that could hamper the dialogue in the group. We need to have this aspect in mind if we want to arrange this kind of activity again. Perhaps it would be better to arrange separate courses with one category of learners in each group.

#### 5.4.3.2.2.3 From syllabus to supporting literature/a diversity of learning sources

A shift in this parameter was not relevant in this case as the current course has been developed and adapted directly for the Nextfood-context.

#### 5.4.3.2.2.3.1 Supporting forces and how to build on them

The different learning sources used has appeared along the way – guided by questions, and topics that have come up during course-meetings. Both teachers and learners have contributed with different types of sources, e.g., webpages, radio programs, brochures etc. - often in the form of links to different websites where you can find information. Links were posted in the Supertext app and documents were



distributed by e-mail or as handouts. One supporting factor was that the group was composed of people with different background and experiences willing to contribute.

### 5.4.3.2.2.3.2 Hindering forces and how to deal with them No hindering forces have been identified.

#### 5.4.3.2.2.4 From textbook to a diversity of teaching aids

A shift in this parameter was not relevant in this case as we usually do not run courses based on knowledge from textbooks only.

#### 5.4.3.2.2.4.1 Supporting forces and how to build on them

In this course we have used a diversity of teaching aids.

#### Characteristics of forest sites

Our main teaching aids were characteristics of the sites visited. We gathered at a site and for example could point at certain phenomena that we wanted to know more about or discuss. Every forest site has its own specific characteristics that could be used as teaching aids when we want to talk about species of fungi, plants, insects, birds or wild animals and specific needs of the various species.

#### Short presentations

Each of the forest owners visited, have also presented their forest property, goals, and in some cases also visions, as well as their thoughts and questions. In addition, one of the learners gave a short presentation on his area of expertise.

#### Film

In preparation for one of the meetings all learners were asked to watch a short movie on YouTube, showing examples of alternative ways to use and manage forests. This film was then discussed during the last meeting.

#### Supertext app

The Supertext app also could be considered as a tool to support learning from different sources – links, photos, inspiration from other group members etc.

#### Core competences

One of the members of the Skogforsk team address the added value of the competences as teaching aids. By introducing the core competences as a tool for learning, the learners could become more aware of their own development.

Now, when we are more aware of the competences, it has become easier to see how each activity can be built around these - that learning contains observation and reflection as well as dialogue in between.



## 5.4.3.2.2.4.2 Hindering forces and how to deal with them Digital tools as teaching aids

Using different digital tools, in our case e-mail and apps require that all participants have access to a computer or mobile phone and a stable internet connection. Even if a majority in Sweden own a computer and/or a mobile phone, not everyone is willing to download a certain app or to use the computer, if not absolutely necessary. In some cases, the facilitators also need to be prepared to give support to single participants.

#### Using an app for communication

One challenge is how to make sure that everyone is participating on the app. Not everyone is comfortable with using an app to communicate. To our knowledge all but one of the learners downloaded the app, and most of them made one or more posts during the course period. A few of the learners have been very active, while others have not made a single post during the period.

Another challenge connected to the Supertext app was that this tool required that at least one from the Skogforsk team was alert and monitored the flow to be able to react on posts and answering questions etc. This meant that we had to keep our phones on also outside office hours. In the beginning of the course, it was suggested that we should distribute the responsibility of being connected to the app between us. However, for some reason we did not implement this idea.

A reflection on the Supertext app from one of the learners addressed that it could be difficult to create a good dialogue on an app.

Supertext provides unlimited opportunities to share information. I think that the chat format is best suited for short texts and pictures. We have had an easy form of conversation at a distance and the chat is effective for information to a group. We have received answers to questions in the chat, the course management has been attentive and answered most of the posts in an affirmative way, but that despite many good links there is a lack of dialogue.

(Respondent 6)

#### 5.4.3.2.2.5 From written exam to a diversity of assessment methods

Our course is a voluntary course that do not give any (university) credits or diplomas, so the question of written exams is not applicable to the Skogforsk case.

Even if written exams are not applicable to this case, being part of the Nextfood project has requested that we collected different kind of data e.g., student reflections and self-assessment documents. The most important challenges connected to data collection are described in this section.



#### 5.4.3.2.2.5.1 Supporting forces and how to build on them 5.4.3.2.2.5.2 Hindering forces and how to deal with them <u>Minimize take-home assignments</u>

Our experience from previous cycles (with machine operators as learners) is that it was very difficult to make the learners completing course evaluations and self-assessment forms and submit them to us. Therefore, we have had to test and try out different ways and to adapt our work model to reality. The advice from our contact person at the forest owner's association (in which the forest owners are members) was to minimize take-home assignment for the learners. Only self-assessment of core competences and course evaluations were included in take-home assignments and to make it as time efficient as possible for our learners, we have re-formatted these documents to digital questionnaires.

We also chose to conduct individual written reflection sessions at the end of each meeting. Before wrapping up the meeting all sat down to individually answer a few reflection questions for 15 minutes on a prepared document. These documents were collected before final coffee was served. These short reflection sessions were probably not an ideal way of training reflection, but it would not have been possible to require that the learners should do the reflection documents at home. None of them are full-time students and most of them are working outside the forest property and don't have the time.

Only the final reflection document, which was more extensive, was given as homework to be submitted within one week. All learners were informed of the deadline and had agreed to fulfil the assignment in time, but some of them still needed to be reminded several times before they finally delivered. In one case, a Covid19-infection was the reason for the late response.

#### 5.4.3.2.2.6 From lecturer to learning facilitator

### 5.4.3.2.2.6.1 Supporting forces and how to build on them

#### Build trust and include everyone

Important factors to succeed as a facilitator is to be able to build trust within the group and to make sure that everyone is heard, to highlight those who are a quiet and support them by actively including them in dialogues and activities.

In our team we could benefit from that most of the experts and researchers at Skogforsk are used to act as facilitators in different situations. During the process the teachers have become better at including all learners and to make sure that everyone is involved by asking questions and actively give the word to individuals that have been quiet on previous meetings.

I think we did well even though not everyone talked for the same number of minutes. Looking at all the meetings, everyone spoke, even though it varies with different participants' personal disposition. (Member of Skogforsk-team)



One of the learners also reflected on this

Everyone's opinions are openly received. Unusual that no expert squeezes in with a sure answer. (Respondent 9)

#### Build a good team of facilitators

It was also positive that the Skogforsk team consisted of individuals with different knowledge, skills, and experiences. In addition to the expert of nature conservation, one of the facilitators have practical experience from working as a machine operator and another has a background as teacher. This gives credibility to the team.

#### Keep it simple

By using a language that learners understand and can relate to, e.g., creating understandable metaphors for the competences, the approach could be more accessible to everyone. Addressing the core competences regularly by listening and asking questions about the forest and to try not to be so explicit when introducing or training of competences has turned out to be a good way.

#### 5.4.3.2.2.6.2 Hindering forces and how to deal with them

#### Including all learners into the group

It is important to make sure that persons that have missed a meeting is updated about the project, how it works and are included into the group. The two forestry officials were not present at the first meeting, instead they got a separate introduction to the project in a Teams-meeting. However, for different reasons (as mentioned in section 3.3.2.2.2) we failed to make them fully part of the group.

#### Don't make it theoretical

There is a risk that the core competences could be seen as something theoretical. One way to try to avoid this, is to make the learners see that they are already using most of the competences (often without thinking about it).

#### Keep to the plan

With a group of active and interested people it is sometimes a challenge to keep to the program as planned. Many interesting questions arise during a walk in the forest, and it is easy to lose focus on the competence we are training at the moment. Many of the learners are eager to talk and it is important to build in this fact in the program, but also to have the ability to interrupt and lead back on the track if necessary.

#### 5.4.3.2.3 What such a change requires from teachers, students, and institutions

#### 5.4.3.2.3.1 Teachers / Facilitators

#### The team

To create a well-functioning team of facilitators with complementary qualities and skills is of uttermost importance.



#### Build trust in the group

To support co- and peer learning it is important to be able to build trust in the group. In this case study the learners were of different ages, had different experiences and most of them had never met before. Therefore, it was important that we met in person and also included social time in the agenda, so that all participants, learners as well as members of the Skogforsk team, got to know each other. Every meeting included time for coffee and sandwich on arrival, lunch at the site and a cup of coffee and cake before driving home. This helped creating and keeping a positive vibe all through the project period.

#### A quote from one of the learners illustrate the importance of building trust

If you have failures and bad experiences that you want to share, it may be perceived as exposing yourself. However, I do not know if it was relevant in our group.

(Respondent 7)

#### Keep it simple

Action learning should be fun, and we need to approach the group of learners by connecting the *how* and *why* to their own situations. Use an easy language adapted to the target group to make the approach more accessible to the learners.

Create easily understandable situations and a good metaphor for the different competences.

It's better to explain them observation based on how you buy tomatoes rather than on the Hubble telescope.

(Member of the Skogforsk team)

When you explain the competences, for example visionary thinking, it could be perceived as theoretical. If you instead ask people about their plans for the weekend, everyone has an answer. Based on an example like that it is possible to move on to developing a vision for the forest.

(Member of the Skogforsk team).

#### Keep in contact

As we only met once a month, it was important to keep in contact between meetings. By having a continuous communication within the group (Supertext), we could keep the momentum, and keep everyone thinking about the approach.

#### Be curious

The learners need to feel that also the facilitators want to learn and listen to their questions and their answers.

We also need to feed our own curiosity, if we want to do it, we need to go all-in.

(Member of Skogforsk team)

We need to be in a dialogue and to practice active listening.

(Member of Skogforsk team)



#### 5.4.3.2.3.2 Students / Learners

#### Expectations and attitude

The learners need to have the right attitude – wanting to be active and curious learners. They must be fully aware of that everyone is expected to participate in the learning process.

#### 5.4.3.2.3.3 Institutions

#### Adapt the model to target group

To fully be able to adapt the Nextfood model it must be customized to fit the target groups that we are working with. In this case it was a small group of private forest owners and a few forestry officials. All with various educational background, experience as forest owners and in an age span from 30+ to 70+ years.

#### Think carefully of the composition of the group - what categories to invite

For the model to work composition of the group is important. Different backgrounds or roles of the participants must not be an obstacle to creating a good dialogue in the group.

# 5.4.3.2.4 Teachers' perception of the greatest challenges to achieving such a change <u>Adapt the concept to non-students</u>

Current design of the Nextfood-model is to a large extent customized for full-time students at a university education, often over a long period of time. The students have chosen to study and that is their main activity – they have scheduled time for working on their own and to work on written assignments. The conditions in our case – private forest owners and forestry officials (and as in previous case cycles machine operators), do not have scheduled time to work with projects and written assignments outside the meetings. This has been a challenge that we have had to deal with – to really adapt the meetings, agenda, and training to make the concept work in this context.

#### Explain the process

Most of the learners in our case, i.e., forest owners at different ages and experiences are used to traditional learning situations, where they are the receivers of knowledge or instructions. Therefore, it is important to know what their expectations are on beforehand, and for us to explain the concept of centric learning – what it means and what it means to be a part of this – and to be clear about what we are expecting from them.

I think we could have been clearer about the goal and the aims from the start. We offer three things in the course description: centric learning, biodiversity, and the core competences. But it was not as obvious for the participants as it was for us, I am afraid.

(Member of the Skogforsk team)

Eventually, the goal must be that everyone is able to see the benefits of this kind of process for themselves and their closer community or even in a wider context. It is



crucial to already from the beginning, be open about our expectations on them and to tell exactly what you are planning to do.

#### Create a common understanding of the core competences

There is a risk that the core competences could be seen as something theoretical. To avoid this, keep it simple and make the learners see that they are already using most of the competences (often without thinking). By introducing the core competences as a tool for learning, the learners could become aware of their own development and get a tool for decision-making etc.

#### Balancing expectations - Nextfood project and participants

A major challenge has been to balance the expectations from learners and from the research-part of the Nextfood project. This is closely related to the type of learners we have, i.e., private forest owners and forestry officials.

It has been a balancing act to give course participants what they expected and at the same time to follow "the big project".

(Member of the Skogforsk team)



# 5.5 Concluding remarks on the case development since the previous reporting

#### 5.5.1 On the case development since the previous reporting

#### 5.5.1.1 The most useful and inspiring experiences (supporting forces) Adapting the course to our learners

Previous experience from arranging courses on forestry and biodiversity show that best results are reached when lecture hall is replaced, and all participants meet outdoors in the forest. Our experience show that this was true also for this specific project. Meeting with the forest owners and forestry officials at different forest sites belonging to a few of the learners, enabled us to talk about what we all see at the same time and to exchange knowledge on an equal level.

The action-based model used within Nextfood is expected to give an added value to the learning process for all participants, i.e., forest owners and forestry officials as well as for the Skogforsk team. Going into the project with an open mind – wanting to learn from the practise and with a desire to teach expert knowledge has been a success factor to reach most of the learning goals in this case.

The part of the Nextfood-model that includes a diversity of learning arenas, learning sources and teaching aids as well as "learning from each other" works well with the type of courses that are arranged by Skogforsk.

#### Awareness of the core competences

Through this case, all members of the Skogforsk team have become more aware of the competences as learning aids. Thanks to some of the challenges we have faced during this period with the Nextfood-project, we have been forced to really work on how to solve different issues, how to adapt the concept to our learners etc. Much of these learnings we can bring with us into other projects and courses in our future work and to spread our experiences to our colleagues in different contexts.

#### Supertext as a tool for communication

Using the app as a communication tool was a good idea. However, as some of the learners mentioned and members of the Skogforsk team addressed – we must think of how to use this app – what it should or should not be used for. Another important question is how to handle the 24-hour-flow.

#### Notebook for reflection

To encourage all participants to train structured reflection between the meetings everyone got a small notebook where they could write about anything they wanted to reflect on. This book fulfilled the desired effect – most of the participants commented that it reminded them on the importance of reflecting, even if they did not write in this particular book.



#### Well prepared exercises

Well prepared exercises help training of core competences during the meetings. Good examples from this course cycle could be used as inspiration to develop more exercises to train competences in different contexts.

#### 5.5.1.2 Main obstacles/challenges encountered (hindering forces)

#### To shift mindset of learners and adapting the model to other types of learners

One of the challenges has been to shift the mindset of (some of) the learners – from expectations on traditional top-down learning to appreciate the new approach implemented in the NextFood-project. Most people are used to traditional learning situations, where they are the receivers of knowledge or instructions, whereas we in this model expect all learners to participate in the learning process. The facilitators must find a way to early in the process make the learners understand the value of this new approach. Perhaps we have been a little afraid of using the competences and it is obvious that it is a process to find out how to adapt and create exercises to the kind of learners we usually meet.

#### Create a common understanding of the core competences

It has been a challenge explaining the added value of being aware of how and when you are using the core competences. In this case we didn't have much time together with the learners. Even if the course ran over a period of 5 months, we only met once every month. This placed high demands on the facilitators to be able to introduce and explain the value of the concept and the importance of the competences in an understandable way already from the start.

We did explain and handed out a document presenting the core competences in short at the first meeting. On the following meetings, we had special focus on one or two competences per meeting. However, as the members of the Skogforsk team have been introduced to the concept and the core competences over a longer period, we were ahead of the learners when it comes to understanding of the competences as they are defined and practiced in the NextFood-project.

We know that the NF-model works, because we have been working with it for quite a while, but I think that for new people it can look quite sketchy. We were offering the learners a course with phenomenon-based learning, biodiversity, and the competences. I don't think the participants read the part about the competences.

(Member of the Skogforsk team)

#### Measuring of learners' progress

It was difficult to draw any strict conclusions about the development of the members in this group from the self-assessments. For many of the respondents the rankings sometimes increased (but in most cases not enough to fit into the criteria of another level of competence), and for some their ranking indicated a lower value than from the start. One reason for this could be that the interpretation of the different levels varies among the respondents and even for the same person when fulfilling the assessment,



a second time. If we want to use this kind of assessment tool in the future, we should have taken some time going through these definitions with the group.

#### Topics and composition of group

The theme of this course was ecology and biology with focus on creating a higher understanding of how to create high value habitats in the forest and finding strategies and methods to do so. Even if these factors are included in the Swedish laws that govern today's forestry (where environmental and production goals have the same weight), it is not entirely straightforward to combine both goals in a rational and costeffective forest management. In certain types of discussions, it could happen that the forestry officials became hostages between the forest owners with great interest in the biological issues and the industry's demand for a rational forestry. This was probably the main reason for the forestry official's low profile during the meetings.

#### Respect for different learning patterns

We must recognize and respect the fact that people have different preferences for learning and using the competences. Some likes to write while others reflect or create visions in their mind.

In this project, one purpose was to try to assess the participants transformation when it comes to understanding and use of the core competences. We were required to collect data in written format and some of the questions in the reflection documents were formulated with the purpose of finding out how the respondents use the competences. From the answers and the length of the answers, it was obvious that the ones that didn't use many words were those who are used to reflect and vision in their minds, while others are used to reflecting and develop their thoughts in writing.

#### Time management

Making good preparations for this kind of activities and keeping participants motivated require much more time and energy, compared with most traditional learning situations (i.e., making a traditional schedule, booking a lecture hall, and inviting lecturers). This is something we need to bear in mind when planning future courses with this approach.

#### Different kind of people

Last, but not least important - someone in the team needs to be good at dealing with different kind of people or personalities.

5.5.1.3 Lessons learned from the inspiring experiences and from dealing with the challenges This type of project involves continuous learning for all of us involved. During this process we have all improved our skills and competences, but we will probably never reach an end point when it comes to finding a "one-size fits all-concept".

When planning and implementing this cycle we have considered our own advice from previous cycles and applied most of these learnings.



#### Italic text lessons learned from the last cycle, still to be developed

#### **Prerequisites**

- All meetings should be scheduled before the course starts.
- Use a contract with learners where they commit to follow the course from start to end and to fulfill the assignments given.
- Meetings in real life works best.
- Arrange a separate kick-off meeting with all participants to create a basic platform for the case meetings. This was planned but not implemented this time because of delayed start. The purpose is to present the project and the approach in a way that creates a common understanding of the benefits of participating and to discuss learning goals and expectations. As the start of this course cycle was delayed, we had to include this information in the first meeting – this was not ideal.

#### Learning arenas

- Variation of forest sites was very good for motivation and learning.
- Good to use the Supertext-app to communicate between meetings. It is important to define the purpose of the app and what kind of posts to include and not to include. Appoint a person in the team of facilitators as responsible to keep the dialogue going in the app. The app also could be used to remind about the core competences and to put out reflection questions.

#### Facilitation

- Keep in contact with learners that were absent during the last meeting. Call to update about what happened at the meeting etc.
- Time-management during meetings could be difficult.
- Set aside enough time to plan meetings.

#### Assignments – data-collection

- Information about expectations needs to be repeated during the course-period.
- Make sure that everyone understands and is committed to making the take-home assignments.
- Bear in mind that our type of learners are not full-time students, and in most cases do not have much time for take-home assignments.
- Digital questionnaires for data-collection worked well learning goals and own contributions, self-assessment, and course evaluation.
- Competence levels in self-assessment must be defined. Important to include a session to define and explain these levels.
- Short reflection sessions (15 minutes) at the end of each meeting. For this use documents with pre-defined questions. Not ideal but worked (even if it is sometimes hard to "reflect on order").
- Final reflection document as a take-home assignment worked well, but reminders needed for some of the participants.

#### Exercises to train competences

- Well prepared exercises on core competences were appreciated by the learners.
- Exercises needs to be developed further.



#### **Flexibility**

• In case of unforeseen events (e.g., pandemics, factors affecting the forests like storms and insect attacks etc), that makes it difficult to keep to the plan – prepare an alternative plan to be activated with short notice.

#### Arrangement

- To create commitment and trust in a group, it is important to include time for small talk so that everyone has a chance to get to know each other.
- Good preparations are important agenda, map and driving directions etc.

#### 5.5.1.4 Plans for how to move forward into the next cycle

For the moment, no new cycle of this course is on the agenda.

#### 5.5.2 Reflections towards the end of the Nextfood project

# 5.5.2.1 What has been accomplished to shift from theory to phenomenon (experience) in agrifood- and forestry systems as the starting point for the learning process?

Already in the invitation to the course planned and implemented within the Nextfoodproject, we made clear that this concept is based on us learning together. This is different from how we usually present various courses or arrangements offered by Skogforsk. In most cases the purpose is to present the latest research and for the participants to listen.

Before starting and continuously during the course-period we have collected information from each of the participants on what they wanted to learn and what they thought their contribution could be.

When visiting forest sites that neither we nor the learners (except one of the forest owners) have been in before, we found a common arena that is more neutral than if we had arranged a course or seminar in a meeting room or lecturing hall. This has contributed to making the shifts easier.

We have used the forest as a learning platform where theory is transformed into practice. The forest providing opportunity for consensus as everyone see the same thing. Starting from a real situation (the forest) provides faster implementation of knowledge. It often makes it easier to shed light on crucial details in complex contexts than finding the answers to specific questions from literature and lectures. One success factor was that everyone has participated in an environment that is recognizable and where everyone can relate to their own experiences.

We have prepared exercises in which all participants (learners as well as teachers) could practice observation and reflection and then met in a dialogue to learn from each



other. In this way we reached an increased understanding of the fact that people with different background see different things, and that we all can learn from each other by having a dialogue on the current subject. Setting aside time for participants to learn from each other is important when planning of the course meetings.

We also used the Supertext-app to share information and pictures on different subjects that we discussed during the meetings. Some learners also asked questions that anyone could answer and sometimes there was a flow of information from different participants around specific topics.

# 5.5.2.2 What has been accomplished to shift from transmission of knowledge to the development of key competences needed to support learning (sustainable development) in agrifood and forestry systems?

From the beginning we have emphasized the work they do by practicing their different competences.

On the first meeting everyone (also the Skogforsk-team) got a small notebook. Everyone was encouraged to take a few minutes every day or week to reflect and to write down their thoughts. It was pointed out that they could reflect on whatever they wanted – their work, their private life, their forest property etc. The idea was that the participants, during the course-period should test practicing reflection as a tool. We did not collect these books.

During the meetings we have used various ways to make the participants use the core competences. In some exercises, all competences have been included and in others we have highlighted one or two competencies to be practiced in a certain situation. In this way, they have not only observed and reflected on what they observed, but also reflected on what they did observe and how important an element it is in a specific exercise. For example, the learners have observed each other's forest areas individually and then in a dialogue worked out different action proposals linked to different thematic challenges, e.g., insect infestation or storm damage.

In most of the reflection documents there were follow-up questions based on the competences and everyone was asked to reflect on their own learning.

In addition, we have included information about what kind of support that is available to use to help creating a vision for their forest property. For example, various digital maps available on websites where forest owners can examine their own properties from different helicopter perspectives.



#### 5.5.2.3 What are the prerequisites for making a successful shift?

- Keep it "simple" no drama.
  The model is effective, even if it may seem fuzzy at first glance.
- Declare the topics and the boundaries
  Don't get carried away too far from your aims, remain in the scope of what you planned.
- Use easy language (spoken and written).
  This is important helps build trust and keep the dialogue going.
- Make sure you are curious and show this.
  Do you really want to do this?
  If the answer is yes, go all in and make sure it is visible to the learners.
- Find and use different learning arenas.
  It's positive if everyone is comfortable and can see similarities to their own daily life.
- 5.5.2.4 What is your concrete advice on the shift from simple knowledge transmission to the development of key competences?
  - Create easy understandable situations/metaphors.
    Don't start with the Hubble telescope, start with tomatoes at the supermarket, talk about hobbies instead of science etc.
  - Build trust.
    Convince participants that their competences (experience, knowledge, skills) matter and these add values to learning in the group.
  - Frequent (and positive) reminders/updates.
    Text messages in an app, short information, and updates by phone, to keep the mindset also outside meetings.

#### 5.5.2.5 What is your main challenge?

Traditional expectations (we teach, you listen)

How can we handle traditional expectations of top-down learning?

- Most learners are used to getting information from teachers, lecturers, or experts. Now they must believe in this new approach - that everyone has to participate in the learning process.
- How can we make the participants understand the value of the new approach?

# 5.5.2.6 What are the three best ideas from the workshop for how to deal with that main challenge?

Based on the input from other participants in the final workshop together with ISEKI and NMBU a SNAP-test was conducted to choose the three best ideas.



6. Give the participants an experience that makes them understand the benefit of this approach, early in the process.

Something that gives them an "aha-erlebnis". One way is to give the learners a reflective question on their expectations and then have a dialogue in the group. In the Skogforsk case, this could be developing a joint vision for how to solve a small problem presented by a forest owner and developing a concrete plan how to realize that vision. This kind of exercises could perhaps help discover the added value of this approach.

7. Inspire openness to new ways of learning.

Take departure in the participants previous experiences – link to how they already have done action learning in their lives before, maybe without knowing it. This could be a driver for stepping into the learning process. Ask them to describe an experience that made an impression on them – i.e., what did you learn from this, how did you learn?

#### 8. Group reflections.

Shared reflections - sessions where participants verbally answer reflective questions might help them to accept this new way of learning.

### 5.6 Appendices (Skogforsk)

- Agenda meeting 1-5 (Appendix 11)
- Learn contribute (Appendix 12)
- Self-assessment of competences (Appendix 13)
- Course evaluation (Appendix 14)
- Reflection documents meeting 1-5 learners (Appendix 15)
- Reflection documents meeting 1-5 teachers (Appendix 16)
- Reflection document final teachers (Appendix 17)
- Reflection document final learners (Appendix 18)



### 6 Case 7: University of South Bohemia

Authors: Jan Moudrý, Chisenga Emmanuel Mukosha

Contributors: Reinhard Neugschwandtner

### 6.2 ID card

#### Course title, level, and language

Development of sustainable farming systems I+II, MSc., Czech + English

#### Course learning goals

The course aims to provide theoretical and methodological basis for preparation and projecting of sustainable farming systems in the framework of the strategical regional development in accordance with principles of agroecology. After absolving of the course, students gain knowledge of principles of development of sustainable farming systems and ability to propose measures focused on environmental and production sustainability of farm

#### Host institution(s) and course leader(s)

University of South Bohemia in České Budějovice, Faculty of Agriculture,

Leaders: Jan Moudrý, Reinhard Neugschwandtner, Chisenga Emmanuel Mukosha

#### Timeline of the activities covered in this report

Course divided into two parts (semesters, evaluated only first part, as second started 17. 2. 2022)

Beginning of the course 7.10.2021

Winter holiday 20. 12. 2021 – 3. 1. 2022

End of first semester 13. 1. 2022

#### Learner categories and number per category (demographics)

9 learners (6 males, 3 females)

Age: 21-25: 9

Czech: 9

All 9 graduates of bachelor course Agroecology

#### Stakeholder categories and type of involvement

Farmers 2x – provide space for student's projects, discussions, evaluation of student's projects

External experts 5x (fields of expertise: agriculture, environment, advisory in organic farming, control and certification in organic farming, social work) – participation on lectures, exercises, evaluation of student projects, discussions, course content and structure comments and updates (planning), reflection

#### Shortlist of learning arenas



- lecture halls, computer room
- on-line form via MS Teams
- farms (different places, including fields, farm buildings, orchard, etc.)
- social enterprise
- university campus (outside of the buildings and lecture rooms)



### 6.3 Extended summary

#### 6.3.1 Research results since the previous reporting

#### 6.3.1.1 Students', teachers' and other stakeholders' experiences and learning

Students and also other stakeholders appreciate the innovative approach, although, it takes some time to adapt on the new methods. Teachers and external stakeholders, who were involved into previous cycles often mention, that with repeating is adaptation of the NEXTFOOD approach easier. From the results of the teachers and stakeholder reflection documents, it was seen that there was an improvement especially in the communication skills and also from the student's there was improvement on their perception and understanding to the competences

## 6.3.1.2 Outcome of the case development process, including effects of making the essential shifts

The main outcomes are related to the steps as the change of learning arenas, from lecturing to co and peer learning, to the multi-actor approach. The multi -actor approach had a positive impact on the communication and also enriched the course content. The lecturing to co and peer learning was important shift being the acceptance of the new role of the facilitators by the teachers and stakeholders that were involved in the previous cycle. The shift is the educational approach from a more theoretical approach to a practical approach which was also stated by the students from previous cycles.

#### 6.3.1.3 Supporting and hindering forces for implementing the Nextfood model

Among the supporting forces we can count positive approach of the students and also external stakeholders and also positive feedback from the on field practical experience. Friendly approach of the farms and their will to cooperate and to provide their farms as the space for student's projects. Also, the interest of the external experts, including colleagues from other institutions, is positive.

The hindering forces are on different levels, overall, the approach to education in the Czech Republic, which is based on the hierarchical structure of the institutions which has an effect in communication competences of students but also some stake holders. Training of the communication skills is insufficient. Hindering force is also lack of support on institutional level and also some technical issues, as the difficult logistic during students' projects on farms, additional workload and time demands during coordination and preparation of the course from facilitators and experts also coordination of the external stakeholders.



# 6.4 Actions taken and data on the development of the case since the last reporting

#### 6.4.1 Actions taken since the previous report

#### 6.4.1.1 Planning

The third cycle was planned on base of previous experiences, minor changes in the structure of the student projects were made, areas for practical works were changed such as the locations of the farms and depending on activities. Farm environment for projects remains, additionally for second semester the projects focused on urban agriculture with aspect of community supported agriculture and short supply chains. Structure of student projects was changed the students were divided into two groups for work on projects. Cooperation with participants from farming practice was extended, additional farmer was involved.

Difficulties with organisation of planning meetings with farmers remains, as they had full season during our planning phase. For some of the meetings, the lecture rooms equipped with computers were reserved, as the work with Land parcel identification system (LPIS) is important part of the practical activities during the course.

#### 6.4.1.2 Implementation

Due to changing COVID situation, the course was held in combined form of on-line meetings via MS Teams and personal meetings with students. Course was affected by numerous absences of all stakeholders, most of them were in quarantine or isolation for different parts of the course. External experts were invited in accordance with original plan to the lectures, in some cases, the meetings were held on-line and the number of the visits on the farm was decreased. During the first part of the course, especially the environmental topics were elaborated, second part will be focused more on agricultural and social pillars of agroecology. Previous problems with stability of internet connection, when students used their own equipment, were solved by realisation of some of the steps supporting the communication (e.g., creation of round tables). Development of communication skills of the students was affected by switching between on-line and presence mode of education and also by numerous absences caused by the COVID restrictions, but still there is significant change (progress) between the beginning and middle of the course.

On base of collected data and feedback from all involved actors, the course is continuously updated. Again, the multi-actor approach was evaluated as very positive, on base of previous experiences more of the "small" methods, as e.g., (icebreakers) were implemented and significantly supported the communication, Structure of student projects and conception of the course was slightly modified, this will be probably necessary for each cycle, as the content of the project and also the place where the projects are realised, is changing.



#### 6.4.1.3 Reflection

During the course, the meetings of teachers and selected external actors were organised (mostly on-line via MS-Teams), where progress of the course was discussed and evaluated, and next steps were planned in accordance with current situation (5 meetings during first part of the course). On the end of the course, teachers and external environmental expert prepared short reflection document. Very often the progress in adoption of the role of the facilitator and communication with other actors was mentioned.

#### 6.4.2 Students' responses, learning and competence development

#### 6.4.2.1 Methods of data collection and analysis

#### 6.4.2.1.1 First week (day) & last week (day) of the course

#### 6.4.2.1.1.1 Student's understanding, contributions, and expectations

At the beginning of the academic year, the students were informed on the course activities that will be undertaken as part of their assignments. All nine students were asked for their consent to participate in the NEXTFOOD research project, all nine students agreed to participate in the project. The students were informed by the facilitator about 4 initial questions to be answered at the start of the course about their expectations, contributions, and understandings as per research protocol and to track their progress 5 final questions were sent in the last week of the first semester. The five final questions were also sent out to students via email and were handed in inform of written documents.

For data collection the documents including the four initial questions were sent out to the students via email at the start of the semester. The students handed in the answered documents inform of written documents. Audio interviews were conducted by the facilitator with the students at the start of the course and the end of the course for supplementary data. The interviews were semi- structured with same approach to all students to understand their expectations and competencies. The interviews were open but followed the question structure of the four initial questions and later the 5 final questions of the NEXTFOOD project as they were used for supplementary data to the questions.

The data analysis and interpretation were done by the course facilitators. The text data was analysed qualitatively using NVIVO qualitative data analysis software (QSR International). Thematic coding and Coding tree in NVIVO was established as per research guidelines for data analysis.

Four initial questions asked at the beginning:

- 3. What are the knowledge, skills, and attitudes (competences) we need to support sustainable development in agri-food and forestry systems?
- 4. What experiences and competences do I bring to the educational activity to make it a success?
- 5. What are the questions I would like this educational activity to help me find an answer to?



6. What are the competences I'd like to train/improve in this educational activity?

Five final questions asked at the end:

- 3. What are the knowledge and skills we need to support sustainable development in agri-food and forestry systems?
- 4. Which of the experiences and competences I brought to the course contributed the most to the learning community?
- 5. What questions did this course help me find an answer to?
- 6. Which competences did I train/improve significantly during this course?
- 7. At the end of this course, what are the questions I am now asking myself?

#### 6.4.2.1.1.2 Self-assessment of competences

At the beginning of the semester the students were informed about the selfassessment questionnaire that would assess their competencies as per research protocol. The questionnaire was sent to the students at the start of the semester as part of their home assignment. The documents were sent out to the students via mail. The questionnaire consisted of 5 core competencies the students were being assessed on namely observation, participation, visioning, reflection, and dialogue. To track the progress of the students a self-assessment was conducted at the beginning and at the end of the course by ranking their competencies on a scale from 1(Novice) - 9 (Expert). The data was collected in form of written documents. For statistical significance of the differences between the self-assessment figures at the start and end, a student t test was done. The p-values indicate an increase in the competences.

#### 6.4.2.1.2 Students' final reflection document (individual)

At the end of the semester the students were asked to evaluate and reflect on the course after its completion. The reflection documents were in form of a short self-reflective essay of the course. With the goal to discuss not only what was learnt but also personal experiences during the learning course. The reflective essay had no fixed format. Students were given a guide but not limited on how to write the reflective essay. Students were provided with 3 guiding example questions but not limited to"1) Describe your learning and personal experience of the learning process? 2)How have you developed your knowledge and skills?3) What are your recommendations for a possible improvement?". The reflection documents were sent to the students via email. The data was collected inform of answered documents via email. The reflection documents contained insights on the students' experiences during the learning process. The data analysis and interpretation were done by the course facilitators. The text data was analysed qualitatively using NVIVO qualitative data analysis software (QSR International). Thematic coding and Coding tree in NVIVO was established as per research guidelines for data analysis.



#### 6.4.2.2 Results

#### 6.4.2.2.1 How do students experience such a learning process with respect to:

#### 6.4.2.2.1.1 learning goals?

When asked at the beginning of the course what they would like this Course to address the student's mentioned topics of sustainable agriculture and application of agroecological methods. Students raised several interesting questions. The students commonly shared the view to gain favorable knowledge which will be applied in practice as well as methods they could relate with in practice. Most students had specific questions such as "what can a farmer do to protect and preserve the environment?" "How can environmental protection measures be applied in big corporations? "What are the ways and laws that are needed when switching to ecological farming?" "How does planning work in practice?" "What laws govern the agri-food and ecological sectors as well as sustainability?" "How to apply the crop rotation in practice?" "How is ecological farming economically effective?" At the end of the semester the students were asked a progressive question about how the course helped answer their goals, there were several comments related to the extent of the gained information, but students understand the need of a balance between theory and practice and appreciate innovative methods of learning. This attributed due to the difference in approach of this course from previous courses students had taken which had mostly the theoretical approach. Six students mentioned they had gained more knowledge about agroecological agriculture and its benefits towards being environmentally friendly which they deemed will be valuable in practice, four students mentioned that they gained more practical knowledge about the LPIS data base "expert explained LPIS is an easy to under way and made us practice individually" as quoted by student five and on the different crop rotation methods which they perceived will be a valued skill in practice, students mentioned they slightly understood the idea of sustainable agriculture. Students mentioned that they learnt how to plan as well as get more detailed information about planning from experts and farmers which they mentioned is a great skill that will help them going forward in their students as well as in practice. This can also be attributed to the projects we had during the course which required them to plan as well as from the side of farms and experts how planning was deemed important in their daily work activities. In two cases students did mention that they learnt about the organizations that govern the agriculture and how the policies affect agriculture.

#### 6.4.2.2.1.2 view on competences needed for sustainable development?

At the start of the academic year, the students were asked about their knowledge and skills needed to support sustainable development in the agri-food and forestry systems. Seven Students mentioned the need of agroecological knowledge to support sustainable development. Five of the students mentioned the need to enhance a more practical approach towards the learning process and the need to find a balance between the theoretical teachings with practice". "Practical experience is very important to support sustainable development" as quoted by student one. Students cited the need to improve communication and planning skills which will be essential to support both systems in the long term. Four Students brought up the need for marketing knowledge and the economics associated in the agri-food system both locally and internationally "teach students and farmers marking kills and strategies "as quoted by student nine. Four students did highlight the need to be aware of the human activities that harm the environment. Two students brought out the need to promote regional products and understanding the supply chain of the goods and in one case the knowledge of legislation that govern the laws in both systems.


At the end of the semester Student's understanding and expectations changed little bit. Six students mentioned the need to identify a problem and quicky react and find a solution to the given problem. This could be attributed to the practical situations the students in counted on the farm actives that need a resolution as fast as possible. "Ability to quickly find a solution to problems" as quoted by student two. Three students suggested the need for an in-depth knowledge about sustainability and environmental protection in to order to support sustainability. Four students addressed the need to educate and share information about sustainability even to people that are not directly involved in the area such as "the public, politicians etc. Communication was perceived by students as a key factor to support sustainability. Five students addressed the need to communicate and build a network with experts in the same field to share information but also including stakeholders that are not directly involved. Students brought out the need for long term planning to support sustainability unlike looking for short term solutions to solve economic situations such as educating them about the environment and ways to productively live without harming the environment. A few mentioned the need to understand the fundamentals of agroecology and ecological agriculture. Generally, the students share the desire to try and improve the sustainability of agrifood and forestry systems.

#### 6.4.2.2.1.3 recognition of own competences and competence development?

Students were also asked about the experiences and competencies they bring to the educational actives. Six students highlighted their willingness to share their experiences and knowledge from their practice such as" knowledge from our family farm "as guoted buy student 4. Seven students mentioned their ability to communicate and share ideas, three students did mention to bring the knowledge gained during their thesis research, also did mention their ability to share and interpret scientific literature. In two cases students did mention they would bring a positive and friendly attitude towards the Learning process which would help when working as a team. Two students did mention they would share contacts for stakeholders and other organizations that would be valuable to their network. At the end of the semester the students were asked about the experiencing and competencies they brought during the course, most students mentioned their active participation and communication during the course, other mentioned their ability to share their experience gained in practice during school projects, a few mentioned that not only contributed but felt inspired by some of their colleagues during the project exercise and presentations done during the course, A few also mentioned their ability to communication in a foreign language when interacting with experts from other intuitions. A few expressed how they were not shy to share their ideas and join in on different group discussions" shared my farm experience and innovative ideas during group work" as quoted by student nine. In a few cases the students shared scientific literature that helped during the projects and tasks given to the students.

#### 6.4.2.2.1.4 transformation?

When ask at the start of the academic year on the competences and skills they would like to be improved, the students did not respond as per project core competencies (observation, participation, dialogue, visionary thinking, reflection), The students were informed about all NF core competencies, but they took a general approach on the



skills and competencies they wanted to develop and mostly being related to field of study. Five of the students mentioned planning as the skill they would like to improve the most. Four students highlighted on how they would like to gain the ability to the gained knowledge from this course in to practice in the future jobs and on their family farms in three cases. Three mentioned the need to expand their knowledge of agroecology and the fundamentals of sustainability. Two students wanted to improve their communication skills and expand their network in the agricultural sector. Four students brought up the need to enhance their ability to work with information database systems used in the industry such as LPIS and GIS. Students wanted to improve their soft skills. When asked about the competencies they significantly improved a Seven of the students emphasized that they significantly improved their communication skills, Four did highlight that they improved their ways of planning of which three of the students are among those that mentioned planning as a skill they wanted to improve at the start of the semester a Two did mention they improved their observation which also helped them identify key problems during discussion and find solutions. Three students mentioned they trained their practical orientation with the LPIS data base and felt more comfortable individually solving problems with the database.

#### 6.4.2.2.2 To what extent does the education enhance the students' competences of:

Overall, there was a slight improvement in all five competences. Detailed discussion on each competence is discussed in the sub sections below. As shown in table 12 below with observation having the least amount of improvement and dialogue with the highest noticeable improvement. At the start of the course a vast majority of the students evaluated themselves as beginners or advanced beginners and in a few cases as competent performers with only one case as proficient performer. There was a significant increase in the dialogue which could be attributed to the classroom environment form of learning. It was noticed that visioning had the least average both at the start and the end of the course. None of the student showed a decrease in the competence score but it was noticed in a few cases a stagnant evaluation in their competences.

Competences	Average scores			Significance P value	
	Start	End	Diff		
Observation	3,15	4,67	+1,52	<.0001***	
Participation	3,67	5,33	+1,66	<.0001***	
Visioning	2,07	3,63	+1,56	<.0001***	
Reflection	2,64	4,49	+1,85	<.0001***	
Dialogue	2,67	5,11	+2,44	<.0001***	

Table 12: Average scores of 9 student's self-assessment – competences at the start and end of the course. The scale used was 1 (Novice) – 9 (Expert). (n = 9).

\*: p-value < .05, \*\*: p-value < .01, \*\*\*: p-value < .001

1: Results of a paired, two-tailed, Student t-test



#### 6.4.2.2.2.1 observation?

Overall observation had the lowest amount of difference between the beginning and the end of the course in comparison to other competencies, on other hand, at the beginning of the course the values were relatively high. Observation was highly emphasized during the course, the presence of external experts and farmers stimulate the observation, when they gave examples to the student e.g. On farm demonstrations and activities on farm resp. in the agricultural landscape as well as in class practical activities. The low difference could be attributed to time individual students had to move to online form of study in events of covid 19 quarantine.

#### 6.4.2.2.2.2 reflection?

The difference between beginning and the end of the course was the second highest in the case of the reflection. Partially this was caused by improved understanding to the term "reflection" by the students during the course, but also the structure of projects and discussion about reached results with other students and stakeholders helped to improve this competence.

#### 6.4.2.2.2.3 visionary thinking?

Visioning had the lowest average both at the start of the course and at the end the course. Visioning was a highly mentioned competence as course was strongly based on the holistic approaches. Visionary thinking was important during course activities such as the preparation of practical application of the student projects outputs, combined with the holistic approach to the solution of projects topics, help to improve visionary thinking.

#### 6.4.2.2.2.4 participation (engagement)?

This competence was perceived as strongest among the students. Participation had the highest average at the beginning of the course as well as at the end of the course. The main factors influencing participation were the practically oriented projects which allowed students to have hands on practice and share their ideas as well as ask or share information. Interaction with other stakeholders and also teamwork and communication, including discussions with other invited stakeholders.

#### 6.4.2.2.2.5 dialogue?

Similarly, to the previous cycle, there was a significant increase in the dialogue competence which could be attributed to the classroom environment form of learn. During first meetings it was necessary to strongly support students in communication, but later they started to be active and also to understand to the different forms of communication, improved their formulation skills and often gained self-confidence for discussions with external stakeholders.

#### 6.4.2.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

The course was strongly based on the holistic approaches, so the system things was necessary. Systems thinking was introduced at the start of the course as is a necessary competence for course activities. During the first part of the course, it was difficult for the students to take in account more aspects and to see different links and



connections between topics and also to identify aftermath of different actions. There is still necessary to train and improve system thinking, but most of the students reached progress.

### 6.4.3 Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education

#### 6.4.3.1 Methods of data collection and analysis

#### 6.4.3.1.1 Teacher reflection document

During the planning and at the start of the course the teachers were informed about a course reflection document that would be sent to them at the end of the course. They were then asked to reflect on the experiences and findings from the course and consent was agreed to use the documents as part of the NEXTFOOD project. The reflections documents were sent via email. The data collected was in form of a short self-reflective essays of the overall course and in the case of farmers their reflection during the farm visits. The reflection document contained question on their experiences and findings from the course as well as possible suggestions to improve the educational approach. Questions in the reflection document were: 1) How do you evaluate the impact of the course for the students? 2) What was the main problems or hindering forces? 3) What was the advantage? 4) How do you evaluate the impact of the course on other actors? The farmers did not write reflection documents but were asked to tell us about their opinion during the interviews. The data analysis and interpretation were done by the course facilitators. The text data was analysed qualitatively using NVIVO qualitative data analysis software (QSR International). Thematic coding and Coding tree in NVIVO was established as per research guidelines for data analysis.

#### 6.4.3.1.2 Course reflection focus group/interviews

Originally plan was to organise round table or focus group with all involved stakeholders, including teachers, farmers, external experts, but due to high workload of all stakeholders and complications with COVID-19 situation, the set of interviews was prepared and realised.

The data was collected from interviews with farmers, stakeholders and experts conducted by course facilitator. All farmers and experts were asked for their consent to participate in the NEXTFOOD research project, and all agreed to participate in the project. The course involved three facilitators, two farmers and five (external experts and stakeholders). The interviews were conducted for supplementary data and were based on a set of prepared questions to get their overall insight on the educational approach. The data analysis and interpretation were done by the course facilitators. The text data was analysed qualitatively using NVIVO qualitative data analysis software (QSR International). Thematic coding and Coding tree in NVIVO was established as per research guidelines for data analysis.



#### 6.4.3.2 Results

#### 6.4.3.2.1 Teacher reflection document

In comparison to the previous cycles, the students started to be active earlier after the start of the course. This was caused partially by presence mode of education (previous cycle was almost fully on-line), by application of some methods as icebreakers and personality of students had influence. Also, the use of some of the tools suggested by NEXTFOOD methodology (e.g., diversity of learning arenas) have positive effect and helped us to bring the students to the more active mode and keep their attention.

During the course the student's activity increased and their progress was visible in comparison with other groups of students, who absolved only traditional lectures. As quoted by facilitator two "Students from our course based on NEXTFOOD methods were able to communicate much more, they were active, and they also opened their own topics, during the discussions, used arguments, etc. That was significant difference in comparison to the second group of students." Students' ability to present own opinion, work individually with the data, search for information, connect them and present them to other participants increased during the course. As quoted by facilitator one "There was visible progress during the course especially in the second half of the course"

Also, the interactions between students and external experts were stronger against the previous cycle, discussions were more impulsive, students often opened their own topics and make comments. This was strongly supported by most of the external experts and of course by teachers in their role of facilitators. As quoted by expert one "Students openly shared their views". Even with some experiences from previous cycles, the facilitating is still challenge, as even the small signs of dominant conducts, e.g., during the moderation of the discussion and its direction to the planned topics, often decrease the student's activity in the communication. We will need further develop our communication skills and collect more methods to support communication and to create more relaxed atmosphere.

From the point of view of content, the course is now balanced, and we will do only minor changes for next cycle. These changes should lead to the more intensive involvement of students and to the better connection between theoretical and practical parts of the course. Also, during this cycle, the change and innovative approach was welcomed by most of the students, and they highly praised our approach.

#### 6.4.3.2.2 Course reflection focus group/interviews

During the interview the invited stakeholders often appreciated the orientation of the course on practical solutions and on focus on real on-farm situations, which help to the students better understand to the real situations in agricultural practice. Although the stakeholders understand to the need of the careful on one hand and intensive communication on other hand, only some of them can realize this approach also during participation on the course. The need of improvement of communication skills and competences is often mentioned not only in relation to the students, but also to the other involved actors. Practically all stakeholders should be trained in facilitation and



often also in communication. Only a few of them saw and mentioned this need. In case of some of the stakeholders (especially farmers) it could be a problem to find motivation for the education in this way. Some of the stakeholders also mentioned higher time demands, if they must be fully involved into course activities, as they need to understand to the whole content. Even the external expert participating on only one lecture should prepare his input in accordance with the goals and activities of the whole course, what means, that he needs to spend some time also by observing of the course. Before the course, the planning meetings with the stakeholder were prepared, but the content and structure is changing also during the course (e.g. switch of some lectures and exercises due to absence of external experts during originally planned period), what is another challenge. This was stressed namely by the stakeholders, who participated first time on this course, those of them, who already have experience from previous cycles, was able to handle this issue better.

## 6.4.3.2.3 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

#### 6.4.3.2.3.1 From lecture hall to a diversity of learning arenas

#### 6.4.3.2.3.1.1 Supporting forces and how to build on them

Although part of the lectures was realized in on-line form via MS Teams, most of the meetings with students were realized in presence form. Among the diversification of learning arenas provided by the visits of the farms and (planned for spring) social enterprise with social farming activities, also part of the meetings in university campus was outside of the lecture rooms. For some of the lectures, the use of computer rooms was necessary for certain activities involving internet data bases such as LPIS. Some meetings were prepared also outside of the buildings in the park and "green parts" of the campus. Especially the farm and outside environment offers possibilities for observation and other competencies training and makes the course more attractive. The willingness of the farmers to corporate enabled us to have the farm visits.

#### 6.4.3.2.3.1.2 Hindering forces and how to deal with them

Main hindering force was still the COVID-19 situation, which caused, that part of the meetings was only in on-line form and also there were numerous absences of all stakeholders, including students. For the future, we still need to learn or develop better tools and methods for on-line education. Another issue is logistic, as the cooperating farm is ca. 30 km from the university and for bigger groups of students it would be necessary to provide e.g., bus transport. We are still looking for the farm or another place for students' projects closer to the university campus. For this, also the major change in course structure could help, if the course will be planned not as 4 hours per week, but as intensive one week on farm and the rest of the course on university. This solution can bring another difficulty, as conflicts with other courses, need of on-farm accommodation, etc

#### 6.4.3.2.3.2 From lecturing to co- and peer learning

#### 6.4.3.2.3.2.1 Supporting forces and how to build on them

After first few meetings, the activity of students increased, and it was easier to motivate them to discussions about specific topics. Later, the cooperation in teams and communication with external experts helped us to motivate students to intensive participation on educational process, sharing of the information and active approach



to the learning. Like the previous cycle, after two months there were significant differences between student groups participating on NEXTFOOD case and other students, who weren't involved into innovative model of education. Especially communication with invited expert and with teachers, but also ability to participate on short exercises and presentation of own outputs was much better on side of students involved into NEXTFOOD case, The approach will be continued to be integrated into the course even after the project is done as it showed significant positive difference from student groups that participate from those that did not participate. The approach will be gradually integrated even into different course in the future.

#### 6.4.3.2.3.2.2 Hindering forces and how to deal with them

The students started to be more active after few meetings, but their activity decrease for a while always, when new actors was involved. Activity and motivation of the students I the key element and in case of passive students also hindering force. To face this challenge successfully, selection of involved stakeholder is important. During this process, the focus should be not only on the expertise, but also on the soft skills related to the communication and social interactions.

#### 6.4.3.2.3.3 From syllabus to supporting literature/a diversity of learning sources

#### 6.4.3.2.3.3.1 Supporting forces and how to build on them

As during the previous cycle, students were asked to use actively internet sources and to find own materials, which they can present to others. Their approach was active, especially later during the course, when they were supported also in use of other materials, than texts. In the beginning, mainly the scientific papers and books were used by students, but later they started to use also other sources, as videos, applications, interactive websites etc. Going forward we will continue with the same approach as it provide valuable to the students shared a lot of content from different sources. Going forward we would recommend user friendly applications as some application posed to be a challenge.

#### 6.4.3.2.3.3.2 Hindering forces and how to deal with them

Hindering forces have technical character, as the good internet connection was important for most of the sources, but in accordance with changes of learning arenas we often changed the places and only in some cases the quality of internet connection was good enough. Another hindering force was perception of some of the sources by some of the external experts or teachers. This is more question of different approaches of different generations, as for younger people some of sources are relevant and easy-to-use, but the older stakeholders don't perceive them as suitable or trustworthy (e.g., some of social networks and medias) and at the same time have in some cases technical difficulties to use these sources. Looking for user friendly information sources will be a way forward as well as applications.

#### 6.4.3.2.3.4 From textbook to a diversity of teaching aids

#### 6.4.3.2.3.4.1 Supporting forces and how to build on them

Also, here the situation was similar to previous cycle, during the theoretical parts of the meetings, we were focused on interactive approaches, discussions, presentations, etc. Feedback from the students was positive, especially during live interactions, during online parts of the course we challenged similar problems as last year.



#### 6.4.3.2.3.4.2 Hindering forces and how to deal with them

Some of the methods were difficult to adopt by all involved persons (more often by the external stakeholders and farmers), also the materials provided by students have very different quality and relevance and, in some cases, it is time demanding to find out, if the material is useful for our purpose. Going forward to allocate more time to certain activities to allow the involved persons to understand. To ask students to submit the materials earlier so that material quality and relevance can be checked. To organise short brief seminar and actively practice with students on how to search for quality material as well as to suggest material sources but not limiting the students.

#### 6.4.3.2.3.5 From written exam to a diversity of assessment methods

#### 6.4.3.2.3.5.1 Supporting forces and how to build on them

The situation was the same as during previous cycle – on base of observation of the student activities and presentation of the student projects, we created feedback and evaluation of the students by wider comments, but officially we must follow the rules, where the evaluation by the grade is necessary. The grade is based on the knowledge, presented during the written test and oral exam.

#### 6.4.3.2.3.5.2 Hindering forces and how to deal with them

For some of the students the assessment based on written evaluation or comments is not so easy understandable as the grade and in these asses, the motivation of the students to reach better results is lower. The student projects were used as part of the assessment meaning the final grade was also based on the assessment from the projects and this helped the students to understand the evaluation better when we explained the evaluation of the project to them.

#### 6.4.3.2.3.6 From lecturer to learning facilitator

#### 6.4.3.2.3.6.1 Supporting forces and how to build on them

The role of facilitator is difficult for some of the teachers or external experts, but it was visible, that those of them, who already participated on this approach, are able the handle it much easier. Going forward we will continue collaborate with teachers and externals that have already been part of the course and also involve new teachers but introduce facilitation more in detailed to them at the beginning. Helpful was also short example during planning meetings, where we tried to introduce this role to the stakeholders new in our course. Later during the course, this approach is appreciated by the students and leads to their higher activity and better communication as well as it appreciated buy the teachers and external experts.

#### 6.4.3.2.3.6.2 Hindering forces and how to deal with them

Among the attitude of some of the external experts, who have the problem with less dominant role of the facilitator, which going ahead will be introduced to the experts in detail to make them understand the role. The students on the beginning of the course are usually passive as they are expecting traditional forms of education and are afraid to be active, especially to lead active communication. The change in whole educational system will be needed in our conditions, on course level some introduction of new simple educational methods or activities as the start of the course of such (ice breakers) which were very helpful.



#### 6.4.3.2.4 What such a change requires from teachers, students, and institutions

The changes should be on different levels. The highest level is change in approaches in education at national level, where the old monologic methods should be replaced by innovative ones focused more on action learning. On institutional level, the higher support of educational activities is needed. Currently the quality of education is often formally mentioned, but in practice, only the scientific results are perceived as really valuable for the institutions. institutions should be rewarded equally as time and energy spent on education should be rewarded equally as time and energy spent on researchh. Motivation for improvements in teaching is missing and unlike the scientific papers, the good pedagogical results and positive feedback from students isn't rewarded by institution. On the level of the students and teachers, changes are needed in communication style, teachers should be ready to perceive students more as the partners, to gain their trust, respect their opinion and to improve teaching towards practice with use of the action learning.

#### 6.4.3.2.5 Teachers' perception of the greatest challenges to achieving such a change

There are more challenges and some of them depends on the personal settings, skills, and competences of individual teachers. From the reflection documents for some teachers could be difficult to accept the role of facilitator (and to lose dominant role), for other the higher workload related to the innovative teaching approaches, organisation of the course, reflection, planning, interactions with other actors, etc.

During the course, the motivation of the students is challenge in conditions of the Czech Republic (and probably in most of the eastern Europe countries). Specially to support their communication skills is in some cases long process. Another challenge is coordination of all actors and keeping of the course structure.

### 6.5 Concluding remarks on the case development

#### 6.5.1 On the case development since the previous reporting

#### 6.5.1.1 The most useful and inspiring experiences (supporting forces)

The most inspiring experiences were the visible progress in communication skills after few months of the innovative approach (especially in comparison with other students' groups) and also positive feedback from absolvents, who appreciate the course retrospectively, after gaining job in agri-food sector which is based on two emails sent by the absolvents in the previous year. Positive is also feedback from some of external stakeholders, which see our approach as very useful and enjoys the cooperation and interactions with students and facilitators. As quoted by facilitator 3"I see sense in this activity, and I would like to develop it further. Work with the students on practical projects is much more interesting than lectures I have in other faculty".

#### 6.5.1.2 Main obstacles/challenges encountered (hindering forces)

Main hindering force is probably overall approach to the education in whole country on more levels. For the students and actually for all involved actors, the action learning approach is something new and due to long-term experiences with usual models of education based on lecturing, also difficult to accept. Another hindering force is lack of



support on institutional level. There are also hindering forces or challenges of technical character, as difficulties with coordination of all involved actors or logistic during students' projects on farms.

6.5.1.3 Lessons learned from the inspiring experiences and from dealing with the challenges Although we are facing different challenges, the repeating of the teaching in accordance with the methods and approaches developed within NEXTFOOD project makes each new cycle easier to handle for the teachers and also for the external stakeholders, in case, that they are involved repeatedly. Very valuable are innovative methods and activities such as ice breaker or rich picture. Important is also gaining the trust of the students (and to lost it), what is the key factor for the communication skills development, including dialogue.

#### 6.5.1.4 Plans for how to move forward into the next cycle

For the next cycle we will slightly improve structure and content of the courses. We are also still looking for optimal places for student projects, to avoid difficulties with logistic. Another plan is to convince leading of the faculty to support our approach. Planned is also further cooperation with institutions from other countries focused on similar topics, in form of the joint on-line meetings and workshop (as motivation of the students for the communication and valuable experience).

#### 6.5.2 Reflections towards the end of the Nextfood project

### 6.5.2.1 What has been accomplished to shift from theory to phenomenon (experience) in agrifood- and forestry systems as the starting point for the learning process?

The course focus was transformed from the common lecture/exercise scheme to the more practical oriented and complex form. Structure of the course was changed, to enable stronger involvement of the students, invitation of external experts and emphasis on activity and communication of all actors. At the same time, it was necessary to keep necessary scope of professional information, included in the course. Content of the course was revised in accordance with this focus.

Important is involvement of the external experts (farmers, environmental experts, advisors, and social workers) into educational activities, their participation on student projects and discussions between all actors.

For improvement of communication and motivation of the students to the active approach, it was necessary to find suitable tools and to work with all involved actors, to keep the balance between them, as the external experts and teachers often tended to the too dominant role, which decreases students' efforts to communicate and be active.

The focus on on-farm projects and involvement of the external experts from practice caused, that the content of the course is more oriented on practical application and the theoretical parts are closely connected with practical part.



# 6.5.2.2 What has been accomplished to shift from transmission of knowledge to the development of key competences needed to support sustainable development in agrifood and forestry systems?

The development of key competences is closely connected with the problem-solution approach during the student on-farm projects and also with the active participation on discussions/communication with external experts. In case of projects, the students are involved straight into particular activities on farm, which requires more active approach. Also, active discussions and dialogue with external experts motivate the students to improve their skills and competences. Important part is interconnection between theoretical parts of the course, student project topics and interaction with farmers and external experts (e.g., proposal of solutions for social farming and green care in cooperation with social enterprise Arpida or with organic and social farm Orchards of St. Prokop).

#### 6.5.2.3 What are the prerequisites for making a successful shift?

To plan clear structure of the course and to be flexible (there will be delays). Create time reserves in the outline of the course and be ready to sip/move/cancel some of the planned topics.

To find right external partners (farmers, experts and to motivate them for cooperation) – focus on their communication skills and ability to be part of the teaching/learning process (personal skills, abilities, competences). Sometimes the communication skills are more important than perfect farm background or expert knowledge. To use all the tools to motivate students and to show them, that they are part of the process and partners.

### 6.5.2.4 What is your concrete advice on the shift from simple knowledge transmission to the development of key competences?

Having projects that are related to the practice (daily work life), optimal situation would be to have content of the project that is applied in practice, as it is a great motivation for the students and with the motivation comes the development of competencies such as visioning, observation etc.

Discussion – topics for active discussion with the students, support activity of the students, student are partners and motivate them to present their opinion. This helps the students in developing competencies such as dialogues and participation.

Inter-institutional/international cooperation – cooperation or just simple communication with external groups of students interested in similar topic increase the activity of students, their concentration and motivation. The students develop the communications skills, observation as well as participation.

To involve students also by letting them to find and interpret own sources of information,



Use variability of environments, teaching materials, tools, and methods, focus on the different competences development and support it with the relevant activities.

Reduce the amount of theory, focus more on practical parts, exercises.

#### 6.5.2.5 What is your main challenge?

Main challenge – MOTIVATION

- How to motivate different groups of actors?

- Students active approach, communication (repeating in new course)
- Farmers + external experts why they should participate, responsibility, role, time possibilities
- Teachers why they should change traditional approach
- Institutions why to support innovative approaches
- + Long term motivation

## 6.5.2.6 What are the three best ideas from the workshop for how to deal with that main challenge?

Communication with the board – convince them with scientific proof represented by the research results from the activity. Here we have chance to update student's projects in more research-oriented way and to gain good quality results for further processing and possible publication. This could be very appealing for the faculty board; at the same time this approach is (in our case) new and relatively easy to realise (possible) and to repeat during following cycles (sustainable).

Publish paper with results – it is possible to gain support also through the publication of the scientific papers. Among the papers resulting from the previous point (research-oriented student projects), we can focus on papers describing the outputs of the innovative learning approaches based on NEXTFOOD. This could be repeated after each few cycles or multiplied by application of the NEXTFOOD approaches also in other courses.

Individual conversation with key persons on the institution and their involvement into activity - experience learning. Instead of the presentation to the whole board, the individual meetings with key persons could be better option. This process is time demanding (also for the members of the faculty board), another challenge is also their function period, where some of them are replaced after relative short time, but still, it is possible to have individual meetings with each of them. Here we can expect the snowball effect, the more key persons gain the personal experience and will see the results, the more supporters our approach will have.



# 7 Case 8: University of Gastronomic Science

Authors: Natalia Rastorgueva, Paola Migliorini, Charlotte Prelorentzos

### 7.2 Chapter 1 ID card MAFS

#### Course title, level and language

Master in Agroecology and Food Sovereignty

(1 year Programme of 90 ECTs)

#### Course learning goals

This Master programme educates the next generation of agroecologists with necessary competences (knowledge and skills), needed to become active facilitators of change in agrifood systems and to support food sovereignty.

With a systemic case- and action-based approach and classes integrating natural and social sciences, the MAFS students will develop an understanding of the ecological, technical, social, economic, cultural and policy dimensions of agricultural and food systems; and a trans-disciplinary profile and competences based on holistic knowledge and necessary skills to cross the gap between knowing and doing and to become a facilitator of change.

The programme is based on an experiential learning approach and supervised actionresearch in agroecological communities, combined with farm visits, garden activities, lectures and seminars on campus.

#### Host institution(s) and course leader(s)

The University of Gastronomic Sciences (Pollenzo, Italy) Course leader (convenor) – Prof. Paola Migliorini

#### Timeline of the activities covered in this report

September 2020 – September 2021

#### Learner categories and number per category (demographics)

- 11 females, 5 males;
- 1 student with Master degree, 15 students with Bachelor degree



#### Stakeholder categories and type of involvement

Network of farmers – partners of the university and Slow Food communities. The stakeholders provide their farms for field visits and invite the students in their communities for action research.

#### Shortlist of learning arenas

• Classroom lectures where the learners listen to teachers. Sessions last for four hours and included group discussions, questions & answers activities.

• Field visits. Learners are given tasks on-site to solve together with stakeholders. One day.

• Nearby farms. On-farm demonstration. One day farm visits.

• The University garden. Learners had different activities in the Garden including gardening and different workshops. Garden activities last four hours.

• Terra Madre communities in different countries. Learners combined their action research and contribution to the communities. The students spend three months in the communities.

• Electronic education platform (Blackboard). Was used for different activities under Covid-19 restrictions.



### 7.3 Extended summary

#### 7.3.1 Research results since the previous reporting

#### 7.3.1.1 Students', teachers' and other stakeholders' experiences and learning

Involvement in the first edition of MAFS was exiting for all participants including students, teachers and other external stakeholders.

The students have experienced action learning approach, competence development, regular reflection activities and carrying out action research in the Slow Food communities, thereby combining theory and practice.

The involved professors (guest and USING professors) were asked to apply action learning approach in order to contribute to essential shifts.

The involved stakeholders (nearby farmers and representatives of the Slow Food Communities) had different experience and benefits after participation in the MAFS activities.

## 7.3.1.2 Outcome of the case development process, including effects of making the essential shifts

The main outcome of the case development process of MAFS was the fact that its first edition was successful notwithstanding different organisational challenges and has preparate the Agroecologists that will be facilitators of changes.

#### 7.3.1.3 Supporting and hindering forces for implementing the Nextfood model

For shift from lecture hall to a diversity of learning arenas the main supporting force was provided university facilities such as classrooms, online platform, University Garden and open spaces, and relationships with the stakeholders, that allowed to provide an availability of such learning arenas as nearby farms and Slow Food communities were the students had their experiential part. Whilst the Covid-19 restrictions were the main hindering force for this shift.

For shift from lecturing to co and peer learning the main supporting force was a close contact with the guest professors and co-designing process of weekly modules. Whilst interpersonal issues between some students was a hindering force.

For shift from syllabus to supporting literature/ a diversity of learning sources, a supporting force was availability of different learning sources including books, films, papers, scientific articles and international electronic databases. Whilst selection of the



learning sources for pre-course assignment, balance between their quantity and quality and their compatibility with learning objectives of each course are the most challenging points for identifying appropriate learning sources.

For shift from textbook to a diversity of teaching aids, an availability of different teaching aids including books, films, papers, scientific articles and online documents was the supporting force for this shift. Whilst selection of the teaching aids for precourse assignment, balance between their quantity and quality and their compatibility with learning objectives of each course are the most challenging points for identifying appropriate learning sources.

For shift from written exam to a diversity of assessment methods, different types of assignment were used as assessment methods: group slides and presentations, individual assignments (papers), stakeholder documents, tests and written group assignments, Portfolio (reflection journal and community portfolio). All these assignments were a part of the co-design process, and a result of discussions with guest professors. This was a supporting force for this shift. Whilst the students' willingness to have different assessment methods for the same discipline was one of the challenges.

For shift from lecturer to learning facilitator, readiness and willingness of the professors to use action learning approach was supporting force for this shift. Whilst lack of sufficient facilitation skills for all professors and tutors was a hindering force for this shift.



# 7.4 Actions taken and data on the development of the case since the last reporting

#### 7.4.1 Actions taken since the previous report

#### 7.4.1.1 Planning

This was the first edition of the Master program, it was developed after 2 Workshops, where different stakeholders were involved.

The MAFS has case-based approach and a 4 phases structure: two first phases on campus for building background and preparing for action learning and action research; the 3<sup>rd</sup> phase in the selected Slow Food communities; 4<sup>th</sup> phase was planned for finalising research thesis and graduation.

The MAFS was developed considering the main shifts such as a strong connection of theory and practice (planned practical experience based on case-based approach for action research); weekly modules for shifting from lecturing to peer and co-learning; facilitated ERS (experience, reflection, sharing) activities for improving core competences.

Planning process of MAFS was started in 2018 and lasted almost two years until September 2020. In order to develop the structure based on action learning approach and to define the content for MAFS, two workshops were organised in 2019 including:

- 9) the 1<sup>st</sup> workshop (February 2019, Pollenzo, Italy) was aimed at defining the structure of MAFS. Activities of the 1<sup>st</sup> workshop are described in details in Appendix 19. Different stakeholders including former and actual UNISG students, professors and researchers from USING and other universities, Nextfood partners from different countries (including representatives of NMBU team) and Slow Food representatives participated in the Workshop. As far as this was an initial workshop, there was discussed a general balance between theory and practice that the students will have during their study, details of the main shifts were planned later.
- 10) The 2<sup>nd</sup> workshop (May 2019, Pollenzo, Italy) was fosuced on exploring the preselected Slow Food communities and creating content & skills modules of the Manifesto. Different stakeholders were invited into in the workshop: Slow Food territorial coordinators (people responsible for communication with the communities in different geographic zones), relevant and former Bachelor students and PhD students, several Nexfood partners.

Further planning procedure of the Master program included drafting Manifesto and its official approval and preselection the Slow Food communities for experiential part of MAFS.



Later, in order to provide shifts from lecturer to facilitator, from syllabus to supporting literature, from textbook to a diversity of teaching aids, from written exam to a diversity assessment method, two online calls were organised with the professors and teaching methods were discussed.

The initially planned activities were reconsidered after the MAFS started due to emerged COVID-19 restrictions.

#### 7.4.1.2 Implementation

The Covid-19 affected a lot the MAFS. Many planned farm visits were cancelled or organised in a virtual way. As far as Italian legislation concerning the Covid situation was changing several times, and situation in the world was changing as well, these forced the students to change their communities (places for action research). All these changes happened very quickly and required high level of adaptability as from the students as from teachers.

#### 7.4.1.3 Reflection

After the first edition of MAFS several internal reflective workshops were organised. During these workshops the new (the 2nd) edition was adjusted.

The reflection activities included:

- 4) One online meeting with students was organised in September 2021. This reflection circle included two rounds: (1) Sharing interesting, inspired and useful aspects; sharing challenging and unexpected aspects; and (2) sharing the issues that changed the students' pre-beliefs.
- 5) Feedback from the communities was received in February 2022. The online questionnaire (see Appendix 20) was sent out to the communities in order to evaluate and to understand their experience within the MAFS programme in Phase 3 Action-Learning and Research. The main outcomes of the questionnaire include: all communities benefited from the involvement of the students; enlarging networks, building relationships and exchange, provided hands-on activities were the main students' contributions to the communities; the students' background was appreciated by the farmers; the farmers are eager to participate in the next edition of MAFS.
- 6) Three reflection sessions were organised by the MAFS research group in order to reconsider the next circle of MAFS. The main outcomes of these reflection sessions included following changes: each week activity was reconsidered and adjusted; number of the fixed assessments was reduced, thereby providing shift from fix assessment to a diversity of assessment methods; the process of the community matching will be more participative and will include more meetings; weekly ERS (experience, reflection, sharing) activities were adjusted



on order to provide more space for reflection; in order to make academic approach more practical, more external stakeholders will be involved into classes, particularly Agroecology activists for each studied topic (representatives of NGO, farmers, ect).

#### 7.4.2 Students' responses, learning and competence development

#### 7.4.2.1 Methods of data collection and analysis

#### 7.4.2.1.1 First week (day) & last week (day) of the course

#### 7.4.2.1.1.1 Student's understanding, contributions, and expectations

Similar to previous three years, four initial questions and five final questions were collected in line with the Nextfood template. Before data collection the students signed a paper where they gave a consent for using their data for the research purposes. The initial questions were asked at the beginning, at the middle (after the 2<sup>nd</sup> phase), and at the end of MAFS. Online questionnaire was created on Qualtrics and was sent to the students, the questionnaire contained a question concerning the students' consent for using their data for the research purposes. Collected answers were extracted from Qualtrics and analysed. Inductive and deductive (deductive coding is based on the predefined coding tree) approaches were used for coding in Nvivo software. Coded text was used to describe the competence development.

Initial questions included following:

- What are knowledge and skills we need to support sustainable development in agri-food and forestry systems?
- What experiences and competences do I bring to this course to make it a success?
- What are the questions I would like this course to help me find an answer to?
- What are the competences I'd like to train and improve significantly during this course?

Final questions included following:

- What are knowledge and skills we need to support sustainable development in agri-food and forestry systems?
- What experiences and competences did I bring to this course to make it a success?
- What are the questions did this course to help me to find an answer to?
- What are the competences did I train/improve significantly during this course?
- At the end of this course, what are the questions I am now asking myself?

#### 7.4.2.1.1.2 Self-assessment of competences



Digital self-assessment test was used as a quantitative tool for data collection. The students evaluated level of their core competences in October 2020 (first week of the Master) and in September 2021 (last week of the Master). Questions based on 9-point Likert scale were prepared in Qualtrics. Received responses were download in excel and elaborated in SPSS 26, paired t-test was used in order to identify p-value for each core competence.

#### 7.4.2.1.2 Students' final reflection document (individual)

The learners were asked to answer several questions for preparing their reflection papers after each phase.

After the 1<sup>st</sup> phase reflection paper there were asked the following questions:

- What exactly did I see?
- What did happen?
- What did I experience?
- What did I feel? Think about this?
- What did I learn from this?

After the 2<sup>nd</sup> phase reflection paper there were asked the following questions:

- What am I learning?
- How did I develop?
- How this phase connected to my upcoming action research phase?
- What is my learning goal for the next phase of the programme?

After the 3<sup>rd</sup> phase reflection paper there were asked the following questions:

- What am I learning?
- How did I develop?
- How is this connected to my future after the programme?
- What is my learning goal for the next phase of the programme?

Only Individual reflections after the 3<sup>rd</sup> phase were analyzed, because they contained the students' thoughts about the experiential phase of MAFS. This phase included numerous activities such as relationship with the stakeholders, action research process, development of action research project, contribution to the communities, regular discussions with the tutors.

The students' reflection session about the whole course including the 4<sup>th</sup> phase of MAFS (thesis writing) was oral and was recorded. There the students were asked on the most interesting things in all MAFS and on ways of improvement. They have note down their main assumptions and discussed them during the sharing circle.



NVivo software was used for qualitative data analysis. Coding process was based on provided coding tree. Several coded references are provided below in order to illustrate the students' competence development and progress in system thinking

The research fellow of the project performed qualitative and quantitative analysis.

#### 7.4.2.2 Results

#### 7.4.2.2.1 How do students experience such a learning process with respect to:

#### 7.4.2.2.1.1 learning goals?

Due to the different students' background and different professional experience, they had different learning goals at the beginning of the course. Inductive coding in NVivo used for analysis of learning goals. The codes were merged in order to provided structure of learning goals. Thus, based on analysis of initial students' questions the main learning goals could be described by following groups:

- Learning about promoting and practical application of agroecological practices;

- Learning about encouraging people to contribute to sustainable agricultural practices and knowledge exchange

- Learning specific subjects (plant protection, production processes, climate change, gender issues)

- Handling complex situations,

- Learning new methodologies,

- Understanding a personal role in the complexity of the food system.

Initial learning goals demonstrate a wide range of issues of the students' interests including different ontological goals and personal role in the complexity of food system. According to the analysis, more goals are ontological and included such issues as agroecology and its practical application (typical question for the students that started Master in Agroecology and Food Sovereignty), other specific ontological goals (plant protection, production process etc.), goals related to new methodologies.

According to analysis provided in the previous Case Development Reports, at the beginning of course the students have more ontological goals, few change-oriented goals and goals connected with inner reflection.

#### 7.4.2.2.1.2 view on competences needed for sustainable development?

After comparison initial and final students' responses, there were clarified a difference between the skills mentioned at the beginning and at the end of the course.

Besides communication skills and leadership (these skills were mentioned at the beginning and at the end of the course), the students specified following competences:



soft skills, 5 core competences, empathy, combination of skills with theoretical knowledge and practice, motivation, open-mind.

At the end of the course the students mentioned cooperation and collaboration, teaching, increased awareness, critical thinking, thinking about future, facilitation skills, skills in economic research, artistic skills, networking and dynamic communication.

Communication skills and leadership were mentioned by the students at the beginning and at the end of the course, it means that after one year of MAFS the students confirmed their initial understanding of the competences for sustainable development.

Furthermore, as demonstrates comparison of initial and final students' views on the competences for sustainable development, after all activities of MAFS, the students have more detailed understanding of sustainable development of agri-food systems and about needed actions for it. That is why their answers had changed after one year.

#### 7.4.2.2.1.3 recognition of own competences and competence development?

The students' answers to initial question "What experiences and competences do I bring to this course to make it a success?" and to final question "What experiences and competences did I bring to this course to make it a success?" were extracted and compared.

Thus, similarly to the previous action learning courses, among the competences recognized by the students at the beginning and at the end of the Master Program there were distinguished three main groups: core competences, specific knowledge and other skills.

The first group, core competences, includes only three core competences mentioned by students: dialogue, observation and reflection. Participation and visioning skills were not recognized as own competences that the students brought to the course.

The second group, specific knowledge, includes different knowledge connected to the students' background, such as graphic design, technology and fermentation. At the end of the Master, the students described more precisely their specific knowledge, such as knowledge on organic agriculture, small-scale farmers and indigenous people, decolonization; experience in plant growing and urban agriculture, anthropology background; skills in data collection.



The third group includes a variety of other skills mentioned by the students: such as empathy, language skills, writing skills, facilitation and teaching skills, multicultural experience

#### 7.4.2.2.1.4 transformation?

Transformation of the students' mindset could be described by differences in their initial and final questions, their comparison is provided in Table 13 below:

Table 13 Initial and final questions

Description of Initial questions	Description of Final questions		
<ul> <li>Many brief questions;</li> </ul>	<ul> <li>Change-oriented questions;</li> </ul>		
<ul> <li>Willingness to understand basic</li> </ul>			
concepts (agroecology, food	<ul> <li>Questions about the future job and</li> </ul>		
sovereignty);	activities;		
- Many questions about general			
concepts;			
<ul> <li>Expressed interest to role of education</li> </ul>	<ul> <li>Questions related to understand the</li> </ul>		
for agroecology and sustainable	student's role in agri-food system		
agriculture;			
<ul> <li>General questions concerning "my role</li> </ul>			
as an agroecologist"			

At the beginning of the course the students asked typical questions related to understanding the concept of Agroecology and Food Sovereignty, role of education for Agroecology and their role in these concepts. These questions demonstrate the students' interest to know more about these concepts,

Usually, transformation is understood as a significant change. Differences between initial and final questions demonstrate changes in the students' mind. An example of transformation is demonstrated on comparison of initial and final questions of a MAFS student.

Initial questions of student St\_MAFS\_1: "How can we better manage food waste?"

Final question of student St\_MAFS\_1: "How can I increase my participation in the sustainable agriculture and bioregional food movement in my community?"

Example of this student demonstrates change from brief ontological question with interest in a general issue to more detailed change-oriented question and willingness to contribute to the specific place. In other words, interest to an ontological issue was transformed to interest to personal participation and personal contribution to the local community.



#### 7.4.2.2.2 To what extent does the education enhance the students' competences of:

Table 14 demonstrates a solid growth in the students' core competences after one year of MAFS and shifts between levels (from advanced beginner to competent performer and proficient performer). T-test demonstrates a high and a very high statistical significance of competence assessments.

	2021 (n=13)				
Competencies	First day	Last day	Change	P-value	
Observation	3,76	6,86	3,10	**	
Participation	4,85	7,53	2,68	**	
Visioning	3,76	6,06	2,30	**	
Reflection	4,32	7,21	2,89	**	
Dialogue	4,05	6,92	2,87	***	

Table 14 Core-competences of the students, results of the 1-year Master Program "Master in Agroecology and Food Sovereignty"

Levels: 1-2 = novice; 3-4 = advanced beginner; 5-6 = competent performer; 7-8 = proficient performer; 9 = expert \*p<0.05, \*\*p<0.01, \*\*\*p<0.001

More detailed analysis of each competence is provided below in appropriate subchapters. Analysis of competence development starts with discussion of the results of self-assessment test and followed by discussion of coded text of Individual reflection documents.

#### 7.4.2.2.2.1 observation?

According to results of self-assessment test, observation competence had the highest growth among all core competences assessed by the MAFS students. After one year of action learning activities the change in assessment was 3,10, thereby demonstrating a shift from the lowest border of advanced beginner level to the highest border of competent performer level. Dynamics of observation competence has a high statistical significance (p<0,01).

During the all phases of the MAFS the students had different practical activities including field visits, web-cases, gardening activities, and during the 3<sup>rd</sup> phase observing community's activities was one of the main initial tasks for all students. All these experiences allowed them to improve their observation skills.

Two following quotes from the students' reflection documents coded as "Observation" demonstrate how the activities of the 3<sup>rd</sup> phase enhanced observation skills for majority of the students.

St\_MAFS\_2 "I realized that the practices I needed to observe in the relationship between humans and soil, to see soil's capacity to function as a vital living



ecosystem that sustains plants, animals, and humans, were not necessarily present there"

St\_MAFS\_3 "I was able to observe several trends which related to agroecological practices this include soil management, water use, agrobiodiversity, traditional knowledge and climate change issues"

After several month of online activities used under the COVID-19 restrictions, the students should use their observation skills on practice in rural realities.

#### 7.4.2.2.2.2 reflection?

According to results of self-assessment test, change in the assessments of reflection competence is very high (2,89). This growth (from 4,32 to 7,21) demonstrates shift from the Advanced beginner level to Proficient performer. Dynamics of reflection competence has a high statistical significance (p<0,01).

These results of the improvement of the reflection competence were received due to regular weekly reflection activities and exercises such as oral and written reflections and preparing individual reflection journal after each phase performed by the students. Besides these reflection activities, the students had to reflect a lot during their action research in order to use received information for their thesis and for their future career. As the examples of the students' reflection activity (Individual reflection documents) during the 3<sup>rd</sup> phase could be following references coded in NVIVO as "Reflection".

St\_MAFS\_4: "I reflected on the process of production at small scale industry where there are a lot of human labor needed that is why the products is meticulously crafted and the price could not be compared with the mechanized products"

St\_MAFS\_4: "... his (the Stakeholder 1) statement made me reflected on how agroecology stands on organic farming and practices"

St\_MAFS\_5: "I have been reflecting on how to increase awareness of the use of acorns for human consumption both for the conservation of oak trees and for the preservation of biocultural diversity"

These quotations extracted from the Individual reflection document demonstrate how different activities of the 3<sup>rd</sup> phase stimulated the students' reflections, and how these reflections allowed them to connect different concepts such as agroecology and organic agriculture (ex. of St\_MAFS\_4). Example of St\_MAFS\_5 also demonstrates the students' reflection activity targeted at bringing together different aspects.



#### 7.4.2.2.3 visionary thinking?

According to results of self-assessment test, visionary thinking competence has the lowest growth among other competences (2,30), and change from 3,76 to 6,06. This is a good result that demonstrates a shift from the Advanced beginner level to the Competent performer level. Dynamics of visionary thinking competence has a high statistical significance (p<0,01).

Visionary thinking was improved by the students during the 2<sup>nd</sup> phase of MAFS, where there were asked to provide future perspectives in several disciplines as assignments.

An example of the improvement of visioning skill could be a final answer to question "What competences did I improved significantly during this course?" concerning visioning of the student St\_MAFS\_6: "Food sovereignty! I had no idea what it was and now I love it. Also visioning. I have always had a creative person locked up inside my brain, but the visioning at the start of the course was truly eye-opening. I now envision everything"

This quotation could be evidence of recognised personal progress in terms of the improvement of visionary thinking.

#### 7.4.2.2.2.4 participation (engagement)?

As demonstrate results of self-assessment test, participation competence has a high growth (2,68), and change from 4,85 to 7,53 (the highest final assessment among other competences). Similarly to dynamics of the reflection competence, changes of the students assessment demonstrate a shift from the Advanced beginner level to the Proficient performer level. Dynamics of participation competence has a high statistical significance (p<0,01).

Active participation in all planned activities is a primary condition of MAFS based on action learning. Thus, the students participated in class activities and later (during the 3<sup>rd</sup> phase) in the community life. Some of the students were very excited to have a hands-on activity after months of online class.

There are several references extracted from the students' reflection journals and coded as "Participation", that demonstrate their involvement in different activities:

St\_MAFS\_7: "I felt that I was able to participate in an important way as I was given tasks that were crucial to their actual production"

St\_MAFS\_8: "I participated in bottling and labelling activities as well as wine filtering, Ph and sugar content measurements in the place where the community process all the raw materials, I was involved in the productions"



Some students noticed several benefits provided by the participation process:

St\_MAFS\_9: "Lastly, participating in the everyday social exchange and witnessing personality dynamics make me really consider how to best enable healthy collaboration in a time when so many of us carry trauma"

All these students had their experiential part in different regions, however they had similar positive emotions related to their physical participation in the community's life.

#### 7.4.2.2.2.5 dialogue?

According to results of self-assessment test, dialogue competence has a very high growth (2,87), shift from the Advanced beginner level to Competent performer and the highest statistical significance (p<0,001). These results were achieved due to regular plenary discussions and peer feedback activities, that involved all the students and forced them to express their opinions and to follow the dialogue rules.

According to the students, the dialogue competence was useful in making personal relationships with farmers. This is confirmed by a following quotation extracted from the students' reflection document and coded as "Dialogue":

St\_MAFS\_9: "Getting practice in dialoguing with various food system stakeholders is a skill I will carry with me into the future. I have learned that when speaking with farmers, you have to "speak their language" in order to have any chance of enabling positive change"

This example demonstrates a dialogue rule accepted by the student such as using an appropriate "farmers" language, and a usefulness of the dialogue competence that the student will use in future.

#### 7.4.2.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

During the 1<sup>st</sup> and the 2<sup>nd</sup> phases of MAFS, portfolio and individual reflections were the main exercises that allow to improve the students' system thinking.

Preparing portfolio (as a part of action research) included description of different aspects related to the community where the students will have experiential part of action learning.

Weekly individual reflection as a part of action research enhanced students' capacity to reflect. The students were asked to fill the individual reflection journal every week.



This didactic activity encourages the students to remind all previous activities and to connect them with their inner world.

Furthermore, during the experiential part of MAFS the students faced the rural realities and complexity of the communities' life. The students received a lot of information from the stakeholders, that allowed them to improve their system thinking, that is confirmed by the quotations from the students' Individual reflection documents.

St\_MAFS\_10: "All these quick activities in the first week have given me a situation awareness of how it farm system is functional. I have developed in the skill of systems thinking"

St\_MAFS\_4: "The phase of learning in class has given me the global picture of the current food system that we are living in right now. On the farm, I really learn a small scope of food system and these two perspectives bring new idea to me when I put it into a system thinking"

The 3<sup>rd</sup> phase has provided to the students an understanding of how the farm works as a system and how to connect received theoretical knowledge and practical experience. This enhanced the students' capacity dealing with "the challenge of the whole". Both quotations demonstrate recognized improvement of the students' skill of system thinking.

## 7.4.3 Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education

7.4.3.1 Methods of data collection and analysis

#### 7.4.3.1.1 Teacher reflection document

Teacher reflection document was prepared during the 1-hour reflection workshop. The MAFS team including two MAFS teachers and one facilitator participated in the reflection workshop. The workshop was targeted at understanding supporting and hindering forces, main lessons learned and future plans after the 1<sup>st</sup> edition of MAFS. The participants prepared answers concerning main challenges, and inspiring and useful aspects. Results of this reflection activity were used for the planning and adjusting the next cycle of MAFS.

#### 7.4.3.1.2 Course reflection focus group/interviews

Online course reflection session was organised online with the students in September 2021 in order to understand the most interesting inspiring and useful aspects and main challenges of the course. Thus, the students had 2 rounds and had an opportunity to share their individual point of view with other.



#### 7.4.3.2 Results

7.4.3.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

#### 7.4.3.2.1.1 From lecture hall to a diversity of learning arenas

#### 7.4.3.2.1.1.1 Supporting forces and how to build on them

Provided university facilities such as classrooms, online platform, University garden and open spaces were considered as learning areas for this Master. Other supporting force is relationships with the stakeholders, that allowed to provide an availability of such learning arenas as nearby farms and Slow Food communities. These supporting force will be used for the next cycle. The University garden will be used more.

Depending on the current Covid-19 restrictions, different areas were used as learning arenas: class rooms, the University garden, online platform, the University open spaces. As far as online education was used most time, virtual rooms played role of main learning arenas.

Online education provided several benefits such as connection between professors and the students based in different countries, and recorded classes that could be used by students several times or according to their time zone. However, the action learning approach that attracted the students suffered from lack of hands-on activities limited due to red zone and lock down period

#### 7.4.3.2.1.1.2 Hindering forces and how to deal with them

National and regional Covid-19 restrictions and related uncertainties were the main hindering forces that allowed to use only online platform as learning arena.

#### 7.4.3.2.1.2 From lecturing to co- and peer learning

#### 7.4.3.2.1.2.1 Supporting forces and how to build on them

Different activities were planned weekly modules including numerous plenary discussions, group presentations and peer-feedback sessions. According to the outcomes of the Course reflection session, the students learned from experience of their colleagues.

Group work and group papers (group assignments and group presentation) were planned as one of basic principles of the Master. The students had a few group activities and peer learning sessions in class, as most of them were online, however group work had positive feedback from the students.



"Close contact with the guest professors and co-designing the weekly modules was one of useful and inspiring issues for MAFS" (teachers' reflection document) – these close contacts between MAFS team and teachers allowed to better plan weekly activities and to implement for the 1<sup>st</sup> and 2<sup>nd</sup> phases.

#### 7.4.3.2.1.2.2 Hindering forces and how to deal with them

According to the students' individual reflection journal (Individual reflection of student St\_MAFS\_11), the students' interpersonal relations and tensions among some students in the groups were hindering forces for this shift. Different compositions of the groups could alleviate this.

## 7.4.3.2.1.3 From syllabus to supporting literature/a diversity of learning sources *7.4.3.2.1.3.1 Supporting forces and how to build on them*

Availability of different learning sources was a supporting force for the shift. The students were exposed to numerous learning sources: books, films, papers, scientific articles and international electronic databases, that were used as learning sources. Pre-course assignment (study of the materials before the course) was one of the features of Master Program.

Each professor provided learning sources. Selection of the learning sources for precourse assignment, balance between their quantity and quality and their compatibility with learning objectives of each course are the most challenging points for identifying appropriate learning sources.

Good feedback from the students could be considered as an indicator of right learning sources. Right learning sources help to the students to understand better the course concept, to participate in further discussions and to answer the students' questions.

#### 7.4.3.2.1.3.2 Hindering forces and how to deal with them

Selection of the learning sources for pre-course assignment, balance between their quantity and quality and their compatibility with learning objectives of each course are the most challenging points for identifying appropriate learning sources. More time dedicated to the selection of the right sources could be a solution for this hindering force.

#### 7.4.3.2.1.4 From textbook to a diversity of teaching aids

#### 7.4.3.2.1.4.1 Supporting forces and how to build on them

The students were exposed by different materials including books, online documents, videos, reports, access to databases that provided a strong support for the 1<sup>st</sup> and 2<sup>nd</sup> phases of MAFS. Availability of these materials was the supporting force for this shift.



#### 7.4.3.2.1.4.2 Hindering forces and how to deal with them

Selection of the teaching aids for pre-course assignment, balance between their quantity and quality and their compatibility with learning objectives of each course are the most challenging points for identifying appropriate learning sources. More time dedicated to the selection of the right sources could be a solution for this hindering force

#### 7.4.3.2.1.5 From written exam to a diversity of assessment methods

#### 7.4.3.2.1.5.1 Supporting forces and how to build on them

Different types of assignment were used as assessment methods: group slides and presentations, individual assignments (papers), stakeholder documents, tests and written group assignments, Portfolio (reflection journal and community portfolio). All these assignments were a part of the co-design process and a result of discussions with guest professors. This was a supporting force for this shift.

This diversity of assessment methods allows to the students to demonstrate their creativity and gives more freedom to express their ideas. Furthermore, group assignments encouraged the students to learn from their peers, to share responsibility and improve dialogue competences.

#### 7.4.3.2.1.5.2 Hindering forces and how to deal with them

The students' willingness to have different assessment methods for the same discipline was one of the challenges. This was considered for the second edition of MAFS.

#### 7.4.3.2.1.6 From lecturer to learning facilitator

#### 7.4.3.2.1.6.1 Supporting forces and how to build on them

Readiness and willingness to use action learning approach of the professors was supporting force for this shift. During preparation of the MAFS program the professors were informed about action learning approach and had time to prepare appropriate didactic activities.

#### 7.4.3.2.1.6.2 Hindering forces and how to deal with them

Not all professors and tutors have sufficient facilitation skills, this was a hindering force for this shift. Pre-training could be a solution for this hindering force.

Not all professors had sufficient time for better organisation and reflection, that resulted in provided classis frontal lectures, thereby impeding the shift.

Lack of personal presence (formal and informal relations with the students) and lack of weekly space for sharing personal issues was another hindering force for this shift.



Reconsideration of weekly structure of the didactic activities and written document would be a potential response for these hindering forces.

#### 7.4.3.2.2 What such a change requires from teachers, students, and institutions

From teachers such shifts (readiness to online teaching and facilitation) require a high level of flexibility and familiarity with digital tools including knowledge of options of electronic platforms.

From the students such shifts require several issues: patience; as lack of social life is one of the students' complains; familiarity with use of digital tools; and high level of engagement such as participation in online group work and plenary activities.

"ERS (experience, reflection, sharing) activities were overwhelming and need better organization, this also requires a better balance between the students' free time and time for study. That could be achieved through the students' improved self organization" (Teachers' reflection). This quotation demonstrates that a good selforganization is required from the students.

From the institutions such shift requires financial support in order to have opportunity to employ people with experience in action learning and to train them.

#### 7.4.3.2.3 Teachers' perception of the greatest challenges to achieving such a change

Lack of sufficient institutional support was considered as the greatest challenge to achieving such change. This institutional support includes economic support (provided funding for people involved in action learning activities) and organisational issues (including favourable conditions for continuous application of action learning approach).

As was mentioned before, MAFS has case-based approach and the 3<sup>rd</sup> experiential phase was a central part of the program that allowed to the students to carry out their research and to connect theory and practice. Therefore, processes of community selection and matching the students and communities were very important as for the students as for the stakeholders (representatives of the communities). However, a great challenge was related to the organizational issues of the of community matching.

Besides, according to the teachers' reflection, another institutional challenge was related to the novelty of MAFS and to the fact that it was the 1st edition of this innovative master Program. MAFS included several new organizational issues, and responsibility of this organization was not taken immediately by the administrative staff.



# 7.5 Concluding remarks on the case development since the previous reporting

#### 7.5.1.1 The most useful and inspiring experiences (supporting forces)

According to teachers' reflection document, there were several the most useful and inspiring aspects for shifts related to the new MAFS. Firstly, a daily team work of our UNISG team and a good internal collaboration that allowed to be very flexible and to adjust the MAFS activities to changing conditions. Secondly, shared reflections by the students have provided a good opportunity to see the students' points of view on the learning process. Thirdly, visible results of planned activities allowed to see how the students have developed action learning approach. Fourthly, close contacts with the guest professors for discussing their activities, content of classes, and supporting materials were a part of co-designing the weekly modules and allowed to shift from textbooks to diversity of teaching aids and from written exams to diversity of assessment methods. Last but not least, an availability of the university facilities has provided a shift from class to diversity of learning arenas, this gives an idea about how to deal with this supporting force in the next MAFS.

#### 7.5.1.2 Main obstacles/challenges encountered (hindering forces)

According to the teachers' reflections, one of the main challenges was related to the novelty of the Master such as not sufficient number of team members. The next challenge was related to uncertainties caused by the Covid restrictions such as not predictable rules and laws determined by the regional authorities. A collaboration with some stakeholders involved in co-design process was challenging as well.

Institutional challenges were related to the 1st edition of MAFS and its novelty such as a fact that the administrative staff did not immediately take responsibility of their organization. Another challenge related to the organizational issues affected the process of community matching, i.e., selection places for further experiential part.

Besides institutional challenges, there were the students-related issues such as right balance between the students' work and free time and better organisation of ERS activities. Both these challenges will be considered in the next edition of MAFS.

7.5.1.3 Lessons learned from the inspiring experiences and from dealing with the challenges According to the teachers' reflections, there are several lessons learned. First of all, the organisational issues should be improved, and institutional and informational needs should be clearly expressed. Furthermore, a complexity of the selection process of places for experiential part of the Master should be deceased. Besides, an improvement of the collaboration between the stakeholders and university, and identification of added value for all involved stakeholders was considered as lessons learned.



#### 7.5.1.4 Plans for how to move forward into the next cycle

Plans for how to move forward include reconsideration of Masters' organisation and improvement of didactic activities. Besides, the collaboration with the stakeholders involved into education process will be reconsidered as well in order to improve the stakeholders' participation and make it more useful and interesting for the students. The ERS activities based on Experience, Reflection, Sharing and including group and individual exercises of action learning organised before and after classes, will be better organised for the second edition of MAFS.

Last, but not least, there is a great hope to have all activities in presence not online, i.e. without the Covid-19 restrictions or similar.



### 7.6 Chapter 2 ID card MOG

#### Course title, level and language

One-week course of Agroecology and Sustainable Agriculture

A part of the Master of Gastronomy, touch in English

#### Course learning goals

The essence of this course is to develop the ability to link ecological concepts and principles to the design and management of sustainable farming systems, with specific reference to organic farming. A farm case will play a key role in the learning process, and will be supplemented by lectures on specific topics of relevance to sustainable and agroecology.

#### Host institution(s) and course leader(s)

The University of Gastronomic Science

Course leaders: Paola Migliorini and Geir Lieblein

#### Timeline of the activities covered in this report

September 2021

#### Learner categories and number per category (demographics)

23 learners including 19 female and 4 males

#### Stakeholder categories and type of involvement

Farmers – partners of the university

#### Shortlist of learning arenas

- Classroom lectures where the learners listen to teachers. Sessions last for four hours and included group discussions, questions & answers activities.
- Field visits. Learners are given tasks on-site to solve together with stakeholders. One day.
- Nearby farms. On-farm demonstration. One day farm visits.
- The University garden. Learners had different activities in the Garden including gardening and different workshops.
- Electronic education platform (Blackboard). Was used for different activities under Covid-19 restrictions.



### 7.7 Extended summary

#### 7.7.1 Research results since the previous reporting

#### 7.7.1.1 Students', teachers' and other stakeholders' experiences and learning

This course demonstrated a good collaboration between the students, teachers and stakeholders.

The students were excited by the diversity course activities (farm visits, interviews with farmers, preparing Rich picture), some of them found new ideas from the course for their future career.

The course again was facilitated by two professors, and this fact was appreciated by the students.

# 7.7.1.2 Outcome of the case development process, including effects of making the essential shifts

The main outcome of the case development is that in presence activities of the course based on experiential learning approach is more efficient than online one, as demonstrated different rural realities for the students with different backgrounds.

#### 7.7.1.3 Supporting and hindering forces for implementing the Nextfood model

Use of physical action learning approach was the main supporting force for shift from lecture hall to a diversity of learning arenas, as it allowed to use all university facilities (garden, library, open spaces) and farms. Whilst possible future restrictions related to Covid could be considered as a potential hindering force.

The students' interest to shift from lecturing to co- and peer learning was a supporting force as well as presence of two course facilitators with appropriate skills. Whilst a short time of the course was the main hindering force.

For shift from syllabus to supporting literature/ a diversity of learning sources, an experience of several previous cycles was the main supporting force. There were no hindering forces for this shift.

For shift from textbook to a diversity of teaching aids, an experience of several previous cycles was the main supporting force. There were no hindering forces for this shift.

For shift from written exam to a diversity of assessment methods, an experience of several previous cycles was the main supporting force. There were no hindering forces for this shift.


Availability of the two involved facilitators was a supporting force for shift from lecturer to learning facilitator. Whilst a lack of time and schedule with overwhelmed activities of both professors could be a hindering force for this shift.



## 7.8 Actions taken and data on the development of the case since the last reporting

### 7.8.1 Actions taken since the previous report

### 7.8.1.1 Planning

The course planning was based on previous experience used before the Covid-19 restrictions. The main change in planned activities is that the course was based on physical activities again, therefore the course had the same structure and all class and experiential activities including farm visits were in presence.

### 7.8.1.2 Implementation

The course was carried out according to developed plans. Besides changes from online to physical activities, the main difference is the time of the course (from the spring time it was postponed to September). Due to lack of the Covid-19 restrictions as the main hindering force, the essential shifts were performed.

### 7.8.1.3 Reflection

An internal 1-hour workshop was organised in order to collect teacher reflection. During the workshop challenges and inspiring aspects of the course were identified.

### 7.8.2 Students' responses, learning and competence development

### 7.8.2.1 Methods of data collection and analysis

Similar to previous three years, four initial questions and 5 final questions were collected in line with the Nextfood template. The initial questions were asked during the 1<sup>st</sup> day of the course, final questions were asked during the last day of the course. Online questionnaire was created on Qualtrics and was sent to the students. The questionnaire contained a question concerning the students' consent for using collected data for the research purposes. Collected answers were extracted from Qualtrics and analysed. Inductive and deductive approaches were used for coding in NVivo software.

### 7.8.2.1.1 First week (day) & last week (day) of the course

### 7.8.2.1.1.1 Student's understanding, contributions, and expectations

The students' responses on the 4 initial and 5 final questions (asked at the beginning and at the end of the course) in line with the Nextfood template. The students' individual reflections were collected at the end of the course and used as qualitative data.

Initial questions included following:

- What are knowledge and skills we need to support sustainable development in agri-food and forestry systems?
- What experiences and competences do I bring to this course to make it a success?



- What are the questions I would like this course to help me find an answer to?
- What are the competences I'd like to train and improve significantly during this course?

Final questions included following:

- What are knowledge and skills we need to support sustainable development in agri-food and forestry systems?
- What experiences and competences did I bring to this course to make it a success?
- What are the questions did this course to help me to find an answer to?
- What are the competences did I train/improve significantly during this course?
- At the end of this course, what are the questions I am now asking myself?

NVivo software was used for qualitative data analysis. Coding process was based on coding tree. Several coded references are provided below in order to illustrate the students' competence development.

The research fellow of the project performed qualitative and quantitative analysis.

### 7.8.2.1.1.2 Self-assessment of competences

Digital self-assessment test was used as a quantitative tool for data collection. The students evaluated level of their core competences on first day of the course and on last day of the course. Questions based on 9-point Likert scale were prepared in Qualtrics. Received responses were download in excel and elaborated in SPSS 26, paired t-test was used in order to identify p-value for each core competence.

The research fellow of the project performed qualitative and quantitative analysis.

### 7.8.2.1.2 Students' final reflection document (individual)

The students' responses on the initial and final questions (asked at the beginning and at the end of the course) and the students' individual reflections were collected and used as qualitative data.

At the beginning of the course the students were asked to answer following questions:

- What are the knowledge and skills we need to support sustainable development in agri-food and forestry systems?
- What experiences and competences do I bring to the course to make it a success?
- What are the questions I would like this course to help me find an answer to?



- What are the competences I'd like to train and improve significantly in this course?

At the end of the course the students were asked to answer following questions:

- What are the knowledge and skills we need to support sustainable development in agri-food and forestry systems?
- What experiences and competences did I bring to the course to make it a success?
- What are the questions I did this course to help me find an answer to?
- What are the competences did I train/improve significantly during this course?
- At the end of this course, what are the questions I am now asking myself?

The reflection document included following questions:

- What happened?
- What did I think and feel?
- What did I learn?
- What do I now need to learn more about process and content?

Data collected after MOG course is different from data collected after each phase of MAFS. First of all, duration of MAFS is one year, and it includes numerous reflection activities. Furthermore, questions for the students' reflection after each phase were different, but the same question for all types of reflection activities both for MAFS and MOG was "What did I learn?"

NVivo software was used for qualitative data analysis. Coding process was based on predefined coding tree. Not all text of the documents was coded, as not all students mentioned improvement of the core competences.

### 7.8.2.2 *Results*

7.8.2.2.1 How do students experience such a learning process with respect to:

### 7.8.2.2.1.1 learning goals?

Among initial questions and learning goals there were distinguished the follow questions and assumptions:

- general goals related to better understanding of Agroecology and its practical application in different scales and in different countries;
- questions related to sustainability and climate change;
- questions related to connection of the course content and its value for practical application, for example: "How to build my own farm?"

At the end of the course there were less questions that at the beginning, there are two main types of final questions and assumptions:



- interest to sustainability of different farms and to the details of the different aspects of sustainability,
- demonstrated willingness to change or to improve current situation or changeoriented questions, as demonstrated the examples of the MOG students: St\_MOG\_1: "What can I do to help agroecology to become the status quo of agriculture?"

St\_MOG\_2: "How can I get involved in my home country?"

### 7.8.2.2.1.2 view on competences needed for sustainable development?

Knowledge/understanding of the main concepts used in agriculture (basic knowledge in botany, supply chain), different the skills: from adaptability to holistic view, and values such as empathy

There is no significant difference between listed competences for sustainable development at the beginning and end of the course, that can be demonstrated on following examples.

Student St\_MOG\_3: did not demonstrate a big change, as in initial and final answers was mentioned the same issue (environmental aspect).

Answer at the beginning of the course: "..we have to work with the natural resources, and its richness, making a good use of all the ecosystem that inhabits the Earth"

Answer at the end of the course: "Respect nature in its whole. Let nature, trees, insects, soil, air, seeds, plants, animals, welcome the system impose by the worker of the land. The farmer should work in consonance with natures' benefits"

Student St\_MOG\_4: did not demonstrate a big change, as in initial and final answers were used the same words.

Answer at the beginning of the course: "Empathy and community! I think these values create a much more holistic system that has goals besides profit.

Answer at the end of the course: "Empathy!! I think empathy is very important. Empathy allows people and the planet to be prioritized over money"

Student St\_MOG\_2: demonstrated a shift from general issues to slightly more precise ones.



Answer at the beginning of the course: "We need more awareness and empathy from people of all disciplinary backgrounds to be more open to changing the ways we learn and eat. Skills will need to be adaptability, working with technologies that do not hinder tradition and culture, and be better listeners"

Answer at the end of the course: "We need to support those who are practicing no till and biodynamic agriculture. I believe that spreading these practices to be done at smaller scales but in more places can help increase biodiversity and overall awareness of one's connection to nature. I also think it will be helpful to make people more aware about the malpractices of monocultures and to stop labelling them as the reasons the world is being fed"

Lack of the significant differences between initial and final answers could be explained by short time if the course activities, and some students need more time to change their mindset.

#### 7.8.2.2.1.3 recognition of own competences and competence development?

The students had pre-reading assignments and during the first day of the course the competences were introduced. The students answered the initial questions during the first day of the course (in the afternoon).

Similarly to the previous action learning courses, among the competences recognized by the students at the beginning and at the end of the course (i.e. based on initial and final answers) there were distinguished three main groups: core competences, specific knowledge and other skills. This could be explained by the fact that the students did self-assessment test after initial questions. The self-assessment forced the students to assess their competences in details and focused their attention in sub-questions for each competence

The first group, core competences, includes only four core competences mentioned by students: observation, visioning, reflection and dialogue. Participation skills was not recognized as one of own competences. This could be explained lack of the students' experiential part and lack of the students' participatory approach in the learning process.

The second group, specific knowledge, includes different knowledge connected to the students' background, such farm management, use of social media, experience in gardening, food supply chains,

At the end of the course, the students described more precisely their specific knowledge, such as knowledge on organic agriculture, small-scale farmers and



indigenous people, decolonization; experience in plant growing and urban agriculture, anthropology background; skills in data collection.

The third group includes a variety of other skills mentioned by the students: such as empathy, language skills, writing skills, facilitation and teaching skills, multicultural experience

#### 7.8.2.2.1.4 transformation?

As demonstrated initial and final questions, not all students demonstrated changes in their mindset. Thus, the main evidence of transformation was shift from general questions to specific ones. Besides, at the end of the course there were less questions than at the beginning, there are two main types of final questions and assumptions:

- interest to sustainability of different farms and to the details of the different aspects of sustainability,
- demonstrated willingness to change or to improve current situation: "What can I do to help agroecology to become the status quo of agriculture?"

#### 7.8.2.2.2 To what extent does the education enhance the students' competences of:

Competencies	2021 (n=23)				
	First day	Last day	Change	P-value	
Observation	4,58	5,44	0,86	*	
Participation	4,72	6,22	1,50	**	
Visioning	4,12	5,30	1,18	**	
Reflection	4,75	5,58	0,83	*	
Dialogue	4,68	5,42	0,73	**	

Table 15: Core-competences of the students, results of 1 week course "Agroecology and Food Sovereignty" - MOG

Levels: 1-2 = novice; 3-4 = advanced beginner; 5-6 = competent performer; 7-8 = proficient performer; 9 = expert; \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001

More detailed analysis of each competence is provided below in appropriate subchapters. Analysis of competence development included also coded text of Individual reflection documents. For this course, two-days farm visits represented a practical part for the students.

#### 7.8.2.2.2.1 observation?

According to analysed results of self-assessment test, there is a slight growth of the Observation competence (from 4,58 to 5,44). This data has low statistical significance (p<0,05) due to several responses with lower final assessment (i.e. final assessment



of the competence level was lower than initial one). At the same time, aforementioned growth of the observation competence indicates a shift from Advanced beginner level to Competent performer.

This quote from the reflection journal of student St\_MOG\_3 could be an example of the improved observation competence: "Thus, a consensus about what is good for the supply chain, for the environment, for the city emerges, spreads, and sometimes disappears in favor of new concepts. This could be discovered also by the simple power of OBSERVATION. A key tool to make these studies was to put ourselves as observers and really let us delight by the power of observing. Not only for us, but the way he learnt from the environment"

### 7.8.2.2.2.2 reflection?

According to self-assessment test, there is a slight growth of the Reflection competence (from 4,75 to 5,58). This data has low statistical significance (p<0,05) due to several responses with lower final assessment. At the same time, aforementioned growth of the reflection competence indicates a shift from Advanced beginner level to Competent performer.

According to the students' reflection documents, Rich picture was mentioned as efficient tool for a group reflection. At the same time, the students differently interpreted reflection activity and this could explain a slight growth in the self-assessment. Thus, some students just mentioned their reflection activity in their reflection documents, some students did not describe their competence development in Individual reflection papers, and some students provided reflections on their personal agricultural experience rather their inner world. The reason of this could be a short time of the course.

According to some students, the short farm visits included in the course program, had caused an interest for the students to see more cases and their strong intention to participate and to change:

St\_MOG\_5: "In order to learn how to "support the transition towards sustainable farming and food systems" I assume it was the right way to see how the reality looks like by visiting some farms and get inspired by what we saw and now everyone of us has to find their way of where to start influencing/initiating the change"

### 7.8.2.2.2.3 visionary thinking?

As demonstrates self-assessment test, among the 5 core competences visionary thinking has a high growth 1,18 (from 4,12 to 5,30) and high statistical significance (p<0,01). It means that majority of students assessed their competences in an adequate way. The evidenced growth of visionary thinking competence demonstrates shift from Advanced beginner level to Competent performer.

The students mentioned improves visionary thinking as one of 5 core competences, i.e. improvement of all these competences was discussed for all of them together, for example: "I think the fundamental approach I learned is the 5 fundamentals steps for



becoming an agroecologist of Observation, Reflection, Visioning, Participation, Dialogue"

### 7.8.2.2.2.4 participation (engagement)?

According to the results of self-assessment test, among the 5 core competences participation competence has the highest growth 1,50 (from 4,72 to 6,22) and high statistical significance (p<0,01). It means that majority of students assessed their competences in an adequate way. The evidenced growth of visionary thinking competence demonstrates shift from Advanced beginner level to Competent performer.

One student explained improvement of participation competence in a following way: St\_MOG\_6: "It is hard for me to share my opinion with other people, I feel judged and sometimes I do not think my ideas are worth as other people's; I realized working with my group that my ideas can really contribute to a common project and my point of view is important"

This student (St\_MOG\_6) appreciated hands-on activity as a part of participation: "For me in particular, the fact of doing some practical work really helped me to feel connected to the subject and the work"

Other students (for example St\_MOG\_2 below) were inspired by the course activities and particularly by connection theory and practice, even though they did not describe their competence development. At the same time, thoughts provoked by the course could be interpreted as a good sing of the participation activity.

St\_MOG\_2 : "... I was able to connect theory and literature to the farm experience both before and after visiting Stakeholder 3. While I do not anticipate I will be cultivating grain in the future, I would love to have my own garden at the very least. This has encouraged me to research agroecological approaches before doing so, so I can put theory into practice"

### 7.8.2.2.2.5 dialogue?

As demonstrates self-assessment test, dialogue competence has the lowest growth 0,73 and shift from advanced beginner level to competent performer. Its high statistical significance (p<0,01) means that majority of students assessed their dialogue competences in an adequate way.

Notwithstanding the lowest growth of the dialogue competence, in their reflection documents the students mentioned its improvement in two ways:

7) dialogue with other students during their group work, as demonstrates example of St\_MOG\_7: "Drawing the rich picture of our expectations was a lot of fun and also stimulated dialogue between our team members"



8) dialogue with the stakeholders as demonstrates example of St\_MOG\_8: "I think that talking to producers and having a direct dialogue can be an effective way to learn new knowledge and from there build on and verify the information received"

### 7.8.2.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

The students appreciate farm visits and described visited farms as a small system, that could give an idea of improvement their system thinking: "Stakeholder 4 is a wonderful example of a business tapping into unique aspects of the Italian system which combined with their own unwavering vision of environmental and social sustainability has created a powerful model for change"

The students expressed their interest and would like to see more similar examples of the farms on order to improve their system thinking (or connection between different parts of ecosystem such as soil, air and chicken). This is demonstrated on the example of St\_MOG\_10: "We need to participate in the processes of our food system, be informed and gain sovereignty. In that regard, we need more Stakeholder 4 in the field to read nature and explain how the relationship between soil, oxygen and a chicken makes perfect sense"

Provided quotation of St\_MOG\_9 demonstrates willingness of the student to use system thinking approach in future: "While I leave the course still full of questions about how to implement specific organic / biodynamic agricultural practices and carry them out on my own, I believe this systems way of thinking will carry me a long way and hopefully put me on a path not only to understanding but to developing solutions as well"

- 7.8.3 Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education
- 7.8.3.1 Methods of data collection and analysis

### 7.8.3.1.1 Teacher reflection document

Teacher reflection document was prepared during the 1-hour reflection workshop. The workshop was targeted at understanding supporting and hindering forces and main lessons learned after the post-Covid short course. Identified Supporting and hindering forces were used for future organisation of the course.

### 7.8.3.1.2 Course reflection focus group/interviews



### 7.8.3.2 Results

- 7.8.3.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts
- 7.8.3.2.1.1 From lecture hall to a diversity of learning arenas

### 7.8.3.2.1.1.1 Supporting forces and how to build on them

Cancellation of the restrictions related to Covid-19 allowed to diversify learning arenas (and use physical and electronic learning arenas), and this was the main supporting force for this shift and for other.

Thus, lack if the Covid restrictions allowed to use university facilities (garden, library, open spaces) and farms as learning arenas

### 7.8.3.2.1.1.2 Hindering forces and how to deal with them

Future restrictions related to Covid could be considered as a potential hindering force. In this case, a unique way to deal with it will be online approach used in 2020, i.e. using web-cases and virtual farm visits for experiential part of the course.

### 7.8.3.2.1.2 From lecturing to co- and peer learning

### 7.8.3.2.1.2.1 Supporting forces and how to build on them

The students' interest to this shift expressed in their Individual reflection documents, i.e. appreciation of Rich picture activities, farm visits and group work is a supporting force for this shift. Furthermore, presence of two facilitators with appropriate skills involved in the course activities is another supporting force.

### 7.8.3.2.1.2.2 Hindering forces and how to deal with them

Short time of course (1 week) have caused a very strict timing of the course activities, thereby stressing the balance between theoretical preparation and practical activities. Unique way to dealing with this hindering force is finding a way to enlarge course duration. This, in turn, will require adjustment of the Master program.

### 7.8.3.2.1.3 From syllabus to supporting literature/a diversity of learning sources

### 7.8.3.2.1.3.1 Supporting forces and how to build on them

Several previous course cycles allowed to have the learning sources necessary for the course, this was the main supporting force. The students are exposed with the learning sources before the course starting. This similar course organisation is the supporting force that allows to use already developed materials.

7.8.3.2.1.3.2 Hindering forces and how to deal with them

There was no hindering force related to this shift.



### 7.8.3.2.1.4 From textbook to a diversity of teaching aids

### 7.8.3.2.1.4.1 Supporting forces and how to build on them

Instead of textbooks the students were exposed to scientific papers, video, farmers interviews. Before the course the students were required to read provided papers and materials as teaching aids. This shift has the same supporting forces as the previous one, i.e., due to several previous course cycles, there are different teaching aids remaining from the previous course cycles.

### 7.8.3.2.1.4.2 Hindering forces and how to deal with them

Similarly to previous shift, there was no hindering force related to this shift.

### 7.8.3.2.1.5 From written exam to a diversity of assessment methods

### 7.8.3.2.1.5.1 Supporting forces and how to build on them

Instead of written exam the students were assessed by a group paper for stakeholders and an individual reflection document. This experience from the previous cycles of the course was a supporting force for this shift.

### 7.8.3.2.1.5.2 Hindering forces and how to deal with them

There was no hindering force related to this shift.

### 7.8.3.2.1.6 From lecturer to learning facilitator

### 7.8.3.2.1.6.1 Supporting forces and how to build on them

Two teachers were involved into full time elaboration of the course cycle and action learning activities. Their availability is a supporting force for this shift.

In their feedbacks the students positively characterised the co-presence of the two professors, opportunity to have two different approaches in teaching and facilitation of class.

### 7.8.3.2.1.6.2 Hindering forces and how to deal with them

Limited time and schedule with overwhelmed activities of both professors could be a potential hindering force for this shift. Long term planning could be a solution for this hindering force.

### 7.8.3.2.2 What such a change requires from teachers, students, and institutions

From the teachers such change requires flexibility and a good time management in order to be in time with all course activities.

From the students such change requires creativity, a good collaboration with peers, high level of participation and concentration.



From the institutions such change requires sufficient support in terms of funding, good organisation and needed facilities.

7.8.3.2.3 Teachers' perception of the greatest challenges to achieving such a change Lack of appropriate institutional support is considered as the main challenge for this change.

## 7.9 Concluding remarks on the case development since the previous reporting

### 7.9.1.1 The most useful and inspiring experiences (supporting forces)

An action learning approach was used as past 4 (and even more) years again back in presence after 1 years online. The farms used as case-based were the same as some past years. However, it is a pleasure to see the progress in the stakeholder's participation in the course, as well as to observe how students learns different aspects of agri-food systems from the cases.

Besides, the most inspiring issue was a strong students' interest in the topic of the course and in the tools, such as preparing Rich picture and stakeholder document. These students were back in presence after 9 months of online, so they were early eager to have a hands-on activities and practical experience. The most exiting issue was received feedback from some stakeholders and some students.

### 7.9.1.2 Main obstacles/challenges encountered (hindering forces)

Besides aforementioned institutional hindering forces, there are several other challenges. Firstly, a right balance between course content (theoretical classes) and experiential part (farm visits). Both these activities are very rich and provide a lot of information to the students, that is why including them in 1 week causes time pressure for the students, as some of them need more time for understanding the course content.

Secondly, a connection between university/students and the farmers, and role of the farmers in the learning process should be clear for facilitators and for farmers. It is always obvious to clarify their role in the course, even when they are used to it.

Given these, the main challenge encountered is to satisfy the students' expectations related to the course.

7.9.1.3 Lessons learned from the inspiring experiences and from dealing with the challenges



The course definitely needs more time (more than 1 week) for all its activities. Extended time for the course will allow to the students to be more focused on its activities, for example to dedicate more time to the development of the core competences.

### 7.9.1.4 Plans for how to move forward into the next cycle

For the next cycle of the course, it is planned to be at the beginning of the Master Program, and not at the end. This will allow to the students to use all core competences and particularly reflection for other courses.

### 7.9.2 Reflections towards the end of the Nextfood project

### 7.9.2.1 What has been accomplished to shift from theory to phenomenon (experience) in agrifood- and forestry systems as the starting point for the learning process?

Three education activities have been accomplished in order to shift from theory to phenomenon:

1) Introduced three-phase structure of study trips for Bachelor students. This structure includes phase 1 (introduction), phase 2 (experiential: field visit or stakeholders meeting) and phase 3 (sharing, reflection and assignments), thereby connecting theory practice and further reflection activities with experiential one. During 3 years activities and assignments for each phase were developed and improved.

2) Improved 1 week course for Master students (1 year Master of Gastronomy), developed instruments for completely online activities of this action learning course, in order to allows the students based in different countries and time zones to carry out the plenary, groups and individual works.

3) Plan, develop, carry out and implement the Master in Agroecology and Food Sovereignty (MAFS). The Master program includes 6 months on campus and 3+3 months of experiential learning and research in different communities, thereby providing to the students a strong connection between theory and practice and space for development of their knowledge.

## 7.9.2.2 What has been accomplished to shift from transmission of knowledge to the development of key competences needed to support sustainable development in agrifood and forestry systems?

In order to shift from transmission of knowledge to development of key competences, in each education activity have been accomplished following actions:

1) Development of key competences are included into preparatory and reflection part of study trips for Bachelor students. Exercises for group work such as group knowledge paper, sharing and discussing and reflections in the groups are imbedded part of the



study trips. Guidelines for the group work and instruments for group reflection are developed.

2) A good organisation of the short course for MOG continuously provides good results in terms of improved key competences. According to the self-assessment tests and to reflection documents prepared by students, they develop and/or improve their key competences.

3) MAFS includes numerous activities in order to provide shift from transmission of knowledge to the development of key competences. It starts with a detailed introduction of action learning approach and introducing all core competences. Beginning of MAFS also includes measuring of dynamics of the competences and steering progress of their development. Besides, the MAFS structure includes weekly reflection activities and regular filing of the individual reflection journal by the students. Thus, they improve their reflection skills. The last reflection journals of the students could be example of progress in competence development.

Furthermore, face-to-face interviews with several students and stakeholders in the communities during the 3<sup>rd</sup> phase of the MAFS (experiential research) had clarified the realities of practical part. The interviews revealed high level of the stakeholders' satisfaction by the students' preparation and participation in the communities' life.

### 7.9.2.3 What are the prerequisites for making a successful shift?

The institutional support within the higher educational institution was very important for support of educational programs based on action learning approach such as the short-term course for Master of Gastronomy and developed new Master Program. An appropriate economic support such as Nextfood project was also necessary to develop a new path and new contracts. It is crucial for hiring people that will implement and research this approach and also for provided tools, facilities, resources ect.

A very good network of stakeholders is also important. This includes personal contacts with farmers and others through research in agroecology. Then, also, this was enforced with the network of the UNISG and the Slow Food movement. The network of food producers, farmers, the reality, the society outside, is very important.

To have facilitators already with appropriate skills and competences is important. Facilitators should have the ability to involve, engage and motivate people for the approach. Apart the facilitators, for the MAFS there is need of food activists, people who are willing to be active.

Possibility to work in teams, both for students and for facilitators, is a prerequisite as well.



Group work is another prerequisite for MOG and for MAFS, and it is important to have the right setting and space to work in smaller groups. Any course leader can decide to work in small groups. However, the maximum number of students for MAFS is 25 people, which is already hogh. The ideal group should be smaller; therefore, all the students will be divided into smaller groups.

Another prerequisite is an introduction of the action-learning approach with very clear learning goals. This should be done in the right time and in the right initial module with the right documents. Thus, the students at the beginning understand that the learning goals are different from the classical transfer of knowledge, the fact they are asked to be active, and a focus on competence development.

Facilitation skills and pre-training is important for facilitators and for the teams. This requires involvement of all the professor, especially those who don't have experience in action-learning. The teachers need to have the willingness to shift from the classical approach to co-design of the activities. Professors that involved in teaching in MAFS were invited in co-creation of the course one year in advance. Thus, they had time to develop the course and to make changes if necessary.

The Nextfood activities (reflection and planning) provided opportunity to adjust the second edition of MAFS and the next course of MOG.

## 7.9.2.4 What is your concrete advice on the shift from simple knowledge transmission to the development of key competences?

Firstly, the concrete advise on the shift from simple knowledge transmission to the development of key competences includes case-based learning exercises or activities and group work.

Secondly, exercises/activities which are practicing the 5 core competencies including:

- rich picture exercises;
- stakeholders document;
- visionary journey exercises ("story of the chair");
- desired future exercise related to a case/theme;
- unbiased observation: looking at a painting and sharing the observations without judgment: "What do you see?"
- individual reflection (reflection journal);
- reflection activities (individual-small groups-plenary) as a base for the learning process (on topic = external world and personal = inner world) i.e. What question do I have about the theme? What was the most unexpected aspect? When do I feel alone (my fragility)?
- sharing circles (on themes and as open space)



### 7.9.2.5 What is your main challenge?

How can we better get all people involved on board (i.e. people that motivated for and have insight in what action learning is and what it takes)?

## 7.9.2.6 What are the three best ideas from the workshop for how to deal with that main challenge?

There were suggested several ideas how to deal the challenge including:

- Increased communications;
- Increased visibility if the activities;
- Closer relations with potential stakeholders, that could be achieved through prioritized individual meetings.



# 8 Case 9: University of Calcutta and Welthungerhilfe, UoC and WHH

### 8.2 ID card

### Course title, level and language

One month online certificate course for Food Entrepreneurs. This course is for bachelor degree holders. The language of the course is English with support on local Indian languages (Hindi and Bengali).

### Course learning goals

This particular course will help the students to prepare themselves on

- Understanding small holder friendly market.
- Knowing stakeholders of his/her business.
- Designing the business and brand positioning
- Essential tools for development and promotion of business

### Host institution(s) and course leader(s)

University of Calcutta (UoC), India – Host, Anshuman Das (WHH) – Leader, Parthiba Basu (UoC) – Leader.

### Timeline of the activities covered in this report

July, 2021 - August, 2021

### Learner categories and number per category (demographics)

Total students - 14

Female- 6

Male-8

Established entrepreneurs-8

Aspiring entrepreneurs - 6

### Stakeholder categories and type of involvement

Stakeholders were University teachers, Practitioners and Established entrepreneurs. Case leaders along with other teachers and practitioners facilitate the learning process and some theoretical inputs. The entrepreneurs shared their story and road to success.

### Shortlist of learning arenas

- Classroom lectures where the learners interacted with the teachers. Sessions last for a couple of hours or more. Students learn about understanding of systems, tools and theories to set up businesses.
- Sharing of successful business stories by the established entrepreneurs.



- Market study and survey to understand how does market work
- Individual work, reflection and peer review to give a shape to future business idea.



### 8.3 Extended summary

### 8.3.1 Research results since the previous reporting

### 8.3.1.1 Students', teachers' and other stakeholders' experiences and learning

This action-reflection based one month course for the food entrepreneurs was a pioneer one in India. The students had new learnings during their sessions which were evident in their documents. The exposure to successful models opened a new horizon to many students which helped shaping up their own future business idea.

## 8.3.1.2 Outcome of the case development process, including effects of making the essential shifts

The students learned about building core competences, such as visioning and reflecting, which is important in their future business endeavours. The ability to reflect back on failure or success will make them successful in future.

Methodology, this particular course will help the students to prepare themselves on

- Understanding small holder friendly market.
- Knowing stakeholders of his/her business
- Designing the business and brand positioning

Essential tools for development and promotion of business

### 8.3.1.3 Supporting and hindering forces for implementing the Nextfood model

The difficulty in licencing in India came up as a big hindering force to start up new agrifood business model. There are many success stories to look upto and the government is also now supporting new efforts and ideas to take place.



## 8.4 Actions taken and data on the development of the case since the last reporting

### 8.4.1 Actions taken since the previous report

This innovative pilot course for the food entrepreneurs is a first of its kind in India. This one month course was organised for the very first time as a part of Nextfood project besides running the three month's online certificate course on Agroecology. The course was targeted for the aspiring food entrepreneurs or alternative restaurateur.

### 8.4.1.1 Planning

Before shaping up the course, the course leaders had one to one interaction with few farmer producer companies and food business and realised that challenges faced by the aspiring small businesses are 1) lack of understanding of the food system as a whole with all its backward and forward linkages 2) lack of understanding of the financial management, pricing etc. 3) bringing in agroecological understanding into food business and 4) planning capacity. The thematic content thus, was catering these 4 challenge areas.

However, the course strategy was developed and guided by EU supported NEXTFOOD pedagogy, which builds participation, observation, reflection, dialogue, visioning, communication and system thinking skills of the students/practitioners active in farm and food systems. The transaction methodology included real-life experiences, field assignments, peer learning and action-reflection based group/individual task. The course advertisement were published countrywide in different newspapers and websites. It was also circulated among the networks of scientists and practitioners. Since the course was online, number of applications received were very high. Students were selected on the basis of their application potential to do this course.

### 8.4.1.2 Implementation

The course started with focus on the introduction to the course and help the students to set up a clear vision about their enterprise. A content format called Rich picture was discussed, which is a combination of images with text. Its advantage is it is easier to communicate ideas especially with those who are not literate. The following sessions introduced the concept of Multi-Perspective (MP) analysis, SWOT analysis, Pricing of Agri commodities, visioning the project, sharing the vision of every participant. And also introduced an example of social enterprise- Bhoomika.

Next, the stakeholders involved in the market and sustainability were discussed. Here we have discussed the value chain assessment, indicators of a sustainable business, various case studies, and branding measures.

The experience sharing of success stories from Agro-Food Entrepreneurship for Rural Non-Farm Systems, Integrated Farming System and Sustainable Development, and



some examples of social enterprise like Foodbury, Prashuk Organic were also performed. The essential tools for development and promotion of business like how to run a Start Up, financial management, and communication were shared.

### 8.4.1.3 Reflection

Reflection had been an integral part of every session – as post session reflection was discussed among the students and facilitators. Additionally, there were structured session reflection through excel sheet on the basis of 3 areas – the learning outcome of the session, usefulness/application possibilities and the transactional process. Along with these, there were also specific reflection sessions like the IKIGAI exercise (IKIGAI is a tool to reflect on personal vision, passion and choices - https://wrkshp.tools/tools/ikigai-canvas), peer reflection on each other's work etc. The course was rather short, compared to our usual 3 month's course, we had regular one to one reflection with the facilitators of each session – where we shared student's reflection on the facilitator's session. These multilayered reflection process 1) at the end of each session 2) specific sessions on reflection 3) learner reflection document ensured

- Identifying what students are not really good with and getting out of their comfort zone to address it (the finances and accounting part)
- Getting a partner to help in their case with accounts and the costing
- Getting a systematic 360 degree overview and input on student's work
- Teachers are also getting input on where they can improve their facilitation

### 8.4.2 Students' responses, learning and competence development

### 8.4.2.1 Methods of data collection and analysis

The consent of allowing the data to be used for further analysis were collected from the students before any data collection.

### *8.4.2.1.1* First week (day) & last week (day) of the course

### 8.4.2.1.1.1 Student's understanding, contributions, and expectations

A 3 person's team along with the recommendation from few facilitators, this course curriculum were designed, planned and executed. One of the core facilitator were responsible to execute the whole curriculum and help the students to learn and build up the core competences of Nextfood model where-as the other two core persons coordinated the facilitators and learners and also gathered and analysed the data.

The students were provided with few following questions on the starting day of the course to answer and they answered back within the deadline they were given. This questions were based on what are their expectations from the course and what are the competences they want to build upon.



1. What are the knowledge, skills and attitudes (competences) we need to support sustainable development in agrifood business models?

2. What experiences and competences do I bring to the educational activity to make it a success?

3. What are the questions I would like this educational activity to help me find an answer to?

4. What are the competences I'd like to train/improve in this educational activity?

Before the final evaluation of the course the learners were again provided with few following questions on their learning, understanding of the subject. They submitted their answers before the final evaluation.

1. What are the knowledge, skills and attitudes (competences) we need to support sustainable development in agrifood business models?

2. Which of the experiences and competences I brought to the educational activity contributed the most to the learning community?

3. What questions did this educational activity help me find an answer to?

4. Which competences did I train/improve significantly in this educational activity?

5. What are the questions I am now asking myself?

The answers on these questions received by the students were extracted and coding was done in NVivo on the basis of six core competences by a single researcher. Trends, commonalities and discrepancies related to the research questions were identified from the data material from each code.

### 8.4.2.1.1.2 Self-assessment of competences

All the learners self evaluated themselves on the basis of the 17 questions that were prepared by NMBU team. They questions were prepared by keeping in mind how the learners have built up five core competences – Observation, Participation, Visioning, Reflection and Dialogue.

The learners scored themselves in a scale of 10, where 10 is the most efficient performer and 1 is just the beginner. This self assessment were done twice in the course, one in the beginning of the course and the other at the end of the course.

These data were analysed with a paired t -test.



### *8.4.2.1.2* Students' final reflection document (individual)

The students were asked to submit learner diary, where they reflect on the sessions they had during the course and their learning. The students submitted Learner diary, which is a reflection for all the sessions in descriptive format with 3 sections – 1. What was the educational activity contents and processes 2. What earning happened 3. Implications for further individual development. The reflection, however, was not limited to this only.

The documents received from the students were first made anonymous with a code as the following LDFOOD\_S01\_2021 (Learner Document FOOD ENTREPRENEURS – Student01\_2021), they were coded according to a **pre-defined coding tree** in the Nvivo, based on the five core competences of Nextfood project. The coding process was performed by a single researcher. He coded and analysed the data resulting from each code.

After coding was completed, a visualisation tool have been used, such as: **word cloud** to visualise the conclusions that we have reached after the analysis.

The word cloud were used for all the reflection documents that the students submitted to visualise the words most frequently used by the students.

### 8.4.2.2 Results

### *8.4.2.2.1* How do students experience such a learning process with respect to:

### 8.4.2.2.1.1 learning goals?

Several ideas were received from the students against the first question. The students said knowledge of business management, account management, consumer's behaviour, ingredients, market economy, strategy, food packages, social networking, and marketing are of great importance.

The experiences and competences that the students brings to the course are new business ideas, courage to get out of the comfort zone, out of the box thinking, ability to develop team work.

Many questions also came up such as, how to manage financial account, how to be resilient, how to measure profit and loss, how to reach to the potential customers, strategies for both B to B as well as B to C business etc.

The students admitted at the end of the course that they learned a lot about different core competences such as visioning, participation, dialogue etc. and it was a great learning experience for them.



The practical learning covered in the course were helpful for the students for their future endeavour in the agri food business sectors. Some were bit sceptical about learning at the beginning but they admitted that they learn many different new ideas during the course.

" Good group exercise on how products go through value change in the markets. I enjoyed working on designing a consumer survey form, and many experiences from the past work began coming together. I wondered why I had not thought of this earlier. The best part was calling up various people or reaching out and being able to think collectively what had to go into a first time form for consumers and listing out many other questions to ask." (WP2\_T2.2\_UoC\_WHH\_2021\_LD\_Student 8)

### 8.4.2.2.1.2 view on competences needed for sustainable development?

Through the group discussion at the beginning and on the final workshop it was amply mentioned by the students that the primary goal of businesses to make a profit have changed considering the future world. The value and purpose-driven entrepreneurs are setting up new businesses which are beyond companies' economic responsibilities. Sustainability is one such important value. The issues and competencies emphasized were the following.

Knowledge - Before one can implement sustainable practices, an entrepreneur need to ensure a basic understanding of ecology, climate threat and footprint of the business. So that one can understand how your business is impacting each of those areas.

A systemic holistic overview – this will help to identify strategic opportunities and solution for one's business. For example value chain analysis was one such exercise where they could identify the challenges and think on possible solutions.

Cost implications from various angles - Consider energy efficiency, for example, which is clearly a sustainable business practices, which has twofold benefits: First, conserving electricity reduces carbon footprint. Second, lowering costs.

Creative thinking – Entrepreneurs, who find out of the box answers and develop creative solutions to complex challenges can succeed in a world where sustainability is important.

### 8.4.2.2.1.3 recognition of own competences and competence development?

The analysis of the data reveals that all the competences showed significant increases from when they start to when they finish the course.



The data analysis reveals that the observation has the most significant increase, which has a difference of 3.3527. Visioning has the second highest increase of 2.9676. Reflection is next with 2.7568 difference in increase followed by participation with difference in increase 1.6443. Dialogue received the lowest increase in in difference with 1.2756.

Competence	Average scores		Difference	Significance
	Start	End		P value
Observation	5.5838	8.9365	+3.3527	<.0001
Participation	6.1335	7.7778	+1.6443	<.0001
Visioning	3.3158	6.2834	+2.9676	<.0001
Reflection	5.5555	8.3123	+2.7568	<.0001
Dialogue	4.2465	5.5221	+1.2756	<.0001

Table 16: Average scores of self-evaluated competence development among students. The scale used was 1 (Beginer) – 10 (Efficient). N=14.

The self assesement questionnaire reveals that the most significant increase were in the case of Observation. This results are an indication that the future business entrepreneurs understands the value of observation in the business. The online practical sessions and activities had many in view of the observation like the examples of out of the box business models, accounting, marketing of the products, organic licensing etc. The next significant increase were in Visioning. It can be explained by the fact that any business plan require a lot of planning and ability to look at the future.

The next competence that came with most significant increase was reflection. Since many of the students have already started their businesses and did not quite see any profit making, it was important for them to learn to reflect back on what went wrong and to students who were just about to start their business was a great learning because they know now how to reflect back.

Since the course was online due to the global pandemic, the session structure was such that the students were bound to participate in the group works and discussion, review and comment on each other's plan and work. So, Participation showed a significant increase in the self-evaluation.

Most of the students who attended this course were either entrepreneurs or an aspiring one. They didn't join just to learn theories, they were less participation in debate, discussion and dialogue than our regular course on agroecology.



The word cloud from Nvivo reveals that the most frequent words were meeting, products, accounts. The next category are licencing, marketing, rich pictures. Further word category shows ideas, analysis, reflection.

The learners were more keen on learning the financial accounting or licencing procedures than learning system analysis. They learned SWOT ananlysis and used it quite well in their future business plans.



Figure 53: The word cloud generated from the reflection documents submitted by the students. This cloud shows how the students wanted to learn different aspects and they those terms came quite frequently in their documents.

### 8.4.2.2.1.4 transformation?

• The transformations were reflected in the self assessment documents as well as in their learning documents submitted.



"Identifying what I am not really good with and getting out of my comfort zone to address it (the finances and accounting part)" (WP2\_T2.2\_UoC\_WHH\_2021\_LD\_Student 3)

"Gaining much clarity on how to put together a plan for the sustained working of our seed bank and also seeing how we can think out of the box with respect to our enterprise. Our model of working won't be like the typical business model." (WP2\_T2.2\_UoC\_WHH\_2021\_LD\_Student 6)

Some of them were confident that they are good in some competences, but when they learn they score themselves below in the end than the beginning of the course.

### *8.4.2.2.2* To what extent does the education enhance the students' competences of:

### 8.4.2.2.2.1 observation?

The observation related activities mentioned were successful business model showing, how the initial failures were turned into success, financial accounting sessions. The students had observed detail so that they incorporate into their own endeavours.

### 8.4.2.2.2.2 reflection?

The documents submitted by the students' shows how this competence was never considered by them in their models. They learned this and plans to apply them to make a successful business model.

" I never thought of methodical reflection on my plans. Now my reflection helped me in understanding that I should (1) to look

for partnership to scale what we are doing. (2) Focus on having a shared vision, need to share the vision with staff, so that they own the vision. (3) Need to have good control over the finance of the business." (WP2\_T2.2\_UoC\_WHH\_2021\_LD\_Student 10)

"Through reflection, I got more clarity on how to communicate about our own product. How to identify the customers?" (WP2\_T2.2\_UoC\_WHH\_2021\_LD\_Student 8)

They were fairly clear about the overall idea of what a social enterprise entails, but still rather nervous about putting together the financial figures and carrying out the calculations and projections in this short time. At the most, we feel this will be a beginning or a seed of a business plan that will need much more working after the final presentation, to put it into action.



### 8.4.2.2.2.3 visionary thinking?

Competence of visioning is something that was never a part of the chalk and talk education system that the students have come across before.

The visioning competences were used in many sessions and students liked it because many of the students were about to start a new journey as food entrepreneurs.

"We need to build a story around our product and need to focus to reach with the same to the customer". (WP2\_T2.2\_UoC\_WHH\_2021\_LD\_Student 3)

"The ikigai was an eye opener especially for a confused college graduate" (WP2\_T2.2\_UoC\_WHH\_2021\_LD\_Student 5)

"Dreaming and Visioning: We need to dream what we want to achieve, where we want to see our enterprise to be, down 3 to 5 year of time. We need specify in terms of number of customer, turnover and any other indicators which we can monitor." (WP2\_T2.2\_UoC\_WHH\_2021\_LD\_Student 14)

### 8.4.2.2.2.4 participation (engagement)?

The students participated in groups and individually in activities such as rich pictures, making business plans etc. At the beginning the students didn't quite have experiences on group participation. But they learn along the way to participate in activities.

"Personally I sidelined my shy behavior and started getting involved in the discussions in the group during this week." (WP2\_T2.2\_UoC\_WHH\_2021\_LD\_Student 5)

"Overall, one of the good highlights of this course has been the break out groups and the chance to work on some of the activities in groups " (WP2\_T2.2\_UoC\_WHH\_2021\_LD\_Student 8)

### 8.4.2.2.2.5 dialogue?

The dialogue has the lowest increase in the self reflection documents. It has also very few mentions in the submitted documents by the students. Self reflection score compared with previos longer batches shows it could be due to the fact that the course's duration was very less (just one month) to develop such competences in the short time. Long courses help to build camaraderie among the students, short ones have very few scope to do that, specifically if it is a online one. Also with time students develop better conversations with the facilitators.



### 8.4.2.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

The reflection documents does not really reflect the challenge of the whole, or how they experience it. May be overlapping sessions on different aspects of businesses and exposure to models made them confused. But they have used multi-perspective analysis like SWOT to get a systemic overview of a phenomena.

"The multi-perspective analysis is understanding a situation from the eyes of each person involved in it, rather than only from our perspective. SWOT is an analysis of the Strengths, Weaknesses, Opportunities and Threats of a situation, person or organization. Strengths and Weaknesses are internal to the situation while Opportunities and Threats are external."

(WP2\_T2.2\_UoC\_WHH\_2021\_LD\_Student 9)

"the sessions on **Multipurpose Understanding of SWOT** analysis and **Vision Exercise.** Made what I could of the ppts sent, and did the exercises. Looked up SWOT online and saw many interesting ways to do it. Again, this is something I would like to repeat internally."

(WP2\_T2.2\_UoC\_WHH\_2021\_LD\_Student 2)

- 8.4.3 Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education
- 8.4.3.1 Methods of data collection and analysis

### *8.4.3.1.1* Teacher reflection document

The course was rather short, compared to our usual 3 month's course, the course leader had regular one to one reflection with the facilitators of each session – where the facilitator shared student's reflection on the facilitator's session.

### 8.4.3.1.2 Stakeholder's reflection

We had course reflection with students but not with established entrepreneurs who shared their experience. Because in those cases – they were only sharing their journey and not have overall understanding of the course processes and content.

8.4.3.2 Results



## *8.4.3.2.1* Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

### 8.4.3.2.1.1 From lecture hall to a diversity of learning arenas

### 8.4.3.2.1.1.1 Supporting forces and how to build on them

The current mainstream has almost no space for diverse arena. Even if they include stakeholders other than teachers and students – that is more in terms of keeping them in the fence, just organising exposure visit.

### 8.4.3.2.1.1.2 Hindering forces and how to deal with them

Classroom is always designed in a way where the entire class literally looks upto the teacher, who is on a raised platform, without any scope to interact with each other. Teacher has very little space to move around. There is no question of students moving around, as this is also considered to be indiscipline. There is no interaction space, where students can sit in bunches and discuss in groups.

To address this, students and teacher should be able to face each other allowing free interaction, move about and gather in groups as and when required to facilitate group discussions, group activities, peer learning, experimentations, explorations or showcasing. The students coming from mainstream education system still has the same mindset when attending online course. They are shy at being always keeping the video mode on, interacting with each other etc.

In the current online course, we avoided powerpoint presentation and used break out rooms, field visit in student's respective location, role play, group work etc to make the learning process activity-action-reflection based.

### 8.4.3.2.1.2 From lecturing to co- and peer learning

### 8.4.3.2.1.2.1 Supporting forces and how to build on them

Self-learning has reached a new hight due to use of internet and role of a conventional teacher is more and more getting redundant. Need of lecture in getting reduced.

### 8.4.3.2.1.2.2 Hindering forces and how to deal with them

On the other hand, teachers being part of the same system, are still focused on lecture methods. Co and peer learning is not there yet. A dynamic curriculum where group of students taking responsibility of own learning is a possible way to deal the challenge.

### 8.4.3.2.1.3 From syllabus to supporting literature/a diversity of learning sources

### 8.4.3.2.1.3.1 Supporting forces and how to build on them

Online resources opened up a new horizon for this. Such platforms can be used more and more.



### 8.4.3.2.1.3.2 Hindering forces and how to deal with them

Generally teachers try to cover all topics and chapters in a stringent, routine bound, academic framework. As a result, teachers find it convenient to read and explain the text and expect the students to rote learn and reproduce.

We can focus on

- An open ended dynamic curricula which allows to explore.
- An open mindset which does not expect just one 'correct answer'
- Accepting that we need to focus on concept and ideas, rather than topics.

### 8.4.3.2.1.4 From textbook to a diversity of teaching aids

### 8.4.3.2.1.4.1 Supporting forces and how to build on them

Online resources opened up a new horizon for this. Such platforms can be used more and more. Multiple learning resources to cater to students with multiple interest and learning pattern – access to knowledge outside system, audio-visuals, stories.

### 8.4.3.2.1.4.2 Hindering forces and how to deal with them

There is acceptance on this largely.

The teachers and students must have the liberty to choose their own texts (not limited to written materials only, but extending to visual and aural materials, or even real life persons/ space/ objects)

### 8.4.3.2.1.5 From written exam to a diversity of assessment methods *8.4.3.2.1.5.1 Supporting forces and how to build on them*

Evaluation system guides methods and contentment of teaching. Even if there is an acceptance of comprehensive and continuous evaluation, in practice it is not there.

### 8.4.3.2.1.5.2 Hindering forces and how to deal with them

The evaluation system (not only for the students but also for the facilitators and the course itself) should be a continuous one, to strengthen methods of transaction and do midway correction. It should test understanding and application, and not merely stress on memorisation.

### 8.4.3.2.1.6 From lecturer to learning facilitator 8.4.3.2.1.6.1 Supporting forces and how to build on them Almost no supporting forces.

### 8.4.3.2.1.6.2 Hindering forces and how to deal with them

The role reversal has to be facilitated well. The teachers needs to redefine their task from 'teaching' to Designing task, Assigning task, Setting expectations, Creating and



Providing scaffolding tools, Checking for progress, Redirecting/ reviewing as and when required, Creating scopes for sharing, Showcasing learning.

### *8.4.3.2.2* What such a change requires from teachers, students, and institutions

- The institution has to reframe the instructional strategies where the students would be actively involved and be in charge of learning. It involves physical and mental engagement in a more holistic manner, where the learning is joyful, meaningful, engaging and sustained
- Critical thinking, logical thinking, reasoning, inferring, problem solving ,Creative thinking and, more recently " Design Thinking" (which involves identifying challenges, gathering information, generating ideas, providing solutions and testing its efficacy. )
- Adequate number of skilled teachers who can facilitate the process of learning. Accepting practitioners, professional like farmers, entrepreneurs can also be knowledge provider. Information can be provided by Google ©
- Students must be allowed enough time to explore, make mistakes, revisit findings and come to conclusions with support from teachers.

### *8.4.3.2.3* Teachers' perception of the greatest challenges to achieving such a change

- An instructional strategy which ensures activity based/project based/inquiry based methods linked to real life situation, especially when we are dealing with farm and food system.
- Instructional design should accommodate various learners visual learners, aural learners, tactile learners and others. Teachers could help students choose their preferred way of learning and presentation of learning.
- Teachers trained in introducing thinking strategies and thinking tools, approaches and methods which integrates Thinking.

### 8.5 Concluding remarks on the case development

### 8.5.1 On the case development since the previous reporting

### 8.5.1.1 The most useful and inspiring experiences (supporting forces)

This was the first of its kind course in India. We received many applications and out of them we selected few. From the learner document of the students who ultimately completed this course, were eager to learn new things (for example visioning) even though few of them were quite experienced in this field. We were asked to continue this course in future.

### 8.5.1.2 Main obstacles/challenges encountered (hindering forces)

Main obstacle was to have the class entirely online – which reduced the scope of peer learning and experiencing the real examples of successful small businesses.

### 8.5.1.3 Lessons learned from the inspiring experiences and from dealing with the challenges

When the course duration is so short, it is important to plan your course in such a way that the core competences get the most priority and also the need to incorporate and omit the important and not so important sessions respectively.



### 8.5.1.4 Plans for how to move forward into the next cycle

There are future plans to continue this course if partnership agreements could be achieved with other Universities or funding bodies.

### 8.5.2 Reflections towards the end of the Nextfood project

- 8.5.2.1 What has been accomplished to shift from theory to phenomenon (experience) in agrifood- and forestry systems as the starting point for the learning process?
  - A huge learning experience through conducting four batches, which established the fact that action-reflection based learning works better the conventional ways of teaching.
  - A course framework and structure was evolved, which can be used easily for future courses. A network of practitioner changemakers, who can further scale out the process.

## 8.5.2.2 What has been accomplished to shift from transmission of knowledge to the development of key competences needed to support sustainable development in agrifood and forestry systems?

A skill and competency base curriculum is in place now, which can be replicated now. Agroecology, being the core theme had also ensured that the issue sustainability remains as a cross cutting core thematic hook.

### 8.5.2.3 What are the prerequisites for making a successful shift?

- Mindset about WHAT to 'TEACH', which can be be further elaborated by need of an open ended dynamic curricula which allows to explore and accepting that we need to focus on concept and ideas, rather than topics.
- The learning space to be facilitation friendly not teacher centric but learner centric.

A system to be in place in terms of adequate number of skilled teachers – who can facilitate the process of learning, accepting the fact that practitioners, professional like farmers, entrepreneurs can also be knowledge provider, multiple learning resources to cater to students with multiple interest and learning pattern and the evaluation system (not only for the students but also for the facilitators and the course itself) should be a continuous one, to strengthen methods of transaction and do midway correction.

## 8.5.2.4 What is your concrete advice on the shift from simple knowledge transmission to the development of key competences?

- Focus on Higher order thinking skills like Analysis, Evaluation and Creation rather than memorisation. Critical thinking, logical thinking, reasoning, inferring, problem solving ,Creative thinking and, more recently " Design Thinking" (which involves identifying challenges, gathering information, generating ideas, providing solutions and testing its efficacy. )
- Teachers needs to be trained and supported with instructional strategies and capacity building process to ensure the desired shift. They should also be supported to re-design their task from teaching to facilitating.



- Accepting the fact that knowledge will evolve and co-created rather than something which is only written in textbooks.

#### 8.5.2.5 What is your main challenge?

There are many challenges, linke

- No interest in mainstream to adopt this approach. Mainstream is probably too big this might remain in its own niche.
- How to continue and grow together as a community of changemakers with all the agroecologists we trained so far?
- Online is both a challenge and scope, so is physical

But the major challenge is mindset of the system, students and facilitators. When we talk about mindset, it is not only about the mindset of the system. We have seen that other faculty members are not so keen on taking this up as an approach. In spite of us presenting this at a mega event at the school itself. That is one area of the system. But in our course, we are also involving many teachers, facilitators which are not directly linked to our course. They are content specialists, and we try to link them up also. But they often fall back on the old-school lecture-based education. There is another aspect of making the students active in the learning space itself. It is very difficult to come out of the idea that this is a course, and they expect teachers to teach, to give them notes, to give them class lectures, and that's all. The students think 'we will memorize something, the teachers will provide maximum information, and we will respond to what they ask'. The idea of co-creating knowledge with the facilitator himself in class, it takes time to make students understand that. The students themselves are also coming from a very rigid mindset. I think the invisible element which is there, the curriculum and the course-structure, framework, which is followed by the mainstream, these frameworks are also a reason for this mindset. The curriculum is actually a state of some concepts, it is not just topics and knowledge, textbooks. In that way, the academy is structured so that you force the students and the facilitators to remain rigid. So that's how we see the main challenge. We see this one as the source of all the challenges that we are facing.

### 8.5.2.6 What are the three best ideas from the workshop for how to deal with that main challenge?

Some of the solutions to address the issue of mindset was -

- build a team in the center that does not only have complementary capabilities, but also can easily step into each other's roles when one person leaves the center.
- involve students as facilitators and teaching-assistants, to prepare them for stepping in when others leave
- Given that mindset is an internal thing and that universities are obsessed with theory, there should then be good opportunities to explain action-learning to people at universities as theory.
- Sharing experiences of those who have taken an action-oriented course, can be helpful. To show the successfulness, for example getting a job, or how they have applied the knowledge. Our students, they have already gone through both experiences. They have taken the normal, mainstream



education, and they have now experienced the action-learning. Documenting their experience can be a good case for others, to motivate.


### 9 Case 10: SEKEM Development Foundation

Authors: Dr. Reham Fathey Ali, Mr. Alaa Elhawwary, Mr. Karim El Mallawany, Mr. Ibrahim Fathey Zalat

Contributors: Ms. Eman Sabry

### 9.2 ID card

### Course title, level and language

### Sub-case 1: Biodynamic Agriculture Course

Level: Undergraduate level, Language: English and Arabic

### Sub-case 2: Entrepreneurship Program

**Level:** Open to all students of 4 grades (training for undergraduate students), Language: English and Arabic

### Course learning goals

The course aims to develop and improve knowledge and understanding skills related to concepts of organic agriculture farming, conversion to an organic system from a conventional system, learning agricultural practices and management of organic vegetable and fruits production. This course enables students to understand the fundamentals of organic crop production as well as methods of managing the crops. Students understand the surrounding environment with the management of the organic crops including a holistic approach towards organic methods including pest control, soil management, and biological activities in soil ecosystem. In addition, the students may understand the role of these microorganisms in nutrients cycling in soil, their contribution to soil fertility and soil structure. Furthermore, the course covers the basic knowledge of soil microbes – plant interactions as well as the various microbial relationships about soil productivity.

### Host institution(s) and course leader(s)

**Institutions:** SEKEM Vocational Training Centre, and the Faculty of Organic Agriculture - Heliopolis University for Sustainable Development.



**Course leaders:** Prof. Dr. Hassan Abou Bakr, Dr. Reham Fathy\*, Ms. Angela Hofmann\*, Mr. Peter Kunz\*\*\*, Mr. Reto Ingold\*\*\*, Dr Jasmine Peschke,

**Institutions:** SEKEM Vocational Training Centre, Faculty of Organic Agriculture -Heliopolis University for Sustainable Development, and the Entrepreneurship Center for Social Impact, Heliopolis University.

**Course leaders:** Dr. Reham Fathy\*, Mr. Karim Mallawany, Eng. Alaa El Hawwary, Mr. Ibrahim Fathey Zalat.

### Timeline of the activities covered in this report

#### Sub-case Biodynamic course:

*First round*: 15<sup>th</sup> October 2021 to 28<sup>th</sup> October 2021 (for 1<sup>st</sup> and 2<sup>nd</sup> grade students). *Second round*: 21<sup>st</sup> November 2021 to 2<sup>nd</sup> November 2021 (for 2nd and 3<sup>rd</sup>

grade students).

### Sub-case Entrepreneurship Program:

*First cycle*: 10<sup>th</sup>,11<sup>th</sup>, 17<sup>th</sup>, 18<sup>th</sup>, and 19<sup>th</sup> September 2021 *Second cycle*: 15<sup>th</sup>, 16<sup>th</sup>, 17<sup>th</sup>, and 21<sup>st</sup> October 2021 *Third cycle*: 23<sup>rd</sup> December 2021 to 5<sup>th</sup> March 2022 (expected).

The participants in this training are the same group, the qualified participants from First cycle moved to Second cycle, however new participants joined second cycle. The new participants had been selected after applying to second cycle announcement online and on Sekem and Heliopolis university website.

#### Learner categories and number per category (demographics)

**1.5.1. Biodynamic course Learners:** Students of Faculty of Organic Agriculture, Heliopolis University: 36 students

First year students: Total: 60

Second year students: Total: 16

Third year students: Total: 21

### 1.5.2. Entrepreneurship Program Learners: 20 participants

First cycle: 20 participants

Second cycle: 20 participants



Third cycle: 5 participants with their team and their own start-up projects.

### Stakeholder categories and type of involvement

Egyptian Biodynamic Association (EBDA): Agricultural Engineers and Extensions training.

### Shortlist of learning arenas

- Classroom lectures where the learners listen to facilitators, instructors, staff members, national and international experts. (Sessions last for 2 hours).
- Field visits (Sekem farm in Sharkia Hydroponic unit in Sekem farm -Hydroponic unit in Heliopolis University – compost production location at Sekem farm).

(Learners are given tasks on-site to observe the live organisms such as plants– take notes of the live case – listen to the expert's session) some session takes 2 hours and sometimes to one day.

- Casework project on farms.
   (Learners engage in open discussion with farmers, growers or agricultural engineers), it took one day at a time, around 6 visits.
- Zoo visit (Learners take notes of the animals' morphology, behavior and habitat difference) (one day).
- Farm visit. (Animal livestock farm at Sekem farm) On-farm demonstration. (Learners observe the live animals' behavior) (One day at a time, around 2 times of visits).
- Factories visits (Atos Factory ISIS factory, both at Sekem farm) (2 hours for visit).
- Kitchen of the school that located in Sekem farm (2 hours for visits, around 2 times of visits).



### 9.3 Extended summary

### 9.3.1 Research results since the previous reporting

The Sekem case for the NextFood project is based on the practical education of biodynamic course and entrepreneurship program. The biodynamic training course is aimed for undergraduate students of the faculty of agriculture. The students spend two weeks every fall and spring semester. The challenge that faces the training organizers were the big number of the students since the three years of the organic agriculture students are participating in the training., additionally the number of the students have significantly increased compared to the previous years. The new year found difficulty in the adapting the NextFood approach as they did not have similar approach during their secondary school. Nevertheless, the students have experienced real life case situations of biodynamic agricultural activities and according to their opinions, the training has significantly added to their knowledge.

The entrepreneurship program has organized by cooperation with SEKEM, Faculty of Organic Agriculture and entrepreneurship centre. The participants have explained that the training had added to their experience and clarify their start up ideas. The main challenges were some of the trainers/instructors we knowledgeable however it was difficult for them to apply NextFood approach. Some of participants have traditional business ideas and they were not flexible to adopt some innovative ideas.

# 9.3.1.1 Students', teachers' and other stakeholders' experiences and learning **Sub-case Biodynamic course:**

In the previous pilot cycle of 2020, the number of students were 36 students from level 1<sup>st</sup> and 2<sup>nd</sup> level students. 2<sup>nd</sup> level students are more experienced with some agricultural practices and farm life, and for 1<sup>st</sup> grade students, it was completely so new and great experience for them to see, touch and smell the nature of agricultural field by their hands and by themselves.

The two groups of the students were very excited to see all the agricultural practices and process by themselves. Visioning activities add so much to their skills. Almost in the end of the training the whole students become like one family and faced a lot of situations together.

The number of staff was 7 teacher assistants and 6 professors. The teaching methods were relatively new to HU staff; however, they were enthusiastic to explore different teaching method.



The teachers have learned how to be flexible and adopt well to the new methodology of teaching that get along with NextFood approaches. The teachers organized more scientific material and learning activities to develop students' skills (in all grades) and cover their needs. It was necessary for the teachers and instructors to have the feedback of students and their reflection as well. The Stakeholders cooperate with SEKEM case very effectively by the support the students and facilitate their field and factories visits to understand the main and basic needs of the local markets. The stallholders understood the value of this training and it will impact on the students' performance and be ready for the competition in labour markets.

The stakeholders were so cooperative to work together with the students and university staff members and exchanging their knowledge with Heliopolis University team.

For the students of Faculty of Organic Agriculture Heliopolis University, they get the benefit of the learning activities and experiences related to the 5 core competences of NextFood approaches. All the students of all grades and of the two new disciplines (Organic crop production – Food processing) get the benefits of this valuable training.

#### Sub-case Entrepreneurship program:

This program offered intensive training presented multiple different topics related to agribusiness and agroindustry into independent enterprises prepared to scale up. The program divided into 3 cycles. The intensive training in cycle 1 and 2 and then cycle 3 offered incubation services to support the development and growth of 5 start-ups who attended the Nextfood training.

The NextFood Entrepreneurship Program training (cycle 1 and cycle 2) includes multiple topics about agriculture such as (Introduction to Organic Agriculture - Integrated Pest Management (IPM) - Introduction to Bio-Pesticide - Common Examples of Bio-Pesticide - Production of Compost and Bio-fertilizers - Horticulture and fruit production - Green Houses and Protected Agriculture - Animal Livestock Husbandry - Hydroponic – Aquaculture).

In addition to business topics such as (Introduction to Marketing - Business Model Canvas - Feasibility study - Finance and Business Model Canvas – Sales - Project Management - Access to finance - Business plan - Financials for startups).

All the previous topics contribute to enhance the participants background about the agriculture projects and connected this by business mindset or financial way.

The training also focused on the other skills that should be delivered to the participants such as presentation skills and Leadership skills.



The learners/participants here are early-stage development startups in the sector of food and agriculture, undergraduate students with business ideas in the sector of food and agriculture, farmers and housewives who are living in 13 villages belong to Sharkia governorate.

This training added to the learners/participants the basics of commercial rules training to establish his/her small projects that related to the agricultural field.

The graduating start-ups will be able to develop their Minimum Viable Product (MVP), learn how to manage their finances, learn how to market their products, reach customers, and how develop their sales competencies.

The number of facilitators/instructors in cycle 1 was 9 instructors, in cycle 2 was 4 instructors and 3 mentors for the 5 graduating start-ups are 3 mentors. The instructors become adopted well the Nextfood approaches and really did their best to deliver their content in unique way, they were enthusiastic to apply different learning method.

The Stakeholders cooperate with this program by providing adequate support and information during the training period and are excited for the last day of training (demo day) to see the development that these 5 start-ups had reached. The Stakeholders support the participants the field and factories visits as study case. The stakeholders become more involved as facilitators through the course as learning resources.

### 9.3.1.2 Outcome of the case development process, including effects of making the essential shifts

### Sub-case Biodynamic course:

The biodynamic training become more developed year by year due to multiple times of meetings, field trips and continuously updating and renewing the course content for training, in addition to enhance the tools of teaching and learning to achieve the five core competences to be more efficient and effective training. All the students, staff members, agricultural engineers, farmers, growers and stakeholders are almost working together as one team exchange knowledge and information about their previous experience and background. At the end of the training the students could understand the importance of all the agricultural practices and food industry.

Nextfood project supported the biodynamic training emphasizing on the main 5 competences to developed all students' skills. For that all the students from all the levels have been exposed to a new learning approaches and new environment of learning whether in classrooms and field visits that improved their skills and abilities such as: communication, reflection, team-working, observation, dialoguing, visioning, problem solving, and critical thinking.



The impact not only for students but also for staff members and instructors as well. In the previous cycles, the university staff and one agricultural engineer had attended the training of the trainers (TOT) that aims to allow the staff to get the knowledge and build their capacity to teach to the future students in more advanced way. The teaching methods in this cycle have allowed the students to engage more with farm animals, soil fertility, soil structure and plants through observation and to do the all activities by hand. Students have been subjected to on-ground case studies based on SEKEM farm experience and present it to the lecturers.

### Sub-case Entrepreneurship program:

The Entrepreneurship program provided to their participants: Business trainings and workshops, technical assistance from field experts, Business mentorship program, Fabrication Facilities and Labs, plus Agriculture lot.

The Entrepreneurship program has been developed by professors and experts in their field, whether agricultural or commercial field, in order to maximize the benefit for the participants to gain adequate experience to start up their projects.

The participants start the program with vision and almost finished with very polished and shiny vision and know how to start their projects.

The graduating start-ups learned how to manage their finances, implement their knowledge, reach their target and their customers in the local markets.

We have now 5 incubation start-ups 1) Farawla Tech, 2) Chito Tech, 3) MicroFert, 4) Myshrooms, and 5) Organic Aquaculture Farm.

In the incubation period, which is cycle 3, the team provides: legal support of startups, equipped office space, Networking opportunities with potential clients, suppliers, financiers, Prototyping Grants for top-performing social startups, access to Investments and financing entities.

### 9.3.1.3 Supporting and hindering forces for implementing the Nextfood model

Supporting forces are for instance the opportunity of spending two weeks on Sekem farm. Consequently, the students as well as the teacher have a real-life case study and challenges.

Challenges are mostly pivoted on the organization and logistics.

For instance, the preparation of the accommodation was not enough before arriving at the farm. Additionally, the teaching materials and topics were not presented beforehand and the topics were not clear to HU staff.



Since the training is not yet in the bylaw of the Faculty of Organic Agriculture, the studying hours, lectures, and grades of the students had to be compensated in their courses. This has resulted in excessive administrative work to compensate for the training grades to other courses and compensate what the students missed in the other courses

Lectures for HU professors had been postponed for two weeks since the professors had needed to be on the farm for the whole two weeks. In this case, the lectures had to be compensated after the training period which represents a burden on the professors' schedules.

The contribution of the teachers in project in the beginning was little hard and get along with 5 main competences of the project. The COVID-19 pandemic situation has been impacted greatly on the organizing the training according to the schedule. The program has carried out when the governmental measures eased to avoid any heavy infections.

# Supporting forces are for instance the opportunity of implanting the Entrepreneurship program.

The number of participants who would like to join the program, who registered through the announcement and the attached link to the training announcement, was already large, which led to a filtering process to choose the most suitable and qualified trainees who had a good idea worth implementing.

### Challenges are mostly pivoted on the organization and logistics.

The whole subcase as program was postponed for almost one year due to COVID-19 pandemic situation, and start in the end of October 2021. The program began after making many preparations, especially preventive preparations, to preserve the safety of the facilitators and participants, and to prepare large wide classrooms for the sessions and training, and to ensure the sterilization process in the right place. And at the beginning of each cycle, we made sure that the participants had received the vaccination to keep the training process going in a healthy manner and without problems.

At the beginning of the training, a number of facilitators were not familiar enough to understand the educational process and the importance of NextFood approaches for that such as a special meeting for each facilitator, to identify the importance of these 5 competences of NextFood approaches.



# 9.4 Actions taken and data on the development of the case since the last reporting

### 9.4.1 Actions taken since the previous report

### Sub-case Biodynamic course:

In the previous cycle in the biodynamic course, the university staff members and agricultural engineers from extension department belong to EBDA (Agricultural Engineers and Extensions training) had training of the trainers (TOT) with the instructors from Goetheanum that aims to allow the staff to get the knowledge and build their capacity and teach to the future students. The training allow the trainers to asses and improve the learning and educational strategy for the next training or can help in other agricultural courses. In addition to, evaluate the impact of the new training's content on students' understanding and competences.

The teaching methods in this cycle have allowed the students to engage more with farm animals, soil, and plants through observation and hands on experience. Students have been subjected to on-ground case studies based on SEKEM farm experience and present it to the lecturers. Developed the practical activities increase the impact of the students' performance.

### Sub-case Entrepreneurship program:

The entrepreneurship program in the first cycle has started with basic knowledge on both agricultural and business knowledge. Then, the second cycle has focused more into depth and the market gaps in agri-food sector in which, later in cycle 3 the participants working on real based start-up in order to fill this gap and ultimately, they have their own business.

### 9.4.1.1 Planning

### Sub-case Biodynamic course:

The planning process of biodynamic training, there was a preparatory meeting about 2 to 4 weeks before the training, and sometimes it could be reach to month and a half before the training. It was almost a continuous process.

The discussion meeting includes all the contributors to the training such as staff members, TA's, instructors, agricultural engineers and representatives of stakeholders, which usually is face-to-face meetings that can be around 6 to 8 meetings.



These meetings were focused on designing the new schedule of the training day by day with avoiding all the previous negatives points that occurred in the previous trainings, in order to improve the new training.

The training schedule includes the targeted topics with the preparation of the training content and prepare all of the learning activities that will be held for students for a period of two weeks in the farm of Sekem.

The practical and learning activities were designed to cover the five core competences: observation, dialogue, participation, visioning and reflection. These activities improved gradually each semester to motivate and stimulate the participation of the students.

Biodynamic Course covers the first steps, focusing on soil-plant-farm unity as a fundamental unit for sustainable farming operations worldwide. The main goal of the course was to bring theoretical knowledge of different directions in one holistic approach into a relationship with agricultural practice.

The students were introduced to observation of soil, plant, and farm components. Also, the students have studied the complex of socioeconomic dimension and its impact on sustainable agriculture. Finally, the students have trained to formulate their healthy diet through the theme of nutrition. All of this has been carried out through shifting the teaching system from the traditional semester style to the real-life case studies.

### Sub-case Entrepreneurship program:

Before implementing the program, NextFood team had multiple meetings with experts in agriculture and bushiness to discuss the main points of interesting topics to participants and cover their needs, then design the outline the future schedule.

The team publish the announcement of Cycle 1 on social media and websites of Heliopolis university invites the participation who those interested in having their own stat-up projects. And the same announcement happened with cycle2 in addition to some qualified participants from cycle 1. The participants represent different categories from the community whether undergraduate students, graduated students, agricultural engineers, growers and housewives from Sharkia.

The preparation of the implementation of this program, started with a well-designed schedule of specify 1) the approximate dates, 2) the training content for the three phases and 3) the instructors, facilitators or experts who will be responsible to deliver these topics. The entrepreneurship program has started with general knowledge on sustainable agriculture and starting a business which have sustainable approach to fill the market gap in Egypt in the field of agriculture.



It was determined that cycle 1 will be on October 2021, with the selected topics will be taught, who are in charge of the teaching process and the place of teaching, and the same things determined for the cycle 2.

Cycle 3 will focus on mentoring and following up of the last selected 5 major start-up projects until the Demo day that almost in end of March.

The participants in cycle 3 are preparing for final presentation which they will presented to a jury to evaluate the feasibility of the start-ups.

Timeline **Next Food Incubation Cycle Plan** Dec'2021 Jan'2022 Feb'2022 Mar'2022 The Full-Timeline W6 **Real value Propositions** Validated Business Model 3 Week Go Market Strategy Traction Growth/Scaling Strategy 3 Weeks **Pitch Deck** DemoDay DemoDay

The action plan for the start-ups projects in the next Demo Day:

Figure 54: The action plan for the start-ups projects in the next Demo Day

### 9.4.1.2 Implementation

### Sub-case Biodynamic course:

The schedule designed to be implemented for two weeks. all the team members worked on finalize all the logistic process, transportation and accommodation issues before starting the training.

The training started and ended as initially planned. The training began with the attendance of all the students and transfer them from the Heliopolis University to Sekem farm location, where the training and full accommodation will be held.

Usually, the day starts at 7:00 am when the breakfast time; and the start of training is at 8:00 am, which around 4 practical sessions, with about 3 breaks per day. The training day finished around at 4:30 pm and then dinner time at 6:00 pm.

The students of the biodynamic course have been subjected to different exercises, assignments, and activities during the day. The activities have been divided into individual and group activities. Each group chose a topic and they should use their creativity to explain their topic by using the resources on the farm. The activities have been focusing on competencies such as observation which students were asked to observe animals, plants, and the whole surrounding and reflected on drawing.

### Sub-case Entrepreneurship program:



Cycle 1 was fully implemented in the Sekem farm, Sharkia governorate, where the focus was on agricultural topics, which included multiple field visits farms, factories and production units such as compost production, animal feed units, hydroponic and nurseries.

The training gets benefits of many agricultural engineers who have high experience to participate in this type of training in the farm. It gives to the trainers' opportunity to have fruitful discussion with the agricultural engineers.

As for cycle 2, the training held at the Entrepreneur center for social impact at Heliopolis University, where the training focused more on business and commercial issues. The instructors/facilitators conducted several exercises and activities to cover the points of how to implement and market their commercial idea.

### 9.4.1.3 Reflection

### Sub-case Biodynamic course:

Regarding the reflection, the staff members already prepare the reflection idea to react with the students. Usually, the reflection was individually with students to express themselves freely and sometimes also as group together to have a different type of reflection. All the teachers team do the reflection process with the students. The reflection was for the training as whole and holistic approach.

Usually after collecting all the reflection documents, papers, painting papers from students, teachers and instructors meet in order to reflect and discuss the results of the students' reflection. This process was documented by written papers, pictures and some small videos.

During the training, teachers have taken notes on each students' performance as well based on the five NF competencies. The assessment was carried on a student group performance and possibly on an individual student after completing the training. Students' responses, learning and competence development. At the end of session, the teacher/instructor has filled a reflection document showed their experiences and possible improvements of any future sessions.

### Sub-case Entrepreneurship program:

NextFood team prepared the reflection idea by interact with participants after finishing every cycle and deliver to them the reflection and self-assessment documents in this program. The reflection was like in group discussion in the end of each cycle and then individually with participants to express themselves freely in their papers. These processes were documented by written papers and also by videos.



### 9.4.2 Students' responses, learning and competence development

### 9.4.2.1 Methods of data collection and analysis **Sub-case Biodynamic course:**

NextFood team and staff members help to distribute the reflection and selfassessments documents. At the beginning of the training, clarified the importance of filling these documents.

Almost all students and some instructors showed a response to fill the documents and share their feedback individually or in group. However, some instructors/facilitators refused to share their feedback or reflection.

In this report, the outcome had been analysed from the students' feedback on the two weeks of training, before and after questions, before and after students' self-assessment on the competencies and reflection. The data analysed using Excel Sheet for statistical analysis.

### Sub-case Entrepreneurship program:

At the beginning of the training, NextFood team clarified the importance of the participants' feedback and their reflection of the program. The team announced that reflection and self-assessments documents will be distributed at the end of each training, and they should to participate. The participants did not show a refusal to cooperate or respond to the reflection methods.

The participants joined in the group reflection and also individually by completing the documents. For the instructors also accept to fill in the self-assessments documents.

The collected qualitative data analysis of the participants' feedback in the program had been analysed by using Excel Sheet for statistical analysis as spreadsheet software and convey information clearly.

### 9.4.2.1.1 First week (day) & last week (day) of the course

### 9.4.2.1.1.1 Student's understanding, contributions, and expectations

### 9.4.2.1.1.2 Self-assessment of competences

### Sub-case Biodynamic course:

Before the beginning of the semester, NextFood team have explained and clarified the importance of participating in obtaining the students' feedback. The students'



understanding and contributions was determined by four questions as initial and five final questions in the end of the training.

At the beginning of the semester, the students were asked to reflect and provide answers to four questions related to their understanding of the course topics.

The four questions were printed in questionnaire form to fil in and give them back to NextFood team or staff members.

The four questions related to their understanding of the course topics, their contribution and skills they would like to train and their expectations to the course. The data had been gained in the students answer through these questions:

1. What knowledge and skills do we need to support sustainable development in agricultural systems?

2. What experiences and skills do I have to make the current course a success?

3. What questions would I like this course to help me find an answer to?

4. What competencies do I want to train and significantly improve in this course?

At the end of the training, the students responded to this for the final five questions as a take-home assignment. The five questions were printed in questionnaire form to fil in and give them back to NextFood team or staff members.

At the end of the course, the students were interviewed individually regarding the same topics. In the interviews, we mainly focused on whether the students felt they had progressed about the topics raised, moreover, to reflect on the core competencies of the course and their progress with achieving the learning goals. The take-home assignments and the interviews were in written form.

The five questions were:

1. What knowledge and skills do we need to support sustainable development in agricultural systems?

2. What experiences and skills do I have to make the current course successful?

- 3. What questions does this course help me find an answer to?
- 4. What competencies have you improved through this course?
- 5. At the end of this course, what questions do I ask myself now?

### Sub-case Entrepreneurship program:

At the first day of cycle 1, NextFood team have clarified the importance of participating the participants to obtain their feedback.

Almost the same process was followed in Entrepreneurship program by providing four questions as initial for the beginning of the cycle and then five final questions as printed



form for the both stages. However, the documents were given to participants by hand and collected from them at the same day for the both types of questions.

### 9.4.2.1.2 Students' final reflection document (individual) **Sub-case Biodynamic course:**

Before starting the training, the staff members and facilitators worked together to organize the self-assessment of students' competences and documents. The questionnaire was designed to cover the five core competences (observation, participation, visioning, reflection and dialogue). The questionnaires were distributed to the students at the beginning of the training and at the end of the training as well, with the help of the staff members and instructors. The students have filled self-assessment questionnaire, to track the development and improvement of the core competences on the Biodynamic course.

For the core competences, all the obtained data from the training has been loaded into the Excel program, and each of them is classified with a specific value from 1 to 10. Each competence such as observation, participation and visioning divided into three questions per competence or categories, while for reflection and dialogue were divided onto set of 4 questions or categories per competence.

Competence	Questions/categories
	I check the whole situation before
Observation	drawing conclusions
	Create a comprehensive overview of a
	complex situation
	Note carefully the position in the field
	Empathize with the goals and feelings
Participation	of stakeholders in the field
	Participation in the field work with
	commitment and dedication
	Recognize the values and conflicting
	goals of different stakeholders in society



	The ability to change by helping the
Visioning	group develop and align around a
	shared vision
	Understand the processes that enhance
	the group's ability to identify current
	challenges and visualize a desired
	future state
	Have a basic knowledge of the factors
	that motivate and hinder creativity in
	individuals and groups
Reflection	The ability to embrace self-learning
	Connecting experiences and theoretical
	concepts to develop your personality
	Linking practical situations to theoretical
	concepts related to agricultural and food
	systems, as well as linking them to
	personal growth
	Awareness of the role of reflection in
	personal learning and development
	You appreciate perspectives and be
	able to identify and challenge the
	assumptions behind your own and
	group thinking
	Questions that stimulate the dialogue
Dialoguing	approach can be identified and
	formulated
	You can introduce the purpose and
	principles of the dialogue to a group
	Understand the differences between
	debate, discussion and dialogue

### Figure 55: Self-assessment questionnaire

The self-assessment questionnaire, at the beginning and the end of the course, designed to conduct the rank scale. Each competence was rated on a scale rank which was from 1 (Novice) as beginner in his/her performance – to 9 (Expert) as high level of the performance. To analyze the data collected from the students, it was applied by



excel sheet program and then interpretation of data had been revealed. A total number of 54 students 35 of them were females attended the biodynamic course.

#### Sub-case Entrepreneurship program:

The same process as previous in Biodynamic training had been implemented in the cycles of Entrepreneurship programme learning. 17 participants attended then Entrepreneurship program-learning course during the reporting period.

# 9.4.2.2 Results 9.4.2.2.1 How do students experience such a learning process with respect to: 9.4.2.2.1.1 learning goals? Sub-case Biodynamic course:

The Sekem case for the NextFood project is based on learning a biodynamics course as first subcase study. The biodynamic course aims to detail and comprehensively inform about local agriculture and food systems, and students' action learning revolves around holistic inquiries into local farming and food systems for undergraduate students of the faculty of organic agriculture to facilitate improved sustainability. Where students are complemented by activities, they are mostly interactive class sessions where theories are drawn to support the students' experiences and to build their confidence that the described process, albeit unfamiliar about what they are accustomed to, will enable them to do so. To become lifelong learners and agents of meaningful change. The students spend two weeks every fall and spring semesters from 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> grade level students the four main themes.

Interaction between staff members and students in action learning activities affecting on learning outcomes for students.

The collected feedback from students and their answers to the questioners, it showed that they became more aware of the importance of the organic agricultural sector in food industry and the significance of sustainable development in the agri-food sector. The content of the training made them understand to a great extent the importance of soil fertility, compost production, livestock husbandry, and economic plants and field crops.

Also, through this training, the students have learned many different personal skills such as presentation skills, preparing good material for their presentations, learning ability, being eager to learn, creativity, networking skills, enrolment in different activities, teamwork, leadership, time management and using the available resources.



In addition to some social skills such as communication skills and communicating with each other as one team and as one unit. During the training, the staff members felt the students almost become as one family in the end of the training.

The students explained the importance of the field visits they undertook during the training period as well.

At the end of the training, the students mentioned that they faced new great experience of being grower or farmer who deal everyday with live animals, plants and soils.

### Sub-case Entrepreneurship program:

The Sekem case for the NextFood project is based on learning of entrepreneurshiplearning course as second subcase study. The program supports the participants/leaners to lead and coach the business idea, developed their practice, and interact with experts to expand their network as well. The program helps the participants in design a well-structured business plan and market their ideas. It works also to enhance other personal skills such social, presentation and leadership skills. At the end of the program the participants will build and grow their business idea with more clarity and confidence.

### 9.4.2.2.1.2 view on competences needed for sustainable development? **Sub-case Biodynamic course:**

At the beginning of the semester, when asked about knowledge and skills needed to support sustainable development in this training. The students were very ambitious to learn about sustainable development in agriculture.

Biodynamic agricultural is an innovative and potentially sustainable method of farming developed in early 1920's. The practices of Biodynamic incorporates the idea that agriculture is holistic by using a collective spiritual, ethical and ecological approaches to the production of food (Fraine, 2015, DOI: <u>10.13140/RG.2.1.1486.8884</u>).

During the training, the students get aware of the importance of the Biodynamic agricultural and how its related positively with sustainable development. Biodynamic farming disallows the use of chemical pesticides and fertilizers and use very unique preparations from natural substances and compost. These agricultural practices enhance the soil structure and tackle the growing problem of soil erosion. The objective of this training is to determine the sustainability and assess how sustainable biodynamic farming is in relation to the definition.



All these concepts had been delivered to students and became convinced of the idea and wanted to communicate it. Many of the students mentioned the need of spreading the awareness among the members of the rural society: farmers and agricultural workers by conducting periodic seminars to spread the idea of sustainability, especially in the field of the agricultural regions.

At the end of the semester, most students still repeated the same needs related to raising the awareness especially for enhancing green practices to preserve the environment in addition to providing technical support to the existing and new small projects in the agriculture sector, which already ensure rational exploitation of natural resources.

#### Sub-case Entrepreneurship program:

This program helps the participants to understand the importance of sustainable development in their small projects. Sustainable development means adopting business strategies that meet the needs of the enterprise and the stakeholders in sake of protecting the sustaining of the resources and enhancing the human and natural resources that will be needed in the future (source: https://www.iisd.org/system/files/publications/business strategy.pdf).

The startup projects of the participants were already developed from in the end of the program in line with the goals of sustainable development.

Moreover, they propose conducting sector assessments to identify the problems that the sector faces and find optimal solutions for them in the future.

### 9.4.2.2.1.3 recognition of own competences and competence development? **Sub-case Biodynamic course:**

Regarding the experiences and competencies, the participants brought into the course, the diversity is quite striking. Some of the highlighted needs of learning the knowledge; to manage projects, research, and development in the field of Agriculture. While others focused on communicating with other partners, and how to work in a team. However, new aspects were brought into the post-survey such disseminate the information and knowledge gained from the training course on the largest scale. Many of them raised that the entrepreneurs should have good knowledge about the agriculture sector intensively, which will lead to an understanding and results of the



current and previous studies, and permanent knowledge of everything new in the sector.

At the beginning of the training, the self-assessment questionnaires revealed that the students were not aware enough of the importance of the 5 core competences or even the importance of the biodynamic training.

However, at the end of the training, the vison become clear to the students and became more aware of the suggestive of these competences especially reflection moments (because all the students discuss together very fruitful moments).

Also, this training added many important information to their experience that that will also support them at their studies.

The students used multiple methods to express about themselves by doing presentation, drawing, teamwork and writing research papers

During the training, it was achieved successfully the:

- 1) **Visioning:** by more learning activities and grouping work).
- 2) observation: by observing activities in the field and focus on the live animals and plants. Many practical activities designed within this training to make the students pay attention to small details of the live organisms around them.
- 3) Participation: it was one of the competences that increased gradually with Organic Agriculture students. At the beginning of the training, they were so shy and not easy to communicate, but at the end of the training they were completely changed in a positive way. Their participation was very satisfactory and very strong.
- 4) Dialogue: this competence improved gradually among the students and among the students and the staff members. At the beginning of the training, the students were not capable of asking questions or even start informative dialogue. However, gradually their performance changed in a good way.
- 5) **Reflection:** it was hard to implement or to show the importance of this competence but with more activities the idea become more clear to them. The students became with high sense of responsibility.

The following table shows in general the differences that occurred for students before and after training, and the percentage of the difference that affected their performance.



Table 17: Results of self-assessments, SEKEM, Biodynamic course

	Average scores		
Competences	Start	End	Diff
Observation	3.45	5.78	+2.33
Participation	5.14	7.81	+2.67
Visioning	2.57	4.32	+1.75
Reflection	3.95	7.14	+3.19
Dialogue	4.17	8.61	+4.44

At the start of the biodynamic course, as recorded in the pre- self-assessment test students were most confident in their competence of participation and dialogue, then reflection following observation and visioning obtained the lowest average score. At the end of the course and as per the results of the post-self-assessment test, they showed a higher level of confidence regarding the different competencies. The largest increase score is the average score of +4.4 for the dialogue competency, and 3.19 for the reflection competency. While other competencies showed moderate-higher levels of increasing, which lay between +2.67 and 1.75 as shown in the previous table.

	Average scores		
Competences	Start	End	Diff
Observation	3.45	5.78	+2.33
Participation	5.14	7.81	+2.67
Visioning	2.57	4.32	+1.75
Reflection	3.95	7.14	+3.19
Dialogue	4.17	8.61	+4.44

Figure 56: Results of self-assessment, SEKEM, Biodynamic course

Sub-case Entrepreneurship program:



The following table reveals in general the differences that occurred for participants before and after the program, and the percentage of the difference that affected their awareness.

	Average scores		
Competences	Start	End	Diff
Observation	13.09	20.27	+7.18
Participation	5.30	6.98	+1.68
Visioning	3.57	6.06	+2.48
Reflection	5.19	6,63	+1.43
Dialogue	4.48	6.93	+2.45

Table 18: Results of self-assessment, SEKEM, Entrepreneurship course

At the start of the first cycle of the Entrepreneurship course, participants' confidence was less in their competence mastery of participation, and dialogue, with reflection, following, and visioning obtaining the low average score. At the end of the course and as per the results of the post-self-assessment test, they showed a higher level of confidence regarding the different competencies. The highest improvement score is the average score of +7.18 for the observation competence. The other competencies showed moderate-higher levels of improvement, which lay between average scores of +2.48 and +1.43, as shown in the previous table.



Figure 57: Results of self-assessment, SEKEM, Entrepreneurship course



The significant increase in self-assessment ranking indicates that throughout the Biodynamic course and Entrepreneurship course, students/participants perceived that they developed their mastery of the five core competencies. The competencies with the lowest average scores at the beginning of the two-course saw the largest increase, which may be due to students being less familiar with those five competencies (observation, visioning, dialogue, participation, and reflection). Additionally, this may also be due to a difference in the difficulty of mastering competencies. Arguably, mastery of reflection is more difficult than mastery of participation, which may explain why reflection saw the lowest or highest increase. Furthermore, when starting the courses, many participants have had a limited understanding of the competencies and may thus overestimate or underestimate their level of mastery. Finally, the increase of the five competencies showed the participants' / students' self and skills improvement.

## 9.4.2.2.1.4 transformation? **Sub-case Biodynamic course:**

At the beginning of the semester, the student listed a plethora of questions they would like the course to provide the answers to. Ranging from specific topical questions, how to make organic feed at a simple cost? How to establish a new project? What are the sales methods? and how to develop sustainable agriculture systems in developing countries and the way to turn it into a global company that competes with companies in the same field? At the end of the semester, inevitably, many students had to admit that they still had some of the same questions as coming into the semester. However, many pointed out that they got answers to questions they did not know they wanted to have answers to those questions such as, how to present and manage the project idea? If the project fails how to do a market study? How to do a market study and project structure? And, how to effectively work in groups?

When asked which competencies they would like to train, most of the students emphasized the core competencies put forward by the course. It should be noted that at the time of answering these questions, the students wanting to increase their competency to learn the basics of project management, animal production management, establishing an agricultural investment company to implement new ideas, and recognizing the values and topography of the different objectives of the stakeholders.

Furthermore, communicate in general, think critically, access finance – fundraising. At the end of the semester, most students felt they had improved their competence



inefficient market study and customer study, skills and experience in the agricultural, animal, and sustainable development fields appreciate the views, and the ability to adopt self-learning in the field of project creation and planning. In addition, to answer many students pointed out about; how does a feasibility study work? How to design a project concept and make it successful? Furthermore, most students highlighted that they had become much better at working in groups during this course, knowing and acquiring a lot of skills and experience in the areas of animal agriculture and sustainable development.

Finally, the students were asked in the take-home assignment, which questions they were asking themselves at that moment, at the end of the course. Most students then moved directly towards questions regarding their futures. They are eager to know how to apply the competencies they have improved on during the course, now they are determining goals during the coming period based on the experience gained during the next stage. On other hand, they asked themselves some questions; will the future be a suitable climate for the success of small projects? Will I be able to understand the agricultural field and apply the experiences on the ground? How to run a profitable and sustainable project? Will the vision you set for the project come true as you imagined it?

Is the project viable the answer is yes!!. Suddenly, they stop asking then they find that's is no longer question, but it is time to move on and start to implement the project by interviewing potential clients, and stakeholders to make the projects come to reality. For the students, the transformation can be noticed in the students' performance during the training, after the training when they back to the university, and during their faculty's courses.

Their performance enhanced very well in dialogue, discussion, teamwork, and group meetings. In addition to increasing in the level of knowledge. The staff members can notice the confidence of their students that increased gradually when they involve in any course discussion.

The self-assessment data shows that for each competence that there was significant increase during the training. Students have become more loving to participate in field work and practical activities more than being in the classrooms. The students expressed in their reflection that it was more interesting for them to observe and watch the agricultural practices in the field instead of theoretical description in classrooms. Their interaction with their staff members, instructors and farmers was very high and effective.



### Sub-case Entrepreneurship program:

At the beginning of the program, the main question was in the participants' mind is "How to establish our small project?".

In this program multiple topics had been provided to enhance their skills in implanting their projects.

The topics focus on sales, marketing, understanding the markets' needs, etc.

At the end of the program, many participants had a clear vision of how to implement their idea.

One of the most competencies effect on their performance is **observation** due to multiple field work, production units and factories visits in addition to observing life cases in the farm.

Most of participants highlighted on the fruitful of the topics of the program recognizing the importance of sustainable development in agriculture and the significance of feasibility study. However, they asked for more field visits and practical cases as examples for their future project. As general, the level of knowledge of the participants, in agricultural and business topics, had been increased positively. In addition to their performance enhanced very well in dialogue, visionary thinking, participation, teamwork, and group discussion. The self-assessment data shows that for each competence that there was significant increase during the program.

For the participants, the transformation can be noticed in that their business ideas have become more refined and clear for implementation.

Finally, they are eager to implement their idea in future. By the final selecting of the final 5 start-up projects, they are now working so hard to present their work successfully.

# 9.4.2.2.2 To what extent does the education enhance the students' competences of:9.4.2.2.2.1 observation?

### Sub-case Biodynamic course:

This competence had been achieved through several practical activities such as field trips, visiting different factories belong to SEKEM, quarries, and zoo.

At the beginning of the course, the group didn't know how to observe plants, soil, landscape and food. At the end of the training, the group made a good progression in



their observation through drawing plants and landscape however the nutrition part needs more work.

The observation changed from initial incredulity to a deep and contemplative observing. **Regarding to data analysis, the observation at the begging of the training recorded 3.45 that improved to 5.78 by difference +2.33 in positive way.** Observation is essential part of teaching process, and the students can get the most benefit of the learning process. Observation can help the students to enhance their performance, make students take care of the details, be careful, thoughtful noticing of the nature and surrounded environment.

The students were told to pay attention to the details of the live animals, plants, soil structure and so on and draw them carefully and how to notice the small characters of the live organisms. In the factories visits, the students observe the details about the equipment, methods of industrial process and how the final product show to the customer in the end. The students were told to write down their notes about the whole process and mention their comments.

#### Sub-case Entrepreneurship program:

The participants' development of core competences as indicated in the data analysis was improved in positive way. For the observation, it started with 13.09 and at the end of the training recorded 20.27, it reveals by positive difference to +7.18. It changed from initial and shallow observing to focused one.

### 9.4.2.2.2.2 reflection?

### Sub-case Biodynamic course:

Reflection moments were completely new for our students to express about themselves. They were shy in the beginning and do not know how to start or to end. In this case the students choose like repetitive for them to speak instead of the groups. It was multiple group of students ranged from 5 to 6 students.

For biodynamic training, the student representatives have emphasized observation as an important competency during the training period. Additionally, participation is another which is developed as many assignments and activities are mainly based on group work. As part of the group work, the students have mentioned dialoguing and discussion has been used intensively during the group assignments.

Regarding to data analysis, the reflection at the beginning of the training recorded 3.95 that improved to 7.14 by difference +3.19 in highly positive way.



At the end of the training, the students have carried out a self-reflection on the whole learning process. Their documents, papers or any feedback method (questioner – painting papers) collected from the students were anonymous, the students should not write his name.

The teachers have asked the students to make their own journal to write their reflection diary as well. The instructors encourage the students to improve this competence by multiple reflection sessions, case studies and group discussions.

It was difficult to the students to track their reflection daily; it was overwhelming for them to understand and apply the reflection concept. Instead, we adopted the method of reflection similar to the previous cycle. The students have chosen a representative (one male and one female) to describe the learning process.

Each representative of each group represents their feedback and their reflection by drawings, words, small light presentation and all the students do this at the same time. So all the groups introduced to each group feedback.

### Sub-case Entrepreneurship program:

Using the experience-based on learning, reflection is a vital part of the learning process during entrepreneurship program. Reflection is also helps to close the gaps when we are dealing with an educational situation. **Regarding to data analysis, the reflection at the beginning of the program recorded 5.19 that improved to 6.63 by difference +1.43 in positive way.** 

Reflection competence showed moderate of improvement showed smalla verged of score in difference.

### 9.4.2.2.2.3 visionary thinking? **Sub-case Biodynamic course:**

Visionary thinking was new competences to be achieved, however some activities of the training work to be accomplished. These activities are focused on analysing the live study cases of the field during the training and collect data regarding to each study case.

**Regarding to data analysis, the participation at the beginning g of the training recorded 2.57 that improved to 4.32 by difference +1.75 in slightly positive way.** The results of self-assessment questionnaires showed good increase in the students' competences of Visionary thinking, however the staff members expected more high increasing in this competence.



### Sub-case Entrepreneurship program:

The visionary thinking competence showed a moderate level of improvement. Visionary thinking recorded 3.57 at the beginning of the program to reach 6.06 by difference +2.48.

Some participants already had this ability of visionary thinking by the unique ability to make others believe in the idea of their start-up project.

### 9.4.2.2.2.4 participation (engagement)? **Sub-case Biodynamic course:**

At the beginning of the training, the participation was too small. There was no interaction among the students and sometimes some of them refuse to join group discussion. They were also shy to speak in loud voice in their presentation.

One of the successful competence had been achieved is Participation. The students were drastically changed in the end of the training compare to the beginning in their performance in participating.

Regarding to data analysis, the participation at the beginning of the training recorded 5.14 that improved to 7.81 by difference +2.67 in positive way.

All the students express that in very positive way in their reflection documents. The staff members noticed the positive change in their performance in other agricultural courses when they back again to university after finishing the two weeks of training. Increasing the participation activities become important to be included in other

courses.

Biodynamic training includes multiple and interesting learning activities that involved participation of the students at all the levels.

The students are open to work together whether in classrooms or in the field with staff members, instructors or growers.

### Sub-case Entrepreneurship program:

The participation enhanced through field work, field visits and group sessions.

# Regarding to data analysis, the participation at the beginning of the training recorded 5.30 reached to 6.98 by slightly difference +1.68.

This competence is gradually improved with the further improvement of other competences such as observation, dialoguing and other skills such communication and how to formulate the right questions to experts.



### 9.4.2.2.2.5 dialogue?

### Sub-case Biodynamic course:

Dialogue showed as satisfactory competence compare to other competences, because it recorded the highest percentage of differences among the rest of the other competences.

Regarding to data analysis, the dialogue at the beginning of the training recorded 4.17 that improved to 8.61 by reporting difference by +4.44 in positive way.

At the begging of the training, the students were not into the process asking or formulate questions; they were so shy and feeling embarrassed to do so. At the end of the training, their performance and attitude changed gradually to achieve the desired goal.

This improvement may be due to enhance their skills in asking questions during the training. Staff members and instructors emphasize working on their social skills and encourage them to engage with others (instructors/ facilitators/ stakeholders/ farmers/ growers). The students require social skills and initiative action to lead the dialogue.

### Sub-case Entrepreneurship program:

Dialogue will help participants in expanding their networks, and this is what the participants have already taken care of during their training to make successful working relationships. The dialogue at the beginning of the program recorded 4.48 that improved to 6.93 by reporting difference by +2.45 in positive way.

And this difference may due to some of the participants have dialogue skill, perhaps because some of them are graduates or have already started small projects before joining the program. During the program the dialogue enhanced by working with experts, mentors and stakeholders.

### 9.4.2.2.2.6 dealing with "the challenge of the whole" (systems thinking)? **Sub-case Biodynamic course:**

The main points of challenges for the whole system and implementing the action learning:

- 1- among academic institutions, teachers, students, stakeholders to create an understanding of the need for the action learning by preparatory meetings and group discussion before implementing the training.
- 2- To deal with the bureaucracy for different types of education by group discussion to overcome this issues.



- 3- To gain institutional supporting and sufficient resources.
- 4- Deliver clear vision of the importance of these competences to our students and instructors by discussion face to face or multiple meetings.
- 5- Train the teachers, not only to deliver the knowledge, but as facilitator to help the students to get the knowledge.
- 6- The stakeholders' contribution is very essential, their interaction with students is useful for the learning action.

### Sub-case Entrepreneurship program:

The main points of challenges for the whole system:

- 1- Not all the facilitators adopted the idea about the NextFood approaches of action learning.
- 2- Through the preparatory meetings set clear objectives of these trainings and orientation of the action learning.
- 3- Interaction of stakeholders with the participants during the eprogram.

## 1.2 Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education

### 9.4.2.3 Methods of data collection and analysis

### 9.4.2.3.1 Teacher reflection document

For teacher reflection, it was individually for each teacher after finishing the training.

At the end of the training/program, the teacher (staff members, instructors, facilitators, stakeholders) reflection documents are collected and then analysed by Excel sheet program.

The teachers have mentioned there is an improvement in student's technical knowledge and skills. Also, the teacher reflected on the training through the following questions:

- 1- How did you experience the session?
- 2- How do you think the students experienced the session?
- 3- If you were to run the same session again, what would you do differently? And why?

### 9.4.2.3.2 Course reflection focus group/interviews

This part had not been done due to short time and no much members to help.



#### 9.4.2.4 Results

9.4.2.4.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

### 9.4.2.4.1.1 From lecture hall to a diversity of learning arenas

### 9.4.2.4.1.1.1 Supporting forces and how to build on them

Introductory Biodynamic Course: The program covered the first steps, focusing on soilplant-farm unity as a fundamental unit for sustainable farming operations worldwide. The main goal of the course was to bring theoretical knowledge of different directions such as botany, zoology, and microbiology in one holistic approach into a relationship with agricultural practice. The students were introduced to "Goethanistic" observation of soil, plant, and farm phenomena. Also, shifting the teaching system from the traditional semester style to the module style which is still under preparation. The students spent two consecutive weeks at SEKEM farm.

Lectures were divided into (i) traditional lecture halls with brief theoretical background to (ii) lectures in the open field and practical instruction based on observation and doing.

The students liked the idea of the Gothic teaching methods since the change of teaching method/place has let them experience other feelings and information compared to class-based education. Yet, the students were overwhelmed since a) the different nature of teaching since the method is not a direct information delivery b) the topic is not yet well organized and the syllabus is not clear c) repetition of some topics since this training is repeated with first- and second-year students.

The students were present in the main hall of Sekem farm in Sharkia or sometimes in the field in front of some production units or animal farms.

For the participants in the entrepreneurship program, they use the main hall of Sekem farm and the main hall of the entrepreneurship center in Heliopolis University.

### 9.4.2.4.1.1.2 Hindering forces and how to deal with them

The logistics for every cycle of the biodynamic course is quite challenging since the number of the students increases every year. Therefore, organizing accommodation and transportation is for this number of students is difficult as there is not enough space. The big number of the students are easily got distracted as they cannot listen to the teachers' instructions. On the other hand, the organizers did not face any significant challenges in the entrepreneurship program.



### 9.4.2.4.1.2 From lecturing to co- and peer learning

### 9.4.2.4.1.2.1 Supporting forces and how to build on them

During the course, the students have been subjected to different exercises, assignments, and activities. The activities have been divided into individual and group activities. The group activities have been given to groups to not more than 4 to 5 students per group. Each group chose a topic and they should use their creativity to show/explain their topic by using the resources on the farm. The activities have been focusing on competencies such as observation which students were asked to observe animals, plants, and the whole surrounding and reflected on drawing. Through group work competencies such as participation and dialoguing have been emphasized during the activities.

### 9.4.2.4.1.2.2 Hindering forces and how to deal with them

Sometimes the students in the biodynamic course face difficulties in dealing with each other specifically between older and newer students, and male and female students. The way to deal with such difficulties was to keep insist on mixed group members and solve insistently any conflict that could arise during the assignment. For the entrepreneurship program there was significant challenging, however, the participants were tending to work on their projects individually.

### 9.4.2.4.1.3 From syllabus to supporting literature/a diversity of learning sources *9.4.2.4.1.3.1 Supporting forces and how to build on them*

In this cycle, a pre-determined syllabus has been set with consulting with the teachers of faculty of organic agriculture and Gotheanum. The previous cycles were not depending on a well definite syllabus and teaching was based on spontaneous teaching based on observation and reflecting. The students, mostly the first-year students, have little or no agriculture background. The teachers from HU are not familiar with Goethanistic methods. From this point, it has been seen that it is important to determine the course outline, syllabus, and materials.

### 9.4.2.4.1.3.2 Hindering forces and how to deal with them

In the previous cycles of the biodynamic course, the teachers were striving to create a stable and clear syllabus to the course. The diversity of the learning depends greatly on specified topic as the student's scientific background varies from different levels. For entrepreneurship program, the participants recommend certain themes that they like to discuss. The challenge is to find the competent instructor(s) on a very short



term. Thanks to the recommended list we had from the entrepreneurship centre and Heliopolis University we could overcome this challenge.

### 9.4.2.4.1.4 From textbook to a diversity of teaching aids 9.4.2.4.1.4.1 Supporting forces and how to build on them

The course aims to let the students have a real-life oriented learning experience. It is emphasized that the students should spend the whole period. The method enhances the ability of students to observe the farm nature, the planted crops, livestock, soil, and even the sky not as an individual element but as one holistic organism. The lessons are in most cases are taken in the field and illustration using colours and drawings instead of PowerPoint presentations.

#### 9.4.2.4.1.4.2 Hindering forces and how to deal with them

The students always like to keep materials and clear content from the teacher otherwise they would feel lost. Yet, in the biodynamic course the teachers clearly informing the students to be outgoing and not depending on materials and they can their own materials through writing and discussing their observations. In the entrepreneurship program the participants did not have this challenge but in fact they were seeking practical knowledge.

### 9.4.2.4.1.5 From written exam to a diversity of assessment methods 9.4.2.4.1.5.1 Supporting forces and how to build on them

The course is not yet added to the faculty of organic agriculture bylaw. Therefore, there are no exams needed for the final assessment. Furthermore, the course is designed not to assess students by the traditional way of exams, but by assessing their capabilities on participation and their output through exercises and individual/group assignments. The final assessment grades of the biodynamic course are added to one agriculture course taken by students in the semester.

*9.4.2.4.1.5.2 Hindering forces and how to deal with them* It was not challenge to not having exams for the both cases



### 9.4.2.4.1.6 From lecturer to learning facilitator

### 9.4.2.4.1.6.1 Supporting forces and how to build on them

The lessons start with the explanation of a definite topic, and after that, the students are subjected to an activity that has to use the information given in the lesson. The students reflect on the topic given by the teacher (facilitator). Afterward, the students are collecting, observing, and discussing the information and finally presenting it to other colleagues. With such a method, the teacher is not exclusively the only source of information, but also students can share their knowledge and their views with the teacher(s) and colleagues.

#### 9.4.2.4.1.6.2 Hindering forces and how to deal with them

For Both cases, the teachers/ instructors are not fully aware of the Nextfood approach requirements specifically the five competencies. Reflection, as for example, has not probably carried out as the concept itself is not fully understood and always mixed with assessment. Nextfood team tried to explain as much as they can about the five competencies on individual bases.

### 9.4.2.4.2 What such a change requires from teachers, students, and institutions Changes requires from teachers:

- 1- The teachers are required on count on action-based and student-oriented approach.
- 2- The teachers/ instructors have less central role and to be more facilitator than teacher.
- 3- The teacher needs to be constant to updates with the active learning methods, conveying knowledge and devoted.
- 4- The teachers will more capable of identifying the students' needs and to actively engaged with them.
- 5- They are supporting the students to solve practical cases.
- 6- They are working on obtain meaningful feedback from the students.
- 7- To cooperative with non-academic experts and stakeholders in learning process.
- 8- To help their students to overcome the social challenges such as different languages and interpersonal misunderstanding.

Changes requires from students:



- 1- Some students are not used to advanced methods of learning that they were not accustomed to in their previous studies.
- 2- The students have various levels of their abilities and the same passion to learn.

Changes requires from institutions:

 Adopted effective procedures of such as NextFood approaches in assessing, evaluating and updating the learning and education methods in multiple and practical courses.

### 9.4.2.4.3 Teachers' perception of the greatest challenges to achieving such a change

The teachers have praised the motivation of the students and the cooperation with the teacher assistants. "The lecture could run the same way, cooperation between the teacher's assistant, the co-lecturer and Sekem was very good." "The students were motivated and working hard in the lectures and group work. They followed well in the excursions, practical lectures, and demonstrations in field." Quote: (Teacher SwR, 2021)

The challenging points are the contradiction of the training load and traditional course load at HU "It should be made sure that students are free to follow the whole seminar without having other duties in the HU. The course is demanding full attention and students should not prepare or deliver other homework during this time." Quote: (Teacher SwR, 2021).

### **Observation**

For the observation, it was hard for the students to understand the appreciate of observing.

"The topic of nutrition in the biodynamic context is very extensive and complex for a two-week course. Accordingly, it is important to build up the course carefully and systematically from day to day, and this should not be disturbed by external interventions. I am not sure whether the students have now a clear and consistent picture of biodynamic nutrition." Quote: (Teacher SwP, 2021).

### Participation and Dialoguing

At the beginning of the course, the students were shy and afraid to participate and present their work. There were almost like two groups: 1) the female and some males



participated good, however 2) some males didn't participate a lot. At the end, the participation increased and the students enjoyed to participate.

The teachers/instructors focused on doing like every day a presentation of the observation competences to encourage the students to participate.

Another teacher observation stated that after a period of time during the traning, some students became more confidant and able to present their work and discuss.

"The students followed well and contributed steadily. They followed our proposals and met our expectations. Perhaps we asked partly too much from them. They complained that it is a lot of work also with parallel demands from other professors at HU." Quote: (Teacher SwP, 2021)

### **Reflection**

At the beginning, the teacher's feedback of the students that a lot of students had difficulty to make connections between different facts.

For example, the teachers note that the students can understand clearly the connection between soil, plants and animals.

For that the teachers work on simple and general topics to deliver a clear meaning of this environmental connections. Teacher try to encourage them to participate more and observing regularly for explaining the connections in reality on the farm.

The students develop their reflection and began to develop their reflection competency at the end of the training.

#### Visioning

The teachers have made an exercise to design at the beginning of the training a farm, however the results were poor.

The expressions of the professors were that the students don't have skills of visualization.

### 9.5 Concluding remarks on the case development

9.5.1 On the case development since the previous reporting

9.5.1.1 The most useful and inspiring experiences (supporting forces)

Sub-case Biodynamic course:


For almost 4 years of preparing and implementing Biodynamic course, we can conclude that logistic preparation such as preparing studying room, transportation, accommodation of students, prepare good schedule and clear syllabus of the courses help in increase satisfaction and openness for both students and teachers. Also, determine students/ participants background and it is efficient to choose qualified instructors who adopt to NextFood approaches. Preparing more live examples from the farm to students help them to understand real life situation. It is very common we face some unexpected circumstances; therefore, it is important to arrange an alternative plan to avoid any unexpected circumstances. The intercultural communication has played big role in the biodynamic course since the beginning of the course this led openness of the students to different cultures.

#### Sub-case Entrepreneurship program:

Entrepreneurship program shares the same principles we faced in the biodynamic course such as qualified trainers aware of the Nextfood approaches, Lively agricultural study cases in the farm, possibility to provide lab facilities to enhance pilot/prototype study, networking events to connect interested investors/policy makers with the start-ups and regular follow up with the start-ups.

We can conclude that the most useful and inspiring experiences:

- 1- The highly valued contribution of staff members/ facilitators/ stakeholders in the training.
- 2- The highly interaction among the students/participants with staff members and stakeholders in the training/program.
- 3- Designing multiple active learning activities with its further development, each semester in better way to suited the training requirements.
- 4- Multiple of field visits and field work to enhance the encountering with the applied and practical part in farm.
- 5- It was good opportunity to university students/participants to see the production units in the fame and introduce them to advanced techniques.
- 6- Introduction of new practical activities.
- 7- The importance of reflection evaluation practices that show new views for the staff members and facilitators to evaluate the training course or program.

#### 9.5.1.2 Main obstacles/challenges encountered (hindering forces)

The most important obstacles/challenges encountered during the training:



- 1- At the beginning of the training, it was not easy for the students to leave their homes easily and reside and live in the farm for two weeks, isolated from the outside world, and their universities and their families.
- 2- Logistic issues which consume a lot of process to facilitate accommodation, living and transportation for students, and the transportation for the participants.
- 3- Some instructors were not easy to quite the classical old methods of teaching and adopt the new NextFood learning approaches. It takes time to change the concept from teacher to facilitator.
- 4- Pandemic situations and lockdowns.
- 5- Sometimes limited time and limited resources.

#### 9.5.1.3 Lessons learned from the inspiring experiences and from dealing with the challenges

- 1- The importance of the main 5 core competences of learning in the students' training or course.
- 2- implementing the practical activities that cover or concern about the 5 core competences endorsed within the Nextfood approaches.
- 3- Collaboration among staff members and stakeholders which expand the vison of our students in their training.
- 4- Some of staff members redesign the outlines and content of some agricultural courses after they saw remarkable progress in the performance of some students.
- 5- Fruitful group discussions with the faculty members and university leaders to improve the quality and resources of this training.

#### 9.5.1.4 Plans for how to move forward into the next cycle

- The future plans will count on the data that collected during training/program.
  Put in our consideration all the implemented action learning activities and undertaking actions to enrich the future training.
- 2- Establish good database includes all the related articles, practical abstracts, documents, questioners, events' reports, detailed description of the project, newsletters, pictures and videos as source of information and begin to launch the online platform of that project.
- 3- Encourage stakeholders, policy makers, academic professionals, nonacademic experts to use this platform as source of information and see what it contains from action learning methods and activities.



- 4- Provide the instructors/ teachers/ facilitators by introduction sessions to introduce them by the learning approaches of the project.
- 5- Provide the facilitators by supporting documents and additional sessions to clarify more about the importance of these competences.
- 6- Important competences such as dialogue (how to ask and formulate questions), observation (appreciate the observation) and Reflection (the importance to share his experience with his colleagues) should be clarified well to make a student aware of this competences.
- 7- Become an active in exchanging data and resources such as studies, surveys, and knowledge with stakeholders and focusing as well on policy makers in future.
- 8- Design plan B, in anticipation of emergency conditions that may exist such as pandemic situation continued for around more than year and postponed the second subcase.
- 9- Strong collaboration between this project and other educational projects.

#### 9.5.2 Reflections towards the end of the Nextfood project

# 9.5.2.1 What has been accomplished to shift from theory to phenomenon (experience) in agrifood- and forestry systems as the starting point for the learning process?

What have been achieved so far in the NextFood subcases and consider are the prerequisites for making a successful shift are (for the both subcases):

- logistic preparation (studying room transportation accommodation of students – prepare good schedule- clear syllabus of the courses).
- 2- preparatory meetings before implementing the programs.
- 3- select qualified instructors who adopt to NextFood approaches.
- 4- You should design plan B for the training in case some issues show up.
- 5- Preparing advance learning activities.
- 6- Increasing the number of lively case studies.
- 7- Started with a small group of students/participants to be more easy to control and the group and much easier to facilitate the knowledge.
- 8- Then gradually the students can be bigger group that will work in better way after design better plan later on.



# 9.5.2.2 What has been accomplished to shift from transmission of knowledge to the development of key competences needed to support sustainable development in agrifood and forestry systems?

The shift needs from *transmission of knowledge* to the *development of key competences* needed to support sustainable development through the points below **(for the both subcases):** 

- 1- Prepare the instructors/mentors by giving them introduction session of NextFood approaches and believe to be the facilitator of the information.
- 2- Design a well- prepared schedule for the training that can cover the 5 competences.
- 3- Be in the field (farm/market) as much as you can be regarding to course' syllabus.
- 4- Working on realistic ideas to satisfy customer needs.
- 5- Make change and shift in mind set among several students/participants by appreciation the importance of reflection.
- 6- Make students/participants become gradually focused more on core competences of the learning approaches.
- 7- Increase the enthusiasm about active learning methods.

#### 9.5.2.3 What are the prerequisites for making a successful shift?

#### Sub-case Biodynamic course:

- preparation well for all the logistic steps (studying room transportation accommodation of students – prepare good schedule- clear syllabus of the courses).
- 2- Determine students/ participants background before join the training.
- 3- Possibility to have intercultural communication.
- 4- Choose qualified instructors who adopt to NextFood approaches.
- 9- Prepare more live examples from the farm to students.
- 10-Design Plan B for the training in case some issues show up.
- 11-Document all the subcases and its deliverables with detailed description in practical abstracts, articles for action learning, newsletters, events, press release and websites.

#### Sub-case Entrepreneurship program:

- 1- Qualified trainers who are aware of the Nextfood approaches.
- 2- Lively agricultural study cases in the farm.
- 3- Design Plan B.



- 4- Possibility to provide lab facilities to enhance pilot/prototype study.
- 5- Networking events to connect interested investors/policy makers with the startups.
- 6- Regular follow up.
- 7- Design a good plan for mentoring the projects.

# 9.5.2.4 What is your concrete advice on the shift from simple knowledge transmission to the development of key competences?

- 1- Prepare instructors/mentors by join them introduction session of NextFood approaches.
- 2- Transfer the teacher from classical teacher to be a facilitator for the knowledge.
- 3- If you want to enhance your course or training, get all the necessary information from NextFood platform such as news, methods and toolbox.
- 4- Hire national and international experts to provide multicultural interaction between the facilitators and students/participants.

#### 9.5.2.5 What is your main challenge?

The main challenge was:

"How can we enable a group of students with different cultural/ knowledge backgrounds to understand the central ideas of the Nextfood approach?"

# 9.5.2.6 What are the three best ideas from the workshop for how to deal with that main challenge?

The three best ideas from the workshop for how to deal with that main challenge:

#### First idea

"I would first try to communicate early on in the course that the approach might be very different from what students are used to, and adding that some countries and scientific disciplines might be more different from the NF approach than others.

Then, I would also have regular reflection sessions on particularly this aspect. A reflective question for students might be: "After x weeks into this course, how do I feel about a phenomenon-based learning approach? To what extent is this feeling influenced by my individual cultural background?" (and maybe the same question applied to disciplinary background)"



This idea can fit our dealing with that main challenge. It could be by doing introduction session to facilitators or students to introduce them to NextFood approaches and action learning methods.

Cooperating with national and international experts as facilitators. This idea also mentions the reflection sessions which is really important for our feedback.

Feedback session show us the and how much the progress has the training made.

Second idea:

"Start the work with levelling sessions where the group have the opportunity to share their technical knowledge and agree in a "vocabulary " that will be used in the rest of the workshop. This could be done through interactive activities".

This idea explains the importance of leveling the sessions according to students' abilities and share simple technical knowledge with them.

Technical knowledge can be presented in multiple interactive and learning activities, which also will enrich the training.

This could be base resources for the future trainings/programs.

Third idea:

"It would be very useful to start the course using exercises where the students can share their cultural backgrounds (talk about their home, the people that they are related to, how is their educational system, their home institution). Then have a conversation about how do they understand the basic concepts to start talking about the NF approach: how do they understand the concept of sustainability, what do they understand about the concept of "competence" and or "skill".

"In that way, students and teachers are aware that the classroom is a multicultural space, and the understanding of concepts can be different."

This idea also emphasizes on using activities and exercises for students to share their cultural knowledge. This type of activities can make the students gradually closer and almost like one team.



This idea describes the steps of conversation among the students first 1) understand the basic concepts of the NF approach, 2) understand the concept of sustainability and then 3) what do they understand about the concept of "competence" and or "skill".



### 10 Case 11: CIHEAM Bari

Authors: Virginia Belsanti, Suzana Madzaric Contributors: Lamberto Lamberti

### 10.2 ID card

#### Course title, level and language

- Course title: Mediterranean Organic Agriculture
- Course level: Master of Science
- Course language: English

#### Course learning goals

The action learning module is part of the Master in Organic Agriculture, and its official learning goals were the following:

-Understand the importance of sustainable production and advocate for ecologically sound solutions at different levels;

-Know the organic legislative and policy frameworks and be able to drive farms to a transition towards organic farming and agroecological principles;

-Know how to produce safe, high quality and sustainable organic food;

-Understand economic and market issues being able to analyse and design organic food value chains;

-Facilitate multi-actors networking for the organic sector development;

-Have expertise to assess agricultural, environmental, and socio-economic opportunities and constraints of organic agriculture in different Mediterranean areas.

The action learning module envisaged complementary learning outcomes as a consequence of having added a thematic focus as well as engaging with stakeholders throughout the module:

- Become knowledgeable about main concepts, forms and dimensions of the social capital in the agri-food sector, and understand the importance of tailor-made approaches to stakeholders;
- 2. Be able to perform community-level analysis and to propose problemsolving and development strategies (pathways);
- 3. Improve their understanding of the interplay of social capital with other elements of the agri-food system, such as institutional arrangements, the governance of markets, consumer awareness, etc.
- 4. Develop and improve competences needed for stakeholders engagement and management of social capital, including six core competences promoted by the project.



#### Host institution(s) and course leader(s)

- Host institution: CIHEAM
- Course leader: Lamberto Lamberti; Coaching team: Lamberto Lamberti, Suzana Madzaric, Virginia Belsanti, Patrizia Pugliese, Ivana Cavoski and Ramez Mohamad

#### Timeline of the activities covered in this report

The present report initially covered the period from December 01, 2020, until May 26, 2021. Case study activities were not finalized at the time the first draft of the report was requested. The present draft has been completed with the remaining activities as they were scheduled for the month of June.

#### Learner categories and number per category (demographics)

- 10.2.1 The action learning activities included a total of 9 learners, all belonging to the post-graduate students' category.
- 10.2.2 Countries of origin: Egypt, Lebanon, Morocco, Serbia, Tunisia and Turkey.
- 10.2.3 Gender: Female 8; Male 1.
- 10.2.4 Age categories: 20-25: 6 students; 25-30: 3 students.
- 10.2.5 Considering the background, 8 students are having an agricultural studies background and 1 food technology.
- 10.2.6 Considering the background, 8 students are having an agricultural studies background and 1 food technology.

#### Stakeholder categories and type of involvement

The Action learning module involved the following types of stakeholders: academic/practitioners to provide the students with a theoretical framework and "lessons from the field" to give them the tools for carrying out their AL activities. They were involved in a number of seminars that took place during the AL module; local authority as a main informant and facilitator for interaction with other local stakeholders; farmers and rural entrepreneurs and cooperatives and associations with whom the students interacted to carry out their AL activities during online meetings and field visits. The main informant was Gianfranco Ciola, president of the Local Action Group of Alto Salento, an agronomist, and professional of rural development with a life-long experience in implementation of development projects and plans for rural and territorial development. He was involved in all field activities as facilitator and acted as main informant of the territory under investigation.

#### Shortlist of learning arenas

The third cycle activities were unfortunately deeply affected by the ongoing pandemic situation. The start of the MSc programme was 1st December 2020, with the first 3 months of the course held online. Students arrived in CIHEAM campus only at the beginning of March 2021. Between December and March the main learning arena was an online lecturing hall (CIHEAM Bari e-learning platform and applications for live lectures and meetings).



However, our desire to reduce the effect of this obstacle resulted in the creation a forum to have a constant exchange with students. We decided to engage students with agri-food sector stakeholders in their countries of origin since the beginning of the course. This was done by different means in observation of COVID 19 restrictions and limitations of action (it was mainly done over the phone, email, whatsapp). As a result, students got in contact with different realities of social capital in their countries, such as farmers' organizations, agricultural cooperatives, women associations in the sector of agriculture, food and rural tourism, etc.

During the period of distance learning, students attended a calendar of online seminars on the topic, which provided them with the necessary theoretical background for better preparation of interviews with stakeholders and to improve their ability to analyze and elaborate their findings. Upon arrival to Italy, students continued coaching/facilitating sessions in presence.

In details we had:

- Classroom lectures held online: 9 webinar on social capital, 3 for an academic framework on social capital, 3 with a practitioners for a combination of theory and practical inputs, 3 with coaches for exchanging feedback and deepening doubts. All webinars were divided into 3 hour lectures/interactions and 2 hour group works
- 6 field visits with stakeholders: 3 cooperatives, one biodistric, one producers association, a farmer, a rural entrepreneur (olive mill). The visits were 3 hour long and stakeholders were interviewed by students groups for information gathering on their group project development.
- 6 sessions with coaches of 1 hour duration for field visits feedback, doubts classification, individual assignment clarifications, group work preparation and finalisation.

Responsiveness of the students, their commitment to the work, and the creation of social relations within the group and with the coaches confirmed that challenges due to distance learning were smoothly overcome. Yet, distance learning poses several difficulties and requires additional commitment and creativity from the action learning team



### 10.3 Extended summary

#### 10.3.1 Research results since the previous reporting

Case study overview - CIHEAM Bari is in its third case study cycle and, as in the previous cycles, involves MSc students in the Mediterranean Organic Agriculture course. Students were divided into 3 groups (3 students each), each coached by 2 learning facilitators. Within the MSc programme, Action learning activities are devoted to the design and implementation of the student's final project, which contributes to 15% of their final grade, and delivers a total of 10 credits (ECTS). As for the first and second cycle, the group report is complemented with an individual essay, providing the space for each student to have a personal reflection.

Action learning activities were organized in the form of Teaching Unit (TU), distributed all along their MSc course studies, while the thematic area selected was Social Capital Development in Agriculture. Below you will find a description of the action learning teaching unit, its aims and expected learning outcomes.

TITLE OF THE TU: Action learning on social capital development in agri-food sector

AIM OF THE TU: The aim of the TU is to facilitate the development of a set of skills that will enable students to:

• Acquire knowledge on social capital and its role in mediating challenges of contemporary and organic agriculture and competences;

• Engage stakeholders and identify pathways and strategies for social capital development.

The TU intends to lead the students towards a critical understanding of the role of social capital and its development and give them the tools to approach real life sector issues and therefore be ready for future professional challenges.

#### LEARNING OUTCOMES:

As a result of the action learning TU (project) students were intended to achieve the following learning outcomes:

1. Become knowledgeable about main concepts, forms and dimensions of the social capital in the agri-food sector, and understand the importance of tailor-made approaches to stakeholders;

2. Be able to perform community-level analysis and to propose problem-solving and development strategies (pathways);



3. Improve their understanding of the interplay of social capital with other elements of the agri-food system, such as institutional arrangements, the governance of markets, consumer awareness, etc.

4. Develop and improve competences needed for stakeholders engagement and management of social capital, including six core competences promoted by the project.

ACTIVITIES PERFORMED WITH THE STUDENTS: Interviews with the sector stakeholders in their countries of origin and in Italy, series of topic-related seminars and lectures, group work and presentations, coaching and discussion with learning facilitators, exercises on the core competences, exercises on social capital assessment methodologies, etc.

#### 10.3.1.1 Students', teachers' and other stakeholders' experiences and learning

Students experiences have been varied and different from the traditional learning arena they were used to. This has conducted them from the initial usual confusion we have recorded throughout the 3 cycles held so far, to the acknowledgement of the acquisition of new competences that will support them in their future professional ore research activities. They have increased the level of interactions with stakeholders and practice their learning in a real-life context. Coaches have improved their capacity to accompany experiential learning in the field with a more consistent knowledge framework supported by literature, group work and lessons with practitioners and academics. Stakeholders have revealed during informal oral exchanges and in the final group presentation that they continue to value the opportunity to be faced with fresh ideas and the enthusiasm showed by students during their meetings.

# 10.4 Actions taken and data on the development of the case since the last reporting

#### 10.4.1 Actions taken since the previous report

Case study overview - CIHEAM Bari is in its third case study cycle and, as in the previous cycles, involves MSc students in the Mediterranean Organic Agriculture course. Students were divided into 3 groups (3 students each), each coached by 2 learning facilitators. Within the MSc programme, Action learning activities are devoted to the design and implementation of the student's final project, which contributes to 15% of their final grade, and delivers a total of 10 credits (ECTS). As for the first and second cycle, the group report is complemented with an individual essay, providing the space for each student to have a personal reflection.

Action learning activities were organized in the form of Teaching Unit (TU), distributed all along their MSc course studies, while the thematic area selected was Social Capital Development in Agriculture. Below you will find a description of the action learning teaching unit, its aims and expected learning outcomes.

TITLE OF THE TU: Action learning on social capital development in agri-food sector



AIM OF THE TU: The aim of the TU is to facilitate the development of a set of skills that will enable students to:

• Acquire knowledge on social capital and its role in mediating challenges of contemporary and organic agriculture and competences;

• Engage stakeholders and identify pathways and strategies for social capital development.

The TU intends to lead the students towards a critical understanding of the role of social capital and its development and give them the tools to approach real life sector issues and therefore be ready for future professional challenges.

#### 10.4.1.1 Planning

Planning of the action learning activities for the third year was even more requiring than the implementation, as we could observe as the course was progressing. We needed to face this 'blended' implementation model, with initial 3 months of the online course, which was new for us compared to two previous years. However, we decided to keep in mind some of last year findings, where one of the main conclusions was that we need to increase the number of topic-related seminars. Thus, we decided to concentrate them mainly in this initial online stage.

Still, due to the experience, we had in previous years, we were aware of how important is contact with sector stakeholders, and that by end of the course this results as the most appreciated by the students. To overcome this challenge we agreed that during the implementations students should individually (in their countries) approach some reality of social capital in the agri-food sector, while to increase interaction with coaches to have a platform with a forum for constant dialogue. As the course started we understood that with additional efforts and group work and planning at the institutional level it is much easier to find solutions in this challenging period of the pandemic

#### 10.4.1.2 Implementation

As already reported above, initial months of our activities were conducted online. We used this period to provide students with solid theoretical background on the topic, but as well to introduce them with the methodology of action learning and core competences promoted by the project. Our idea to make students work with stakeholders in their countries demonstrated several challenges during the implementation. Students were not adequately prepared for interviewing stakeholders, despite inputs coming from the case study team and detailed instruction on how to conduct an interview. Further, availability of stakeholders and time to devote for students was limited, which partially could be attributed to the fact that students could not communicate in clear manner the objective of their activities. Further, it is thus expected that the objective will not be clear for the stakeholders, or they were not convinced to participate in something which does not bring concrete benefits for their organisations. All this resulted in very divers outcomes reported by the students, while



some of them did it in more structured way, the other had significant lack of information and were not able to approach again selected stakeholders, due to the lack of interest.

To compensate this gap, we decided that upon their arrival to Italy we should provide them opportunity to meet in presence different realities of social capital in agriculture, which at that time was restricted by the COVID related regulations. Only at the second part of May, we finally had opportunity to take students outside of the campus and to let them meet different actors. We devoted one full week for on-site visits, which was very much appreciated by the students. This last part of the activities contributed significantly to the desired shifts among our learners, since finally they got opportunity to explore different arenas, to have hand-on experience approach, to practice their dialogue skills, etc.

#### 10.4.1.3 Reflection

The 3rd cycle experience showed that action learning as online activity poses a lot of challenges and requires additional efforts from involved staff. Despite the best intention, we understood that learning outcomes are of much higher quality when activities are done in direct interaction with students. At the endo of the course a reflection document was drafted by coaches assisting and facilitating learning during the AI module. The reflection was based on the perceptions acquired during the interactions with students, the results of the module's assignments (an individual assignment and a group presentation) and the observations during the stakeholders interaction activities. The results reveal a persistence of initial confusion towards the methodology, however, there is a significant awareness of the increase of competences developed in relation to the interaction with stakeholders and facing the challenge of real-life contexts.

#### 10.4.2 Students' responses, learning and competence development

#### 10.4.2.1 Methods of data collection and analysis

Following the project research protocol (D2.1), we collected the data, anonymized and stored it according to the instructions. During the first week of the course we have delivered and collected a self-evaluation questionnaire, whose answers where used for making an assessment of students' initial knowledge and abilities in relation to the learning goals of the module. The 1st part of the questionnaire aimed at driving them through a self-assessment and thus to understand how they evaluated their current level in relation to specific skills of Observation, Reflection, Dialogue, Participation and Visioning, while in the 2nd part of the questionnaire, it was asked to deeply reflect on 4 questions related to the specific technical skills and the competences to develop.

At the end of the Action Learning module a final self-assessment questionnaire was delivered and answers were collected to assess the progress towards the learning outcomes and its interplay with our MSc course. This year we did not perform mid-term evaluation, since in general due to the pandemic, the course started one month later, and we needed to make this adjustment to be able to respect project deadlines. We



also performed a qualitative evaluation of students' competences through 2 sets of assignments, an individual essay, argumentative, and a group report based on the interactions with stakeholders and learning on social capital. These 2 assignments were evaluated based on coaches reviews of the documents submitted (9 individual assignments on discussing a chosen aspect of social capital and a group report and presentation based on the projects carried out in the local territory supported by interactions with local actors), written comments and oral exchanges to achieve an agreement on the final mark.

#### 10.4.2.1.1 First week (day) & last week (day) of the course

#### 10.4.2.1.1.1 Student's understanding, contributions, and expectations

At the beginning of the AL module students were given a self-assessment questionnaire including questions related to their understanding of the course topics and their expectations. Coaches sent the questionnaire by email and collected the answers by email as well inviting the students to reflect on each questions:

- **Question 1**: What are the knowledge and skills we need to support sustainable development in farming and agro-food systems?
- **Question 2**: What experiences and competences do I bring to the Action Learning Module activities to make it a success?
- **Question 3:** What are the questions I would like this Action Learning activity to help me find an answer to?
- **Question 4:** What are the competences I'd like to train and improve significantly in this Action Learning activity?

At the end of the course students were given a self-assessment questionnaire including 5 questions that would help to gain insights on the achievements at the conclusion of the training path in relation to their understanding, contributions and expectations:

1. What are the knowledge, skills and attitudes (competences) we need to support sustainable development in agro-food and forestry systems?

2. Which of the experiences and competences I brought to the educational activity contributed the most to the learning community?

- 3. What questions did this educational activity help me find an answer to?
- 4. Which competences did I train/improve significantly in this educational activity?
- 5. What are the questions I am now asking myself?

These questions were sent with the whole questionnaire by email and answers were collected in writing and sent by email to the course coaches.

The answers of the initial self-assessment questionnaire were analysed through the use of Nvivo 12 software (QSR International – 2020). All data were collected in the written form. All answers were anonymized and subjected to coding, following data analysis instructions shared by the WP leaders. Besides 10 codes provided within the manual (Competences: Dialogue, Facilitation – by students and by the teacher,



Observation, Participation, Reflection, Visionary thinking; and Transformative learning) we introduced one more code, named: Technical knowledge and/or competences, following our experience of the last year and to have the possibility of comparing the data, in the light of scientific publishing possibilities.

The answers to the final questions were analysed using a free word cloud generator, to check the recurrence of key terms for considering progress towards the learning objectives. We grouped all answers for each question and repeated the process for all 5 final questions.

#### 10.4.2.1.1.2 Self-assessment of competences

At the beginning of the course and at the end a self-assessment questionnaire was handed to the students by the coaches targeting the Nextfood core competences. Each competence was defined by a number of statements concerning relevant skills and students had to select the level they saw themselves at the beginning and at the end of the course. The self-evaluation was sent to the students by email and answers collected by email by coaches. A t-test was used as a methodology to allow a comparison between the initial and end values and analyse the results to record any improvement at the end of the course.

#### 10.4.2.1.2 Students' final reflection document (individual)

This cycle we have not asked an individual reflection document according to the research protocol. We did, instead, asked 12 questions, in a questionnaire enclosed to the self-evaluation questionnaire, where we asked the following questions related to their understanding of Action Learning in relation to the learning of technical content and how AL would contribute to personal career development:

- 1) How was in general the AL module for you?
- 2) How did you adapt to the learning methodology?
- 3) What did you like more of the methodology?
- 4) What the application of AL required from you?
- 5) Do you think that the outcomes of your group activities have been useful to LAG and/or other actors you interacted with along the AL?
- 6) How was the team coaching by CIHEAM staff devoted to your group?
- 7) Has the AL contributed to prepare you to face real situations and problems as part of your future career?
- 8) To which extent the AL was a tool to consolidate and develop the knowledge acquired along the MSC OA course?
- 9) Please think about specific two specific skills you acquired through our AL
- 10) What are the two main strengths that you attribute to our AL
- 11) What are the two main weaknesses that you attribute to our AL?
- 12) May you in few words state what the AL meant to you, and which change you observed in relation to yourself when looking at the beginning and end of the activities?



The answers to questions 1-4 and 8 had to be selected among given options, answers to questions 5-7 were based on the Linkert scale, answers from 9 -12 open text.

Due to the heterogeneity of the typology of questions and answers, we organised the data to be graphically represented by a histogram from questions 1 to 8, a pie chart for question 9 and word clouds for questions 10 to 12.

Progress towards the learning outcomes, in terms of progress towards those outcomes envisaging social capital learning, was evaluated using a combination of individual essays, of argumentative type, and group presentations based on the results of group work that had been conducted benefiting of several moments of interaction with local stakeholders, classroom learning and coaches facilitation. The assignments were qualitatively evaluated by 3 groups of coaches, who wrote their comments in an excel file, attributed a value comprised between 60 (minimum) and 100 (maximum) and then an average for each student was agreed. The group assignments were evaluated based on qualitative criteria (clear structure, presentation of data, discussion of results, recommendations and understanding of social capital)agreed among coaches on a scale from 60 to 100.

#### 10.4.2.2 Results

#### 10.4.2.2.1 How do students experience such a learning process with respect to:

#### 10.4.2.2.1.1 learning goals?

In our AL module, the learning goals aimed at combining an increased knowledge about social capital as a component of organic agriculture with the competence s needed for facing real-life complexity (the AL core competences).

- 1. Become knowledgeable about main concepts, forms and dimensions of the social capital in the agri-food sector, and understand the importance of tailor-made approaches to stakeholders;
- 2. Be able to perform community-level analysis and to propose problem-solving and development strategies (pathways);
- 3. Improve their understanding of the interplay of social capital with other elements of the agri-food system, such as institutional arrangements, the governance of markets, consumer awareness, etc.
- 4. Develop and improve competences needed for stakeholders engagement and management of social capital, including six core competences promoted by the project.

Qualitative analysis of the text from the first self-evaluation is presented in the form of a hierarchical map (Figure 58), where text coding resulted in the dominant presence of competences over transformative learning (TL), and technical skills. In the case of TL, this was expected for the first data collection (knowing the complexity of TL, and having last year experience with data analysis), however, we would expect a higher frequency for technical skills. As we wrote above, we see it related to the clearer definition of the topic.





Figure 58: Hierarchical map compared by the number of coding references for the first data collection

Considering the core competences, we can see that **participation and observation** were the most frequently coded, followed by **facilitation and dialogue**, while as the last year reflection and visionary thinking were coded less frequently. Still, compared to the last year we had an increase in the frequency of coding for reflection, here it is difficult to argue, but this can be linked to the fact that students understood better second question of evaluation (Q2: What experiences and competences do I bring to the Action Learning Module activities to make it a success?), or to the previous experience they had during the BSc studies about social capital and NGOs in the agrifood sector, higher overall maturity and work experience of one student in development projects.

At the end of the course the answers to analyse learning goals were reported with the visual help of a treemap, Figure 59, where the first 4 questions (students understanding contributions and expectations at the end of the educational activity) are reported with answers coded following the previous coding. At the end of the course technical competence have increased their weight, and the textual analysis of the single answers (that have been coded for easy visual presentation), show progress towards the course learning goals mainly in terms of acquired knowledge of organic agriculture and social capital understanding, acquisition of skills for interacting with stakeholders (dialogue, participation, context analysis ability) and problem solving. Group work is very important as well. Students showed in their answers that group work was an important development together with the ability to dialogue with fellow students and with stakeholders. Participation was felt as the skill that they better trained and the learning path enabled them to acquire technical knowledge necessary for understanding and operating organic agriculture and the role of social capital for its development.





Figure 59: Hierarchical map of 2nd part of final self-assessment questionnaire

The last question about "questions asked to myself", according to textual analysis, showed a prevalence of 3 main questions: what is the use of AL skills in real life, if they can use what they have learnt in this course for progressing in their career and if this course and AL skills can help developing countries towards improving organic agriculture.



As we said we also used individual assignments and group assignments to test

students' understanding of social capital. In the first case it was needed to test their capacity to defend argument an based on relevant literature. The individual assignments sustained the appreciation of a shift towards а better understanding of the content related aspects of the course (learning outcomes 1 and 3). The results of the individual assignments are

Figure 60: Results of individual assignments

reported in figure 60 and show a good general level of argumentative capacity and understanding of social capital and the ability to discuss a relevant concept with which they agreed or disagreed finding arguments to support their point of view. The evaluation of the assignments highlighted that students were able to focus on social capital and explore it well through literature review revealing a capacity to shift between literature references and critical enrichment. Through the group work and final group



presentation they showed capability to understand the studied cases and provided a narrative analysis for each case. They demonstrated the acquisition of skills supporting the investigation of multi-stakeholder networks and the role they may play in a sustainable development framework. They were evaluated according to a scale between 60 and 100 and both the 2 groups that were formed for these final presentations obtained 95/100, showing a more than satisfactory progress towards the module's objectives and established learning outcomes.

#### 10.4.2.2.1.2 view on competences needed for sustainable development?

Compared to the last year we introduced action learning more precisely defined concerning the topic/thematic area of investigation/interest (social capital development in agri-food sector), while last two years we had a more "open/general" approach (rural/territorial development). This change was now reflected in the findings of the first data collection, where ¬students focused more on the topic of interest while highlighting less technical skills (i.e. farming practices, techniques, etc.).

This is confirmed with the word frequency in the Word Cloud presented below (Figure 61), where the most frequent words were development, activity, sustainable, agro-food systems and most interestingly word competences (which was not the case for the last year. Further, we can see that the words social and capital had medium frequency, as well as help, support, improve, knowledge, etc. We associated this to the more precise description of the topic, and thus the immediate effect on students focus, despite having most of them with the agronomic background. This is for us very useful experience, and after three years of case study implementation we found a good balance, where we had an open approach in terms of methodology, but better framed in terms of topic, giving a chance to students to progress faster in the learning process.

situation environment lot regarding management deal information especially new understand sustainability country visioning experience agriculture answer significantly challenges countries problems able knowledge questions thinking sharing dialogue make development important main relevant real field organic support good activity even find bring farmers activities access person aware success know sustainable help capital related rural situations solutions goals systems food agro social also effective addition critical point order module competences improve solving network different farming people well system required create actors work experiences benefits ability process observation importance aspects moreover problem first communication understanding stakeholders

Figure 61: Word frequency from the first data collection



A world cloud (Figure 62 below) was created based on the answers provided at the end for question: (1) What are the knowledge, skills and attitudes (competences) we need to support sustainable development in agrifood and forestry systems?



Figure 62: Word cloud on question 1

The word frequency in the answers at the end of the cycle show a persistence of the term sustainability, organic agriculture, development, agri-food, which represent a general framework of reference for the students. It is interesting to note that at the end of the cycle a more prominent use of the terms participation, problem solving, dialogue, farmers, knowledge, communication is recorded, allowing to interpret the data as an



indication of the stepping up in the scale of students' learning priorities of soft skills and the role of agricultural stakeholders.

#### 10.4.2.2.1.3 recognition of own competences and competence development?

To analyze the data collected from the students, it was applied a t-test that showed the progress in terms of core competences (participation, observation, visualisation, reflection, dialogue) as a group, and based on self-assessment, from the start to the end of the module.

The results are shown in table 19. The interpretation of data reveals that the most relevant increase is recorded in the case of participation with a difference of 1.72 from the beginning to the end of the course. The next increase is that of visioning with a difference of 1.59 being followed by reflection with a difference of 1.16 and then observation and dialogue. However, the reason for dialogue being the one with the minimum difference is due to the fact the initial self-evaluation was already high and therefore no major change was felt at the end. Participation was perceived as a very important skills both in terms of group work with fellow students, in the exchanges with coaches and the interactions with stakeholders.

Competence	Average scores		Difference	P value
	Start	End		
Observation	4,67	5,77	1,10	0,0104
Participation	5,22	6,94	1,72	0,0097
Visioning	4,92	6,51	1,59	0,0137
Reflection	5,62	6,78	1,16	0,0156
Dialogue	6,39	7,25	0,86	0,0164

Table 19: t-test core competences

#### 10.4.2.2.1.4 transformation?

Transformation can be interpreted by the results of the self-evaluation, where progress in the core skills is highlighted compared to the start of the course, the 5 questions show a transformation in the learning and competence acquisition, where technical knowledge is valued and core skills are seen as a crucial component of the learning path, whereas at the start of the course some of the core competences were not clearly understood and there was an initial confusion concerning the AL approach. Transformation has been clear also in the understanding of social capital (as we could see in the individual assignments and final group assignment. Transformation can also be recorded through the analysis of the reflection guestionnaires. Below the answers are reported in clear diagrams to appreciate the data significance. Table 20 shows that towards the end there was a polarization between students that learned and enjoyed the approach towards those, a minority, that did not like it at all. Table 21 indicates the most common aspect throughout the case study cycles: students are always faced with an initial confusion that later is softened and followed by curiosity and engagement. A very small group suffers this confusion until the end, which probably is a matter of development for coaches, to try to identify alternative entry points to contribute more clarity since the beginning.





Table 22 shows that the main feature liked of the methodology was engagement with stakeholders, which happened in the last part of the course due to the ongoing pandemic. As we saw also from the group assignments based on the cases the 2 groups of students had to elaborate and report from, engaging with stakeholders, analyse their context and work on the problem solving skills was the most transformative experience of the group of students. In fact, some of them had never been directly involved with local actors in a real life setting. Table 23 shows that interaction and active participation were the most required skills and flexibility was following as adjusting to real life circumstances and to group discussion and opinions entailed the acquisition of a certain degree of flexibility.





Table 24 shows that students have perceived their work and engagement as a factor of transformation for the local actor with whom they have interacted and this is connected to the level of engagement, their observation of the contexts, identification through dialogue and participation of the needs and through reflection and more dialogue conducive to visualising a possible future for the local stakeholders activities. The stakeholders feedback during the group presentations reinforced this feeling of being "agents of change". Table 25 shows how students felt about the role of this AL module in terms of complementarity with the main Organic Agriculture course. Consolidation of knowledge was considered the main result followed by improving knowledge acquired in traditional module, therefore acknowledging the transformative nature of this approach. Last to follow provision of new knowledge or they found it useless.

Figure 63 shows what the students considered the 2 main skills acquired through the AL module.



#### Figure 63: question 10

Thy considered active listening, adaptability and knowledge of organic agriculture the top skills (same rating for the last 2), followed by dialogue and all the others. These are skills mainly felt important in the relationship with stakeholders but also a consequence of group work as the main work modality.



Questions 10 and 11 of the reflection questionnaire were targeting strengths and weaknesses of AL according to the students. In the tables below the results reported

Table 26: AL	strengths a	nd weaknesses
--------------	-------------	---------------

Strengths	Weaknesses
encourage thinking	lack of creativity
planning	luck of good management
field experience	unclear assignments plan
problem solving	initial confusion
practical	time management
open	time consuming
flexibility	complexity
team work	unclear work plan
group work	organisation
stakeholder engagement	

In bold those items considered stronger as strengths or weaknesses and we see again that the end of the course teal work, flexibility together with problem solving and field experience are the elements more valued by students and that also reflect the transformative force of this approach. In terms of weaknesses students resent an unclear presentation of the methodology and they have a resistance towards what they consider an absence of planning, whereas coaches invite to elaborate work plans following their judgement and according to circumstances and specific needs.

### 10.4.2.2.2 To what extent does the education enhance the students' competences of:

#### 10.4.2.2.2.1 observation?

Observation is mainly enhanced during the field visits. Students are encouraged to observe the contexts, to listen to the stakeholders explaining the situation, their needs, etc. The maturity of the process is shown, partly by the results shown in the t-test, in the answers to the reflection questionnaire but especially in the group final presentations where observation has provided students with the grounds for building their case. Students have showed commitment to understand the attitude implied in this skill, interviewing actors in their selected local contexts without expressing any overarching judgment or bias. This time observation has been limited to distant contacts for the impossibility to travel and has limited the scope of possibilities. Students have, nonetheless, been able to report a good picture of their own case. Based on their self-evaluation they have seen themselves as competent and proficient performers.

"I improved in my competences for observation, participation and discussion, I feel more comfortable to be in a field and interact with stakeholders and then elaborate my input to solve a problem" (STUDENT4END\_2021)

#### 10.4.2.2.2.2 reflection?

They have been able to organise notes and materials for their investigation carried out in remote modality. A review and improvement of the approach used in their interviews



leading to a better execution of the second assignment has shown an improved level of reflection abilities. However, this has been affected by the initial limited consideration paid to support literature that was suggested by coaches to provide a theoretical background for their activities. In the group work individual reflection has sometimes been overtaken by those group member more comfortable with the skill, as also can be seen in the t-test, where the value is among the highest ones. After each contact with the actors, students were invited to reflect on the findings and the experience, based on which they were planning further activities and interviews. The group has become aware of the role of reflection as some answers of the final self -assessment questionnaire have shown:

" Actually I have a lot of questions in my mind but the most important to me:

-How far social capital can help the economy and the society of a country? -How can I integrate social capital and organic agriculture to sensitize the maximum of people and protect the environment? How can I use my competences and my back ground properly? -How can I get benefits from the network I have?" (Student1END\_2021)

#### 10.4.2.2.3 visionary thinking?

The limited interactions with local actors have hampered the opportunity to grasp the concept of visioning in its full potential. Field visits in May to facilitate field experiences, have provided a good opportunity for reflecting on the visioning and where it can stand in their activities design. The visioning has however proved to be the most complex skill to develop and this is reflected in the self-evaluation results. However, the work with stakeholders had pushed the students to engage in achieving a better understanding of the visioning skills. Infact, in the final group presentations both group works have identified key messages, future plans and future key points for discussions of all their work cases.

"To know how to deal with different people and conducting dialogue and how to come up with innovative solutions to help these people, how to identify and understand the obstacles and challenges in rural areas and how to tailor a development plan"(Student3END\_2021)

#### 10.4.2.2.2.4 participation (engagement)?

Students have showed a good level of participation in activities and in the exchanges with coaches, sharing their doubts, achievements, and ideas, reflecting on their suggestions and integrating them in their work. They have also improved their participation in peer learning activities, discussing within the group how to design further steps in their assignments. They effectively interacted with key informants and actors from the territory, remotely, they showed interest in the role of each of the actors and tried to prepare questions that could clearly define roles, interests, conflicts, objectives, etc. Participation is among the most valued competences by the students as it is manifested in the self-evaluation questionnaire.

"We need to have knowledge about people and their needs exactly, and all related challenges they face, what is the nature they are living in and all related aspects. We should know and consider the different situations of people and territories, we should have the skills of treating people well, understanding them and respect their privacy and traditions very well" (STUDENT5STRT\_2021)



"I developed my capacity to have dialogue with field actors" (STUDENT3END\_2021)

"Objectives became more clear and I appreciated the value in interaction with stakeholders" (STUDENT5END\_2021)

"I improved in my competences for observation, participation and discussion, I feel more comfortable to be in a field and interact with stakeholders and then elaborate my input to solve a problem" (STUDENT2END\_2021)

"I can interact with stakeholders in a more professional way" (STUDENT6END\_2021)

"I learnt to interact more with local actors in the field and help them to find solutions" (STUDENT7END\_2021)

"First, I felt very confused because the method was new for me, but after explanations and meeting stakeholders I tried to adapt and learnt more than expected. I liked the engagement with stakeholders" (STUDENT8END\_2021)

#### 10.4.2.2.2.5 dialogue?

Students have been able to discuss progress about their findings among themselves, with the coaches and, in some cases, with the local actors. The results of this process were conveyed in the final assignment and presentation. Their self-assessment reports a majority of students recoding an improvement to confident/proficient level in the acquisition of the dialogue competence.

During this Action Learning activity, I would like to improve my skills in group working and try finding the best solutions that suit everyone. In addition, I would like also to enhance my time management abilities and delivering tasks even if I have a load of duties stacked up together in a very short time. On the other hand, I'd like to train myself to be able to conduct fruitful dialogues even better with stakeholders and local farmers. (STUDENT8STRT\_2021)

"For a better Action Learning Module, I can promote leadership skills, in addition to solving critical problems where I found it challenging for me. The most important competence is that I understand well other's opinions and respect them. Moreover, I feel that I can also give my point of view from a different perspective with high manners and without forcing anyone to take it into consideration. "(STUDENT9END 2021)

"AL helped me to prepare for meetings, structure my time, to be clear about what I want and ask for it and also listening to my collegue's opinions" (STUDENT1END\_2021)

#### 10.4.2.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

Students were able to perceive importance of the system approach and thinking, their analysis of sector actors, identification of their challenges, networks, relations, etc. demonstrated their ability to look at the system as a whole, to analyse it and to make interpretation of findings. This process has been reported in the self-evaluation as the result of a long process where confusion about the methodology and also a limited understanding of how this would contribute to improving technical knowledge in organic agriculture were widespread among the students. The table below also shows



the changing attitude of students who consider AL as a valuable tool for facing complex problems.

#### Table 27: Question 7



### 10.4.3 Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education

#### 10.4.3.1 Methods of data collection and analysis

Teachers involved in the action learning were visiting professor, experts on the social capital and very curios and open to participate in our case study. They expressed their support for innovative learning methodologies such as action learning. Still, their involvement was based from few days of teaching to up to one full week, thus not allowing them to follow the whole process, however this positive feedback is important indication for us, while we must increase participation of teachers affiliated to CIHEAM. Teachers' reflection was collected in oral form, following finalization of their involvement in our case study. Coaches reflection document, on the contrary was completed and collected by the case coordinator.

The reflection document's results have been qualitatively analysed based on the Nextfood core competences, no specific tools have been used for the analysis only textual reporting.

Coaches organized zoom meetings on a 2-week schedule, according to the availability of students. The first meetings were based on the comprehension and understanding of the assignments received by the case study leader and clarification of the content and process of the questions they were expected to pose to the actors selected in their countries.

Other 2 zoom meetings have been dedicated to the feedback on the activities carried out and what worked or was hard to achieve. The exchanges were followed by invitations to get in touch if any help was required. Support material had been selected during some seminars held in the framework of the case study. Coaches involvement included evaluation of individual and group assignments.



Stakeholders overall perceptions have been collected in a focus group held at the end of the course group presentations. Once more, the data are reported as textual extracts.

#### 10.4.3.2 Results

Coaches reported that students have showed different levels of development. They all tried in adapting and understanding the new approach to the learning.

Observation: students have showed commitment to understand the attitude implied in this skill, interviewing actors in their selected local contexts without expressing any overarching judgment or bias. This time observation has been limited to distant contacts for the impossibility to travel and has limited the scope of possibilities. Students have, nonetheless, been able to report a good picture of their own case. The skill developed more during the field visits and it resulted in well structured final group presentations.

Participation: Students have showed a good level of participation in activities and in the exchanges with coaches, sharing their doubts, achievements, and ideas, reflecting on their suggestions and integrating them in their work. They have also improved their participation in peer learning activities, discussing within the group how to design further steps in their assignments. They effectively interacted with key informants and actors from the territory, remotely, they showed interest in the role of each of the actors and tried to prepare questions that could clearly define roles, interests, conflicts, objectives.

Reflection: students have been able to organise notes and materials for their investigation carried out in remote modality. A review and improvement of the approach used in their interviews leading to a better execution of the second assignment has shown an improved level of reflection abilities. However, this has been affected by the initial limited consideration paid to support literature that was suggested by coaches to provide a theoretical background for their activities. In some cases, group reflection has not led to group improvements, whereas individual competence and experience have contributed to better individual results.

Dialogue: students have been able to discuss progress about their findings among themselves, with the coaches and, in some cases, with the local actors. The results of this process werre conveyed in the final assignment and presentation.

Visioning: The limited interactions with local actors have hampered the opportunity to grasp the concept of visioning in its full potential. Visioning has been articulated as a skill in a weaker way but still, students were able to envision change with stakeholders as the final group presentations showed.



### 10.4.3.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

#### 10.4.3.2.1.1 From lecture hall to a diversity of learning arenas

The third cycle activities were unfortunately deeply affected by the ongoing pandemic situation. The start of the MSc programme was 1st December 2020, with the first 3 months of the course held online. Students arrived in CIHEAM campus only at the beginning of March 2021. Between December and March the main learning arena was an online lecturing hall (CIHEAM Bari e-learning platform and applications for live lectures and meetings).

However, our desire to reduce the effect of this obstacle resulted in the creation a forum to have a constant exchange with students. We decided to engage students with agri-food sector stakeholders in their countries of origin since the beginning of the course. This was done by different means in observation of COVID 19 restrictions and limitations of action (it was mainly done over the phone, email, WhatsApp). As a result, students got in contact with different realities of social capital in their countries, such as farmers' organizations, agricultural cooperatives, women associations in the sector of agriculture, food and rural tourism, etc.

During the period of distance learning, students attended a calendar of online seminars on the topic, which provided them with the necessary theoretical background for better preparation of interviews with stakeholders and to improve their ability to analyse and elaborate their findings. Upon arrival to Italy, students continued coaching/facilitating sessions in presence.

#### 10.4.3.2.1.1.1 Supporting forces and how to build on them

Responsiveness of the students, their commitment to the work, and the creation of social relations within the group and with the coaches confirmed that challenges due to distance learning were smoothly overcome. Yet, distance learning poses several difficulties and requires additional commitment and creativity from the action learning team. Thus human capital remains one of the key elements and supporting force for the case study implementation. Here the proper recognition at the institutional level should be present, to keep the involved personnel motivated, and as well to have possibility to better balance the work load related to action learning.

#### 10.4.3.2.1.1.2 Hindering forces and how to deal with them

We cannot start this section other than with pandemic condition, being the main hindering force in general for case study preparation, to the levels which could be indicated as overwhelming. Here flexibility of staff and modern technologies absorbed to some extent negative impact, but we are sure that the learning outcomes would be better if we had condition for work as in the previous two years.

#### 10.4.3.2.1.2 From lecturing to co- and peer learning

The "mixed" model approach, co-learning with stakeholders, within the students group and with coaches was, as in the previous cycles, the main model adopted. During the



topic-related seminars learning facilitators were involved to follow the lecturers but also to participate in the knowledge acquisition with the students. What was particular in the first three months, is that we were "information-dependent" from the students, since they were the ones who had direct contact with sector actors, conveying findings afterward to us. This was enriching for the coaches, since we obtained information and knowledge about 9 different realities of social capital, all around the Mediterranean basin. This aspect was discussed orally during internal meetings, as coaches exchanges views on the groups commenting the work and the difficult situation. No record of these comments is available.

To provide learners with the "peer-learning" dimension, students from the previous year were invited to share their experience and reflect on the previous cycle of action learning, further they were open to students questions and shared their ideas for this year action learning activities. Co-learning as in the previous years was promoted with group activities and interaction with sector stakeholders.

#### 10.4.3.2.1.2.1 Supporting forces and how to build on them

This year we had higher number of staff involved in the case study implementation, compared to previous two years. This proved to be enriching, bringing additional arena for dialogue, increased creativity, and as well possibility to share the work load. We hope to keep this trend for the next year, and to even more integrate our action learning activities within MSc path.

#### 10.4.3.2.1.2.2 Hindering forces and how to deal with them

What we faced as an obstacle in peer-learning was the fact that last year students were back in their countries due to the pandemic (making their thesis in mobility mode). Thus, we had to reduce their contribution to online interventions, while last year peer-learning involved their participation in field visits and some initial exercises with the students.

#### 10.4.3.2.1.3 From syllabus to supporting literature/a diversity of learning sources

During the third cycle, we placed focus on exercises related to assessment frameworks for social capital assessment, which required students to explore previous studies on social capital, to interact with stakeholders and to know their profiles and activities better. A combination of individual and group work was fundamental for the setting up of their work process. In order to individually approach their chosen local actor they had to develop a methodological framework (resulting in a check list for interviews) within their work group. After that they would individually conduct the interviews and then organize another session of group work to discuss and elaborate their findings in order to prepare a common presentation to be delivered to all classmates and learning facilitators.

This approach was applied as well to make students combine knowledge from the lectures and seminars, information available in the research articles and reports of



international cooperation projects, findings coming from interactions with stakeholders and knowledge co-created within the group/s

#### 10.4.3.2.1.3.1 Supporting forces and how to build on them

Here we observed students progress over time, in fact, they showed an improvement of their knowledge base and research abilities, which were later reflected in the improvement of the presentations delivered. Young generations nowadays are very much IT oriented, which was supportive during the online phase, which should be further exploited in the coming year.

#### 10.4.3.2.1.3.2 Hindering forces and how to deal with them

Majority of the students are coming from "conventional" world of education, thus their initial confusion about the methodology still remains challenging for us. The same applies for the sector actors, despite having some of them very passionate to share the experience, still we cannot distinguish for if the financial compensation is one of the main motivations to get involved within our activities.

#### 10.4.3.2.1.4 From textbook to a diversity of teaching aids

As we highlighted at the beginning of the report our e-learning platform was a new teaching aid, compared to the last year. Forum established within the platform supported dialogue, space for questions, exchange of the literature, etc. Considering that new generations are more and more "technological" we consider it as an interesting teaching aid, to be used even during the residential course. As in the previous years, we coupled it with the use of videos, presentations, and after students arrival to Italy with flip charts, poster preparations, etc.

Their arrival enabled us to have direct interaction, however, it also meant for students to continue the interaction with their country stakeholders remotely. This required additional flexibilities from actors involved, since all representatives of social capitals have their regular work duties, and even some are not that familiar with the use of applications for video calls.

#### 10.4.3.2.1.4.1 Supporting forces and how to build on them

Pandemic conditions reduced our space for activities, students managed to keep the interactions alive, allowing them to build on information already collected with the new one, and to use them as the source of knowledge on a real case (life) context and problems/challenges actors are facing. When onsite visits were finally done in Italy, this shift got additional positive impulse.

#### 10.4.3.2.1.4.2 Hindering forces and how to deal with them

Identification of literature supporting the process but not overloading the students at the same time remains a small challenge for coaches, which again should be addressed better in the planning stage.



#### 10.4.3.2.1.5 From written exam to a diversity of assessment methods

Our assessment methods do not reflect the standard of the classical examination. This shift for our case study is the more constant. Thus we kept using comprehensive evaluation all along the course duration, including students presentation, group reporting, individual preparation of argumentative essay and students participation and contribution in exercises. Again, apart from the self-assessment test proposed by the project research protocol we used an additional questionnaire at the end of the course, looking for insights on how students perceive methodology used, support of the coaches, alignment with their MSc programme, and if the activities performed according to them could contribute to stakeholders involved in the case study, and even wider at the sector level.

Group report further facilitated dialogue competence and requested from students to work as a team, to communicate and to arrive to shared proposals and solutions. Students were engaged in the analysis of their selected stakeholders (representatives of social capital in the agri-food sector) and needed to report as a group about their networks, relations, distribution of power. They could discuss the benefits for their main actor, the structure of the network and potential conflicts, and finally to envision a potential scenario showing what would be the reality if the actors were not the part of social capital.

As an individual assignment, we used an argumentative essay, since last year experience confirmed how beneficial it was. This format requests students to combine their personal experience with actors and information coming from the literature, where they need to provide arguments but as well contra-arguments, all supported by the evidence.

#### 10.4.3.2.1.5.1 Supporting forces and how to build on them

At the end of the course, students will prepare a final group presentation, to be presented to concerned stakeholders and researchers and staff from CIHEAM Bari. As last year, in the final conference we involve our institutional representatives, apart from the staff directly involved in the "NextFood" project, to further support desired institutional shift for innovative forms of education and learning.

#### 10.4.3.2.1.5.2 Hindering forces and how to deal with them

Assessment methodology is not something that we define at the beginning of the action learning activities, but it is more fluent activity which we adapt/change based on the course progress and observed reactions from students. This is something which is seen by students as disturbing factor, and again we would associated this to more "conventional" way of thinking. However, with the course finalization we expect that students will appreciated this approach, and see its advantages, since it calls for flexibility, but as well for creativity and constant dialogue among group members.



#### 10.4.3.2.1.6 From lecturer to learning facilitator

As we reported for the previous years, our action learning activities are part of the MSc course, where students are receiving a significant amount of classical lectures, thus our role again was defined as learning facilitators, which are trying to "get the best" of lectures already delivered to the students and to combine it with our action learning methodology. What is important to highlight for this third year of case study is that we provided significantly more space during the course for action learning activities, being now in form of a teaching unit, with more time for topic-related seminars and lectures. This possibility came from the fact that course coordination was changed, with a new coordinator being more open to action and experiential learning. This allowed us to have even a full week of lecturing devoted to action learning, with lectures familiar with the methodology, thus giving additional support to personnel who had the role of coaches.

In the two previous years, we were dividing students in the group around the middle of the course, while this year to overcome the gap coming from the online initial part we divided them into the groups from the very beginning, giving more time to coaches and students to create strong bonds and the atmosphere of co-learning.

#### 10.4.3.2.1.6.1 Supporting forces and how to build on them

Higher involvement of staff was supportive during this year, still the place for improvements always remains, and it would be desirable to have even more lecturers and regular MSc course syllabus involved in action learning activities, which remains our important aim for the last year of the case study implementation.

#### 10.4.3.2.1.6.2 Hindering forces and how to deal with them

Our action learnings were structured with coaches going after different group of students who independently worked on phenomenon, open and action-oriented cases. Our coaches complained that we need to ensure to students' sets the same treatments and experiences and feel uncomfortable if things take different directions for different students' groups. Here maybe increase dialogue in the planning stage could help to overcome present challenge.

#### 10.4.3.2.2 What such a change requires from teachers, students, and institutions

Flexibility, a lot of flexibility, open mind, a bit of courage, good planning and institutional support.

#### 10.4.3.2.3 Teachers' perception of the greatest challenges to achieving such a change

- Distance learning (on-line part of the course) brought several challenges, especially in terms of dialogue and relation development between students and coaches. It is also somehow in logical contradiction with the action learning approach (hand on experience), thus this was one of the greatest challenges for the third year of case study implementation. Further, multi-actor approach is desirable, but at the same time



difficult to manage, and less efficient when we come to the learning outcomes" (COACH1end\_2021)

The experience of distance learning is for coaches extremely challenging as the organisation of field experience and the interaction with stakeholders becomes challenging to organise, to make it effective, to follow up and to present to students as an opportunity for transformation.

- Another challenge is still conveying the concept of "visioning", which becomes even more complicated to acquire without direct interaction with actors. (COACH2END\_2021)

Coaches have been presented wit the difficulty to explain visioning to students and students find difficult to convey the concept when interacting with stakeholders. A set of exercises could be specifically prepared to train students to operationalise this concept in a more effective way in their activities with stakeholders and when reflecting in group.

- A main problem is to have an action learning totally integrated in a master course. It needs coordination among a wide range of teachers and researchers who are used to discipline driven and oriented activities. It needs a strong coordination and sharing of objectives.(COACH 3END\_2021)

In a course with different modules and visiting professors it becomes the greatest challenge to uniform the methodology throughout the whole master course.

- The involvement of stakeholders has been challenging, more dictated by good relationships with teachers and/or on services provision mechanisms (paying fees to actors for their interventions) rather than by a real concern on activities and action learning results.(COACH5END\_2021)

It is always a matter of concern thinking of the benefits stakeholders can draw from interacting with our course modules and to engage them in a continuous and fruitful exchenge.

### 10.5 Concluding remarks on the case development

10.5.1 On the case development since the previous reporting



#### 10.5.1.1 The most useful and inspiring experiences (supporting forces)

It was very inspiring to see happiness of students when they got in direct contact with the actors. Even though online phase was challenging, it was useful to learn how to work fully online with and action learning approach.

#### 10.5.1.2 Main obstacles/challenges encountered (hindering forces)

The open questions (challenges) for us, are the following one:

- Are sector stakeholders sufficiently ready to be part of action learning activates? Do they have as well more "conventional" approach, and do we need thus to educated as well sector actors, and not only to work at the level of educational institutions?

- How to shift a whole course syllabus to action learning, rather than a single module. How to improve the visioning skill development in students.

#### 10.5.1.3 Lessons learned from the inspiring experiences and from dealing with the challenges

Good planning helps, but in specific conditions of this year margins for planning became very narrow. One of the lessons is that more exchanges between the students groups need to be scheduled in the activity program for cross-contamination and alignment. Further, we concluded that individual essays should be designed and proposed as an integral, complementary part of the main learning path. Any deviation from this main path has proven to produce confusion and waste of students' learning energy and commitment

#### 10.5.1.4 Plans for how to move forward into the next cycle

 $\Rightarrow$  Longer focus on an agreed package of tools for data collection and analysis;

- ⇒ Further expose students to multiple actors, activities, landscapes from the territory, possibly organise their direct longer, practical, involvement in some specific on field activities;
- ⇒ Envisage various intermediate meetings with local actors in connection with the different phases of the exercise (we already conveniently did some which in our opinion proved to be very useful);
- ⇒ Organise in advance a package of relevant references to share with students. Such references should be of course relevant for the topics addressed in the exercise; at the same time clear, explicit connections should be created with taught disciplines and materials distributed within the master program;
- $\Rightarrow$  Plan a series of relevant seminars/webinars on specific topics of common interest.

#### 10.5.2 Reflections towards the end of the Nextfood project

## 10.5.2.1 What has been accomplished to shift from theory to phenomenon (experience) in agrifood- and forestry systems as the starting point for the learning process?

In consideration of our experience, and as educational course designers and managers, we consider that the shift from theory to phenomenon is a key step for


designing a student's learning process on farming and agri-food systems development; and that after our experience, we think that it is a high value to build a master course centred on an action learning mechanism. The question is rather how to support students in an experience learning based on phenomenon analysis and understanding. Here it comes the importance to transfer selected theories, experiences, topics, frameworks. Thus, we are not in principles in favour of a radical shift from knowledge to experience, but more on looking for what is useful for feeding a productive and active learning process by students. Without knowledge on specific disciplines/topics/frameworks the risk is that students may become blind to phenomenon, not very active for the prevailing of sense of confusion, following wrong learning trajectories. The matter is rather to identify which knowledge, topics, frameworks the students must be exposed to (and how to transfer), that will depend on the overall course objectives. Thus, as an example, in our new course organization, we have considered the action learning somehow at the centre of the program with around it several inputs (teaching units) in terms of knowledge, topics, frameworks that give key instruments to students for analysing things and phenomenon and act with an inductive approach. We built a course managing teams composed of topic experts (for the transmission of knowledge) and facilitators (who manage experiential learning) who work together, with the perspective to set a reciprocal acceptance of different roles and willingness to cross experiences and activities. Practioners, entrepreneurs, farmers and other real actors, used to have an inductive approach to problems solutions, became key part of the educational approach.

# 10.5.2.2 What has been accomplished to shift from transmission of knowledge to the development of key competences needed to support sustainable development in agrifood and forestry systems?

From the implementation of the Nextfood approach we learned about the importance to work for developing students' competencies, whatever these are. We saw that a key step is that students would be active, engaged and interested on processes and activities, giving them appropriate space and time to act, reflect, express, and learn, in a repetitive and evolutive manner.

We are in the process to review our didactical approaches in the teaching units as well, usually centred on lecturers and on their transfer of information, and with students asked only to study notes and materials to overpass exams. We are proposing lecturers to drive a change in the way they organize the teaching units, placing students at the centre of a learning process, and designing activities giving students time for their research, analysis, reflection, and synthesis, engaging them in project implementation, essays, seminars, and practical approaches. This process is triggering mechanisms, with lectures who are exploring new options and approaches for giving more effectiveness to their activities in the perspective to develop students' competencies. It takes time and, like in agricultural production, the matter is sowing and taking care of fields for a good harvest.



#### 10.5.2.3 What are the prerequisites for making a successful shift?

At institutional level finding resources (logistics, financial, human resources) is crucial to enable the development of activities related to the approach; strong links with market means for us identifying effective stakeholders key informant that can add value to the territorial interaction; important to identify ways to build trusts between learners and stakeholders as well as learners and learning facilitators. It is important to clarify the link with sustainability concept and the connection with systems thinking and practice and to develop assessment methods targeting cross-cutting competences and group work skills rather than traditional knowledge such as assessed in exams.

## 10.5.2.4 What is your concrete advice on the shift from simple knowledge transmission to the development of key competences?

Increase the combination of knowledge building with practice on the field, encourage system thinking and interaction with stakeholders and increase the value of the role of coaches in facilitating learning processes.

#### 10.5.2.5 What is your main challenge?

How can we further integrate extra-institutional actors in our educational activities, for mutual benefits?

### 10.5.2.6 What are the three best ideas from the workshop for how to deal with that main challenge?

- formalize a network that participates in planning, implementation and reflection of the educational activities.
- formalize an extended learning group, that can participate in course as external stakeholders but still gaining some sort of course diploma
- Spend time on (1) recruitment, including (2) explanation of the action learning process and its essential phases and activities and (3) finding out what the stakeholders think might be in it for them.
- To try to establish a network of potential actors and bring them together for an informal, non-binding shared meeting/focus group to establish common ground and identify needs and expectations for potential involvement.
- Start with resources already available and recruit new stakeholders via these channels.

Engage in dialogue with stakeholders and hear what it would require for them to participate/how they would be interested in involving students in their work.



### 11 Case 12: University of Kerala

Authors: Manju S. Nair, Anupama Augustine

### 11.2 ID card

#### Course title, level and language

Title: Certificate Course on Agroecology: Action Research and Education

Level: Post Graduation

#### Language: English

#### Course learning goals

At the end of the course students will be able to,

- 1. Understand and appraise concepts relating to agroecology, sustainability and system thinking.
- 2. Enhance competences of observation, reflection, participation, visioning and dialoguing.
- 3. Practice participatory action research with stakeholders and get familiarized in action learning tools and techniques.
- 4. Participate in peer learning activities and gain both soft skills and green skills needed to act as change agents in the community

#### Host institution(s) and course leader(s)

Host Institution: Centre for Agroecology and Public Health (CAPH), University of Kerala

Course leader(s): Dr. Manju S. Nair (Hon. Director (CAPH), Professor, University of Kerala and Dr. Anupama Augustine, Research Associate, CAPH.

#### Timeline of the activities covered in this report

Initial Planning (Planning workshop): 23/11/2021

Implementation (Conduction of Short Course on Agroecology: Action Research and Education): 25/11/2020 to 22/12/2021

Reflection workshop- 23/12/2021

#### Learner categories and number per category (demographics)

Learner Categories: Nine students joined the course, but one student discontinued during second week of the course. Only eight students completed, in which five students are females and 3 are males

Age- 20 -30: 8 students

Nationality: Indian- 8



Social Science background: 7 students

Natural Science: 1 student

#### Stakeholder categories and type of involvement

Farmers- 3

Farmers guided students when they visited the farms and made arrangements for students to participate in farming activities. One farmer participated in planning workshop and made suggestions while formulating the curricula for course.

Mentors (alumni students) - 3

Alumni students from 2021 batch acted as mentors in the course. Mentors were assigned with responsibility to guide each of the group during educational activities. They provided suggestions during activities, assessed student involvement in group activities, and evaluated assignments. Mentors participated in both planning and reflection workshop and made their suggestions. In addition, they supported with logistics to ensure smooth conduction of educational activities.

#### Shortlist of learning arenas

Educational activities included diverse learning arenas like

- Classroom lectures: Lecture sessions were used to introduce concepts to students. There were around seven sessions where each session lasted for one and a half hours. Two of the sessions were handled by farmers and the rest by academicians.
- Field visits: Students were taken to organic farms where they observed and interacted with farmers. Two days were spent for field visit, where three farms were visited.
- Casework project on farms: Students visited case farms twice, during first and third week of the course and spent six days in case farms. They observed the farms, conducted semi structured interviews and participated in farming activities.
- Online sessions: Online sessions were conducted for literature review and response paper presentation. It lasted for around three hours. Power point presentation, shared discussion rooms etc. were used.
- Practice sessions outside classroom (in campus)- Practice sessions were conducted outside classroom where activities such as transect walk, photo novella were conducted. Each activity took around two hours.
- Peer learning sessions inside classroom: Competence training sessions were organized inside classroom, in groups. Around seven sessions having duration of one hour each was conducted.
- Exhibition Centre: Rich picture exhibition was organized for students to examine the rich pictures made by previous batches. It lasted for an hour, where they interpreted and evaluated the rich pictures.
- Online platform: students used online platforms such as WhatsApp, telegram to discuss their work progress and coordinate educational activities.



### 11.3 Extended summary

#### 11.3.1 Research results since the previous reporting

#### 11.3.1.1 Students', teachers' and other stakeholders' experiences and learning

Students, teachers and other stakeholders acted together to plan and implement the certificate course on agroecology, and reflected up on the experience and learning. Students, by participating in the course were able to achieve their learning goals such as enhancing knowledge, competences, interdisciplinary research methods and gained awareness of agroecology and sustainability issues. Students, by the end of the course understood that empathy, participatory approach and enhancing skills and competence of all stakeholders are important for attaining sustainable development. Initial questions posed during the first week of the course made students to think about their own competences and peer learning activities helped to cocreate knowledge, improve creativity, and knowledge of action research. Students reported an enhancement in competence such as observation, reflection, dialoguing, visioning and participation as a result of participating in course, that the self-assessment of competence shows this. Self-assessment of competences shows improvement in student's competences and this is evident from the learner documents. The course made a transformation in students, as they started to reflect up on qualities needed for researchers and impact of interdisciplinary research outcomes, learning styles and pedagogy and needed agroecological transition.

To teachers, organising planning and reflection workshops and conducting the course activities provided an opportunity to undergo the iterative process of experiential learning. Teachers gained the skill of facilitation and this helped in redefining the conventional learning space and successfully completing the educational activities. Writing reflection documents helped mentors and teachers to improve quality of the educational activities. Farmers guided students during field participation and these activities helped to create a bond between farmers and students. Farmers provided students with practical tips to do farming and the whole experience was inspiring and useful as reflected by both the students and farmers.

### 11.3.1.2 Outcome of the case development process, including effects of making the essential shifts

The process of enhancing the intended shifts were done, by refining the curriculum of course to include new learning arenas, teaching aids, literature and peer learning activities. This was done through meticulous planning and sharing responsibility among teachers, mentors and farmers. Selecting diversified case farms, conducting exposure visits, organising qualitative research workshop, using online applications for explaining concepts, rich picture exhibition, familiarising students with farm application software etc. were the outcome of planning workshop. Students expressed enhancing the competences of observation, reflection, dialoguing, visioning and participation by participating in educational activities such as reflection session, transect walk, photo novella, literature seminars and field participation. Analysis of self-assessment of competences at the beginning and end of the course show significant improvement in



competences, and this shows that the shift towards introducing new learning arenas and teaching aids was effective. New assessment method- . preparation of client and learner document- helped students to reflect up on the educational activities and to get insights into Nextfood approach to experiential learning.

#### *11.3.1.3 Supporting and hindering forces for implementing the Nextfood model*

Covid 19 restrictions and hostile climate were the hindering forces to implement new learning arenas, but support from university administration, open mindedness and ability to make joint decision, at times of hindrances made this shift possible.

Guidance of mentors and diversity of student groups made peer learning possible, however, conflicts in group and drop out of student during course effected peer learning.

Technical know how of teachers made introduction of new teaching aids possible, but time and resource constraints acted as hindering force.

Adaptive capacity of learners made introducing new learning resources possible, however differences in academic background/ knowledge level made difficulties in using these resources by students equally.

In assessment methods, originality of reflection documents made assessment meaningful, but, lack of specific criteria to assess these documents posed challenges.

Teamwork helped the transition from teacher to facilitator, but there are issues in getting acceptance to redefining the role of teacher among colleagues.



# 11.4 Actions taken and data on the development of the case since the last reporting

#### 11.4.1 Actions taken since the previous report

During the final cycle, with the involvement of stakeholders a planning workshop was conducted prior to the beginning of the course to discuss curriculum and course schedule. The course was conducted in offline mode for 28 days at Department of Economics, University of Kerala. And, a reflection workshop was organised at the end of the course where both mentors and facilitators participated. A curriculum for conducting online course was also developed during the cycle, forecasting the prolonged threat of Covid 19.

#### 11.4.1.1 Planning

Farmers, alumni students and mentors were invited to the course planning workshop. The workshop activities were in accordance with 'planning workshop template' in Next food toolbox. Dr. Manju acted as facilitator during workshop. The discussions were based one whether to include all activities of previous course in the upcoming course/ or to introduce more activities, and also on the mode of conduction of course.

Covid cases were reducing and the lockdown was easing, so it was decided to conduct the course offline mode by including all activities in the previous course.

To make the essential shift envisioned in NEXTFOOD, most important step was selection of case farms as centre of course, and mentors pointed out the need for selecting new farms to maintain diversity among case farms and to avoid repetition in client documents. After discussion, one farm was selected from tentative choices as new case farm while keeping the other two case farms. Also, for exposure visit, an integrated farm maintained by State secretariate was selected and facilitator was assigned to get essential permissions for visit.

Secondly, three alumni students volunteered to act as mentors during the course and their roles and responsibilities were discussed. The logistics needed for the course was discussed and a plan was made to arrange everything before the beginning of course.

Need for including new learning arena was discussed in the workshop. Mentors cited the expertise of the team on qualitative research and suggested to include a new session on qualitative data analysis and data collection techniques. And it was decided to include a hands-on training session for qualitative data analysis.. Also, new learning arena such as, demonstration farm plot by each student group was suggested and included, but was not materialised during the course



Need for introducing new teaching aids was discussed. The two suggestions - Using online applications for explaining concepts, rich picture exhibition, familiarise students with farm application software- seemed good and it was decided to include in curricula.

It was decided to change the research papers given for response paper writing and group literature review presentation. Recent articles were selected and added.

To boost the role as facilitator, a new activity, 'dialogue with mentor' was suggested. Also, it was decided to give students an understanding of the Next food project and relevance of agroecology at the beginning of the course, and one session was planned for discussing this.

A course schedule was prepared including all these suggestions. Responsibility of conducting each session was divided among each facilitator and mentors and a time table was prepared. It was decided to have meeting to monitor the arrangements on the day before commencement of the course.

#### 11.4.1.2 Implementation

Inculcating the suggestions from planning workshop course schedule and time table were prepared and shared with relevant stakeholders. Twenty-eight days was the duration and class timings were 10 a.m. to 5 p.m. Students participated in field for seven days and went for exposure visits. Self-assessment of competences, learner document, client document and assignments were submitted by participants.

To introduce new learning arenas such as exposure visit and model farm plot, most important step was to get permission from authorities. Permission from University authorities was taken for conducting outdoor activities including developing a demonstration (model) farming plot. Similarly, procedures were completed to get permission from State secretariate for exposure visit. Facilitators visited the newly added case farm and had discussions with owners of the farm. Roles and responsibilities of farmer as facilitator during field work was communicated and the farmer agreed to participate in the process.

Short videos were downloaded to engage students with the concept of agroecology and farm software and its uses were introduced to the students. As a part of qualitative research session, NVIVO software was also introduced to students.

All the planned activities were carried out, except, the model farm plot, as it was heavily raining during the first week of the course and students were unable to do outdoor activities.



#### 11.4.1.3 Reflection

Writing teacher reflection document was a hectic task, along with managing the course and making student assessment. So, it was decided that the facilitator and one mentor in charge of each session shall write reflection journal at the end of each day. Thus, two facilitators and three mentors shared the responsibility of writing teacher reflection journal. Reflection notes during the days of field visits were done, after collecting feedback from students and farmers on each day's activity. This was done through sharing pictures and videos in WhatsApp group and discussing online with students. Phone conversation with farmers were not that effective, as farmers were not trained enough to assess student activities.

Reflection workshop was conducted at the end of the course, in which mentors and facilitators participated. The course was rated based on Nextfood intended shifts by workshop participants and supporting and hindering forces were jolted with regard to each shift. Student feedback were collected by providing them with four questions at the final day of course and getting written comments from them. Final questions, self-assessment of competence, reflection journal was also submitted by students.

#### 11.4.2 Students' responses, learning and competence development

11.4.2.1 Methods of data collection and analysis

#### 11.4.2.1.1 First week (day) & last week (day) of the course

11.4.2.1.1.1 Student's understanding, contributions, and expectations

Four initial and five final questions in Nextfood toolbox were used to collect information from students. The questions were introduced in classroom and students presented their answers. Later the answers were emailed. The answers from each student were compiled and made into one word document. Manual coding was used to derive insights from the documents since the information was short and analysis demanded comparison of students at the beginning and end of the course.

#### 11.4.2.1.1.2 Self-assessment of competences

Self-assessment of competence was collected using the 'Competence selfassessment rubric' at the beginning and end of the course. Students marked their rating in hard copies at classroom and later the data was entered into excel by mentors. Paired t test and percentage change witnessed in competences were worked out using SPSS software and the results were interpreted.

#### 11.4.2.1.2 Students' final reflection document (individual)

Students were given guidelines to write reflection document during the first week of the course itself. They were told to submit it at the end of course. As an introduction to reflective journal, power point presentation was made based on 'A guide to the reflection document' in Nextfood tool box. The three steps of log-writing from 'The Reflective Journal' in toolbox was shared with students. The questions included;

• What, exactly, did I see?



- What did happen?
- What did I experience? What did I feel/think about this?
- What did I learn from this? (Connecting to both experiences and relevant literature is necessary)

Students were advised to write a daily log, based on these questions and submit the reflective journal based on it.

The reflective journal received from students were anonymised by giving number and by removing pictures. The journals were imported to NVIVO and coded using coding tree given in the project. No additional codes were used. The documents were coded by only one facilitator, and so, intercoder reliability check was not done. The coded data is used for deriving insights in to writing the case report.

#### 11.4.2.2 Results

#### 11.4.2.2.1 How do students experience such a learning process with respect to:

#### 11.4.2.2.1.1 learning goals?

Students joined in the course with an expectation to learn action research techniques, interdisciplinary approach to research, enhance skills/competences and understand sustainability issues related to agriculture. Students expected opportunity to participate in field work, to know nature better. Student's motive for joining the course was to gain knowledge of action research, by understanding in what ways information can be collected from field, and how these data can be organised and analysed to reach in to inferences. A student write,

"The educational activity is expected to give an in-depth knowledge on what action research is, and how field work can be effectively used in order to grab relevant information needed for research study".

- (Initial Questions)

Another Student notes that "the course helped in finding answers to so many questions I had in mind before entering the programme. The purpose of studying agroecology, what is action research all about, the importance of peer learning, and how well action learning contributes to the development of one's own personality".

- (Final Questions)

Students opine that they learned how to involve in field and this helped them to understand how hard it is to work in real life situations, compared to learning theories.



"(Learned) how to act rather than think and philosophize. It's easy to talk about sustainable agriculture, but its real hard work to go to the field.... I am trying to fetch answers to the question 'how to act'."

(Final Questions)

Many of the students expressed that they were able to achieve their learning goals towards the end of the course, however, for some students the course prompted to ask themselves much more philosophical questions related to learning such as whether "purpose of education is really meant only for career", "who are real teachers" and "can I do anything for our nature"

"My goal from this course was to get to know what agroecology is and improve my research perspective; I would say that I reached the goal"

(Final Questions)

#### 11.4.2.2.1.2 view on competences needed for sustainable development?

Students were asked to share their views on competences needed for sustainable development and at the beginning of the course, most of the students opined that knowledge (of sustainable development practices), awareness (about impact of harmful practices), expert opinion (on feasible solutions to bring in sustainable practices) are the major competences needed for sustainable development. Also need for observation skills, interdisciplinary skills and team work are mentioned. Towards the end of the course students feel that empathy, participatory approach and competences are important. Student testimonies are as follows;

"We should follow a participatory approach by socializing and empathizing with each other"

#### Student (Final Questions)

"Co- creation and sharing of knowledge had to be practiced to support the process of attaining sustainability. A good observation of what is happening around us, the reflection of what we have observed combining our previous knowledge and ideas generated, the ability in dialoguing combining the thoughts of the peer group (for that good listening power is a mandatory element), and developing a vision for future all are crucial skills needed in the process of supporting sustainability."

Student (Final Questions)

#### 11.4.2.2.1.3 recognition of own competences and competence development?

Field experience, ability to with stand difficult circumstances, technical skills, lab experience, communication skills, patience, critical thinking skills, socialisation skill, academic/research experience, observation skill, listening skill, ability to work in groups, positive attitude are the major skills recognised by students and they feel that these can help in successful completion of the course.



"My listening and communication skills will help me to hear patiently what others have to say and to collect relevant information from the peer groups. As a curious learner I regularly update information about the new things that come up in the process of learning. The capability to analyze the information obtained critically might help me while doing the course. My interacting skills might help me to share the knowledge thus obtained in the most efficient way. I am a person who have an opinion that learning and unlearning is a continuous process that should not be confined inside a classroom but has to be more action based, this outlook will lead to the successful completion of the course".

- (Initial Questions)

Student opined that communication skills can help in peer learning activities, and updated knowledge, critical thinking skills and positive attitude towards action learning may help in participating in the course. Another student considers experience of interacting with stakeholders including farmers during post-graduation is the competence he/she brings to course.

"The experience and competence I think that I have is listening skills, communication skills, prior experience in field survey during my PG project in the area (of sustainable agriculture) in which I interacted with so many stake holders, farmers and agricultural officers. I think all these will help me in this Agroecology course"

-(Initial Questions)

Students wanted to improve grasping capacity, multi-dimensional thinking, practical know how, dialoguing skills. Students opine that their competences improved while undergoing the course. Dialoguing, communication, observation, mind mapping, rich picturing, reflective thinking, qualitative research and learning is some of the competences students have cited.

*"I think I have improved my communication skills and presentation skills during the class hours".* 

- (Final Questions)

"The Course has opened me with new insights on qualitative learning. It helped me to use my competences in dealing with real life situations. The introduction to rich picture as a scientific research tool definitely benefited me as a student of social science. I do feel that rich picture is the most creative of all the research tools I have ever learned"

#### (Final Questions)

"Dialoguing is one important competence that I got from the course, it helped to become a good listener with immense patience and to hear a subject without prior misconceptions".

#### (Final Questions)

"The course gave me a different experience by breaking all the rules of conventional classroom learning and more into student centred learning. It helped me in building



new competences and gave an idea of my existing competences. The course taught me how a researcher should be, what observation skill do we need and how to reflect on those things that I have observed without being judgemental".

#### (Final Questions)

The above student testimonies show that educational activities have helped students to improve communication skills, especially dialoguing. They feel that their listening skills and patience has improved since dialogue practice sessions. Another competence enhancement is with regard to action research capabilities, the tools and techniques. To students, rich picturing, observation and reflection techniques has benefitted them to deal with real life situations in research, and they have gained an understanding of skills and values needed for a researcher as a result of participating in the course.

Students have pointed out specific skills that they have developed after undergoing the course. For instance, one student opines that she has gained the following skills:

- Knowledge of sustainable development and agroecology (Through lectures, interactive sessions, presentations and experiences, I got various ideas on agroecology)
- Using action research tools such as rich picturing and mind mapping
- Writing and reading skills (The lecture on review writing helped me a lot; Now I know how to read a research article, to note down important points. and to summarize it)
- Enhanced creativity (At the time of rich picturing, photo novella and writing client document)
- Interactive skills (I never knew I could interact so well in a diverse group)
- Self-confidence (I think I am more confident (now) in expressing myself, raising my views. I have spoken a lot (during the course) and it has helped me to reduce my stage fear)

#### Self-assessment of competence: Quantitative analysis

H0(Null Hypothesis) : There is no significant change in competence level before and after the course

H1 (Alternative Hypothesis): There is significant change in competence level before and after the course

Paired t test is used to test the hypothesis

Table 28: Results of Paired Sample t test

Paired Samples t test



		Paired			Sig. (2-
		Differences	t	df	tailed)
1	Observation initial - final	-1.66586	-4.912	7	.002
2	Participation initial - final	-1.61550	-4.339	7	.003
3	Visioning	-2.23204	-5.870	7	.001
4	Reflection	-1.08070	-3.675	7	.008
5	Dialoguing	-1.73564	-4.927	7	.002
6	Competence (Average)	-1.81111	-5.122	7	.001

Using t test the null hypotheses is rejected. Hence the results show that there is a significant change in final score of competences as compared to the initial score. The mean initial and final scores of competences and the improvement in percent is presented below. The average vale of self-reported competences have improved by 102 per cent as per the data given by the participants.

				Percentage
Competences		Initial value	Final value	change
Observation	Mean	3.29	6.50	97%
	SD	1.02	1.38	
Participation	Mean	3.16	6.71	112%
	SD	1.26	1.63	
Visioning	Mean	2.84	6.58	131%
	SD	0.78	1.81	
Reflection	Mean	3.59	6.63	84%
	SD	1.27	1.98	
Dialogue	Mean	3.63	6.96	92%
	SD	1.01	1.78	
Overall				
Competency	Mean	3.30	6.67	102%
	SD	0.79	1.64	

Table 29: . Descriptive Statistics of Competences – Initial and Final.

#### 11.4.2.2.1.4 transformation?

Students have highlighted some of the changes that they experienced with regard to their personality, learning style and group behaviour as a result of participating in the course. For instance, to a student, the course helped him learn social skills, via doing group activities for the first time. The course opened a new arena of research to the student who was only familiar with quantitative data, and as a result, he gained ability to observe things thoroughly, change some of the perspectives, and to reach in to



conclusions only after considering every aspect surrounding a research problem. Student testimony says,

"I have never been this social to a group of people whom I have met for the first time. I have worked with quantitative data, but going to the field and working at the grass root level was a different experience. As I was doing research, I had the tendency to come to the conclusion very fast, but this course changed that. I started to observe even the little things around me and it's changing some of the perspective I had. I enjoyed doing group activities which I never did before coming here. The course thought me that different perspective and opinion matters and one shouldn't be Judgemental". – Student 1 (Feedback Questions)

Students during the course started to reflect up on qualities a researcher has to possess, desired outcome of research and actions to be taken to bring in an agroecological transition. And they started to critically evaluate the learning pedagogy they underwent in the previous years by comparing it with the educational activities the course provided. Students became more aware of the circumstances at grass root and the importance of taking action to protect nature.

"The question I ask myself is, are you ready for following agroecological practices?"

#### Student 2 (Learner Document)

"Throughout these years of learning, the practical applicability of what I have learnt was missing, and this could be attained through an action-oriented approach towards learning"

#### Student 4(Learner Document)

"What qualities do I have as a researcher, whether my observations skills and dialoguing skills, that I got (from the course) will help (me)in doing my upcoming (research) works effectively; what are the changes that have occurred in my personality, and self-development (after attending) this course".

#### Student 6 (Learner Document)

"After witnessing sustainable agricultural practices at the grass root level, I am asking myself regarding the contribution that I should (make) so as to preserve nature. Its unworthy to sit down and making opinion about farming, it's a wakeup call for people living in comfort zone like me to act".

#### Student 2 (Learner Document)

Student opines that the course has practical applicability, compared to conventional courses and to some students the course was a wake-up call to start agroecological practices/ to act. Student expects that the skills they gained from the course can be helpful in doing research with more quality and they started to introspect their personality as a result of the course. Participating in field has made an impact in the mind of students, and they have been asking themselves about the ways in which nature can be preserved.



#### 11.4.2.2.2 To what extent does the education enhance the students' competences of:

#### 11.4.2.2.2.1 observation?

The competence of observation was practiced by conducting transect walk, photo novella, field visits and observation sessions at classroom. Students point out that their observation skill has improved after undergoing the course. One student opines that transect walk helped him to observe and reflect things without being judgemental. To another student, Photo Novella seemed the most interesting activity that encouraged students to think critically and analytically by paying attention to the outside world. Student testimonies are added below;

*"My thought process and observation skills have been improved after the observation and reflective activities"- Student 1(Learner Document)* 

*"It (Transect walk) also made me to learn how to observe and reflect things as a knowledge seeker without being judgemental or critical"- Student 4 (Learner Document)* 

"This activity (Photo Novella) was the most exciting one in the whole course. It is a photographic story that encourages us to think critically, moreover analytically in various perspectives and pay attention to the world around us"- Student 4, Learner Document.

Students have appreciated the method in which the competence was practiced during the course. They feel that starting with observation walk, instead of introducing theory was more helpful to them to study the competence. Being non-judgemental is one quality highlighted by students to be a good observer.

"The observation walk gave me an opportunity to do so. The most highlighting aspect was, the session on observation was conducted after the observation walk. This helped me to rectify my mistakes in observing things and also helped me to identify the difference between observation and reflection. This activity made me understand the importance of being a good observer. Even though I used to observe things critically, the activity taught me to not to be judgmental while observing things as that would make me biased. During the session everybody shared their observation and this highlighted the aspect that each participant observed things in a different perspective and sharing thoughts with them had broadened my thought process". - Student 5 (Learner Document)

According to student, observation session helped him/her to rectify the mistake made during transect walk in observing things and as a result the difference between observation and reflection was thoroughly understood. Students highlighted how student perspectives largely varied even though all the students observed the same place, and this helped them broaden their thought process.

#### 11.4.2.2.2.2 reflection?

Reflection by students include reflection on impact of educational activities and resultant competence development (to themselves as well as team), reflections



relating to case work (characterises of case and vision of farm) and reflections on macro aspects such as learning process, agroecological implications, and impact on personality.

Students have mentioned about how the course was different from conventional courses, how a particular educational activity was advantageous for some of the classmates, advantages of group work, and what are the competences and how it improved via learning by doing.

"This course was totally different from conventional learning in the sense that it included less of lecturing and more of observation, reflection and dialoguing". Student 2 (Learner Document)

"It was an interesting class, not only for me but all the students were enthusiastic during writing memos and learning NVIVO, because no one has ever heard or tried this before. Apart from me all others were research students and this class was so much useful for them". – Student 3 (Learner Document)

"The method was like "learning by doing", where we learned skill first by doing it and then classes were given, thus we learned from our own mistakes which unfolded a new path of learning. The course helped me to understand my existing competences that I never recognized before and also helped in building new competences along with good observation, listening, reading and writing skills. Another peculiarity of the course is making participants to work in groups. These group works helped me a lot to understand our strengths and weakness, reflect our thoughts in groups and there by leading to co creation of knowledge. Also, it helped us improve our patience and comprehension skills" – Student 4 (Learner Document)

"This exercise (mind mapping) helped me think how to connect thoughts and ideas about these concepts, share with the peer group, combine the idea and represent it in the simplest way".- Student 5 (Learner Document)

Student's client document and reflection journal shows that they were deeply concerned about the case farm and many of the reflections are related to it.

"With this course I was able to understand the challenges and the possibilities of organic farming and it also helps to make a close look on the vulnerabilities of the farmers"- Student 7 (Learner Document)

Some of the reflections are related to personality, their choices, and concerns relating to sustainability.

"I have never taken the life around me seriously and this activity has changed a lot on that. The picture is taken by me during the activity and this showed me that life is a never-ending process, like from the picture a mushroom is grown from a cut down branch, but this cycle can end if we over exploit the resource and keep on consuming....It was very interesting because, I as a person ask very less questions,



and he made us to think that much aspect in our life is to be questioned". Student 1 (Learner Document)

#### 11.4.2.2.3 visionary thinking?

Visioning exercise was conducted in classroom so that students can improve the skill of visioning. And students opines that the practice sessions were very helpful for them to vision about their future. *"Even though I had plans for future which was not set in proper way, this exercise helped me to set my goals for the future in a systematic way and now I could vision myself where I will be in the next 5 years".* Student 4, Learner Document

Students were given opportunity to vision with farmer to create a vision for case farm and the activity was reported effective.

"Also, as a part of this (visioning), we went back to (name of farm and farmer) farm to have a joint vision with the farmer. That experience was so good, where we shared our vision with him and (it offered an opportunity) first one of a kind in my whole life to make a change in some other person's future vision".- Student 4 (Learner Document)

Rich pictures can be used to depict joint visions, and this can give clarity of future scenario. Students experience this as a fruitful activity.

A rich picture of the vision about the farm was drawn after the field visit. This was a group work. The farmer's vision as well as our personal vision about the farm were combined and illustrated using a rich picture. This helped in expanding my vision and to understand how this vision could be illustrated in a way that could be understood by all.

Based on the experience on visioning, students have highlighted the process of visioning. "Visioning is the process of developing ideas for future based on insights and thoughts. These are developed on the basis of past experience, previous knowledge, awareness about the current situation"- Student 5 (Learner Document)

Visioning exercise has created a positive attitude and confidence in students, which enabled them to think about their dreams, and make a plan of action to achieve the same.

"Being imaginative is not a sin. It helps us to think what you want to do for the future years, how it can be achieved and how you stand in life after some years etc. Visioning helps to create a concrete image of our desired future. Visioning exercise helped me to think about my life and career and I am practicing this method in all applicable fields".(Student 7, (Learner Document))



#### 11.4.2.2.2.4 participation (engagement)?

According to students, participation took place at two different levels,

- Engagement with peers (participation in group activities)
- Engagement with farmers (participation at case farms)

Most of the educational activities were done as group activities. Peer learning was encouraged to improve quality of learning. And students opined group learning sessions as interesting and useful. Peers helped each other to stay motivated and complete assignments and in the learner document they have elaborated on the process as follows;

"We had to write a client document for the farm after studying the farm. It was (name of group member) who pushed me to start writing, every time. We divided the content amongst us, later we reviewed each other's portion (writing), added our points, or deducted some points. Thanks to her calls, we completed the document within the time limit".- Student 3 (Learner Document)

"Group activities are a good chance for interaction and sharing. Working as a group helps to gain more knowledge rather than reading a long theory. Group works helped me a lot to understand our strength and weaknesses that I never recognised before; ...by leading to cocreation of knowledge"- Student 4 (Learner Document)

"The course began as dialogue between the facilitator and the learner, rather than a monologue. The course focused on peer learning and co-creation of knowledge".-Student 4 (Learner Document)

Students visited case farms twice during the course. They started with an observation walk in the farm, and then jointly reflected on their observations. Later students interacted with farmers and participated in farm activities. Students learned from farmers practical tips for farming such as making organic manure etc.

"After the observation we sat together to recollect the individual observations and tried to made reflection based on that. We documented our group's observations and reflections and we made interview questions to understand more about the farm".

#### Student 6 (Learner Document

"Now it feels like we belong there (case farm). It was nice interacting with them (farmer family) and being part of some of the farming activities" Student 3 (Learner Document

"His (Farmer's) enthusiasm towards farming was really appreciable. Even though I had interviewed farmers during PG project, it was the first time I interacted with whole family of a farmer, which was a totally different experience and I think it will help me a lot in my future research works to hear out from people with immense patience" Student 6 (Learner Document

"He wants each and everyone have a terrace farming setup to cultivate vegetables for meeting our daily needs. He taught us to make organic manures like Jeevamrutham and Muttamisrithm and its application". Student 7 (Learner Document



#### 11.4.2.2.2.5 dialogue?

Dialoguing is one competence that all of the students mentioned in the reflection journal. According to students, they were never aware of dialoguing as a competence to do research and student testimonies that,

*"I have never imagined of dialoging, being taught as part of a research workshop" Student 6 (Learner Document)* 

Students understood the difference between debate and dialoguing through the practice sessions. They feel that listening to peers is very important in effective dialoguing.

"The activities on dialoguing gave us the idea about what is an effective dialoguing and how it is different from debates. We always try to win an argument; we don't even care about what the other person says. The sessions on dialoguing helped us to change that, it also showed that we have to be non-judgmental and should have all the ears to hear what the other person want to say" Student 2 (Learner Document)

Dialoguing has been highlighted as a significant competence to have participatory approach to learning since it makes communication with peers meaningful. Here, reflecting after listening is considered an important technique to improve the quality of dialoguing.

"After listening, being silent for a moment to think on it and then reflecting can do wonders. The session highlighted the relevance of having a participatory approach towards learning. This particular session is of much relevance for me as it taught me the difference between debate, discussion and dialoguing. It helped me to interact with the peer learners effectively, listen to them without being judgmental and without directly reaching a conclusion myself". Student 5 (Learner Document)

#### 11.4.2.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

Students opined that they have gained the ability to think holistically, as they familiarised with agroecological concepts and the group consisted of students from diverse academic background. This is evident from the reflection journal where they tried to see the macro aspects related to the course as well as issues related to sustainability.

"Sustainable farming demands the participation of the academic community as the bearers of information and skill sets, for the betterment of farmers. All the participants (in the course) were unique and were contributing different ideas regarding the same topic depending on their reflective capacity" – Student 1 (Learner Document).

Along with analysing the peculiarities of course, students became more aware of the concepts related to agroecology and sustainability. They claimed to understand the need for holistic thinking and participatory action to bring in sustainability. Student states that,



"Holistic approach towards learning is the key element of the course. The course provided me with an idea of what agroecology is and how it will lead to a broader concept of sustainability. Action research method is the best way to understand more about the concept as rather than discussing things in a class, working closely with the nature helped me to understand the interconnectivity" -Student 2 (Learner Document)

## 11.4.3 Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education

#### 11.4.3.1 Methods of data collection and analysis

#### 11.4.3.1.1 Teacher reflection document

Reflection documents were prepared by teachers (course facilitators and mentors) in charge of each educational activities. But, perception of other stakeholders (farmers) was not collected in written format, as farmers were not well trained to write such reflection documents and they didn't turn up for reflection workshop. Facilitators talked to farmers during field visits, and those insights were included while writing reflection notes relating to 'conduction of case work'.

#### 11.4.3.1.2 Course reflection focus group/interviews

At the end day of course, other than the final questions, a FGD was conducted to understand the student experience of learning process. The discussion points included,

- a) How do you (students) experience the learning process with respect to,
- New learning arenas
- Teaching aids used in the course
- Literature provided
- Assessment mechanism used
- b) What were the supporting and hindering forces in the learning process? Students shared their experience and notes were taken by mentors.

On the next day a reflection workshop was conducted in which mentors and facilitators participated. The template for reflection workshop was used for the workshop. Course was rated in accordance with the 'next food intended shifts' and supporting and hindering forces in bringing in in each shift were discussed. Here, we used reflection logs written each day, for deciphering the supporting and hindering forces related to each educational activity/intended shifts. Points were collected as a written document from each participant.

#### 11.4.3.2 Results

During the reflection workshop and FGD, supporting and hindering forces related to each intended shifts were discussed, and, the points high lighted by both students and teachers are used to write the results. Also, points from 'Final reflection workshop' has been included.



### 11.4.3.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

#### 11.4.3.2.1.1 From lecture hall to a diversity of learning arenas

11.4.3.2.1.1.1 Supporting forces and how to build on them

New learning arenas were successfully incorporated in the course. The supporting factors include,

Open mindedness of the team: Alumni students cited the static nature of the course since 2018 and suggested to incorporate new educational activities. And this criticism was taken positively. Being accommodative to criticism and encouraging participants to come up with new ideas are very important in introducing new learning arenas.

Ability to make joint decisions by the team: When new learning arenas were discussed during planning workshop, everyone agreed to the decision, and took responsibility to implement it. Sharing responsibilities in the team is much needed if new learning arenas are to be experimented, as this demands more labour from existing members.

Support from University administration: Office administration agreed to set up a model farm in the Department and this support is essential in implementing intended shifts. Maintaining good contact with the administration is very much important in this.

#### 11.4.3.2.1.1.2 Hindering forces and how to deal with them

Covid Restrictions: Restrictions as a part of covid 19 pandemic was a threat in successfully introducing new learning arenas. Forecasting the threat, an online curriculum was developed, so as to supplement some of the educational activities, if offline classes are not allowed.

Hostile climate: unexpected rain during initial week of the course made farming activities impossible. Climate resilient options for field participation (participating in poly house farming/ terrace farming) has to be implemented.

#### 11.4.3.2.1.2 From lecturing to co- and peer learning

#### 11.4.3.2.1.2.1 Supporting forces and how to build on them

Keen observation by mentors: Mentoring improves peer learning. Suggestions from mentors based on observation of group activities can improve quality of peer learning. For instance, frequent shuffling of groups can improve the quality of interactions. Providing training to mentors can improve quality of mentoring.

Diversity in groups: More diverse student group produces better results. When screening candidates for the course, it should be ensured that students from multidisciplinary background participate in course.



#### 11.4.3.2.1.2.2 Hindering forces and how to deal with them

Conflict in groups: Ability to balance individual and collective opinion is very important in promoting co-peer learning. From the beginning itself, students should be given an orientation so that they can understand the importance of peer learning.

Drop outs: When one student quits in mid-way from the course, their entire group get effected. Inform students about the need of participating in every session, and make arrangements accordingly, if a student genuinely need support.

#### 11.4.3.2.1.3 From syllabus to supporting literature/ diversity of learning sources

#### 11.4.3.2.1.3.1 Supporting forces and how to build on them

Adaptive learners: Learners easily adapted to the nature of the course. They were not provided with a fixed curricula and most of the sessions were activity based, but students tried to cope up with the new learning technique. Appreciating efforts of students/ innovativeness is important in introducing diverse learning sources.

#### 11.4.3.2.1.3.2 Hindering forces and how to deal with them

Difficulty in understanding/differences in academic knowledge level of students: There was an observed difficulty in adequately understanding the concept of agroecology using supporting literature, because learners were from diverse background. Allowing more time for students to read articles and giving them e a second chance to present review.

#### 11.4.3.2.1.4 From textbook to a diversity of teaching aids

#### 11.4.3.2.1.4.1 Supporting forces and how to build on them

Technical know-how of facilitators and students: Technical know how made it easier to use educational applications to introduce concepts and practice skills. Students were enthusiastic to learn software applications and online tools. Creating a repository of online tools/ facility for students to practice the tools can help in effectively using teaching aids.

#### 11.4.3.2.1.4.2 Hindering forces and how to deal with them

Time and resource constraint: Innovative teaching aids demand more time and resources. Mobilising more resources (improving quality of infrastructure) can be a solution to this.

#### 11.4.3.2.1.5 From written exam to a diversity of assessment methods

#### 11.4.3.2.1.5.1 Supporting forces and how to build on them

Originality of student reflection documents: the reflection documents submitted by students are original and in accordance with guidelines provided. Good quality of these documents itself shows the success of the course. Giving an orientation to students



on how to write reflection journal and recurrent reflection sessions can further enhance the quality.

#### 11.4.3.2.1.5.2 Hindering forces and how to deal with them

Lack of specific criteria to evaluate student reflection journal. Its important to create a guideline for evaluation.

#### 11.4.3.2.1.6 From lecturer to learning facilitator

#### 11.4.3.2.1.6.1 Supporting forces and how to build on them

Team work: good communication and organisation within the team is very important in materialising the intended shift of being a facilitator. Developing a good work culture and focusing on capacity building can reinforce this transition.

#### 11.4.3.2.1.6.2 Hindering forces and how to deal with them

Getting acceptance to the concept of 'facilitator' from colleagues: Many lecturers in the University see this shift with hesitation and criticise the independence given to students. It is important to bring in attitudinal shift among lecturers for the smooth conduction of educational activities in the campus.

#### 11.4.3.2.2 What such a change requires from teachers, students, and institutions

During the reflection workshop requirements from teachers, students and institutions were discussed. And major points include,

Requirements from teachers,

Shift in mindset- Understanding the shortcomings of conventional education and accepting the need for new educational pedagogy is essential for materialising the intended shifts.

Capacity building: Being a facilitator requires new set of skills and competences and teachers have to get training to take up the responsibilities of a facilitator.

Redefining the learning space- Infrastructure, behaviour and norms in the learning space has to be redefined, through constant dialoguing and interaction so that a new classroom/learning culture can be developed. This quintessentially demands change in mindset of teachers to recognise the contemporary developments in education and research.

Ensuring participation of non-university actors: Action learning will not be possible without the participation of non-university actors. So, it is important to enter into joint activities that are mutually beneficial. And here facilitators have to show perseverance to build long term relationships with non-university actors.

Requirements from students:



Having clear learning goals and positive attitude to initiate self-directed learning.

Readiness/enthusiasm to work in groups and learn from each other.

Being active learners: Students have to play an important role in reaping maximum benefits from the flexible curriculum by suggesting relevant topics for lectures/ discussion or other educational activities.

Multi-dimensional thinking: Students should have open mindedness to share their experience to those who are alien to the subject and think muti-dimensionally.

Respect and appreciate the contributions of non-university actors and being empathetic to them.

Requirements from institutions:

Change in mindset to experiment new innovations in education and research

Recognising academicians/project partners who brings in change in existing education system

Providing departments/projects managerial autonomy.

Introducing flexible/ innovative assessment mechanism.

Resource allocation according to the innovativeness of projects.

Eliminating red tapes for academic collaboration. Proposals are vetted at different administration levels resulting in long delays in obtaining sanctions

#### 11.4.3.2.3 Teachers' perception of the greatest challenges to achieving such a change

Teachers have raised challenges related to both functional and structural aspects. When it comes to functional aspect, running the course along with conventional courses at the University, creates a double burden on teachers as on the one hand, they have to lecture in conventional courses, and have to prepare more intensely to act as facilitator in action learning course, since it is offered as a add on certificate course. Both conventional courses and action learning course demand largely different attitude, skills set/competence and timing. This duality effects the quality of classes and teachers are faced with hectic work schedule. This creates issues in scheduling course activities, conducting continuous assessment and even in ensuring availability of classrooms. If the intended shift, (that the teachers were able to initiate) has to sustain, teachers need support from institutional authorities and other stakeholders. A change in attitude, flexibility in responsibility sharing, freedom to take functional decisions should be ensured for teachers. Here, ensuring additional infrastructure and resources, training new/ junior staff, expanding already established acceptance of the approach, networking is very important.

11.5 Concluding remarks on the case development since the previous reporting



#### 11.5.1.1 The most useful and inspiring experiences (supporting forces)

We were able to conduct an effective planning workshop including facilitators, farmers, and alumni students and most of the decisions taken in the planning workshop were executed during conduction of the course such as introducing new learning arenas, including new case farms and exposure visits. Feedback session (FGD) with students was inspiring, as students shared their experience of learning process, in which they explained how each educational activities helped to develop particular competences, and to what extent they found the new approach to learning useful and inspiring.

#### 11.5.1.2 Main obstacles/challenges encountered (hindering forces)

Restrictions due to spread of covid 19, hostile climate and interference with conventional class timings were the major obstacles in conducting the course. Also, lack of active participation from non-university actors, especially farmers, compromised quality of certain programs. For instance, farmers were not present in reflection workshop and even though a training program was planned for farmers it didn't materialise.

#### 11.5.1.3 Lessons learned from the inspiring experiences and from dealing with the challenges

Importance of planning in conducting the course, especially including all stakeholders was the most important lesson learned. Quality of Nextfood approach depends on, to what extent we are able to bring together diverse stakeholders and develop a plan to act together, so that knowledge can be cocreated, which is beneficial to all parties. While dealing with challenges, ability to take next best alternative solution, seemed important. The challenges were external to the case, and the team tried maximum to handle these challenges with resources at stake.

#### 11.5.1.4 Plans for how to move forward into the next cycle

Centre for Agroecology and Public Health is determined to continue with the course, as it received recognition from university and there is demand from students to join the course. The course hopes to make use of the Nextfood tool box for technical support. Other plans include, offering the course in online mode and offering the course as a credit course to affiliated colleges so that graduate students can participate.

#### 11.5.2 4.2 Reflections towards the end of the Nextfood project

#### 11.5.2.1 4.2.1 What has been accomplished to shift from theory to phenomenon (experience) in agrifood- and forestry systems as the starting point for the learning process? Experience, as the starting point for learning process happens at two levels;

Firstly, conduction of 'Certificate course on Agroecology: action learning and education' places '**case farm' at the core of the course**, and all educational activities are centred around observing, analysing and creating visions for the 'farm case', in accordance with principles of agroecology. This includes,



- Practicing transect walk to sharpen observation and reflective thinking. During the first day of field work students conduct transect walk at fields and explain present situation of the farm.
- ✓ Reflective photography is practiced at the class to enhance reflection based on a given theme, this helps students to do theme-based documentation of farm.
- Dialoguing sessions at the classroom, enhances communication skills of students, and this helps students to create a rapport with farmer and his family, and to collect information from farm, so as to analyse sustainability aspects of farm.
- ✓ Visioning sessions make students capable of conducting joint visioning sessions with farmer and design short term and long-term sustainable development goals for the farm.
- ✓ Literature sessions and interactive sessions with experts provide students the theoretical underpinning of the phenomenon (the farm case) and to link it to sustainability issues.

This learning process became feasible because of,

- ✓ Selecting limited number of students
- ✓ Selecting students from transdisciplinary background
- ✓ Incorporating alumni and farmers as facilitators/mentors
- ✓ Conducting a planning workshop before the course to determine curriculum
- ✓ Keeping a flexible curriculum and time schedule
- ✓ Collecting feedback from students and conducting FGD at the end of the course
- ✓ Dividing students into groups based on personality traits/talents
- ✓ Getting administrative sanctions without delay
- ✓ Knowledge dissemination activities- conduction of symposium and workshops
- ✓ Associateship with stakeholders in a mutually beneficial way

Secondly, being a case in the Nextfood project itself act as starting point for experiential learning; the cyclical and iterative process of learning and research where 'experience of KU case' as a phenomenon echoes action learning pedagogy. All activities as a part of the project,

- ✓ Exposure visits
- ✓ WP2 meetings
- ✓ Peer learning activities- Subgroup meetings and interactive sessions
- ✓ Contribution to research documents



refines the KU case to improve over each cycle and understand the approach better.

# 11.5.2.2 What has been accomplished to shift from transmission of knowledge to the development of key competences needed to support sustainable development in agrifood and forestry systems?

Courses at University of Kerala adopts theory- centered learning with lecturing being the instructional method and written examination being the assessment method. Even though continuous evaluation system and student assignments exist the system doesn't promote transdisciplinary, participatory, and experiential learning. With a vision to create an alternative to this, the Certificate course on Agroecology: Action Research and Education was introduced. The course aims to develop skills from participatory experience to co create knowledge along with farmers and other stake holders to benefit the society as a whole to meet the challenges of sustainable agriculture.

This necessitated changing the structure of conventional classroom. During the course students were given group works, they were given the freedom to dialogue and along with classroom activities other learning arenas and teaching aids were used. This includes,

**Peer learning sessions**: Students from multidisciplinary background are parted into groups, and as they indulge in peer learning activities, following skills are improved,

- ✓ Ability to think holistically and deeply
- ✓ Respect perspectives of other team members
- ✓ Learn from each other's prior academic knowledge
- ✓ Sharing viewpoints and working accordingly
- ✓ Learn to work in teams and gain problem solving skills

Key competencies are enhanced by,

**Mind mapping**: Mind mapping is a brain storming activity. When done in groups, it helps students to think multidimensionally and helps them to express all aspects of the phenomenon.

**Rich picturing**: Rich picturing enhances skills of observation and reflection in students and students make rich picture of the selected case farm depicting present situation of farm and future situation of farm.

**Academic writing**: As a part of the course students write client document, reflective journal and response paper. Students are given training for polishing the skills of academic writing.



Hands on training for **qualitative and quantitative data collection and analysis**: Analysing and interpreting the case farm necessities knowledge of data collection and analysis. Students are given training for this which they use during field work.

Power point presentations, photo novella presentation and IGP (Individual, group, plenary) discussions improved **communication skills** of students.

**Visioning exercise** at classroom and at field enhanced competence of visioning and interactive sessions with experts provided clarity to the visions as they provided theoretical underpinning to the phenomena they observed. Thus, major aim of the course was to enhance the skills of students and the experiential learning approach improved student competences. Initial and final assessment of competences provided students an opportunity to reflect on the level of competences and the initial questions, related this reflection to the sustainability aspects. The answers helped facilitators to plan each activity accordingly. Similarly, interaction with non-university actors instilled competence to deal with the real-life situations, and along with theoretical knowledge, the course succeeded in enhancing student competences and the learner document provides enough evidence for the same.

Certificate course on Agroecology and Action research, when it was introduced in University of Kerala, was a maiden initiative, that provided an alternative to the conventional education system being practiced in the University. Successful conduction of the course over the past years has transformed attitude, skills and knowledge of all stakeholders.

#### Facilitators and mentors:

For our team (consisting of facilitators and mentors) being a part of Next food project and implementing the activities over these years,

**Enhanced confidence regarding scope of action learning pedagogy**: Introducing experiential learning activities at the University, specifically as a part of Department of Economics, was a challenge to us, since, initiating interdisciplinary learning and research paused procedural delays, and inductive approaches to learning was never experimented due to resource constraints and attitudinal dilemmas. We were able to solve both of these issues by starting a Centre for Agroecology and Public Health, were a bunch of academicians, students and other stakeholders, who are passionate about popularising experiential learning can indulge in activities to promote inductive approaches to learning vis a vis agroecology. This experience enhanced our skills and confidence to be a change agent and envision participatory learning at university. We learned that having a vision and developing an action plan can help in replacing conventional notions related to education and research and clarity in proposals, continuous follow up and creating interpersonal relations can help in reducing procedural delays.



**Increased knowledge and awareness:** Nextfood educational approach to learning opened new arenas of knowledge regarding the subject of agroecology as well as the learning pedagogy. In addition, it instilled a sense of awareness that helped us to think beyond the boundaries of academic knowledge and interact with the non-university actors. This opening up to see the world around us has invariably improved the quality of research.

**Gaining the skill of facilitation**: A transition from teacher to facilitator was a difficult one; but learning the skill of facilitation enhanced the skills to interact with students and inspire them to become life long learners.

**Good work culture**: Training students to gain competences and soft skills has enriched the skills of facilitators as well; the five competences stressed in Next food approach- observation, reflection, participation, dialoguing and visioning- has helped in improving the work culture as team work, cocreation of knowledge and values form an important part of the approach.

Attitude to experiment: the approach provides space for experiments to suit the regional peculiarities; and this has helped to experiment with new learning arenas, teaching aids and assessment methods, which in turn resulted in improved quality of course as well as enhanced an attitude to think differently and experiment new techniques.

#### Students:

**Familiarising new learning pedagogy**: Most important impact of the project is that students got familiarised to action learning pedagogy, and this has enhanced,

Communication skills

Ability to work in groups

Think multi-dimensionally

To become lifelong learners

To gain skills and competences

To familiarise new learning arenas and teaching aids

To think critically

To be empathetic to stakeholders- to interact with farmers and appreciate their contributions

To practice peer learning techniques

To gain knowledge



To be agroecologists (agents of change)

**New direction for research**: many of the alumni students has chosen topics related to agroecology/sustainability for their PhD. Understanding the importance of agroecology has made students to choose relevant research topics, and to experiment with qualitative and participatory action research techniques. For instance, alumni students have chosen research topics such as 'Urban Greenspace Utilization for Agriculture: An Analysis from a Behavioural Economics Perspective,' 'Agroecological aspects of Pokkali Farming', Agroecological Transition during Covid times : An analysis of nudges, and strategies etc.

#### **Other Stakeholders:**

Farmers: Farmers were the prominent stakeholders in the activities;

**Establishing an associateship with farmers**: The activities over the past years revealed the significance of farmers in experiential learning. Farmers acted as facilitators during filed visit, interacted with other farmers, students and experts as a part of the course. Centre succeeded in creating a long-term association with farmers, as students positively contributed to farm development and farmers enjoyed respect and acceptance. Honouring farmers at university and recognising their achievement in front of academic community enhanced confidence of farmers.

**Recognition from University Administrators**: Dialoguing with administrators and disseminating research output has made attitudinal change in administrators. They started to recognise the course and exhibited the project as an innovative experiment in the 'Self Study Report' submitted to the NAAC (accreditation agency). The project also received 'Best Project Award' from university, which shows the positive attitude of university administrators towards experiential learning. University has given approval for introducing Action learning course in Agroecology in affiliated colleges.



#### 4.2.3 What are the prerequisites for making a successful shift?

Based on the experience of planning and implementing Certificate course on Agroecology, the prerequisites for making a successful shift from theory to phenomenon is creating human, social, physical and knowledge capital, with the resources at stake, by taking feasible decisions. And in the process following steps are involved,

- Building a team who believe in experiential learning pedagogy
- Capacity building/Training: Understanding the current system of education at institution, and identifying the suitable format (of course) to introduce pilot programme
- Acquiring managerial autonomy (since action learning requires immediate and innovative decisions)
- Establishing a system for action learning facilitation
- Networking sustainability

Team: Building a team with the following features is the first step towards making a successful shift. The team should have,

- · Like-minded individuals having shared vision of implementing the shift
- Members with complementary skills
- Members with emotional intelligence (since dealing with multi-stakeholders)
- Positive workplace culture (ethos and values, collaboration and communication, inclusive, clear goals and rewards)
- Diversity Inclusion of Non university actors
- Flexibility in functioning and ability to facilitate.

Capacity building: it is important to enhance the competence of team through capacity building activities such as,

- Workshops and training programs for team members
- Skill development programs to enhance green skills and soft skills through practice sessions
- Developing the value system in team members through field exposure, meeting with multi stakeholders
- Identifying abilities of team members and division of labour according to talents
- Establishing SOP (Operating procedures) for smooth functioning.
- Resources- identifying, mobilizing and utilizing resources (human and physical infrastructure)



Plan a Pilot course (structure and nature) before launching the course extensively;

Decide upon the following features of the course;

- Target group and eligibility students/farmers/ professionals /others
- Tenure- semester/ year
- Nature- Online/offline/ others
- Level- undergraduate/graduate/PG
- Themes/modules/teaching aids or tools/learning outcomes/teaching materials/accreditation
- Facilitators, mentors and stakeholders
- Assessment credits/ grading/ evaluation process
- Make participants to write an 'expression of interest' while applying for the course, so that attitude and expectations can be considered while making admission decisions.
- Use 'initial questions' in the Next food model so that their current knowledge, skill set and background can be assessed while deciding the educational activities.
- Group division: students from diverse disciplines in one group
- Introduce educational activities that are helpful for students to realize peculiarities of their team members, at the beginning of the course (Eg. Identifying commonalities in observation practice of students from multidisciplinary backgrounds).
- Plan educational activities that make students appreciate multi-dimensional thinking.
- Keep a flexible curriculum where students can suggest topics for lectures/ discussion or other educational activities
- Arrange peer learning sessions where students from a particular academic background can share their experience to those who are alien to the subject.
- Adjust the timeline of educational activities accordingly for individual students, as previous educational background can be advantageous for one and hindering force for the other.

Experience as starting point of course : Practical Tips

- Choosing the right approach (a model to adapt to, like Next food)
- Thorough knowledge of real life situations filed visits, add on programmes, dialoguing with stakeholders
- Identifying non university actors and building rapport with the stakeholders



- Choosing a case that resembles reality as the centre of the course
- Identifying new learning arenas (and getting permissions to implement it)
- Developing/Adapting teaching aids

To ensure participation of Non university actors, the following strategies can be helpful;

- Orienting non-university actors: Giving orientation to non-university actors prior to the course is essential to make them understand their roles and responsibilities.
- Including non-university actors in the planning workshop: Inputs from these actors can help in refining curriculum to include 'real life contexts.
- Make students aware of the contributions/work/ achievements of nonuniversity actors before assigning joint sessions with non-university actors.
- Highlight mutually beneficial outcomes of association, and clearly state nature of expected benefits enjoyed by the actors.
- Include regional language as medium of instruction, if the non-university actors are not familiar with English (medium of instruction at university) and translating relevant documents to regional language will be helpful.
- Develop long term relationship with non-university actors by entering into joint activities other than course, by which competence and attitude of the actors can be improved.
- Honor/acknowledge contributions of non-university actors.

Managerial autonomy: Achieving managerial autonomy is important for a successful shift. For this, identifying suitable managerial structure (centre/project modes) is important. Similarly, overcoming red tapes by convincing University authorities about the advantages of action learning courses and ensuring needed permissions is necessary. Along with this, follow up of files and establishing effective documentation, entering into mutually beneficial decisions, gaining confidence and trust (awards and recognition), and ensuring transparency and accountability (auditing) are very much important.

Establishing and effective system of functioning with feedback from students, university officials and project partners are necessary. Work Division with regard to academic, research and administrative responsibilities can improve quality. Networking with stakeholders and conducting programs that benefit non university actors too, other than purely academic oriented program can ensure participation of all. Alongside, refining the system whenever needed, based on the feedback (course structure, work responsibilities, role of stakeholders) is important to make successful shift.



## 4.2.4 What is your concrete advice on the shift from simple knowledge transmission to the development of key competences?

Shift from knowledge transmission to the development of key competencies can be realized with,

- ✓ Triggering attitudinal shifts
- ✓ Developing Infrastructure
- ✓ Facilitation
- ✓ Practice sessions
- ✓ Experimenting in real life situations
- ✓ Mobilising Resources

Attitudinal shift: Attitudinal shift can be made through creating awareness by,

- Understanding knowledge creation doesn't automatically bring in assumed change in the world and by recognising significance of non-university actors
- it is not a monopoly of teachers
- Learning doesn't mean capacity to memorize and reproducing it during exams, a student need other skills and competence that are essential

Infrastructure:

 Competence enhancement requires good infrastructure compared to conventional classroom, spacious room / facility for conducting parallel sessions (when more students are there), arrangements for group sessions smart class/ e-resources/ library /electronic gadgets /space outside classroom and more financial resources (for field visits, equipment, stationary)

Facilitation:

- Stimulating an attitudinal change in participants, so that they are able to appreciate participatory learning techniques and co-creation of knowledge, by which conventional teacher-student roles are redefined.
- Improved understanding of participants regarding the background of stakeholders and significance of their contributions can enhance quality of interactions
- Ice-breaking session to familiarize participants with facilitators at the beginning of the course.
- Improvement in non-sector specific skills such as personal management skills, team working and interpersonal skills, and fundamental skills.
- Practice/reflection sessions for all stakeholders
- Developing a clear vision of learning outcomes and preparations before sessions

Practice sessions for competences such as observation, reflection, dialoguing, visioning and participation

• Audio/video/power point presentation/rich picturing/mind maps/ interactive learning tools to introduce new competence to participants



- Sharing personal experience (as examples to convey significance or use of competences) of facilitators/ mentors with participants
- Competence practice sessions in classroom using IGP model
- Providing supporting literature to know more about particular competence
- Competence practice in real life situations (Joint visioning with farmers, observation sessions in farm, dialoguing with stakeholders, participate at filed, reflection of daily life events)
- Reflect and write their experiences of practicing competences in a daily log and reflective document

Experimenting in Real Life Situation

- Exposure to real life scenarios and opportunity to use it (For instance, how the competences can be used for PhD, or in career/social enterprise)
- Sharing experience of alumni (who practice competences in their life)
- Mock situations for practice/ mock tests
- Introduce new educational activities to enhance competences
- Knowledge dissemination (linking with similar initiatives)

Resources: Creating financial resource, human resource and social capital (practicable only with support from community) are very important.

#### 4.2.5 What is your main challenge?

[Here, you can copy in the challenge that you agreed upon during the workshop to be the main challenge for your case.]

Sustainability and development: These are related to upscaling of the course; there are constraints related to,

- ✓ Training new staff, once the persons who were involved in initiating the course leave for permanent positions
- ✓ Lack of beneficial input to farmers, since the centre belongs to Faculty of social science.
- ✓ Lack of managerial autonomy.

### 4.2.6 What are the three best ideas from the workshop for how to deal with that main challenge?

1. Using the new criteria for accreditation of courses at university to upscale the course

Sustainable way to upscale the course: Only if the course get accreditation from university the course can be conducted permanently as a credit course. New way to convince: Till date, the idea was to convince University by conducting certificate course by collaborating with other institutions as, the assessment mechanism for course was not adaptable to university accreditation systems.


Appealing: Developing the Next food curriculum, in accordance with new criteria for accreditation of courses (that provides autonomy for teachers to decide up on components of continuous assessment) is appealing. Possible: University, in the new criteria has adapted 'outcome-based education' and flexible assessment mechanism, so that upscaling of course as

'credit course' is possible.

- Involve students as facilitators and teaching assistants, to prepare them for stepping in when others leave.
   The idea is sustainable since, students with an experience of undergoing the course on action learning will have the passion to take the course forward. And it seems appealing since we are already conducting mentoring system successfully, where alumni students support participants. Compared to recruiting fresh staff, training students as facilitators is easier.
- 3. Involving farmers, field experts and other colleges.

Upscaling will be possible in long term only if the course is popularised, in which introducing it to affiliated colleges is very important. Currently, farmers are not involved to the threshold level, if it happens, it can create a new educational movement. And, such an involvement is appealing since quality of the course can be improved. Already we have experience of working with farmers, so deepening the relationship is possible.



### 12 Case 13: University of Chile

#### Authors: Claudia Rojas

Contributors: Osvaldo Salazar, Andrés Muñoz, Ricardo Pertuzé, Gabriela Lankin, Francisco Nájera.

### 12.2 ID card

#### Course title, level and language

"Linking agroecology with society", postgraduate course, Spanish.

#### Course learning goals

Understand the meaning of linking Agroecology with society as a way to contribute to human well-being and the sustainable development of Agroecosystems.

Develop a diagnosis and proposal for improvements in an agroecological system through participatory research.

Develop personal commitment and dedication when interacting with social actors and the teaching team, strengthening relationship skills in different cultural and/or community contexts.

Effectively apply action learning in order to holistically approach practical work in teams and with social actors.

#### Host institution(s) and course leader(s)

Host institution: Faculty of Agricultural Sciences, University of Chile.

Course leaders: Claudia Rojas, Andrés Muñoz, Osvaldo Salazar, Gabriela Lankin, Ricardo Pertuzé, Francisco Nájera.

#### Timeline of the activities covered in this report

Preparation of the course: June – August 2021

Implementation of the course: From August 20<sup>th</sup> – December 3<sup>rd</sup> 2021 (Spring Semester).

Reflection on the experience: January 2021

#### Learner categories and number per category (demographics)

The course was composed by 6 Chilean students, from 25 to 29 years old:

- 3 students in the fifth year of the University of Chile undergraduate program "Agricultural Engineer"
- 2 students (one from fourth and one from fifth year) of the University of Chile undergraduate program "Renewable Natural Resources Engineer".



1 student (second year) of the University of Chile postgraduate program "Msc. In Territorial Management of Natural Resources"

#### Stakeholder categories and type of involvement

Stakeholders involved:

Farmer: in transition towards agroecology. He has been always a farmer, lives in the country side of Santiago, and grows a farm of 2 Ha, renting the field to grow during the spring-summer season. His involvement during the course consisted in allowing the course participants to visit his farm and observe the management and processes occurring during his work.

Agronomist: she works in and Agroecological Foundation called "Fundación Origen", it has over 30 years of experience in Agroecology, and has developed a model of education, tourism and food market. They also let us visit their accommodations and observe the processes of the agroecological farm.

#### Shortlist of learning arenas

- Online lectures where the learners listen to teachers and participate in exercises. Sessions last for 1,5 to 3 hours.
- Field visits. Learners are given tasks on-site to solve together with stakeholders. One day, three visits in total.
- Casework between the students. Students met to work on their case reports. Three to four hours.



### 12.3 Extended summary

#### 12.3.1 Research results since the previous reporting

#### 12.3.1.1 Students', teachers' and other stakeholders' experiences and learning

During the development of the course "Linking agroecology with society", virtual sessions, field visits and group work among the students were done. The sessions highlighted the importance of addressing the problems we face today in agrifood systems, through inter and transdisciplinary approach. Also considering the importance of forming interdisciplinary work teams. Students are more conscious on recognizing and valuing different types of knowledge and the dialogue of knowledge as a tool to understand the reality of the field.

Students realized about the importance of making a good diagnosis when carrying out field work, using the skills of observation, dialogue and participation. The importance of reflection was reinforced, understanding it as a process in which experiences are linked with content.

The team is aware on the importance of conducting courses in which work is done directly and continuously with social actors (stakeholders). During the development of the case study reports, students became more engaged and wanted to be the leaders during the process, because they have the responsibility of identifying opportunities and gaps through the diagnosis, but also to give stakeholders feasible recommendations.

## 12.3.1.2 Outcome of the case development process, including effects of making the essential shifts

The case development had its first experience as a pilot course. Students manifested that they want to experience new educational methodologies, in which there is time and a place to reflect and dialogue, but more importantly, there is an opportunity to interact with the community through the field visits.

The "Tool Box", was an excellent instrument for the UCH team to adapt the content into the local context, and is a first step to move forward using this new approach.

Interdisciplinary and transdisciplinary approach were key parts of the theoretical content of the course.

# 12.3.1.3 Supporting and hindering forces for implementing the Nextfood model As main supporting forces it can be remarked:

- The good disposal of the stakeholders to participate in the course



- The motivation of the teaching team to experience a new way of teaching
- The motivation and engagement of the students.
- Promote a learning environment in which students can be inspired

As main hindering forces it can be remarked:

- The lack of time needed to successfully implement this shift and the allocated resources are not enough from the Institution
- The research centred focus of Universities (teaching is left out)
- The loneliness of the academic work (more interdisciplinary and diverse teaching teams are needed)
- The students and teachers mindset that resist new pedagogical approaches and is used to traditional education.



# 12.4 Actions taken and data on the development of the case since the last reporting

#### 12.4.1 Actions taken since the previous report

#### 12.4.1.1 Planning

In December 2020 the UCH team organized a workshop with NMBU and the project coordinator. The aim of the meeting was to introduce teachers from the program into the concept of action learning. It was an interesting and fruitful opportunity, to give the first step as a Case Study. After the approval of the European Commission Coordinators to include the Msc-program in Agroecology as a Case Study in the project, UCH took part in official activities organized by WP2. The Msc. In Agroecology has not started yet, because is still on the process of approval from the Central Services of the University. It has been a long way and there are still details needed from the Postgraduate Department of the University of Chile.

That is why the idea of running a pilot course, during the second semester 2021 (August-December), was born. The course "Linking Agroecology with Society", is part of the proposed Msc. Study program, and is a mandatory course. This course seeks the linkage between students and social organizations through team and interdisciplinary work.

The original plan, was to follow the recommendations of the D.2,2 Action-Research Protocol/Master Manual, and run a planning workshop. Unfortunately this was not possible due to Covid restrictions during the months previous to the second semester (June-July). In that context, the only possibility was to hold it online. In that scenario, the UCH team decided not to run it, so we organized a meeting between the program coordinator, the Faculty of Agricultural Sciences Postgraduate Director and a member of the Academic Committee of the program, to think about a possibility to implement the NF approach during the Spring Semester of 2021. In this meeting we discussed the following:

- 1. Made a revision of the original program presented in the Msc. Agroecology proposal.
- 2. What to include in the course program, considering the NF approach: in this point we discussed the importance of including the 5 core competences of the NF approach.
- 3. It was defined that it would be a postgraduate course, with a small number of participants (8-10 students) considering the restrictions of the Sanitary Conditions due to COVID-19.
- 4. It would be run online considering two field visits to the stakeholders involved during the semester.
- 5. Define pre-requisite for application: students must have to approve the undergraduate course "Agroecology and sustainable food-systems".
- 6. Define the course coordinator and the steps to follow: present the course and the program to the Postgraduate Council, dissemination of the course with



students, define the participants in the course (teaching staff and stakeholders).

#### After the meeting:

**Development of the program**: This had to be adapted into the programs template provided by the Postgraduate School. The program details are in Appendix 21.

**Presentation of the program to the Faculty of Agricultural Sciences Postgraduate School Council**: At the end of June (June 29<sup>th</sup>), the course was presented to the Postgraduate Council for its approval. The presentation included: the course description, aims, content, methodology and assessment. The council approved the program.

**Course dissemination**: before the implementation, the course was disseminated among students through a flyer in social networks, e-mails and through the educational platform used in U.Chile (U-Cursos):



Figure 64: Flyer used for the course dissemination.

**Contact and invitation of stakeholders to participate in the course:** considering the sanitary context, we look stakeholders who worked near the University facilities, in order to facilitate the practical aspects of the field visits. That is why we contacted two actors who lived in a rural sector of the Metropolitan Region, called Pirque, which is situated approximately 17 km away from the Faculty. One of the collaborators have worked in the zone, so he provided the contact telephones. Then, the course coordinator contacted them to ask if they were willing to participate in the course allowing the students to visit their farm/facilities. The stakeholders agreed and had a very good disposal to contribute along the whole course.

The participants in the course can be resume in the next figure:





Figure 65: Participants in the course.

#### 12.4.1.2 Implementation

The course was developed in a hybrid mode, due to the pandemic context. In that sense, all the Universities of the Country, were only running virtual classes until the end of 2021. For the second semester, and taking into consideration the improvement in the sanitary conditions of the pandemic, the Faculty of Agricultural Sciences developed a protocol where some critical activities could be executed in presence. Thus, the implementation of the course will be presented under the following way:

<u>Online Class Sessions</u>: The online class consisted in a presentation of a teacher, followed by an exercise related to one of the core competences of the NF approach. The classes where distributed in the following way:

• Session 1. Introduction to inter and transdisciplinary studies in agroecology.

During this session we made a general introduction of the course, making a short presentation on the NF approach and the 5 core competencies of action learning. We asked students to present themselves and to tell us about why they were interested on participate, and their expectations on the course. Then, the teacher (agroecologist) talked about the complex problems that we are facing as society, the role of agroecology in this context, and how the transdisciplinary and interdisciplinary studies play a fundamental role in this

• Session 2. Holistic understanding of agroecological systems and observation exercise. The focus of the exercise was on explaining the core competence of Observation. The "Tool Box" was an excellent starting point, because it has many exercises already developed and proved. We use as a reference the "Observation walk", but instead of making a walk, we showed the students a <u>video</u>, where the famous chef Jamie Oliver cooked a Healthy South American Brunch. After the



participants watched the video, we asked them some quick questions, in order to identify if they were capable of observing with attention and without judging. The questions were for example: how many botanicals families are in the recipe? Or, how many botanical families appear in the recipe? Name the ones you know, which processed foods listed in the recipe are plant-based? (Not fresh), what colour is the cover of the kitchen in which Jamie is cooking? Then we asked them what captured most of their attention and why. At the end of the exercise we realized that each of us observed different things. This exercise was key for the next part of the class, in which we discussed about what to have in mind before visiting the field, in order to jointly build a guideline about what to observe and ask to the stakeholders in the field. During this session we had the participation of 3 teachers: one specialist in soil sciences, one specialist in plant sciences (genetics, horticulture) and one specialist in plant health/protection (pest management). The task for the students was to prepare (jointly), a guideline to bring to the first field visit, in which they had prepared points to observe, ask, look, in order to gather the best data for the diagnosis report.

# • Session 3. Introduction to participatory research in agrifood systems and dialogue exercise.

This session was led by an Extensionist, in which she made a presentation on participative process for the transformation of agrifood systems. She included definitions, methodologies (participative research, participative rural diagnoses, tools and challenges), and case of studies (also anecdotes to chat). During the class, we facilitate an exercise, also proposed in the "Tool box", but modified to the online conditions. We wanted to introduce the competence of Dialogue. In this case we asked students to think in a time of their life when they had a really good conversation, perhaps a conversation that led them to change their mind about something. We let them 3 minutes to think about it and then we asked them: What characterized that conversation? Why was it different from other conversations?. All the participants in the session responded, and it was a pretty intimate moment, where we listen to very honest and personal answers. In fact, this exercise led the group into a meaningful and very good conversation, in which we practiced dialogue by listening without judgement.

 Session 4. Transfer of knowledge and dialogue of knowledge "experiences in the field".
 During this session, the course coordinator made a short presentation about the different kinds of knowledge linked to agroecology, in which we revised the concept of agroecology and defined it as a living concept, something interpretable and



adaptable to multiple situations. We talked about the concept of "knowledge transfer" and "knowledge dialogue". And then we had the presentation of a stakeholder he is a farmer, autodefined as neo-rural, who had not previous studies in the agricultural/agroecological field, but he learned from experience, from communities and from networks. The point of this session, was to reflect on the existence of different kinds of knowledges, and to have the opportunity of a non-conventional class, with the traditional lectured-base model of only transfer academic knowledge to the students. The comments and reflections of the students in this class were very positive, and they expressed their gratitude to the stakeholder

- Session 5. Inter and transdisciplinary problems: expectations, aspirations and scientific rigor
  This class was led by an anthropologist , who presented students the concept of complex or wicked problems, and how the social sciences is facing this problems through inter and transdisciplinary approaches. She also gave students some tips for observation in the field (from the social science perspective), and this was an excellent opportunity for students to make a revision on the guideline that they had prepared for the first field visit.
- Session 6. Participatory methodologies and reflection exercise.

After the first field visit we started the session with a reflection exercise (all adapted from the reflection exercises proposed in the "Tool Box") on the experience, in which we asked the students to answer the following questions:

Recalling the experiences you had during the field visit last week, experiences that made an impression on you:

1. How am I going to connect these experiences lived in the field visit with the theoretical aspects (content and processes) treated in the course so far?

2. Going back, recalling what was observed and the issues encountered during the field visit:

What do I need to learn more about (content and processes)? 3. What will I do to learn this over the next few weeks?

We also had a second class made by María Paz, about methodologies for the work field in the community and cultural context.

• Session 7. "Visionary thinking" competence, visualization activity and work on the diagnostic report.

During this session we made an exercise to introduce the visionary thinking, matching the process of elaborate the first report. The exercise was focus on visualizing the time in which the students present the results of the diagnosis report to the stakeholders. First, we followed the template provided in the



"Tool Box" for visionary thinking exercises, trying to introduce the students into a relaxed environment to imagine. Then, we asked them the following questions:

Imagining that it is Friday, October 29, 2021 (in two more weeks) 1. Imagine that you pass the report to the stakeholders, and the first thing they see is the table of contents. What is it that causes curiosity or immediate interest in the farmer? And in Carolina? What chapter titles particularly catch your eye?

2. What content of the report give stakeholders a clear impression that THIS document will really be useful and that it really has an impact?

3. What content of the report does the farmer find inspiring? and the agronomist?

4. What about the structure, the design, the way the teamwork developed is presented that makes the report so simple and understandable for the user?

Students presented their thoughts and impressions after the exercise, and they revealed that were anxious and scared about the reception of the report. After sharing their thoughts, we left more time for the students to solve some doubts about the report and to work on it in groups.

• Sessions 8 and 9. Reflection on the learning of the last month, introduction to participation and work on the diagnosis report

During this session we reflect on the learning process carried out so far, and we helped the students on their process of writing the final report with recommendations to the stakeholders.

We made a reflection on the visualize exercise made on the previous session, in which we asked them: *What experience during the exercise caught your attention and made you look at it in greater detail? why? How did the activity inspire you to improve the report you are working on?* 

On the other session the course made a reflection remembering the processes and topics that have been addressed during the last month.

Then the course coordinator asked everyone to take 5 minutes to write (individually) 3 important things they wanted want to do in the remainder of the course (last week of October and November). Then we asked them to choose another partner and exchange plans (via chat).

• Session 10. Reflection on the field visit, review of the diagnostic report and preparation of the final presentation. This session we discusses the impressions on the last and final field visit and students present their questions on the final presentation to the stakeholders with the results of the final report with recommendations.



• Session 11. Evaluation of the course. During the final session, the only one that could developed physically, students and the course coordinator made a revision of the past sessions and reflect around the following questions: *Reviewing what we have seen in the course, what was useful, inspiring, interesting? Imagine that you are completely in charge of the next course. What things (name at least three) would be different to achieve the proposed learning outcomes.* 

#### Field Visits:

**1st field visit to meet the stakeholders**: Farmer) and the Agronomist. The field visit was carried out in October first, and 5 of the 6 students participated in the visit. The group was also composed by 4 members of the teaching team.

The students used their guideline, and made a route around each field, and then they made the questions to each actor. We visit first the farm of Luis, and then we visit "Fundación Origen".



Figure 66: First visit to the case studies fields (farmer left and agronomist right).

**Second field visit: the second field visit:** During the second field visit, we could only visit the farmer. In that visit 3 students participated and the course coordinator. It was a good opportunity to present the farmer the preliminary results of the report, in a relaxed environment with time to ask questions and dialogue with the farmer. Students listened to the farmers' opinion about what they presented to him. They were satisfied with the experience.







Figure 67: Second visit to the farmer's field.

#### 3rd and last field visit to present the diagnoses to social actors:

During the third field visit, the students presented to the stakeholders the results of their diagnoses reports. In this activity the 6 students and 3 members of the teaching team participated. This field visit was not originally planned, but students asked for it. The results were satisfactory because it allowed students, teachers, and stakeholders to have continuity during the development of the course. It was also an opportunity to present to the agronomist the results of the diagnosis and potential recommendations. Students realized that the research work that they have done was not enough, because many of the proposed solutions to the identified problems were already implemented in the Foundation.



Figure 68: Third visi to the case study fields (farmer in the left and agronomis in the right)

#### Development of case study reports:

Students had online meetings to work on their reports. The class only had 6 students, so all the students worked as a group in the 2 study cases. They were asked to develop:

- A diagnosis report on each of the cases including: previous or existing information for the diagnosis, used methodologies for the diagnosis and results (gaps and opportunities identified), preliminary proposals and/or recommendations.



A final report with feasible proposals to the stakeholders on what was identified in the diagnosis.

<u>Final presentation</u>: The final presentation included the evaluation of the course and the presentation of the proposals to the stakeholders. The session was held physically, in which the results were presented to the agronomist via Zoom. Then the students and the teaching team transported towards the farmer's house. The teaching team asked the students to consider for their presentations:

- General diagnosis: include what is the relationship of each actor with agroecology
- Proposals
- How to make these proposals have continuity over time?
- Conclusions of the experience
- What did I learn from the territorial actors with whom we worked in the course? What did this experience contribute to my professional development?



Figure 69: Final presentation to the agronomist (left) and the farmer (right)

#### 12.4.1.3 Reflection

The refection on the course experience was carried out before the reflection workshop, during a meeting with the involved teachers in the course. We couldn't collect the reflection document from all teachers, only from the course coordinator.

There are some impressions and comments that can be described in the results sections, regarding the experience of the teachers in the course. At the end of the course, and previous to the final reflection workshop organize by NMBU, members of the teaching team gathered in a meeting, and reflect on the main outcomes, learnings and projections of the experience.

12.4.2 Students' responses, learning and competence development

12.4.2.1 Methods of data collection and analysis Data was collected from:



- Self- assessment of competences
- Reflection documents
- Task 1 (included one of the first 4 questions)
- Notes from classes (hand writing)
- Videos from the online session (transcription)

The consent was collected at the end of the course, by asking the students to fill in the "Informed consent" document from the Appendix of the 2.1 Action Research Protocol. The document was translated and sent to the students through e-mail.

The analysis of the written documents, was made using the coding tree. No tools and/or programs were used for this. The procedure was the following:

- For reflection documents, the steps were the following:
  - 1. The course coordinator read the document of each learner
  - 2. Made the coding process by identifying relevant phrases and/or quotes that could be related to one or more codes of the coding tree.
  - 3. The quotes were translated into English
  - 4. The quotes were added into a special document called "coding from reflection documents".
- For the written document called "Task 1", the steps were the following:
  - 1. The course coordinator read the answers of each student, identifying the skills and knowledge mentioned.
  - 2. Each skill and knowledge was copied into a document called "skills for sustainable development"
  - 3. The course coordinator made a separation between skills and knowledge, and then identified the most repeated ones.
  - 4. Finally, a list was made with the skills and kinds of knowledges named by the students.
- For the hand writing notes and transcription of the session videos, the steps were the following:
  - 1. In each class, a relevant comment was written down in a personal notebook of the course coordinator.
  - 2. Comments were transcribed into a word document.
  - 3. Relevant comments and/or notes were identified and translated into English to be coded under the coding tree.
  - 4. In the case of the transcription of the session videos, the discussion parts were listened again, and the course coordinator took notes of relevant concepts identified in the conversation. The next steps were the same as the ones described above.

#### 12.4.2.1.1 First week (day) & last week (day) of the course

#### 12.4.2.1.1.1 Student's understanding, contributions, and expectations

From the four questions proposed to ask at the beginning of the course, only one was answered: What knowledge and/or skills are necessary in the professionals of the future to contribute to linking agroecology with society and to the sustainable



development of agroecosystems? Please name at least 3 skills and/or knowledge and briefly explain why you selected them. The question was answered by a written paper that was sent to the course coordinator by each students before the second session. Results were coded under the coding tree.

Other questions about the evolution of the students learning were asked through reflection exercises. Some of the final questions were approached during the 9<sup>th</sup> session of the course, asking the students to answer the following: what questions am I asking myself in relation to our last learnings and experiences? How should I proceed to find the answers to these questions? During what activities we carry out this month: Did I feel more energized and engaged? Did I learn more?

The answers were re-listened by the course coordinator, who took notes on the most relevant parts of the conversation.

#### 12.4.2.1.1.2 Self-assessment of competences

After three sessions of the course, the coordinator sent to students by e-mail a translated version of the document provided in the Appendix of the 2.1 Action Research Protocol "Self-Assessment of Core Competences". The students had to fill in a questionnaire where they were asked to rank their level of competence mastery on several statements related to each competence on a scale from 1 (Novice) – 9 (Expert). In the last session of the course, students were provided with the printed document that they sent to the coordinator, in order to have the self-assessment of competences at the beginning and at the end of the course. The data collected was transcribed into an Excel document. Differences between the scores at the beginning of the course were analysed through a t-test with a p-value < 0.05.

#### 12.4.2.1.2 Students' final reflection document (individual)

In the third class of the course, we asked students to start working on a "reflection document". The document was addressed to answer the following questions:

1. Class content and activities: briefly describe what was seen in class and the activities carried out.

2. Learning: What lessons can I learn from today's class?

3. Implications for future personal development: how can today's experience contribute to my personal development?

From 6 students, the course coordinator only received 4 reflection documents. The assignment was not considered in the final grade of the course, so it was difficult to get the documents from the students because they were working on the final reports of each case study and were dealing with high loads of academic work. Many of them delivered the documents after the due date.



Because the template of the reflection document was free, the content and structure varied from every student. It was also understood as a reflection from each class, so they didn't include their reflections from the field visits.

#### 12.4.2.2 Results

12.4.2.2.1 How do students experience such a learning process with respect to:

#### 12.4.2.2.1.1 learning goals?

Understand the meaning of linking Agroecology with society as a way to contribute to human well-being and the sustainable development of Agroecosystems.

Students at the beginning of the course were asked to answer which were their expectations and what was their linkage to agroecology. Many of them wanted to learn more about the topic itself, because it wasn't part of their program curriculum. Others had been before in the undergraduate course "Agroecology and sustainable food systems" and had more knowledge about it, but they were looking to be more involved with society and communities through the course. The linkage of agroecology with society was treated through trans-e interdisciplinary approach, and students revealed was not covered through their curriculums, and they were lacking of this new way of thinking to solve the complex problems we face. In that sense, students were aware of the importance of linking agroecology with society, but they wanted to find how to do it: "I feel that perhaps there would not be so much uncertainty in how to do it (implement the transdisciplinary approach in agrifood systems) if throughout the race we were more involved with the farmers. I feel that friction is missing, knowing who one is going to give the message to ... " (Student\_4\_notes from Session1\_2021). Others manifested the need of including other disciplines into the curriculum "... we should have more classes in the social area and even in the psychological area, knowing that we have to work and interact with people... "(Student\_3\_notes from Session1\_2021).

"I wonder what kind of restrictions transdiscipline will have if we find ourselves with actors who do not contribute to the objective, human beings usually have discrepancies in opinion, but we have to enter a world that is going to be hostile, new, and perhaps it is not going to be very well received under certain conditions, I think it is a bit complex to fully apply the term transdisciplinarity..." (Student\_2\_notes from Session1\_2021)

During the development of the course, students realized that they need to learn more about methodologies, processes, tools, that are required to experience a participative and meaningful relationship with social actors. It also was a course that opened the door to students that were not that familiarized with agroecology, and to keep learning about it. At the end of the course, students valued the opportunity of interact and work with stakeholders, and the importance of listening other perspectives, because there are different kinds of knowledge "all knowledge is different but none is more important than the other" (Student\_1\_notes from Session11\_2021).

"I learned many things in this class, especially valuing knowledge outside of the academic field that has been forged from the experience and daily effort of people



who probably did not have the opportunity to access this type of knowledge. Do not undervalue the worker or feel like a better person for having a privileged education. Complement the academic perspective with traditional or cultural rural knowledge that has much to contribute instead of separating the visions. I think that everything learned in this class is very useful for the future, since in the professional world as an agronomist I will be in constant contact with farmers with whom I must talk about knowledge and reach an agreement to make decisions" (Student\_2\_reflection document 2021).

At the end, students recognized and experienced that in agroecology you will find different kinds of knowledges, and that is important to value them and make an integration, in order to better understand the reality you are observing and working with. In that sense, keeping a constant relationship with social actors is key, to integrate their knowledge into the resolution of common problems.

Regarding the learning outcome about Develop a diagnosis and proposal for improvements in an agroecological system through participatory research. The students developed the diagnosis and proposal for improvements to both study cases. In both reports and presentations they obtained a good achievement. The evaluation was performed by three members of the teaching team, and the grading system goes from 1 to 7 points. Students obtained 5.5 (good) in the diagnosis report and 6.3 (very good) in the final report with recommendations and 6.5 (very good) in the final presentation with stakeholders (See some of the outcomes of the student's work in Appendix 22). But what the teaching team can highlight more, is the process of how they developed each of the reports and prepared the final presentation. Students had time to develop a guideline before the field visit, in order to be prepared to observe and ask the necessary information to write the diagnosis. During the previous sessions, they noted and asked to members of the teaching team how to implement the recommended tools and methodologies, and they had the chance to share with specialists of the social sciences field, the guideline they had prepared. They showed a feeling of uncertainty on how to apply what they had prepared: "What makes me more complex is applying the tools of the social sciences, how can one stand in front of a person and how to get there as well as possible so as not to be so boring, repetitive, monotonous, participatory" (Student\_6\_notes from Session 6\_ 2021)

But also they realized that not everything that they planned before going to the field is going to be as the way they expected. They had a plan, a distribution of roles to ask and write, a formal entrance to present themselves to the farmer, but in the end the visit and the interaction turned out in being a more informal encounter. The course coordinator also realized that some students are more open to the uncertainty of this field visits, and more prepared to change the original planned once they are in the field, but others, that showed to be more structured had more difficulties to deal with this kinds of situations:

"We need more of these experiences, and spend more in these, it is knowledge that can only be acquired by learning and making mistakes... if I had my own garden I



would already have more to say about it... they are things that one can gain as the experience of having done this or that... this are very difficult things to process... more time is needed to be there, observing and reflecting if we can establish and realize what is lacking in the fields, talking to each other and listening to what each of us believe and how we could improve..." (Student 2\_notes from Session 6\_2021)

"When it comes to integrating what one knows, with lived experience, you must to adopt or declare an analytical framework in which to establish models from which we are going to observe the phenomenon... The methodology and how we perceive each of the parts of the system... This made me think, is that the two experiences (two cases) were very different, under what lenses are we going to observe two such different phenomena? The clearest experience is that on the second visit I did not know what to do... because everything was much managed, I did not know how we were going to deal with this report..." (Student 5\_notes from Session 6\_2021)

During the last session, students also mentioned they lacked more technical and specific concepts about agroecology in order to have a better basis on their technical recommendations to the stakeholders. On the other hand, the students showed fully committed to the assignment, not only because this was an important part of the course final grade, but because they had a commitment with the involved stakeholders. In that sense, this is related to the third learning outcome of the course: **Develop personal commitment and dedication when interacting with social actors and the teaching team, strengthening relationship skills in different cultural and/or community contexts**. Thus, students know the value of interacting with social actors, in order to have a richer experience and a richer work in the field "Understand that we need to start using knowledge sharing and co-creation rather than knowledge transfer.... Remember that we have 2 ears and 1 mouth, apply this in everyday life and particularly in qualitative research, but do not forget that one is part of this research by being inserted in the place that we are studying" (Student\_2\_reflection document 2021)

Regarding the learning outcome about: Effectively apply action learning in order to holistically approach practical work in teams and with social actors, this will be analyzed in the next points. Students valued the opportunity of always reflect on and observe the process of development of the core competences during the implementation of the course.

#### 12.4.2.2.1.2 view on competences needed for sustainable development?

At the beginning of the course, the coordinator sent to students the first Task, in which she asked them to answer 2 questions regarding the needed skills for sustainable development. The most repeated skills by the students were: empathy, communication skills, ecological knowledge and perspective (integrate different parts of an ecosystem), understand and value the local knowledge, and technical-specific knowledge about agroecology. Students also mentioned other skills like patience, creativity, ability to work as a team, adaptation and resilience capacity, keep an open mind.



The answers were focused mainly on the ability of building a relationship with farmers and other stakeholders in the field, in order to exchange knowledge and learnings.

At the end of the course, during the final evaluation session, students mentioned the transdisciplinary and interdisciplinary approach in agroecology. Topics that were repeatedly discussed along the sessions. They also remarked the development of relevant skills, referring to them as "soft skills" such as: communication, management, dialogue and team work.

#### 12.4.2.2.1.3 recognition of own competences and competence development?

For this point, the results from the "Self-Assessment of competences" was used. Results are presented in Table 30.

Table 30: Average scores of self-reported competence development among the students during a course partly focused on developing the competences. The scale used was 1 (Novice) – 9 (Expert). N=6.

	Average scores			Significance
Competences	Start	End	Diff	P value <sup>1</sup>
Observation	4,39	6,67	2,28	<.05*
Participation	5,94	7,22	1,28	>.05*
Visioning	4,39	5,83	1,44	<.05*
Reflection	5,50	6,71	1,21	>.05*
Dialogue	5,67	6,63	0,96	>.05*

\*: p-value < .05.

<sup>1</sup>: Results of a paired, two-tailed, Student t-test.

From Table 30, it can be concluded that all the average scores increased between the evaluation at the beginning and at the end of the course. Nevertheless, only the competences of *Observation* and *Visioning* presented highly significant differences. The most probable answer to this, is that students at the beginning of the course felt more confident on the competences of reflection, participation, and dialogue, but after understanding the concept and experiencing the exercises, at the end of the course they ranked it more closely to their first score. On the other hand, the exercise about observation on the session 2, and the work done by the students preparing the guidelines for their first field visit, gave them more consciousness about been competent observers. Regarding visioning, it is a competence between novice and advanced beginner. During the course, they had the opportunity to make a self-reflection with a better understanding of the concept.



#### 12.4.2.2.1.4 transformation?

Regarding transformative learning, students had the expectation of experience something new through the development of the course, in terms of content and methodology "What I rescue the most from this class is the concept of transdisciplinarity, which I consider to be essential when facing problems, and also the learning methodology that is far from conventional. For my personal development, I consider that it helps me to broaden my view of the current educational model and to reflect on the way in which crises are faced today. (Student\_2\_reflection document 2021).

Students experienced a process to question their professional background, and also the educational system in which they were immerse. There were few conversations during the sessions, in which students manifested their concern about "wasting their time" and wondering if what they have been studying, and the way they have studying it, was the correct one. For example, one student after session 4, in which a stakeholder talked about his story on how he acquired his knowledges under experiential learning, said "I'm thinking, while I'm talking, I'm still emotional from your talk (to the stakeholder)... this distrust of my training came to me, it made me distrust what is happening.... These stories of the countryside, of effort, where the true value of life is seen...that is what make sense to me now" (Student 5 notes from Session 4\_2021). Other student said in the same session "the truth is that it is very different from everything we have seen... it is striking for the same reason, entering this class and realizing that it really is different. Where are the power point formulas? Where are the points to take notes? where is that? Personally in all classes we have had in the course, the only thing I have done has been listen and I have learned a lot, unlike other traditional courses were I am keeping anything... in this course I have learned a lot without having to take notes" (Student 2\_notes from Session 4\_2021).



Figure 70: Students, members of the teaching team and stakeholders in the field visit

Perhaps the main important point of this experience to the students, was the opportunity to question themselves, to question the system and the learning environment in which they are used to learn.

"I very much question the educational system in which I have been all my life, which is very different from what is proposed in this course... it has led me a lot to think



that the system is poorly designed... we tend to separate things into different aptitudes and not to join them...when we can apply associations in many areas of life and in many things...it does not only apply to agronomy...I have thought a lot about why we are separated into subgroups when we should help each other...how can we manage this to something more macro? At the level of industries or large companies? I have thought a lot about what would be the best way. We have not trained this. We are acquiring new skills that not only have a line of operation..." (Student 2\_notes from Session 8\_2021).

#### 12.4.2.2.2 To what extent does the education enhance the students' competences of:

#### 12.4.2.2.2.1 observation?

Students were focus on developing a full and completed diagnosis of the situation of each case study in order to give feasible and responsible recommendations. Under that context, they had to consider all the possible factors to observe and ask, sometimes things that weren't previously thought until they got into the field. It was in that place when they realized about what to ask and to observe. It is very important to have a guideline, in order to keep in mind what kind of information they want to gather. Observing the crops in the fields, the interactions, and listening to the stakeholders, reminded students that they do not have to only observe with their eyes, they need to use all of their senses, and they have to take the necessary time to do that "From today's class I can rescue that observing is complex, since in the first exercise it caught my attention that I only concentrated on the ingredients that were used in the recipe (of the video), but when doing the reflection exercise together with my classmates, there were many details I didn't see, but they did. For example, the rings on the cook's hand, the color of his clothes, the furniture, etc... Today's experience may dispose me to open my senses more when carrying out observation work, whether on a farm or in another activity, since if I were to carry out a job, for example, as a professional making a territorial diagnosis, all the necessary information of a territory should be collected, without having biases that limit the observation" (Student 4 reflection document 2021).



Figure 71: Screenshot of the video watched for the observation exercise during session 2.

On the other hand, students and teachers realized about how we are used to make judgements during an observation, and how that can determine the information you gather for example in a field visit *"it was very difficult for me to disassociate myself from* 



the role of observer, and within that same role I was very shocked that I could not separate myself from the judgment, when I saw the fried things I immediately noticed that I was using a lot of oil. Also when I saw the rings I immediately said that the cook was married" (Student 5\_notes from Session 2\_2021).

The exercise about observation during session 2, also lead to a conversation about how each of the participants disciplines could influence the observation in the field, and not only the observation but the instruments you carry to go to the field. *"I really like the idea of being with so many agronomists, that option is never given throughout the course, thanks to these courses it is given… I was a little scared because I have no agronomic knowledge… I am going to see things that are different from what everyone Come, I hope it's for the best" (Student 1\_notes from Session 2\_2021), other student quoted: <i>"That was what this session taught us. If each one goes their own way, we don't get anywhere, we have to get everything together and see what we get"* (Student 3\_notes from Session 2\_2021)

There is a kind of "deformation" of our professional formation, making count of our weaknesses because we know very much of a very specific subject. But that is also an opportunity to learn how to integrate different disciplines and to work with diverse groups and people. In that sense, one of the teachers mentioned a quote that says: "The map is not the territory, there is a territory and everyone builds their own map".

Students experienced observation, realized that comes farther than just seeing something, it involve senses. They are aware of the importance of sharing their observation with their work team, and building an interdisciplinary team to have different visions of the object they are observing. They realized that they have to take the needed time, without judgements, in order to have a good diagnosis of the reality they are facing.

#### 12.4.2.2.2.2 reflection?

During the course, there were many moments of reflection, but students were aware of the meaning of reflecting, under the description of the NF approach, from the 4<sup>th</sup> session. The course made students to question if they were really reflecting and how they were "the exercise of uniting theoretical knowledge with lived experience in the field is complex. The first thing that happened to me when both experiences were mentioned (the field visit and the content of the class) was to be invaded by a tendency to separate both things as if they were totally different from each other... It took me a long time to be able to find the link, but after several minutes of thinking, an idea became clearer until I finally managed to come up with a coherent answer that may not have left me completely satisfied, but it fulfilled the objective. Although I consider myself a highly reflective person, I realized that it is a much broader field than what I had personally experienced. Reflection, in my opinion, is a key competence, since it allows us to grow from mistakes, generate ideas and get to know oneself, all of which



are long-term processes, but they allow us to expand our minds and knowledge to be better in the future." (*Student\_2\_reflection document 2021*).

Reflection is documented in this whole report, under the student's reflection documents and student's comments in the sessions. The course promoted reflection through exercises, but in the end students asked to have an opportunity to reflect, to evaluate what was made during the learning experience.

#### 12.4.2.2.3 visionary thinking?

The visionary thinking competence, was considered as a complex term and student's didn't quite understand it at first. They made an exercise of visualize a future scene, related to the work they were doing with the stakeholders. At first, they related their visioning only to the course requirements and the task they had to achieve, but then they understood that the exercise of visualize something, is also collective, and includes values, engagement, and a common sense "*I understood that visualize something, allows us to set a north, with what values, with what feeling we connect when projecting that thought…in the first instance it is important to set a final north as a joint projection…"* (Student 4\_notes from Session 7\_2021). Other student understand it as "shared visions, for a reason we entered to study what we study, for the same reason we are in this course, in a certain way we think something in common, we seek to do something with our professional life…" (Student 6\_notes from Session 7\_2021).



Figure 72: Students participating in the visionary exercise during session 7.

During session 8 students reflect on the questions they were asking after the previous sessions of the course. They were anxious about how to have an answer to those questions, but in the end they were solving the questions together. They were projecting themselves into the future, and they were finding and co-building a solution as a group "I feel that we are already looking for those answers, it is something that occurs in all classes, or in group work... we are short of time because they are almost existential questions... I find that it is already positive to be doing it... it is also good to know other experiences... for us it is new, but they are experiences that have already been done in other places and that is important" (Student 3\_notes from Session 8\_2021)



In the final evaluation session, one student said that we should "*work agroecology as a philosophy where we have to transit towards a horizon, or utopia*" (Student 5\_notes from Session 11\_2021).

#### 12.4.2.2.2.4 participation (engagement)?

Students were active participants during the whole course: they participated in each session sharing their opinion, thoughts and feelings. They demonstrated their engagement through active participation, group meetings, and questions to the teaching team, their concern of achieving a good work. The course coordinator was aware, because they were trying to find the way of presenting their results to the stakeholders in the best possible manner, trying to find innovative solutions on the format of presentations. All of them agreed on that a traditional report was not enough for a farmer, it would probably be something that the farmer was not going to read. Instead, they thought on a didactic way to present their results, in order to make the farmer feel comfortable, and let him to express his opinion on the things they were presenting "we have to define well what we want to do, what we have to do and what we should do... because this is an academic work... but in this case the format would have to be different if we want the farmer to make sense of what we show him..." (Student 1 notes from Session 8 2021) - "how can we establish levels of sufficiency? especially now when we discussed with my classmates about the report, we talked about the farmer... perhaps the report is not going to help him... sometimes we are limited to the framework of the institution's requirements, but is not always what the user needs... that is what I question..." (Student 5 notes from Session 8 2021)

They were also aware of the contents shared in the 3<sup>rd</sup> and 6<sup>th</sup> session, in which methodologies and tools to incorporate participation into the field work were discussed and learned. One of the students showed here concern about how to implement better participatory methodologies, because they are active participants, but they also recognize the importance of participatory research and work: "*I was thinking a lot about the participatory processes we learned, how to channel all that? How to land it? How to apply it myself or how to take it to a level that goes beyond me? At the level of public policies, in local sectors... how to extend the importance of processes being more horizontal and more participatory?" (Student 3\_notes from Session 8\_2021)* 



Figure 73: Students interacting with one of the stakeholders



In the final session, students manifested as a thing to improve, that they could have more independence and more responsibilities regarding their relationship with stakeholders, they wanted to be in contact to ask the needed information, rather than having an intermediary (course coordinator). In that sense, that shows their empowerement during the experience, and how they are asking to take more responsibilities in the practical steps of the process.

#### 12.4.2.2.5 dialogue?

Students heard the concept of dialogue after the third session, in which they experienced the exercise of analyze a good conversation. As it was described before (implementation section), the conversation achieved intimacy and was very meaningful. The session turned into a space of respect and attention towards the person that was speaking.

Dialogue was also appreciated or understood under the concept of "*dialogue of knowledge*", in which different knowledges encounter and interact. The importance of listening, but also having the time to talk with social actors

"I am very happy with this talk, it is incredible because I feel that very personally things are happening that are taking me to the communities, just three days ago I arrived somewhere, and I was with many people who live on the shore from Cerro La Pincoya (a hill in a poor neighborhood of Santiago), and I spent a lot of time talking with people about their ancestors, about the colonizers, about nature... how difficult it is to listen to what they want... sometimes one goes with another idea, they need other

things, but there is a to the time to get to k like I'm going and th 1\_notes from Sessio



gue, but also thanks d... that's where I feel exciting..." (Student

Figure 74: One of the slides used by the stakehoder invited to talk in session 4, describing the networks that lead him towards his "knowledge dialogue".

Students also recognize the importance of dialogue between them, as class mates, as partners, in order to solve questions "*Dialogue, dialogue, dialogue, support each other... as we have been doing in this course... support each other since it is something new in every one of us.*" (Student 2\_reflection document \_2021)

#### 12.4.2.2.2.6 dealing with "the challenge of the whole" (systems thinking)?

The topic of interdisciplinary and transdisciplinary approach of agroecology was approached during the whole course, exploring the theoretical content applied to



agroecology from diverse perspectives. Students are aware of the complexities of agrifood system, and the urgent need to integrate different parts in order to understand and solve the problems that are presented.

"Observation seeks to go beyond simply observing, but also to analyze, hypothesize and become aware of the space in which one finds oneself. I also appreciate a lot the dialogue that was generated, because it allowed me to realize how necessary and useful the different opinions of the people present in the activity become, since they all think differently and see things differently despite the fact that the vast majority develops in the field of agronomy. It is very important to listen to the opinions of the rest in order to complement each other" (Student 4\_ reflection document\_2021)

Many of "the challenge of a whole" was discussed under the point of observation, students are aware of the complexity of things. But, they are still wondering, they are strongly experiencing the challenge of facing the complexity of a whole, of the system: "what questions am I asking myself? I wonder rather, are we doing interdisciplinary work? At the university, are we doing interdisciplinary work? In life, am I doing interdisciplinary work? I feel that it sounds nice, but it is not done yet, in the University it is not done... that word makes me very confused... other questions arise with the work... I think that in the course, I do feel that it is interdisciplinary, but with the cases we are working with, I feel that it is not interdisciplinary...because up to now we are only observing..." (Student\_1\_notes from Session 9\_2021)

### 12.4.3 Teachers' and other stakeholders' perceptions of the overall process of developing the case towards the Nextfood approach in education

#### 12.4.3.1 Methods of data collection and analysis

Regarding teachers' and other stakeholders, data was collected from:

- The notes taken by the course coordinator in sessions and in the final reflection meeting in which there are quotes from members of the teaching team. (hand writing)
- Videos from the online session (transcription)

The analysis of the written documents, was made using the coding tree. No tools and/or programs were used for this. The procedure is described under points 3.3.1.1 and 3.3.1.2

#### 12.4.3.1.1 Teacher reflection document

There is only one reflection document that was analysed, and it represents the thoughts of the person in charge of making the analysis and writing the report, thus, many of the opinions are already documented in the previous points. That is why, in this section, the impressions and appreciations made by members of the teaching team during the sessions are also included. These were collected under notes made by the course coordinator, and the transcription of the session videos.

• For the Teacher reflection document, the steps were the following:



- The course coordinator answered the questions proposed for each session in the Appendix E "Teacher Reflection Template", part of the Further Research development document. The course coordinator also included notes from the sessions
- 2. The coding process was made by identifying relevant phrases and/or quotes that could be related to one or more codes of the coding tree.
- 3. The quotes were translated into English
- 4. The quotes were added into a special document called "coding from the Teacher reflection document".

For the hand writing notes and transcription of the session videos, the data collection steps were the following:

- 1. In each class, a relevant comment was written down in a personal notebook of the course coordinator and in the Teacher Reflection Document Template.
- 2. The notes (of the hand writing notes) were transcribed into a word document.
- 3. Relevant comments and/or notes were identified and translated into English to be coded under the coding tree.
- 4. In the case of the transcription of the session videos, the discussion parts were listened again, and the course coordinator took notes of relevant concepts identified in the conversation. The next steps were the same as the ones described above.

#### 12.4.3.1.2 Course reflection focus group/interviews

The course reflection focus group was not held for this cycle, instead, the teaching team gathered in a meeting before the final reflection workshop. The meeting was to reflect on the teachers experiences with course, and how to project the new educational approach towards the future, especially thinking about how to implement the NF approach in the Msc. In Agroecology.

During the meeting the course coordinator made two questions to the assistants:

- What do we think is needed in order to make the shift towards this new educational approach?
- What have we learned from this experience? What would you recommend to other colleagues that could be interested in implementing the NF approach?

After the meeting, notes were transcribed into a word document and the more relevant concepts were selected in order to make the analyses.

#### 12.4.3.2 Results

For this point, the UCH team did not performed a Force Field Analysis. However, the notes taken from the online sessions, the reflection meeting and the final reflection workshop, were used to identify the hindering and supporting forces, along with the challenges and inspirations.



### 12.4.3.2.1 Supporting and hindering forces for change towards the Nextfood approach with particular focus on the essential shifts

#### 12.4.3.2.1.1 From lecture hall to a diversity of learning arenas

#### 12.4.3.2.1.1.1 Supporting forces and how to build on them

This point could not be explored in the traditional context of classrooms, because the course was held virtually. The supporting forces identified in this field were:

- Available tools to transform the classroom into an interactive space. E.g. The proposed exercises in the "Tool Box". (Notes on Sessions, 2021)
- The field visits and the continuity of the field visits across the course.
- The interdisciplinary teaching team: including stakeholders as well (Notes from session 2, 2021)
- The reduced number of students participating in the course, made easier the implementation of the approach. (Notes on reflection meeting, January 2022)
- The motivation of the teaching team to experience a new way of teaching (Notes on reflection meeting, January 2022)
- The motivation of the students to experience more participatory learning, and their openness and disposition to participate in the proposed exercises (Notes on Sessions, 2021)
- Inspired students (Notes from sessions and student's reflection documents, 2021)

#### 12.4.3.2.1.1.2 Hindering forces and how to deal with them

- The current sanitary context due to the COVID-19 pandemic. How do we promote educational aids and participatory learning in a virtual/digital environment? The virtual context restricted some of the proposed exercises, so these had to be adapted. (Teacher reflection document, 2021)
- The consumption of time to implement all the things required to complete the cycle, especially because the sanitary protocol of the Institution demanded many specific conditions to accomplish in order to carry out the field visits. That consumed a lot of time of the course coordinator. (Teacher reflection document, 2021)
- There is still a template for courses programs that not fully allow to implement the complete cycle of the NF approach.
- There is an Institutional resistance to change, there is too much rigidness (Teachers reflection meeting, January 2022)

#### 12.4.3.2.1.2 From lecturing to co- and peer learning

#### 12.4.3.2.1.2.1 Supporting forces and how to build on them

The time destined to reflect and discuss in each class (Notes from sessions, 2021)



- The students engagement with the group work (Students reflections documents and notes, 2021)
- The students engagement with the stakeholders (Notes from sessions 6 and 8, 2021)
- The time destined to have group meetings (Notes from the coordinator teacher, 2021)

#### 12.4.3.2.1.2.2 Hindering forces and how to deal with them

 Students are used to being told what to do, students mindset regarding traditional education. This made them hesitate on their knowledge and decisions (Teacher reflection document, 2021)

### 12.4.3.2.1.3 From syllabus to supporting literature/a diversity of learning sources *12.4.3.2.1.3.1 Supporting forces and how to build on them*

There is interest of the students to participate in a group to analyse relevant literature to complement their work with case studies (Student 5\_Notes from session 10\_2021)

#### 12.4.3.2.1.3.2 Hindering forces and how to deal with them

- The use of literature was recommended, but there weren't exercises related to analyse literature (Teacher reflection document, 2021)
- Students are not used to utilize the recommended literature that is in the program (Teacher reflection document, 2021)

#### 12.4.3.2.1.4 From textbook to a diversity of teaching aids

#### 12.4.3.2.1.4.1 Supporting forces and how to build on them

- Virtual context allowed the teaching team to include videos and technology in the learning environment (Teacher reflection document, 2021)

#### 12.4.3.2.1.4.2 Hindering forces and how to deal with them

There is still a strong costume of using power points as learning materials, this can considered as textbook.

### 12.4.3.2.1.5 From written exam to a diversity of assessment methods *12.4.3.2.1.5.1 Supporting forces and how to build on them*

- The institution allows the teacher to decide on the better assessment method for her/his course (Teachers reflection meeting, 2021)



- The course was focus on the group works with the diagnosis and the recommendations report: there was not a written exam considered in the course (Teachers reflection meeting, 2021)
- The final presentation was a good assessment method, because students had to adapt to the stakeholders reality and context in order to present the results (Notes on session 11, 2021)

#### 12.4.3.2.1.5.2 Hindering forces and how to deal with them

- There are still doubts in the teaching team on how to evaluate the students learning outcomes (Notes on teachers reflection meeting, 2021)
- Students not always responded to the given tasks (Notes on teachers reflection meeting, 2021)
- The reflection document was not fully understood by the students and was not graded at the end of the course, thus, not all the students delivered it on time (Notes on teachers reflection meeting, 2021)

#### 12.4.3.2.1.6 From lecturer to learning facilitator

#### 12.4.3.2.1.6.1 Supporting forces and how to build on them

- The relationship between the teacher and the students was more horizontal, so students feel more comfortable to ask questions and share opinions (Notes on teacher's reflection meeting, January 2021).
- The methodological approach allows dynamics, where students and teachers shared on their thoughts and listened to each other to build a co-learning environment (Notes on teacher's reflection meeting, January 2021).
- The good communicative skills of the teaching team.
- There is an opportunity to build good and trusty relationship with students (Notes on teacher's reflection meeting, January 2021).

#### 12.4.3.2.1.6.2 Hindering forces and how to deal with them

There is still a strong mindset on the traditional educational system of "the teacher" and "the student" (Notes on teacher's reflection meeting, January 2021).

#### 12.4.3.2.2 What such a change requires from teachers, students, and institutions

 Institutions must give more freedom to implement new methodological approaches. The system is still rigid, the curriculum is still traditional. The University has still a policy centred in research rather than teaching, in that sense, teaching is left out. Institutions must allocate resources in teaching. The institution must also invest in more practical work, in building 499



relationships with their surrounding communities, promoting a bidirectional link between the University and the society.

- Teachers work most of the time alone and this is a time consuming task. Teachers are not used to build teaching teams, and that is fundamental to have a good and enjoyable work.
- Under a research-centred environment, the time and resources are scarce.
- Students: must know that they have the knowledge and tools to generate a paradigm shift towards sustainable systems. And students must to assume a leadership to manage the problems they face in these courses. They have to look for different kinds of answers.

#### 12.4.3.2.3 Teachers' perception of the greatest challenges to achieving such a change

The main challenge to achieve such a change is implement this new kinds of educational approaches into the educational and academic system that domains current higher education. Teachers need to expand what was made in the Pilot course, being capable of apply this new approach in bigger courses, with more students, but think of it as an extension, to implement it with other teachers to apply it in other stages of the undergraduate programs. Go beyond the borders of this course, let it be a way of approaching, of thinking. Teachers also must not be afraid of thinking big, on proposing big changes. This new educational approach must be revolutionary, otherwise it will not make a change.

### 12.5 Concluding remarks on the case development

#### 12.5.1 On the case development since the previous reporting

#### 12.5.1.1 The most useful and inspiring experiences (supporting forces)

The most inspiring experiences for the students were those in which they interacted with the stakeholders. Someone that can inspire students and someone that can turn the session into something different, like in the case of the farmer during field visits or the session 4, in which students expressed and experienced gratitude, emotion, inspiration, and motivation "Students are expressing a need of inspiration because they are disappointed of the current system in which they are developing as professionals" (Teacher 6\_reflection document\_2021). They were inspired by the farmer's ability to deliver their knowledge, without filter, the best disposition to teach from humility. They were inspired because through the case studies they realized that agroecology is possible but it is difficult. On the other hand, students realized about the obstacles that you can face in the field. In that sense, this relationship was also useful for them to open their eyes and face reality.



Another useful experience was the group work, between the students: working with colleagues, sharing visions and reaching agreements. The students also perceived the motivation of the teaching team, which generated a pleasant environment to carry out the course. There was a common interest of the participant teachers in learning about the NF approach, and that is a key motivation factor to implement this new educational initiatives. You must have motivated teachers in your teaching team, because is a time consuming task, that requires creativity and motivation towards change "*More than agroecology, the topic of new teaching methodologies motivates me in this course, new ways of learning and teaching. I am interested in being able to offer more motivating courses, because sitting in front of a computer with a person talking and the rest in silence, it is very similar to what was done in the 1950s. New technologies have taken this (education) back in time because teachers have not been able to adapt, so the idea is to start adapting" (Teacher 1\_notes from session 1\_2021).* 

It is important to build a learning environment in which students and teachers have an interdisciplinary approach. In that sense, this experience was an opportunity to value the interdisciplinary teaching and working teams. It was stated and recognized during session 2, in which the teachers that were participating, reflect jointly with the students, about how the professional background and formation, conditions your observations and diagnosis in the field "Agroecology poses certain challenges to those of us who are trained in a single discipline, for example, to identify native vegetation, or animals, there is a point where observation will show us weaknesses, understanding that in agroecology we should integrate these things holistically... so based on those weaknesses you can see how to collaborate, but also identify new interests" (Teacher 2\_notes from Session 2\_2021)

On the other hand, it was very inspiring to see the students inspired and grateful during sessions and field visits. A very strong bond was generated between the students and the teaching team, receiving and giving positive feedback from and for the students, is an extra motivation to the teachers to continue with this path.

It is also important to count with the support and engagement of the stakeholders that participated in the field visits. Without that interaction, the outcomes of the course would be very different. Working with stakeholders, give dynamism to the learning experience, and it can lead you to earn "unexpected learning outcomes". Neither the students nor the teachers have total control of the situations that are occurring, and that is positive because is experiential learning for every participant.

#### 12.5.1.2 Main obstacles/challenges encountered (hindering forces)

Time and resources are scarce, and academic work at the University is more focused on research than on teaching-learning processes. The culture of the academy is very lonely, and therefore solid teaching groups are not built, which allow to distribute the work and balance the load.



Although the students valued the teamwork they were able to carry out, they realized that it was difficult for them to manage the organization of work, is an important challenge, but is also something to work in these learning experiences.

The students realized that it was necessary to incorporate more theoretical and technical content on agroecology into the course, in order to have better tools when delivering recommendations to stakeholders.

The way in which the reflection document was presented to the students was not adequate, and the students did not take the weight of the importance of carrying out this task. Therefore, the majority wrote the document at the end of the course, which is made very difficult by the academic load at the end of the semester, which reduces the quality of the reflection. The document was also not part of the final grade for the course, it was also not part of the final grade, which may also imply a disincentive for students to do so.

There was also a lack of diverse disciplines in the group of students.

#### 12.5.1.3 Lessons learned from the inspiring experiences and from dealing with the challenges

The UCH team is still beginning with the first cycle and there are many things to still learn. After having a first pilot experience, there are a lot of things we have already learned, that can be highlighted: the importance of using innovative exercises, and using elements that are not currently used in classes "*It seems to me that it is also important to use resources that allow "thinking out of the box". The exercise we did with the video of a recipe, for example, in which we applied an absolutely everyday thing to an observation and integration exercise" (Teacher 4\_notes from reflection meeting\_2021).In the same line, the reflection document (considered as an assessment tool that is also linked to an everyday basis) is a fundamental tool to evaluate the learning outcomes, and the progress of each student in the development of the core competences. In this aspect, the way in which the reflection document is requested and presented to the students for the first time, should be very clear and they should be asked to write down their thoughts after each class, not at the end of the course.* 

It is important to form interdisciplinary teaching teams that incorporate not only academics, but also students, professionals linked to the area, farmers, and representatives of the public sector.

The need to find a balance between the tasks and instructions that facilitator gives, and the leadership and responsibilities that the students must acquire is fundamental from the promotion of participation and to change the original mindset on traditional education, that teachers and students have. The teachers also remarked the



importance of having a continuous communication among all actors "Also be doing a permanent check to have feedback between all the actors almost in real time. This was seen in the final presentation, in which there was clearly a feedback that allows a good analysis and good proposals for the future" (Teacher 3\_notes from reflection meeting\_2021). The learning experience should maintain the attention and interest of students throughout the course. That is why, tt is also important to include classes with innovative content and themes: in our case trans- and interdisciplinary, participatory research and methodologies, dialogue of knowledge, etc. These are topics that are not constantly addressed throughout the degree, and that are important to consider in a course that is seeking the linkage with society through the promotion of motivating experiences and content.

Other important lessons learned:

- Assemble interdisciplinary teaching teams with participants from various sectors (academy, public sector, private sector)

- Have a permanent contact with the social actors that collaborate with the course (stakeholder), made them protagonists of the work that is developed in the semester, maintaining communication with the students.

- Link knowledge and practice with real problems, considering the social and political context of people and the reality they face.

- Incorporate a session that addresses leadership or organizational culture

- Incorporate more theoretical and/or technical content regarding the course main subject (e.g. agroecology), through guided readings or the analysis of other learning sources.

And in order to promote the development of the key core competences, the teaching team should focus in strengthen the leadership and autonomy of the students (that is, make the students face the problems, propose ideas, compare and share them among themselves and with academics and farmers, then synthesize the proposals/solutions), "we should keep in mind that the central focus is the "why" and "what for" of a complex problem, and then comes the "how", that is, the goal is to learn and understand a system, then how the problem can be faced. trouble. In my opinion, the simple transmission of knowledge focuses on the how and leaves aside the foundation of understanding the system" (Teacher 5\_notes on reflection meeting\_2021)

#### 12.5.1.4 Plans for how to move forward into the next cycle

After this final cycle, the next step is to define if the course will be again implemented, and it is important to share these experience with other colleagues that could be interested in using the NF approach in their courses.



The UCH team will also discuss how to implement this new approach in larger classrooms and in a new sanitary context (students are back to the University) and how to implement t in the new Msc. In Agroecology.

#### 12.5.2 Reflections towards the end of the Nextfood project

### 12.5.2.1 What has been accomplished to shift from theory to phenomenon (experience) in agrifood- and forestry systems as the starting point for the learning process?

At the beginning, when we were planning the course and building the program, it was sometimes difficult because the courses and academic processes are institutionalized, and in consequence standardized. In that sense, both, the teaching staff and the students are used to the theoretical lectures and literature, and that is what both sides expect.

We also haven't started the face-to-face classes yet, because of the sanitary restrictions. That is a huge challenge to promote experiential learning: how do we learn from experience if we are behind a screen? How do we teach students about linking agroecology with society without having permanent contact with the field? It was challenging, but beside the context and conditions, we think the shift from theory to phenomenon was achieved.

With the uncertainty of the sanitary conditions, we had to plan only two field trips, one at the beginning of October and the other at the end of November (middle of spring in Chile). So, the first period (August-September), had theoretical classes by Zoom, and the content was focus on preparing the students for their field trip. During October and November, the course was focus on developing the work with stakeholders and case studies (field visits, diagnosis, reports). In order to have a different experience than expected, we focus on three main points:

- 1. **Have innovative and diverse content of the classes**, in order to prepare students for their field trips and also for their professional life. The classes were focus on these main topics:
  - Transdisciplinarity and interdisciplinarity in Agroecology: studies, problems, expectations, scientific rigor.
  - Holistic understanding of agroecological systems
  - Participative research and participative methodologies in agri-food systems
  - Knowledge transfer and knowledge dialogue


- 2. Have a diverse and interdisciplinary teaching staff, and not only from academia: agroecologist, soil scientists, entomologist, extensionists, plant scientist, anthropologist, farmers, agronomists.
- 3. Have a direct work with the stakeholders involved in the case studies and the development of reports: after the first field trip, in which students met the actors involved in their case studies, the experiential learning (phenomenon) started. Students had the challenge to choose the best methodology to collect information from the field, develop a diagnosis of each situation and then writing a report, and share their thoughts, results and visions with each stakeholder. During the course, students asked to have a third field trip in order to collect more and better information, and more complete results on their reports. Fortunately we could go on a field trip in the middle of November. In that sense, that was a novelty too: there is continuity in the process of working with stakeholders, and students realized the importance of that. At the end, they had to collect all the information and develop concrete proposals, considering the identified problems and opportunities, but always listening what the actors of their case studies thought and said. But most important, they had to build a relationship with each stakeholder and communicate with them, in order to make responsible and feasible proposals for their agroecological systems.

We are still in the stage of analysing and reflecting about the process of running this course, this was our first experience with the NF approach. Students had the opportunity to put in practice their knowledge, skills, and also, to apply the contents learned during the curse. This was also an opportunity for the teaching staff to make things differently, to challenge ourselves. We think we are going through the transition from theory to phenomenon, but there are still a lot of things that we have to improve and keep learning on the way, and we want to do it

# 12.5.2.2 What has been accomplished to shift from transmission of knowledge to the development of key competences needed to support sustainable development in agrifood and forestry systems?

[As we stated in the first question, this was our first experience with the NF approach. In that sense, the "Tool Box" was an excellent starting point, because it has many exercises already developed and proved. Only the context and conditions changed, but we could adapt it to our current situation. The progress of shifting from transmission of knowledge to the development of key competences, was thought for each class, and students were aware of the learning outcomes from the first moment.

The five core competences of action learning were introduced at the beginning of the course, trying to make a short and clear definition of each of them. Then, each class and content, was design thinking about working one or more of the 5 key competences, making practical exercises to understand them from experience.



The observation exercise made in the second session of the course, was key for the next part of the class, in which we talked about what to observe and ask in the field, and what to have in mind before visiting the field. The conversation was very interesting because in the teaching staff we had a plant scientist, an entomologist and a soils scientist: each of them observe different things when they go to the field, and each of them bring different tools and equipment to make observations and/or take samples. We (students and teaching staff) realized that in certain point we have a "professional deformation", and there is a need to share our observations and open our minds, in order to have a clearer diagnosis of what we observe in the field. We also realized about the importance of interdisciplinary teams. After that class, students developed a list with the things they had to observe and to ask in their next visit to the field, and they applied it.

As the example described above, we worked the other competences: dialogue, reflection and visioning, using as reference the articles and exercises proposed in the Tool Box. The competence of participation involved the other 4, and it was experienced and developed during the practical work in the field, in classes and in the students group work. We also work with reflection across the whole course, having always at least 30 minutes to reflect and discuss about the things we were learning.

#### 12.5.2.3 What are the prerequisites for making a successful shift?

- Innovative contents in the classes and exercises to promote motivation: "thinking out of the box". Keep the students attention and interest during the whole course.
- Demonstrate students that they have the tools to make the shift towards sustainable systems (For example: integrating the agroecological principles)
- To work with an Interdisciplinary teaching staff (academia and non-academia)
- Have permanent contact and communication with the stakeholders involved in the course to have continuous feedback. It is also important to link knowledge and practice with real problems, considering the social and political context of people and the reality they face.

### 12.5.2.4 What is your concrete advice on the shift from simple knowledge transmission to the development of key competences?

- Invite students to feel comfortable and confident in class: key for reflection and dialogue.
- Try to clearly introduce the reflection document as a key assignment to finalize the course
- Use the "Tool Box" developed in the NF platform: you can adapt the proposed exercises into your context.
- Try to always have time for reflection after field work.
- Strengthen the leadership and autonomy of the students (make the students face the problems, propose ideas, compare and share them among themselves and with academics and farmers, and later synthesize the proposals/solutions).



• Keep in mind that the central focus is the "why" and "what for" of a complex problem, and then comes the "how", that is, the goal is to learn and understand a system, then how the problem can be faced

#### 12.5.2.5 What is your main challenge?

How to propose the NF approach in initial undergraduate courses (with high number of students and where the basic knowledge is the goal.

How can we apply the NF approach in different courses of the Msc in Agroecology? (Considering that the contents of each course are different). How can we encourage the use of the learning outcomes and developed skills (during the Msc or action learning course) in real case experiences? (For both students and teachers).

### 12.5.2.6 What are the three best ideas from the workshop for how to deal with that main challenge?

There were many proposed ideas to the UCH Challenge, the participants made some practical proposals in order to approach the exposed challenges, but other participants went to a deeper point of the way of seeing the implementation f the NF approach: the basic is to be focus on learning how to learn. We must start with this question, because is the basis of everything else. So here are the tree best ideas from the final reflection workshop for UCH:

- The first thing we need to explore, is "What do we think is basic"? (What do we actually is basic in education?) And, when we decide, ask ourselves, are we then giving primacy to theory (subject) or to the learner (the experiences of the students).
- Learning how to learn is maybe the most important basic to start with at university.
- Basically, the students should meet their main stakeholder out there, which in agriculture would be the farmer, on the first day of their studies. This is the basis for what should happen later.

### **13 References**

Brook, C. (2010). Action learning in health care. In Action learning and its applications. Palgrave Macmillan, London.

Checkland, P. and J. Poulter (2006). Learning for action: a short definitive account of soft systems methodology and its use for practitioners, teachers and students. Chichester, England, John Wiley & Sons Ltd.



Currie, K., Biggam, J., Palmer, J., & Corcoran, T. (2012). Participants' engagement with and reactions to the use of on-line action learning sets to support advanced nursing role development. Nurse Education Today, 32(3), 267-272.

Fraine, (2015). Is biodynamic farming the sustainable agriculture of the future? DOI: <u>10.13140/RG.2.1.1486.8884</u>).

Lieblein, G. *et al.* (2007) Educational Perspectives in Agroecology: Steps on a Dual Learning Ladder toward Responsible Action. NACTA Journal.

Lincoln, Y. S. & Guba, E. G. (1985). Naturalistic Inquiry. Newbury Park, CA: Sage Publications.

McGill, I., & Brockbank, A. (2004). Action learning handbook. Kogan Page.

Pfeffer, J. and R. I. Sutton (2000). The knowing–doing gap. Boston, Massachusetts, U.S.A., Harvard Business School Press.

Richardson, J., Ainsworth, R., Allison, R., Billyard, J., Corley, R. & Viner, J. (2008). Using an action learning set (ALS) to support the nurse and allied health professional consultant role. Action Learning: Research and Practice, 5(1), 65–77.

Smith, P.A.C., O'Neil, J., 2003. A review of action learning literature 1994–2000: part1 – bibliography and comments. Journal of Workplace Learning, 15(2), 63–69.

Stewart, J.A. (2009). Evaluation of an action learning programme for leadership development of SME leaders in the UK. Action Learning: Research and Practice, 6(2), 131–148.

Taylor, R., Coombes, L. & Bartlett, H. (2002). The impact of a practice development project on the quality of in-patient small group therapy. Journal of Psychiatric and Mental Health Nursing, 9, 213–220.

Walia, S., & Marks-Maran, D. (2014). Leadership development through action learning sets: An evaluation study. Nurse education in practice, 14(6), 612-619.

QSR International (2020). NVIVO Qualitative Data Analysis Software.



### **14 Appendices**

Appendix 1: NMBU - Course Schedule

- Appendix 2: UNIOR Force Field Analysis
- Appendix 3: UNIOR Final Evaluation of the Product + SWOT Analysis
- Appendix 4: UNIOR Evaluation professional skills
- Appendix 5: AFS Observation log
- Appendix 6: AFS Reflection log
- Appendix 7: AFS Interview guide
- Appendix 8: AFS ALSs Participant Sociodemographic Characteristics
- Appendix 9: AFS Detailed information on the Learning Sets' Visits
- Appendix 10: AFS Tables with Force Field Analysis
- Appendix 11: Skogforsk Agenda meeting 1-5
- Appendix 12: Skogforsk Learn contribute
- Appendix 13: Skogforsk Self-assessment of competences
- Appendix 14: Skogforsk Course evaluation
- Appendix 15: Skogforsk Reflection documents meeting 1-5 learners
- Appendix 16: Skogforsk Reflection documents meeting 1-5 teachers
- Appendix 17: Skogforsk Reflection documents final learners
- Appendix 18: Skogforsk Reflection documents final teachers
- Appendix 19: UNISG The 1st Workshop for planning MAFS
- Appendix 20: UNISG Questionnaire
- Appendix 21: UCH Course Program Details
- Appendix 22: UCH Some outcomes from the final report and students' presentations
- Appendix 23: Instructions for data analysis Text\_2.1
- Appendix 24: Instructions for data analysis Numerical data
- Appendix 25: Self-Assessment of Competences



### Appendix 1: NMBU - Course Schedule

nine procession - or constant		<ul> <li>Mid-term exelution</li> <li>Mid-term exelution</li> <li>form</li> <li>forment</li> <l< th=""><th>rablorfastat mateja međ tramcob</th><th>to transessetbed • erreserce prostange rootsaup latini voot</th><th>zinamngizzA</th></l<></ul>	rablorfastat mateja međ tramcob	to transessetbed • erreserce prostange rootsaup latini voot	zinamngizzA
<ul> <li>Learner document</li> <li>Oral exam</li> </ul>	<ul> <li>Engagement/participation</li> <li>Engagement/participation</li> </ul>	noiteqiziheq\tnemegegn3	noiteqisiheq\tnemegegn3	noiteqioitheq\themegegn3	fnomzzozzA
	1 meeting per student (30 minutes)	1 meeute reg geratud (10 (c) meeute (c) meeute	1 meeting per student (30 minutes)	1 meting per student (30 minutes)	lindividual meeting vith core teachers
Focus group	5tudent-led	bəl-tnəbut?	Teacher-led		Reflection sessions
	zrotetiliset Atiw gnieem quorð	Group meeting with facilitators	zrotstiliset ritiv gniteem quorð	zrotstiliset ittiv gniteem quorð	
		Literature seminar	lterature seminar		
qorizhow notisulare lanit 🔹	naitstreseng lisni htim qortehow leaf-indenorg tood cases soon tood cases and on the soon of the soon	zilmenyb quorð	Topical lectures	isivimist • Introduction • Diversity localrealer	estivita Activita
	Facilitation	rotistilos7			
	gnixinity ynenoirely				
	Dialogue	augolaid	augolaid		
	Reflection	Reflection	Reflection	Reflection	
	noueviero	noutonistad	nousvosco	nolisviskoU	
	anito and	- ooiteessed0	Systems thinking	contemportation (	seonetemod
	tiziv eses boot <sup>bo</sup> t	žičiv <sup>bn</sup> C bne <sup>12</sup> ľ		, p. 10 mg •	Food case
			žeiv <sup>d</sup> C bne <sup>do</sup> C	fiaiv <sup>12</sup> 1.	Farm case
December	November	October	September	tzuguA	



### **Appendix 3: UNIOR – Force Field Analysis**



#### Force Field Analysis Worksheet

For instructions on Force Field Analysis, visit <u>www.mindtools.com/rs/ForceField.</u> For more business leadership skills visit <u>www.mindtools.com/rpages/HowtoLead.htm</u>.

Forces FOR change	Score			Forces AGAINST change	Score
1 diverse learning arenas	5		L	pandemic situation	3
		Change proposal		different schedules	4
2asking questions	3	1. From lecture hall to a diversity of learning			
2stakeholders learnt fron	3	arenas			
2pair-work, group work	5	2. From lecturing to co-		S not learning from teach	4
2the teachers learnt from	3	and peer learning	and peer learning		
		3. From syllabus			
3digital materials	4	literature/a diversity of		no change to syllabus	5
3 new courses	5	learning sources	learning sources		
		4. From textbook			
4several teaching aids	5	to a diversity of teaching aids		no time to create others	3
		5. From written			
5external evaluation	5	diversity of assessment	diversity of assessment		2
6 method 3B4ME	4	methods		6 students resistance	3
TOTAL	42			TOTAL	24

For new tools like this, subscribe to the free Mind Tools newsletter: http://www.mindtools.com/subscribe.htm.

© Copyright Mind Tools Ltd, 2006-2011. Please feel free to copy this sheet for your own use and to share with friends, co-workers or team members, just as long as you do not change it in any way.



### Appendix 4: UNIOR – Final Evaluation of the Product + SWOT Analysis

1. Vă rugăm să descrieți produsul. / Please describe the product.

Produsul este de formă și culoare gălbuie, ușor închisă. Aspectul este rugos, rotund cu diametrul mare de 7,5 cm.Textura este crocantă, onctuoasă. Ambalarea este efectuată la tuburi de hirtie. Produsul este dulce, cu gust specific de germeni de grâu.

2. Care este aspectul inovator al produsului? What is the innovator aspect of the product?

Introducerea germenilor de grâu in reteta este aspectul inovator al produsului. Germenii de grâu conțin importante resurse nutritive bioactive. Este un produs natural. Are efecte favorabile asupra sănătăți în special asupra sistemului circulator, vitamina E și conțin o gamă largă de vitamine B (B1, B2, B6), precum și zinc, magneziu și fosfor și sunt foarte utili în lupta contra nivelului crescut de colesterol..

3. De ce luați în considerare produsul ecoinovator? Why do you consider the eco-innovator product?

Produsul acoperă o nișă de piată fără oferte cu accente pe consumul de către tineri.

4. Sistemul de ambalare este ecologic, dacă da de ce? The package system is ecological? If yes, why?

Da, materialul folosit pentru tubul de hârtie biodegradabil, reciclabil, iar hirtia de împachetare este reciclabilă 100%.

5. Produsul este potrivit pentru producția industrială și care este principalul motiv care permite acest lucru? Is the product suitable for industrial production and what is the main reason that allows this aspect?

Da, nu sunt dificultăți de transfer în producție.

6. Este nevoie de acest tip de produse pe piață și denumiți produse similare? Is this type of product needed on the market and please name similar products.

Este nevoie dea cest produs datorită prorietăților sale bioactive și datorită beneficiilor aduse. Nu există produse similare în piață.

7. Care este principalul avantaj nutritiv al produsului dvs.? What is the main nutritional advantages of your product?



Din punct de vedere nutritiv germenii de grâu sunt bogați în vitamina E și conțin o gamă largă de vitamine B (B1, B2, B6), precum și zinc, magneziu și fosfor.

8. Există alergeni în compozițiile produsului, numiți-i dacă da? Are there allergens in the composition of the products. If yes, please name them.

Glutenul din făină este alergen dar datorită cantității reduse folosită ponderea nu este mare.

9. Care sunt principalele proprietăți senzoriale ale produsului dvs.? What are the main sensorial properties of your product?

Gust plăcut dulceag, specific de germeni de grâu. Consitența este crocantă plăcută.

10. Prezentați analiza SWOT a produsului dumneavoastră. Present a SWOT analysis of your product.

Puncte tari	Puncte slabe
<ul> <li>&gt; Gradul de noutate al produselor;</li> <li>&gt; Raport calitate-preţ, compania oferă o calitate la un preţ scăzut;</li> <li>&gt; Materie primă de calitate la un preţ scăzut;</li> <li>&gt; Tehnologia utilizată este modernă;</li> <li>&gt; Personalul este tânăr, dinamic, calificat şi specializat;</li> <li>&gt; Produs care urmează tendinţele pieţei;</li> <li>&gt; Utilizarea ingredientelor naturale.</li> </ul>	<ul> <li>Companie fără notorietate;</li> <li>Ambalaje 100% naturale fabricate din plante și amidon 100% degradabile;</li> <li>Resurse financiare limitate; Brand fără notorietate;</li> <li>Lipsa unui element de politică de produs;</li> <li>Lipsa experienței personalului de marketing.</li> </ul>
Oportunități	Amenințări
<ul> <li>Schimbarea legislației care încurajează produsele cu ingrediente naturale.</li> <li>Consum redus de biscuiți în România, sub media europeană;</li> <li>Tendința de creștere a pieței biscuiților;</li> <li>Posibilități de extindere a sortimentului de produse.</li> </ul>	<ul> <li>Concurență puternică - SC EUROPEAN FOOD SA;</li> <li>Consumul în scădere al populației;</li> <li>Prezența pe piață a producătorilor cu potențial financiar ridicat;</li> <li>Instabilitate economică;</li> <li>Importuri foarte mari;</li> <li>Situație economică neclară.</li> </ul>



### Appendix 5: UNIOR – Evaluation Professional Skills

Romanian case

Evaluation of projects - Cycle 2

The evaluation was based on Romanian case Evaluation methodology from the following points of view:

- ➢ GDRP,
- > Chance equality,
- ➢ Environmental protection,
- ➢ Sustainability,
- ➢ Comunity oriented,
- Profesional performance,
- $\succ$  Free acces,
- ➢ Creativity.

The evaluation was done under presented principles by a pannel of 3 evaluators.

The evaluators were from outside of the project or university staff people with high expertise.

They grade the project of each teams and also their products.

There were assessed all the products based on their performance. The first stage was an evaluation of each product by the jury from technical point of view. The second stage was related by insertion on the market and comunity according general Europen rules. The grades weres betwen 1 and 5 according with the criteria from Table 1. from Romanian case Evaluation methodology.

No	Evaluation criteria	Grading criteria				
		1	2	3	4	5
1	How innovative and	No	Innovativ	Very	Very	Very
	eco-innovative the	innovative		innovative	innovative	innovative,
	proposal is				and original	original and
						novelity
2	Industrial feasibility	No	Week	Industrial	Mediumm	Strong
		industrial	industrial	feasibility	industrial	industrial
		feasibility	feasibility		feasibility	feasibility

Table 1. Evaluation criteria for professional skils aquired



3	Market credibility	No	Week	Credibility	Mediumm	Strong
		credibility	credibility		credibility	credibility
4	Nutritional	Antinutritio	No	Week	Medium	Strong
	characteristics	nal factors	nutritional	nutritional	nutritional	nutritional
			characterist	characterist	characteristi	characterist
			ics	ics	CS	ics
5	Food safety	Dangerous	No	Minimal	Advanced	More than
	and		conformity	conformity	conformity	conformity
	conformity to		but edible			
	the European					
	rules					
6	Taste, organoleptic	Disagreabil	Weak	Acceptable	Normal	Advanced
	qualities		properties	properties	properties	properties
7	Marketing	No	Week	Fesability	Medium	Unicorn
	and	fesability	fesability		fesability	
	communica					
	tion plans					
8	Packaging	High	High	No	Biodegrada	Recyclable
		polutant and	polutant	protection	ble and	and
		no		but low	protection	biodegrada
		protection		polutant	provided	ble
		of the				
		product				
9	General	No	Acceptable	In normal	Creating	Unicorn
	presentation	Acceptable		range	new	
					standards	
10	Awarded for			1	•	1
	participation					

#### Results

#### 1. How innovative and eco-innovative the proposal is

No.	Product	Grade
1		
2		
3		
4		

2. Industrial feasibility

No.	Product	Grade



1	
2	
3	
4	

#### 3. Market credibility

No.	Product	Grade
1		
2		
3		
4		

#### 4. Nutritional characteristics

No.	Product	Grade
1		
2		
3		
4		

5. Food safety and conformity to the European rules

No.	Product	Grade
1		
2		
3		
4		

#### 6. Taste, organoleptic qualities

No.	Product	Grade
1		
2		
3		
4		

7.	Marketing	and	communication	plans	
----	-----------	-----	---------------	-------	--

No.	Product	Grade
1		
2		



3	
4	

8. Packaging

No.	Product	Grade
1		
2		
3		
4		

#### 9. General presentation

No.	Product	Grade
1		
2		
3		
4		

#### 10. Awarded for participation

No.	Product	Grade
1		
2		
3		
4		

#### General grading

No.	Product		Criteria			Total						
		1	2	3	4	5	6	7	8	9	10	
1												
2												
3												
4												



### **Appendix 6: AFS - Observation Log**

Date:	
ALS number:	
Location:	
Participants:	
Facilitator:	
Researcher:	

#### Main topics discussed

(Agenda of the session, other relevant issues brought up during discussion)

#### Engagement

(Paying attention/staying focused on issues discussed during the session, contributing to the process, displaying active participation behaviours)



#### Meaning

(Asking relevant questions, showing signs of comprehending and reflecting on the issues discussed, relating concepts to practices/lived experiences, attempts to transfer innovative knowledge to the situation, signs of change in the meaning assigned to previous knowledge)

#### Interaction

(Displaying positive engagement with other group members and facilitator, signs of positive affect towards other group members and facilitator, enabling and hindering factors of communication, signs of meaningful and task oriented interaction, group dynamics)



Accomplishment
(Ability to complete group-related tasks and activities, agree and contribute to actions for the next session, follow-up on actions from previous sessions)
Other peter
Other notes



### **Appendix 7: AFS - Reflection Log**

Please take some time to answer the questions below based on your reflections of taking part in the action learning set.

Name:

Date of the action learning set:

Date of completion of the reflective log:

#### 1. What are your general thoughts and feelings about the session?

- What made a particular impression on you?
- Which parts of the session did you find the most useful?
- Which parts of the session did you find the least useful?

(You might like to reflect both on the content of the issues discussed during the session and the process of the learning set [i.e., the way in which issues were described and discussed during the session])

2. What are your thoughts and feelings about your engagement in the session?

• Which factors were the *most* helpful in enabling your active participation in the session?



<b></b>	
	<ul> <li>Which factors were the <i>least</i> helpful in enabling your active participation in the session?</li> </ul>
	Do I feel that my participation was effective? Would I like to improve it and
	<ul> <li>Do you feel that your participation in the session was effective? Could your</li> </ul>
	engagement in the session be improved? How do you feel that it could be improved?
	(You might like to reflect on practical factors [e.g., the location of the session], factors relating to the session itself [e.g., your interaction with other participants], the content of session, and personal factors [e.g., your feelings about expressing your opinions in a group])
3.	What have you learnt from the session, if anything?
	Which factors were the <i>most</i> helpful in enabling you to benefit from the learning process?
	• Which factors were the <i>least</i> helpful in enabling you to benefit from the
	<ul> <li>Does the knowledge I gained relate or contradict knowledge I already have? If so, how will I deal with this?</li> </ul>
	(You might like to reflect on issues discussed relating to sustainability in general, and particular sustainable agricultural concepts and practices)



4. How effective was the session in helping you develop your personal competences?
<ul> <li>Which factors were the <i>most</i> helpful in enabling you in this process?</li> <li>Which factors were the <i>least</i> helpful in enabling you in this process?</li> <li>What competences have I brought to the session that made it successful?</li> <li>What competences do I believe I need to develop further?</li> <li>(You might like to reflect on personal competences in general and competences relating to sustainability)</li> </ul>
5. How do you think that you could use the things that you may have learnt during the session in the future?
(You might like to reflect on specific learning aspects and how these can inform your work/professional development in the future)



6. What changes would you make, if you could, to improve the session? (You might like to reflect both on the content of the issues discussed during the session and the process of the learning set [i.e., the way in which issues were described and discussed during the session])

Thank you very much for taking the time to complete the log!



### **Appendix 8: AFS – Interview Guide**

#### Interview / Focus group Topic Guide

#### Preamble

Thank you for coming to this interview. Please remember that your participation in this discussion is entirely voluntary. You are free to stop at any time, either completely, or to take a break in the room or outside. Also, please be assured that everything we discuss today is strictly confidential and will remain completely anonymous.

We have invited you to take part in this interview today because you have already had some experience of participating in action learning sets as part of this study. Our research is examining whether the action learning set format could be useful in enhancing students' and agricultural professionals' knowledge and competences relating to sustainability and sustainable development. Today we are interested in exploring your thoughts and views about the action learning sets as a learning method based on your experiences from your earlier involvement in the study.

#### Questions (plus prompts, if needed)

- 1. How did you find your overall experience of participating in the action learning sets?
- Which aspects of the learning sets did you find the most useful? Why these?
- Which aspects of the learning sets did you find the least useful? Why these?
- Did you encounter any particular challenges during your participation in the action learning sets?

2. How effective did you find the action learning sets to be in enhancing your knowledge and developing your competences relating to sustainability issues and sustainable development?

- Which aspects of the learning sets were the most or, conversely, least helpful in enabling you develop your knowledge and competences?
  - Factors relating to your engagement with the process?
  - Factors relating to the content of the learning sets?

3. What impact, if any did you feel you had on the other actors of the learning set during the process?



- What do you think hindered or enabled a possible impact?
- How do you know what impact you had?

4. How would you describe the communication between you and the actors of the learning set?

- What factors enabled good communication?
- What factors hindered your communication?

5. Do you have any thoughts about whether and how you could use the knowledge and competences gained through your participation in the action learning sets in the future?

- As part of your professional/educational development?
- As part of your personal development?
- To initiate changes in work/learning practices?

6. After having the experience of participating in action learning sets as part of this study, would you be willing to take part in future learning sessions that follow the same format?

- What changes would you make to improve the action learning sets?
- Changes to the process?
- Changes to the content?

#### **Concluding Statement**

Is there anything that you would like to add or ask before the end of the interview?

Thank you for taking part in this interview.



### Appendix 9: AFS – ALSs Participant Sociodemographic Characteristics

ALSs Participant Sociodemographic Characteristics

ALS A	
Students	
AS1	
Age	22
Gender	Female
Course title	Food Science and Technology
Level of studies	Undergraduate
Study year	<b>4</b> <sup>th</sup>
AS2	
Age	22
Gender	Female
Course title	Food Science and Technology
Level of studies	Undergraduate
Study year	<b>4</b> <sup>th</sup>
Professor (APR)	
Age	53
Gender	Female
Prof. role title	Professor
Years of experience in present role	11
Years of experience in the field of agriculture	25
Professional (APL)	
Age	37
Gender	Female
Prof. role title	Head of Lab
Years of experience in present role	3
Years of experience in the field of agriculture	10



Adviser (AA)	
Age	47
Gender	Male
Prof. role title	Agricultural consultant / adviser
Years of experience in present role	5
Years of experience in the field of agriculture	23

ALS B		
Students		
BS1		
Age	25	
Gender	Female	
Course title	Agricultural Technology	
Level of studies	Undergraduate	
Study year	Final	
BS2		
Age	25	
Gender	Male	
Course title	Agricultural Technology	
Level of studies	Undergraduate	
Study year	Final	
Professor (BPR)		
Age	69	
Gender	Male	
Prof. role title	Professor in plant protection	
Years of experience in present role	20	
Years of experience in the field of agriculture	40	



53	
Male	
Farmer	
30	
30	
53	
Female	
Agricultural Adviser	
23	
5	

ALS C		
Student (CS)		
Age	23	
Gender	Male	
Course title	Agricultural Technology	
Level of studies	Undergraduate	
Study year	<b>4</b> <sup>th</sup>	
Professor (CPR)		
Age	69	
Gender	Male	
Prof. role title	Professor in plant protection	
Years of experience in present role	20	
Years of experience in the field of agriculture	40	
Professional (CPL)		



Age	26	
Gender	Male	
Prof. role title	Agronomist / Oregano producer	
Years of experience in present role	0	
Years of experience in the field of agriculture	8	
Adviser (CA)		
Age	47	
Gender	Male	
Prof. role title	Agricultural consultant / adviser	
Years of experience in present role	5	
Years of experience in the field of agriculture	23	

ALS D		
Students		
DS1		
Age	22	
Gender	Female	
Course title	Agricultural Technology	
Level of studies	Undergraduate	
Study year	4th	
Professor (DPR)		
Age	62	
Gender	Male	
Prof. role title	Professor in Artificial Insemination	
Years of experience in present role	20	
Years of experience in the field of agriculture	e field of agriculture 30	
Professionals (DPL)		
DPL1		
Age	49	



Gender	Male
Prof. role title	Farm manager
Years of experience in present role	2
Years of experience in the field of agriculture	8
Adviser (DA)	
Age	46
Gender	Female
Prof. role title	Animal Nutrition Consultant
Years of experience in present role	16
Years of experience in the field of agriculture	21

ALS E			
Students			
ES1			
Age	23		
Gender	Female		
Course title	Agricultural Technology		
Level of studies	Undergraduate		
Study year	4th		
Professor (EPR)			
Age	62		
Gender	Male		
Prof. role title	Professor in Artificial Insemination		
Years of experience in present role	20		
Years of experience in the field of agriculture	30		
Professionals (EPL)			
EPL1			
Age	52		
Gender	Male		



Prof. role title	Farmer – Livestock breeder	
Years of experience in present role	35	
Years of experience in the field of agriculture	25	
EPL2		
Age	46	
Gender	Female	
Prof. role title	Farmer	
Years of experience in present role	20	
Years of experience in the field of agriculture	20	
Adviser (EA)		
Age	46	
Gender	Female	
Prof. role title	Animal Nutrition Consultant	
Years of experience in present role	16	
Years of experience in the field of agriculture	21	



# Appendix 10: AFS – Detailed information on the Learning Sets' Visits

#### <u>Visit 1:</u>

**Participants**: AFS Advisor (plant or animal science professional), professor, student, farmer/professional, AFS observer (the member of the research team that will help coordinate the first discussions, observe, take notes and carry out the interviews, questionnaires etc.)

If the learning set is on-line, it will serve as an introduction between the actors, for setting the stage for the interactions and creating an agenda for the issues to be addressed.

If done in-person, the first learning set will aim to support the student and provide them with the experience of a professional interaction with a farmer. They will have the opportunity to observe the setting, meet the farmer, and see how the advisor handles the conversation. On the other hand, the farmer will be able to talk with the student and establish the ways in which they think the relationship and the process of the learning sets can become valuable to them. During the first visit, the actors will decide on the topics that they will be concerned with. For example, issues of sustainable waste product disposal, sustainable plant protection, animal welfare, the use of novel ingredients in food production, social impact of technological advances in traditional food production etc. This is the time when the farmer/professional will try and decide what issues they would like to address in their unit. The professor, together with the student and possibly the advisor will then try and formulate the research questions of the thesis and the specific ways that they could work on them in relation with the professional.

#### Visits 2-4:

#### Participants:

In the case that the first meeting is done on-line, it is a good idea to involve all the actors again in the second meeting, in order to achieve the above objectives. If it was done in-person, in the second visit we will start to reduce the number of participants to the professor, the student and the observer, in order to allow more room for the student to interact more actively. The aim is that the student does at least one visit on their own (with only the observer present).

This is also the time when we will introduce the concept of impact indicators and give some examples to the student and farmer of how we might measure the impact of the action-research project.

Also, before the final meeting we aim to have produced a practice Abstract in collaboration with the student and the farmer.

#### <u> Visit 5:</u>

Participants: professional, AFS advisor, professor, student, AFS observer.



The final learning set will, again, consist of the whole range of actors. This will allow us to make comparisons between the quality and relative characteristics of the interactions. It will also serve as a closing scene, where all actors will be able to reflect on their experience and possibly offer ways that they can develop the relationships.

After the learning sets have finished we will engage all actors in a focus group where we will discuss the overall progress of the learning sets, whether or not the goals of the actors were reached, the actors' perceptions of their participation in the process, the impact and value they have placed on the process and the possibilities for further development and interaction.



### Appendix 11: AFS – Tables with Force Field Analysis

**Diversity of learning arenas** 

# pros

- get accustomed to working environment
- identify problems in the field
- discuss problems with stakeholders
- suggest sustainable solutions

- time spending in the field
- possibly poor representation of reality



#### **Peer learning**

## pros

- exchange information
- exchange opinions
- develop relationships
- understand each other's needs
- familirise with the topic
- gain mutual understanding
- gain holistic understanding of the topic
- allow clarifications
- positive atmosphere creates engagement

- students hesitate to voice opinions during intial sessions
- proffessors assume a more dominant role
- professors take protective role over students



#### **Supporting literature**

### pros

- meaningful conversations
- exchange of ideas found in the litarature
- brainstorming
- students identify new topics for searching related bibliography

- need for further development of searching skills
- need for more courses on English language and terminology
- language barrier
- litarure is using scientific language
- terminology clarification



#### **Diversity of assessment methods**

# pros

- assess students' work in advance
- provide feedback
- identify possible issues for the dissertation improvement
- assess student competences on the field
- provide student support thoughout the process of dissertation production

- big number of students hinders assessment
- traditional assessment system is based on exams
- traditional assessment system is not based on attendance and participation
- reluctance to change the assessment system



### Appendix 12: Skogforsk – Agenda – meeting 1-5



#### Kan man både bruka och bevara sin skog? Träffar och programpunkter

Appendix 1

1.	16 september 2021	Skogforsks demonstrationsor	nråde, Bredvik REF
2.	6 oktober 2021	Skogsägare	VISION
3.	17 november 2021	Skogsägare	DIALOG
4.	8 december 2021	Skogsägare	OBSERVAT
5.	13 januari 2022	Skogsägare	ALL

#### Träff 1

#### Välkommen och presentationsrunda

- Välkommen till Bredvik, var är vi?
- Vilka är vi i projektgruppen?
- Deltagarna (namn, bakgrund)

#### Presentation av projektet

Introduktion och förutsättningar + fallstudien

#### Dagens tema

Vi promenerar till ett ställe (längs skogsbilvägen) för att titta på två åtgärder som vi gjort där och få lite inspiration inför diskussionen om förstärkt naturhänsyn.

- Förstärkt naturhänsyn tankar och erfarenheter
- Avverkad trakt eller trakt som planeras hur styr markägaren?

#### Våra kompetensutvecklingsverktyg

Kärnkompetenser - reflektion, dialog, observation, vision

#### Arbetsformer och datainsamling

Presentation om arbetsformer och datainsamling med chatt etcetera.

**Reflektion** med 2 – 3 styrda frågor (datainsamling på papper - görs vid varje träff innan avslut) <u>15 min</u> för intro och reflektionsövning och insamling av ifylld blankett



#### Träff 2

#### Välkommen och presentationsrunda

Introduktion och förutsättningar

#### Dagens tema

Vi promenerar till det östra beståndet och validerar basvägsplaneringen och söker efter möjligheter till förstärkt naturhänsyn

- Förstärkt naturhänsyn tankar och erfarenheter
- Observera sin trakt Planera sin trakt Visionera sin trakt
- Vad finns det f
   ör st
   öd och hj
   älp

#### Våra kompetensutvecklingsverktyg

 Denna träff – fokus på Vision Hur ser man på sin fastighet om 5, 10, xx år?

**Reflektion** med 2 – 3 styrda frågor (datainsamling på papper - görs vid varje träff innan avslut) <u>15 min</u> för intro och reflektionsövning och insamling av ifylld blankett

#### Träff 3

#### Välkommen och presentationsrunda

- □ Välkommen till Råda, var är vi?
- 🗆 Vilka är vi i projektgruppen alla
- Deltagarna (namn, bakgrund) (m.t.p de två tjänstemännen från Mellanskog)

#### Presentation av projektet (repris)

#### Introduktion och förutsättningar

#### Dagens tema

Beståndsanpassat skogsbruk

- 🗆 Återkoppling från förra gången
- Dependent Promenad till blandskogen
  - Eva är rädd för granbarkborren, ska hon göra tallskog?
- 🗆 Olika dilemman, observera, reflektera, visionera
  - I grupper diskutera se till att alla kommer till tals

#### Målbilder

• Kan målbilderna bidra i era visioner/reflektioner över era fastigheter - gruppdiskussion

#### Våra kompetensutvecklingsverktyg

- □ Kärnkompetenser reflektion, dialog, observation, vision
- □ Hur går det med kompetenserna? Parvis
  - o Tänker ni på dem är ni medvetna?
  - o Har de utvecklats?
  - Använder ni reflektionsboken?

**Reflektion** med 2 – 3 styrda frågor (datainsamling på papper - görs vid varje träff innan avslut) <u>15 min</u> för intro och reflektionsövning och insamling av ifylld blankett


## Träff 4

Välkommen och presentationsrunda

□ Välkommen till Sämjesta, var är vi?

#### Dagens tema

- Möjligheter med framtida lövdominans
- Promenad till gammal orörd skog
- □ Egen observation
- Olika dilemman, <u>observera</u>, reflektera, visionera (Hur ser det ut? Var står tallarna? Risk för skador? Finns uppenbara naturvärden?)
- □ Myren
- 🗆 Fornlämningen

I grupper diskutera vad som observerats – se till att alla kommer till tals – 3 grupper

Gruppvis redovisning

Leonards respons/tankar

#### Våra kompetensutvecklingsverktyg

Kärnkompetenser - reflektion, dialog, observation, vision

#### □ Hur går det med kompetenserna?

**Reflektion** med 2 – 3 styrda frågor (datainsamling på papper - görs vid varje träff innan avslut) <u>15 min</u> för intro och reflektionsövning och insamling av ifylld blankett

#### Träff 5

□ Välkommen var är vi?

#### Dagens tema

- □ Guld och gröna skogar har ni sett filmen?
- □ Fastigheter vad värderas och hur
- Deromenad till "Lyxskogen"

#### Utgångspunkter från lära in och lära ut

(så har vi gjort upplägget och detta har ni skrivit i början av kursen)

#### Presentera den kommande hemläxan

#### Väck frågan:

- □ Tror ni att ni lärt er mer med detta upplägg jämfört med traditionella katederundervisningar/ föreläsningar? (återkommer i final doc)
- Har vi blivit medvetna om att vi har kompetenserna?
   Använder vi dom, och i så fall när?

Laget runt:

- □ Vad har vi lärt oss under träffarna?
- □ Vad tar vi med oss efter dessa träffar?

**Reflektion** med 2 – 3 styrda frågor (datainsamling på papper - görs vid varje träff innan avslut) <u>15 min</u> för intro och reflektionsövning och insamling av ifylld blankett



# Appendix 13: Skogforsk – Learn - contribute

Appendix 2

# "Lära in och Lära ut" Formuläret syftar till att samla in önskemål för upplägg och innehåll i den fallstudie där du medverkar. Fallstudien fokuserar på: a. Hur kan vi nå en förstärkt miljönytta i samband med avverkningsarbete? b. Vilka möjligheter och utmaningar finns och vad blir effekterna? c. Kan vi nå ökad kunskap med genom dialog mellan forskare, tjänstemän och markägare? För att alla ska känna en nytta av sitt deltagande i projektet styrs innehållet i fallstudien delvis av deltagarnas önskemål och idéer. För detta behöver du besvara två frågeställningar som kopplar till fallstudien: Vad vill jag lära mig inom området för fallstudien? (ex. detta har jag funderat på...? vilken effekt ger det om man...? skulle man kunna göra så här...?) Vad kan jag lära ut till de övriga deltagarna? (ex. det här kan jag en del om..., det här brukar underlätta..., jag gjorde så och det blev bra...) Mvh Skogforsk-teamet

- 1. För- och Efternamn samt befattning/titel
- 2. Vad vill jag lära mig inom området för fallstudien?
- 3. Vad kan jag lära ut till de övriga deltagarna?



# Appendix 14: Skogforsk – Self-assessment of competences

## Appendix 3

	Kunskapsnivå								
	NOVIS		S NYBÖRJA RE		KOM N	KOMPETE NT		KLIG	EXPE RT
	1	2	3	4	5	6	7	8	9
OBSERVATION									
Kunna observera olika situationer i fält									
ur ett drivningstekniskt perspektiv									
Kunna observera olika situationer i fält ur ett ekologiskt perspektiv									
Skapa en omfattande översikt över en									
komplex situation									
Göra en analys av hela situationen innan									
du drar slutsatser									
VISIONÄRT ARBETSSÄTT									
Ha grundläggande kännedom om vad									
som stimulerar respektive blockerar									
kreativitet hos enskilda individer eller									
grupper									
Förstå processerna som underlättar en									
grupps förmåga att identifiera dagens									
kritiska utmaningar och föreställa sig ett									
önskat framtida tillstånd									
Kunna inspirera förändringar genom att									
hjälpa en grupp att utveckla och anpassa									
sig till en gemensam vision									
REFLEKTION	1		1	1	1		1		r
Medvetenhet om reflektionens roll i									
personligt lärande och utveckling									
Koppla samman situationer i skogen till									
teori relaterat till skogsbruk och									
personlig utveckling									
Anslut erfarenheter och teori till egen									
personlig utveckling		1							
Förmåga att lära på egen hand									



	Kunskapsnivå								
	NOVIS		NYBÖRJA RE		KOMPETE NT		SKICKLIG		EXPE RT
	1	2	3	4	5	6	7	8	9
DIALOG									
Förstå skillnaderna mellan debatt,									
diskussion och dialog									
Kan förklara syftet och riktlinjer för									
dialog till en grupp människor									
Kan identifiera och formulera frågor									
som stimulerar till dialog									
Kan bedöma och utforska olika									
perspektiv och samt identifiera och									
utmana antagandena bakom ditt eget									
och en grupps tänkande									



# Appendix 15: Skogforsk – Course Evaluation

Appendix 4

# KURSUTVÄRDERING

Vi vill veta hur du upplevt kursen DENNA DAG och ber dig svara ärligt på följande frågor:\_\_\_\_\_

- 1. Vilken yrkesgrupp tillhör du?
- O Markägare
- C Tjän steman
- © Forskare
- 2. Är projektets mål tydligt?
- ه ٥
- © <sub>Nej</sub>
- C Tveksamt
- 3. Är fallstudiens mål tydligt?
- ه ا
- © <sub>Nej</sub>
- C Tveksamt
- 4. Verkar förklaringen av de olika kärnkompetenserna begriplig?
- ه ^
- © <sub>Nej</sub>
- C Tveksamt
- 5. Känner du nyfikenhet och/eller intresse för att delta i projektet?
- ° <sub>Ja</sub>
- © <sub>Nej</sub>
- C Tveksamt
- 6. Tror du att du kommer att kunna utveckla din kunskap genom att delta i projektet?
- ° <sub>Ja</sub>
- © Nej
- C Tveksamt



- 7. Känner du att det du vill bidra med kommer fram i diskussionerna i gruppen?
- °\_\_\_a
- © <sub>Nej</sub>
- C Tveksamt
- 8. Har något under dagens möte gett nya insikter eller kunskaper?
- د اهل
- © <sub>Nej</sub>
- C Tveksamt
- Hur nöjd är du med dagens möte på en skala 0 10 (sätt x på linjen nedan)

- 10. Kryssa för de ord som du tycker beskriver dagen som helhet
- Rolig
- □ Svår
- Intressant
- Obegripligt
- Högtravande
- □ Spännande
- Onödig
- Bra diskussioner
- Dåliga diskussion er
- Utmanande
- Högt i tak
- För praktiskt
- □ Tyst
- Ingen lyssnar
- Jag blev lyssnad på
- Jag lyssnade på andra
- □ Jag lärde mig något nytt
- Jag lärde mig inget
- Ingen lärde sig något



- Ointressant
- Tråkig
- För akademiskt
- Alla får prata
- Oväntat
- Positiv



# Appendix 16: Skogforsk - Reflection documents – meeting 1-5 learners

Appendix 5



## **REFLEKTIONER – DELTAGARE**

#### TRÄFF1

- 1. Reflektera över dagens träff det vi pratat om och sett i skogen idag på temat förstärkt naturhänsyn
- Vad har du lärt dig idag?
- Blev du inspirerad att tillämpa något på din egen fastighet
  - $\circ$  om *JA*: vad och varför?
  - om *NEJ*: varför inte?
- 2. När du tänker på övriga moment i dagens agenda
- Varför fastnade du för just dessa moment?

#### **TRÄFF 2**

På dagens träff har ni i ett par korta övningar fått visionera kring den skog vi besökt idag respektive er egen skog.

- 1. Vilka reflektioner gör du kring det här med att visionera hur upplevde du att det var?
- 2. Reflektera kring kompetensen att kunna visionera
- I vilka sammanhang tror du att kompetensen att visionera kan vara användbar?
- Om du skulle ägna dig åt att på ett strukturerat sätt skapa en vision i något sammanhang – vad tror du att det skulle kunna tillföra (jämfört med att gå direkt på att göra upp en plan)?

exv. i planeringsarbetet av ditt skogsbrukande, i olika sammanhang på ditt jobb eller inför en stor förändring eller vid planering av ett större evenemang eller en resa.



## TRÄFF 3

- Berätta vad har du lärt dig idag?
   tänk brett alltifrån skogliga frågor till begrepp och kompetenser vi använt!
- 2. Reflektera kring dagens möte när det gäller *innehåll, genomförande och kringarrangemang.*
- Skriv ner <u>3 saker</u> som du fann speciellt inspirerande och intressanta utveckla gärna!
- Skriv ner <u>3 saker</u> som du skulle gjort annorlunda om det var du som planerat träffen – och berätta kort hur du skulle gjort istället!

#### TRÄFF 4

Dagens reflektion handlar om kärnkompetenserna observation, reflektion, dialog och vision

- 1. Hur tänker du kring kärnkompetenserna beskriv kort vad begreppen innebär för dig:
- Observation att observera?
- Reflektion att reflektera?
- Vision att skapa en vision / att ha en vision?
- Dialog att ha en dialog?
- Fundera över något sammanhang (utanför träffarna) då du använt dig av någon eller några av kompetenserna och vad det *tillförde* att använda dig av dessa – beskriv kort!

*Ex. vad var det du observerade och vad var det du såg (som du kanske inte skulle uppmärksammat om du bara tittat, inte observerat)?* 

- Observation
- Dialog
- Reflection
- Vision
- 3. Var det en <u>medveten tanke</u> att du skulle observera, visionera, ha en dialog och / eller reflektera vid dessa tillfällen eller är det något du upptäckt att du gjorde, efteråt eller nu idag när du uppmanas att reflektera?



## TRÄFF 5

- 1. Reflektera över de tre första punkter på dagens agenda
  - Guld och gröna skogar har du sett filmen?
  - Fastigheter vad värderas och hur
  - "Lyxskogen"

Fundera på hur var och en av punkterna presenterades och vilka moment och vilket innehåll som dolde sig bakom rubriken.

 Välj ut den programpunkt som du upplevde var mest intressant/givande och berätta varför du valt just denna!

2. Tänk nu på hur <u>hela dagen</u> varit – från att du klev ur bilen vid ridhuset i morse fram till nu när du sitter med dagens sista uppgift.

Du har förhoppningsvis 😇 lärt dig en eller flera saker under träffen

- Berätta vad du lärt dig och beskriv vilka egenskaper och kompetenser du använt dig av under dagen för att ta in kunskap och information?
- 3. Troligen har du också själv bidragit till gruppens lärande under dagen
- Berätta vad och på vilket sätt du upplever att du bidragit till gruppens lärande under dagen!

Om det skulle vara så att du just idag inte tycker att du bidragit med något speciellt – välj ut något från en av de tidigare träffarna och berätta på vilket sätt du bidragit till gruppens lärande!



# Appendix 17: Skogforsk – Reflection documents – meeting 1-5 teachers

Appendix 6



## Reflektioner - Skogforsk-team

Om dagens upplevelse och erfarenheter – "our prouds and sorries"

## TRÄFF 1

- 1. Reflektera över dagens träff
- När vi planerade denna träff vad var det vi ville uppnå?
- 2. Idag har vi genomfört första träffen av fem
- vad har fungerat bra moment, arrangemang etc?
- vad gick mindre bra och varför?
- vad har vi lärt oss och tar med oss in i nästa träff?

#### TRÄFF 2

- 1. Reflektera över dagens träff
- När vi planerade denna träff vad var det vi ville uppnå?
- 2. Idag har vi genomfört andra träffen av fem
- vad har fungerat bra moment, arrangemang etc?
- är det något av det vi lärde i samband med genomförande av första träffen som vi tillämpat på denna träff som påverkat på ett positiv sätt – vad?
- vad gick mindre bra och varför?
- vad har vi lärt oss och tar med oss in i nästa träff?



#### TRÄFF 3

- 1. Reflektera över dagens träff
- När vi planerade denna träff vad var det vi ville uppnå?
- 2. Reflektera kring dagens möte när det gäller innehåll, genomförande och kringarrangemang.
- Skriv ner <u>3 saker</u> som du fann speciellt inspirerande och intressanta utveckla gärna!
- 3. Tänk dig att du innan denna träff hade tillgång till en tidsmaskin och redan har

upplevt hela träffen i förväg!

– Är det något som du skulle ändrat på eller gjort annorlunda om du vetat då vad du vet nu (när det strax är dags att avsluta för dagen)?

Berätta kort vad och hur du skulle gjort istället!

#### **TRÄFF 4**

- 1. Hur tycker du att vi lyckas med att förmedla kompetenserna till gruppen?
- Vilken av kompetenserna är lättast att förmedla?
   Varför tror du att det är så?
- 3. Vilken av kompetenserna är svårast att förmedla?
- Vad är det som är svårt och varför?

Reflektera kring din uppmärksamhet på kompetenserna - hur du själv använder dig av kompetenserna sedan vi började med caset.

- Är du uppmärksam på när och hur du använder dig av kompetenserna i din vardag – i jobbet, privat etc. – berätta kort!
- 5. Har det hänt att du bestämt dig i förväg för att "nu / idag / i dessa situationer ska jag använda kompetens X" utveckla dina tankar och berätta om ett sådant tillfälle!
- 6. Händer det att du i efterhand kommer på att "nu använde jag kompetens X" berätta om någon sådan händelse!



## **TRÄFF 5**

Reflektera över dagens träff
 Vi fick med ganska kort varsel planera om denna träff – lokalisering, arrangemang och till viss del innehåll

- □ Hur upplever du att <u>resultatet</u> blev (som du känner just nu)?
- 2. Reflektera kring vår <u>process i</u>nför mötet att planera, omplanera, fixa kringarrangemanget och genomföra etc.
- Berätta vad tycker du fungerat bra och vilka faktorer har tror du har bidragit till detta?
- Var det något som gick mindre bra och vad tror du att detta beror på?



# Appendix 18: Skogforsk – Reflection documents – final learners

Appendix 7



Namn: .....

# REFLEKTIONER

Skriv ner dina reflektioner under varje fråga, svara så utförligt du kan och använd så mycket utrymme du behöver till respektive fråga.

Dina tankar och synpunkter är viktiga för projektet!

Börja med att gå tillbaka i tanken till dagen då du först fick inbjudan till denna kurs.

 Berätta hur du tänkte när du såg erbjudandet - vad var det som avgjorde att du anmälde dig att delta?

Den pedagogiska modellen bygger på att kunskapsutbyte sker från alla till alla som deltar, d v s cirkulärt lärande i stället för "top-down".

2) Fundera på *hur* vi lärt oss och *om* kunskapen satt sig på ett annat sätt jämfört med om vi hade erbjudit traditionell katederundervisning med föreläsningar på samma tema istället – utveckla dina tankar kring detta!

För att underlätta lärandet och för att få syn på vårt eget lärande har vi använt en verktygslåda som bl a innehåller de fyra kärnkompetenserna – observation, reflektion, dialog och vision.

3a) Tycker du att det gjort någon skillnad att vi använt kompetenserna - har de bidragit till gruppens och din egen utveckling på något sätt – berätta hur?

I vår verktygslåda ingår förutom kompetenserna också appen Supertext, där vi utbytt bilder, funderingar, frågor och svar, nyttiga länkar m m.

3b) Berätta *vilka* av verktygen – observation, reflektion, dialog, vision och Supertext som du tycker är särskilt användbara och varför?



Relatera till dina erfarenheter från kursen och reflektera kring ditt eget lärande – både vad gäller innehåll, inverkan på dina tankar kring din egen fastighet och lärprocessen.

4a) Vad har du lärt dig under träffarna?

- 4b) Vad kommer du att bära med dig?
- 5) Under vilken av aktiviteterna kände du dig mest engagerad och vad tror du att det var som bidrog till detta?
- 6) Har du genom att delta i samtal och övningar under kursen fått syn på någon kunskap / kompetens som du inte visste att du hade – berätta!
- 7) Skriv ner 3 viktiga saker som du vill göra på din fastighet nästa vecka / nästa månad / nästa år (du väljer själv den eller de tidsperspektiv som passar).

Ju mer man lär sig om ett ämne, desto fler frågor brukar dyka upp....

- 8a) Vilka frågor hjälpte aktiviteterna dig att finna svar på?
- 8b) Vilka nya frågor (när det gäller ditt eget skogsbrukande och/eller något annat med koppling till kursen) har dykt upp till följd av att du deltagit i denna utbildning?
- 8c) Hur kan du gå tillväga för att hitta svaren på dessa frågor?

Till sist, några frågor med koppling till Reflektionsboken som du fick på första träffen

9) Har du använt dig av reflektionsboken eller något motsvarande?

Om du svarat ja ovan

- tycker du att den har fyllt någon funktion och i så fall vilken?
- Berätta gärna hur du använt reflektionsboken strukturerat eller vid speciella händelser / tillfällen etc.
- Vill du delge något ur den exempelvis vad du reflekterat över, någon idé som dykt upp, hjälpt dig att lösa något problem etc.



# Appendix 19: Skogforsk – Reflection documents – final teachers

Appendix 8



Namn: .....

# **Skogforskares Reflektioner**

Skriv ner dina reflektioner under varje fråga, svara så utförligt du kan och använd så mycket utrymme du behöver till respektive fråga.

Frågorna relaterar i till caset med skogägrareföreningen

Börja med att i tanken titta tillbaka på caset – från planering inför första kontakten med Mellanskog, genom de 5 träffarna och fram till idag när vi håller på att knyta ihop säcken.

- 3) Hur upplever du att helheten blev huvudtema, innehåll och frågeställningar?
- 4) Hur väl tycker du att vi lyckats fånga in deltagarnas (inkl. dina egna) läromål?
- 5) Om du skulle planera och genomföra en liknande kurs igen
  - a. berätta vad du skulle behålla och varför du tycker så
  - b. berätta vad du skulle göra annorlunda eller ta bort och varför du tycker så

OBS! Tänk brett - alltifrån planering, process, genomförande och innehåll

Den pedagogiska modellen bygger på att kunskapsutbyte sker från alla till alla som deltar, d v s cirkulärt lärande i stället för "top-down".

- 6) Fundera på *hur* vi lärt oss och *om* kunskapen satt sig på ett annat sätt jämfört med vid traditionell katederundervisning utveckla dina tankar kring detta!
- Beskriv hur du upplever att kursdeltagarnas engagemang varit över tid för projektet som helhet och på träffarna.
- 8) Hur upplever du att deltagarnas kompetenser utvecklats? Ge gärna konkreta exempel!



För att underlätta lärandet och för att få syn på vårt eget lärande har vi använt en verktygslåda som bl a innehåller de fyra kärnkompetenserna – observation, reflektion, dialog och vision. I verktygslådan ingår också appen Supertext, där vi utbytt bilder, funderingar, frågor och svar, nyttiga länkar m m.

- 7a) Tycker du att det gjort någon skillnad att vi använt kompetenserna har de bidragit till gruppens och din egen utveckling på något sätt – berätta hur?
- 7b) Berätta *vilket/vilka* av verktygen observation, reflektion, dialog, vision och Supertext som du tycker är särskilt användbara och varför?

Relatera till dina egna erfarenheter från kursen och reflektera kring din egen upplevelse av processen och ditt eget lärande.

- 8a) Berätta vad har *du själv* fått ut av att delta i projektet och hur dina tankar gått under processen!
- 8b) Under vilken av aktiviteterna kände du dig mest engagerad och vad tror du att det var som bidrog till detta?
- 8c) Har du genom att delta i projektet (som del i Skogforsk-teamet och under träffarna) fått syn på någon kunskap / kompetens som du inte visste att du hade? – Berätta!
- 8d) Reflektera kring hur dina erfarenheter från detta projekt kan komma till nytta i din roll på Skogforsk eller kanske till och med i privata sammanhang!
- 8e) Har du upptäckt något som du skulle vilja och/eller behöva lära dig mer om?

Till sist, några frågor med koppling till Reflektionsboken som du fick på första träffen

10) Har du använt dig av reflektionsboken eller något motsvarande?

#### Om du svarat ja ovan

- Tycker du att den har fyllt någon funktion och i så fall vilken?
- Berätta gärna hur du använt reflektionsboken strukturerat, vid speciella händelser / tillfällen etc.
- Vill du delge något ur den exempelvis vad du reflekterat över, någon idé som dykt upp, hjälpt dig att lösa något problem etc



# Appendix 20: UNISG - The 1<sup>st</sup> Workshop for planning MAFS

# **NEXTFOOD (WP2)**

# Developing a master programme in Agroecology and Food Sovereignty at UNISG

# Desired outcomes of the workshop

- f) A draft plan of a master programme based on the Nextfood model
- g) A shared understanding of the shift that we are aiming to achieve
- *h*) A plan of implementation: What, who, when, where

# **Participants**

# Facilitator(s)

Case responsible group in collaboration with the NMBU team

# Monday, February 25

18:30 - 20:00	Openin	g and welcome
	Purpose	e of the workshop
	and	The aim of the workshop is to create a shift in mindset, process content of the Nextfood educational activities.
	Particip	pants introduce themselves
	Desire	d outcome
	The ag	enda for the next days
Tuesday, Februa	ry 26	

# 10:00-12:00The Nextfood model and the intended shiftPart 1: Overview of the model (15 minutes)<br/>Short round of questions concerning the model. What<br/>adaptations of the model are necessary to meet local needs

**Part 2:** Overview of what needs to shift in order to comply with the Nextfood model and discussion of what typifies our current practice.



The overall shift from teaching to learning and from knowledge to competence implies concrete shifts in the following six areas:

- 4. From lecture hall to a diversity of learning arenas
- 5. From lecturing ('vorlesung') to 'nachlesung' and peer learning
- 6. From syllabus to supporting literature/a variety of learning sources
- 7. From textbook to a diversity (variety) of teaching aids
- 8. From written exam to a variety of assessment methods
- 9. From lecturer to learning facilitator (which includes the introduction of and training in dialogue, visionary thinking, observation and reflection

Question in plenary: On a continuum of 1-10, where 1 signifies our current practice and 10 signifies practices consistent with the Nextfood ambitions, where do we stand today? Discussion in whole group as they try to place a "x" along the continuum for each of the six areas.

*Optional activity: Invite participants to think creatively about one of key areas, for ex:* 

# Nr 1. From Lecture hall to a diversity of Learning Arenas.

main whitel	Question in plenary: What do we normally consider as the learning arenas for students today? (Note on board)
if we	Instruction: Let's assume there are many alternatives and see can come up with some new and original ideas.
	<i>Exercise in small groups of 3:</i> ( <i>NB</i> ! <i>Select someone to note down all the ideas</i> )
	Step 1: You now have 5 minutes to come up with at least 15 alternative "learning arenas".
stretch judgement,	Follow the guidelines for divergent thinking (brainstorming), your thinking, don't evaluate each others ideas, suspend focus on quantity, allow for completely new ideas! ).



have Choose will for now just see potential)	Step 2: You now have 5 more minutes to go through the list you made and choose 1 of these new ideas for "learning arenas". an idea which is appealing. (Remember all new ideas eventually have to be developed to be fully realistic, but select an idea which is new and novel and where you
idea to the and relevant	Step 3: In the next 5 minutes prepare to present your chosen whole group. Why do you think it has potential as a new learning arena?
new potential,	<b>In Plenary</b> : Listen to each small group present their idea for a learning arena. Invite the other participants to explore it's and request that they keep an open mind.
	Step 4: Summing up the work on the intended shift towards a diversity of learning arenas.
	Begin to evaluate which ideas connected with the different learning arenas could be combined. Look for interesting and unique combinations that together could be integrated into an ideal master program.
	Keep in mind: To succeed, we should in all our programs strive for a shift in all the 6 described areas.
ł	Discussion: Which of these shifts do was want to give priority to why?

An alternative could be to designate one shift area to each small group, and let them work creatively on that one area. That way there could be creative thinking on each of the 6 areas at the same time. Afterwards, each group could share their most appealing ideas to the large group and let that information be input to the outline of the desired course.

12:00 – 13:00An outline of the desired courseA presentation of the ideal course/program, for improvement by the<br/>participants, based on the creative thinking of the groups during the<br/>first session. As such, the alternative approach there, with small groups<br/>working on several of the areas of shifty would be the best approach.<br/>Preparation for the open meeting after lunch

13:00 – 14:00 Lunch

14:00 - 15:00	Presentation of a draft of the master program
15:00 - 15:30	Break
15:30 - 17:00	Feedback from the participants

# Wednesday February 27

10:00 - 11:00	Summing up from the previous day
11:00 – 13:00	<ul> <li>What would it require from learners, facilitators and institutions to succeed with such a course/program that is based on the Nextfood model?</li> <li>Review of dialogue guidelines</li> <li>Exercise to address the question</li> <li>Individual reflection (5 minutes), followed by a dialogue in small groups (40 minutes) and a discussion in plenary (15 minutes).</li> <li>Write on flip-over or whiteboard</li> </ul>
13:00 - 14:00	Lunch
14:00-14:45	<b>Planning for implementation</b> - What needs to be done when and by whom to implement the intended transition to action learning in the course/program? (10 min individually, 15 min in small groups, 20 min plenary) Write on flip-over or whiteboard Facilitator ideas:
14:45 – 15:00	Coffee break
15:00 – 16:30	The immediate next steps (What, when, who, where) Who should meet and when? What should be ready and when? ( <i>Plenary discussion to make a timeline</i> )
16:30 – 17:00	<ul> <li>Wrap-up</li> <li>Reflection and small group discussion after each question below.</li> <li>(2 min individually, 5 min in small groups, 10 min plenary)</li> <li>Write on flip-over or whiteboard <ol> <li>Note down three things you liked about this meeting, that you found useful, inspiring, interesting!</li> <li>If I were to be responsible for the next workshop, what would I do differently?</li> </ol> </li> </ul>



# **Appendix 21: UNISG - Questionnaire**

With this short questionnaire we would like to evaluate and to understand your experience within the MAFS programme in Phase 3 Action-Learning and Research.

It will take not more than 10 min of your time

- 1. Please write you name -OPEN
- 2. name of the Community OPEN
- 3. Did you have experience in research and education before MAFS?

YES-NO

4. Was the goal of the collaboration between UNISG students and your community clear?

YES-NO-Partially clear

- 5. What was the motivation for the community to participate in the programme? [Select as many as you want.]
- to enlarge networks, build relationships and exchange among all actors (other communities, UniSG team, students, tutors, Slow Food team, and professors);
- to know new cultures, rural realities, local contexts, different production approaches and will be able to put theory directly into practice;
- to identify strengths and weaknesses of the communities through the actionlearning projects analysis (portfolio) on the specific topics (i.e. soil, water, biodiversity, climate change, economy, social, policy, etc.);
- to provide pathways and suggestions for overcome barriers, for sustainable development and facilitating the communities' activities through the actionlearning projects results and discussions;
- to have hands-on support at the community;
- to deliver two final results: master thesis (academic), and booklet (narrative)
- to promote the community through its presentation on the thesis defence, and chapter in the booklet (also online available, see link in the e-mail)
- to contribute to the communities' Food Sovereignty through Agroecology
- OTHER (Open): \_\_\_\_\_
- 6. Did the community benefit from the involvement of the MAFS students into the community? YES-NO



- 7. What was the specific student's contribution to the community? [Select as many as you want.]
- we as community have enlarged the networks, build relationships and exchange among all actors: other communities, UniSG team, students, tutors, Slow Food team, and professors;
- we as community have known new cultures, rural realities, local contexts, different production approaches and will be able to put theory directly into practice;
- we as community have received support in identifying strengths and weaknesses of the communities through the action-learning projects analysis (portfolio) on the specific topics (i.e. soil, water, biodiversity, climate change, economy, social, policy, etc.);
- we as community have received pathways and suggestions to overcome barriers, for sustainable development and facilitating the communities' activities through the action-learning projects results and discussions;
- we as community had hands-on support at the community;
- we as community contributed to the final results: master thesis (academic) and booklet (narrative);
- we as community got promoted as community through the thesis defence and chapter in the booklet (also online available);
- we as a community developed the communities' Food Sovereignty through Agroecology.
- OTHER (Open): \_\_\_\_\_
- 8. Was the balance between the MAFS students' work and research appropriate? YES-NO-partially
- 9. What do you think about the students' research project? Was it interesting? Did you participate in the selection of the themes? In the planning? In the research data collections? In the results? OPEN
- 10. Were the students well prepared? YES-NO-partially
- 11. Overall, what would you improve/change in the process to make it more useful and satisfying for all participants? OPEN
- 12. Please evaluate your level of satisfaction about this experience and collaboration?1 (very dissatisfied) 5 (Very satisfied)

13. Would you like to participate/collaborate in the next edition of the MAFS (sept 22-sept 23, phase 3: april-june 2023) yes-no-we will decide later



# **Appendix 21: Course Program Details**

- Course title: Linking agroecology with society
- Course Description: This course seeks to link students with social actors who work in the field of agroecology and/or sustainable agrifood systems. The course will be developed through theoretical classes, groups discussion, reflection activities and practical teamwork, in which a participatory research process based on case studies will be carried out. On the other hand, this course will be a pilot experience to implement a new educational methodology developed within the framework of the international project "Educating the next generation of professionals in the agrifood system- NEXTFOOD" of the European Commission (https://www.nextfood- project.eu/). The expository classes, group discussion and reflection activities will be carried out online, however, two field trips have been planned, which will be evaluated according to the sanitary conditions and the status of the Step-by-Step Plan in the Metropolitan Region.
- Teaching team: Claudia Rojas (course coordinator), and collaborators:

Teacher		Main research field						
-Andrés Muñoz, A PhD.	Agronomist,	Agroecology; Conservation biology; Landscape ecology.						
-Ricardo Pertuzé, PhD.	Agronomist,	Plant breeding and genetic resources with special interest in the horticultural area.						
-Gabriela Lankin, . PhD.	Agronomist,	Integrated pest management; Applied Entomology in Crops; Biological Pest Control.						
-Osvaldo Salazar, A PhD.	Agronomist,	Soil fertility, agroecological soil management, application of computational models.						
-Francisco Nájera, . PhD.	Agronomist,	Soil ecology; Carbon dynamics in the soil.						
-María Paz Agronomist. MSc.	Santibañez,	Agricultural and Rural Extension.						
-Catalina Amigo Anthropologist.	o, MSc.	Just Energy Transition; Climate change; Territorial Systems; Transdiscipline and Science-Policy Interface.						

- Learning outcomes: described in 1.4
- Course content:
  - II. Context
    - Introduction to interdisciplinary studies



- Introduction to participatory research in agri-food systems
- o Holistic understanding of agroecological systems
- Interdisciplinary problems: expectations, aspirations, and scientific rigor
- Interdisciplinary study methodologies
- Transfer of knowledge and dialogue of knowledge
- Fieldwork methodologies in the cultural and community context
- Solutions? Context, Reflections, and Challenges
- II. Teamwork with the social organization
  - Coordination meeting
  - Team preparation day
  - Visit to social organization (diagnosis)
  - Day of presentation of the diagnosis before teachers and colleagues. Share experiences.
  - Preparation of improvement plan
  - Visits to social organization (improvement plan presentation)
  - Final presentation
- Course methodology

During the development of the course, the pedagogical approach proposed within the framework of the NEXTFOOD project, which is based on the action learning methodology that seeks to develop in students the skills of participation, observation, dialogue, vision and reflection. The NEXTFOOD approach contemplates 5 steps:

- Maintenance of a document throughout the course in which students and teachers will write their reflections on the learning process
- Evaluation by the students of the content and dynamics carried out in the educational activities (it will preferably be done every 2 weeks and at the end of the course)
- c) Self-assessment of students' skills and abilities at the beginning, halfway (optional) and at the end of the course.
- d) Interview the students to identify their learning objectives and the development of their skills during the course (it will be done at the beginning and at the end of the course)
- e) Discussion and reflection sessions at the end of each class.

On the other hand, student work groups will be established, which will be linked, throughout the semester, with a social actor who develops in the field of agroecology and/or sustainable agri-food systems, in the latter case farmers. or cooperative of agroecological farmers of the Metropolitan Region, to develop a diagnosis and proposal for improvements in their agroecological systems.

In addition, teachers who contribute to contextualize the students in the field of linking agroecology with society will be invited and rotated.



- Assessment:
  - Diagnosis report (25%)
  - Final report with recommendations (30%)
  - Final presentation (30%)
  - Homework and discussion activities (15%)



# Appendix 22: Some outcomes from the final report and students presentations

One of the highlighted outcomes regarding the case study with the farmer, was that students identified an opportunity to help him through technology, with a concrete resource with which he could expand his business to other clients.



Image 1. Flyer made by the students as a dissemination material to help the farmer to sale his products during summer.

Regarding the Agroecological Foundation, the agronomist remarked the idea of building a collaboration with the University. That is why, students made the contact between an agroecological school that is under the charge of the Foundation, and a University student's organization, that works preparing high school students to enter College.



Image 2. Promotional flyer of the students organization



# Appendix 23: Self-Assessment of Competences (from D2.1 Action Research Protocol)

Questions	1	2	3	4	5	6	7	8	9
OBSERVATION									
Carefully observe a situation in the field.									
Create a comprehensive overview of a									
complex situation.									
Allow for examination of the whole									
situation before drawing conclusions.									
PARTICIPATION									
Recognize values and goal conflicts of									
different stakeholders in society.									
Participate in work "out in the field" with									
commitment and dedication.									
Empathize with the goals and feelings of									
stakeholders in the field.									
VISIONING									
Have basic knowledge of factors that									
stimulate and block creativity in individuals									
and groups									
Understand the processes that enhance a									
group's ability to identify today's critical									
challenges and envision a desired future									
state									
Able to inspire change by helping a group									
develop and align around a shared vision									
REFLECTION									
Awareness of the role of reflection in									
personal learning and development									
Connect situations in the field to theory									
related to farming and food systems as well									
as to personal growth									
Connect experiences and theory to own									
personal development									
Ability to embrace self-guided learning		1							
		1							

# SELF ASSESSMENT OF COMPETENCES



DIALOGUE					
Understand the differences between					
debate, discussion and dialogue					
Can introduce a group to the purpose and					
guidelines for dialogue					
Can identify and formulate questions which					
stimulate a dialogic approach					
Can appreciate and explore a variety of					
perspectives and be able to identify and					
challenge the assumptions behind your					
own and a group's thinking					



# Appendix 24: Instructions for data analysis – Text\_2.1 (Amendment to D2.1 Action Research Protocol)

# Instructions for data analysis - Text

# Version 2.0

As mentioned in the Research Protocol (D2.1), rigorous data collection and analysis is paramount to the success of the action research in the Nextfood project. In order to ensure consistent data collection, the Research Protocol provides instructions on how to collect data from the activities performed when following the Manual for Case Development (D2.2). Once the data have been collected, they need to be analysed in a consistent and rigorous manner in order to allow for fact-based improvement of each case and for cross-case comparisons. Our aim is therefore to provide you with clear instructions on how to analyse the data that you are collecting throughout the activities in your case.

With the instructions provided in this document we aim to support you in analysing the data that you have collected in the form of text or that can easily be turned into text. We have developed these instructions for you to analyse text qualitatively through the method of Content Analysis. This is a well-established method which we will guide you through one step at a time. You don't have to be experienced in qualitative research to work with this document, but you should be acquainted with the Nextfood approach.

Given that Content Analysis is the method we are using, let's start with looking at what that method is all about.

Content analysis requires (1) starting with research questions that you want to find answers to; (2) creating a set of codes for categorizing the text; (3) applying those codes systematically to a set of texts; (4) testing the reliability of coders when more than one applies the codes to a set of texts; (5) creating a unit-of-analysis-by-variable matrix from the texts and codes; and (6) analysing that matrix [...] (based on Bernard 2006)

- The research questions in the Nextfood project are situated at two levels: 1) The students' learning and experiences in the new learning landscape, and 2) The process of changing the learning landscape (the course activities) towards the full-fledged Nextfood approach. (re. the areas of shift)
- 2) We have already created a set of codes for themes in the research questions based on the Nextfood model, the so-called coding tree.
- 3) In this document we will describe how to apply those codes systematically to your data that are or can easily be converted into text.
- 4) We will also describe how you can do an intercoder check in which you test the reliability of several coders.
- 5) We will describe how to cluster data and create units of analysis, potentially using qualitative data analysis software.
- 6) We will explain you how to analyse those units qualitatively.





# Figure 1 Overview figure

Figure 1 shows the different steps that we will guide you through in this document. Starting in the upper left side of the figure and following the arrows clockwise, this document will guide you through the following steps: You have collected the data and should make them ready for analysis first. This means that you should **transcribe** some of the data. You should then **code** your data. Be aware that this is a time consuming and concentration demanding process! Moreover, coding your data includes doing **intercoder check(s)** if several persons are coding, which is also a tedious task. Once coded, you should **cluster** your data through several **extraction** processes. Next, you can start **analysing** your data, which means looking at what your data indicates thanks to the coding and clustering you have done. The analysis leads to an understanding of the meaning of the data and at this stage you are ready to write the Case Development Report.

This document will guide you through these different steps. Each step is represented in a section that starts with a visual representation of that step as well as a box that mentions who is best suited to conduct the step and what material to start and end with. Then, each section describes what you should do based on examples from the NMBU case and with reference to previous Nextfood deliverables and scientific literature when necessary.



# **TRANSCRIPTION: Preparing your data for analysis**



Figure 2: Visualisation of the transcription phase of data analysis (excerpt from fig. 1)

WHO?	Anyone (who can read and write, is meticulous and able to translate to English if necessary)
START WITH	Data in the form of text files, video files, audio files
END WITH	Data in the form of anonymised text, filed in line with the guidelines

Transcription is the process of turning your audio recordings/assignment

responses/notes/video recordings or other raw data into a text document that you can further code. If your data already is in the form of a text document, this step is mainly about anonymity, storing and possibly translation. During this process you should anonymise the data, and store the data using the correct structuring syntax (in line with Nextfood's D6.2: Data Management Plan). Preferably you should also translate the data during this process. However, if you have very large data sets, which would make the translation timeconsuming, or if you are worried that during translating you lose a lot of the content, you may also opt to transcribe and code in your local language and only translate those parts that you would like to use as quotes when describing your results.



Transcription begins by creating a new text document and naming it using the syntax explained in the box below. To do that there are several structuring decisions you have to make regarding naming the datasets, subsets etc.

Explanation of the naming system and rationale
From D6.2 p.11: "WPNumber_TaskNumber_PartnerName_DataSubset_DatasetName_Version_DateofSt orage"
To accommodate for the multiple similar datasets that will be made throughout the cycles in the cases, we decided to add a naming category, which makes our naming system follow this structure:
WPNumber_TaskNumber_PartnerName_ <b>CycleYear</b> _DataSubset_DatasetName_Versio n_DateofStorage"
Rationale: WPNumber = WP2 because that is where the cases have funds in the project
TaskNumber = T2.2 because that is where the case development reports stem from
PartnerName = NMBU
<b>CycleYear</b> = 2019 because that is the year the course ran.
<b>DataSubset</b> = Exercise 1 because it is the subset of the dataset gathered.
DatasetName = Beginning of semester because it is the dataset which includes the particulardatafile

Additionally, you have to make an identification key that links the participant's<sup>10</sup> name with an anonymized code. This identification key must not be kept together with the transcribed data. As a suggestion, you print out a list of all the participants, assign a randomized code to each participant and circulate the list physically among only those who will do the transcription work. Do not share this key online, even amongst the team. Thereafter, you should start the transcription by writing short and descriptive meta-information for instance like this:

<sup>&</sup>lt;sup>10</sup> In this document, we use the term 'participant' for all persons from which this project generates data, to name a few: students, teachers, stakeholders, participants in focus group discussions.



Content:	End-of-semester interview regarding learning outcomes	
When/where: NMBU 2019		
Data type:	Audio recording	
Interviewer: Åsmund Steiro		
Transcriber:	Åsmund Steiro	
Participant-ID:	390	
Structure:	I: Interviewer	
P:		Participant

Now you are ready to transcribe the contents. There is no need to write down all the "uuh"s and "eeehm"s, but the transcribed data should stay close to the wording of the participants. It is however not necessary to transcribe everything that is being said in a conversation. If a part of the interview is clearly not relevant for the further analysis, it is better to not spend time transcribing and coding it. For instance, if the interview digresses and the two people start talking about the recent weather patterns, it's appropriate to mark the transcription with a timestamp of when the digression started and ended and then indicate the contents of the digression with a short description. For instance, you may write "13:30-15:30: [Talked about the weather]". While transcribing, any information that might compromise the identity of the participant must be anonymised. For example, if a student reveals their hometown, age, their name, a classmate's name or any other identifying information the transcriber should substitute the identifying text with for instance [age] or [name of classmate]. If you decide to translate non-English information to English, you may find it most convenient to do that while transcribing instead of in two separate operations. If the transcriber is uncertain about a translation, s/he should include the original phrase and the interpretation, indicated by [square brackets] where necessary.

The most classic type of transcription is writing down word by word the contents of an audio recording. However simple that task sounds, it should not be taken lightly as it is very time consuming. If you have a lot of data that needs to be transcribed, you should consider hiring extra help from for example a graduate student as the task does not require much knowledge of the project.

If you decide not to transcribe your data, or if your data are already in English, you should nevertheless anonymise the data.



# **CODING: Structuring your data**



Figure 3: Visualisation of the coding phase of data analysis (excerpt from fig. 1)

WHO? leaders)	Researchers who are familiar with the Nextfood approach (case
START WITH	Data in the form of anonymised text, filed in line with the guidelines
END WITH	Data coded individually by one or several coders,

# Coding individually using a predefined coding tree

After having collected and prepared your data comes the task of sieving out what is interesting in the data. This is essentially what coding is. We have developed a coding tree (figure 4) that every case should use as a sieve. In practice, this means that you read through data and select parts of the text and tag it with a code if that text is related to that particular code. Examples of coding below will make this clear. Coding is a time-consuming task and requires good understanding of the research questions and the Nextfood approach and we therefore believe it is best if researchers familiar with this (i.e. case responsibles) carry out this task.

The coding tree has been developed to structure the data. More specifically, to structure the data in a way that makes it easier to answer the research questions that we ask ourselves during the implementation phase of the case work. You might remember those questions from the research protocol (D2.1). We also repeat them below. As stated in the introduction of this document, we're investigating these questions at two levels: 1) The students' learning and experiences in the new learning landscape, and 2) The process of changing the learning landscape (the course activities) towards the full-fledged Nextfood approach.



At this point in time, we focus on the first level since that is the level to which the material we are coding now is related. Indeed, we are now coding data that were generated by students. The second level will be dealt with in the analysis of the planning/reflection workshops.

More specifically, the questions we're looking to answer by analysing data from the implementation phase is (from the research protocol, p. 11):

How do students experience such a learning process in terms of

- how they adapt?
- what it requires from them?
- what it gives them?
- what is missing?

How and to what extent do various educational activities enhance the students' abilities to deal with 'the challenge of the whole', including to take or facilitate informed action, and the competences considered necessary for doing so (observation, reflection, dialogue, participation and visioning)?

The first questions are best answered by using a data-driven approach where we explore how learners describe experiences with the "new learning landscape". Conversely, the second question should be answered by a more concept-driven approach where we look for instances where the learners describe how and to what extent various educational activities have helped them develop the six core competences.




#### Figure 4: The coding tree

As shown in the figure above, the coding tree begins with two branches: competences and transformative learning. Competences then branches further into the six core competences that we have placed a heavy emphasis on in WP2. Finally, the competence facilitation branches into students and teachers to distinguish between facilitation done by students and by teachers. These ten codes are the primary codes to be used when coding the text data, however, we encourage each case to add additional codes if you feel it is necessary. Be advised that for each additional code added, the task of coding becomes more challenging as the coder has to consider a larger number of themes to look for in the text data.

Qualitative data analysis programs can make this job easier. In the NMBU case, we use NVIVO 12 Pro (QSR International 2019) and we recommend all cases to use this software too because that will make it easy to share coded data and do cross-case comparisons. Throughout the rest of this chapter we will explain how the codes in the coding tree should be assigned to the data you have collected and prepared for coding.

#### How to use the coding tree

There are two categories of formulations from your transcribed data regarding competences that should trigger coding them; (1) where participants describe **their own** actions or experiences related to competence development during, or in relation to the course; (2) where participants describe **others'** actions or experiences related to competence development during or in relation to the course. Sometimes the participants explicitly mention the competence they or others developed, and then it is easy to know which competence to code for. However, often participants describe actions or experiences where they developed competences without explicitly referring to the competence. In such cases, you should try to assign a suitable competence code based on the definitions and examples in the following sub-sections.

The competences are pre-defined concepts that we instruct you to code for, while "transformative learning" is a more data-driven code where we encourage you to not feel



constrained by the theoretical concept of "transformative learning". For an explanation of how to use the code "transformative learning", see the sub-section below (p. 14)

Depending on the data type you are coding, you will probably find more of certain types of statements. For instance, when coding reflection documents where students are describing their learning process, you should look for <u>text where students describe actions that relate</u> to developing competence(s) or transformative learning that took place during the course or when they refer to such actions when describing <u>their own future plans</u>. You should not code text where students describe actions that took place before the course. After all, you are coding the reflection documents to gain insights into how competence development and transformative learning happens **during** or **because of** the course. However, when coding students' answers to the questions that you ask them at the start of the course, you should also code text where students describe actions that took place <u>before</u> the course because that's the only thing students can refer to at that point in time and you code those answers precisely because you want to gain insight into their evolution over time (by comparing their answers before, in the middle and after the course, as well as comparing those answers with what they write in their reflection documents)

Be aware that you can also code "negative examples" where participants describe a failure to develop the competences or expresses the need for an increased level of competence development at a certain point in time, during a specific activity, or in general. (See examples 3 and X below.)

Let's look into examples for how to use the different codes in the coding tree.

<u>**Competences**</u> includes the six core competences of the Nextfood project, but also all other competences that do not have an explicit code in this coding tree. The definition proposed by Wiek et al (2011, p. 2014, referring to others) is useful in that regard: We employ in this article the definition of competence as a functionally linked complex of knowledge, skills, and attitudes that enable successful task performance and problem solving (cf. Spady 1994; Baartman et al. 2007).

A competence is thus not synonymous with a skill. To be competent, one has to combine knowledge, skills and attitudes to enable successful task performance. And in this context, the successful task performance is related to improving the sustainability of our future farming and food systems. When coding for competences, we encourage you to keep this important distinction between skills and competences in mind. It may become clearer to you by reading the examples below.

This particular code (**competences**) should be applied to text where competences in line with this definition are mentioned, and are not captured by either of the six core competences of Nextfood. In other words, you should use this code when you have the impression the text describes competence development, but you cannot put your finger on which competence exactly. Let's move on to see how we intend to code the six core competences.

Participation is defined in D2.1 and D3.1 as follows:



Participation is the competence of participating in work in the field, not as a distant observer, but rather with personal commitment and dedication in interaction with different stakeholders.

By "in the field" we mean any learning arena outside the traditional academic arenas. For instance, this could be participation in farming/forestry operations, participatory classroom sessions, stakeholder workshops, or other forms of systems inquiries. See example 4 below.

Further (D3.1, p. 15), "participation can be interpreted as a transformative process focused on making a difference, as opposed to accepting status quo."

Therefore, it is not enough to simply be present in the learning arena. In this context, participation refers to interactions with the stakeholders with the aim of changing the system. We'll provide some examples to demonstrate how we should use this code:

Example 1: participation and reflection

Participant: "First, both caseworks were safe experimental spaces that offered good examples of how participation helps build trust between people who do not know each other but are brought to work together towards a higher purpose. They also allowed me to assess and reflect on the value of participatory inquiry processes as we conducted them."

The participant is describing that the caseworks, which are essential parts of the course, enabled her/him to improve their competence in participation and reflection. In this example there is a clear causal suggestion from the participant. It is clear from this quote that it was the situation in the caseworks that enabled her/him to improve their level of competence mastery. This is exactly the information we are after in coding the reflection documents and a clear example of the first category: the participant describes her/his own experiences during the course where competences were developed.



#### Example 2a: Participation

#### Participant:

"At the first two schools, we were only able to speak with administrators, and didn't really get an idea of the canteen managers' point of view. The third school provided us the opportunity to do so, and this canteen manager turned out to be the greatest well of knowledge. We realized from our interview with the canteen manager at the third school that canteen managers seem to be the main catalyst for success in this project. Implementation of the goal runs through them. Therefore, we attempted to set up more meetings with the other managers, eventually being able to speak with one more. The school interviews were vital to our understanding of the system, and of our role in it. After these interviews, our group had a pretty good understanding of how to move forward and the project became clearer. However, that is not to say that the system itself became

Example 2b: Participation

Participant:

"Participation on both farms included potato harvesting, cleaning out the barn, pulling up electric fences and changing tractor tyres. This work allowed for an appreciation of the typical daily scenarios of the farmers. This took place over several hours which gave us the opportunity as a group to talk quite constructively about what the situation was here on each of the farms."

Explanation



#### Example 3: "negative example" of participation

Participant:

"When we came back for the visioning workshop on our second visit on the field, we presented our rich picture to the participants and asked them for feedback. This way, our data, interpretations and conclusions could be tested by field actors who could challenge our findings and point out discrepancy. However, most of the stakeholders we interviewed to analyse the food system and construct our overview of it where not those who were present at the workshop. So we could not really make sure we were representing the initial participants' view."

#### Visionary thinking is defined in D2.1 and D3.1 as follows:

Visioning is the process whereby we activate our insight and imagination, connect with our values and sense of purpose and create mental images of a desired future state. Being able to engage a group in creating a shared vision can heighten the possibility for breakthrough solutions and unite and provide the link between diverse people, interests and activities.

When applying this code you should look for instances where participants describe actions related to envisioning a desired future for a system they are interacting with. This may for instance be co-developing a plan for farm improvement with a farmer. However, it is important that the desired future is not just a quick-fix to a technical problem, but that it has an element of activating insight, imagination and connecting with values. The term should not be conflated with problem-solving as visionary thinking encourages thinking about a desired future and not focusing on the problems.

Example 4: Visionary thinking

Participant: "I was thoroughly impressed with the farmers abilities to get into the visioning session that we held with them. Initially we did not think it would be appropriate or possible to convince them to feel 'safe' in closing their eyes and imagining. We were keen to give it a go and I led the script with helpful support from the rest of the group. It was beneficial for the group members to also take part in the session and help with further idea generation and probing as we tried to then get the thoughts on a mind map."

Explanation



**Observation** is defined in D2.1 and D3.1 as follows:

Observation is the competence of carefully examining situations in the "world out there" with which you are confronted, before you make any judgements about the situation. This has the intention of an unbiased examination.

Furthermore, to be a good observer you have to be aware of your potential biases. For instance, if a student with crop science background visits a farm, s/he will have a bias towards observing the crops at the farm. The good observer is aware of those biases and doesn't try to ignore those perspectives, but rather seeks to look beyond as well. When applying this code you should look for instances where this mode of exploration is described in relation to the case activities.

Example 5: Observation

Participant: "After the observation of a situation, we were asked to draw a rich picture; it was something I had never tried before. Drawing a rich picture is a group exercise that helps to understand the complexity of an entire situation by the illustration of different perspectives. The main idea is to think holistically about what we've seen and try not to structure. It's about understanding relationships and connections without representing the organization of the system. It was difficult for me not to give structure to our rich picture. However, I understood, step by step that structure does not mean cohesion and that it's possible to represent a messy situation in a clear way."

#### **<u>Reflection</u>** is defined in D2.1 and D3.1 as follows:

Reflection is a process of exploring and examining ourselves, our perspectives, attributes, experiences and actions and interactions. It helps us gain insight and see how to move forward. It increases our ability to link our own experiences to theory and to personal development.

The key to coding for reflection is to look for instances where the participants describe improving their abilities to reflect or that they practiced the ability of reflection. For instance, phrases similar to "this experience made me realize the value of connecting



the insights from concrete experiences and theory". We're not looking to code reflections per se. So if a participant is stating that "As I am a person who needs frequent feedback to do well, the amount of peer-feedback was very beneficial for me.", the statement itself is a reflection, but should not be coded for reflection as it does not describe how the participant improved their abilities of reflection. It should also be noted that reflection is not the same as feedback or evaluation.

Example 6: observation and reflection

Participant: "Drawing a rich picture with the group helped me to practice my observation competence. The aim of the rich picture was to draw all the observations and information made during the working day and interviews. I found that exercise challenging because it forced me to just draw what I observed, the challenge was in that I was quickly jumping into system analysis without exploring all the observation phase. Thanks to this exercise I understood that if I want to have an overview of a whole complex situation, I need to take the time to observe before I jump to system thinking and other conceptualization reasoning. I also think that this understanding was part of being an autonomous learner thanks to the reflection I had about that experience. "

Explanation

#### **Dialogue** is defined in D2.1 and D3.1 as follows:

Dialogue is a process which helps us notice the nature of our thinking. Dialogue increases our capacity to move into and toward difficult issues in a welcoming fashion. It expands our capacity to listen and to become aware of the piece of the mosaic that might be missing from our own and the collective understanding.

A dialogue is a form of conversation, which as opposed to a debate, is focused on understanding each other, learning from the conversation and gaining a higher understanding than one could have by oneself. People who are good at the competence of engaging in dialogues are able to reflect together in this form of conversation. When you code text for this competence you should look for instances where the participants describe experiences with this type of conversations in relation to the case activities.



#### Example 7: dialogue and reflection

Participant: Firstly, the dialogue, thanks to the theory I knew what the characteristics of the dialogue were. I observed that in our group there was at some points an unwillingness to be influenced and an absence of active listening as it seemed that we were thinking about an answer while the other person was talking. An example of it was when we tried the talking stick, which was a good idea towards being interrupted by the other members of the group while explaining ideas. It turns out that as soon as the person finished everybody directly wanted to take the parole and have the stick, in that could see the absence of at least a short assimilating phase before answering. It seemed that everybody had already an answer to what was said. Thanks to these observations I experienced that the mindset of the individuals in the group was something very important towards having a good dialogue. "

#### Explanation

#### **Facilitation** is defined in D3.1 (p.13) as follows:

Facilitation is the ability to enable others to cultivate the other five competences.

Pierce et al. (2000) established a facilitator competency model describing key aspects of what a competent facilitator should be able to do. We recommend that in order to gain a good understanding of what facilitation entails in this context, read the "Pierce paper" in addition to the chapter in D3.1 (p. 21) describing facilitation in education.



Example 9: facilitation (by students), dialogue, participation, visionary thinking

Participant: "When we have been explained the process of how we may conduct our farm case. I had doubts about it, it was very abstract and new for me because of the reason explained above. But once I started doing the visioning session and the action planning session with the farmers, I understood how this approach was powerful. The farmers had ideas about what they wanted to implement in their future. They had the resources as well to make those ideas possible. We just helped them to identify what values were behind those ideas, how to organize them and bridging the abstract world (ideas and not concrete plans) with the real world (making an action plan in order to start implementing those ideas). "

**Explanation** 

#### Example 10: "Negative case" of facilitation (by teachers)

Participant: "In addition, lectures and readings provided me with tools that I believe can be very helpful when facing a complex situations. I admit not having consciously made use of all those tools during the group work. Some reasons for that were maybe the presentation of those tools being very little rooted in examples from reality - making it hard to figure out how to actually utilize them - and my reluctance to theory in general."

Here, the participant is expressing the view that the course content can be helpful. However, the participant goes on to say that the presentation of the course content (i.e., the facilitation) contributed to the participant not fully utilizing the course content. Thus, this is an example where participation by teachers is the right code to use. This is an example of the second category: the participant describes that others (in this case, the teachers)

<u>**Transformative learning**</u> is defined in D3.1 as follows:



Mezirow (2003) defines transformative learning as "[...] learning that transforms problematic frames of reference–sets of fixed assumptions and expectations (habits of mind, meaning perspectives, mindsets)–to make them more inclusive, discriminating, open, reflective, emotionally able to change".

And further:

Mezirow and Associates (1990) call transformative learning: "...learning experiences that leave a significant impact on the learner, a paradigm shift that shapes the learner and affects subsequent experiences".

#### Example 11: transformative learning

Participant: "I think that in August I was more focused on what knowledge I was going to learn, and I think, in addition to other factors (such as poor sleep), that to an extent made it difficult for me to absorb the other aims of this program. But now I appreciate more the value of experiencebased learning and reflection. I feel I may some time look back at the two courses and recognise some ways in which it will have impacted my modes of thinking"

Here, the participant is relating back to how her mindset was at the beginning of the semester and see that it has changed through the course. The shift is here from being focused on content to starting to appreciate other forms of learning and being more interested in the processes. Transformative learning is a long process, and is not very likely to be visible within one semester, but elements of a shift in mindsets can be detected, as this example shows. This is an example of the second category where participants

#### Writing a coding log

While you are coding, you should keep track of what you are doing and why you are doing that. In fact, you should keep such detailed track of your coding process that anyone can take over at any point in time. For example, if you decide at one point to add a code to the coding tree, you should write that down in the coding log along with an explanation of why you took that decision. You should also write down in your log that you decided to take out a certain data source and why (because the participant has withdrawn consent, for example).

If you work with several coders together in your case, you should keep track of what each of you are doing and when, so the others should only check the coding log in order to know where to start from.



Writing a coding log is crucial to enable yourself to check for consistency in your coding, to enable a check for consistency across cases, to avoid doing double work, and to keep track of rigour in the data analysis process.

Examples from the **NMBU coding log**:

#### 2020-01-28

Åsmund: coding

WP2\_2.2\_NMBU\_2019\_exercise 1\_beginning of semester\_student 389\_2019-08-21

- While coding, I notice that "systems thinking" comes up many places. Should we add this as a code? Seeing the whole instead of only the parts is repeated as necessary for making the desired change.
- I also question the reliability of the data since the timing of these responses are questionable. The students received these questions in the introductory week to the MSc program where they were introduced to "our" way of interpreting these challenges. Their responses might be quite biased.

#### <u>2019-01-16</u>

Åsmund and Lutgart: Compared our coding for

WP2\_2.2\_NMBU\_2019\_exercise 1\_beginning of semester\_student 399\_2019-08-21

Dissimilarities in coding and what we agreed upon:

"This requires also knowledges especially in problem- and conflict management."

- Lutgart had coded as Competence/dialogue and as
- Competence/facilitation/by students

• Åsmund hadn't coded because the student explicitly mentions knowledge only

We agreed that for this dataset, where students do not have much notion yet about competences versus knowledge etc., we can code it with the competences because a student might call this knowledge while s/he is not distinguishing between knowledge and competences yet.



# INTERCODER CHECK: From multiple coding styles to a converged coding



Figure 5: Visualization of the intercoder check phase of data analysis (excerpt from fig.

WHO?	Everyone involved in coding, case leader
START WITH	Data coded individually by several coders, following the provided coding tree
END WITH	Data coded according to a refined and converged coding tree

1)

Checking for **intercoder reliability** means making sure that coders see the same things when they code the same block of text (Bernard 2006). Qualitative data analysis software can help you to calculate how much two coders are in agreement through a statistic test called **Cohen's kappa**, or *k*. "When *k* is 1.0, there is perfect agreement between coders. When *k* is zero, agreement is what might be expected by chance. When *k* is negative, the observed level of agreement is less than what you'd expect by chance. And when *k* is positive, the observed level of agreement is greater than what you'd expect by chance." (Bernard 2006:513). In this context, it means the following:

K = 1	Perfect! No further refinement is
	possible!
K = [0.7, 1)	Great! No further refinement in
	necessary!
K = (0.2, 0.7)	Good! Try to resolve intercoder
	discrepancies.
K = (0, 0.2]	Oops! Refinement is necessary!!!
K is negative	Oops! You might need to start all over
	again!!!

You should do intercoder checks until you have reached a k of 0.70 or higher.



Examples of resolving intercoder discrepancies from coding log:

#### 2019-01-16

Åsmund and Lutgart: Compared our coding for

WP2\_2.2\_NMBU\_2019\_exercise 1\_beginning of semester\_student 399\_2019-08-21

Dissimilarities in coding and what we agreed upon:

"This requires also knowledges especially in problem- and conflict management."

- Lutgart had coded as Competence/dialogue and as Competence/facilitation/by students
- Åsmund hadn't coded because the student explicitly mentions knowledge only

We agreed that for this dataset, where students do not have much notion yet about competences versus knowledge etc., we can code it with the competences because a student might call this knowledge while s/he is not distinguishing between knowledge and competences yet.

"Thus, we have to link these knowledges with action, in order to make our food-print really



# **EXTRACTION: Getting a first view on the structuring of your data**



Figure 6: Visualization of the extraction phase of data analysis (excerpt from fig. 1)

WHO?	The one(s) who will write the case development report
START WITH	Data coded according to the (refined and converged) coding tree
END WITH etc.	Excerpts of text per code, visual representations (e.g. word cloud)

At this stage it is time to start looking at what the coded data indicates. We are now starting to converge towards writing the results of the course cycle that you analysed data from. There are many possible ways to extract insights from the coded material and depending on the amount of data you have, we recommend different approaches. In either case, the first step is to group all the coded data by codes and by data type. If you didn't make changes to the coding tree, you have 10 codes, which means that per data type (e.g. reflection documents, interviews, exercises), you should have 10 reports, one for each code. You can, of course, opt to ask for only one report for facilitation instead of three (facilitation, facilitation by students, facilitation by teachers).

If you have only a few pages of coded material per code per data source, you shouldn't do any further grouping. You should then extract all quotes? per competence. (In NVivo, this is done by double-clicking each code/node). You should then proceed to the next step, which is analysis and discussion.



If you have a large amount of data per code, it might be a good idea to use some visualisation tools to help guide your further analysis.

# ANALYSIS & DISCUSSION: Asking yourself "what do the data tell us?"



Figure 7: Visualization of the analysis & discussion phase of data analysis (excerpt from fig. 1)

WHO?	1 <sup>st</sup> ) Researchers who know the Nextfood approach (case leaders);
	2 <sup>nd</sup> )Everyone involved in implementing the Nextfood approach in your case
START WITH	Excerpts of text per code, visual representations (e.g. word cloud),
END WITH	Preliminary findings, new research (sub)questions,

You've now reached the final step before writing the case development report. It starts by reading through the clustered material and looking for trends, commonalities and discrepancies related to the research questions mentioned in the introduction. It is paramount to spend time and energy on this step and it cannot be left to an algorithm. NVivo and other software has functions for clustering, structuring and visualising the coded data, but as Bernard (2006:519-520, italics in original) points out, "Computer programs do a lot, but in the end, *you* do the analysis; *you* make the connections and formulate hypotheses to test; *you* draw conclusions and point them out to your readers".

The first step you should take when analysing your coded material is to investigate the outcomes from the different data materials per code. Examples of useful questions to guide your analysis are:



- What components of the course seems connected to transformative learning based on what the students write in their reflection documents?
- How do the students describe competence development throughout the course?
- Which parts of the course are related to the development of which competences?
- How do the responses to the questions compare from the beginning of the semester to the end regarding competence development?
- How can the qualitative data help explain the results from the selfassessment of competences?

The answers to these guiding questions will enable you to start writing section 3 of the case development report where you are asked to answer the broader question of "What do the data indicate? Present your analysis in a structured and clear manner.".

Throughout this process you will probably also realise ways you could have done either the data analysis or collection differently. This is why we recommend you to not stop after writing the case development report, but to go on to the next and final step in this instruction document.



LEARNING FURTHER: Going back to coding, or collecting new/additional data



Figure 8: Visualization of the learning further phase of data analysis (excerpt from fig. 1)

WHO?	The researchers who conducted the data analysis and those who
	conducted the data collection
START WITH	Overview of the previous analysis and collection process
END WITH	Refined codes/analysis strategy for the data you had and/or
	new strategy for data collection for next cycle

At the end of a data collection and analysis cycle, it is important to evaluate the process. For some of you, this might have been one of your first attempts at analysing qualitative data and for all of us, this has been the first time following these instructions. So, how can we improve on the process for the next cycle?

We suggest that you take some time to review the process of data collection and data analysis. Ask yourselves the questions:

- How well did we follow the protocol with regards to data collection?
- How can we improve our data collection strategy to benefit our analysis of the case activities?
- How well did we follow the instructions with regards to data analysis?



- How can we improve our data analysis strategy to gain the maximum possible insights out of the data we collected?

Use the answers to these questions as basis for dialogues within your data collection/analysis team to determine the necessary changes you need to make. The sooner you do this after the analysis is done, the better you will remember the important details. And hopefully you have a coding log with many interesting remarks that can be used for this step too (and if not, maybe this can be a point of improvement for next cycle?).

Once you're done with this final step it is time to give yourselves a big round of applause and set your sights for the next round of data collection to begin.

### References

Bernard HR (2006) Research methods in anthropology – Qualitative and quantitative approaches. (4<sup>th</sup> edition) AltaMira Press, A Division of Rowman & Littlefield Publishers, Inc. Lanham, New York, Toronto, Oxford.

Pierce V, Cheesebrow D, Braun LMJGF (2000) Facilitator competencies:24

QSR International (2018) NVivo qualitative data analysis software; QSR International Pty Ltd. Version 12, 2018.

Wiek A, Withycombe L, Redman CL (2011) Key competencies in sustainability: a reference framework for academic program development Sustainability Science 6:203-218 doi:10.1007/s11625-011-0132-6



# Appendix 25: Instructions for data analysis – Numerical data (Amendment to D2.1 Action Research Protocol)

Instructions for data analysis –Numerical

Version 1.0

As mentioned in the Research Protocol (D2.1), rigorous data collection and analysis is paramount to the success of the action research in the Nextfood project. In order to ensure consistent data collection, the Research Protocol provides instructions on how to collect data from the activities carried out when following the Manual for Case Development (D2.2). Once the data have been collected, they need to be analysed in a consistent and rigorous manner in order to allow for fact-based improvement of each case and for cross-case comparisons. Our aim is therefore to provide you with clear instructions on how to analyse the data that you are collecting throughout the activities in your case.

With the instructions provided in this document we aim to support you in analysing the data that you have collected as **numerical data**. These are the the **data relating to or expressed as a number or numbers**. Please note that those data are only *expressed* as numbers, they are not numbers *per se*. Therefore, these numerical data cannot be analysed in a purely quantitative way, which some of you might be familiar with. We will explain the types of data and how to analyse them in detail in this document. For now, please bear in mind that "[a]nalysis is the search for patterns in data and for ideas that help explain why those patterns are there in the first place" (Bernard 2018:355).

In this document, we will first have a closer look at what kind of numerical data we have. Are they really numerical after all? Next, we look at how we can analyse the kind of data we have. Finally, we guide you through the analysis we suggest, in a step-by-step manner.



# What kind of numerical data do we have?

In line with the Research Protocol, all cases should collect the following data:

- Self-assessment of competences (scale 1-9, representing "novice" up to "expert")
- Ranking of shifts (flipchart/whiteboard at workshops, scale 1-10, representing "entirely according to conventional linear education system" up to "entirely according to a transformative and participatory learning model (NF approach)")
- **Course evaluations** (scale 1-7, meaning "worst, inefficient" up to "excellent")
- Demographics
  - A. Number of students starting the educational activity (male and female)
  - B. Number of students passing the educational activity
  - C. Educational background of students (high school, bachelor, master, PhD)
  - D. Number of students with more than three years of experience in the field/business,
- (Forthcoming: results of questionnaire for stakeholders, scale 1-5, representing "I fully disagree" up to "I fully agree")

Apart from the demographics, all these data are **scalings**. "*A scale is a device for assigning units of analysis to categories of [a] variable.* The assignment is usually done with numbers, and questions are used a lot as scaling devices." Bernard 2018:254, italic in original). It is important to bear in mind that the respondent is the principal source of measurement error in this kind of data collection (Bernard 2018).

For example, in the self-assessment of competences, we can *scale* students per competence according to how they assess themselves for that competence. Thus, students are our "units of analysis"; the five core competences (observation, participation, dialogue, visioning and reflection) are the five variables we want to look into; and each of those variables has nine categories ("novice" up to "expert").

Furthermore, these are all **single-indicator scales** (Bernard 2018:255), whereby we assign units of analysis to categories of a variable.

For example, in the self-assessment of competences, given that students can choose only one level of competence for each of the five competences, we assign each student per competence to one category of the variable.

Moreover, these data are scalings with scaling devices that produce numbers that have **ordinal properties**. This means that numbers represent words that represent position or rank in a sequential order (Wikipedia: Ordinal numeral).

For example, in the self-assessment of competences, someone who has assigned him/herself to "1=novice" for reflection and to "9=expert" for dialogue, is *less* competent in reflection than in dialogue (according to him/herself). However, we don't



know if that person considers him/herself exactly 9 times less competent in reflection than in dialogue because we are working with an ordinal scale.

To sum up:

Our numerical data are <u>scalings</u>, collected using <u>single-indicator scales</u> with scaling devices that have <u>ordinal</u> <u>properties</u>.

### How do we analyse those data?

Before we explain the details of how to analyse, let's have a look at the **research questions** again. The research question we would like to answer is:

How and to what extent do various educational activities enhance the students' abilities to deal with 'the challenge of the whole', including to take or facilitate informed action, and the competences considered necessary for doing so (observation, reflection, dialogue, participation and visioning)? (D2.1 Research protocol:11).

For example, based on the self-assessments of competences, we can gain insight into the extent to which a full course enhances students' competences (as assessed by the students themselves), for each of the competences, and averaged out over the entire student group. Please note that we are not interested in comparing between students. Rather, we would like to know if the course has a positive or negative effect on students' competence enhancement on average.

This means that we will do a **bivariate analysis** of the data we have. Most importantly, we would like to measure the difference between two averages. This can be done with a *t*-test that evaluates whether the averages of two different groups differ on some variables.

For example, when analysing the self-assessments of competences, we will conduct a *t*-test to evaluate per competence whether the average for all students at the start of the course differs from the average for all students at the end of the course. This means that we will do five *t*-tests, one for each competence, whereby we compare the average for that particular competence at the start of the course with the average for that particular competence at the end of the course.



# Doing a *t*-test: Comparing two means

First of all, we do a quantified structuring of the data. Then, we will analyse that structuring qualitatively. This means that we will look at the numbers generated by the *t*-test and think through what they mean.

Bernard (2018:355, box 15.1): Data processing and data analysis:

Most methods for quantitative analysis – things like factor analysis, cluster analysis, regression analysis, and so on – are really methods for data *processing* and for finding patterns in data. Interpreting those patterns- analysing them, in other words-is up to you. Interpretation-telling us what findings mean, linking your findings to the findings of other research-starts with ideas in your head and comes out in words on paper. It's a pretty qualitative exercise.

### Quantified structuring of the data

In Microsoft Excel, you can calculate the mean for the whole student group, for each competence, at the beginning of the course, and at the end of the course.

Then, excel can run the *t*-test for you.

Next, you can evaluate the **statistical significance** of *t* at different levels of statistical significance.

Statistical significance is expressed as a percentage, and gets the symbol (letter) P. Conventionally, P < 0.05 is referred to as 'statistically significant'. This means that your result is significant at a level below 5%, meaning that there is less than 1 in 20 chance that the result is wrong. Likewise, P < 0.01 is referred to as 'statistically very significant' (less than 1 in 100 chance), and P < 0.001 is referred to as 'statistically highly significant' (less than 1 in 1000 chance of being wrong).

If  $P \ge 0.05$ , your result is not statistically significant.

#### Qualitative analysis of the structured data

Now, it is time to look at the results of your *t*-tests and interpret them.

First, you should look for each competence if the difference between the two means is significant at level P < 0.05 or even better.

If the difference is **not statistically significant** for a certain competence, you can look into the dataset lying behind to see if there are major 'outliers' that might cause the insignificance. An **outlier** is a special case, for example one individual student whose self-assessment for that competence differs a lot from those of the other students. In that case, you can do a *t*-test for the **medians** for that competence. "The median is the point in a distribution above and below which there are an equal number of scores in a distribution" (Bernard 2006:563) and is less affected by extreme scores than the mean. If there are no outliers, that means your course has not caused a significant



change in development of that particular competence in your students on average. This is an important finding! You can now think why that particular competence is not significantly developed in your course and what you would do different in the next cycle of your course to significantly improve the development of that competence. Or, maybe your students had (on average) assessed themselves already at the beginning of the course as experts in that competence and thus, there was very little need or room for further development. Other datasets can set light on your throughs as well.

If the difference is statistically **significant** for a certain competence, that's an important finding as well. Hopefully, the difference is a significant increase in development of a competence, and not a decrease. You can then look at other data sets and develop your own ideas about why your course has caused a significant increase in students' competence development for that particular competence.

