D2.3: Master manual draft 2

WP2 – Action research facilitation

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Authors	Lutgart Lenaerts, Åsmund Lægreid Steiro, Tor Arvid Breland, Geir Lieblein			
Contributors	Anna Marie Nicolaysen, Marie Henriksen Bogstad, Kristiane Brudevoll			

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Executive summary

In this document, the case leaders will find specific instructions on how to develop their case towards the educational goals described in the Review Report of Educational Approaches (D3.1). Primarily, this document describes the iterative process of planning, implementing, and reflecting, which is to be followed by each case. Specific instructions are given to each of the three phases and appendices contain templates in relation to those specific instructions as well as examples from past cycles of project activities.

This 2nd draft of the master manual builds further on D2.2 Master manual draft 1. In that document, the case leaders found specific instructions on how to develop their case towards the educational goals described in the Review Report of Educational Approaches (D3.1). This new version of the master manual contains more detailed instructions as well as more detailed and updated appendices.

Introduction

A new educational approach will be needed to cultivate the competences required to improve sustainability in agrifood and forestry systems. This new approach (the 'Nextfood approach') is characterized by 1) a shift from theory to phenomenon as the starting point for the learning process (experiential learning) and 2) a shift in focus from knowledge transfer to building of competences needed to take informed and responsible action as the ultimate goal of learning. Sustainability challenges are complex, and the gap between knowing and doing is often larger than between ignorance and knowledge. Therefore, such a transition in education requires emphasis on a systemic approach and on facilitation of change. Further, the core competences—the integration of knowledge, skills and attitudes—required for involving in such inherently participatory and transdisciplinary processes, must be fostered (e.g., observation, participation, dialogue, visionary thinking and reflection).

The transition to a radically different approach in education implies a paradigm shift that is likely to pose new challenges to all actors involved (students, teachers, stakeholders, and institutions). These may pertain to the mindset, habits and competences of both teachers and students, which are often rooted in specific disciplines and a tradition of theory as starting point for learning. Institutions with education usually organised according to disciplines sub-divided into topics and with a dominance of assessment methods that reward only theoretical knowledge, may be reluctant to support new education that needs to be transdisciplinary, involve various extra-university stakeholders, and include other assessment methods than written or oral exams. Within this context, there is a need for more knowledge about how to effectively plan, implement and further improve the new approach.

The aim of the Nextfood project is to produce new knowledge needed to drive a transition from traditional, lecture-based teaching to action learning in agrifood and forestry education (Figure 1). For the rest of this document, the traditional terms 'teacher' and 'student' are still used, even though the new educational approach implies that 'learning facilitator' and 'learner' are often more covering terms.

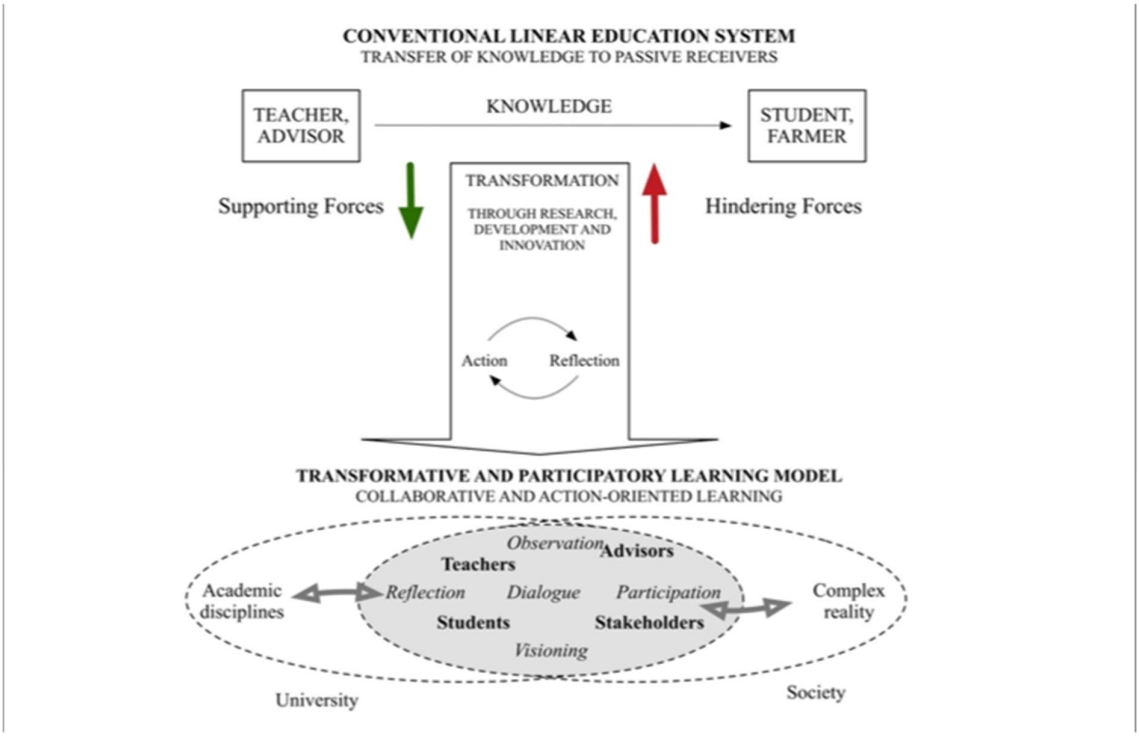

Figure 1: The Nextfood approach

To accomplish such a transition, action research (Levin and Ravn, 2007) is conducted in 12 selected educational activities. This means that while developing a case (described in this document, D2.2), research will be done on the development process (as described in the Action Research Protocol (D2.1)). Each Nextfood case will during the project go through several cycles, that each contain three major phases: ***planning – implementation – reflection*** (Fig. 2).

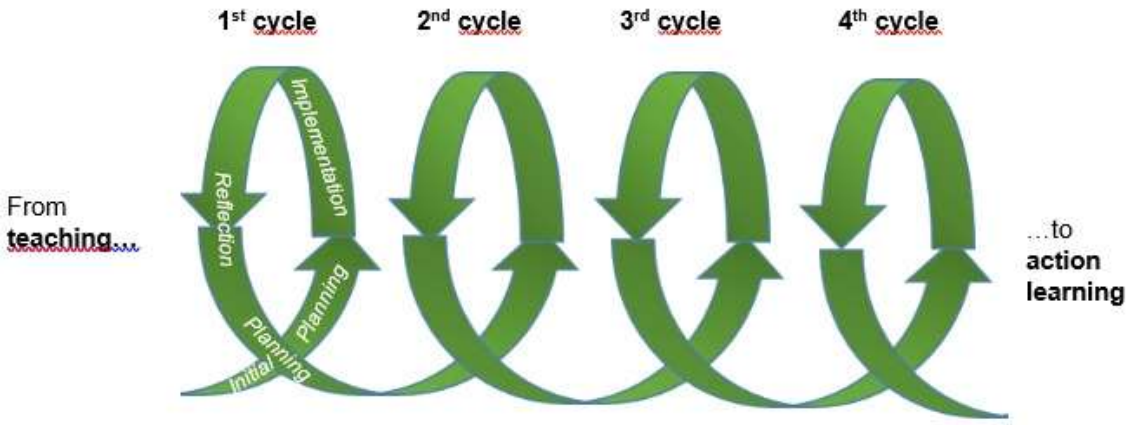

Figure 2: The iterative process of planning, implementation and reflection

The purpose of this document is to guide the transition towards action learning in the 12 Nextfood cases. The content is based on knowledge from literature on action learning and research, on our experience from establishing and conducting action-oriented education prior to this project, and on new insights obtained from the Nextfood cases. The document will provide general instructions for the transformation process and specific examples of how to take each step. With each case following these instructions, cross-case learning will become easier over time, and streamlined data collection (explained in the Action Research Protocol (D2.1)) will enable cross-case analysis and publication of the results. This document might also have an additional value as a guide for anyone interested in developing an educational activity or programme in line with the Nextfood approach.

Instructions for transformation

The steps outlined in this manual can be used as a guideline to transform educational programmes into phenomenon-based and action-oriented learning. The recurring phases of *planning*, *implementing*, *reflecting, and planning again* (Figure 2) are paramount for ensuring a continual improvement towards the desired future state of an educational programme. We urge everyone to follow the same model which will increase the quality of our cross-case analysis and interpretation.

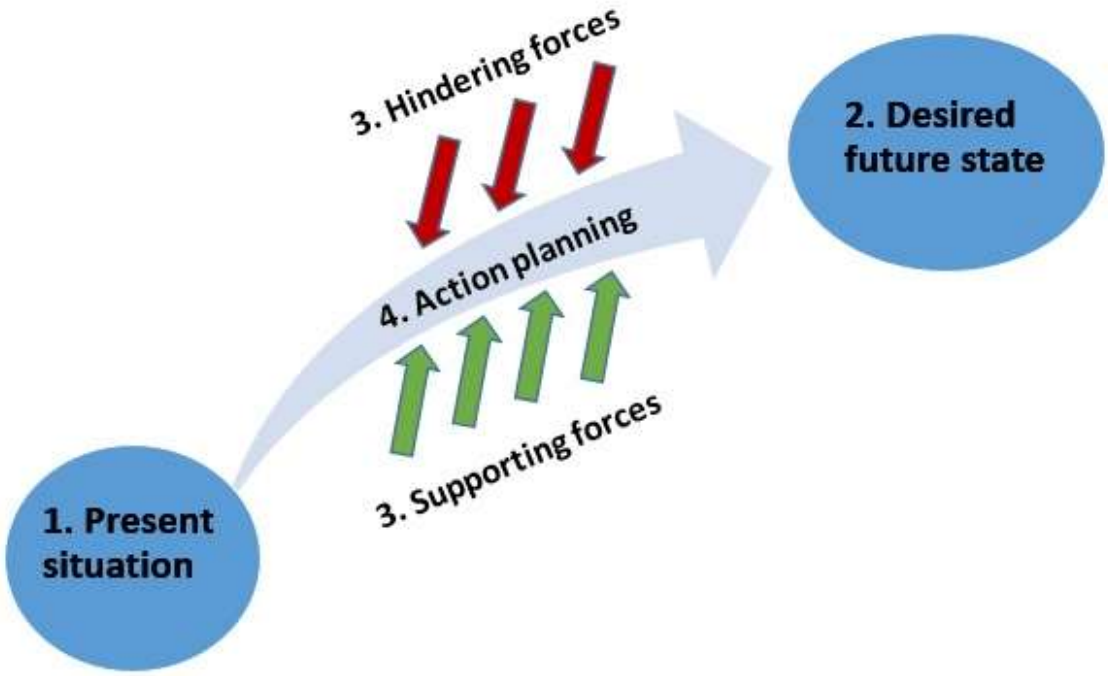

Figure 3: Outline of the process for planning the transition from the current state to education according to the Nextfood approach

The planning phase encompasses four distinct activities: (1) describe and reflect on the present situation, (2) envision a desired future state, (3) determine the supporting and hindering forces for change, and (4) make a plan of action for how to get there (Figure 3). During the *implementation* phase, planned actions should be implemented while simultaneously recording the process. After implementation, there is a phase of *reflection* upon the results of conducting the educational activity. This reflection informs the next cycle of planning, implementation, and reflection. Throughout the document, instructions for how to conduct each phase will be given.

Initial planning

The first phase in developing the case is *planning* (Figure 2), which should start with an initial planning workshop to explore the shifts needed for transition to participatory action learning as defined by the Nextfood approach. The goal of the workshop is to create a shared understanding of the shifts that we are aiming to achieve and the necessary steps that should be taken to achieve this transformation. This workshop should include not only the teachers, but also students and key stakeholders (e.g., researchers, resource persons from 'the field', representatives from school or university administration, and stakeholders with an interest in the education or the competence of the candidates). The process should be similar to that of Nextfood WP2 workshops with a focus on guiding all participants through individual reflection, group reflection and plenary dialogue around the central topics. Appendix 1 contains a template script that is to be used as a starting point for designing and scheduling an initial planning workshop according to the needs of each specific case. Additionally, we encourage case leaders to access presentations (pptx-files) on the Nextfood project's Platform that can be used in these workshops. Our ambition is to make this reference material public in the future (through technical publications to reach a wider audience), so that also teachers outside the Nextfood Consortium can use the materials and approach. We have set up a toolbox on the Nextfood website as well, where some relevant content is already uploaded. Further population of the toolbox will be done during the coming year.

Briefly summarised, the workshop and immediate follow-up activities ideally should include the following steps:

1. Exploring the present situation in the case
2. Envisioning the case after the implementation of the Nextfood approach
3. Determining what it would require to implement the Nextfood approach
4. Planning of implementation, particularly the immediate next steps

Step 1: Exploring the present situation

The objective of the initial step is to establish the best possible understanding of the current situation, before creating a shared understanding of the desired future situation and deciding on the actions to transition. A shared understanding should be established with participation of key stakeholders to include all relevant perspectives and create ownership and commitment. This means that all participants in the exploration of the present situation should be informed about both the state-of-the-art knowledge that informs the content of the educational activity (topics, training activities, desirable knowledge and skills etc.) and the conceptual base of the Nextfood approach (see section "1 Introduction" above). The NMBU team will assist, if needed, in clarifying what the Nextfood approach may entail in each case.

Practical tip!

Getting an overview of the present situation can pose a great challenge. The technique of drawing rich pictures, described in Rosalind Armson's book, Growing Wings on the Way: Systems Thinking for Messy Situations (2011) is suggested for getting a shared overview of the present situation. You can also read more about it on this Wikipedia page: https://en.wikipedia.org/wiki/Rich_picture

Step 2: Envisioning the case after the implementation of the Nexfood approach

After having obtained a shared understanding of the present situation, the focus should now turn to obtaining a shared vision of the educational activity in agreement with the Nextfood mission (what), approach (how) and vision (why):

What: educating the next generation of professionals

How: by facilitating a transition to phenomenon-based, action learning

Why: to improve the sustainability of agri-food and forestry systems

This "root definition" (Checkland and Poulter, 2006, pp. 37-47) of the Nextfood project must guide all thinking about the future state of the educational activity. Ideally, answers to the following questions should be formulated before starting to think about the future:

What is the **educational activity** (e.g., a bachelor or master's course, or an entire programme)?

What is the **situation** in which the students will involve (e.g., farm, forest or food-related activity)?

What is the **action** the students are supposed to take in their main learning arena (e.g., a farming, forestry or food system inquiry to facilitate a sustainability improvement)?

Once these questions are answered, one can start thinking about the future. Visionary thinking is a good tool for that. Pool and Parker (2017: pp.3) describe "visionary thinking" as "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 relevant to the challenge that is in focus". An introduction to visionary thinking and an example of an exercise in visionary thinking and action planning (conducted with all case leaders in September 2018, Pollenzo, Italy) can be found in Appendices 3, 4 and 5.

When it comes to practical pedagogy, the implementation of the Nextfood approach should focus on the following shifts (Østergaard, 2018, pers. comm.):

From:	The traditional situation	To:	The NextFood approach
	Lecture hall		A diversity of learning arenas
	Lecturing		Co- and peer learning
	Syllabus		Supporting literature/a diversity of learning sources
	Textbook		A diversity of teaching aids
	Written exam		A diversity of assessment methods
	Lecturer		Learning facilitator

Hence, the visioning can focus on the right-hand column of the table above in the sense that the educational activities are expected to shift over time to using a diversity of learning arenas rather than lecture halls only, applying co- and peer learning rather than lecturing only, drawing on literature supporting the learning process rather than predefining in a syllabus what the learning process should cover, using a diversity of teaching aids rather than a textbook that draws the boundary of what is to be learned, assessing learning through a diversity of assessment methods rather than an exam only, and facilitating learning rather than lecturing only. Likewise, it is important to emphasize the multi-stakeholder approach in education already at this stage, where practitioners (e.g., food producers and advisers) actively contribute with their interest and knowledge to several phases in the learning process (Posch and Steiner, 2016). Already at the visioning stage, the following principle must be kept in mind: educational activities and theory should be included and timed according to needs as they are expected to emerge in the action learning process (also known as "just-in-time education" (Salomonsson et al. 2005). This process is often not tidy and sequential, but a description of the ideal sequence of typical key phases can be found, e.g., in Kolb (2015) and Checkland and Poulter (2006).

Additionally, the Phase 2 Working Paper on "Further Case Development (WP2)" (in Appendix 8) and the PowerPoint presentation from the WP2 mini-workshop on further case development (held on 15 September 2020) (in Appendix 9) can serve as inspiration for how to further develop your case by implementing cyclical learning aligned with the Nextfood approach (Figure 4, below). We strongly advise you to go through those documents before Step 3 of this phase on 'reflecting and planning again'.

A video recording of the mini workshop has also been made available to all WP2 participants.

Furthermore, the power point presentation from the WP2 mini workshop on reflection (conducted on 24 September 2020) (in Appendix 10) gives you more detailed guidance on two important aspects of case development: (1) How to bring reflection into your course, and (2) reflection sessions and other examples from NMBU. At this step during the Initial planning phase, this presentation as well as tools for reflection which will be available in the toolbox, can be a great inspiration for how to build reflection into both your educational activity and your case development process.

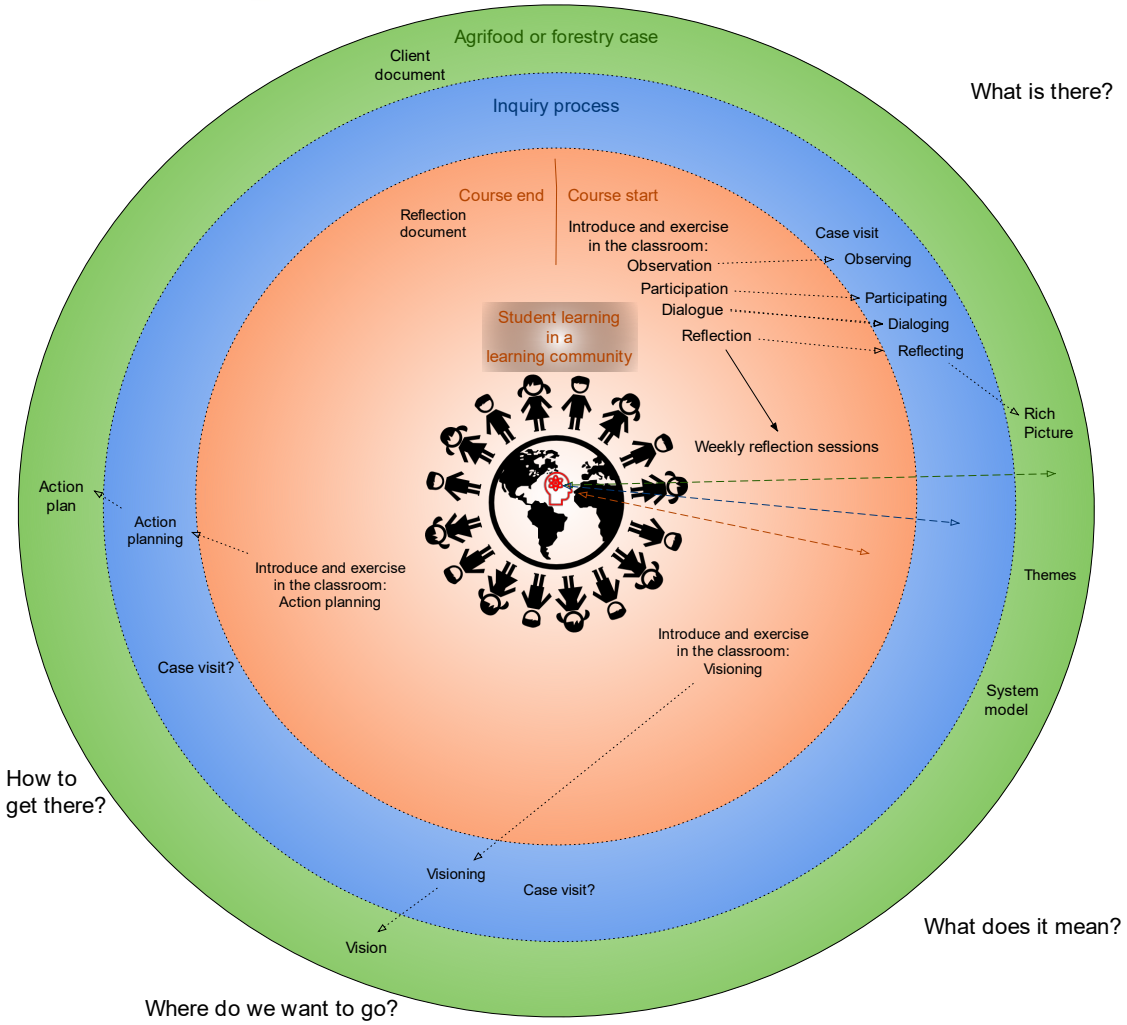

Figure 4: Cyclical learning –Experiential and action-oriented (the Nextfood approach)

Step 3: Determining what it would require to implement the Nextfood approach

With a shared understanding of what the Nextfood approach is about, of basic elements in action learning and, ideally, a vision of the future education to be developed, it is now time to explore what it would require to implement the Nextfood approach. In essence, this revolves around figuring out which supporting forces to build on and which hindering forces to address. A comparison of the vision and the current situation serves to focus on themes associated with a transition to action learning, and on forces supporting and hindering the transition. These analyses provide important background for working out action plans. In this step, we especially recommend bringing in the views of stakeholders in the case.

Step 4: Planning of implementation, particularly the immediate next steps

Having established both the direction of the implementation of the Nextfood approach and what it would require getting there, it is now time to decide what implementing these changes would mean in practice.

To pursue the joint vision, it is necessary to work out a set of interconnected plans for *what* must be done *how*, by *whom* and *when*. To ensure consistency of means and ends, it should also be explicitly stated *why* things will be done (cf. the "root definition" above of the entire Nextfood project). Important questions during the action planning are: how to make use of supporting forces and how to handle the challenges of the hindering forces?

The result of the planning phase is two-fold. First, one should have an overview of what needs to be done to establish or further develop an educational activity based on the Nextfood approach. Second, one should have a concrete plan for the educational activity.

Each stakeholder with responsibilities in the case should leave the initial planning phase with at least one, preferably several immediate next steps to be taken. These steps should be formulated as concrete, straight-forward and not too large tasks. This could, for instance, be "On the upcoming Wednesday, [case responsible] will read the Action Research Protocol (D2.1) in order to be able to plan for data collection during the implementation of our plan." Or "By the end of the week, [case responsible] will have contacted at least three suitable local businesses to explore possible collaborations for moving out of the lecture halls." An obvious early major task is concrete planning of the educational activities and their scheduling according to the principles outlined above in Step 2. Resources and tips such as examples of schedules, reading lists and educational activities will be provided in the Toolbox. See also appendices 6 and 7 for examples.

Implementation

During the implementation phase of the process, the plans made in the previous phase are to be conducted. The primary task is, of course, running the educational activity, and setting the stage for the students to reach the desired learning goals. Additionally, as a facilitator, one should consider what it takes from both the teachers and the students to successfully move towards the desired future state of the educational activity. In essence, this means following the action plans determined in the initial planning phase. We suggest implementing the steps below to aid the transition process. Note that these steps are simultaneously part of the data collection required to perform according to the Action Research Protocol (D2.1). Therefore, in addition to the educational activities (e.g., field trips, lectures, group work, presentations, evaluations) based on a detailed educational activity plan and a script for what needs to be considered during the educational activity, the following five activities should be included:

1. Writing reflection documents (by teachers and students)
2. Evaluating the educational activity contents and activities (by students, preferably weekly or bi-weekly and then at the end of the educational activity).
3. Self-assessing competences and skills (by students, at the beginning, mid-term (optional), and the end of the educational activity).
4. Interviewing students to map their learning goals and competence development (at the beginning and the end of the educational activity).
5. Reflecting (e.g., weekly).

Step 1: Writing reflection documents

Structured reflection throughout the duration of the educational activity is essential both for documenting the transformation process and for learning from it. The students' reflection documents should be structured such that the writing of the documents allows them to explore and express what their learning outcomes have been in relation to the learning goals. These documents are well suited to be part of the evaluation of the students' performance in light of the learning goals. A guide to writing reflection documents can be found in Appendix 11.

Reflecting on our experiences, exploring ideas, and linking experiences to existing and new knowledge and skills, help us focus on what we need to work on in the future.

The teachers of the educational activity should also reflect upon their experiences during the educational activity, both to document the process from their side and to aid the improvement of the educational activity.

We also strongly recommend having another look at Appendix 10 and the tools related to reflection in the toolbox at this step.

Step 2: Evaluating the educational activity's contents and sub-activities

Practical tip!

Two important questions for individual evaluation are:

Looking back at the course, what have you found useful, inspiring, interesting?

Imagine that you were the one to be completely in charge of the next course! What three things would you do differently in the pursuit of its key learning goals?

A frequent and formal individual evaluation will enable the students to express their views on the educational activity and to share their experiences in a format that is different from the informal sharing that might occur during the educational activity (for an example of how this can be done, see Appendix 8 in D2.1 Action research protocol). For a teacher, it is important to know to what extent the goals have been reached and to make improvements in the upcoming parts of the educational activity based on the students' feedback. And for the students, doing this evaluation informs their individual reflections about the educational activity.

This individual feedback gives a unique insight into the students' experiences and combined with other considerations enables the teachers to further develop the educational activity.

Another important step in the implementation is getting feedback from key stakeholders with whom the students will have interacted throughout the educational activity.

During the educational activity, we suggest weekly or bi-weekly individual evaluations. We suggest leaving space for comments.

Step 3: Self-assessing competences and skills

In the transition from a traditional focus on transferring knowledge to be consumed by the students, to developing the necessary competences and skills, a tool to evaluate the degree of this development is needed. We suggest asking the students to self-assess their own competences at the beginning and end of the educational activity and to then measure their (self-assessed) progress.

Competence self-assessment can serve several purposes. On the one hand, it helps teachers to see how the educational activity functioned: How much competence development happened during the educational activity? On the other hand, students' self-assessments can serve as an aid to help them become clearer about their own learning goals and style of learning. In addition, the ability of assessing oneself is an important skill to develop for the future generation working in sustainable agrifood and forestry systems. Doing this self-evaluation will help students to structure their own reflection about the educational activity and their overall learning experience.

In the Action Research Protocol (D2.1), more specifically in its appendices 6 and 11, you will find a template for a proposed competence self-assessment tool that describes an individual's progression through a series of five levels: *novice*, *advanced beginner*, *competent*, *proficient*, and *expert*.

Step 4: Interviewing students to map their learning goals and competence development

At the beginning of the educational activity, the students might both expect and desire a diversity of learning goals to be met. Even though the educational activity has specific learning goals, the students might also have additional desired outcomes or questions that they want to find answers to. Similarly, the students have a varied degree of competence mastery and understanding. Addressing these differences by asking the students to describe them at the beginning of the educational activity is beneficial as it allows the teachers to gain insight into the student group and adjust the educational activity's structure if necessary. Additionally, the students get the opportunity to put their expectations and experiences into words. Asking the students these questions should either be done by handing them out as exercise questions to be responded to in a written format, or by conducting individual interviews with the leaners. At the end of the educational activity, these questions should then be readdressed to assist the students in reflecting upon their experiences and learning outcomes. A minimum required list of questions is described in chapter 3 of the Action Research Protocol (D2.1).

Step 5: Reflection

Practical tip! - List of questions that was used in the Norwegian case at the beginning and end of the first cycle:

At the beginning of the course	At the end of the course
What would I like to learn in this course?	What did I learn during this course?
What experiences and competences do I bring to the course to make it a success?	What experiences and competences did I find particularly useful when taking this course?
What characterizes good observation?	What characterizes good observation?
What characterizes good reflection?	What characterizes good reflection?
What is the relationship between observation and reflection?	What is the relationship between observation and reflection?
What are the questions I´d like to find answers to in this course?	What are the questions I'm now asking myself?
Which skills and competences do you want to train/improve in this course?	Which skills and competences did I get the chance to train/improve during the course?

To accommodate the students' competence, skill, and knowledge development through the educational activities, it is important to set aside sufficient time for structured reflection upon

the experiences in the educational activities. We suggest that this should be done on a regular basis throughout the educational activity led by a teacher.

We also strongly recommend having another look at appendix 10 and the tools related to reflection in the toolbox at this step.

Reflection sessions in practice:

Reflection means the ability to link own experiences to theory in sustainable agrifood and forestry systems and to personal development. To do that, a structured reflection session works wonders. A suggested exercise is to focus the session on an experience that recently took place in the course. Thereafter, the process of individual reflection – sharing in small groups – plenary sum-up could be followed.

For instance, first ask the following:

“Looking back at the field visit last week,

1) What did you observe that made you want to look deeper into it, and why?
2) In what ways did the visit inspire you to improve your group work project?”

Instruct the students to think for ten minutes in silence.

Thereafter, arrange the class into groups of 3-5 students and ask them to share what they thought of during their individual reflection.

Lastly, ask the groups to share what they talked about and facilitate connections that the whole class can benefit from hearing. Also, encourage students to keep a logbook with their reflections and regularly reflect individually. Reflection is a competence that, with practice, one can master.

Reflection and planning again

At the end of one cycle in the educational activity, it is time to reflect on the implementation of the plans and explore how this reflection can affect the planning of the following cycle. This is best done in a workshop following the same basic principles as the planning workshop. Guidelines on how to conduct such a workshop can be found in Appendix 2.

Before the workshop, the data gathered throughout the implementation phase need to be summarised. It is crucial for the success of the reflection workshop that each case responsible has read through the main findings from the cycle that will be reflected upon. To do that, the raw data needs to be processed in line with the data analysis methods described in the Action Research Protocol (D2.1).

The reflection workshop has three overarching goals. Firstly, there is a need for structured reflection upon the educational activities to learn from the experiences. Secondly, cognitive-emotional reflection upon the implementation of the educational activities will enrich the structured reflection. Thirdly, the outcome of the reflection should be used to develop a plan for how to improve the educational activities.

To reach these three goals, the workshop should include the following steps:

1. Recapitulating the educational activities
2. Assessing the shifts
3. Determining the supporting and hindering forces
4. Planning of how to build on the supporting forces and how to address the hindering forces
5. Planning the next steps

Step 1: Recapitulating the case activities

Throughout the implementation of the latest cycle, a lot of data will have been generated. To be prepared to reflect upon the experiences, it is important to get a good overview of the data that encompasses not only the teachers' experiences, but also the students' experiences. While it is not necessary to analyse the data fully at this stage, a first round of analysis (e.g., a first coding of text data) is necessary. When reflecting on the educational activity, identify the most important themes that come forth: "Looking back at the educational activity, what is the main story to tell and what where the most important episodes?"

We also strongly recommend having another look at appendix 10 and the tools related to reflection in the toolbox at this step.

Step 2: Assessing the shifts

After having achieved an overview of the previous cycle of case activities, to reflect on the activities, we suggest revisiting the shifts (see Appendix 2 for instructions).

Assessments of the students' achievement of core learning goals also indicates to which extent the shift has been successful in terms of a new level of competency for improving the sustainability of agrifood and forestry systems, i.e., the "why" of the Nextfood project. These assessments include those made by the students themselves, teachers, external examiners, and stakeholders involved in the educational activity. It may also involve a reflection on the direct impact and usefulness of the innovations and solutions to complex problems produced by the students during the educational activity.

Step 3: Determining the supporting and hindering forces

The next step in reflecting upon the case activities is determining what hinders the case from developing towards implementing the Nextfood approach and what supports that development. It is important to spend time reflecting on this before moving into the planning of the next cycle.

Focus group interviews for supporting case development

In Kerala, India, Nextfood organised a focus group interview with 5 academic leaders and faculty members. This was performed as part of the reflection process, which is an important step for learning before initiating the next cycle. The topic for the focus group interview was institutional factors that either support or prohibit the transition to a more participatory and student-centred education. Institutional factors are connected to central values and attitudes of how higher education should function, and how these values are maintained. By identifying these factors, we increased the understanding of the environment in which the case in Kerala operates, which is important for the forthcoming support of the case and for the overall research in Nextfood. The interview touched upon areas such as the structure and the organisation of higher education, leadership of education, as well as gender equality and access to education. The interview was facilitated by a Nextfood researcher involved in the case. It lasted for approximately 1.5 hours, was audio recorded, transcribed, and analysed.

Step 4: Planning of how to build on the supporting forces and how to address the hindering forces

Considering the reflections on the previous case cycle experiences, it is now time to start planning the next cycle. The first step in planning the next cycle is deciding how to build on the supporting forces and how to overcome the hindering ones. It might be tempting to wish for the hindering forces to disappear, but in the long run, it is much more fruitful to plan for how to overcome them.

Step 5: Planning the next steps

Having established an overview of the progress of implementing the Nextfood approach and how to deal with the supporting and hindering forces, it is now time to figure out what implementing these changes would mean in practice.

It is necessary to work out a set of interconnected plans for *what* must be done *how*, by *whom* and *when*. To ensure consistency of means and ends, it should also be explicitly stated *why* things will be done. Important questions during the action planning are: How to make use of supporting forces and how to handle the challenges of the hindering forces?

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Appendices

Appendix 1 Initial planning workshop facilitation guidelines

NEXTFOOD (WP2) INITIAL PLANNING WORKSHOP

Developing transformative education in the agrifood and forestry system

To be extended, shortened – adapted to local needs

One-day initial planning program

Desired outcomes of the workshop

a) *A shared understanding of the Nextfood approach that we are aiming to achieve*
b) *A plan of implementation: What, who, when, where*

Participants

Teachers/researchers
Students
Resource persons from 'the field'
Representatives from institutional administration
Stakeholders with an interest in the education or the competence of the students

Facilitator(s)

Case responsible group (in collaboration with NMBU team

08:30 – 08:50 **Arrival and registration**

08:50 – 09:00 **Welcome and opening speech**

09:00 – 09:30 **Background for this workshop**

1. **The Nextfood Project**
   Aim of the workshop : to explore the shifts needed in order to transition to participatory, experiential and action-oriented learning.
   Desired outcome: a draft of a plan including which actions and decisions should be given priority for the next 6 months
2. **The Case** (*7 minutes*)
3. **Plan for the day**, feedback from participants (*3 minutes*)

Distribute printouts of the participants' programme.

09:30 – 10:00 **Introduction of participants – Who are we?**

Question: Where do you work or study?

What excites you about the work you are currently involved in?

Share in small groups (4-5 at each table, for example, depending on total group size)
Write down the information that you would like to share with the Case responsible group

The Nextfood approach and the intended shift

10:00-10:45 **Part 1:** Overview of the approach *(15 minutes)*
Short round of questions to the approach. (*5 minutes*)

What adaptations of the approach are necessary to meet local needs?

Exercise to address this question:
Individual reflection (5 minutes),
followed by a dialogue in small groups (10 minutes) and
a discussion in plenary (10 minutes).
Write on provided sheets (groups) & on flip-over or whiteboard (plenary)

10:45-11:00 **Coffee break**

11:00-12:30 **Part 2:** Overview of what needs to shift in order to comply with the Nextfood approach and what typifies our current practice.

Presentation of the shifts in six areas (*10 minutes)*

The overall shift from teaching to learning and from knowledge to competence implies concrete shifts in the following six areas:

1. From lecture hall to a diversity of learning arenas
2. From lecturing ('vorlesung') to 'nachlesung' and peer learning
3. From syllabus to supporting literature/a variety of learning sources
4. From textbook to a diversity (variety) of teaching aids
5. From written exam to a variety of assessment methods
6. From lecturer to learning facilitator (which includes the introduction of and training in dialogue, visionary thinking, observation and reflection

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 group as they try to place a "x" along the continuum for each of the six areas.

Exercise to address this task:

Dialogue in small groups (10 minutes) and
a discussion in plenary (5-10 minutes).
Put slide with six shifts up, write on provided sheets (groups) & on flip-over or whiteboard (plenary)

Explain for the shifts that you rated below 5 why they are rated low and what can be improved

Exercise to address this task:
Dialogue in small groups (15 minutes) and
a discussion in plenary (5 minutes).
Put slide with six shifts up, write on provided sheets (groups) & on flip-over or whiteboard (plenary)

Explain for the shifts that you rated above 5 why they are rated highly and what can be learned from these as well as how they can be maintained

Exercise to address this task:
Dialogue in small groups (15 minutes) and
a discussion in plenary (5 minutes).
Put slide with six shifts up, write on provided sheets (groups) & on flip-over or whiteboard (plenary)

Come up with at least 2 suggestions for additional shifts.
Follow the guidelines for divergent thinking (brainstorming), stretch your thinking, don't evaluate each other's ideas, suspend judgement, focus on quantity, dare to think out of the box, allow for completely new ideas.

Exercise to address this task:
Dialogue in small groups (10 minutes) and
*a **ranking** of suggestions in plenary (5 minutes).*
Put slide with six shifts up, write on provided sheets (groups) & on flip-over or whiteboard (plenary)

Recapitulation and intro to programme after lunch (*5 minutes*)

12:30 – 14:00 **Lunch**

14:00-15:30 **What would it require from students (students), teachers and institutions to succeed with the Agroecology programme at MU that is based on the Nextfood approach?**

- Review of dialogue guidelines (*15 minutes*)
- Exercise to address the question

Individual reflection (5 minutes), followed by a dialogue in small groups (40 minutes) and a discussion in plenary (30 minutes).
Write on flip-over or whiteboard

15:30-15:45 **Coffee break**

15:45-16:30 **Planning for implementation including the immediate next steps (what, when, who, where)**

- What needs to be done when and by whom to implement the intended transition to action learning in the educational activity?

Who should meet and when?
What should be ready and when?
*(10 min individually, 30 min in small groups **to make a timeline,** Case responsible group members collect written output and will send a summary of that output to participants later). Write on sheets provided.*

16:30 – 17:00 **Wrap-up**

- Reflection and small group discussion after each question below.

(2 min individually, 5 min in small groups. Case responsible group members collect written output and will send a summary of that output to participants later). Write on sheets provided.

1. Note down three things you liked about this meeting, that you found useful, inspiring, interesting!
2. If I were to be responsible for the next workshop, what would I do differently?

Appendix 2 Reflection workshop facilitation guidelines

NEXTFOOD (WP2) REFLECTION WORKSHOP

Developing transformative education in the agrifood and forestry system

To be extended, shortened – adapted to local needs

Two-day reflection/planning program

Day 1:

Desired outcomes of the workshop

c) *Achieving a shared, comprehensive understanding of the implementation of the latest cycle of educational activities.*
d) *Cognitive-emotional reflection on the implementation of the latest cycle of educational activities.*
e) *Determining supporting and hindering forces to the implementation of the educational activities.*

Participants

Case responsible group

Facilitator(s)

One or two from the case responsible group

09:00 – 09:30 **Introduction**

Aim for the workshop: Reflecting upon the case activities in order to learn from the experiences.

Desired outcome: An understanding of the completed case cycle that can be used to improve the planning of the next cycle.

Remind the participants that they should try to take into account what is stated in the data as well as their own perspective.

"Rules of the game", plan for the day, and feedback from participants.

Ask if everyone can be present the whole day.

Discuss whether "first cycle" should also include the past few years.

09:30 – 11:30 **Recapping the case activities**

Presenting the data from the educational activity, mentioning the data sources that were analysed and how they were analysed. (30 min)

Question: In the data from the first cycle, what was most inspiring, and why?

Individual reflection 5 min. Plenary 10 minutes.
Write on provided sheets (groups) & on flip-over or whiteboard (plenary)

What did it require from students, teachers and institutions to implement the educational activity in line with the Nextfood approach?
- Review of dialogue instructions (15 minutes)
- Exercise to address the questions (30 minutes)

Individual reflection (5 minutes), followed by a dialogue in small groups (15 minutes) and a discussion in plenary (10 minutes).
Write on flip-over or whiteboard

11:30 – 13:00 **Assessing the shifts**

Presentation of the shifts in six areas (*15 minutes)*

The overall shift from teaching to learning and from knowledge to competence implies concrete shifts in the following six areas:

7. From lecture hall to a diversity of learning arenas
8. From lecturing ('vorlesung') to 'nachlesung' and peer learning
9. From syllabus to supporting literature/a variety of learning sources
10. From textbook to a diversity (variety) of teaching aids
11. From written exam to a variety of assessment methods
12. From lecturer to learning facilitator (which includes the introduction of and training in dialogue, visionary thinking, observation and reflection

Part 1: Where do we stand today?
On a continuum of 1-10, where 1 signifies close-to-zero diversity and 10 signifies full diversity, 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.

Exercise to address this task:
Reflection individually (10 minutes) and

a discussion in plenary (5-10 minutes). The plenary can be done with participants moving along an imaginary line through the room whereby their position along that line represent their ranking of the shift on the continuum of 1 to 10.
Put slide with six shifts up, write on provided sheets (groups) & on flip-over or whiteboard (plenary)

Explain for the shifts that you rated **below** 5 why they are rated low and what can be improved

Exercise to address this task:
Dialogue in small groups (15 minutes) and
a discussion in plenary (5 minutes).
Put slide with six shifts up, write on provided sheets (groups) & on flip-over or whiteboard (plenary)

Explain for the shifts that you rated **above** 5 why they are rated highly.

Exercise to address this task:
Dialogue in small groups (15 minutes) and
a discussion in plenary (5 minutes).
Put slide with six shifts up, write on provided sheets (groups) & on flip-over or whiteboard (plenary)

Part 2: Which additional shifts?
Come up with at least 2 suggestions for additional shifts.
Follow the guidelines for divergent thinking (brainstorming), stretch your thinking, don't evaluate each other's ideas, suspend judgement, focus on quantity, dare to think out of the box, allow for completely new ideas.

Exercise to address this task:
Reflection individually or dialogue in small groups (10 minutes) and
*a **ranking** of suggestions in plenary (5 minutes). The plenary can be done with participants moving along an imaginary line through the room whereby their position along that line represent their ranking of the shift on the continuum of 1 to 10.*
Put slide with six shifts up, write on provided sheets (groups) & on flip-over or whiteboard (plenary)

13:00 – 14:00 **Lunch**

14:00 – 15:00 **Supporting and hindering forces**

Remind the participants that they should try to take into account what is stated in the data as well as their own perspective.

1. Note down three supporting forces for implementing the educational activity in line with the Nextfood approach. (*individual reflection, 5 minutes, then 10 minutes plenary)*

2. Note down three hindering forces for implementing the educational activity in line with the Nextfood approach. (*individual reflection, 5 minutes, then 10 minutes plenary)*

3. Ranking of the forces

Exercise to address this task:

Rank all supporting forces mentioned, with rank 1 for the most important that needs to be addressed first.

Rank all hindering forces mentioned, with rank 1 for the most important that needs to be addressed first

*Individual reflection for these last two tasks together: 10 minutes, than a **ranking** of suggestions in plenary (20 minutes). The plenary can be done with participants moving along an imaginary line through the room whereby their position along that line represent their ranking of forces with the left-hand side of the room being rank 1.*

Put slide with six shifts up, write on provided sheets (groups) & on flip-over or whiteboard (plenary).

15:00 – 15:30 **Wrap-up**

- Reflection and group discussion after each question below.

(10 min individually, 10 min plenary)

Write on flip-over or whiteboard

1. Note down three things you liked about this meeting, that you found useful, inspiring, interesting!
2. If I were to be responsible for the next workshop, what would I do differently?

- Summary of the day, plan for the next day (*10 minutes*)

Day 2:

Desired outcomes of the workshop

a) *Exploring what it takes to build on the supporting forces and how to overcome the hindering forces.*
b) *A plan of implementation: What, who, when, where*

Participants

Teachers/researchers
Students
Resource persons from 'the field'
Representatives from school or university administration
Stakeholders with an interest in the education or the competence of the candidates

Facilitator(s)

One or two from the case responsible group

09:00 – 10:15 **Introduction to/background for this workshop**

Introduction by the facilitators:

Aim of the workshop: Developing a plan for how to improve the educational activities based on the experiences from the previous cycle.

Desired outcome: a draft of a plan including which actions and decisions should be given priority before the upcoming cycle of case activities.

Plan for the day, feedback from participants

Presentation of the outcomes from **Day 1** of the workshop.

Reflection exercise (*based on what I've heard so far, what are the questions I'm now asking myself?)*

10:15 – 10:30 **Break**

10:30 – 12:00 **How should the supporting forces be built upon and how can the hindering forces be overcome?**
- Review of dialogue instructions (15 minutes)
- Exercise to address the questions (75 minutes)

Individual reflection (15 minutes), followed by a dialogue in small groups (20 minutes) and a discussion in plenary (40 minutes).
Write on flip-over or whiteboard

12:00 – 13:00	**Lunch**
13:00 – 14:00	**Planning for implementation** - What needs to be done when and by whom to build on the supporting forces and overcome the hindering forces? *(10 min individually, 20 min in small groups, 30 min plenary)* *Write on flip-over or whiteboard in plenary*
14:00 – 14:15	**Coffee break**
14:15 – 15:15	**The immediate next steps (What, when, who, where)** Who should meet and when? What should be ready and when? *(10 min individually, 20 min in small groups, 30 min plenary)* *(Plenary discussion to make a timeline)*
15:15 – 16:00	**Wrap-up** - Reflection and small group discussion after each question below. *(5 min individually, 5 min in small groups, 10 min plenary)* *Write on flip-over or whiteboard* 1. Note down three things you liked about this meeting, that you found useful, inspiring, interesting! 2. If I were to be responsible for the next workshop, what would I do differently?

Appendix 3 Introduction to visionary thinking (ppt)

NEXTFOOD WP2: Case meeting
September 17 – 19, 2018
University of Gastronomic Sciences
Pollenzo, Italy

Session 4 (cont.): Creating Shared Visions

NMBU team

Nextfood: Co-creation of new knowledge

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«Every successful large-scale change that I have seen has, as a part of it, a change vision. What that means is a picture of after we have made the changes on whatever dimensions, this is what we're going to look like.»

John Kotter

Myths about vision

Escape from the real world
-daydreaming

For charismatic
leaders only

Vision is an answer to the question:
What do we want to create?

Every human being has
the capacity
to create visions

Unrealistic

Only if we believe that
causality is the only driving
force in the world

Wishful thinking

A concrete image of
a desired future

That it has to be stretched out
far into the future

Up to us to decide

What is a vision?

"A picture of the future one wants to create. It articulates a view of a realistic, credible and attractive future for the organization, a condition that is better in some important ways than what now exists. It provides a framework for our decisions and priorities."

W. Bennis

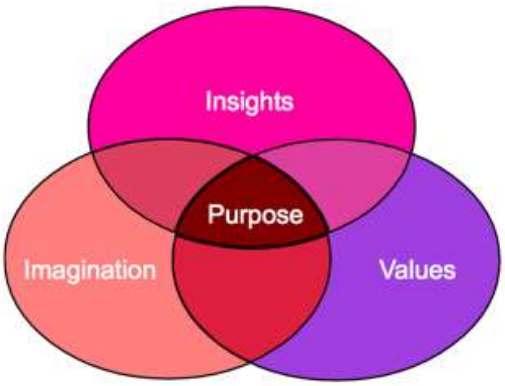
What is a shared vision?

- Shared visions are expressions of what people have in common; of what they, as a whole, are committed to.
- They provide alignment around a picture of what the desired future outcome will look like.

What is visionary thinking?

- 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 relevant to the challenge that is in focus.

Where do visions come from?



Why vision?

"People who have the ability to welcome change, think in visions. Instead of planning in detail, they create an intensely alive picture of a desirable future state, and let their actions today be guided by their visions".

R.Moss Kanter

Why vision?

"A learning organization is an organization that is continually expanding its capacity to create its future.

The shift from an authoritarian to a learning organization must start with learning how to create shared vision".

P.Senge

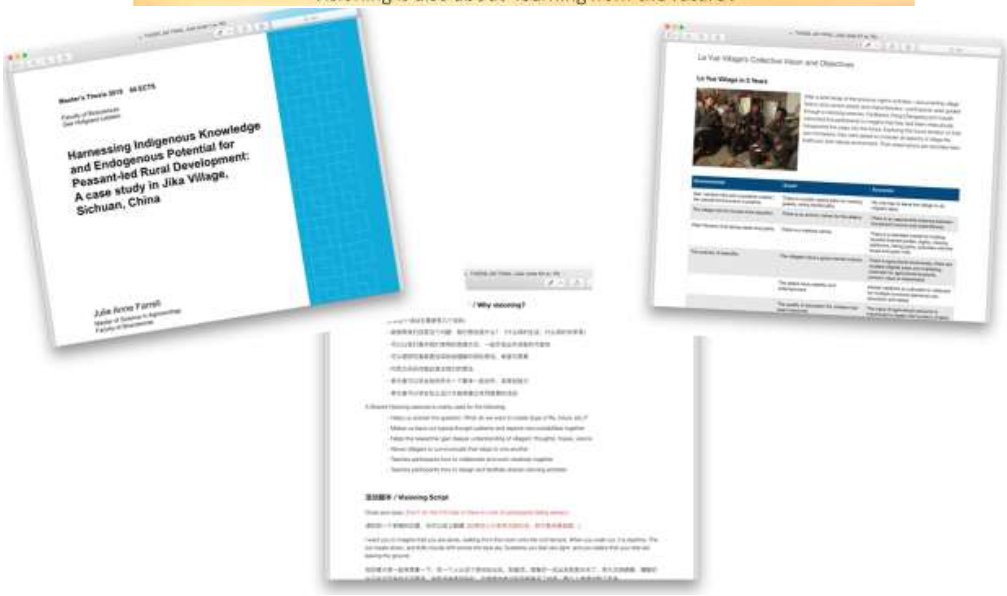
2013

Aschjem Gårds Farming System: A Vision for Sustainability

NORWEGIAN UNIVERSITY OF LIFE SCIENCES
MSC. IN AGROECOLOGY

DEVELOPING A VISION
FOR EVA'S FARM

Visioning is the competence to go beyond existing thought patterns and to think in new an novel ways, a willingness to take risks and not to be inhibited by a fear of failing. Visioning is also about 'learning from the future'.



What can stand in the way of creating shared visions?

- Tendency to focus on limitations, what isn't working/what we want to get away from
- Focus on what's operational
- Short term orientation
- Eagerness for quick-fix solutions
- Negative beliefs - "Me? I'm not a visionary!"
- Reluctance to move into a relaxed state

Where could we in our work connected to NEXTFOOD benefit from having a shared vision?

- Designing a physical space
- Fostering cross-functional collaboration?
- A core value?
- An ambiguous opportunity?
- Bringing a critical concept or idea to life?

Relaxation

Being able to relax prior to envisioning a desired future state is a critical success factor.

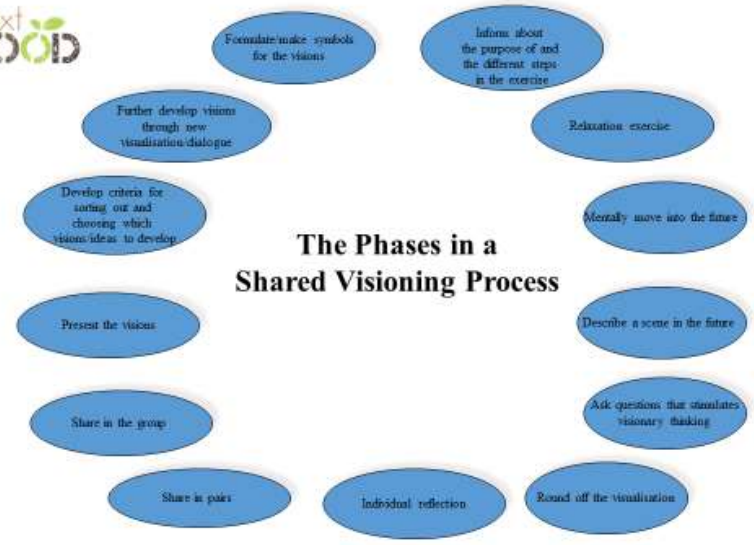
In order to reach futher into our intuitive, creative and imaginative capacities, our racing brain must take a break!

Mental imagery

- Imagery is the mental processes of creating sights, sounds, smells, tastes and sensations in the absence of any actual external stimuli.
- Imagery is a means of improving communication between the conscious and unconscious levels of the mind as it provides simulatneous access to both levels.
- Our images give us the power to span time.
- Images are a vehicle for profund intuitive insights.
- Imagery allows us to express ideas and feelings which are not usually easily accessible.
- Imagery is an especially useful tool when dealing with tasks which are complex, incertain and novel, such as visioning.
- Guided imagery is the process of leading someone on an imagery journey. In our M.Sc. Program we have introduced the students to guided imagery and we feel this has made it much easier for the students to envision the outcomes of their projects.

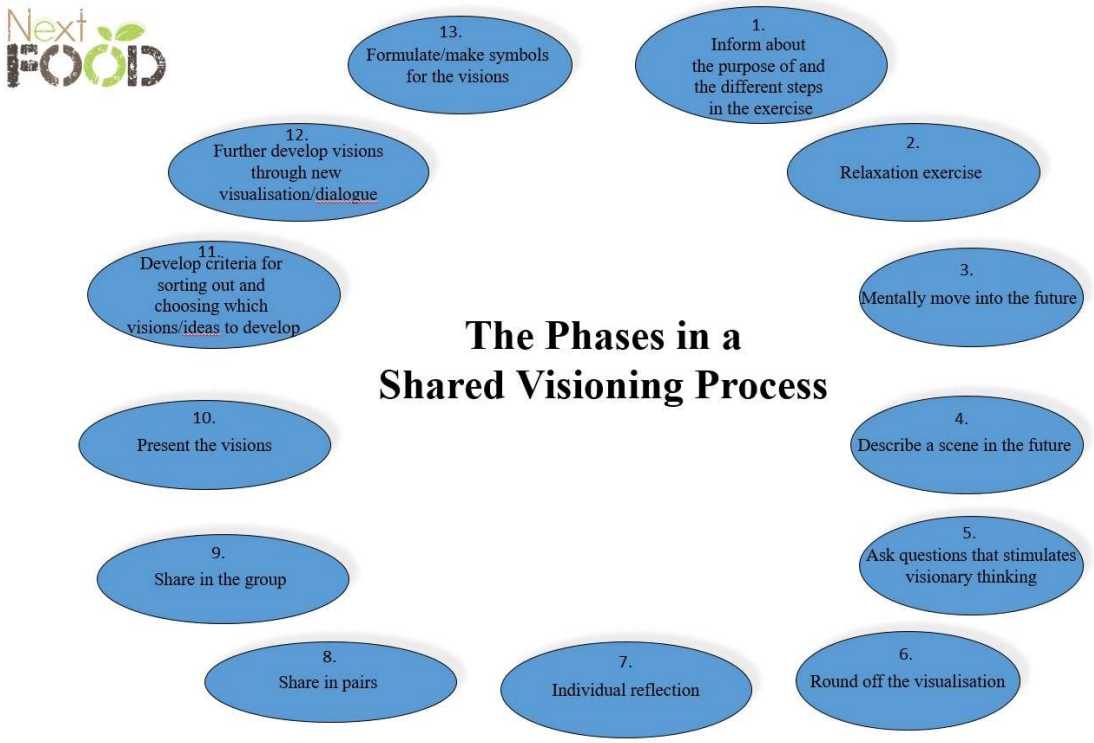
Let's create a shared vision of:

Co-creating new knowledge
in the NEXTFOOD project



Appendix 4 Exercise to create a shared vision

During the WP2/3 workshop held in Pollenzo in September 2018, all Nextfood cases were represented with the aim of practicing and getting a shared understanding of the Nextfood approach. One part of the workshop was an exercise where the participants were asked to develop a shared vision according to the phases in a shared visioning process as described in the figure below. The topic of the shared vision was the shared success of the consortium in implementing the Nextfood educational strategy.

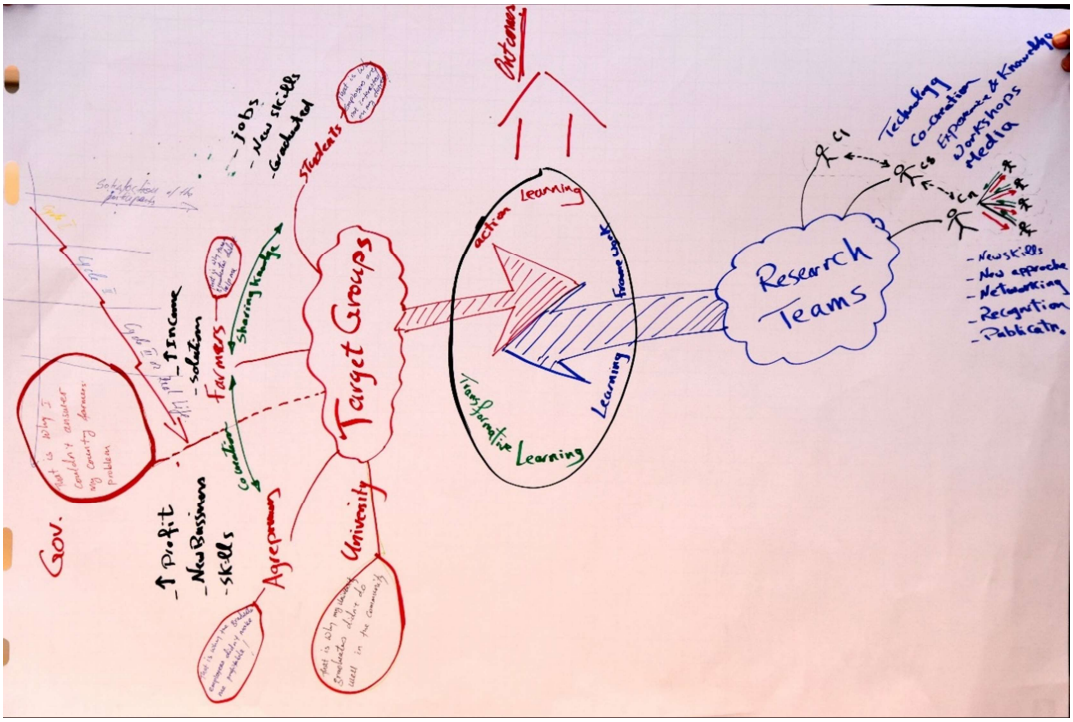


Cycle of visioning as presented by Geir Lieblein at the workshop.

First, the participants were informed about the process of visioning before a relaxation exercise was conducted. Thereafter, a script was read by the exercise facilitator where the participants were invited to mentally "move to the future" and form their individual representation of the vision. After the "individual reflection"-element of the cycle, the participants answered the following three questions:

1. *What are the mechanisms that are enabling the co-creation of new knowledge?*
2. *How is your own team contributing?*
2. *What are you especially proud of?*

The responses to the questions were shared in small groups in a dialogue-inspired manor. Following the sharing, the participants were instructed to transition towards developing a shared vision. The following day, the shared visions were presented. All of the groups drew rich pictures of their shared visions. Below follow a few examples of the rich pictures.



Appendix 5 Visioning exercise

”The successful start-up of NEXTFOOD”
Meeting with program officer in Brussels

March 17, 2019

Ask Participants to take out a blank sheet of paper and write at the top of the page

March 17, 2019

1. Read short relaxation exercise

3) Description of future scene – 6 months ahead in time

Now that you are in a relaxed state, imagine that it is March 17, 2019, and you are in Brussels, Belgium. Pause … You find yourself waiting outside of a meeting room in an EU-commission building. Pause …

You alone have been selected by your EU program officer as a representative of the NEXTFOOD project to appear before a group of EU officials. Pause …What are you wearing? Pause …The program officer has heard rumours about the NEXTFOOD project where co-creation of new knowledge among different universities and across cultural boundaries is no longer just a buzzword, but already an integral part of day-to-day activities in the project.

Pause … You yourself are thrilled for having been selected, and are eager to share what´s behind our success in being able to co-create new knowledge. Pause …

The door to the meeting room opens, and the program officer comes out to greet you. You hear him/her say: "We are fortunate to have you here with us today to share what is going on in the NEXTFOOD project that enables the co-creation of new knowledge among the project partners.". Pause …

You enter the meeting room together with the program officer, and are delighted to see that also several other EU officials are sitting around the table.

4) Questions to envision

Your program officer says: "You must feel enormous pride in knowing that your approaches are proving to be so effective"

1) What are the mechanisms which are enabling the co-creation of new knowledge?

Just listen quietly to how you respond. You do not need to censor anything. (Pause)

2) How is your own team contributing?

Again, listen to how you respond (pause)

3) What are you especially proud of?

Listen to yourself respond.

Now you hear the program officer concluding:

" Many thanks for your willingness to be with us today and share your insights". Pause

Now listen to the EU officials applauding – they are obviously excited and inspired by all that you have said.

5) Closure

Now see yourself walking slowly down the corridor to the elevator. Now see yourself leaving the building, and walking out into the open air. Allow yourself to feel pride in having been asked to share the mazing achievements of the NEXTFOOD project.

6) Capturing images individually

On the lawn, not far from the building is a white painted bench. See yourself sitting down on the bench.

I will now ask you to open your eyes. Pick up a piece of paper and pen and write at the top of the page, "**Today is March 17, 2019** " . This reminds them to write as if the future is now.

Remain silent and please do not speak with your neighbour. You will now have time to note your responses to the questions posed by the conference leader.

(Write questions on whiteboard or flip-over so the participants can take a look in case they have forgotten.)

Remember – it is still March 17, 2019, and your responses are describing what the achievements that are now manifesting in the year 2019. Write your responses in the present tense. For example: what are the mechanisms that are in place in the NEXTFOOD project is…… My own team is contributing in the following ways…. ……..

If, in addition to words, it feels easier to illustrate your responses by making a drawing or sketch, feel free to do so. There are coloured pens on the table. Feel free to use your non-dominant hand to make the drawing. This approach sometimes makes it easier. It does not matter if the drawings are simple or rough sketches.

You have plenty of time to do this. If you complete the writing/drawing before the others, remain in your chair and be completely quiet.

NB! Give them **15-20 minutes** to do this and **then ask them to put a star** next to those ideas or images that are most central to their experience/ or perhaps are most excited about.

From Individual to Shared Vision

1) Small group sharing – deep listening 20-30 minutes

Encourage participants to be fully present in the ***desired future state*** when they begin to share what they experienced in the visualization.

Present some ground rules,- A symbolic red card will be given to anyone who:

Overhead: RED CARD to anyone who:

- Brings the discussion back to today's problems
- Begins to focus on the difficulties or barriers to achieving their own or the others' visions
- Underestimates their own or others' abilities to realize the vision
- Gets hung up on how this is all going to happen

Once you have covered the ground rules, invite them to get to share the descriptions or **images that they starred.**

Instruct them to share their visions in the present, as if the future they created in their minds already exists. For example: "It's March 17, 2019 and one of the the mechanisms which is enabling the co-creating of new knowledge is . …

When one person shares, the others should simply listen and appreciate the images and descriptions. The idea is to make sure that each person's images are fully heard.

Be sure to walk around the room and gently correct people's language if they are straying into today's time frame or focusing on how to make changes. You will also want to make sure that everyone is getting a chance to share his or her vision and that one or two people aren't dominating the group.

2) Dialogue in plenary - finding common themes

1) Explain that the purpose of this next section is to **explore the common themes** that arose in the small groups.

3) Ask each small group to share 3-4 elements of what they envisioned with the whole group. Write these on a flipchart or in a drawing.

4) Because of the natural tendency to look for faults or weaknesses in other peoples' ideas, it's extremely important that participants are asked to listen to one another's visions with an open mind and appreciative mindset. Ask some of those listening to share something they like about what they are hearing.

It can help if, as they listen, they ask themselves, for example:

- What I find most appealing is…
- The three most positive aspects of this vision are…
- What would be interesting to take a step further is…

5) When all the groups have reported in, **invite the whole group to identify the most common themes. Write these themes in words and/or drawings on a flip chart**

or whiteboard.

6) As you identify themes, begin to link them together, where appropriate. If someone can create pictures, symbols that illustrate the connections between them, great. **Having some kind of visual representation that everyone in the group can see is always useful.**

Take time to help the group work towards a shared understanding of each theme by clarifying the underlying assumptions of each one. This helps to move the group towards a shared vision. It also builds the team's level of ownership and commitment to implementing the vision.

3) Group discussion –establishing criteria/aligning around the shared vision

- Once the group has identified the common themes from their visions, it's useful to **generate criteria for evaluating which of the themes to include in the shared vision.**

- After creating a list of possible criteria, help them select the ones they feel are the most important. You can use voting, if need be, but often the group is able to come to a consensus without that.

- Ask the team to evaluate the various aspects of the vision against the final criteria. Using a rating system like 1-5 or "red, yellow, green" helps the group test their vision against the criteria. We have found that 6-7 final criteria usually work well.

Criteria may have to do with time frames, costs involved, groups affected, tangibles (like materials or resources needed), or moral or legal implications. As a final test, you might want the group to check whether the vision meets some overall general criteria by asking:

This process supports the group in modifying and refining the vision, identifying something that has been missing or expanding on something important.

- Often, there is a need for a deeper shared understanding of what some of the words or images mean. At the end of this process, the shared vision should feel even stronger, more compelling, realistic and engaging. Helping a group move from individual visions to shared vision is incredibly important and takes time.

The planning session: Making the vision real

(Identifying barriers and leverage - Force Field Analysis

Force Field Analysis could be used here, but it might not be necessary.)

1) Small group discussion - identifying stakeholders – for support and acceptance

Taking time to think through and discuss which groups and stakeholders inside and outside the organization need to be informed, which ones you actively need to obtain acceptance from, who might be potential resisters – all this information is useful. It gives background for being able to tailor

approaches to gaining acceptance and support depending on the situation and needs of different types of stakeholders. It will help your team create an informed, proactive and robust plan for reducing the gap between your vision and current reality.

The groups can be invited to go through the list of questions, note down their responses, and share in small groups, alternatively the entire group. This increases the likelihood of identifying stakeholders which might not have come to mind initially.

OVERHEAD or HANDOUT

- Who, among our stakeholders needs to hear and understand our vision?
- Which of these stakeholders need to be aligned with the vision?
- Who are the key players and supporters we believe can motivate others to buy into the vision?
- Who are the people we need to gain acceptance from?
- Who are the persons/groups who will likely support and can assist in making the vision a reality?
- Who are the individuals, groups, departments, etc. that might resist achieving our vision?

The next step is to create a shorter list of key people whose acceptance and support is critical.

2) Action planning – in plenary (first in small groups and then in plenum)

Select the questions below that are most relevant to your situation and/or write some new ones to cover areas these don't address.

Ask participants to jot down their responses, and then invite them to share either in small groups, or in the large group. The ideas that emerge in relation to the questions will naturally funnel into additional action items for the plan.

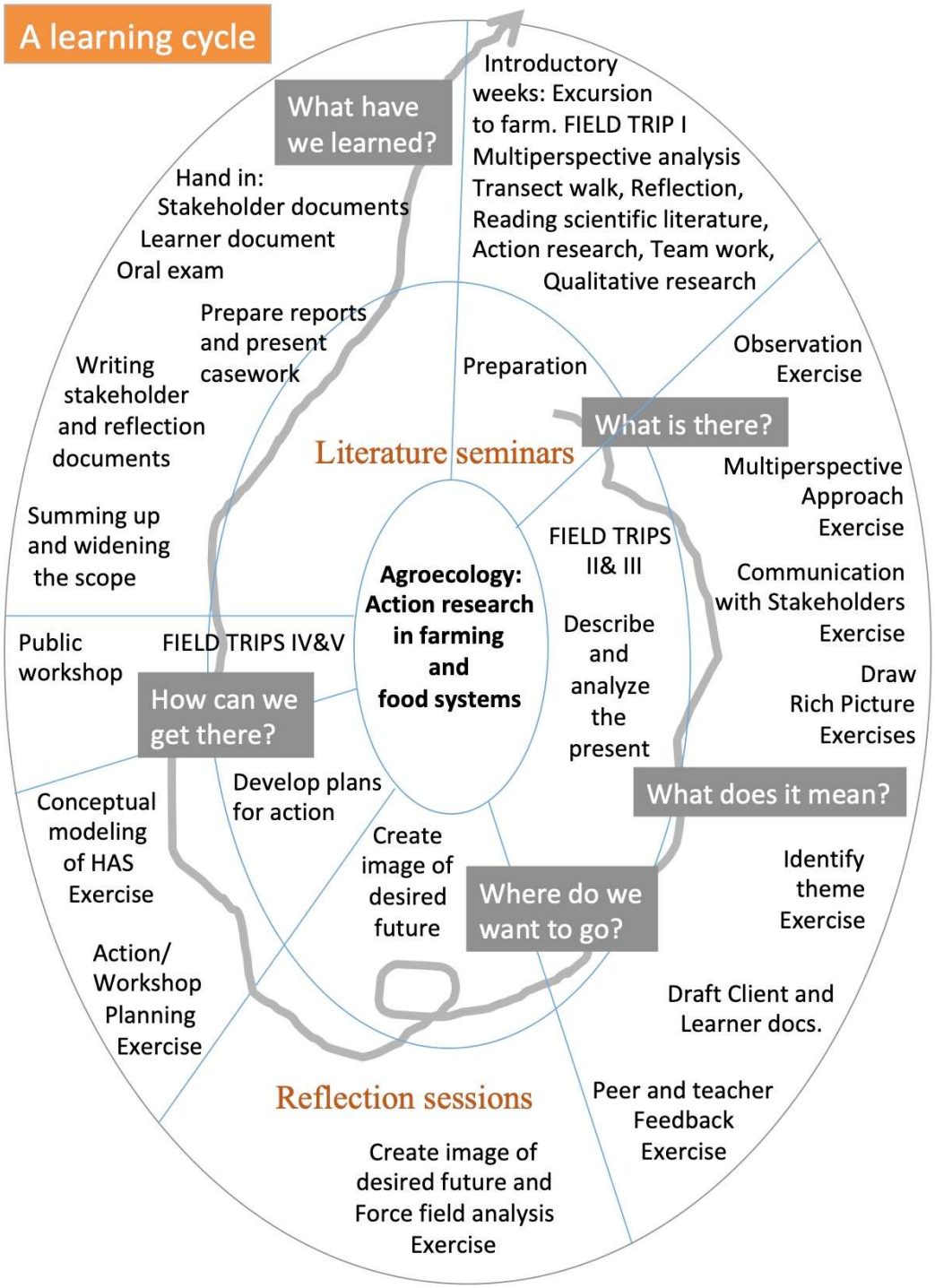
Overhead or Handout: Questions for action planning (Pick the relevant questions and align around first steps, etc.

- What first steps might we take to initiate action? How? When? Why?
- What next steps might follow? How? When? Where? Why?

- What deadlines or schedules might we follow?
- What resources could be of assistance? How might we best put them to use?
- What follow-up might we need to deal with unexpected repercussions?
- What important obstacles must be considered in implementing the plan?
- What new skills might be critical for achieving our vision?
- In what ways can we ensure that employees can ask questions and offer feedback to our change vision?
- In what ways can we test people's understanding of our vision and its implications in their area of responsibility?
- In what ways can we ensure that decisions support the achievement of the change vision?

Sum up the action steps, so that everyone is aware of what will happen with regards to introducing mechanisms to ensure co-creating new knowledge and how their group is going to contribute. Who shall do what, when, how?

Appendix 6 NMBU educational activity wheel



Appendix 7 Kerala agroecology course schedule

AE June 2017		Week 1 June 1-3 INTRODUCTION and PREPARATION	Week 2 June 5-10 OUT IN THE FIELD 1	Week 3 June 12-17 REFLECTION	Week 4 June 19-24 OUT IN THE FIELD 2	Week 5 June 26-28 SUM UP
		What is there? Present		What does it mean?	Future - What can we do?	How can we do it?
Monday	09:15 - 10:00					Presentation of casework
	10:15 - 11:00			Presentation of first field visit Feedback - teacher and peer		
	11:15 - 12:00		First Field Visit		Second Field Visit	
	12:15 - 13:00					
	13:15 - 14:00		in groups of three students	Start working on documents: Report for stakeholder		
	14:15 - 15:00			and individual learner document		
	15:15 - 16:00		Daily log		Participate on the farms	Daily log
Tuesday	09:15 - 10:00		Participate on the farms	Work on Competences	Participant observation	
	10:15 - 11:00					Public workshop
	11:15 - 12:00		Conduct interviews	Observation	Conduct interviews	
	12:15 - 13:00					
	13:15 - 14:00			Participation		
	14:15 - 15:00					
	15:15 - 16:00		Daily log	Daily log	Daily log	Daily log
Wednesday	09:15 - 10:00	Intro to Agroecology		Work on Competences	Reflect on experiences	
	10:15 - 11:00		Participant observation			Reflection on and evaluation of the whole course
	11:15 - 12:00	Holistic approach		Dialogue		
	12:15 - 13:00				Conduct a Vision Session with the Stakeholders Future Situation	
	13:15 - 14:00	Rich Picture of the course		Reflection		
	14:15 - 15:00	Students present themselves				
	15:15 - 16:00		Daily log	Daily log	Daily log	Daily log
Thursday	09:15 - 10:00	Observation walk		Work on Competences	Work on documents: Report for stakeholder	
	10:15 - 11:00	Joint Reflection	Reflect on experiences		and	
	11:15 - 12:00	Daily log		Visioning	individual learner document	
	12:15 - 13:00					
	13:15 - 14:00	Qualitative methods - interview techniques		Read literature relevant to methods and topic		
	14:15 - 15:00					
	15:15 - 16:00	Interview each other	Daily log	Daily log	Daily log	
Friday	09:15 - 10:00	Manual for Fieldwork	Make a rich picture of the situation		Work on documents: Report for stakeholder	Hand in of documents?
	10:15 - 11:00			Read literature relevant to methods and topic	and	
	11:15 - 12:00	Daily log intro	Prepare for presentation of field vis		individual learner document	
	12:15 - 13:00					
	13:15 - 14:00	Team work				
	14:15 - 15:00					
	15:15 - 16:00		Daily log	Daily log	Daily log	
Saturday	09:15 - 10:00		Work on rich picture		Work on documents: Report for stakeholder	
	10:15 - 11:00	Prepare for fieldtrip	and presentation	Prepare for fieldtrip	and	
	11:15 - 12:00				individual learner document	
	12:15 - 13:00	Daily log	Daily log	Daily log		
	13:15 - 14:00					
	14:15 - 15:00					
	15:15 - 16:00					

Further case development (WP2)

Phase 2 Working paper

Version 1.0 on 11 September 2020

EUROPEAN UNION

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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

1 Background

We are now into the second half of the Nextfood project, which is a good moment in time to look back at our achievements in order to step up our work during the remaining time of the project. In our project description (GA) we state that: “NEXTFOOD will challenge the linear view of knowledge transfer as a top-down process from research to advice and practice, and support the **transition to more learner-centric, participatory, action-based and action-oriented education and learning in agrifood and forestry systems**». The work within the educational cases in WP2 is at the core of that endeavor.

In the project description, we have also emphasised the importance of the **cyclical approach to learning** in the different courses (GA p. 3) : “Figure 1 (the Nextfood model) describes a necessary paradigm shift from a linear to a cyclical approach to learning. In agrifood and forestry, it represents a dramatic shift from a conventional, mono-culture mode of education, towards ecosystemic, cyclical and participatory education and training systems.”

We further stated (GA part B, p. 11): “It is well known that active, social learning having the **complex reality as point of departure** - with theory in a supporting role - is generally more effective than traditional, theory-based strategies and more suitable when it comes to understanding and handling complex sustainability challenges”

Additionally, we emphasised the importance of **cultivating five core competence** of importance for sustainable development observation, reflection, participation, dialogue, and visionary thinking (GA, part B, p. 11).

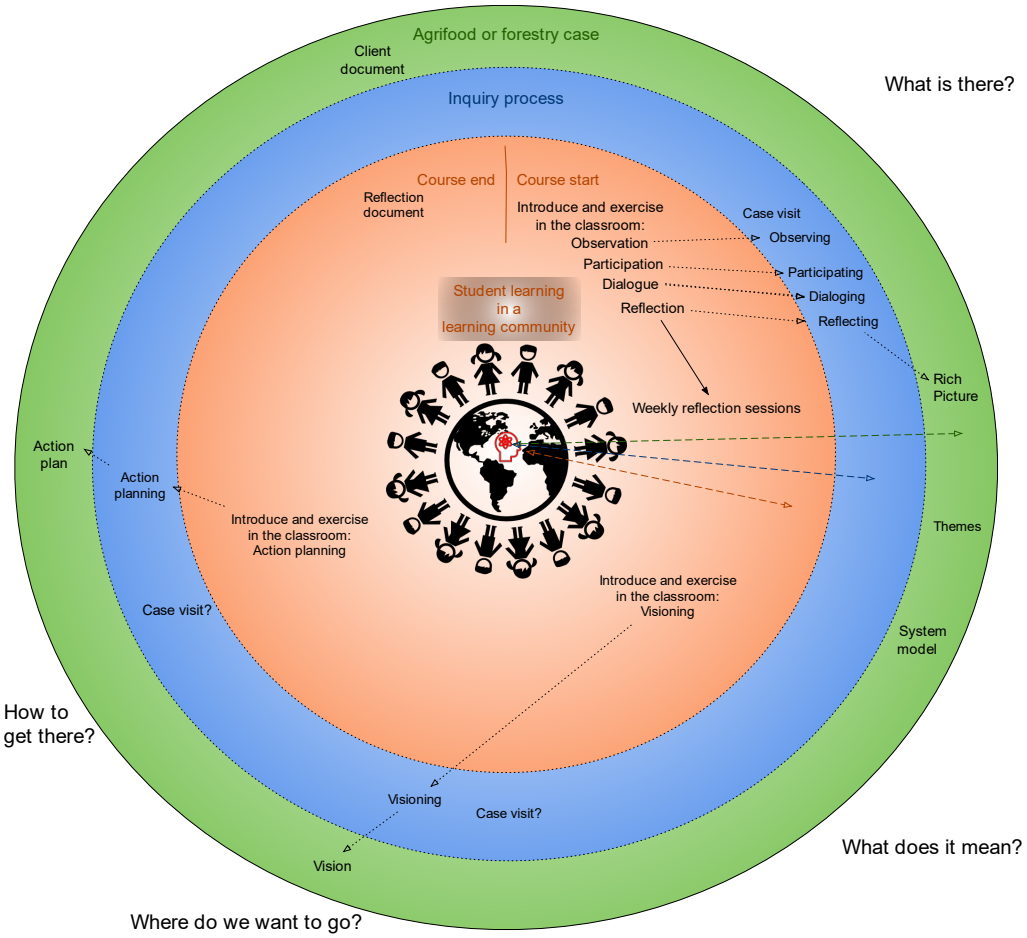
In sum, WP2 is key in the Nextfood project to enable a transition to more learner-centric, participatory, action-based and action-oriented education and learning in agrifood and forestry systems. This transition can happen when all WP2 cases take the following core elements at heart: 1) a cyclical approach to learning, 2) complex reality as point of departure, and 3) cultivating five core competences.

During the first half of the Nextfood project we have kicked off the innovation process towards cyclical learning, and further made initial try-outs of the approach in different settings. In parallel, we have initiated a process of researching such a transition process including the learning outcomes for the students and other learners in our programs. Overall, we have made good progress, but we still have a concern that there are some cases that lack inclusion of some of the above-mentioned core elements of what we have called “The Nextfood approach to education”. Our view is therefore that it is time for us to shift gear and step up our activities, to enable a delivery that matches what we have promised, we need to A) support a transition to more learner-centric, participatory, action-based and action-oriented education and learning in agrifood and forestry systems (i.e. taking the three above-mentioned core elements at heart), B) active research on this development process, and C) research into the learning outcomes for those that are involved in the cyclical learning processes. While this document focuses on course development aligned with the transition in education and learning (A), a forthcoming condensed research protocol will deal with (B) and (C).

The aim of this document is thus to provide a base for the necessary step-up of activities. The document will provide a condensed version of how to further develop the Nextfood course(s) through a stepwise planning process (ref. D2.2 Master manual), As such, it should function as a recipe for helping us to deliver what we have committed to do. We further think that this is the best way to achieve good results in the project.

The final part of this document contains a check- list of activities that are required for the case to be considered as a Nextfood case. Our aim is that such a check-list will help the cases to further develop their course activities

2 Cyclical learning (the Nextfood approach)



3 Plan and implement the course

3.1 Place the students and their competence development in the center of the planning process

3.2 Let a real-life case be the point of departure for the learning process

3.3 Organise the course in a cyclical manner (a learning cycle)

3.4 Exercise core competences

3.5 Emphasise reflection as a structured activity for learning in the cyclical learning process

3.6 Organise student-led literature seminars

3.7 Include a student reflection document as important output for assessment

3.8 Include a stakeholder document (preferably teamwork) as important output for assessment

3.9 Have teachers write a reflection document as well

We will support the operationalisation of these steps through the toolbox and through direct communication when the toolbox is insufficient, or else when required.

4 Required activities checklist for a Next-food course

Required activities checklist for

The Nextfood Course: (name) From: (dates)

Activity	Done ✓	In the case report
Plan & implement the course		
Organize the course as a learning cycle		
Place a real-life case in the centre of the course		
Exercises on all core competences:		
- Reflection sessions		
- Observation		
- Participation		
- Dialogue		
- Visioning		
Literature seminars		
Student reflection documents		
Stakeholder documents		
Teacher reflection documents		
Research the course		
Collect data from:		
- Initial expectations and questions		
- Self assessment: Start of course		
- Final questions		
- Self assessment: End of course		
- Student reflection documents		
- Teacher reflection documents		
Analyse the data		
Write up the results		
Course reflection		

Appendix 9 WP2 Mini workshop

Desired outcome: A shared and improved understanding of the further case development in WP2

Schedule

09:00 – 09:10	Intro 1: The learning cycle diagram (NMBU)
09:10 – 09:15	5 minutes individually
09:15 – 09:40	Feedback (all) Use also chat.
09:40 – 09:45	Intro 2: The checklist (NMBU)
09:45 – 09:50	5 minutes individually
09:50 – 10:15	Feedback (all) Use also chat.
10:15 – 10:25	Break
10:35 – 10:35	Intro 3: On reflection (NMBU)
10:35 – 10:40	5 minutes individually
10:40 – 10:55	Feedback (all) Use also chat.
10:55 – 11:00	Sum-up (NMBU)

Rationale for this meeting

Half-way the project

Final goal: **Transition to a more learner-centric, participatory, action-based and action-oriented education and learning in agrifood and forestry systems.**

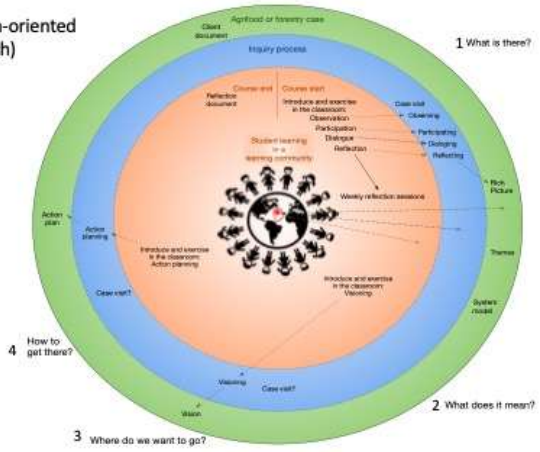
And: **Action-research on this development process;**
Research into learning outcomes for those involved in cyclical learning processes.

This means that all Nextfood cases should…

- Have a cyclical approach to learning;
- Take complex reality as point of departure; and
- Cultivate five core competences (observation, participation, dialogue, reflection, visioning)

How to further develop NF cases?

Cyclical learning –
Experiential and action-oriented
(the Nextfood approach)



Questions & ideas for improvement

What are the questions I have about the figure?
What ideas do I have for improvements?

Five minutes individually
Then a round of feedback (you can also use the chat)

How to plan and implement your course?

- **Place the students and their competence development in the center of the planning process**
- **Let a real-life case be the point of departure for the learning process**
- **Organise the course in a cyclical manner (a learning cycle)**
- **Exercise core competences**
- **Emphasise reflection as a structured activity for learning in the cyclical process: Organise frequesnt reflection sessions in the class-room**
- **Organise student-led literature seminars**
- **Include a student reflection document (also as important output for assessment)**
- **Include a stakeholder document (preferably teamwork) as important output for assessment**
- **Have teachers write a reflection document as well**

Required activities checklist

Activity	Done✓	In the case report
Plan & implement the course		
Organise the course as a learning cycle		
Place a real-life case in the centre of the course		
Exercises on all core competences		
- Reflection sessions		
- Observation		
- Participation		
- Dialogue		
- Visioning		
Literature seminars		
Student reflection documents		
Stakeholder documents		
Teacher reflection documents		
Research the course		
Collect data from:		
- Initial expectations and questions		
- Self assessment: Start of course		
- Final questions		
- Self assessment: End of course		
- Student reflection documents		
- Teacher reflection documents		
Analyse the data		
Write up the results		
Course reflection		

Questions & ideas for improvement

What are the questions I have about the figure?
What ideas do I have for improvements?

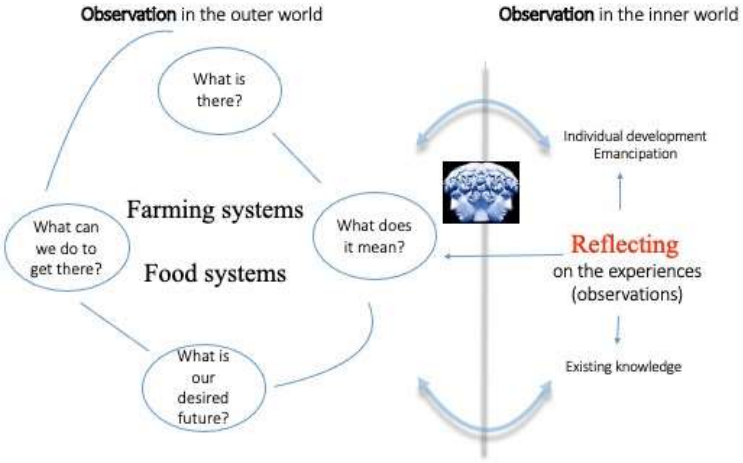
Five minutes individually + 10 minutes break
Then a round of feedback (you can also use the chat)

Reflection

A crucial competence to develop in cyclical and experiential learning

Experience is transformed to knowledge (learning) through reflection

Learning agroecology: Valuing and connecting observation and reflection



Questions & ideas for improvement

What are the questions I have about the inclusion of a structured approach to reflection in my case?

Five minutes individually
Then a round of feedback (you can also use the chat)

Reflection
How can you bring it into your course?

- Weekly reflection sessions led by course facilitator(s)
- Students write a log
- Final reflection document by students (individual)
- Teachers write a log
- Final reflection document by teachers (individual)
- Student-led reflection sessions

Reflection sessions: Basic principles

Three levels of learning – including their interrelationships

Individual learning
Learning in project groups (4-6 people)
Learning in the whole class setting (all students and 2-3 teachers)

Three depths of learning – including their interrelationships

1 What are the facts? What has happened?
2 What does it mean to content (case or class) and process (systems inquiry or learning)? Interactions among experience, literature and own background/development ➔ Key issues
3 What does it mean to me? Implications for the individual

The double focus of reflection

Reflection about both content and process (issues)
Need for thinking about both issues (point 2 above) and personal learning (point 3 above)

General structure of a reflection session

1 Introduction. What is to be covered, in terms of both content and process.
2 Formulate/ask questions that demand something.
3 Develop/present an approach for how to do the reflection

Reflection sessions at NMBU

Examples can be found on Teams, one example:

Before lunch the students have been asked to go for long walks to different locations in the landscape, in pairs.
They are asked to emphasize non-judgemental observation, and not talk to each other on the way 'out', only on the way 'back'.

Then they all meet with the teachers after lunch, with the following program:
1. Introduction to reflection and why it is important in the agroecology course.
2. Then two rounds of reflection

1st round of reflection

"You have now returned from the observation walk.
1. Choose an experience from the walk, one that made an impression on you.
2. Try to describe that experience in as much detail as possible.
3. Ask yourself the following question:
Why is this experience important for me?
PROCESS: 10 minutes individually – IN SILENCE
THEN: 10 minutes in groups of three. Share in the groups.
THEN: 5 more minutes: Ask yourselves:
What are the commonalities between our experiences?"

2nd round of reflection

"Then ask yourselves:
What characterizes a good observer?
PROCESS: 3 minutes individually
THEN: 10 minutes in groups of three. Share in the groups.
And: What characterizes good reflection?
And: what is the relationship between Observation and Reflection?
Plenary session (Mind-maps on the board)"

Log-writing / the learning (reflective) journal

The 3 and 6 steps of log writing

1) What, exactly, did I see and hear? What exactly did happen? What did I experience?
2) What did I feel/think about this?
3) What did I learn from this?

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?

The past ←	The present	→ The future
What did I experience?		What are the questions I am asking myself?
What made an impression on me?		What will I do to find the answers?
What did I think and feel about this?		
What did I learn from this? – in terms of both *content* (ontology) and *process* (epistemology)		What are the implications for my own development – for what I will do in the future?
(Connecting to both experiences (linking) AND relevant literature is necessary + connecting separate experiences)		*The primacy of the agroecologist (over agroecology).*

Writing a reflection document

Learning from experience

Every experience (case) contains something specific
and something generic

Reflect on your own experiences – *reflection* is different
from *description* (should also be included) and *reviewing*.

Be attentive towards both content (ontology) and process (epistemology)

Relate to the course as a whole – both campus and off-campus activities

Be explicit towards yourself regarding how and why you organize the document the way you do

Ideas for how to organize the document

Chronological: f.i. Week by week – select experiences that made an impression
Reply to the 4(-6) questions. Deal with both content (ontology) and process (epistemology). Needs a summarizing chapter (questions 4 – 6) –
and connecting several experiences.

The course as a learning cycle: A chronological dimension here as well,
but the use of the learning cycle concept represents an add-on.

Core competences and learning goals (ours and yours)

Or another way, based on a solid rationale – use the rich picture approach?

Student-led reflection sessions

Dual purpose:

- To enhance the reflection abilities of the class by handing over responsibility of the question-designing and process to the groups.
- To give members of each case study group the chance to practice facilitation skills by designing the structure of and leading a reflection session as a way to prepare for the participatory case workshop with the farmer and food system stakeholders

Preparatory session:

- what can be learned from reflection?
- what key ingredients make a good reflection?

Sessions take 1 ½ hours, followed by ½ hour feedback on content and process.

Questions & answers

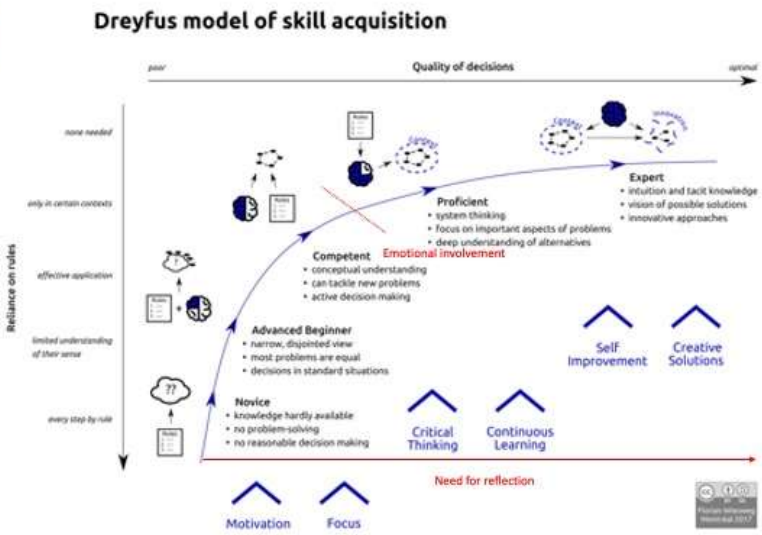
1. Thinking about bringing reflection into your course, what remains unclear?
2. What do you find inspiring about bringing reflection into the core of your course in the next cycle?
3. Will you (be able to) implement this in your case/course?
   - Why (not)?
4. What support do you need to implement this in your case/course?
5. What would you need to learn more about to implement this in your cases/course?
6. What would you need to focus on (first) to implement this in your cases/course?

Following steps in WP2

1. All cases start to work with what they have learned today and contact the NMBU team if they need support

2. NMBU team will contact each case individually for a skype meeting about further case development

1. ...


Dreyfus model of skill acquisition
Quality of decisions
poor
optimal
Reliance on rules
none needed
only in certain contexts
effective application
limited understanding of their sense
every step by rule
Novice
• knowledge hardly available
• no problem-solving
• no reasonable decision making
Advanced Beginner
• narrow, disjointed view
• most problems are equal
• decisions in standard situations
Competent
• conceptual understanding
• can tackle new problems
• active decision making
Proficient
• system thinking
• focus on important aspects of problems
• deep understanding of alternatives
Emotional involvement
Expert
• intuition and tacit knowledge
• vision of possible solutions
• innovative approaches
Motivation
Focus
Critical Thinking
Continuous Learning
Self Improvement
Creative Solutions
Need for reflection

Appendix 10 WP2 Mini workshop Reflection

Desired outcome: A improved understanding of the role of reflection in cyclical learning, and preliminary plans for inclusion of reflection in the WP2 cases

09:00 – 09:20	What is reflection? (NMBU)
09:20 – 09:30	How to bring refleection into your course? (NMBU)
09:30 – 09:40	BREAK 10 minutes
09:40 – 10:10	Questions & answers (All)
10:10 – 10:25	BREAK: 15 minutes
10:25 – 10:45	Reflection sessions and other examples from NMBU
10:45 – 11:00	Questions & answers (All)
	Following steps in WP2 (All)

Rationale for this mini workshop

In WP2, the final goal is a **transition to a more learner-centric, participatory, action-based and action-oriented education and learning in agrifood and forestry systems.** We also do action-research on this development process, as well as research into learning outcomes for those involved in cyclical learning processes.

This means that all Nextfood cases should…

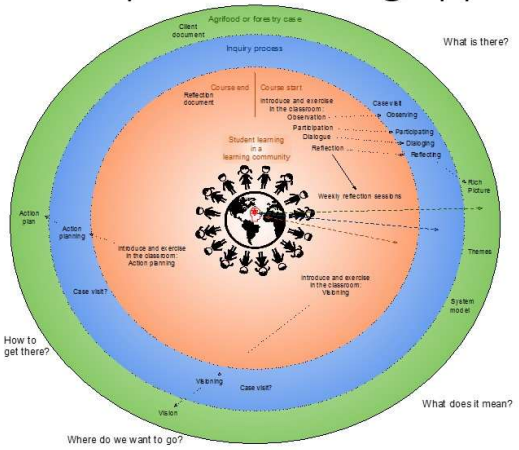
- Have a cyclical approach to learning;
- Take complex reality as point of departure; and
- Cultivate five core competences (observation, participation, dialogue, reflection, visioning)

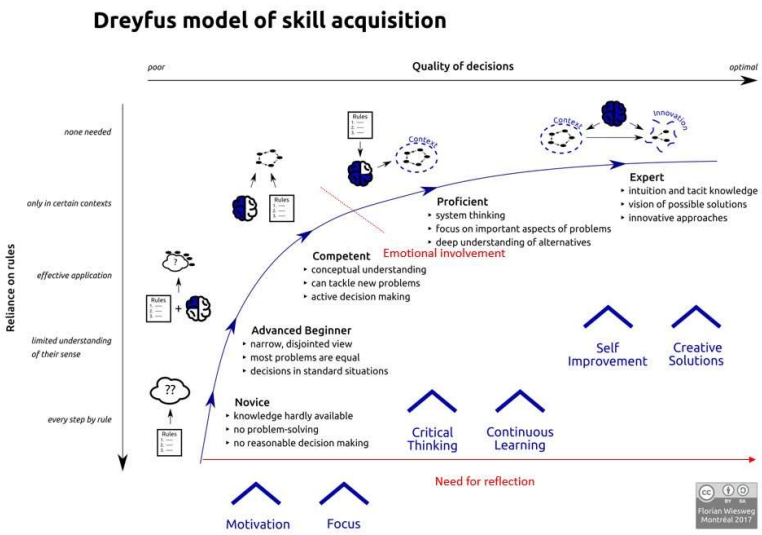
REFLECTION plays a vital role in the Nextfood approach to education

But what is **REFLECTION** and how do you bring it into your course?

Where does reflection take place in a cyclical learning approach?

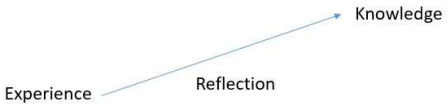
Cyclical learning
(the Nextfood approach)



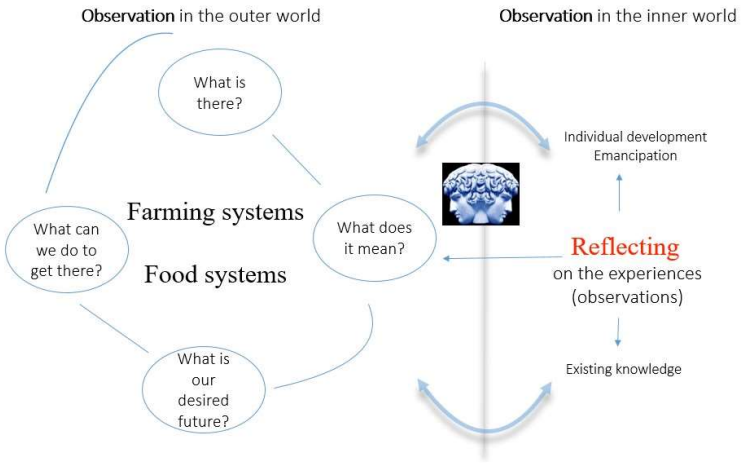


What is reflection?

- Reflection – *re*(«back»)-*flectio* («turning»)
- R*e-peat, re-flect, re-search*
- Dialogue and reflection: **The diversities of reflection** – from a very loose activity to a more structured form.



Learning agroecology: Valuing and connecting observation and reflection



Reflection

How can you bring it into your course?

1) Introduce reflection as a structured process for learning
2) Run weekly reflection sessions led by course facilitator(s). ---→ led by students
3) Have students write a learning log
4) And then a final reflection document (individual)
5) Have teachers write a learning log
6) And the a final reflection document by teachers

Reflection sessions: Basic principles

Three levels of learning – including their interrelationships

Individual learning
Learning in project groups (4-6 people)
Learning in the whole class setting (all students and 2-3 teachers)

Three depths of learning – including their interrelationships

1 What are the facts? What has happened?
2 What does it mean to content (case or class) and process (systems inquiry or learning)?
Interactions among experience, literature and own background/development ➔ Key issues
3 What does it mean to me? Implications for the individual

The double focus of reflection

Reflection about both content and process (issues)
Need for thinking about both issues (point 2 above) and personal learning (point 3 above)

General structure of a reflection session

1 Introduction. What is to be covered, in terms of both content and process.
2 Formulate/ask questions that demand something.
3 Develop/present an approach for how to do the reflection

BREAK: 10 minutes

Questions & answers

Thinking about bringing reflection into my course, what are the questions I am asking myself?

5 minutes individually
25 minutes in plenary

BREAK: 15 minutes

Reflection sessions at NMBU

Examples can be found on Teams, one example:

Before lunch the students have been asked to go for long walks to different locations in the landscape, in pairs.
They are asked to emphasize non-judgemental observation, and not talk to each other on the way 'out', only on the way 'back'.

Then they all meet with the teachers after lunch, with the following program:
1. Introduction to reflection and why it is important in the agroecology course.
2. Then two rounds of reflection

1st round of reflection

"You have now returned from the observation walk.
1. Choose an experience from the walk, one that made an impression on you.
2. Try to describe that experience in as much detail as possible.
3. Ask yourself the following question:
Why is this experience important for me?
PROCESS: 10 minutes individually – IN SILENCE
THEN: 10 minutes in groups of three. Share in the groups.
THEN: 5 more minutes: Ask yourselves:
What are the commonalities between our experiences?"

2nd round of reflection

"Then ask yourselves:
What characterizes a good observer?
PROCESS: 3 minutes individually
THEN: 10 minutes in groups of three. Share in the groups.
And: What characterizes good reflection?
And: what is the relationship between Observation and Reflection?
Plenary session (Mind-maps on the board)"

WEEK 3

	Monday morning jump start
	DIALOGUE (GL, LL)
TOPICS	
	Future global food and resource challenges (CF)
PROCESSES	Reading time
Individual work	
Small team work (inside and outside of classroom)	Literature seminar – Agroecology, systems thinking (CF)
Workshops (teacher intro -> individual and team tasks)	Reading time
WEEK 2	
Ways to read scientific papers, and peer review (CF, TB)	

GL 340.08.2019

Looking back on the processes and topics of this week:

What are the questions I am asking myself in relation to these processes and topics?

10 minutes individually – IN SILENCE

THEN: 15 minutes in groups of three. Share in the groups

"How might I go about finding the answers to these questions?"

3 minutes individually – IN SILENCE

THEN: 10 minutes in groups of three. Share in the groups

GL 30.08.2019

What do you think of this reflection?

The positive first, then the negative
and what can be improved

3 minutes individually
5 minutes two and two

Then plenary

GL 30.08.2019

Log-writing / the learning (reflective) journal

The 3 and 6 steps of log writing

1) What, exactly, did I see and hear? What exactly did happen? What did I experience?
2) What did I feel/think about this?
3) What did I learn from this?

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?

The past ← The present → The future

What did I experience?

What made an impression on me?

What did I think and feel about this?

What did I learn from this? – in terms of both *content* (ontology) and *process* (epistemology)

(Connecting to both experiences (linking) AND relevant literature is necessary + connecting separate experiences)

What are the questions I am asking myself?

What will I do to find the answers?

What are the implications for my own development – for what I will do in the future?

The primacy of the agroecologist (over agroecology).

Writing a reflection document

Learning from experience

Every experience (case) contains something specific and something generic

Reflect on your own experiences – *reflection* is different from *description* (should also be included) and *reviewing*.

Be attentive towards both content (ontology) and process (epistemology)

Relate to the course as a whole – both campus and off-campus activities

Be explicit towards yourself regarding how and why you organize the document the way you do

Ideas for how to organize the document

Chronological: f.i. Week by week – select experiences that made an impression
Reply to the 4(-6) questions. Deal with both content (ontology) and process (epistemology). Needs a summarizing chapter (questions 4 – 6) – and connecting several experiences.

The course as a learning cycle: A chronological dimension here as well, but the use of the learning cycle concept represents an add-on.

Core competences and learning goals (ours and yours)

Or another way, based on a solid rationale – use the rich picture approach?

Questions & answers

1. If I were to (further) implement reflection in my course, what would be my main challenge?

5 minutes individually
10 minutes plenary

Further steps in WP2

1. All cases start to work with what they have learned today and contact the NMBU team if they need support
2. Workshop on Action Research: Wednesday 30 September
3. Groups of cases to learn from each other about specific topics
4. NMBU team will skype with each case individually to follow up case development and action research

Student-led reflection sessions

Dual purpose:

- To enhance the reflection abilities of the class by handing over responsibility of the question-designing and process to the groups.

- To give members of each case study group the chance to practice facilitation skills by designing the structure of and leading a reflection session as a way to prepare for the participatory case workshop with the farmer and food system stakeholders

Preparatory session:

- what can be learned from reflection?
- what key ingredients make a good reflection?

Sessions take 1 ½ hours, followed by ½ hour feedback on content and process.

The learner document:
A guide to writing reflectively

Master of Science in Agroecology

September 2020 – January 2021

Geir Lieblein, Tor Arvid Breland, Anna Marie Nicolaysen,
Petra Bakewell-Stone, Charles Francis, Suzanne Morse

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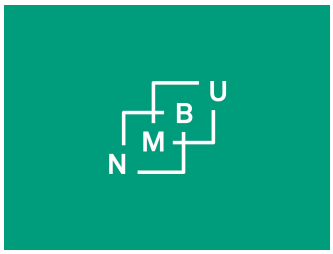

Norwegian University of Life Sciences

Faculty of Biosciences (BIOVIT)

"Sometimes there is a struggle to make time to reflect and learn from experience.

Make an appointment with yourself in your diary"

(Moon 2004)

"Try to love the *questions themselves* like locked rooms and books that are written in a very foreign tongue. Do not seek the answers, which cannot be given to you. *Live* the questions now.

(Rilke 1934)

Why should we reflect, and why should we aim for deep reflection as professionals in agrifood- and forestry systems?

Figure 1. Characteristics of simple, complex, and wicked problems in agroecology, and in general

Contemporary societies face a seemingly unprecedented number of wicked problems, such as sustainability challenges (Figure 1). This is in part a function of expanding our boundaries and including national and global issues that impact us all. Therefore it has become vital to consider the prerequisites that are needed for dealing with increasing complexity. King and Kitchener (1994) emphasise the need for what they call "reflective judgement" as a vital competence for dealing with problems that are "wicked". Since these problems, that often include ethical issues, do not have a right or wrong answer, they require reasoning and personal judgement. King and Kitchener (1994) further found that dealing with simple problems required activities at a lower level of intellectual complexity, whereas the higher (deeper) level of reflection (reflective judgement) is necessary to be able to deal with situations where there is uncertainty and unpredictability. Since reflection/reflective judgement is a competence, it needs to be practised in order to be developed. If the reflection is on something of interest to others, ideally the results should also be communicated and applied. Reflection is not a concept to be understood but something to practise.

On experience, reflection and learning

The act of reflection spans a wide gamut from a very loose mental activity to thinking in a more structured and serious endeavour. Moon (2004: p.82–83) described these "end-points" as "a common-sense view of reflection" and "reflection applied in academic contexts: a development of the commonsense view".

John Dewey (1938) proposed that "we do not learn from experience… we learn from reflecting on experience", and went on to say that reflective thinking is an "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends" (Dewey 1933, p.9). In action learning "ill-structured" or "messy" situations will often be what the learners need to confront and process. The situations often have ambiguous answers, and sometimes even the nature of the problem to be dealt with is not clear. At times these are the result of incommensurate goals, that is the goals of different players are not in sync. These situations, where moral and ethical issues become important, require reflection at a higher level than when dealing with more structured problems or issues. King and Kitchener (1994) call this activity "reflective judgement". According to Mezirow (1990), "Reflection enables us to correct distortions in our beliefs and errors in problem solving. Critical reflection involves a critique of the presuppositions on which our beliefs have been built". As such, the reflective activity shapes the path towards what Mezirow (1990) called transformative learning: "…learning experiences that leave a significant impact on the learner, a paradigm shift that shapes the learner and affects subsequent experiences". Whereas the competence *observation* explicitly deals with the world in which we live, *the outer world,* reflection can be called *'observation in the inner world'*. As such, reflection is characterised by a "Janus-quality" (after the Greek and Roman god Janus, with one face looking outwards into the world of food, agriculture and the environment, and the other face looking in the opposite direction, into the inner world of the student. The challenge for the student is to value the importance of both perspectives and to cultivate the links between the two: to become a citizen of both the inner and outer world. (Figure 2)

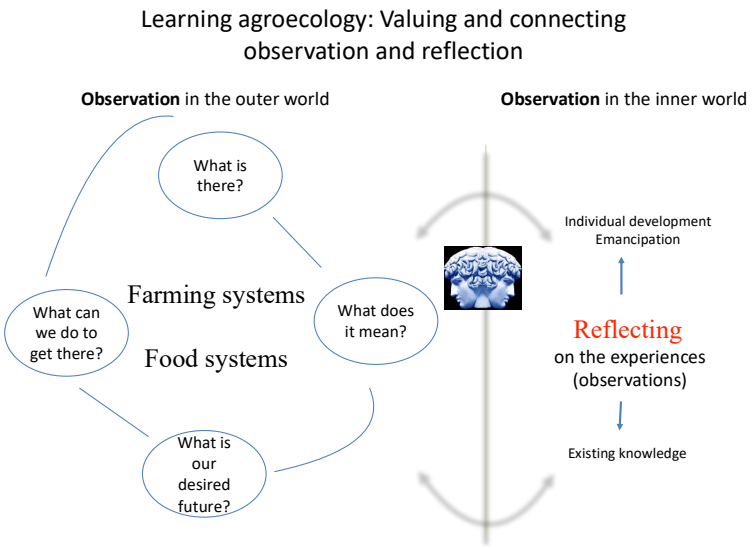

Figure 2. Learning agroecology: valuing and connecting observation and reflection

The temporal dimension of reflection is also important. When we reflect, we relate to our experiences as well as to relevant theory (the past), in the mode of empirical reasoning, and then move to the present and proceed towards the future, through moral reasoning: What are the implications of what I have learned for what I should do in the future? In such a shift towards the future in reflection, lies the moral and emancipatory dimension of reflective activities (Figure 3).

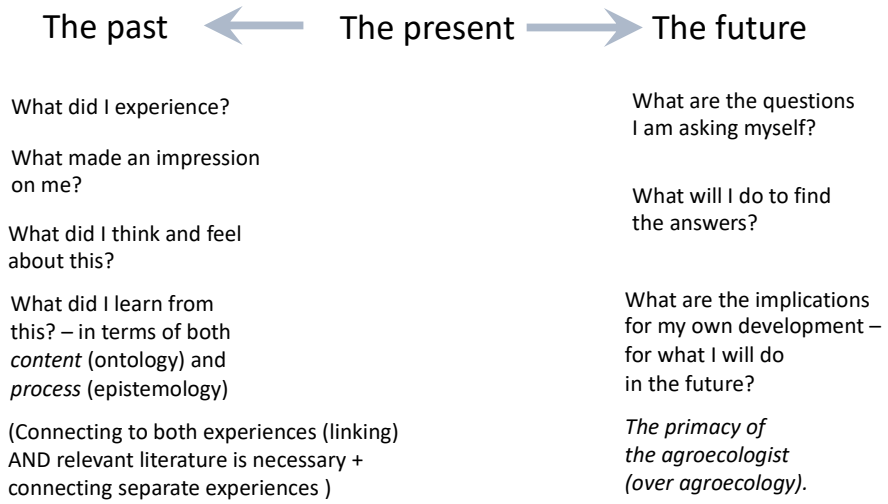

Figure 3. Reflection: Looking into the past and into the future

How to write the learner document

The purpose of the learner document is for you to present your course reflections in a coherent, written format for others to read and assess. We ask you to relate your experiences in the course regarding both the ontology of farming and food systems and epistemology (the process of learning about these systems) to relevant theory, and to implications for your own personal development in the area of sustainable agriculture and agroecology. In the learner document you should use agroecological, systems and learning terminologies, as well as others when found useful, to describe what you have learned about ontological and epistemological features of farming and food systems, and about yourself. Remember the two directions involved when the reflection is deep: into the outer world and into the inner world. See also Lieblein *et al*. (2007), presented in Appendix 1. In Appendix 2 some additional guidance is presented.

Experience and reflection are primarily individual activities, but they will usually be mediated through social relations. When you look back at the course or parts of it (Figure 4), your learning diary will be a vital source of information. The purpose of the weekly reflection sessions is to support you when you write in your learning diary. Additional questions you can ask yourself are: What did I observe (myself, the whole group, the topics, the processes)? Which of these processes would I like to have more experience in? What are the topics I need to know more about? When you write your reflection document, you should also be aware of the recognition that reflection and reflective writing may demand "emotional stamina" (Mezirow, 1998).

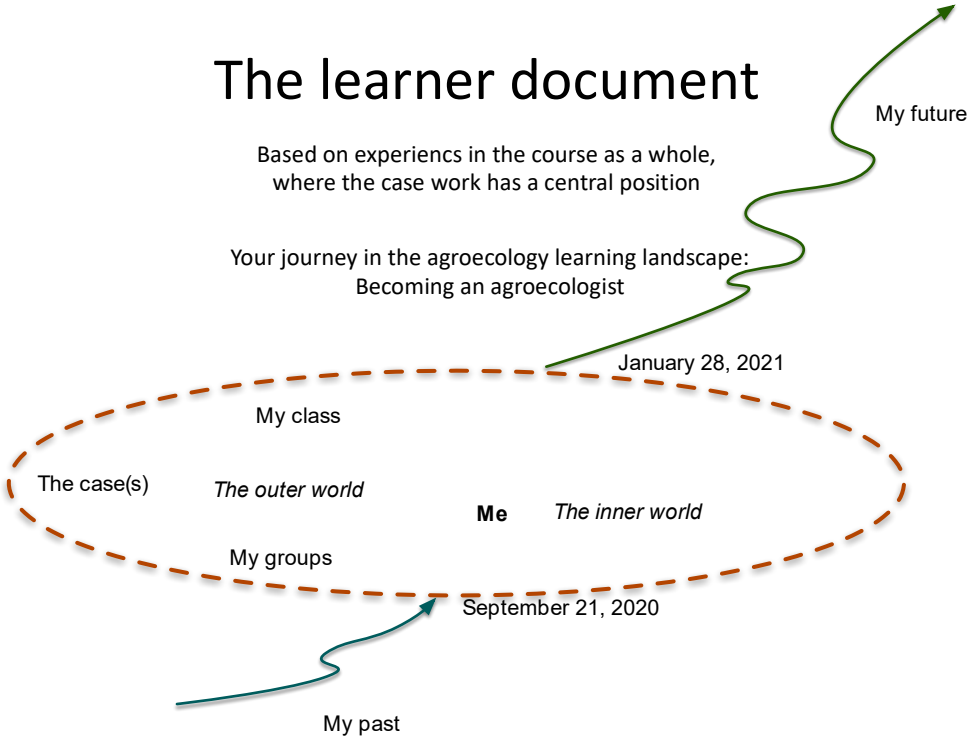

Figure 4. The learner document as a reflection on my journey through the agroecology learning landscape

There are different ways of organising your learner document. What is the most important is that you have an explicit strategy for your organisation that is logically linked to the structure of the course and its learning goals (Figure 4). Whereas structure is important when writing about something as complex as the result of reflective activities, you should also be aware of the proposition that "Tidy images of learning are usually deceptive" (Eraut, 2008, p28), although you should not use this statement as an excuse for muddled thinking.

You might still ask yourself, "What should I write about in my reflection document?". As indicated in the initial paragraph, there are different levels of reflection, from a shallow level (that can be used to solve simple problems) to a deep level (that is necessary to deal with wicked problems). Kitchener (1983) presents a three-level model of reflection. At the first level, we find basic information tasks such as perceiving and memorising. At level 2, "metacognition", reflection is about monitoring cognitive processes when an individual is engaged in level 1 activities. In level 2 mode, you will be able to self-reflexively evaluate and correct how you process information. At level 3, "epistemic cognition", we not only think about our thinking (metacognition) – we think about and evaluate the foundations of thought itself.

King and Kitchener (1994, p.47) go further to identify seven stages, from what they call pre-reflective stages (1, 2 and 3) – where people do not acknowledge that there is the possibility that knowledge can be uncertain and, therefore, the existence of problems that do not have a correct solution – to the two stages of reflective judgement (6 and 7) – where people understand that claims of knowledge are related to the context where they are generated, and where there is willingness to learn from experience.

In Appendices 3, 4 and 5 you will find examples of reflective writing at different levels. In Appendix 6 some further questions you might use to support reflective writing are presented, and in Appendix 7 a generic framework for reflective writing is presented, that includes features of reflective writing at different levels. Appendices 2 – 7 are from Moon (2004).

This suggested approach to the learner document should be used as a starting point. It may be considered a guide to describe how you are dealing with the challenge of the whole, encompassing what (agroecosystem structure and functioning) and how (the process of system inquiry and of learning) as well as why (goals and values). A reasonable balance between these elements is expected, but you should feel free to emphasise the areas you consider most important and to move in the direction you find most meaningful.

Suggested minimum length of the learner document is 8000 words (12–18 pages depending on text density). The document should not exceed 25 pages. In addition to the reflection itself, the document should contain a table of contents, a summarising abstract, an abstract of the stakeholder report, and a list of cited references (all of which should not be included in the suggested minimum word count of 8000) as well as an introduction. For this learner document, the Core Teachers will facilitate a process whereby drafts will be shared with fellow students in order to elicit and engage in constructive feedback. Contact any of the teachers if you have questions.

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Appendix 1: A dual learning ladder

The learning process can also be viewed as a dual learning ladder, to enable insight into the external and internal dimensions of learning and action. Lieblein *et al*. (2007) state that:

"The model consists of an external, cognitive ladder as borrowed from Bloom (1956), which describes ascending steps encompassing training of routine skills, memorizing facts and theories, exploring real-life situations, visioning scenarios of improvement, and implementing change. However, our model represents a radical break with Bloom's idea of a one-way upward movement in the learning ladder from simpler to more advanced activities and cognitive processes. In agreement with the phenomenology (Husserl, 1970) and experiential learning (Kolb, 1984) approaches, our students start on step three with exploring real-life phenomena and move freely up and down the ladder. The students step down to learn routine skills, facts and theories; they explore links between theory and practice; and they step up to envision improvements and to implement them. Several steps in this ladder inevitably involve personal emotions, attitudes and ethics. Therefore we expanded the model with a ladder that the students, concomitantly to stepping up the external, cognitive ladder, are stepping down to deepen their reflection about themselves as practicing, assimilating, connecting, creating, and acting persons, respectively. The dual learning ladder enables the students to understand and act within agriculture and the wider food system and to practice reflection as basis for personal growth."

Figure 2. Student learning in the inner and outer world (from Lieblein et al.*, 2007)*