D4.2 - Identification of strategies for improvement

WP4 – Policy assessment and recommendation

EUROPEAN UNION

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 771738

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Document Information

Grant Agreement	771738	**Acronym**	NextFOOD	
Full Project Title	Educating the next generation of professionals in the agrifood system			
Start Date	15/03/2018	**Duration**	48	
Project URL	www.nextfood-project.eu			
Deliverable	D4.2: Report on Identification of Strategies for Improvement			
Working Package	WP4 – Assessment and Recommendations of Policies			
Date of Delivery	**Contractual**	Month 24	**Actual**	Month 37 (29/04/2021)
Nature	R – Report	**Dissemination Level**	P - Public	
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Document History

Version	Issue Date	Stage	Changes	Contributor
0.1	05/06/2020	Draft	Presentation of the Task4.2 delivered during online partners' workshop in June 2020	Partners that participated in the meeting and shared feedback
0.2	18/06/2020	Draft	A guidelines document prepared and shared with all partners	
0.3	21/09/2020	Draft	A pilot workshop report prepared and shared with the partners	
0.4	23/09/2020 – 11/01/2021	Draft	Country level workshop reports written by numerous partners, received	LU, UNIOR, AFS, ACRCM, SKOGFORSK,CIHEAM, WHH, IFA, MUC, UCH
0.5	28/02/2021	Draft	A draft of Deliverable 4.2 with only local findings	
0.6	03/03/2021	Draft	An executive summary prepared from D4.2 draft to introduce the EU-level workshop's participants to local findings	Martin Melin
0.7	09/03/2021	Draft	The EU-level workshop report, turned into an activity report following the finalisation of the workshop	
1.0	To be updated	Final	All previous reports written/and received by partners are integrated together, and the final deliverable is finalized	

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Executive summary

Introduction and background

The agriculture and forestry (AFF) sectors are nowadays rapidly evolving especially with the introduction in this field of new and innovative technologies. AFF professionals are thus facing new challenges to adapt to this evolving process that requires the use of new and different skills and approaches. Besides, they need to adapt to the rapidly evolving social and environmental challenges that they are faced with, which causes a high level of uncertainty and growing risks of shocks. In order to achieve the needed level of preparation and resilience to deal with this multitude of challenges and strive in this rapidly evolving sector, among other things, the AFF professionals need to have access to innovative education systems. Education is one of the most powerful and proven vehicles for sustainable development, as also stated as part of the Sustainable Development Goals (SDGs). Quality education is one of the 17 SDGs, which aims to ensure inclusive and equitable quality education and promote life-long learning opportunities for all. Towards this direction, policies are deemed necessary to support the sustainable transition of the AFF sectors and guide the education of the next generation of professionals.

The literature review that has been conducted within this study reveals that while education needs in the AFF sectors are widely addressed in the literature and that the Agricultural Knowledge and Information Systems (AKIS) framework was largely used by researchers as a lens to analyse the local/sectoral innovation and knowledge systems, a precise policy framework boosting the development of the education and training in this sector seems lacking or insufficient. For this reason, specific studies are being carried out in order to give a more complete picture of the actual agricultural education on a wider scale (e.g. at European level). The NextFOOD project aims to inform the broader policy environment as well as the design of youth-targeted policies.

The aim of task 4.2 and the deliverable

This deliverable reports the results of Task 4.2, which aims to identify strategies for improvement of education and training policy frameworks in the AFF sectors. The task is based on a round of workshops conducted by the NextFOOD (NF) partners, addressing their country contexts, in addition to a final workshop conducted at the EU-level, where outputs from the country-level workshops were presented and discussed further to gather a wider perspective and to address the cross-cutting issues on a more systematic way.

Methodology

The workshops had been designed in a way to allow participants to frame the problem and the policy needs and strategies, referring to the New Green Deal and European Farm to Fork (FtF) Strategy, raised by the European Commission. In this way, the current issues and challenges of the agrifood and forestry sectors were directly addressed.

Before the round of workshops was performed by the NF partners, a pilot workshop has been conducted in the presence of 5 participants, by the University of Bologna (UNIBO) team on 30th of July 2020, in order to test the workshop methodology in the Italian context. Following the pilot workshop, a round of workshops has been organized by the NF partners in their country contexts (Austria, Chile, Czechia, Denmark, Greece, India, Italy, Norway, Sweden), between August and December 2020. A total of nine workshops were conducted, in which 55 stakeholders have participated, who came from 12 different countries. Following these workshops, an EU-level workshop was conducted on the 4th of March, 2021, with the participation of 20 experts, academicians, advisors, and officers from a variety of organizations, associations, and universities.

Main findings of the workshops

The participants of the workshops addressed the policy problems and recommendations and strategies for improvement, addressing the six FtF strategies, namely (1) Sustainable food production, (2) Ensuring food security, (3) Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices, (4) Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets, (5) Reducing food loss, (6) Combatting food fraud.

The themes that were mentioned the most and discussed more in-depth by the participants, and those that were cross-cutting and emphasized during all workshops were as follows:

- Skills and competencies needed in the sector: while technical skills necessary differed according to the FtF strategy in question, skills and competencies such as critical and systems thinking, problem-based and multi-disciplinary approaches, and entrepreneurship, in addition to knowledge of the English language and skills such as marketing, communication and ability to use digital instruments were mentioned in all workshops.
- The need to update curriculums, and complement *formal* education (schools and universities) with extracurricular activities and those activities that could allow students to gain practical skills on the field – referred to as *non-formal* education and education achieved through other educational entities, e.g. NGOs, associations, - was also another topic mentioned in all the workshops. The extracurricular

activities, non-formal education and internships, were proposed as instruments to both achieve the right balance between theory and practice and to involve the industry, enterprises and third sector entities in curriculum-making.

- The importance of life-long learning was also underlined with critical importance. In all the workshops, participants stressed the importance of life-long learning, which has to go hand-in-hand with formal education in order to provide to professionals the right tools to overcome the challenges of the future. According to what emerged during the workshops, life-long learning should be: short, flexible, and digital.
- Another topic that was mentioned in all the workshops with critical importance was the need to enhance collaboration and dialogue among the main stakeholders of the AFF sectors. Especially, the need to integrate the industry, as well as the society (farmers and other local stakeholders) in decision-making and curriculum-making processes of the education and training institutions on all levels were stressed by the participants. It was argued that only in this way, the needs of each AFF sector and the realities on the ground could be addressed by the curriculums of formal educational institutions.
- The need for coordination among different policies and policy instruments – European, national and regional – was also addressed, in order to reduce the administrative pressure and allow an agile construction of educational and training processes.
- Participants also underlined, in several occasions, the importance to attract students, and to increase their motivation towards the sector. Hence, "enhancing students' motivation" was expressed in several workshops by using different terms, such as: "increasing personal motivation"; "encouraging students' innovation"; and "making the sector more attractive". How education in the agri-food and forestry sectors is made relevant and attractive to the students will be a challenge for future policies.
- The need to integrate the topic of sustainability in education, starting from early ages was also stressed in all the workshops. Besides, awareness-raising among the public about sustainability in all parts of the value chain, in addition to integrating it into technical practices in the whole of the sector was noted many times by the participants.
- Regarding food storage, consumption and disposal (or re-use), consumers have a key role in the public policies and political instruments. There is a need to empower consumers regarding the importance of healthy and sustainable diets that points to

the necessity of starting food education from early ages and providing the right instruments to the children in order for them to understand the importance of a new sustainable way of consumption. A suggestion towards this goal stressed the importance of: “Eating local, breaking the paradigm of industrial food chains and equipping an ethical code in food production and consumption”).

- Besides, the need to have a common language, common goals, shared knowledge and innovation was underlined during the workshops.
- The topic of gender was also specifically addressed as well as the need to make the sector gender-neutral by providing equal rights to women in the whole sector, in addition to policy-making and decision-making with regard to the education and training policies were underlined in all of the workshops.

Next steps and way forward

Following the execution of the workshops in the scope of Task 4.2, and the finalization of the deliverable, the following task (4.3) will aim to bring together all findings obtained so far in the scope of Work Package 4 and to develop concrete guidelines for policymakers and education managers towards the improvement of policies in the AFF sectors. In this direction, strategies identified within the scope of the round of workshops conducted (Task 4.2) will be formalised into a conceptual framework and specific policy design options, establishing links to best practices, enriched by an extensive desk-research. Besides, new policy instruments and tools will be developed and specified, that match the needs of the sector and strengthen EU education and training system.

1 Introduction

1.1 Background

The importance of speeding-up people's skills and education is one of the priorities of the European Commission (New Strategic Agenda for the EU for 2019-2024). Towards this direction, the Communication on the European Education Area, which sets out a vision to be achieved by 2025, is also targeted mainly towards enabling all young people to benefit from the best education and training, and to find employment across Europe. This vision is underpinned by six dimensions: quality, inclusion and gender equality, green and digital transitions, teachers, higher education, a stronger Europe in the world. It is aimed that efforts to establish the European Education Area, will work in synergy with other critical strategies, including and not limited to the Skills Agenda and the renewed Vocational Education and Training (VET) policy, to put forth inclusion, mobility and innovation in education; the EU Gender Equality Strategy (2020-2025) to promote gender equal workspace culture, to name a few.

Meanwhile, sustainability in agricultural systems is viewed as a prerequisite for the transition to sustainable development at the global level. Given its scale and scope, the sustainability transition is a significant challenge to the entire agrifood and forestry sector; and the main question remains on how to support this transition process (COM, 2019). The current European agrifood and forestry systems are too slow to innovate towards more sustainable agriculture, forestry, food and bio-based value chains. Farmers need to develop their capacities to innovate: to co-create and implement new practices; to adapt to legislative, policy, market and environmental changes; to develop contemporary skills in order to market their products; and to take part in interactive innovation-based networks. Various education systems and methods can enhance farmers' capacity to innovate and thus increase the viability of a rural livelihood in a time when there is an increasing shortage of skilled agrifood system workforce, especially in rural areas. Meanwhile, integrated legal frameworks, policies and governance systems that are able to address the main gaps in the sector may provide an enabling environment supporting the transition towards more resilient and sustainable food systems, which requires urgent measures by the part of all stakeholders of the sector (FAO, 2018).

The need to speed-up innovation has been repeatedly emphasized in recent years and is now a core element of the European Commission's communication for the future of food and farming. For this reason, the necessity of a good policy framework that could drive the education of future professionals in the agrifood and forestry sectors becomes urgent. According to the Agricultural Knowledge and Innovation System (AKIS) (SCAR, 2017), it is necessary to share knowledge and innovation for agriculture and rural areas development and to promote mutual learning through the involvement of farmers, advisors, trainers, researchers, media and other agricultural experts operating at EU, national, regional and local levels. In this regard, the linear, passive and teacher-centred approaches to learning and sharing of knowledge, which dominated the

traditional views, are no longer sufficient to address the challenges of our day. Instead, student-centred, collaborative and social learning approaches need to be adopted.

The European Green Deal and Farm to Fork Strategy (EU Farm to Fork, 2020; EU Green Deal, 2019) stress the importance of the sustainable transition of food systems that also give emphasis to the resilience and the justice along the food chains. Thus, it is underlined that the sustainable transition of food systems must be achieved by food systems which have a neutral or positive environmental impact, preserving and restoring the natural resources on which the food system depends; helping to mitigate climate change and adapting to its impacts; protecting land, soil, water, air, plant and animal health and welfare; reversing the loss of biodiversity; ensuring food security, nutrition and public health, and making sure that everyone has access to sufficient, nutritious, sustainable food while preserving the affordability of food; generating fairer economic returns in the supply chain, fostering the competitiveness of the EU supply sector, promoting fair trade, creating new business opportunities. Finally, it is also highlighted the necessity to strengthen educational messages on the importance of healthy nutrition, sustainable food production and reducing food waste. More generally, education is awarded a major role in achieving the objectives above by allowing and supporting innovation and transition processes. The EU can play a key role in setting global standards with this strategy, also in its interplay with education and training policies. In this context, a focus on the possible strategies for educational policy improvements is needed, that will permit a shift towards a more sustainable and innovative sector and to face the new challenges of an evolving sector that requires new and different learning approaches, starting from knowledge sharing, education, and training of future professionals.

1.2 WP4 aim

Thus, the WP4 aims to assess the existing policies related to education in the agrifood and forestry systems by considering the interactions among different actors in the innovation process, hence having as a reference the composition and functioning of AKIS.

In fact, the analysis of existing policies in the scope of task 4.1 was carried out on multiple scales and levels, from EU to local and non-EU countries, considering different roles in education policy (Viaggi et al., 2019). Relevant education policies and their interaction with sector innovation and training programmes, e.g. those included in the CAP are covered. Several levels of education, from high school to Ph.D. and life-long learning are considered.

Following this assessment, policy recommendations will be delivered based on research activities through which we aim to explore what impact the present education and training systems have on the learners' knowledge on sustainability and related subjects, and skills needed to solve problems in an action-oriented and collaborative manner. Policy recommendations will be finally developed for all stakeholders affected by education and life-long learning programmes for sustainable agrifood and forestry systems, in particular for decision-makers who are working with education governance

and for those who are dealing with education management at regional, national, EU-level and non–EU level education. Policy recommendations will be designed to promote gender equality in research and education, which ties into the implementation of the gender equality dimension in the Europe 2020 strategy. The policy development will tie into the EU objectives to address challenges in education and training systems by 2020:

• Making life-long learning and mobility a reality;

• Improving the quality and efficiency of education and training;

• Promoting equality, social cohesion, and active citizenship;

• Enhancing creativity and innovation, including entrepreneurship, at all levels of education and training.

1.3 Summary of Task 4.1 results

In the previous task conducted, namely task 4.1, we assessed the existing EU and non-EU policy instruments (with the main reference to existing formal education and life-long skills development programmes). As underlined above, the necessity of a good policy framework that could drive the education of the future professionals in the agrifood and forestry sectors becomes urgent as farmers need to acquire the skills to innovate and to deal with the increasing sustainability challenges. For this reason, this task analysed the gaps present in the actual educational policy framework and suggests potential improvement tools.

The task was based on a pan-EU survey of actors in the research and education system, involving judgments about the effectiveness of existing policies and their interaction as well as gaps, which has paved the way for providing a diagnostic of the existing policies, and will contribute further to the proposition of effective strategies. In this context, we surveyed the national and EU-level decision-makers and experts, considering also non-EU countries, and considering the legal framework in force as well. A special focus was given to the role of policies in the context of information transmission among different actors in the research and education system and the role of education policies in this context. References to success stories and needs for the future are also added, in order to make the survey able to contribute to the further tasks. The work builds on synergies with the work performed in WP1 and WP3.

The results obtained from the survey in task 4.1 highlighted the existence of policy gaps such as:

- None, or insufficient coordination among the four policy fields addressed (Pre-university, University, Adult learning and vocational education, and Training measures in agrifood), which are planned mostly on a country level.
- Poor awareness of the existence of strategy documents on educational policy in the agrifood field.
- Lack or insufficient amount of financial support (especially for young agrifood and forestry professionals to access adult training and vocational education).

- Lack of sufficient innovation in education tools and innovative ways of learning (student-centred learning, participatory and practice-oriented learning, interdisciplinarity, internationalization, mobility, networking).
- Scarce efficiency of educational policies in promoting sustainability, entrepreneurship and innovation, and to be adherent to the practice and real needs of the sector.

These results were also consistent with those obtained under WP1 tasks about the current gaps in skills, and were considered during the design of task 4.2, the results of which will be detailed in the following sections of this report:

- Connection between theory and practice;
- Holistic knowledge (too specialized knowledge);
- Digital skills;
- Motivation and consciousness;
- Teamworking, interpersonal skills, and communication;
- Involving the local community;
- Networking;
- Lifelong learning.

And with the findings of the already performed case studies under WP2 and WP3 tasks, which identified some necessities for effective learning process:

- Facilitate the dialogue during different activities;
- Build on human capital;
- Allocate time for reflection;
- Revise institutional aspects: more flexibility in curricula and infrastructure and financial support necessary for the practicalities;
- Increase the interest of different actors involved in activities;
- More implementation of practicalities;
- Enhance students' motivation and students' interaction with situations in the field;
- Provide students' self-assessments.

These results showed that the quality of actual educational policy in the agricultural, food and forestry sector is still perceived as poor to support the sustainability transition challenges of the agrifood and forestry sectors. Farmers, especially the future generation of young farmers, need to develop their capacities to innovate, to co-create and implement new practices, to adapt to legislative, policy, market and climate changes, to develop contemporary skills in order to market their products, and to take part in interactive innovation-based networks.

Consequently, the work done in Task 4.1 with the survey on diagnostics of education policies related to agriculture, food and forestry provided a background for Task 4.2 "Identification of strategies for improvements" by identifying the gaps that are perceived in the current educational policy framework.

1.4 Description of work in Task 4.2 and objectives of the document

In a nutshell, Task 4.2. aims to propose strategies for policy improvement of research and education in the field of agrifood and forestry, by identifying options for improved policy instruments in different context scenarios. Changing education means (e.g. action learning), use of perspective technology (e.g. digital instruments), forms of organisation (e.g. communities), as well as issues related to gender are specifically targeted. The task has been performed through a round of workshops that were conducted by the NextFOOD partners between August and December 2020, in connection to the NextFOOD case studies or particular country contexts. Furthermore, the results from WP1 and WP2 activities (skills needed and case studies outputs) were considered to capture local education governance perspectives. For this task, stakeholders and the local, regional, national or EU-level authorities and policymakers responsible for policies in the research and education sector have been particularly involved.

Hence, this document provides strategies for the improvement of educational and training policies in the field of agrifood and forestry, as identified and proposed by the participants of the NF partners' workshops. The professionals involved in these workshops include academicians, policy-makers, education or training managers, advisors and experts. Indeed, stakeholders have a key role in designing policies and in providing strategies to improve them. Thus, stakeholder workshops are critical in collecting the perspectives of different actors, and arriving at multi-actor solutions in order to address sustainability challenges in the scope of agrifood and forestry sector. In this vein, findings from the workshops will be used to define concrete policy instruments towards improving the education and training policy framework.

Besides, these workshops had been designed in a way to allow participants to frame the problem and the policy needs and strategies proposed to improve the policy framework, referring to the European Farm to Fork (FtF) Strategy raised by the European Commission. In this sense, the current realities and challenges of the agrifood and forestry sectors were aimed to be directly addressed. The FtF Strategy put in light the necessity of a legislative framework for sustainable food systems which will allow the European food systems to become the global standard for sustainability. In this view, changes in education means (e.g. action learning) and new educational policy instruments become relevant to tackle the European goals.

The rest of this report is organised as follows: In section 2, a background literature is presented to give an overview of topics and areas addressed by the literature. In section 3, we present the methodology of this study, including the workshop design and the implementation of the workshops. Section 4 then provides the results of the study and finally, section 5 presents the discussion of the findings.

2 Some background literature

Moving toward a more sustainable future, research and innovation are fundamental to ensure production with less impact on the environment, more equity in gender and social issues, and fairer economic returns (EC, 2020). Indeed, the main objective of several supranational bodies' growth strategies is a development that must balance environmental, social, and economic sustainability (UN, 1992; COM, 2010).

To better understand how and what is needed to improve a societal context, a thorough knowledge of the context itself is necessary (Grin et al., 2010). In this sense, a theoretical framework that includes all the three sustainability dimensions can create a holistic perspective, useful for further investigations and a tool for policymakers (Esposti, 2012). For this purpose, the EU adopted the Agricultural Knowledge and Innovation System (AKIS), which is a framework that aims to describe the differences between countries, regions, and sectors in the field of innovation and knowledge production (EU-SCAR, 2012). The original purpose of the AKIS framework was to demonstrate that knowledge and innovation do not flow in a linear way, and only in one direction – from researchers to farmers –, but rather the flows of knowledge and innovation are often unpredictable (Arzeni et al., 2021; Hermans et al., 2015; Klerkx et al., 2012). Nevertheless, the AKIS' multidimensional and holistic approach fits well with the comprehension of actual productive contexts, both in their strengths and in their gaps, and this allows to explore the sustainable dimensions of a country, or a sector (Fieldsend, 2020).

For these reasons, from its adoptions to date, the AKIS framework was largely used by researchers as a lens to analyse the national knowledge and innovation structures (Knierim et al., 2015; Zahran et al., 2020), but also as a starting point for a deeper analysis of sectorial aspects. To provide a few examples, Lawrence et al. (2020) propose the concept of Forestry Knowledge and Innovation System (FOKIS), to better fit with the forestry context, and Klerkx and Begemann (2020) develop the concept of Mission-oriented Agricultural Innovation System (MAIS).

The importance of this conceptual framework increased over the years thanks to a changed policy context in Europe: the financial and economic crisis (2008), the EU2020 strategy (COM, 2010), and the CAP reform with the introduction of the European Innovation Partnership initiative (COM, 2012; EU, 2013). In addition, more recently the New Green Deal (COM 2019), and the pandemic (2020) have strongly reinforced the idea that a systemic and collaborative approach is fundamental to face the challenges of the future (EU-SCAR 2019). Furthermore, the transition from the old concept of Agricultural Knowledge and Information System (Rivera et al., 2005) to Agricultural Knowledge and Innovation System underlines the transition to a wider concept that can incorporate a higher number of actors involved in the system (actors related with innovation: input suppliers, food processors, retailers, accountants, banks, media) (Knierim et al., 2015) and reflect the complexity of the actual agri-food and forestry sector.

Indeed, identification of actors involved in the European, as well as global AKIS contexts is a complex process – following the two-layers of actors theory of the innovation networks made by Bogers (2011). We can find a core group of actors (farmers, advisory services, private sector, research institutes both private and public, policymakers, NGOs) and a peripherical group of actors (consumers, civil society, financial and economic entities, technology developers, media). The interactions between the actors are also complex – partnerships, contracts, networks, alliances, platforms (Zahran et al., 2020), but also shared values, tacit knowledge and common objectives (Klerkx et al., 2012; Lioutas et al., 2019). Last but not least, external factors that influence the entire system also prove to be complex – geographical context, education system, new techniques, digitalization and new technologies and economic and financial context (Fieldsend, 2020).

Below, the main contributions made in the literature relating to AKIS has been presented in three parts, namely: actors-oriented research, relationships-oriented research, and external factors-oriented research.

Actors-oriented research

Actor(s)-oriented research is the type of research that is mainly interested in one (or more than one) actor of the AKIS, exploring the skills requested or needed by that actor in the modern agriculture, and/or the typologies of approaches of that actor toward innovation and knowledge, information, power and goals (Long, 2001; McDonald & Macken-Walsh, 2016).

The actors-oriented literature comprises of two principal groups: in the first, the attention is reserved to farmers and forest owners; in the second, the main focus is on advisors, extensionists, and all the figures related to advisory services.

In the first group, we can include McDonald & Macken-Walsh (2016), who present a narrative analysis of dairy farmers participating in an Irish initiative that aimed to facilitate the founding of a new farm in dairy context, the "Ireland's New Entrants' Scheme". Sutherland et al. (2017), instead, focus on how small-scale farmers (located in Bulgaria, Poland, Portugal, and the United Kingdom) use different networks for achieving different knowledge. Furthermore, in the discussion section, the scholars point out that small-scale farmers are under-serviced by formal advisory services, with a consequential barrier to knowledge and innovation flows. Another actors-oriented research is that conducted by Cofré-Bravo et al. (2019) on how farmers compose their networks to support their farm innovation process, with the specific focus on Chilean fresh fruit exporter farmers, an important category of agriculture in Chile.

The second group, on the other hand, includes research on criteria for a system-level evaluation of farm advisory services made by Prager et al. (2016). In the paper, the authors try to find the main characteristics of advisory services in order to propose a criteria for evaluating the effectiveness and the value of agricultural advisory services. A similar contribution is made by Dunne et al. (2019), who explore public and private agricultural advisory services in Ireland. In this case study, the methodological approach was a questionnaire implemented to selected farmers, which aimed to examine the reach, the content, and the quality of advisory services. The authors state

that they "have limited reach and their operations may not be sufficient to meet the nuanced and complex requirements of the farming community and wider rural society" (Dunne et al., 2019, p. 411).

Relationships-oriented research

The knowledge and innovation systems are first of all social systems: the relationship-oriented research aims to understand the quality and the different types of interactions and relationships between AKIS actors and/or across different networks (e.g. organization, performances). Generally, the main focus is to point out the success or failure factors that can affect a collaboration.

Despite the growing interest in the nature of interactions across actors (Hilkens et al., 2018), this type of exploration of the AKIS framework is still rare. An example is the work conducted by Cerf et al. (2017), who evaluate the relations between public and private networks by exploring the way such networks design and perform intermediation to implement a public policy in decreasing pesticide use. The theoretical framework used by the authors combines three different, but interlinked perspectives: one political, one experiential, one interactive. In this way, an in-depth study of intermediation practice to support less pesticide use was achieved. Another example is given by Gava et al. (2017). In this case, a "social network analysis" was performed with the aim of studying the interactions between the stakeholders of the AKIS and the biogas adopters in a region, Tuscany (Italy), that features arable farming systems. A wider analysis was conducted by Lioutas et al. (2019), who explore different extension systems in three European countries (Greece, Italy, Slovenia) to capture the value flows. In particular, they distinguish between two different aspects of value: "value in production" and "value in use". More in-depth, the authors view the extension services "as service ecosystems, where different actors interact through service exchange to produce value" (Lioutas et al., 2019, p. 140).

External factors-oriented research

Despite the personal efforts of each actor in an AKIS to improve in the professional dimension (the actor's skills and competencies), and in the social dimension (the relationship between actors), some factors are beyond the ability of individuals to change. These are external factors that can modify the system for better or for worse.

An example of an external factor-oriented research is the analysis of a new technique or a new technology adopted in a certain AKIS. For example, we can cite Abebe et al. (2013) and Adolwa et al. (2016), who analyse, respectively, the introduction of improved varieties of potatoes in Ethiopia and the diffusion of the new concept of Integrated Soil Fertility Management (ISFM) in Ghana and Kenya. Another example can be Turner et al. (2017), who explore two different long period projects in New Zealand, one on improving lamb survival and the other on sustainable land management. In this case, a discussion is made towards the need for the right mix of innovation, adaptive and absorptive capabilities in projects, and more in general in the AKIS.

However, in the last years, high interest was shown to new technologies and their effects on the various AKIS. In particular, a common topic is digitalization and its

consequences on different systems (Ingram & Maye, 2020; Klerkx & Begemann, 2020; Knierim et al., 2019; Rijswijk et al., 2019). Rijswijk et al. (2019) explore the concept in the new Zealander context, stating that it is still in the early stages of development. Knierim et al. (2019) focus on the German scenario in the smart farming technologies (SFT). In the latter study, the scholars stress the perception, by German farmers, of barriers in digitalization and "that an improved enabling environment would greatly improve the favourable adoption conditions, in particular focusing on better access to SFT related information, training and advisory services and to reliable digital infrastructure" (Knierim et al., 2019, p. 8). Finally, Ingram and Maye (2020), in a perspective paper, try to find an answer to what are the implications of digitalization for Agricultural Knowledge. Analysing digital agriculture in correlation with knowledge processes, farmer knowledge and decision-making, and the changing AKIS (new entrants and changing roles), the authors assess digitalization as a disruptive technology, still far from expressing its full value. They also argue that fostering co-learning and collaborations is an important step to satisfy the new demands, relations, and tensions that digitalization can bring.

Despite the classification that we have made, it is important to underline that the distinctions are blurred in practice: systemic analysis try to include all the elements (actors, relationships, and external factors) that shape an AKIS in a region or in a sector. Nevertheless, the previous categories are useful to understand the main focus of a paper and how different researchers try to capture the reality of the agricultural context. However, the wide range of elements involved (i.e. social, economic, environmental, policy, ethical) requires different knowledge expertise. In this light, it is clear that the diffusion of multi-, trans-, inter-disciplinary approaches (Lawrence et al., 2020; Lewandowski, 2018; Schut et al., 2014) try to capture more than one perspective of the complex reality. As underlined by Ingram and Maye (2020), every significant change in the AKIS (in their case, digitalization) "brings along technical, social, economic, ethical and practical questions with significant implications for how commercial agriculture is structured, practiced and governed" (Ingram & Maye, 2020, p. 1). In this vein, integrating social and natural science methods (interdisciplinary), uniting different actors (transdisciplinary), and different fields of research (multidisciplinary) can be key steps to enhance the AKIS framework and to improve its practical consequences.

Indeed, on this topic, the AKIS framework received several criticisms from researchers. Knierim et al. (2015) state that "the infrastructural diversity encountered in a real-world context is too great to be unambiguously captured with the current analytical level of the AKIS concept" (Knierim et al., 2015, p. 35); and that change of pace towards more quantitative comparative analyses, instead of qualitative analysis, is necessary. A similar concept is expressed by Lawrence et al. (2020) that stress how AKIS "has more often been a research tool than an operational reality" and remark that at the centre of many political approaches there is still the "technology transfer" idea. Indeed, the term "transfer" is commonly referred to the old paradigm of the linear model of innovation (monodirectional and often only from research to practitioners) without the multilateral flows of knowledge that is underpinned by the term "sharing" (knowledge sharing, innovation sharing, technology sharing, etc.), closer to the AKIS model (Fieldsend et al., 2020). Furthermore, Lioutas et al. (2019), referring to some national contexts

(Greece, Serbia, Italy), underline that also for agricultural advisors, the idea that farmers are not important sources of their knowledge creation is widespread, highlighting that the concept of knowledge and innovation sharing is still far from practice. According to this concept, Fieldsend et al. (2020) state that external communications of co-innovation projects (funded by public bodies) are for some actors seen as not well-spent resources. In other words, the sub-systems inside the overall AKIS do not always adopt the sharing approach, preferring the advantage of some over the entire agri-food and forestry system.

In conclusion, after more than ten years following the creation of the concept of AKIS in the European context, a wide literature confirms the interest of researchers around this framework (Coquil et al., 2018; Klerkx et al., 2019; Schut et al., 2014). As we have seen in the previous paragraphs, the pivotal role of the actors, their interactions and relationships, and the influence of external factors are deeply explored by authors. Furthermore, a cross-cutting theme as education is often involved in AKIS literature (Fieldsend et al., 2020; Ingram & Maye, 2020; Knierim et al., 2019), but rarely it is the main focus of research (Viaggi et al., 2019). Still, less space is reserved for vocational education and lifelong learning, which are not addressed directly in a study that we know to date. Moreover, a precise policy framework boosting the development of education and training in this sector seems lacking or insufficient. Although some of the literature studies can have important implications to drive policymaking in the agri-food sector (e.g. Knierim et al., 2015; Prager et al., 2016; Zahran et al., 2020), the need for further research that can inform the broader policy environment as well as the design of youth-targeted policies, projects, and programs in the dynamical agri-food sector is deemed necessary (Coopmans et al., 2020). Furthermore, the studies that attempt to discuss existing policies in the area of agricultural education and skills development are mostly conducted on a local or national level, through specific and fragmented case studies and this does not allow to have a European vision.

A deeper analysis to find the key points for a European strategy in the field of education and training in the AFF context is seen as fundamental to achieve the FtF objectives and reaching the targets set by the EU Green Deal.

3 Methodology of the study

3.1 Workshop design and the preparation phase

The task has been performed through a round of workshops in the different partners' country contexts and especially connected to the NextFOOD case studies to capture local (national and regional) education governance perspectives, followed by a final workshop on the EU-level. The workshops on the country level aimed to gather different perspectives of stakeholders, including local, regional and national academicians, experts, advisors, farmers, education and training managers and policymakers, on new strategies and policy recommendations towards improving education and training policies in the AFF sectors. The EU-level workshop, on the other hand, aimed to gather together the outputs from the first round of workshops to discuss the strategies that come out of these workshops on the EU-level to bring an overall perspective. In this context, cross-cutting issues, such as the necessity to bring sustainability and the gender perspective into the discussions had significant importance.

Before the execution of the workshops, a "workshop guidelines document" was prepared by the UNIBO team. Following the feedback of the project partners, the document was finalized and distributed, whit the intention of giving some guidelines to organize the workshops in project partners' country contexts/local sites. Through this document, the partners, who wanted to contribute to this task by conducting a workshop in their countries, were given some instructions about how to organize these workshops and some aspects to consider for receiving the best intended outcomes (the workshop guidelines document can be found under Annex 1). In a nutshell, the document first aimed to give a background on the conceptual framework it uses, referring to the Agricultural Knowledge and Innovation System (AKIS) (Figure 1 and 2 as presented in the guidelines document), in order to conceptually layout how task 4.2, by identifying policy strategies, will fit into the assessment and improvement of education and training policies in the AFF sector. Then, suggestions were made with regard to the organizational aspects of the workshop, including the participants to be invited, timing and duration of the workshops, and themes to be addressed.

In this regard, the below framework (Figure 1), which was presented as part of the workshop guidelines document, shows the transition process of current education and training policies in the agrifood and forestry sectors towards desired policy outcomes, through the identification of strategies for improvement. The framework proposes that these strategies, that are to be developed (in the context of Task 4.2), would address the identified gaps in the current policy framework (Task 4.1) towards creating desired policy outcomes, which then feed into the current educational policy system, iteratively and circularly. It should be noted that the education and training system of the agrifood and forestry sectors, that is shown in Figure 1, is a component of the wider AKIS framework, which is presented in the following figure (Figure 2). More in detail:

- The term Agricultural Knowledge and Innovation Systems (AKIS) is used to describe the whole knowledge exchange system: the ways how people and organizations join together and interact to promote mutual learning, to generate, share, and use agriculture-related knowledge and information within a country or a region.

- Farmers, advisors, researchers, education and training providers (secondary, tertiary, or life-long learning levels), input suppliers, retailers, farmer organizations, NGOs, business and enterprises, media services and ministries are all part of national or regional AKIS, since they all either need, produce or exchange knowledge and innovation for agriculture and interrelated fields (value chains, environment, society, consumers, etc.) The below figure shows the AKIS framework.

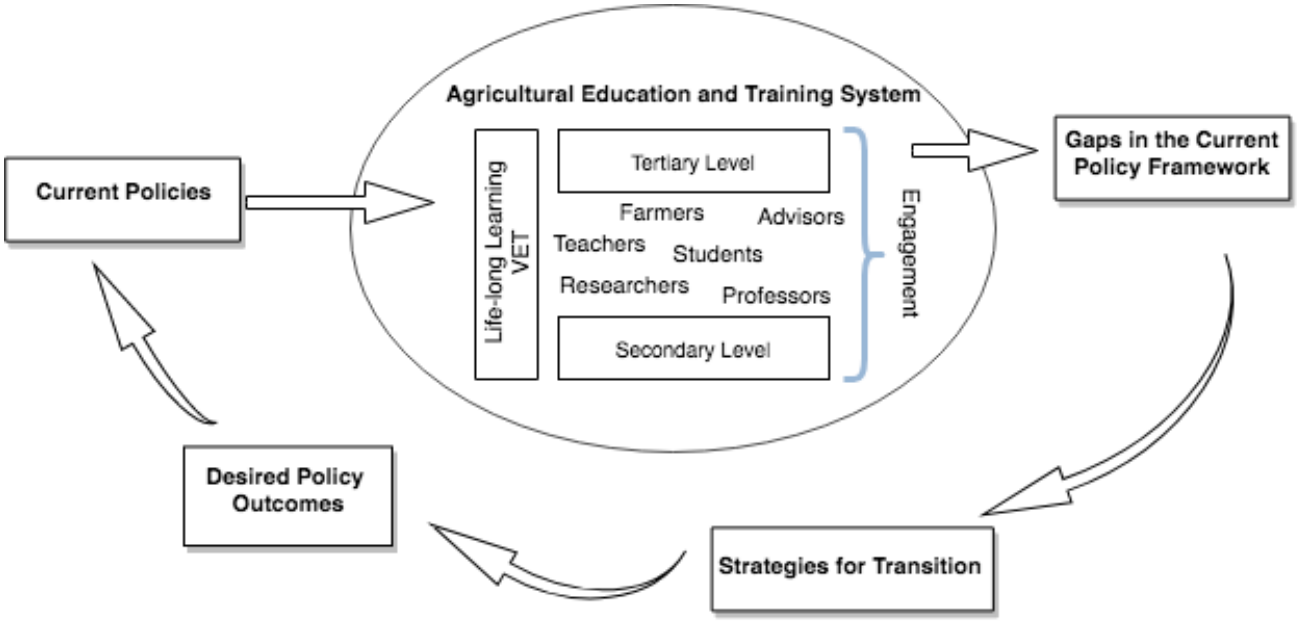

Figure 1. The proposed framework for educational policy transition process in the agrifood and forestry sector in relation to AKIS.

Sources: Adapted by Standing Committee of Agricultural Research (SCAR) Policy Brief on New Approaches on Agricultural Education, 2017

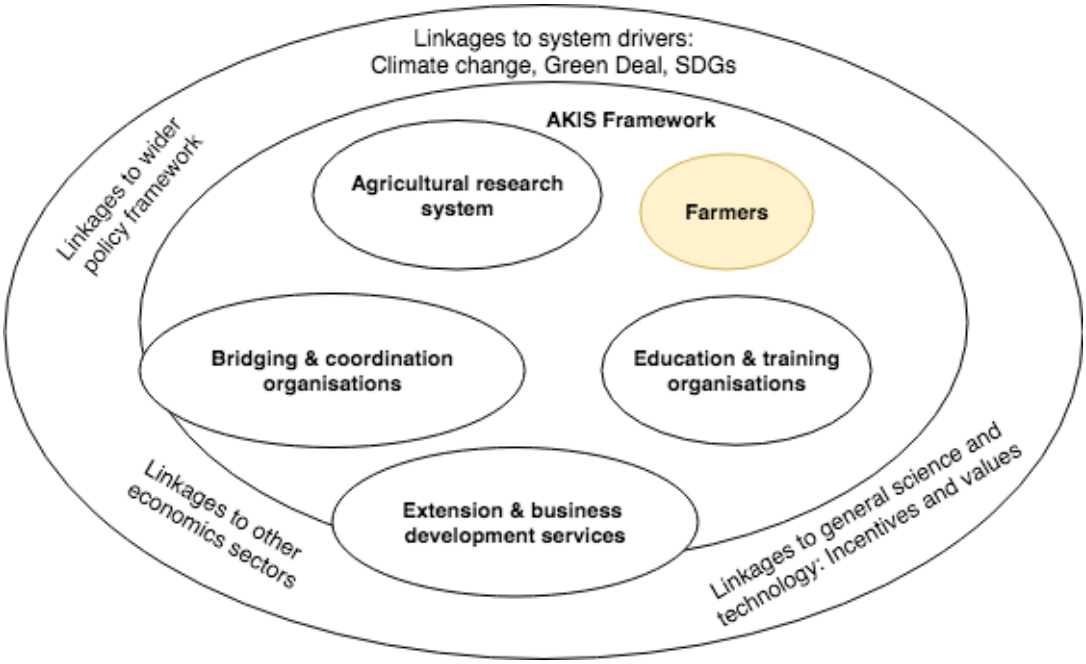

Figure 2. The AKIS Framework.

Sources: Adapted by SCAR, 2015; Dockes et. al., 2011; Riviera et. al., 2005; Arnold, E. & Bell., M., 2008; Spielman, D. & Birmer, R., 2001; World Bank, 2007.

With regard to the themes to be addressed in the workshops, the participants of the workshops were asked to frame their discussions considering, and referring to the Farm to Fork (FtF) Strategy objectives, namely:

1. Ensuring sustainable food production (in line with circular bio-based economy)
2. Ensuring food security
3. Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices
4. Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets
5. Reducing food loss and waste
6. Combating food fraud along the food supply chain

Meanwhile, for each of the above FtF objectives, the participants were asked to provide answers to the following questions, to guide the discussions of the workshops:

1. What lacking skills and competencies are needed to achieve these objectives?
2. How can education and training policy contribute?
3. What (changes in) education policy instruments are needed?
4. What roles can different AKIS (and other) actors play?
5. Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics (1-6)?

In this sense, the below table was distributed to the participants as part of the workshop guidelines document, and they were asked to fill in the table during the workshops. The

pillars of the table were not, in all cases, taken "as it is" by the partners, but was revised to the extent necessary to ensure relevance for the specific sector of interest. For instance, in the scope of the Swedish workshop (Annex 3.5) which was dedicated to the forestry sector, the partners revised the table to be able to discuss education and policies from a forestry perspective, adopting the matrix to themes and questions of relevance for Swedish forestry sector.

Table 1: Farm to Fork Strategy objectives needing new skills and educational policy interventions and instruments.

FtF topic (objective)	What lacking skills and competencies are needed to achieve these objectives?	How can education and training policy contribute?	What (changes in) education policy instruments are needed?	What roles can different AKIS (and other) actors play?	Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics (1-6)?
Ensuring sustainable food production (in line with circular bio-based economy)					
Ensuring food security					
Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices					
Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets					
Reducing food loss and waste					
Combating food fraud along the food supply chain					

For the execution of the workshops some suggestions have been proposed by the UNIBO team, and shared with the participant through the workshop guidelines document. According to the guidelines regarding the execution of the workshops, the following agenda and plan were recommended, in addition to a few guidelines to follow

before and after the workshops. While this plan was proposed as a broad example, partners were told they could adapt the plan and steer the discussions, according to the specific needs and contexts of countries or cases in question.

Before the workshops

Before the workshops, the NF partners were asked to send an invitation e-mail to the potential workshop participants, with a short presentation of the workshop with instructions (that were provided by the workshop guidelines documents) and Table 1. The partners were recommended to ask the invited participants to fill the table and return it before the workshop (or come to the workshop with the table pre-filled in).

During the workshops

The following agenda was recommended to be followed by the NF partners for the execution of the workshops

- **Introductory round – 10 min**
  In this round, the NF partners were asked to conduct a short round where each of the participants introduce themselves, during when their names and affiliations were noted down.

- **Introduction and brief presentation of NextFOOD project and aims and brief presentation of Results from task 4.1 and aims for task 4.2 – 15 min**
  A brief PowerPoint document was provided by the UNIBO team to facilitate the presentation of: the NextFOOD project and its aims; the results of WP4 Task 4.1; and, the aims for task 4.2 (aims of the workshop).

- **Circulation of the AKIS framework and table to be filled out individually by participants– 15 min**
  The NF partners were asked to circulate a note including the framework of AKIS (Figure 1 and 2 as presented in the previous section above), and the table (Table 1 presented above) to be filled out individually by participants.

- **Presentation of Results – 15 min**
  The NF partners were asked to present to the participants of the workshops, the main comments/suggestions/recommendations that came out following the filling out of the tables individually.

- **Consensus discussion about new policy instruments to be proposed and designed – 30 min**
  The NF partners were proposed to ask the participants of the workshops to discuss the improvements needed in educational policies for each Farm to Fork objective and discuss which policy strategies or instruments they would suggest for improving each of the European objectives and how they could be designed/implemented.

- **Conclusions and follow up - 15 min**

3.2 Execution of the workshops

3.2.1 Pilot workshop (University of Bologna, Italy)

Before the round of workshops were conducted by the NF partners, a pilot workshop has been conducted by the UNIBO team, in order to test the workshop methodology in the Italian context, by using the workshop design detailed in the previous section (section 3.1).

The workshop has been conducted on 30th of July, 2020, online, through the use of Microsoft Teams, by the facilitation of the University of Bologna project team (Davide Viaggi, Rubina Sirri, Yaprak Kurtsal). The workshop started at 14.30 and lasted a total of 2 hours and 25 minutes. The stakeholders that were invited to the workshop came from both the region and from either academic or higher-level institutions. As a result, 5 experts (two officers from the Emilia-Romagna Region, two professors from UNIBO, and the director of a private advisor/training company) have participated in the workshop, affiliations of whom are presented in the table below. The discussions on the other hand were made in the context of the steps and planning that were detailed in the previous section of this report (section 3.1).

Table 2: Participants of the Pilot workshop (University of Bologna)

Participants	Institution
1	DISTAL, University of Bologna
2	DIMEVET, University of Bologna
3	DINAMICA
4	Regione Emilia-Romagna
5	PWC

3.2.2 The round of workshops by the NF partners

Following the pilot workshop, a round of workshops has been organized by the NF partners in their country contexts, between August and December 2020. A total of nine workshops were conducted, and each of the workshops was implemented in the local language of the country in question, and then the discussions were translated in English and reported by the use of workshop reports submitted by the partners to the UNIBO team. Each of the workshop reports can be found under Annex 3 of this document. Meanwhile, the NF partners, the country contexts, and the date when each of the workshops was conducted are as follows:

- ISEKI-Food Association (IFA) (A European non-profit organization: Participants of the workshop came from **Italy, Germany, Scotland, Portugal, and Belgium**), 8 October 2020
- Norwegian University of Life Sciences (NMBU), (**Norway**), 8 October 2020
- Joint workshop of Lund University and the Forestry Research Institute of Sweden (LU- SKOGFORSK), (**Sweden**) 24 August 2020
- Roskilde University (RUC), (**Denmark**), 21 September 2020
- University of South Bohemia (USB), (**Czechia**), 25 August 2020
- University of Chile (UCH), (**Chile**), 24 September 2020
- Joint workshop of Welthungerhilfe and University of Calcutta (WHH-Calcutta), (**Germany and India**), 8 September 2020
- Centre for Advanced Mediterranean Agronomic Study (CIHEAM), (While CIHEAM is an institute that is represented by 13 countries of the Mediterranean Basin, the workshop participants represented the **Italian** context), 18 November 2020
- Joint workshop of Agronutritional Cooperation of the Region Central Macedonia and the American Farm School (ACRCM-AFS), (**Greece**), 12 November 2020

A total of 55 participants took part in these workshops. The information about the participants can be found in the below table (Table 3).

Table 3: Participants of the workshop according to the country they represent, and the NF partner that organized the meetings

NF partner that organized the workshop	Country or countries of discussion	Number and details of participants
Agronutritional Cooperation of the Region Central Macedonia and American Farm School (AFS)	Greece	13 professionals participated, coming from wide variety of policy related sectors (representatives from educational institutes, ministry of education/agriculture, regional authorities, farmer groups, agriculture and relative professional chambers
ISEKI-Food Association (IFA)	Italy, Germany, Scotland, Portugal, and Belgium	7 participants participated, coming from different accreditation agencies in the agricultural sector across Europe
Norwegian University of Life Sciences (NMBU)	Norway	4 professionals participated, all from a different working background (a farmer's union employee, a Norwegian Agricultural Cooperative employee, a Norwegian Agency for Quality Enhancement in Higher Education officer, a researcher)

NF partner that organized the workshop	Country or countries of discussion	Number and details of participants
Lund University (LU) and the Forestry Research Institute of Sweden (SKOGFORSK)	Sweden	6 professionals participated, who are either responsible for or are engaged in education, policies, and/or skills supply in the forestry sector, coming from both academic institutions and industry
Roskilde University (RUC)	Denmark	5 experts participated, two from vocational education, a university professor, one industry officer, one food policy officer
University of South Bohemia (USB)	Czechia	4 professionals participated, a university professor, a ministry of agriculture officer, a member of the Institute of Agricultural Economics and Information, and a member of the National Institute of Public Health
University of Chile (UCH)	Chile	5 professionals participated, that are involved with educational and/or policies in the agri-food sector (one extensionist, two professors, one ministry of agriculture officer, one regional FAO officer
Welthungerhilfe (WHH) and University of Calcutta (UoC)	India	7 professionals, all professors or researchers from several universities and institutes around India
Centre for Advanced Mediterranean Agronomic Study Workshop (CIHEAM)	Italy	4 participants, representing different stakeholders, an academician, a vocational institution, a local authority linked to rural development, a farmer representative), took part to the meeting

3.2.3 EU-level workshop

The EU-level workshop, which aimed to bring together discussions from the round of national workshops, and to extend the discussions at the EU-level, has been conducted on March 4, 2021, online, using Microsoft Teams by the facilitation of the UNIBO team. The meeting, which started at 13.10 lasted one hour and fifty minutes and was conducted in English.

Sixteen experts who are either responsible for or are engaged in education, policies, and/or skills supply in the AFF sectors were invited to take part in the workshop. In these experts list, two groups can be outlined: - a group of selected experts found

through different channels and contacts; - a group of partners from the NextFOOD project (in particular, all the WP's leaders). All these experts were initially contacted directly by the UNIBO team via email to ask for their participation with an agenda of the workshop and the link to participate. One day before the workshop, the executive summary of the present Deliverable 4.2 was sent to all the invited experts – both confirmed and not confirmed - to better introduce them to the theme of the workshop. The selected participants that were invited came from universities, research institutions, farmers organizations, the food industry, and the European Commission. From the first round of emails, ten confirmed, five declined and one did not answer. A general request from confirmed participants to extend the invitation to some of their colleagues was made. In this vein, a final number of twenty participants was reached and they are presented in Table 4 below. In addition to these twenty experts, the UNIBO team participated in the workshop with four members, for a final number of twenty-four participants.

The workshop started with a presentation of the participants, followed by a short introduction to the NextFOOD project made by the project coordinator, Martin Melin from the Swedish University of Agricultural Sciences. After that, the presentation of the outcomes of the ten local expert workshops followed by a synthesis of potential identified key points was made by Davide Viaggi (WP Leader, UNIBO team). The presentation focused on cross-cutting themes than specific Farm to Fork objectives found in the local workshops.

No breaks were made, and after the presentation of findings, a round of discussions was immediately introduced.

Table 4: Participants of the EU-level workshop (University of Bologna)

Participant	Affiliation/Institution
1	Swedish University of Agricultural Sciences
2	Swedish University of Agricultural Sciences
3	University of Hohenheim
4	University of Hohenheim
5	Copa-Cogeca
6	University of South Bohemia
7	University of South Bohemia

Participant	Affiliation/Institution
8	Lund University
9	European Council of Young Farmers (CEJA)
10	European Council of Young Farmers (CEJA)
11	Council for Agricultural Research and Economics (CREA)
12	Council for Agricultural Research and Economics (CREA)
13	Council for Agricultural Research and Economics (CREA)
14	American Farm School
15	American Farm School
16	American Farm School
17	Norwegian University of Life Sciences
18	Norwegian University of Life Sciences
19	Norwegian University of Life Sciences
20	European Commission

The round of discussions was initiated with the general question of additional comments about findings, especially to WP leaders, who held the local workshops. A general request of suggestions, questions, or comments was made to all the participants to discuss the results. The detailed minutes of the workshop can be found under Annex 1, while a summary of the main themes that were discussed during the workshop are listed below.

3.3 After the workshop

After the workshops, the NF partners were asked to write a report of the workshops they conducted, focusing on the discussions made on main suggestions, proposals and recommendations for new policy strategies and instruments to be implemented in educational policies. They were also asked to refer to the main inputs provided by participants through forms filled-out and write down a summary using Table 1, titled "Farm to Fork Strategy objectives needing new skills and educational policy interventions and instruments", as a template (Section 3.1).

Following the collection of all workshop reports from the NF partners, a qualitative data analysis has been conducted in order to interpret the workshop outputs. The qualitative method used to analyse workshop outputs was a thematic analysis. Thematic analysis is a qualitative descriptive approach that is mainly described as a method for identifying, analysing and reporting patterns (themes) within data (Braun & Clarke, 2006). In the scope of this analysis, the six steps proposed by Braun and Clarke (2006) have been used, namely (1) familiarization, (2) coding, (3) generating themes, (4) reviewing themes, (5) naming themes, and (6) writing up the results.

The first step of familiarization consisted of studying the workshop reports, taking initial notes, and looking through the data to familiarize with it. In the second step, coding was undertaken, in the form of highlighting sections of the text, including phrases and sentences and distinguishing the outputs according to each of the FtF objective discussed, and in terms of answers provided to each of the questions proposed during the workshops, namely:

1. What lacking skills and competencies are needed to achieve these objectives?
2. How can education and training policy contribute?
3. What (changes in) education policy instruments are needed?
4. What roles can different AKIS (and other) actors play?
5. Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics?

Following this stage of coding the text (in our case, with regard to answers provided to each of the questions posed), then patterns were identified among these answers, and themes that are coming up are evaluated. Studying the text, differing themes were identified, and grouped together (e.g. skill gaps, needed skills, strategies related to curricula, practical skills, learning approaches and so on).

Once themes have been identified and grouped together, we returned to the data to see if any discussion is left out, or whether further grouping or merging is needed or not. Following this step, we allocated a title to each of the themes, formulating what is meant by each theme and how it would help understand better the data (e.g. how can curricula be improved towards providing necessary skills and competencies; establishing and strengthening networks and collaboration between actors). Finally, as the last step, the results section of the report was written. The section of the report, titled synthesis of workshop results (section 4.3) includes all themes that came out of the workshops, and the section titled summary of main discussion points and cross-cutting issues arising from the workshops, include those themes that were repeating across all workshops (or a great majority of the workshops).

Following the drafting of the workshop results, the findings were shared with the stakeholders invited to the EU-level workshop in the form of a draft report, and a presentation has been made, discussing the main cross-cutting themes that were identified in the scope of the workshops. Finally, after the EU-level workshop, the discussions that were made during the workshop were also integrated into the results.

4 Results

In this section of the report, the outputs of a round of workshops conducted to identify strategies for the improvement of educational and training policies in the field of agrifood and forestry are presented. Towards this goal, first, in section 4.1, the summary of each of the nine stakeholder workshops conducted by NF partners in their country contexts, as well as a workshop conducted on the EU-level are presented (the detailed reports of each workshop can be found in Annex 3). Then, in section 4.2, a summary of main discussion points and themes arising from the workshops, and cross-cutting issues are presented compactly. Then, finally, in section 4.3, a detailed synthesis of the outputs of all workshops are provided, according to each of the relevant FtF strategy addressed during the discussions.

4.1 Summary of Workshops

4.1.1 ISEKI Food Association Workshop

The workshop was organized by ISEKI-Food Association, an independent European non-profit organization, that aims to support teachers, trainers, scholars, students, and industry staff to assure the best possible competencies for all working in the food sector.

The workshop was held on October, 8th 2020, and it lasted two hours. Due to COVID-19 restrictions, the workshop was organized online.

At the meeting seven professionals participated, coming from different accreditation agencies in the agricultural sector across Europe (Italy, Germany, Scotland, Portugal, and Belgium), providing the workshop a European perspective. The professionals were all involved in the accreditation system, an important issue for the IFA.

Of the seven participants, two were female and five were male.

The common work field of the participants allowed the workshop to be focused predominantly on ECTS-system and university-external bodies relationships, in addition to higher education and external activities. Nevertheless, the different geographical origins gave the workshop more than one point of view.

Key messages emerging from the workshop:

- In the first part of the meeting, participants agreed on the difficulty for the university students to get the accreditation of external activities. Participants suggested that there is a general distrust between academia and external bodies providing trainings (e.g., NGOs). However, the participants also agreed on the need of guarantee and certify the quality of external training services. In this sense, an integrated qualification framework was argued to be missing – there are now 2 or 3 separate systems: Bologna, Copenhagen, EAPA (European alliance professional accreditation).

- In the field of vocational educational training there is a lack of recognition of diplomas and, in general, of learning experiences. Furthermore, there is a lack of comprehensive policies, and validation strategies are missing in some EU countries.
- Several instruments were mentioned such as the fostering of projects on skills (soft skills, digital skills) such as ESCO (European Skills Competencies and Occupations), that was mentioned as a policy instrument for the future.
- It was also mentioned that there are already competence frameworks for sustainable development in place and that the European Skills Agenda considers digital transition but, to date, there is no mention of a green education plan and this should be an opportunity to not be missed. Also, because it would require a cooperation with the UN Developing Goals.
- There was an agreement among the participants that it is positive to see the FtF goals providing a holistic approach, integrating several EU authorities and responsibilities.

4.1.2 Norwegian University of Life Sciences (NMBU) Workshop

The workshop was organized by the Norwegian University of Life Sciences, a government-funded university, with 5000 students distributed among 64 study programs, based in Ås, Norway.

The meeting was held on October, 8th 2020 and it lasted one hour and a half. Due to COVID-19 restrictions, the workshop was organized online.

At the workshop four professionals participated, all from a different working background (a farmer's union employee, a Norwegian Agricultural Cooperative employee, a Norwegian Agency for Quality Enhancement in Higher Education officer, a researcher).

There was a gender balance: two participants were female and two were male.

According to what was explained by the interviewer "it was challenging to keep the participants focused on certain objectives and questions." Moreover, the discussion was very critical on the educational and training systems in Norway.

Key messages emerging from the workshop:

- The participants underlined the importance of practical knowledge and experiences in students' education. Internships and field trips should be mandatory to get the final certification.
- It was pointed out that the importance of having a common language – in Europe – in terms of sustainability, sustainable food production, a common understanding of the FtF goals, etc., because, as of now, it is not clear.
- Continuous learning should be supported more, because in the near future there will be a much larger spectrum of competencies that will be needed, and this is true and important for all AKIS actors.
- There was a methodological proposal: shifting from the triangle (education, research, business) to the rectangle (education, research, business, and local

society), where the local society is regarded as a new dimension, fundamental for new projects.

- Other considerations were about academia and teachers, perceived as distant from farmers' world, and criticized for the incentive system (publishing articles) that "is actually wrong, it should change and should be based on how you contribute to the society."
- Three words were used to describe the life-long learning of the near future: short, flexible, digital.

4.1.3 The joint workshop of Lund University and the Forestry Research Institute of Sweden

The workshop was organized by the collaboration of two partners: the Lund University (LU) and the Forestry Research Institute of Sweden (SKOGFORSK).

The LU is a public body that each year offers over 200 courses modules or programs within food studies.

The SKOGFORSK is the central research body for the Swedish forestry sector, jointly financed by the government and the members of the institute.

The meeting was held on August, 24th 2020, and lasted 2 hours and a half. Due to COVID-19 restrictions, the workshop was organized online.

There were six professionals, who are either responsible for or are engaged in education, policies, and/or skills supply in the forestry sector, coming from both academic institutions and industry.

Of these six experts, two were female and four were male.

To be able to discuss education and policies from a forestry perspective, the partners decided to adapt the matrix (FtF table) to themes and questions of relevance for Swedish forestry. Furthermore, the guiding document of the meeting was the Swedish National Forest Programme (giving the discussion a local perspective, according to the aim of these workshops). An academic point of view was predominant.

Key messages emerging from the workshop:

- A general request for a greater spirit of collaboration was expressed in several ways: a) closer collaboration between educational bodies and industry to balance theory and practice; b) joint efforts to develop work placement and applied projects; c) engage and interact with the outside world; d) broader competence through collaboration and mixing competencies, also with an international outlook.
- Despite the request of enlarging the collaborations, the "more of everything" approach was criticized, preferring the "specific focus area" approach for each education course or programme. Nevertheless, further flexible teaching was requested too. A policy shift to more flexible forms of education that are linked to universities but are not traditional educational programs, was recommended.

- Static education volumes make it difficult for universities to adapt when the industry changes. More flexible ways of determining the number of students should be installed to facilitate structural changes in the industry.
- The importance of increasing the attractiveness of the forestry sector, especially the forest industry, was pointed out. A new way to communicate with new target groups (new storytelling) should be adopted: it was emphasized that the forest industry, with sustainable raw materials and the circular economy approach, has a "fantastic" story to tell.
- A Swedish paradox is that it is easier to go from a practical upper secondary school to theoretical university education with practical elements than the other way around. Change to more flexible ways to evaluate prior knowledge.

The main message was formulated by one of the participants as: "We must give ourselves the chance to be the future!"

4.1.4 Roskilde University Workshop

The workshop was organized by the Roskilde University, a public university, with 9000 students, located in Roskilde, in East Denmark.

The meeting was held on September, 21th 2020 in a conference room at Roskilde University and according to the COVID-19 restrictions and meeting guidelines at that time. It lasted two hours and twenty minutes.

Five experts (two from vocational education, a university professor, one industry officer, one food policy officer) participated at the meeting.

No information was revealed about gender equity.

The two main debates in the workshop were regarding: 1) The ability of students to understand and utilize their position and knowledge in a larger value chain/system context; 2) The need for continuing education or life-long learning regarding certificates or courses of sustainable practice. The discussion was kept on a broad level within the areas of vocational gastro- and agro-education as well as academic agro-education.

Key messages emerging from the workshop:

- Despite the great paces in the last decades, sustainability in the current educational context is "characterized by niche thinking (now everything needs to be about insects or vegetarian food) and often removed from a larger context, allowing it to be utilized as people please without consideration of systemic context."
- "How are we to change a society if the majority of people occupying positions are not trained to combat new types of challenges during the next 40 years of their remaining time on the job market?" The same person answers that this situation "highlights the need for this to be a top-down arrangement."
- Sustainability must become the target than just the means.

- Vocational education is market-driven, and this means that without strong demand for courses in sustainable practices, classes are not filled and courses are not held.

4.1.5 University of South Bohemia Workshop

The workshop was organized by the University of South Bohemia, a public university, with 9000 students, located in České Budějovice, in South Czechia.

The meeting was held in two rounds: the first one on August, 25th 2020 with three participants; the second one on August, 27th 2020 with one participant. Due to COVID-19 restrictions, both rounds of the workshop were organized online.

At the meeting four professionals have participated (a university professor, a ministry of agriculture officer, a member of the Institute of Agricultural Economics and Information, and a member of the National Institute of Public Health).

There was gender balance, as there were two females and two males.

A great relevance was reserved to education, perceived as one of the pivotal means to exploit the FtF objectives, and to life-style, pointed out as the unique way to pursue sustainability, especially in the environmental sense.

Key messages emerging from the workshop:

- The economic pressure on primary agricultural production and processing, from the global market, does not fit with environmental needs. According to this sentence, the participants stressed the underestimation of negative externalities and the lack of ability to eliminate them by farmers (well-established practices and fear of change). Also, long-term contracts with input supplies – a lock-in situation – can be regarded as a negative externality.
- To ensure sustainable food production a reduction of the bureaucratical pressure is requested: both at the EU level and national level, the abundance of documents and regulations limit entrepreneurship.
- Beginning the education on sustainability in primary school and these progressive changes of lifestyle gradually bring a society-wide and long-term effect.
- To stimulate sustainable food processing, wholesale, retail, hospitality, and food services practices a proposal can be to ban unhealthy food and change lifestyles. For this purpose, an important help can come from education policies that should be placed on practice and training of field workers, instead of focusing on university education and high expertise.
- The knowledge of utilization of “waste” or rather the knowledge of how to handle ingredients and semi-finished products so that they do not become waste can be part of a change of mentality in older and new professionals in food processing.

4.1.6 University of Chile Workshop

The workshop was organized by the University of Chile, a public and national institution, the oldest university in Chile, and it was located in Santiago de Chile.

The meeting was held on September, 24th 2020 and it lasted two hours and a half. Due to COVID-19 restrictions, the workshop was organized online.

At the workshop five professionals participated, experts that are involved in educational and/or policies in the agri-food sector (one extensionist, two professors, one ministry of agriculture officer, one regional FAO officer).

Participants were distributed as follows: three females and two males.

The discussion was small enterprises-centred. In fact, great importance was given to the local dimension of both production and education. Furthermore, Chile is facing a new constitutional process and this stimulated an in-depth analysis of what can be the pillars of the new constitution in terms of sustainable production and healthy food, highlighting the right to consume and access to sustainable and healthy food as a fundamental human right.

Key messages emerging from the workshop:

- There are no clear educational policies within the agri-food sector in Chile. Policies are independent according to the subject: agriculture, health, nutrition, and environment. There must be a multidisciplinary and interdisciplinary approach.
- There is a weak link between the political sector and universities. There is a need to include these key topics in the Universities' curricula. There is also a need to involve students with their local environment and field reality during their early years of studies to acquire skills related to knowledge integration, interdisciplinary work, and communication. Furthermore, the concept itself of sustainability is not installed in professionals; it does not come from the university.
- Consumers have a key role in the public policies and political instruments regarding food production and sustainability in agri-food systems. There is a need to empower consumers regarding the importance of healthy and sustainable diets ("Eat local, break paradigm of large food and equip an ethical code").
- There is no relation between health and nutrition and sustainable production. It´s time to understand the link between both concepts when we talk about food and nutritional policies, including educational policies.
- An important issue is that to promote processing for the farmer, the system (schools, universities, advisors, agronomists, etc.) must teach them to add value and not only volume.
- The socio-sanitary crisis brought new and interesting topics regarding food systems policies. There is a need to acquire digital skills to facilitate food marketing for entrepreneurs and to facilitate the consumption using digital tools. There is a gap in this topic that affects older people and women.

4.1.7 The joint workshop of Welthungerhilfe and University of Calcutta

The workshop was organized by the Welthungerhilfe, one of the largest private aid organizations in Germany. According to the Sustainable Development Goal 2: "Zero Hunger by 2030", WHH is trying to fight hunger around the world.

The meeting was held in collaboration with the University of Calcutta, on September, 8th 2020 and it lasted three hours. Due to COVID-19 restrictions, the workshop was organized online.

At the workshop seven professionals have participated, all professors or researchers from several universities and institutes around India.

The participants consisted in large part by males: of seven people, six were male and one was female.

The presence of mainly professors and researchers gave the workshop a strong academic point of view. In this vein, many theoretical schemes were cited to target the FtF objectives, and the concerns about education and training.

Key messages emerging from the workshop:

- AKIS framework is built purely from a structural perspective. Many actors are missing.
- AKIS miss transformational perspective - transition from one state to other state. The framework is described from a non-agroecological perspective, very compartmentalized itself, and compartmentalization should be avoided as much as possible and bring AKIS in a more system perspective.
- The education system is too much focused on job creation – so transformation or systemic changes are not part of the outcome, in general. For this purpose, incubation centres for passing out students – as it has often been experienced that agriculture university students can't work directly in the farm – can be the right solution. An intermediary institutional hand over process is necessary.
- Drivers and dynamics of the education system is highly corporate/market dominated. The food/farm system had faced a transition from public to private and ecological challenges are already marginalised. Participation of various stakeholders has experienced dilution over time. Such sources of challenges are not discussed much. Need to understand that perspective first, before going to F2F strategy discussions. In other words, reduce top-down scenario as much as possible.
- Research and education need to go through a political contestation – knowledge will emerge out from such debate and dialogue. Furthermore, the system should encourage students' innovation.
- Tools and methods for food fraud identification is not part of agriculture education currently.

4.1.8 Centre for Advanced Mediterranean Agronomic Study Workshop

The workshop was organized by the Centre for Advanced Mediterranean Agronomic Study (CIHEAM), an intergovernmental organisation founded under the aegis of the OECD and the European Council in 1962, and including 13 countries of the Mediterranean Basin (Albania, Algeria, Egypt, France, Greece, Italy, Lebanon, Malta, Morocco, Portugal, Spain, Tunisia and Turkey). CIHEAM has five institutions, one of which is located in Bari, Italy.

Four participants, representing different stakeholders (an academic, a vocational institution, a local authority linked to rural development, a farmer representative), took part in the meeting.

All stakeholders were male.

A great emphasis was given to education, educational process, and means and tools for training. A student perspective was a theme that influenced the discussions. Furthermore, the importance of public-private partnerships (PPPs) was underlined, in order to achieve most of the FtF objectives in education, training and lifelong learning.

Key messages emerging from the workshop:

- Students appreciate the relationship with the real world and this should be a driver for designing new educational programmes also because it responds to the stakeholders' needs. But it is important to incentivize private business to cooperate with schools by providing a normative framework that does not penalize or increase the financial burden if they accept trainees.
- There is a need to integrate different competencies to educate a new generation of sustainable agricultural operators and this leads to designing multi-disciplinary programmes. Moreover, designing new educational approaches and programmes can have a positive impact on traditional courses that can be pushed to innovate.
- At the policy level, there is a bottleneck because there are not enough incentives and adequate regulations to promote traineeship and involve enterprises, both at secondary and university level of education.
- The reduction of investments, fragile systems for teaching appointments, limited resources for technological updates lead to the failure in preparing technicians ready to face real context requirements in agriculture. Teachers need to be continuously updated so that they can better identify students' needs. This combined with a better integration of farmers and farming and food system entrepreneurs in the development of courses could provide students with all the necessary tools for employment.
- Technological update is also necessary, because without the right tools students cannot be educated as needed. Also, because the lack of technical innovation into the schools create a gap that will be always more difficult to fill over time.
- The interaction of schools and experts should be facilitated by a simplified bureaucratical process for organization: very often this kind of interaction is

provided by external instruments, like targeted funding; but this is not sufficient, it needs to be institutionalized in the normal programming.

- Gender equality does not represent a problem either in the courses' attendance or in farm management and farming activities. Actually, women's participation in agriculture increased by 20% as reported by the participants' experience in education and farming.

4.1.9 The joint workshop of Agronutritional Cooperation of the Region Central Macedonia and the American Farm School

The workshop was co-organized by the Agronutritional Cooperation of the Region Central Macedonia and the American Farm School, both Greek institutions.

The Agronutritional Cooperation of the Region Central Macedonia is a civil non-profit organization, a partnership of 18 institutions, all around Greece. The American Farm School is an independent, non-profit educational institution located in Thessaloniki, Greece.

The meeting was conducted on November, 12th 2020, and it lasted three hours. Due to COVID-19 restrictions, the workshop was organized online.

Thirteen participants were present, coming from a wide variety of policy related sectors (representatives from educational institutes, ministry of education/agriculture, regional authorities, farmer groups, agriculture and relative professional chambers).

Except one female, all other participants were male.

The discussion was developed considering skills/competencies across a variety of subjects, the hindering forces and general suggestions for improved educational policies.

Key messages emerging from the workshop:

- Thinking of the professionals of the future, some skills/competencies were pointed out. First of all, the importance of a goal setting, visionary thinking and personal motivation were highlighted. Moreover, practical training (experiential knowledge and ability to relate), familiarization with all the levels of production, familiarity with the experience of previous generations are essential elements for the next generation of professionals.
- A description of the hindering forces was made: bureaucracy, lack of resources and funds, absence of legal frameworks to support multi-actor networks, lack of communication with other countries, lack of systematic record keeping of needs, and low applicability of the present educational programs. Moreover, the poor communication between actors and legal entities (e.g., ministries, academia, chambers of commerce, districts, municipalities, etc.) does not help to improve the situation. Furthermore, there is an over-abundance of academics, linked with the familial idea of wanting all children to be degree holders and "well-studied", and this decreases the quality of professionals.
- Several suggestions were proposed, with a common theme: collaborations. The necessity of increasing collaboration should be adopted in a wide range of

relationships, for example between universities and market actors, between ministries (an idea can be the creation of inter-ministry networks/entities), between all the AKIS actors with a network mindset, but also to learn from the experience and good practices of foreign bodies. Great importance should be reserved to the curricula of study of next generations, that should be organized according to the new CAP, the suggestions from other actors (e.g., commercial chambers), and a practice-oriented pathway (with practical market experience should be obligatory throughout University). For these purposes, formation of annual goals which will also be assessed and reappraised annually should be adopted.

4.1.10 EU-level workshop

The European-level workshop was organized by the University of Bologna, the WP4 team leader.

The workshop was held on March, 4th 2021, and it lasted one hour and fifty minutes. Due to COVID-19 restrictions, the workshop was organized online.

At the meeting, twenty selected stakeholders that have expertise in EU education and training policies in agri-food and forestry sectors participated. The experts came from different contexts: research and academia, international farmers organizations, and the European Commission.

Of the twenty participants, ten were female and ten were male.

The participants enriched the discussion about the outcomes of the local workshops thanks to their professional and personal points of view on education and training in the EU.

Key messages emerging from the workshop:

- Importance of actors coming together to discuss issues was underlined. In this way, even actors that have contrasting views can discuss common concerns and possibly arrive at common solutions.
- Importance of collaboration was further underlined by several participants. In this regard, several themes were addressed:
    - Importance of building coherence between different frameworks.
    - Co-creation is also critical, and co-creation methodology still needs to be developed. Although it is being discussed and acknowledged, the actors still do not have the skills and knowledge to apply this methodology.
    - Collaboration of education system within the AKIS framework also needs to be worked on, education system is still not engaged in multi-actor approaches.
    - Increasing collaboration in the CAP strategic planning was also argued to be important. In this regard, especially the relationship between two

ministries and two disciplines (education and agriculture) needs to be developed.
    - Peer to peer learning also came forth for enhancing the practical skills of farmers; yet there are limitations across regions (e.g. it is more challenging in remote areas). In this regard, the importance of digitalization was underlined.
        - Digitalization is also critical for skill generation.
- Participants further addressed the importance of the AKIS framework; yet pointed to the need of some improvements. AKIS concept is not well-defined, and still not owned by actors and especially is not perceived as a system, but more as a list of actors. In order for AKIS to be applied and to operationalized, it is important for actors to own it.
- The importance of the advisory system, and the need to improve it was also a theme discussed during the workshop. The need to establish a system, where both public and private advisory services are both presented, and can collaborate was also underlined.
- In terms of skills, on the other hand, it was noted that economic-financial skills (entrepreneurship) are missing: a lot of young farmers are not able to prepare a business plan or get a loan from banks. Further, young farmers are having difficulties reading the market and orienting themselves accordingly. It was also noted that higher order learning skills are very important to realise FtF objectives. This also points to the need to have more action learning approaches in the education system.
- For the design of the curricula, and to meet the needs of the sector, the need to adopt long-term thinking, and to see beyond the current or the future CAP was suggested. It is, hence, critical to think about the future skill needs (both expected and unexpected ones) while designing the education system. It was also argued that there is currently no systematic approach in recording the needs of the market, and this needs to be also improved.

4.2 Summary of main discussion points and cross-cutting issues arising from the workshops

In this section, a summary of main points that were discussed during the majority of the workshops, and cross-cutting issues that apply across the value chain, - in other words across all FtF strategies - are presented. Besides, some important themes that were touched upon during the EU-level workshop are also introduced. The aim of this section is to provide an overview of some of the most important findings that came out of the workshops, and to provide a summary of some of the themes there were both cross-cutting and also discussed most extensively by the participants. Meanwhile, in the following section (4.3) a more detailed presentation of the discussion points made according to each FtF objective can be found.

Below, the cross-cutting issues and main themes arising from the workshops are presented under six main headings, namely: i) the lacking skills and competencies in the sector that needs to be filled by Education and Training (ET) policies; ii) the need

to update and improve curriculums; iii) the need to enhance collaboration; iv) the changes needed in the approach and content of the ET system; (v) the need to adopt new approaches in educational policy-making; and finally, (vi) gender as a cross-cutting issue in policy-making.

i. The lacking skills and competencies in the sector that needs to be filled by Education and Training (ET) policies

- Especially soft skills are missing, such as strategic development and marketing, leadership, teamwork, communication, and interpersonal skills.
- Economic-financial skills are also missing: a lot of young farmers are not able to prepare a business plan or get a loan from banks. Further, young farmers are having difficulties in reading the market and orienting themselves accordingly.
- Higher order learning skills are important to realise FtF objectives. This also points to the need to have more action learning approaches in the education system.
- Also, a diverse range of approaches need to be integrated:
  - critical thinking, systems thinking, problem-based and multi-disciplinary approaches;
  - besides, students lack the capacity to use the knowledge they acquired (putting the knowledge into use) in a larger value chain/system context;
  - digital skills are also missing or insufficient;
  - digitalization - one of the main cross-cutting themes – digital skill and digital use – being a new frontier for all AKIS actors;
  - this need exacerbated also after COVID-19;
  - skills (and approach) of educators are also outdated;
  - teachers and educators are still in some cases very traditional, resistant to change;
  - also, the lack of practical skills was underlined in all of the workshops.

ii. The need to update and improve curriculums

- Policies are insufficient to establish links between theory and practice:
  - formal education insufficient to provide practical skills and real-life examples;
  - lack of ET policies regulating non-formal education (e.g. extracurricular activities);
  - vocational education and life-long learning insufficient to meet the needs of the sector;
- Complementing formal education with non-formal and informal education:
  - need of recognition of practical learning experience and activities outside of school:
    - accreditation agencies can include extra-curricular activities as requirements;
    - not only for students but also for instructors and life-long learners.

- It is often observed that agriculture students cannot work directly on the farm:
  - so, intermediary institutions such as "incubation centres" can be mobilized.

- Life-long learning should be given utmost importance:
  - continuous learning should be promoted (or even be made mandatory);
  - three words to describe the life-long learning of the near future:
    - short, flexible, digital;
  - extension services also need to be improved:
    - not only to target middle-aged male farmers, but farmers of all ages and genders.

- Curriculums should be re-organized:
  - suggestions from all AKIS actors need to be taken into consideration;
  - a practice-oriented pathway (with practical market experience) should be obligatory throughout University;
  - formation of annual learning goals/outcomes (assessed and reappraised annually) for learners should be adopted;
  - the need to adopt long-term thinking, and to see beyond the current or the future CAP: critical to think about the future skill needs (both expected and unexpected ones) while designing the education system.

iii. The need to enhance collaboration

- Current educational policy framework:
  - lacks legal frameworks to support multi-actor networks;
  - lacks communication with other countries;
  - has poor communication between actors and legal entities (e.g., ministries, academia, chambers of commerce, districts, municipalities, etc.), as well as policies;
  - interdisciplinary and cross-sectoral approaches and collaboration are missing.

- Co-creation missing in the sector – need to be enhanced:
  - broader competence through collaboration and mixing competencies is necessary (inter-disciplinary, multi-actor):
    - different actors coming together and working together in teams – addressing concrete needs: in this way, even actors that have contrasting views can discuss common concerns and possibly arrive at common solutions.
  - co-creation methodology still needs to be developed. Although it is being discussed and acknowledged, the actors still do not have the skills and knowledge to apply this methodology;

- peer to peer learning is also critical for enhancing the practical skills of farmers; yet there are limitations across regions (e.g. it is more challenging in remote areas):
  - digitalization in this regard is critical.
- engaging and interacting with the outside world and gaining an international outlook are also necessary.

- Closer collaboration between educational bodies and industry is required – to balance theory and practice:
  - need to increase collaboration between academia and industry; however, there is a lack of incentives and adequate regulations to promote traineeship and involve enterprises:
    - accepting trainees shall not increase their financial burden or penalize them;
  - need to involve the industry and enterprises in curriculum making
  - joint efforts to develop work placement and applied projects should put in place.

- Involving/integrating NGOs and the community is necessary:
  - to involve those that are directly affected by the sector's decisions;
  - to make sure the real needs on the ground are addressed (e.g. farmers' needs);
  - to create scope of network, where farming community participate in pedagogic processes and curriculum development;
  - need to have more collaboration between Universities and policy-makers.

- Cooperation between different policy frameworks and also DGs is necessary:
  - to develop a competence framework tailored to agrifood;
  - importance of building coherence between different frameworks;
  - increasing collaboration in the CAP strategic planning is also critical: especially the relationship between two ministries and two disciplines (education and agriculture) needs to be developed.

- Collaboration between Universities and policy-makers:
  - collaboration between the education system and the AKIS actors – in a framework perspective - also needs to be worked on. Furthermore, the education system is still not engaged in multi-actor approaches.

iv. The changes needed in the approach and content of the ET system

- "Sustainability" and "resilience" still seen as "niche thinking":
  - instead, need to be put in the centre - and be integrated into education/curriculums starting with early ages;
  - "sustainability" should not be a term/concept that is learned later in life/after school in work life;
  - should also be integrated into vocational education and life-long learning;

- only in this way, future technicians will be ready to face real-context challenges;
- a common understanding of the term is necessary in the sector;
- the inseparable link between sustainable production and healthy eating need to be integrated into curriculums:
  - health/nutritional and educational policies need to work/act together.

- Changing the approach
  - from "more of everything" approach to "specific focus areas";
  - from the focus on creating "degree-holders" to creating skills;
  - from rigid/traditional curriculums to more flexible forms of education:
    - static education makes it difficult for universities to adapt when the industry changes;
    - switching between focus areas/curriculums be made easier.

- Technological update is necessary:
  - investment in new technologies, laboratories, and instruments needed;
  - more laboratory time needs to be inserted into curriculums;
  - essential to get more competent at digital learning platforms:
    - also pushed very abruptly with COVID-19.

v. The need to adopt new approaches in educational policy-making

- Harmonization of policies is needed:
  - lack of comprehensive policies and validation of strategies;
  - a more systematic and integrated policy-making needed;
  - a need to enhancing coordination among different policies;
  - better coordination amongst General Directorates (agriculture, health, education and training);
  - spreading of best and good practices would help with harmonization efforts.
- Necessary to reduce bureaucracy – standing in the way of innovation:
  - simplification of bureaucracy in the academic context;
  - simplification of controls of European funds:
    - Interaction of schools and experts to be simplified;
    - This interaction often provided by external instruments (e.g. targeted funding);
  - problem of an abundance of documents and regulations (both at EU and national level);
  - it was also argued that there is currently no systematic approach in recording the needs of the market, and this needs to be also improved.

- Better (and common) understanding of terms:
  - governmental institutions need to set clear definitions from an early point;
  - better understanding of the terms and goals at different levels of the AKIS system;

- common understanding of New Green Deal and FtF goals.

- Revising the AKIS framework:
  - very compartmentalized: more systems perspective needed;
  - AKIS concept is not well-defined, and still not owned by actors and especially is not perceived as a system, but more as a list of actors. In order for AKIS to be applied and to operationalized, it is important for actors to own it;
  - role of actors need revision:
    - the division of actors either needing, producing or exchanging knowledge should be changed:
    - all actors produce, exchange and need knowledge (not linear, does not flow in one direction);
    - students' role should be emphasized more (responsibility to put knowledge into use);
  - AKIS functioning regarding advisory services:
    - technical advisors are lacking in the sector;
    - the need to establish a system, where both public and private advisory services are both presented, and can collaborate was also underlined.

vi. Gender as a cross-cutting issue in policy-making

- Gender angle in agriculture education is missing: need to bring it in from scratch
  - having gender equality as a horizontal priority in designing of programmes needed;
  - gender equal/neutral value chain to be integrated into the curriculum – starting from early ages.
- Need to include a gender (equality) perspective in political instruments.
- Bringing gender equality/neutrality in educational policy-making is important.
- Increasing opportunities for women to have political roles in food production and consumption is critical:
  - women: not only as contributors at home;
  - men: taking roles to feed their families (cooking, nutritional issues, not only financially).
- Gaining digital skills can also drive this change – in empowering women entrepreneurs.
- Emphasizing best practices and role models are importance.

4.3 Synthesis of Workshop Results

In this section, the discussions made in the scope of all the conducted workshops are presented in a combined manner under each of the relevant FtF strategy they addressed. Namely, the FtF strategies that have been addressed in the context of the workshops were: (1) Sustainable food production, (2) Ensuring food security, (3) Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices,

(4) Promoting sustainable food consumption and facilitating the shift to healthy and sustainable diets, (5) Reducing food loss, (6) Combating food fraud. Hence, under each of the sections allocated for FtF strategies, the discussions made by the workshop participants are presented under different headings that address the topic and theme of strategies proposed.

In this section, we present in parenthesis the acronym of the NF partner institution to show from which workshop the discussions come from. The acronyms we used in relation to the NF partners are as follows:

- ISEKI-Food Association (ISEKI)
- Norwegian University of Life Sciences (NMBU)
- Joint workshop of Lund University and the Forestry Research Institute of Sweden (Lund- SKOGFORSK)
- Roskilde University (RUC)
- University of South Bohemia (USB)
- University of Chile (UCH)
- Joint workshop of Welthungerhilfe and University of Calcutta (WHH-Calcutta)
- Centre for Advanced Mediterranean Agronomic Study (CIHEAM)
- Joint workshop of Agronutritional Cooperation of the Region Central Macedonia and the American Farm School (ACRCM-AFS)

In the rest of this section, under each of the FtF strategy, we first present a table summarizing the discussions, and the main themes addressed in the context of each of the FtF strategy. Then following each table, we present in detail the discussions made and strategies put forth by the stakeholders as part of the round of workshops conducted. Finally, we present the discussions and main conclusions from the EU-level workshop in the last sub-section of the Results section.

4.3.1 Farm to Fork Strategy I – Sustainable Food Production

In this section, the discussions during workshops focused on which skills and competencies are needed, and which strategies needed to be followed towards achieving the FtF strategy of sustainable food production are presented. Namely, towards this goal, the strategies proposed by workshops participants mainly targeted the following themes: attracting and motivating students; adopting new approach to education and training; improvement of curricula towards providing necessary skills and competencies; improving the quality of education; enhancing networks and collaboration between actors; enabling life-long learning; adopting new approaches to educational policy making; in addition to what roles can AKIS actors play; and finally enabling gender equality towards achieving these strategies. The below table summarizes the themes discussed as part of the workshops.

Table 5: Main themes and topics discussed as part of FtF Strategy I – Sustainable Food Production

Main themes addressed	Main topics addressed under each theme
Skills and competencies needed to attain the FtF strategy objectives	Need to develop an understanding towards sustainability Need to develop the skills of teachers Need to develop the skills of students (and future-farmers)
Strategies for improvement of educational policies	
The importance of attracting and motivating students in the sector	The importance of storytelling as a way to communicate with the target audience (students) Making more visible to the public, the future job opportunities and their links to the needs of the evolving sector (e.g. links to sustainability)
Which new approaches to education and training need to be adopted	Before everything else, the need to adopt new approaches in agricultural production itself (with emphasis on sustainability) The need to adopt a more holistic approach in the AFF sector The need to have a transition from traditional to more flexible forms of education New approaches to teaching and learning need to be adopted: problem-based, cross-sectoral, interdisciplinary, inductive, experiential, cyclical; avoiding "more of everything" approach, and compartmentalisation
How can curricula be improved to provide skills and competencies	Updating curricula so that gaining practical experience through curricular activities Changing curricula to meet the needs of the sector
Enhancing networks, collaboration and dialogue between the actors of the sector	Establishing collaboration to enable link between theory and practice in education and training Including businesses in the education and training systems Integrating the views of the society in the decision-making processes in education and training The need to increase collaboration in policy-making
Enabling life-long learning	The importance of life-long learning to implement sustainable practices The importance of extension services
Adopting new approaches to educational policy-making	Harmonization of policies Reducing bureaucracy Better understanding of terms
What roles can AKIS (and other) actors plays	Students are responsible to put the knowledge they gain into use, and they need to learn how to utilize this knowledge University professors/teachers to provide new approaches to learning; and responsible for providing public awareness

Main themes addressed	Main topics addressed under each theme
	Incubation centres to take roles in education Ministries to work together to establish policy frameworks that allow sustainability Consumers have a key role to drive the demand and motivate suppliers to change
Gender equality	The importance to bring gender equality in educational policy-making; gaining digital skills can also drive this change

i. Which skills and competencies are needed to attain the FtF Strategy objectives

In this part, the issues touched by the participants regarding the skills and competencies that are lacking towards attaining FtF strategies are presented. The participants in this section discussed mainly the skills and competencies that are missing in the sector, or lack of knowledge, awareness or information that are insufficient, and are needed to be developed.

Developing an understanding towards sustainability and how it is linked to the needs of the sector

First of all, in the area of food production, the participants raised attention to the need to address the awareness and knowledge gaps with regard to sustainable food production. The main point made in this regard focused on the lack of knowledge and understanding about what is meant by sustainability. In this context, it was noted that a clear and common understanding of what we mean by sustainable food production is needed. Understanding of benefits and risks related to implementing sustainable food production is also critical (NMBU). Sustainable food production is often understood from a technical side. But the issue of the economic sustainability of the production is usually not touched. Hence, in the same way, sustainability is often understood only from a technical-environmental perspective without always considering the social and or economic factor (UCH). In this direction, it is of critical importance for students to be informed about issues related to sustainable production during University education (or even earlier). Another point raised was regarding students being able to make a connection between climate change and production (UCH). Besides, farmers underestimate the negative externalities related to climate change, and the ability to eliminate these is lacking (USB). Another participant, on the other hand, argued that knowledge of the relationship between the environment and the possibilities of breeding (cultivation) is also lacking (USB). Last but not least, it was stressed that there was insufficient information, knowledge and education, as well as support about the opportunities and complications about obtaining "bio" certificates (USB).

In the meantime, in the scope of all workshops, participants noted some of the lacking skills and competencies in the sector. The participants mainly focused on skills that need to be developed on the side of the teachers and students.

Need to develop the skills of teachers

It was argued that it is first of all very important for teachers to have the sufficient skills, in order to equip the students with the skills and competencies that are needed in the sector. Hence, the need to train the trainees was highlighted. The skills of teachers need to be continuously updated so that they can better identify students' needs (CIHEAM). Moreover, it is important that teachers also have the necessary practical experience and knowledge of the local agricultural political context (NMBU).

Need to develop the skills of students (and future-farmers)

On the side of the students, the lack of skills and competencies were mostly divided in two categories: The first is regarding the abilities, and the second is regarding practical skills.

Firstly, in terms of abilities, it was highlighted that students lack the ability to contextualize results (UNIBO, CIHEAM), and put their knowledge into play in different contexts and reflect on own skills and competencies (CIHEAM). Most importantly, they lack the ability to act and use the specific knowledge they gain to bring change (RUC). So, it is important to make sure that future food producers (as well as current ones) can acquire new knowledge and know how to use it, and that they become more adaptable (NMBU). Students also lack the ability to apply holistic and analytical thinking (USB), and are not able to use approaches such as life cycle assessment approach (LCA) (RUC). In addition, they fail to make good diagnoses and transmit appropriate techniques to achieve sustainable production (UCH). Hence, it was argued that if they are trained in how to approach problems they are not familiar with, they learn how to apply their knowledge and what sort of questions to ask (RUC).

In terms of practical skills, it was underlined that students lacked technological skills, whereas there is also lack of digital literacy (UCH). Besides, competencies in the fields of data analysis, economics, statistics, mathematics and financing; transversal competencies, such as entrepreneurship, leadership; and skills related to English language, marketing skills and customer communication are missing (UNIBO). Moreover, competencies such as farm resource planning and traditional knowledge validation are lacking (WHH-Calcutta). It was further noted that in technical high schools in agriculture some specific new competencies are needed to be taught, including precision agriculture, use of information systems to monitor and manage the agricultural activities as well as management of large datasets (UNIBO).

ii. Attracting and motivating students

In the scope of some of the workshops conducted, some participants stressed the importance of first motivating farmers to change, and then the necessity to focus on the things that motivate them towards this change (NMBU). If we want change to happen, it is necessary to provide motivation both economically and socially (NMBU). Towards this end, we need to bring more passion to education (CIHEAM). In other words, we need to make young people love production, to recognize food quality, to appreciate their land (CIHEAM); and then educate students so that they can immediately after education support the sector (CIHEAM).

In this regard, it was underlined that attracting and motivating students, future farmers and forestry professionals was of utmost importance. Hence, the industry must be perceived as attractive. So, it is necessary to find ways to attract students to the sector (Lund-SKOGFORSK), and to stimulate students to get interested in course contents (CIHEAM). Furthermore, providing innovative courses are important so that innovative competencies can also be provided to students in addition to the traditional skills and competencies (CIHEAM). It was noted that this is not only enabled by a new pedagogical model, but instead, a broader approach must be taken (Lund-SKOGFORSK).

In one of the workshops (Lund-SKOGFORSK), the importance of storytelling as a way to communicate with target groups was emphasized. It was noted that in order to increase the number of students applying, it is important to reach and attract those who are interested in the sector but who do not find their way to the related institutions. It was noted that, for example, the forest industry, with sustainable raw materials and the circular economy approach, has a fantastic story to tell and that this should be used in a better way. To make education and work life in the industry attractive, it is important to create a belief for the future, and showing that this sector is actually something that belongs to the future. Anyone studying in this sector should know in advance that there are summer jobs and internships and that you have a future to go out to (Lund-SKOGFORSK). Although this discussion was made in the scope of the forestry sector, the recommendation can be extended to cover all parts of the agrifood and forestry sector.

iii. Which approaches to education and training need to be adopted

Adopting the approach towards agricultural production

Adopting new approaches to education and training was emphasized by a variety of participants during the workshops. In this context, some participants noted the importance to adopt a new approach towards agricultural production, even before adopting a new approach in education and training. In order to reach a sustainable food production system, it is important to give importance to each pillar (social, economic, environmental) and not focusing or exalting only one dimension of sustainability (USB). It was noted that sustainable production is currently driven by the economy, however, more focus should be put on ecological issues (WHH-Calcutta). While the level of knowledge is relatively good in this field, what is often a problem is well-established practice and fear of change (USB). For this, we need more examples of the fact that it is possible to harmonize the economic and environmental aspects of food production and find new agroecological methods in cooperation with practice (USB).

Adopting a more holistic approach

Another suggestion towards adopting a new approach in the agrifood and forestry sector was regarding adopting a more holistic approach. The argument was that we cannot study just small part of the problem, but have to be holistic, interact with others, thus creating new professional figures, open for changes (CIHEAM). Besides, the importance of including the local needs and perspectives were also highlighted with

regard to the need of adopting a more holistic approach. It was argued that education should not only focus on knowledge transfer, but to convey as well local cultures and stories behind food (CIHEAM). Hence, all recommendations need to take the local context into account. The political situation in one country may be different than in the rest of Europe (NMBU) and it is very important to consider it when designing policies in the agrifood and forestry sector. Finally, it was noted that a holistic approach is needed in the degree courses to help the future professionals be equipped with technical innovations, that will lead them to critically contextualize results, numeric data or laboratory data in the real context of a farm or a company (UNIBO), and to be ready for work when they finish school (CIHEAM).

From traditional to more flexible forms of education

The increased focus on traditional academic approaches to education has ultimately made the collaboration between education and companies more difficult. In this regard, a policy shift to more flexible forms of education that are linked to universities but are not traditional educational programs was recommended (Lund-SKOGFORSK, CIHEAM). Static education volumes make it difficult for universities to adapt when the industry changes (Lund-SKOGFORSK). Hence, it was proposed to design more flexible education routes, and also allow people to cross disciplinary boundaries more easily (NMBU). Moreover, in some cases teachers and educators are still very traditional, resistant to changes. This must be treated as a problem and we need to have instruments to move them from the box and request them life-long learning and flexibility (CIHEAM). In the case of the forestry sector, it was noted that more flexible ways of determining the number of students should be installed to facilitate structural changes in the industry (Lund-SKOGFORSK). In addition, it was noted that prerequisites (prior knowledge requirements) exclude many potential candidates to forestry education. Hence, a change to more flexible ways to evaluate prior knowledge (Lund-SKOGFORSK) would be necessary.

New approaches to teaching and learning

In addition to the already mentioned approaches discussed, other recommendations of adopting new approaches suggested are listed below:

- Avoid “more of everything” approach (Lund-SKOGFORSK). Specific focus areas should be defined for each education course or programme, instead of trying to deal with all aspects of the sector (Lund-SKOGFORSK).
- Cross-sectoral, interdisciplinary approaches (NMBU).
- Problem-based approach (real cases to solve that would meet the needs of companies or organisations) (NMBU).
- Instruments promoting students’ active learning (NMBU).
- Change should start from childhood: If we want a change, education should be changed from primary school. Kids should have their small garden to get familiar with plants and soil from early age, we see now in time of pandemic how this connection is important (CIHEAM).
- Focusing on inductive approach rather than deductive (WHH-Calcutta).
- Experiential learning to be brought in (WHH-Calcutta).

- Cyclical education that supports creativity, innovative thinking and flexibility need to be adopted (USB).
- Transform technocentric agriculture education into system thinking orientation (WHH-Calcutta).
- The education system is too much focused on job creation, so transformation or systemic changes are not part of the outcome, in general (WHH-Calcutta).
- Compartmentalisation to be avoided as much as possible and bring in more system perspective (WHH-Calcutta).
- Drivers and dynamics of the education system is highly corporate and market dominated. The food and farm system had faced a transition from public to private and ecological challenges are already marginalised. Participation of various stakeholders has experienced dilution over the time. Such sources of challenges are not much discussed. Need to understand that perspective first, before going to F2F strategy discussions (WHH-Calcutta).

iv. How can curricula be improved towards providing necessary skills and competencies?

An important part of the discussions was directed towards how curricula can be updated in order to respond to the needs of the sector, towards equipping the students with the necessary skills and competencies. Meanwhile, the discussion regarding improvements in the scope of curricula were clustered in mainly two areas. The first concentrated on the importance of gaining practical experience through activities outside of the educational institutions, and establishing the necessary links to non-formal learning. The second topic, on the other hand, focused on the ways in which curricula can be changed towards being more dynamic, in order to meet the needs of the sector.

Gaining practical experience and the importance of extracurricular activities

It was argued that deepening theoretical knowledge and combining it with practical possibilities in their application (USB) was critical. Hence, in all levels of education, there should be increased use of practical training. Students appreciate direct connections with the actors in the field, and they would benefit significantly from the hands-on approach (CIHEAM). Hence, it is important to get students off-campus and into the reality of production to test their knowledge and tools and learn how to apply them (RUC). In this way, they can get to listen to territorial actors, to see what are the real problems, and then transfer this to educational programs (CIHEAM).

While the importance of practical experience for students in the field was highlighted, it was also noted that this is not always easy to achieve. It was noted that due to the cost of providing practical experience to students, many institutions don't do it and then pushes it to the next level, for instance trying to get businesses to take on students for practical experience. This may be good, but the education should also be practical on its own (NMBU). In this direction, a recommendation was directed towards making placements and practical market experience obligatory throughout University, not only in short periods of internships during which interns are often given trivial jobs to do, that are far from their subject (ACRCM-AFS). In this regard, another recommendation was to make sure students gain experience by working in farms. It was noted that, it is

one thing to take students out into the field for field trips, however students should ideally work in a farm for a couple of months. Participation should be very concrete. It would be good that students should document practical experience in order to get their certification for their education (NMBU).

It was also suggested, towards the goal of attaining practical experience in the field, to establish cooperation and links between universities and NGOs (ISEKI). Hence, we should explore how students can gain experience, while also allowing universities to contribute to the local community through extracurricular activities of students and faculty. It was also noted that currently there is a distrust between academia and other organizations (e.g. NGOs) regarding providing trainings. In this regard, micro credentials and open badges are high on the agenda, yet, the question is how to ensure quality (ISEKI).

Following these discussions, the participants debated on the ways in which these kinds of activities, that would provide practical experience to students, can be accredited. It was noted that the recognition of non-formal learning is implemented in a different way in different countries and different institutions, and in theory, universities can give credits for any activity the student does (ISEKI: the rest of this paragraph is also taken from the ISEKI workshop). It was, further argued that accreditation may be easier than policy changes. One recommendation was to suggest Accreditation Agency for Degree Programmes in Engineering, Informatics, Natural Sciences and Mathematics (ASIIN) to certify particular modules. It was noted that ASIIN can certify particular modules. Different universities or educational providers offer modules certified by ASIIN and a student can shop and take the modules they need. In addition, on this topic, some participants raised the question of what specific policy instruments could enable extra-curricular activities to provide credits for participating students, lifelong learners and for instructors? Several instruments were mentioned such as the fostering of projects on skills (soft skills, digital skills); ESCO as a policy instrument; and more and better cooperation among universities and external stakeholders. For instructors, it was noted that instruments are currently at the university level. All staff is evaluated every year on issues such as research record, pedagogical record, participation in scientific and management activities and student view. Hence, there is room for other things instructor does, such as extra-curricular activities.

Moreover, it was argued that currently the University degree programs are accredited by a national agency (ISEKI), and it is important to convince the accreditation agency that extra-curricular activities (for students and faculty) are included among accreditation requirements (ISEKI). At the higher education level, there may be more recognition of extra-curricular activities, but this is not the case in vocational education nor in secondary education (ISEKI). Finally, it was noted by other participants that although there are opportunities to conduct extracurricular activities on farms, what is lacking is a protocol for safety at work, hence, this should be defined by policies (CIHEAM). In addition, the example of Indonesia was also given, where students must spend 6 weeks as part of their study programmes in the field or doing local community work and that this is an integral part of the educational system (ISEKI). In the case of the forestry sector, it was noted that free standing courses can be a good way to give a forestry profile to students and professionals with education in other fields, such as

business administration or natural sciences (Lund-SKOGFORSK). In this regard, one recommendation was to make the 1-year introductory program – with free standing courses without a certain specialization – permanent, and its benefits should be clearly communicated to students and stakeholders (Lund-SKOGFORSK). It was noted that the program has been a good way to broaden the recruitment base of students.

Changing curricula to meet the needs of the sector

Meanwhile, some participants particularly focused on updating and changing the curriculums towards meeting the needs of the sector. It was noted that agriculture is a dynamic sector, schools and education system have problems to follow it. In this regard, the need to integrate different competencies to educate a new generation of sustainable agricultural operators was highlighted, by mainly focusing on the need of designing multi-disciplinary programmes (CIHEAM). Moreover, designing new educational approaches and programmes can have a positive impact on traditional courses that can be pushed to innovate (CIHEAM). Towards this end, one argument has been that on-campus-based learning is the main focus in many curricula and country contexts. Meanwhile, free standing courses and lifelong learning courses have been given lower priority or seen as compensatory activities when there have been few students on the regular programmes (Lund-SKOGFORSK). It was hence argued that be able focusing more on life-long learning, a clear policy decision must be taken. Hence, some recommendations have been made to design less rigid programmes (Lund-SKOGFORSK), in addition to short, flexible and digital courses (NMBU). The importance of distance learning and teaching was also underlined (Lund-SKOGFORSK). While the importance of distance learning became much more prominent following the pandemic, it was noted that, in the case of the forestry sector, the geographical profile of forestry education (schools and campuses are mostly based in small cities in remote areas) is a major impediment to attract groups outside the traditional base for forestry work. To increase diversity in terms of socio economics, ethnicity and gender balance, some measures should be taken. Distance learning approaches have been promising for broadened recruitment. More flexible learning approaches than rigid programmes with prerequisites, fixed semesters, limited or no work placement during the programmes were recommended as a way forward (Lund-SKOGFORSK). Moreover, the necessity of providing more free courses to students were also stressed. This would help to meet the needs of the sector (CIHEAM).

Another point towards making the curricula more innovative to meet the needs of the sector was directed to include a wide array of perspectives from different actors in designing courses. In this regard, adopting a multidisciplinary approach and a holistic view in degree courses, by enhancing dialogue and collaboration, was underlined (UNIBO). It was underlined that different commercial chambers can play an active role in the formation of university curricula (ACRCM-AFS). Meanwhile, it was noted that teachers and lecturers should design courses where they interact directly with experts and business (CIHEAM). Moreover, these kinds of interactions through courses, seminars, or other activities should be facilitated by a simplified bureaucratical process for organization (CIHEAM). Finally, integrating the perspectives of foreign institutions, that are able to provide a knowledge base from a different country context, were also underlined. It was argued that there is a need to utilize the experience and

good practices of foreign bodies. This may be done by organizing placement abroad and utilizing the people with such experiences (ACRCM-AFS). Furthermore, the importance to obtain a foreign experience was also underlined by recommending a study period abroad for all programs. It was noted that study periods taken abroad and international collaborations are very important in contributing to gain crucial skills. During these study periods abroad, students obtain international connections and contexts both in individual courses and on international trips that are part of various educational programs (Lund-SKOGFORSK).

In terms of changing the curricula to meet the needs of the sectors, some participants particularly focused on the need of including sustainability and sustainable food production in the curricula. It was noted that education should provide knowledge about sustainable living and importance of changing lifestyles; and this should start already in primary school (USB). Hence, it is also critical to link education (at the University) with the field and local reality, starting from early years of education (UCH). The education must consider the inseparable link between healthy eating and sustainable production (UCH). In order to do that, different stakeholders should be more involved in education programmes and also participate in the creation of the new curricula (CIHEAM). Concrete ideas were brought up relating to the promotion of research initiatives that examine the way in which and the extent to which higher education is integrating sustainability aspects in their study programmes and curricula. In this regard, it is important to provide knowledge about the true and comprehensible provision of information, including a list of negative impacts of current farming methods (USB), and to promote the change from conventional to sustainable production (UCH). It was also argued that having information about the baseline will enable us to set concrete targets. There are already competence frameworks for sustainable development in place and that the European Skills Agenda considers digital transition but that there is no mention to a green education plan (ISEKI). It was also mentioned that several guidelines are already in place in higher education institutions to integrate sustainability in existing programmes covering the FtF goals, but that there is a knowledge gap at the secondary education level about agriculture (ISEKI).

v. The quality of education should be increased

Other comments by participants included the need to increase the quality of education, and in order to do that, there is a need to change policies (CIHEAM). In terms of increasing the quality of contents, the importance of technical innovations was underlined. It was noted that there is a gap in providing technical innovations to students, and for this reason, when they finish school, they are not ready for work (CIHEAM). In order to achieve this, one important factor is to equip schools with the necessary infrastructures, where students have better access to modern equipment (NMBU), and this needs significant investments in new technologies, laboratories and instruments (CIHEAM). Technological update is necessary, because without the right tools students cannot be educated as needed. In addition to the necessary infrastructure changes, also more laboratory time should be included in normal courses (CIHEAM). Besides, it will be essential to get more competent at using digital learning platforms in the future. And this is also very abruptly pushed with the COVID-19 situation (NMBU). In addition, the necessity of better inclusion of research and new knowledge in the

education systems (NMBU) was also highlighted towards increasing the quality of education.

vi. Establishing and strengthening networks and collaboration between actors

In the scope of achieving the FtF objectives, the necessity of establishing networks, collaboration and dialogue between a wide series of actors and implementing a more interdisciplinary approach have been addressed by the participants in the context of all the workshops. Furthermore, this aspect was given significant importance in all the discussions. During the discussions, the topic was approached from the perspective of various actors, including the students, teachers, and the industry. Moreover, the importance of a several different kinds of collaboration between actors have been noted, including collaboration between universities and market actors, better communication and communication between ministries, creation of inter-ministry networks and entities, as well as formation of networks with all the interested actors and entities, such as ministries, chambers and universities (ACRCM-AFS), in addition to better connection throughout the entire education system and between different levels in the education tracks in agrifood production (NMBU).

Establishing collaboration to enable the link between theory and practice

One of the points was regarding the lack of links established between theory and practice, which was mainly argued to be the results of lack of dialogue and coordination between academia and other stakeholders. In this regard, one of the perspectives adopted during the discussions was from the side of the students or future professionals, while also focusing on the benefits that will have on addressing the needs of the sector. It was argued that students appreciate the relationship with the real world and this should be a driver for designing new educational programmes also because it responds to the stakeholders' needs. (CIHEAM). It was also noted that more dialogue and coordination between the academia and stakeholders is needed to better improve the education of students as future professionals, by fostering practical activities of problem solving in all the production chain until consumers, and organizing more job placement occasions could be ways to stimulate students (UNIBO). Moreover, providing more educational programs that allow practical training in companies, or more practical internships in the agricultural sector was proposed to help future professionals with the practical experience that they need to achieve (UNIBO). In the case of the forestry sector, the importance to find a balance between theory and practice was also underlined. It was noted that in recent years, a gradual "academization" of forestry education took place. To some extent, this has been beneficial in terms of critical thinking, but there is a risk that practice-based learning elements are downplayed. Hence, closer collaboration between educational bodies and industry was recommended. This included also the necessity to collaborate and communicate with entrepreneurs (Lund-SKOGFORSK), which also means thinking outside of the box and work on areas that fall outside the traditional forestry business and education; yet, this would be important to create income and jobs (Lund-SKOGFORSK).

Including businesses in the education systems

In this regard, the necessity to increase connections with enterprises (CIHEAM) was highlighted. On the side of the industry, it was noted that the collaboration between school and business is necessary to initiate a virtuous circle that will improve education and consequently improve the service and expertise provision to enterprises and, through their needs' identification continue to foster programme design with the requirements for skills update (CIHEAM). In this direction, the importance to involve stakeholders like private companies and businesses in the design of the new courses and increase the chances for traineeship were highlighted by the participants. In this regard, one idea that was put forth was "work smarter and not harder" approach (Lund-SKOGFORSK), which proposed to not burden students with more work, while also supervising students is a time-consuming task for the people in the industry. Hence, by the closer collaboration established between educational bodies and industry, emphasized by joint efforts to develop work placement and applied projects, achieving better results is possible (Lund-SKOGFORSK). It was noted that this could also lead to have access to higher availability of modern technologies during practical education activities. In doing so, there is a need to stimulate participation of enterprises, and to provide motivation for them to participate. It was hence underlined the necessity to put in place mechanisms to get enterprises more involved in education (CIHEAM). In this regard, we should favour collaboration, ask enterprises to have organigram with appropriate people to work with students, include system of awards, or to allow a higher visibility due to their engagement in education. However, at policy level, the existence of a bottleneck was also stressed, because there are not enough incentives and adequate regulations to promote traineeship and involve enterprises, both at secondary and university level of education (CIHEAM). Hence, it is critical to incentivize companies, so they cooperate with schools by providing a normative framework that does not penalize or increase the financial burden if and when they accept trainees (CIHEAM). It was proposed that enterprises' participation in education could be as well awarded in form of tax reduction, and similar measures (CIHEAM).

Integrating the views of the society into the decision-making processes in education

On the other hand, another discussion made in terms of the need to have more collaboration and dialogue between different actors of the sector was due the need to include views of the society and local communities in the education system. It was argued that academics and teachers often don't really know the farmers' world. In this regard, co-creation of knowledge is critical, meaning a method to create good connection to the local society in addressing mutual objectives (NMBU, UCH, WHH-Calcutta). It was noted that each actor needs to be put in each other's reality. Understanding each other's perspectives will affect own practices (USB). Hence these types of dialogue and working together shall be promoted. Hence, it was noted that the knowledge triangle that includes education, research and business, should be transposed into a knowledge rectangle – to also include the local society – (NMBU). This dimension would make it possible for the projects undertaken to also be relevant for the society too. One example provided was Mære landbruksskole, the transdisciplinary school where there is a good connection between different sectors (NMBU). In addition,

building further on the Erasmus+ projects was also stressed, which is able to bring different people from different sectors together.

The need to increase collaboration in policy-making

Finally, the need of collaboration was stressed with regard to preparation of innovative curricula and policy-making in the agrifood and forestry sector. In this regard, the need to have more collaboration between Universities and the policy-makers were underlined (UCH). Cooperation between DGs is necessary (ISEKI) in order to develop a competence framework for education for sustainable development, one tailored to agrifood. In addition, creating scope of network, so that stakeholders from farming community and industry are also able to participate in the pedagogic processes and curriculum development (WHH-Calcutta). Finally, it was also noted that there are many critical voices when it comes to both agriculture and forestry that one must learn to meet in a dialogue. To handle the polarized debate on issues of both agriculture and forestry, a broader competence needs to be built in these industries. In the broader education programmes, it should be encouraged to critically examine different perceptions of modern forestry and agriculture, to encourage a fruitful dialogue with actors outside these sectors (Lund-SKOGFORSK).

vii. Enabling life-long learning

One other aspect that was found to be important in the discussions was the importance of enhancing life-long learning opportunities in order to reach the FtF objectives. It was noted by some participants that life-long learning and continuous education would be very important in achieving the desired outcomes (RUC, UCH, NMBU).

Importance of life-long learning to implement sustainable practices

First of all, it was noted the need for continuing education and life-long learning in regard to sustainable practice. Many primary producers and agro professionals are educated with the start of their twenties and rely on further acquisition of knowledge through profession-specific literature and magazines (RUC). It was hence argued, although it was controversial, that there was a need for more degree of obligatory continuing education or life-long learning in regards to sustainable practice. How are we to change a society if the majority of people occupying positions are not trained to combat new types of challenges the next 40 years of their remaining time on the job market – was a question that was asked (RUC). In this context, the importance to provide knowledge on how to do and possibilities of sustainable production (USB, UCH), agroecology (USB, UCH), and promoting healthy and sustainable diets facilitating access, not just physically, but also economically was underlined (UCH).

Importance of extension services

Similarly, the importance of extension services was highlighted, in order to develop for the primary producers their future competencies. It was argued that extension services should be central to the educational system in the agrifood sector (NMBU). People often become farmers at a middle age (around 43 on average) (NMBU), so it is critical also to encourage young people to be provided with the necessary education to become professionals in the agrifood and forestry sector. Hence, it is important for them to have

a clear career path for them and that they should not have to wait until they are middle aged (NMBU).

viii. New approaches to educational policy making

On this topic, a few points were made by the participants, mainly in the area of the importance of harmonization of policies and the necessity to reduce bureaucracy.

Harmonization of policies

Firstly, with regard to harmonization of policies, it was noted that there is a lack of comprehensive policies and validation of strategies are missing in some EU countries (ISEKI). In this regard, there is a need of policy harmonization, a more systematic and integrated policy, with a better coordination amongst General Directorates (agriculture, health, education and training), in addition to quick response mechanisms and procedures (UNIBO). In addition to the need of better coordination among policy-making bodies, the need to enhance coordination among different policies was also underlined (UNIBO). Higher flexibility of expenditure of EU funds and simplification of controls were also suggested (UNIBO). Besides, the necessity to develop education and training policies in parallel to policies stimulating sustainable food production, such as those on market development or provision of incentives, was highlighted (NMBU). It was added that sustainable production needs to be included in all food and nutrition policies (CIHEAM).

Reducing bureaucracy

Secondly, the participants stressed the need of a simplification of bureaucracy in the academic context, in addition to simplification of procedures of control of European funds (UNIBO). It was noted that there is also a problem in the abundance of documents and regulations, whether at EU or national level (USB). Spreading of best or good practice examples would help with harmonization of regulations (USB).

ix. What roles can different AKIS (and other) actors play?

Some participants noted that many actors are missing in the AKIS framework, and it is built purely from a structural perspective (WHH-Calcutta), while others discussed some of the roles that different AKIS actors can play. These are addressed below:

- Students: It was underlined that more emphasis can be given to the students' role. It was noted that the concept of the AKIS model was challenged, stating the division of actors as either needing, producing or exchanging knowledge. Everybody does all and should be considered as such. Hence, the divided perception of how attaching the role of "delivering specialized knowledge" on the side of universities could be misleading. As, the people who attain the knowledge should put it into use. The candidates need to know how to utilize their knowledge, put it into play in society (RUC).
- University professors /teachers: It was noted that university professors need to teach methods of agroecological practices to students (USB). In addition, it was argued that fostering the AKIS functioning regarding advisory services is very important. Currently it is very difficult to find freelance technical advisors, and

it is the role of university professors to train future advisors to fill this gap (UNIBO). Moreover, it was noted it is teachers' role and responsibility to provide general public awareness (USB). Educators must choose the right ways of informing (individual approach to individual groups of people and their ability to understand the topic) to provide truthful information, advice and help (USB).

- Incubation centres: It was noted that incubation centres could be of importance. It has been often experienced that university students often cannot work directly in the farm, hence, an intermediary institutional hand over process is necessary (WHH-Calcutta).
- Researchers: Research into the use of waste for agriculture, zero waste agriculture and new-agroecological methods were proposed (USB).
- Ministries: It was noted that Ministry of agriculture should push the agenda to the Ministry of education towards making strategies coherent (NMBU). Moreover, it was argued that currently topics and competencies to be delivered in the high schools are defined by the Ministry of education. This is the place where changes should start and where we need revisions (CIHEAM). Moreover, it was argued that public authorities should, in close collaboration with the private sector and scientific community, develop the political framework for sustainable food production, including definition, policies, legislation and market instruments. Producers need a clear framework. It is also necessary for the authorities to convey a profitable future to producers. In other words, producers should imagine profitability, if they could change their behaviour. Otherwise, they will not be motivated to acquire new knowledge (NMBU).
- Consumers: Consumers have a key role, as the change depends on what they demand (UCH). Hence, consumer demands motivate suppliers to change (USB).

x. Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics?

In the area of gender, and gender equality, while some participants noted that there are currently no issues with regard to inequality of gender (RUC), others noted that the gender angle in agriculture education is significantly missing, and that there is a need to bring it in from scratch (WHH-Calcutta). It was also further underlined the need to include a gender perspective into the political instruments (UCH). Hence, the need to include women as a decision maker into the production, not only as a contribution for home (UCH). Furthermore, some participants proposed to have gender equality as a horizontal priority in designing of programmes (NMBU). In this regard, the importance of digital skills was highlighted, towards contributing to women entrepreneurs (UCH), and the importance of role models was also stressed (NMBU).

4.3.2 Farm to Fork Strategy 2 – Ensuring Food Security

In this section, the participants discussed which skills and competencies are needed, and which strategies needed to be followed towards achieving the FtF strategy of ensuring food security, what roles can AKIS actors play; and finally enabling gender equality towards achieving these strategies.

Table 6: Main themes and topics discussed as part of FtF Strategy 2 – Ensuring Food Security

Main themes addressed	Main topics addressed under each theme
Skills and competencies needed to attain the FtF strategy objectives	Importance to attain knowledge about climate change adaptation and risk prevention measures in education, in addition to standards and norms Knowledge of processing technologies, storage and distribution Need to attain skills in interdisciplinary work, national and global policy analysis, and thinking in a holistic way, and problem solving in all the production chain until consumers
Which new approaches to education and training need to be adopted	Importance of a multidisciplinary, multisectoral and mixed approach to policy making in food production and health towards food security Research that is not short-term, and which has complexity and that involves different professions Public awareness on the topic through educating of consumers Supporting local farmers, through local food networks and awareness raising towards local food Improving curriculums – by making connections between different disciplines
What roles can AKIS (and other) actors plays	AKIS actors have to learn to work together in this field Public sector needs to coordinate more; and prohibition or sanctioning unhealthy food should be considered More emphasis should be placed on role of consumers Teachers, responsible for public awareness Industry needs to motivate entrepreneurs to hire students

	Researchers and policy analysts to be part of educational courses
Gender equality	The importance to bring gender equality in educational policy-making; opportunities for women to have a political role in food production and consumption

i. Which skills and competencies are needed to attain the FtF Strategy objectives

In the area of sustainable food security, it was noted that there is a need to acquire, first of all, knowledge about some important concepts. First of all, knowledge about the concept of food security (UCH) and nutrition security (WHH-Calcutta), and internalizing the concept and what it means for the work of professionals are of utmost importance (UCH). It was argued that more than talking about food security, we should talk about food sovereignty, and how to involve the people in political decisions (UCH, WHH-Calcutta). Besides, the need to add the ethical dimension to food production and nutrition was highlighted (UCH), in addition to the need to consider healthy eating as a human right (UCH). The importance of attaining knowledge about climate change adaptation and risk prevention measures in education (NMBU), in addition to standards and norms (USB) were also underlined. Meanwhile, on the technical side, knowledge of processing technologies and their influence on the behaviour of food in different temperature conditions of storage (microbial and technological stability) and distribution (USB) was stressed.

Apart from the proposition to gain more knowledge about these matters, some suggestions were made regarding attaining some abilities. It was noted that ability to conduct interdisciplinary work (UCH), national and global policy analysis (WHH-Calcutta), and thinking in a holistic way (UNIBO) were necessary. Besides, more practical activities of problem solving in all the production chain until consumers (UNIBO) was suggested. Finally, the importance of abilities to produce food while reducing residues of pesticides, drugs and other substances used in primary production and especially in processing (USB) was stressed.

ii. Strategies and recommendations for improvement

The participants focused on a few topics regarding recommendations for improvement for ensuring food security. One of the major points was regarding the importance of a multidisciplinary, multi-sectoral and mixed approach to policy making in food production and health towards food security (UCH, WHH-Calcutta). Hence, the need to focus more on interdisciplinary work teams was underlined. In a similar way, the importance of more dialogue between academia and other stakeholders (UNIBO), and greater connection between science and practice (USB) were underlined.

Another point was regarding the need to conduct and support research on this subject (UCH). Kind of research that is not short-term, and which has complexity and that

involves different professions was proposed (UCH). Furthermore, research to find new agroecological methods in cooperation with practice was suggested (USB).

Another discussion on policy was directed more to the public awareness on the topic, and towards supporting local farmers. Policies were proposed to support farmers, and especially small farmers, and also to introduce policies that promote production for self-consumption (UCH). Besides, policies to raise awareness among consumers and towards changing the behaviour of consumers were proposed. It was argued that the change in consumer demand is an important factor. Attitudes of consumers depend on permanent education at school and public awareness. Education and upbringing can raise public awareness, and should emphasize environmental aspects. The consumers' knowledge and their interest in paying for better and healthier food put pressure on supermarkets not to artificially or disproportionately increase the price of better-quality products (e.g. bioproducts) (USB).

Finally, on the side of the curriculum and teaching, it was emphasized that at high schools, focusing on study programmes in nature, restaurant management and food (NMBU), and at the level of vocational education, teaching about the possibilities of sustainable production (USB) would be useful. Brining policy analysis and policy history as a tool or topic in undergraduate or post graduate courses (WHH-Calcutta) was proposed. Meanwhile, practical examples and the possibility of first-hand experience of individual processing methods and their impact on the "behaviour" of food could also be included in education (USB). Also, establishing better connection between various disciplines (NMBU) was proposed. In addition, access to shorter education tracks to top off the competence people already have within food, and especially local food was highlighted (NMBU). It was also proposed that in order to secure funds for education in this field, enterprises can invest in schools, in form of instruments and technical support to lecturers. In this way, they support formation of their future resources. For this we need regional and country support, strategies and investments (CIHEAM).

iii. What roles the AKIS actors play?

- It was argued that all AKIS actors have to learn to work together in this field (UCH).
- Public sector: It was argued the public sector lacks the willingness to coordinate, thus more coordination from the public sector was proposed (UCH). Furthermore, prohibition or sanctioning of unhealthy foods (similar pressure as with alcohol and tobacco) was proposed as a role of the government and the parliament (USB).
- Consumers: It was proposed to place more emphasis on the role of consumers (UCH).
- Teachers: Public awareness raising was expected by teachers (USB)
- Industry: Motivating entrepreneurs to hire students, and greater emphasis on the possibility of working in the manufacturing sector (USB).

- Researchers and policy analysts – to be part of educational courses (WHH-Calcutta).

iv. Which skills and competencies and policy instruments needed to contribute to gender equality?

Women are heavily impacted by food insecurity in global south. While, this topic is part of gender studies, it is still not part of agriculture education (WHH-Calcutta). Besides, still the tasks are not shared between men and women. There must be an education towards the need to share the tasks. There is a lack of evidence that reinforces the role of gender in the part of food security. Accompanied by organizations in which there is participation of women, women need a political role in the production and consumption of food. Hence, opening that opportunity in public policy is crucial (UCH). Moreover, while providing opportunities for women to have a political role in food production and consumption, it is also important to provide tools to men on how to feed their families, considering cooking and/or nutritional aspects, not only financially speaking (UCH).

4.3.3 Farm to Fork Strategy 3 – Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices

In this section, the participants discussed which skills and competencies are needed, and which strategies needed to be followed towards achieving the FtF strategy of stimulating sustainable food processing, wholesale, retail, hospitality and food services practices. In addition, the participants discussed what roles can AKIS actors play; and how gender equality can be enabled towards achieving these strategies.

Table 7: Main themes and topics discussed as part of FtF Strategy 3 – Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices

Main themes addressed	Main topics addressed under each theme
Skills and competencies needed to attain the FtF strategy objectives	Enhancing students' knowledge of food processing and marketing The need to enhance knowledge in the area of sustainable food consumption and awareness about shifting to healthy and sustainable diets Increasing skills in digital literacy; this would also have an impact on small producers who want to add value to their products Enhancing skills professionally trained staff at all levels involved in catering services
Policies towards enabling sustainability in the sector	A holistic understanding and system perspective in food processing and marketing will make future actors more sensitive towards sustainability The importance of local food practices for achieving the FtF strategies and sustainability outcomes
Strategies for improving education and training policies – focusing on improvement of curriculums	Integrating sustainability into the sector and the educational path Everybody working with food to be obliged to have a profession specific sustainability course or certificate to be renewed within given intervals Need for lifelong learning, continuous learning, post-education to be mandatory to a larger extent Increasing the contribution of practical work in educational activities Advocacy for opening up courses that provide knowledge on critical thinking, problem solving, and entrepreneurship Introducing the concept of apprenticeship
What roles can AKIS (and other) actors plays	Consumers play a fundamental role to drive the demand Policy-makers shall promote certification of companies that make a responsible marketing Industry has an ethical "conduct code" role and to adopt a corporate social responsibility

	Businesses should also require certain standards of sustainability practice certification prior to buying a service (e.g. a catering scheme)
Gender equality	Gender equality and gender sensitive and neutral value chain should be integrated into the curriculum starting from a much lower grade in the education system

i. Which skills and competencies are needed to attain the FtF Strategy objectives

With regard to the FtF strategy of stimulating sustainable food processing, wholesale, retail, hospitality and food services practices, participants mentioned some lacking knowledge among actors of the sector that needs to be enhanced, and also some skills and competencies that need to be attained. It was noted that students' knowledge of food processing and marketing is very poor (UCH). Meanwhile, in commercialization, it is highly biased towards exports (UCH). Hence, better education at the University about food processing and marketing is needed, and not only focusing on exports (UCH). On the other hand, the knowledge about small farmers can be enhanced. They are the ones, along with old individuals (consumers) who are affected the most (UCH). Besides, the large companies are profitable because of the large volumes they produce, so it is important to teach the small producers about how to add value to their products (UCH). In addition, revaluating the idea of small entrepreneurs (and not only small producers) is important, and something that is needed to be part of education (UCH). Finally, the need to enhance knowledge in the area of sustainable food consumption and awareness about shifting to healthy and sustainable diets were underlined (USB). It was noted that there is a lack of knowledge and willingness to know the ecological footprint of individual technological processes. Creating a form of visualization of the "ecological footprint of production and distribution" displayed on the product was proposed (USB).

On the side of skills, competencies and abilities that needed to be attained, the importance of digital skills was noted (UCH, UNIBO). Especially, as a result of the pandemic, the importance of digital skills even increased. The use of digital tools to market products is important. They will depend on intermediaries who manage social networks. There is a vicious cycle of digital literacy, affecting small producers who want to add value to their products. It is also important for older adults who do not have access to food, but as consumers do not have those tools (UCH). In addition, some participants noted that students lack the ability to put professional knowledge into a larger context amongst vocational gastronomy students. They also lack the ability to see their own profession and position in the context of sustainable food production (RUC). Besides, it was noted that professionals who are experienced in the area of nutrition are important in the sector, however, increasingly professionals that have knowhow on climate-environment and resources are demanded (RUC). Finally, more practical activities of problem solving in all the production chain until consumers was proposed, in addition to skills in language, and marketing skills and customer

communication (UNIBO). It was also argued that there is a lack of professionally trained staff at all levels involved in catering services (USB); hence skills were needed in the area of value chain operation, especially which is suitable for small-scale farmers; sustainable business standards for food processing and food vendors; and holistic understanding of value chain from production to consumption (WHH-Calcutta).

ii. Strategies and recommendations for improvement

In this section, the discussions concentrated on three main themes, namely, the participants first discussed some approaches that should be adopted in order to attain the FtF objectives; then participants proposed strategies to improve the education and training policies in this topic, which mainly focused on integrating the concept of sustainability into education, and updating and improving of the curricula. Finally, participants proposed some more general strategies in order to meet the needs of the sector.

First of all, participants made comments and proposed approaches that should be adopted towards enabling sustainable food processing, wholesale, retail, hospitality and food services practices in the agrifood and forestry sector. It was argued that a holistic understanding and system perspective in food processing and marketing will make future actors more sensitive towards sustainability (WHH-Calcutta). This holistic approach could also lead to addressing the entire value chain and will help understanding key issues and struggles of all stakeholders involved (WHH-Calcutta). In this context, the importance of emphasizing both environmental and economic benefits of this process was underlined (USB). Besides, the importance of local food practices was also underlined towards achieving the FtF strategies and sustainability outcomes. In this regard, it was argued that strengthening local distribution channels and shortening marketing chains were critical, in order to eliminate the middlemen in distribution of food and hence to support local farmers and to enable them to add value to their production (UCH). Hence, valuing local food markets as providers of healthy food (UCH) was highlighted.

Secondly, participants proposed strategies in terms of improving education and training policies, and to update or change curricula towards achieving the desired outcomes. The first point in this regard focused on integrating sustainability into the sector and the educational path. A participant argued that sustainability is not currently a large part of vocational gastro education, and that it could be emphasized stronger in the educational executive orders from the ministry (RUC). Another participant also concurred with sustainability being more of a means than a target at the moment and that this should change; however, emphasizing that gastro candidates should not become experts in sustainability- more that sustainability should resemble hygiene - deeply intertwined in all processes of the operations (RUC). Another participant also agreed that sustainable practices should be sufficiently included in the education, further noting that employers need to demand candidates with such competencies, as the sector is very demand driver (RUC). Towards a similar direction, one participant proposed to provide promotions to companies that do sustainable practices and services (UCH). Another participant compared this issue with mandatory certificates in the transportation sector to be

renewed within given intervals and points to the need for politically decided measures in this area – everybody working with food should be obliged to have a profession specific sustainability course or certificate to be renewed within given intervals (RUC). Another point that was made was regarding these kinds of courses, including those focusing on sustainability practices, being demand driven; hence without strong demand for courses in sustainable practices, it was noted that classes are not filled and courses are not held. For this reason, the need for lifelong learning, continuous learning, post-education to be mandatory to a larger extent was pointed out, or nudged more than it is today. Currently it is optional and many are not taking the time although they have the right of a certain number of days of post-education (RUC).

Another topic that was proposed to be integrated into the curricula was local food markets and associated impacts. It was proposed to introduce the concept of local food markets, local distribution channels and the importance of shortening value chains in the agri-food system in the University curricula (UCH). It was argued that local food markets are an entity that must be valued and take advantage of the conclusions of the COVID-19, that retail markets have a role as providers of healthy food. Hence, it is critical to introduce it into student curriculum.

Meanwhile, other participants have proposed changes and additions to the curriculum as follows:

- It was proposed increase the contribution of practical work in educational activities, which could thus contribute later on to sustainability (CIHEAM). It was argued that technical (practical) education is currently not sufficient in number of hours; hence, countries do not invest enough to practical education, thus our practical education can be indicated as fragile (CIHEAM). This was also consistent with another point made regarding education policy currently being too focused on university education and high expertise; hence, more focus on practice and training of field workers (e.g. chefs) was proposed (USB).
- For basic education (and general consumer awareness), it is important to know what ecological footprint individual technological procedures have. Hence, creating a form of visualization of the "ecological footprint of production and distribution" displayed on the product was underlined (USB).
- At the level of vocational education, teaching about the options of production of nutritionally valuable products and their distribution with a minimal "ecological footprint" was proposed (USB).
- Advocacy for opening up courses from knowledge providing to critical thinking and problem solving was proposed (WHH-Calcutta). Besides, it was argued that courses should also focus on entrepreneurship development with specific focus on food entrepreneurs (WHH-Calcutta). Creating situations where student's innovation can be encouraged further is proposed (WHH-Calcutta).
- Introducing the concept of apprenticeship was highlighted (WHH-Calcutta). Besides it as added that it is important to raise the attractiveness of the field of catering services, and preparing a new generation equipped with the necessary skills, by focusing on secondary and apprenticeship education (USB).

- Meanwhile, another proposed strategy was utilization of the potential of a very developed system of school canteens for education about healthy eating and lifestyle (USB).
- Besides, the importance of Incubation centres and the involvement of students in these centres were noted (WHH-Calcutta).
- Meanwhile, some participants commented on the importance of face-to-face interactions as opposed to online teaching and learning. A participant pointed to the need for the certifications/courses to be rooted in person as opposed to online, in order to strengthen the capacity to engage people in discussion regarding sustainability (RUC). “One thing is to have a course, another thing is getting people to act -this requires engagement” (RUC). Another participant concurred with certification idea and points out that training and education are often better accepted when done on-site in the company/organization, however this can be a costly method for the vocational schools (RUC).
- Another participant, meanwhile, proposed practically and manually oriented supplementary teaching at elementary and primary school (USB).

In addition to updates and improvements in curricula, studying the preservation of nutritional values and, in cooperation with practice, new agroecological methods of production, packaging and distribution was proposed to be conducted as part of research activities (USB).

Apart from education and training policies, some more general strategies were proposed to meet the needs of the sector. These can be summarized as follows:

- Some participants proposed ways to sanction some activities, or to provide incentives to those who conduct sustainable practices. In this regard, reduction of waste from the processing of agricultural products and food was proposed (USB), and providing promotion to companies that do sustainable practices and services (UCH). On the other hand, a participant noted that a radical solution may be to ban or sanction unhealthy foods (similar pressure as with alcohol and tobacco).
- At a general level, however, some participants noted that the main factor that will shift the sector would come from consumer demand. A participant underlined that a change in the lifestyle of consumers is necessary for long-term change. Their demand will fundamentally affect retail chains in the supply of sustainable food. In this regard, some proposed strategies included: Wide distribution of the knowledge of nutrition and the importance of individual nutrients and the recommended daily intakes was proposed (USB); and the use of a developed school canteen system for education on healthy eating and lifestyle (USB). This is helped by practically and manually oriented supplementary teaching at elementary and primary school.
- Meanwhile, more dialogue between academia and stakeholders; and organizing more job placements occasions; integration among information platforms (UNIBO) were proposed. Deepening the cooperation with entrepreneurs (USB),

in addition to stakeholders from industry and market network (WHH-Calcutta) were also underlined.

- Furthermore, the importance of creating a greater connection between science and practice and to share good practice was addressed, which will motivate entrepreneurs to cooperate with research. To support sustainability, it is important to study the preservation of nutritional values and, in cooperation with practice, to introduce new agroecological methods of production, packaging and distribution, further analyse the composition of waste from the processing of agricultural products and food production and promote the possibilities of its further use. Reduction of waste from the processing of agricultural products and food. (USB)
- Finally, creating scope to include indigenous knowledge in food processing and value chain operation was proposed (WHH-Calcutta).

iii. What roles the AKIS actors play?

In terms of roles that AKIS actors can play, the following were proposed by the participants:

- It was argued that consumers play a fundamental role, on especially what they demand (UCH).
- The role of policy-makers was proposed to be: (UCH) Promoting certification of companies that make a responsible marketing. (UCH); and promoting and enforcing codes of conduct and corporate social responsibility (UCH). Besides, motivating entrepreneurs to cooperate with research (USB), and prohibition or sanctioning of unhealthy foods (similar pressure as with alcohol and tobacco) (USB) were mentioned as roles of policy-makers in this field.
- Moreover, the industry was argued to have an ethical "conduct code" role and to adopt a corporate social responsibility (UCH). Meanwhile, it was mentioned by one of the participants, the possibility of a corporate driven regulatory framework like e.g. Global Gap in terms of lifelong learning, continuous learning, post-education or sustainable practice certificates that could be implemented by companies. In this way, the focus is shifted away from national regulation, which is unattractive for many people. Perhaps combined with a larger degree of on-site company education, it would feel like less of a state intervention, historically known to discourage the more conservative target group – less prone to change. Schemes such as Global Gap are already in process in many places and perhaps the education of staff could be included in an easy way (applicable both for agro and gastro education) (RUC). Meanwhile, another participant emphasized the role that organizations, corporations or institutions have regarding requiring certain standards of sustainability practice certification prior to buying a service (e.g. a catering scheme) (RUC). This would be demand driven procurement practice and is already evident amongst some of the large retail and hospitality chains in terms of sustainability measures and certification schemes because they can see the market moving in this direction (RUC).

iv. Which skills and competencies and policy instruments needed to contribute to gender equality?

It was argued that gender sensitive and gender-neutral value chain will be a new topic, which should be actually be taken from much lower grade in education system (WHH-Calcutta). Meanwhile, one participant mentioned equal representation on the admittance and completion of vocational gastro education but overrepresentation of men in the professional gastro business due to long and weekend-based workhours incompatible with current social division of work at home. Reports that female candidates tend to be moving to more meal-oriented professions such as public institutions and food service (RUC). Another participant also concurred that recruiting male candidates are a challenge for the organization part. Primarily due to the overrepresentation of females amongst nutritional candidates (RUC).

4.3.4 Farm to Fork Strategy 4 – Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets

In this section, the participants discussed which skills and competencies are needed, and which strategies needed to be followed towards achieving the FtF strategy of ensuring food security, what roles can AKIS actors play; and finally enabling gender equality towards achieving these strategies.

Table 8: Main themes and topics discussed as part of FtF Strategy 4 – Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets

Main themes addressed	Main topics addressed under each theme
Skills and competencies needed to attain the FtF strategy objectives	The ability to distinguish sustainable and healthy food; understanding the relation between food, nutrition and diet diversity Capacity and ability to work with local communities and territories, and local food organizations; communication skills in order to be able to empower consumers regarding this topic Digital skills, marketing skills and knowledge of English language Multidisciplinary approaches, and the skill to be able to work with different professions were also highlighted
Strategies towards increasing awareness and knowledge	Society-wide awareness raising on consumption patterns, and their cultural aspects, as well as knowledge of nutrition and the importance of individual nutrients and the recommendation of daily intakes

Main themes addressed	Main topics addressed under each theme
Changing of policies for enabling access to more sustainable and healthy products	The right to healthy and sustainable food to be put into the constitutions Restricting business with unsuitably processed products, in addition to limitations of aggressive advertising and offers, especially for children Funds to be provided by the government to buy sustainable and healthy food at schools
Enabling collaboration and dialogue among stakeholders to enable such changes	More dialogue between academia and stakeholders Greater integration of science with practice and sharing of good practices
Policies related to changing and improving the curricula in educational institutions towards equipping the students with better knowledge and skills in the area of sustainable consumption and diets	Integrating this topic in the schools' curriculum; awareness about healthy diet and nutrition to be incorporated in education, from early on in school At the level of vocational education, teaching about the options of production of nutritionally valuable products and their distribution with a minimal "ecological footprint" Courses for food entrepreneurs; and to involve small businesses as cases for study; and the importance of multi-disciplinary approach and attaining practical skills
What roles can AKIS (and other) actors play	Importance of empowering consumers
Gender equality	The need to make this topic gender-neutral

i. Which skills and competencies are needed to attain the FtF Strategy objectives

Towards achieving sustainable food consumption and facilitating shift to healthy and sustainable diets, some necessary skills that need to be attained were underlined by the participants. These can be listed as follows:

- The ability to distinguish sustainable and healthy food (USB). In other words, before everything, knowledge and awareness about sustainable and healthy food was proposed by the participants. In a similar way, it was noted that understanding the relation between food, nutrition and diet diversity was critical (WHH-Calcutta).
- Then, a skill that was seen to be important in this area was to have communication skills in order to be able to empower consumers regarding this topic (UCH). In this way consumers could also be informed, and be motivated and empowered to change habits and lifestyles towards sustainable solutions.

- Another know how that was seen as necessary was the capacity and ability to work with local communities and territories (UCH), as local food and local food organizations were regarded as critical in obtaining sustainable and healthy diets, in addition to empowering local farmers and ethical food purchases.
- Digital skills were underlined to be important also, especially in terms of being able to carry out organizational tasks in the sector through digital platforms (UCH).
- Multidisciplinary approaches, and the skill to be able to work with different professions were also highlighted (UCH).
- The skills to conduct nutrition sensitive agriculture (WHH-Calcutta) was proposed.
- Finally, marketing skills and ability of customer communication and knowledge of English language were underlined (USB, UNIBO).

ii. Strategies and recommendations for improvement

In this section, the discussions could be grouped into four main categories: First, recommendations and strategies towards increasing the awareness and knowledge, as well as opportunities among the public towards accessing more sustainable and healthy products; and second, changing of policies to allow this; thirdly, the importance of collaboration and dialogue to enable such changes, and fourthly, policies related to changing and improving the curriculums in educational institutions towards equipping the students with better knowledge and skills in the area of sustainable consumption and diets.

In the first category, regarding allowing the populations to be more aware and also have easier access to sustainable and healthy products and diets, the recommendations proposed were as follows:

- First of all, the ways of conducting agriculture and the mindset and approach should be changed, before making other changes in the society and in curricula. It was noted that taking agriculture out of its productivity regime to more sustainable and nutrition focused paradigm was of utmost importance (WHH-Calcutta).
- Following the changes in the way of doing things, then the awareness and knowledge shall be distributed to the public. It is a society-wide process. Promoting sustainable food consumption and facilitating the shift to healthy and sustainable diets is critical (USB, UCH). The awareness should be raised society-wide on consumption patterns (WHH-Calcutta), and their cultural aspects (UCH), as well as knowledge of nutrition and the importance of individual nutrients and the recommendation of daily intakes (USB). The ability to distinguish sustainable and healthy foods at all levels (producers, control, and especially consumers) plays an important role (USB). In this regard, promoting local agriculture is also important (UCH).

- Besides, it was argued that there is a lot of research about selection of varieties of vegetables based on resistance to drought or diseases, but not based on their nutritional value (UCH). Hence, dissemination of information in this matter was suggested. Promoting "simple" solutions was also proposed – the needs of metabolism, the contribution of individual foods to the development of the organism at different stages of life, and physical and mental stress (USB). In addition, using, for example, social networks to focus on different groups of the population and acquaint them with the physiological process during metabolism and the ways in which they can positively influence this process towards better health (USB).

Participants also underlined the related policies that could be imposed, towards increasing awareness and level of knowledge among the society, as well as to enable the shift toward more sustainable and healthy diets:

- First of all, it was proposed to include the right to healthy and sustainable food into the constitution (UCH). It was also noted that there is no mention of sustainable diets in the national food and nutrition policy (UCH), however, there are threads that could be applied that go along the lines of sustainable diets.
- The importance of policies about the right to know what our food actually contains and its traceability was underlined (UCH) (e.g. transgenic products). Labelling law in Chile was proposed as an example; however, the question of what does a person with a low socioeconomic income can do, and someone who does not have time to access food market with healthier food? The use of food guides was also suggested, that include information on sustainable diets, local production, maintaining and providing biodiversity in countries (UCH). In this context, the importance to establish links to the local aspect was particularly underlined.
- Restricting business with unsuitably processed products (USB), in addition to limitations of aggressive advertising and offers, especially for children was also noted (USB).
- It was proposed that funds should be provided by the government to buy sustainable and healthy food at schools. It was argued that this could also support local economies, and could generate a major change by making only a small modification (UCH).
- The importance of defining spaces available to conduct these activities was also highlighted (USB).
- Finally, it was noted that schools can be the bodies, which can inform the public on these aspects. It was noted that schools should become better at communicating their key competence from their activities to the public. Avoiding that the usual public speakers dominate the "truth" (NMBU).

The third point of discussion on this topic was with regard to the importance to increase collaboration and dialogue among stakeholders. More dialogue between academia and stakeholders was proposed (USB); and organizing more job placements occasions (USB). Greater integration of science with practice and sharing of good practices was

also underlined (USB). An example of a possible collaboration opportunity was given with regard to the recognition of farmers and food producers for working with scientists and teaching other farmers and food producers (through demonstration farms, etc.) (USB). It was also proposed to finding an answer to the question of why, for example, nutrition therapists or university-educated people in a similar field do not participate more in activities towards eating together (USB).

Finally, the necessity to change or update the curriculum was a topic that was discussed among the participants. The points of discussion were as follows:

- Integrating this topic in the schools' curriculum was proposed in all workshops. It was argued that the role of the State is critical in this area, to influence the curriculum of Universities (UCH).
- Awareness about healthy diet and nutrition to be incorporated in education, from early on in school (WHH-Calcutta). It was also noted that transferring these values to kids as well as scholars, could increase parents' connection to school (CIHEAM), in addition to enable dissemination of knowledge.
- At high schools, strengthening of recruitment of studies focused on nature exploitation (farming, fishing, forestry etc.), and increasing the general knowledge within this area, and its link to sustainability was noted (NMBU).
- At the level of vocational education, teaching about the options of production of nutritionally valuable products and their distribution with a minimal "ecological footprint" was stressed (USB).
- In research, studying the preservation of nutritional values and, in cooperation with practice, new agroecological methods of production, packaging and distribution (USB) was underlined. Moreover, the importance of studying and researching the consumption behaviour was also stressed (WHH-Calcutta).
- Furthermore, courses for food entrepreneurs, and to involve small businesses as cases for study (WHH-Calcutta). Besides, underlining the importance of a multi-disciplinary approach, practical work that forces students to relate to other professions (e.g. agronomist with nutritionist) (UCH) was proposed. It was stressed that it is important to not only focus on production of food, but place bigger emphasis on how the produced food can feed the population (UCH). In this regard, establishing the link between agriculture and nutrition in the educational courses was proposed (WHH-Calcutta).
- In terms of lifelong learning, focusing on supporting the education of regular workers working in the operation and practice was stressed (USB).
- Finally, utilization of the potential of a very developed system of school canteens for education about healthy eating and lifestyle was put forth (USB).

iii. What roles the AKIS actors play?

In this regard, the importance of empowering consumers in the topic was underlined.

iv. Which skills and competencies and policy instruments needed to contribute to gender equality?

It was argued that this topic has high relevance and often linked to women; hence, the challenge is to make it more gender neutral (WHH-Calcutta).

4.3.5 Farm to Fork Strategy 5 – Reducing food loss

In this section, the participants discussed which skills and competencies are needed, and which strategies needed to be followed towards achieving the FtF strategy of reducing food loss, in addition to what roles can AKIS actors play.

Table 9: Main themes and topics discussed as part of FtF Strategy 5 – Reducing food loss

Main themes addressed	Main topics addressed under each theme
Skills and competencies needed to attain the FtF strategy objectives	Raising awareness on the issue in all parts of the society Raising skills and abilities on how to utilize waste, or rather raising knowledge of how to handle ingredients and semi-finished products so that they do not become waste Developing skills on social and technical innovation, such as to develop in students, the ability to add value to the different vegetable parts
Strategies for improvement of educational policies – focusing on the improvement of curricula	Courses focusing on circular strategies and sustainability Education of the general public about the shopping behaviour and preferences Teaching to use more parts of the food, and conditions and possibilities of donating unused food, as part of students' education Reinforcing short value chains, local markets and production for self-consumption in curricula
Enhancing research on the topic	Research on local procurement, storage and distribution; study of consumption behaviour; food grabbing in crises context (e.g. COVID-19); production technologies with minimal waste; using available methods and connecting them with the possibilities of social networks; support of zero waste technologies
Policies and laws to be enacted on this topic	Law for supermarkets to donate their waste Establishing of food banks Policies on best-before standards, and use-by dates Review of food storage and distribution policies
What roles can AKIS (and other) actors play	Public, - consumers – to shift their shopping behaviour and preferences All ministries to take responsibility in this field

Main themes addressed	Main topics addressed under each theme
	Researchers to research into the use of waste for agriculture, zero waste agriculture and new agroecological methods It is important to give a role to small and medium-sized enterprises: Focusing on "producers - wasters" awareness through waste disposal companies Teachers to have a role of raising the awareness in the general public (awareness that "everyone matters") University professors to teach methods of agroecological practices

i. Which skills and competencies are needed to attain the FtF Strategy objectives

In the area of reducing food loss, the knowledge and awareness that need to be attained by the actors of the sector was underlined, in addition to some necessary skills that need to be attained. These can be listed as follows:

- The topic was argued to be a very invisible theme (UCH, USB), and it is something that has to be addressed. In this regard, raising of awareness and dissemination of information in this area was underlined. It was noted that students and professionals do not consider how much is lost from the food that is produced and marketed (UCH). Knowledge about the issue: to really know how much is lost (from the production until market – including farmers' waste, domestic waste, hotels, supermarkets etc.) (UCH) need to be acquired. In addition, knowledge of how much I can save if I do not waste food – not only in my own wallet, but in relation to the environment (food waste disposal), information on the usability of food waste for one's own household, knowledge about the production and the economy of the whole chain from production through manufacture and use in nutrition (USB) should be acquired. Hence, this should be a knowledge that should be acquired by the actors of the sector. It was underlined that now there is an international day to combat this issue; hence dissemination of information is critical (UCH).
- In terms of skills and abilities, utilization of "waste", or rather the knowledge of how to handle ingredients and semi-finished products so that they do not become waste was stressed (USB). In the case of production, this includes, for example, bad batches, non-completion of the production process, or poor quality or unsaleable products (USB). Besides, the importance of skills on social and technical innovation, such as to develop in students, the ability to add value to the different vegetable parts (UCH) was highlighted.

ii. Strategies and recommendations for improvement

In this section, the discussions focused in three main areas: One, the change of curricula in education, second, the topics to be studied in terms of research, and finally policies and laws to be enacted in this area.

Firstly, the importance of providing information and training at all levels, in different contexts and opportunities (UC), in addition to incorporating the subject into University curricula (WHH-Calcutta) were underlined. In this regard, some examples were given regarding the topics to be studied as part of curricula. These included:

- Higher education: Courses focusing on circular strategies and resource exploitation (NMBU) should be thought in schools, in addition to sustainability and courses focused on nature exploitation (farming, fishing, forestry etc.) in order to increase the general knowledge within this area.
- Reinforcing short value chains, local markets and production for self-consumption in curricula (UCH).
- Teaching to use more parts of food as part of students' education (UCH).
- Education in the possibilities and conditions of donating unused food (USB).
- Education among diners and general public about shopping behaviour and preferences, and involvement of teachers, managers of catering facilities were stressed (USB).

Secondly, research was proposed to be conducted in the following areas:

- Focusing of local procurement, storage and distribution (WHH-Calcutta)
- Study of consumption behaviour (WHH-Calcutta)
- Food grabbing in crises context (e.g. COVID-19 situation) (UCH, WHH-Calcutta)
- Production technologies with minimal waste (USB)
- Using of available methods and connecting them with the possibilities of social networks (USB)
- Support of zero waste technologies (USB)

Finally, some policies and laws were proposed by participant as part of discussions. These included:

- Law for supermarkets to donate their waste (e.g. Food banks) (UCH) was proposed (USB). It was discussed that in the case of restaurants, it is the early preparation of food that must be discarded after a certain period of time. Or unused ingredients. The problem is the complex system of giving opportunities to the ones in need. Currently, it is better for restaurants to throw it all away and pay a fine. It is necessary to motivate employees in the possibilities and conditions of donating unused food. Hence, the importance of clarification of

conditions for food donation from restaurants and production facilities (USB) was highlighted.

- Establishing of food banks (UCH).
- Policies on best-before standards, and use-by dates (USB)
- Introducing pressures on the responsibility of individual employees (USB)
- Policies about how to recover food from local markets in a freely and safely way (WHH-Calcutta).
- Review of food storage and distribution policies (WHH-Calcutta).

iii. What roles the AKIS actors play?

- It is important to give a role to small and medium-sized enterprises: Focusing on "producers - wasters" awareness through waste disposal companies (USB).
- Teachers to have a role of raising the awareness in the general public (awareness that "everyone matters") (USB).
- University professors to teach methods of agroecological practices (South Bohemia).
- Researchers to research into the use of waste for agriculture, zero waste agriculture and new agroecological methods (USB).
- Ministries, including Ministry of Agriculture, Ministry of Education, Youth and Sports, Ministry of the Environment to take responsibility in this field (USB)
- Public, - consumers – to shift their shopping behaviour and preferences (USB)

4.3.6 Farm to Fork Strategy 6 – Combatting food fraud

In this section, the participants discussed which skills and competencies are needed, and which strategies needed to be followed towards achieving the FtF strategy of combatting food fraud; in addition to what roles can AKIS actors play, and finally how to enable gender equality towards achieving the FtF strategy of combatting food fraud.

Table 10: Main themes and topics discussed as part of FtF Strategy 6 – Combatting Food Fraud

Main themes addressed	Main topics addressed under each theme
Skills and competencies needed to attain the FtF strategy objectives	Raising the awareness of consumers on safe food and composition of food Raising the awareness among those who is educated to handle food Policies for shortening food chains

Main themes addressed	Main topics addressed under each theme
Strategies for improvement of educational policies	Harsher punishment for food fraud Standardizing food processing Improving curricula – towards providing ethics and morality as part of upbringing and education; courses on food safety standards, and tools and measures to identify food fraud; and inclusion of stakeholders from industry in the design of the curriculum
What roles can AKIS (and other) actors play	Influencing retailers to focus more on food quality and not primarily on pricing policy Parliament to enact laws in this area Government for the application of laws and sanctions against cheaters
Gender equality	The importance to bring gender equality in educational policy-making; women's role and knowledge to be acknowledged.

i. Which skills and competencies are needed to attain the FtF Strategy objectives

With regard to combatting food fraud the following knowledge or skills were proposed to be attained by the actors of the sector:

- Increasing consumers' knowledge of the composition of food and its relation to shelf-life (WHH-Calcutta)
- Ability to conduct "on-line" control of food composition (WHH-Calcutta)
- Awareness of consumers on safe food (WHH-Calcutta), and increasing their knowledge on how food "behaves" in a standard environment and how food fraud influences it (e.g. it will prolong its shelf life, smell, taste and more) (USB).
- Awareness among those who is educated to handle food (WHH-Calcutta).

ii. Strategies and recommendations for improvement

In this section, the discussions focused in two main areas: One, policies to be introduced to make improvements in the sector, and second, the change and improvement of curricula in education.

In terms of policies, the following were proposed:

- Policies for shortening distribution channels (WHH-Calcutta)
- Harsher punishments for cheating (WHH-Calcutta)

- Motivating people not to prioritize private business interests over common ones, to have a real interest in supporting this strategy (USB)
- Standardise food processing (WHH-Calcutta)
- Sharing of good practice versus fraud cases and their resolution (USB)

Meanwhile, in terms of changes and improvements in the curriculum, the following were proposed, underlining that the topic itself is currently ignored in the content of agricultural education (WHH-Calcutta):

- Providing ethics and morality as part of upbringing and education (USB), including the attainment of responsibility and conscience.
- Courses on food safety standards (WHH-Calcutta)
- Involve the actors in food chain operation in the course content and transaction (WHH-Calcutta)
- Tools and methods of food fraud identification to be integrated in agriculture education (WHH-Calcutta)
- Industrial processes and requirement (WHH-Calcutta)
- Inclusion of stakeholders from the industry in the design of curriculum (WHH-Calcutta)

iii. What roles the AKIS actors play?

- Influencing retailers to focus more on food quality and not primarily on pricing policy (USB)
- Parliament to enact laws in this area (USB)
- Government for the application of laws and sanctions against cheaters (USB)

iv. Which skills and competencies and policy instruments needed to contribute to gender equality?

- Women's role and knowledge to be acknowledged (USB).

5 Discussion of findings

The participants of the workshops addressed the policy problems and recommendations and strategies for improvement, addressing the six FtF strategies, namely (1) Sustainable food production, (2) Ensuring food security, (3) Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices, (4) Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets, (5) Reducing food loss, (6) Combatting food fraud.

The participants focused on the first FtF strategy of sustainable food production the most, and more in-depth than other topics. Considering that education and training in the agrifood and forestry sector concentrates mostly on and needs considerable effort on the area of production, and the fact that the NF project particularly targets students (and young farmers) in this sector, make it not surprising that this topic was addressed more in-depth. Besides, as sustainable food production is the first FtF strategy addressed, it also is not surprising that as in most of the workshops, the participants discussed issues in the order of FtF strategies, having less time to the final topics could also be a factor. In addition, it was observed that in the case that participants of the workshops filled the FtF tables provided before the workshop in detail, then almost all FtF objectives were addressed in a more balanced way. In addition, in some cases all the discussions made with regard to each FtF strategy were the same, meaning that some participants believed that the necessary strategies across all strategies were cross-cutting and needed to be applied across the sector, along the value chain, from production, to handling of food waste.

The themes that were mentioned the most and more in-depth by the participants of the workshops, and those that were cross-cutting and emphasized during all workshops were connected with the five questions posed during the workshops for each FtF objective (see Chapter 3), and can be synthetized as in the following bullets and in Figures 3 and 4:

- Skills and competencies needed in the sector: While technical skills necessary differed according to the FtF strategy in question, skills and competencies such as critical and systems thinking, problem-based and multi-disciplinary approaches and entrepreneurship, in addition to knowledge of the English language and skills such as marketing, communication and ability to use digital instruments were mentioned in all workshops. Digitalization, in this regard, came across as one of the main cross-cutting themes – digital skill and digital use – being a real new frontier for all AKIS actors.
- The need to update curricula, and complement formal education with extracurricular activities and those activities that could allow students to gain practical skills on the field was also another topic mentioned in all of the workshops. While, recommendations on how to update curricula, and also on which level of education the participants addressed (e.g. primary education, higher education) changed, the need to involve the industry and enterprises in curriculum making, and having links to the industry, through extracurricular activities, non-formal education and internships, were proposed as a way to

combine theory and practice in a more balanced way as part of education and training policies. In this regard, flexibility was also a concept that was discussed several times: it can be connected with a) a request of greater freedom in education, training; b) the dynamic dimension of the modern agriculture (Klerkx, 2017); c) a purpose in line with the request of reducing bureaucracy. Meanwhile, it was also suggested that towards the goal of attaining practical experience in the field, it is important to establish cooperation and links between universities and NGOs (ISEKI).

- The importance of life-long learning was also underlined with critical importance. In all workshops, participants stressed the importance of life-long learning, which would be necessary to meet the needs of the sector, and which would go hand-in-hand with formal education. According to the discussions made during the workshops, life-long learning should be: short, flexible, and digital.
- Another topic that was mentioned in all the workshops with critical importance was the need to enhance collaboration, dialogue and coordination among the main stakeholders of the sector. Especially, the need to integrate the industry, as well as the society (and local stakeholders) in decision-making and curriculum-making processes of the education and training institutions on all levels were stressed by the participants. It was argued that only in this way, the needs of the sector and the realities on the ground could be addressed by the curricula of formal educational institutions. In addition to collaboration for education and training policies, the need of coordination among different policies and policy instruments were also addressed, in addition to the need to collaborate and enhance dialogue in the overall sector for achieving better results and more sustainable solutions through agricultural and forestry practices. In addition, indigenous/local knowledge and local food heritage were also discussed by participants with regard to enhancing dialogue and collaboration among the AKIS actors.
- The need to integrate the topic of sustainability in education, starting from early ages was also stressed in all the workshops. Besides, awareness raising among the public about sustainability in all parts of the value chain, in addition to integrating it into technical practices in the whole of the sector was noted many times by the participants.
- Participants also underlined, in several occasions, the importance to attract students, and to increase their motivation towards the sector. Hence, "enhancing students' motivation" was expressed in several workshops by using different terms, such as: "increasing personal motivation"; "encouraging students' innovation"; and "making the sector more attractive". How education in the agri-food and forestry sectors is made relevant and attractive to the students will be a challenge for future policies.

- The topic of gender, and the need to make the sector gender neutral by providing equal rights to women in the whole sector, in addition to policy-making and decision-making with regard to the education and training policies were underlined in all the workshops.
- It was also noted that regarding food storage, consumption and disposal (or re-use), consumers have a key role to play in public policies. There is a need to empower consumers regarding the importance of healthy and sustainable diets, which points to the importance of discussing these issues starting with early years of education and providing the students with the right instruments to understand the importance of a new sustainable way of consumption. Besides, the need to have a common language, common goals, shared knowledge and innovation was underlined during the workshops.
- Another common theme was the transition from public to private, which has started in '80s (WHH, and Chapter 2), which brings along the question of how can policies incorporate all these new actors (innovation brokers, private universities/institutes, advisors, etc.) in new policy contexts.
- Besides, the need to have a common language, common goals, shared knowledge and innovation was underlined during the workshops. This also suggested a) the importance of EU-level policies that sets the standards, and provides a benchmark; b) the importance of collaborations across countries; and c) the importance to act together and in a collaborative manner with regard to environmental, educational, innovation, research issues.

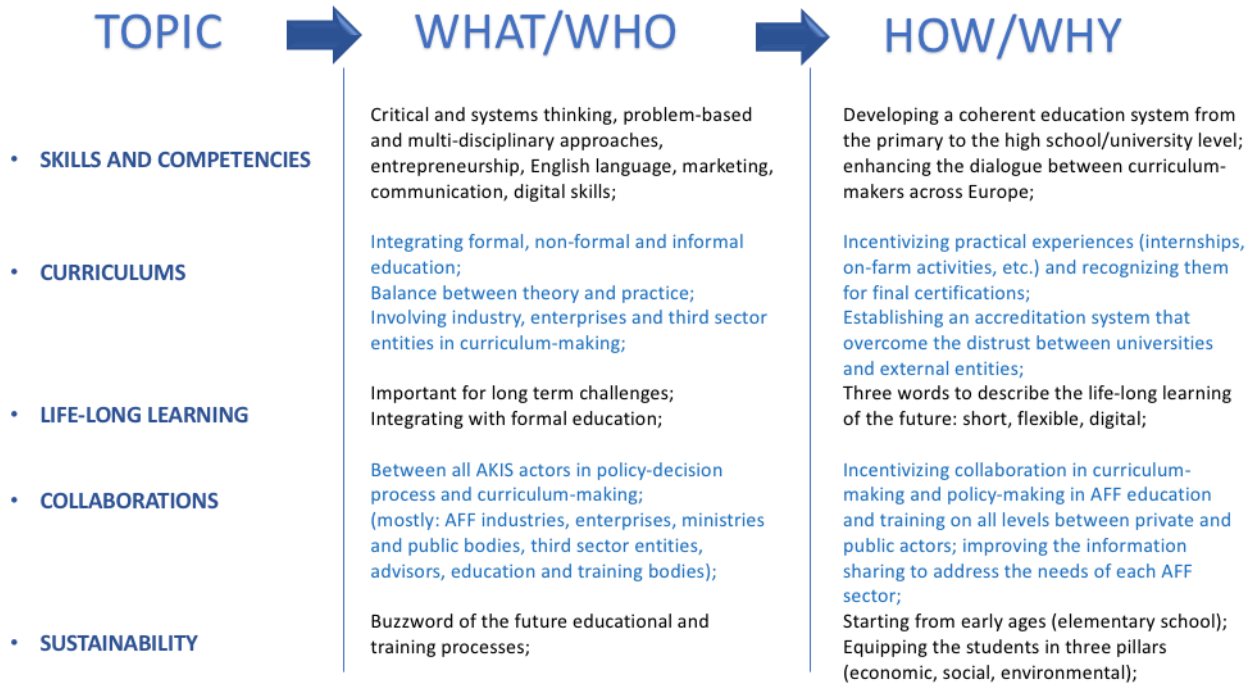

Figure 3. Topics and related suggestions emerged from the round of workshops, part 1.

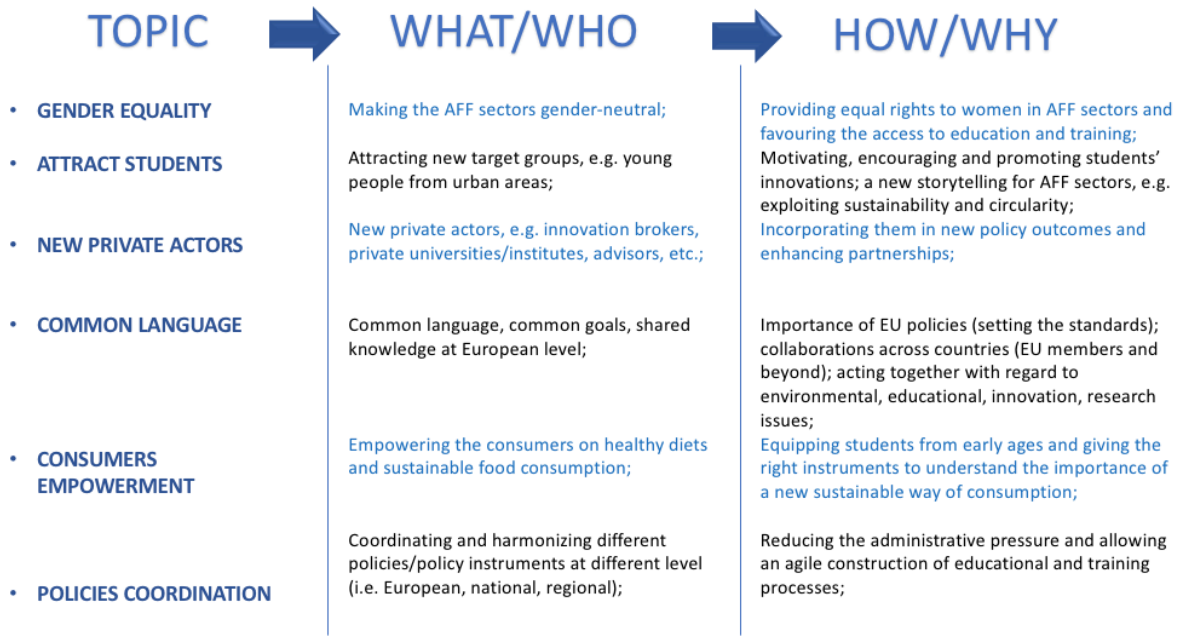

Figure 4. Topics and related suggestions emerged from the workshops, part 2.

Furthermore, it is important to underline how the main findings of the round of workshop are substantially in line with the vision of the European Skills Agenda (ESA), the European five-year plan to help individuals and businesses to develop more and better skills. Indeed, in the Communication - European Skills Agenda for sustainable competitiveness, social fairness and resilience (EC, 2020), and life-long learning is seen as fundamental to succeed in strengthening sustainable competitiveness, ensuring social fairness and building a resilient system. Moreover, the ESA is strongly inter-linked with other European policy initiatives in the field of education, mainly European Education Area (EEA) and European Research Area (ERA), showing how education starting at early ages, and that continues throughout the lifetime, is fundamental (i.e., schools, universities, vocational education and training, adult learning, lifelong learning). Hence, in the scope of the EEA the Commission has presented a first package of measures addressing three main issues: a) key competencies for lifelong learning; b) digital skills; and c) common values and inclusive education. In this regard, the "key competencies for lifelong learning" adopted by the Council are as follows: literacy; multilingualism; numerical, scientific and engineering skills; digital and technology-based competencies; interpersonal skills, and the ability to adopt new competencies; active citizenship; entrepreneurship; cultural awareness and expression. It can be argued that these key competencies can also be accompanied by some of the elements that were discussed in the scope of the workshops conducted as part of this deliverable, including: integrating sustainability in all levels of the education system, and improving collaboration across different skills and levels of education. These elements and the other findings of this deliverable can be the first step for establishing a dialogue with the ESA, the EEA and the ERA.

It is important to underline that this study was also subjected to some limitations. Some partners stressed that it was not always easy to stay on the topic and this can also mean that education and innovation are hot topics in modern agriculture. Especially in these workshops where around the table there were numerous points of view, perspectives and suggestions, staying on the topic and steering the discussions in a structured manner could prove to be difficult. Another difficulty was observed regarding the use of the FtF strategy table that was provided by the UNIBO team. There were hence differences regarding the use of the table, where some participants did not use it at all, and in the scope of some workshops, it was used in an in-depth way. These differences, hence, caused some challenges in provision of the outputs in the results section. Meanwhile, it was also observed that the participants focused on the first FtF strategy of sustainable food production the most, and more in-depth than other topics. Considering that education and training in the agrifood and forestry sector concentrates mostly on and needs considerable effort on the area of production, and the fact that the NF project particularly targets students (and young farmers) in this sector, make it not surprising that this topic was addressed more in-depth. Besides, as sustainable food production is the first FtF strategy addressed, it also is not surprising that as in most of the workshops, the participants discussed issues in the order of FtF strategies, having less time to the final topics could also be a factor. In addition, it was observed that in the case that participants of the workshops filled the FtF tables provided before the workshop in detail, then almost all FtF objectives were addressed in a more balanced way. In addition, in some cases all the discussions made with regard to each FtF strategy were the same, meaning that some participants believed that the necessary strategies across all strategies were cross-cutting and needed to be applied across the sector, along the value chain, from production, to handling of food waste.

Finally, following the execution of the workshops in the scope of Task 4.2, and the finalization of the deliverable, the following task (4.3) will aim to bring together all findings obtained so far in the scope of Work Package 4. These findings will be enriched by an extensive desk-research to develop concrete guidelines for policy makers and education managers towards improvement of policies in the AFF sector. In this direction, strategies identified within the scope of the round of workshops conducted (Task 4.2) will be formalised into a conceptual framework and specific policy design options, establishing links to best practices. Besides, new policy instruments and tools will be developed and specified, that match the needs of the sector and strengthen EU education and training system.

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Annexes

Annex 1 – Workshop Guidelines Document

Workshops guidelines for Task 4.2 - Identification of strategies for improvements

Aim

This document provides guidelines to identify strategies for policy improvement of research and education in the field of agrifood and forestry, by identifying options for improved policy instruments in different context scenarios. The recently released European Farm to Fork (FtF) Strategy put in light the necessity of a legislative framework for sustainable food systems which will allow the European food systems to become the global standard for sustainability. In this view, changing in education means (e.g. action learning) and new educational policy instruments become relevant to tackle the European goals. The task 4.2 here presented will be performed through a round of workshops in connection to the NEXTFOOD case studies and considering the results from WP1 and WP2/WP3 activities (skills needed and case studies outputs) to capture local education governance perspectives. For this task, we will particularly involve the stakeholders and the local/regional/national/EU-level authorities and policymakers responsible for policies in the research and education sector.

Background

The work done in Task 4.1 with the survey on diagnostics of education policies relate to agriculture, food and forestry provided a background for the task 4.2 "**Identification of strategies for improvements**" by identifying the gaps that are perceived in the current educational policy framework. The **results obtained from the survey in task 4.1 highlighted the existence of policy gaps such as**:

- None or insufficient coordination among the four policy fields addressed (Pre-university, University, Adult learning and vocational education, and Training measures in agrifood), which are planned mostly on a country level.
- Poor awareness of the existence of strategy documents on educational policy in the agrifood field.
- Lack or insufficient amount of financial support (especially for young agrifood and forestry professionals to access adult training and vocational education).
- Lack of sufficient innovation in education tools and innovative ways of learning (student-centred learning, participatory and practice-oriented learning, interdisciplinarity, internationalization, mobility, networking).

- Scarce efficiency of educational policies in promoting sustainability, entrepreneurship and innovation, and to be adherent to the practice and real needs of the sector.

These results should be integrated and connected with those obtained under WP1 tasks about the current gaps in skills:

- Connection between theory and practice.
- Holistic knowledge (too specialized knowledge).
- Digital skills.
- Motivation and consciousness.
- Teamworking, interpersonal skills, and communication.
- Involving the local community.
- Networking.
- Lifelong learning.

And with the findings of the already performed case studies under WP2 and WP3 tasks, which identified some necessities for effective learning process:

- Facilitate the dialogue during different activities.
- Build on human capital.
- Allocate time for reflection.
- Revise institutional aspects: more flexibility in curricula and infrastructure and financial support necessary for the practicalities.
- Increase the interest of different actors involved in activities.
- More implementation of practicalities.
- Enhance students' motivation and students' interaction with situations in the field.
- Provide students' self-assessments.

These results showed that the quality of actual educational policy in the agricultural, food and forestry sector is still perceived as poor to support the sustainability transition challenge of the agrifood and forestry sector. Farmers, especially the future generation of young farmers, need to develop their capacities to innovate, to co-create and implement new practices, to adapt to legislative, policy, market and environmental climate changes, to develop contemporary skills in order to market their products, and to take part in interactive innovation-based networks.

According to the recently released European Farm to Fork Strategy and European Green deal (EU Farm to Fork, 2020; EU Green Deal, 2019) the sustainable transition of food systems must be achieved by: food systems which have a neutral or positive environmental impact, preserving and restoring the natural resources on which the food system depends; helping to mitigate climate change and adapting to its impacts; protecting land, soil, water, air, plant and animal health and welfare; reversing the loss of biodiversity; ensuring food security, nutrition and public health, and making sure that everyone has access to sufficient, nutritious, sustainable food while preserving the affordability of food; generating fairer economic returns in the supply chain, fostering the competitiveness of the EU supply sector, promoting fair trade, creating new

business opportunities. Finally, it was also highlighted the necessity to strengthen educational messages on the importance of healthy nutrition, sustainable food production and reducing food waste. More generally, education is awarded a major role in achieving the objectives above by allowing and supporting innovation and transition processes. The EU can play a key role in setting global standards with this strategy, also in its interplay with education and training policies.

In this context, a focus on the possible strategies for educational policy improvements is needed, that will permit a shift towards a more sustainable and innovative sector and to face the new challenges of an evolving sector that requires new and different learning approaches, starting from knowledge sharing, education, and training of future professionals.

The below framework (Figure 1) shows the transition process of current education and training policies in the agrifood and forestry sector towards desired policy outcomes, through identification of strategies for improvement. The framework proposes that these strategies, that are to be developed (in the context of Task 4.2) would address the identified gaps in the current policy framework (Task 4.1) towards creating desired policy outcomes, which then feed into the current educational policy system, in an iterative and circular manner. It should be noted that the education and training system of the agrifood and forestry sector, that is shown in Figure 1, is a component of the wider Agricultural Knowledge and Innovation System (AKIS) framework, which is presented in the following figure (Figure 2).

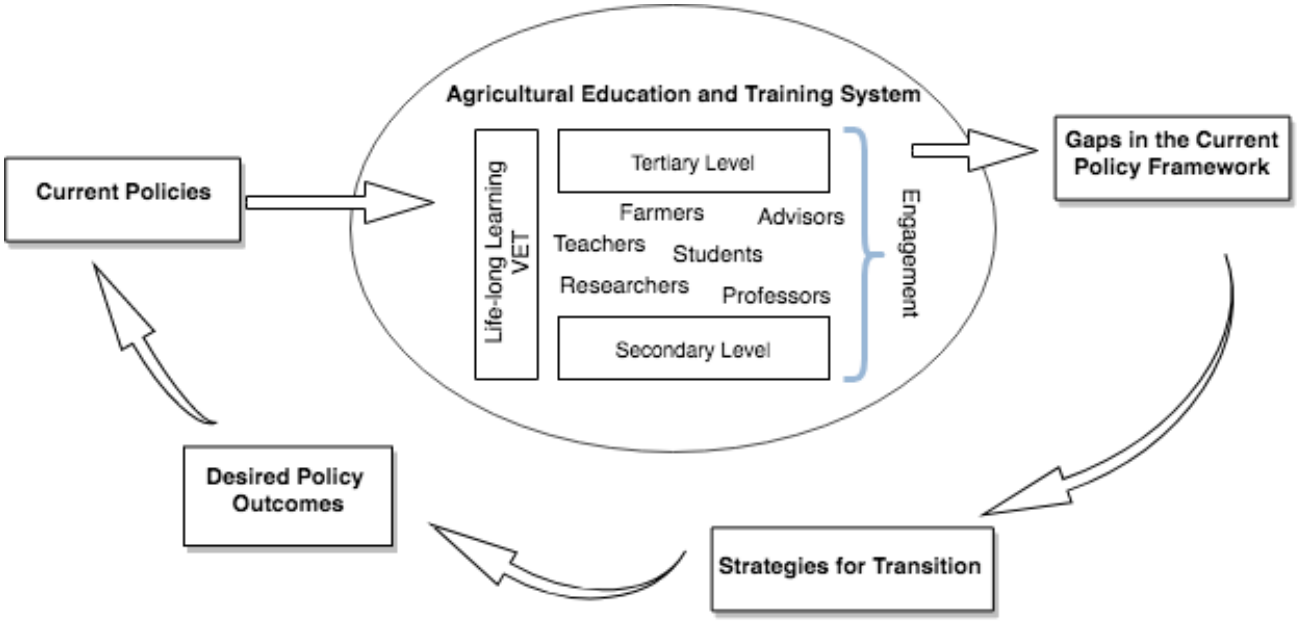

Figure 1: The proposed framework for educational policy transition process in the agrifood and forestry sector in relation to AKIS

Sources: Adapted by Standing Committee of Agricultural Research (SCAR) Policy Brief on New Approaches on Agricultural Education, 2017

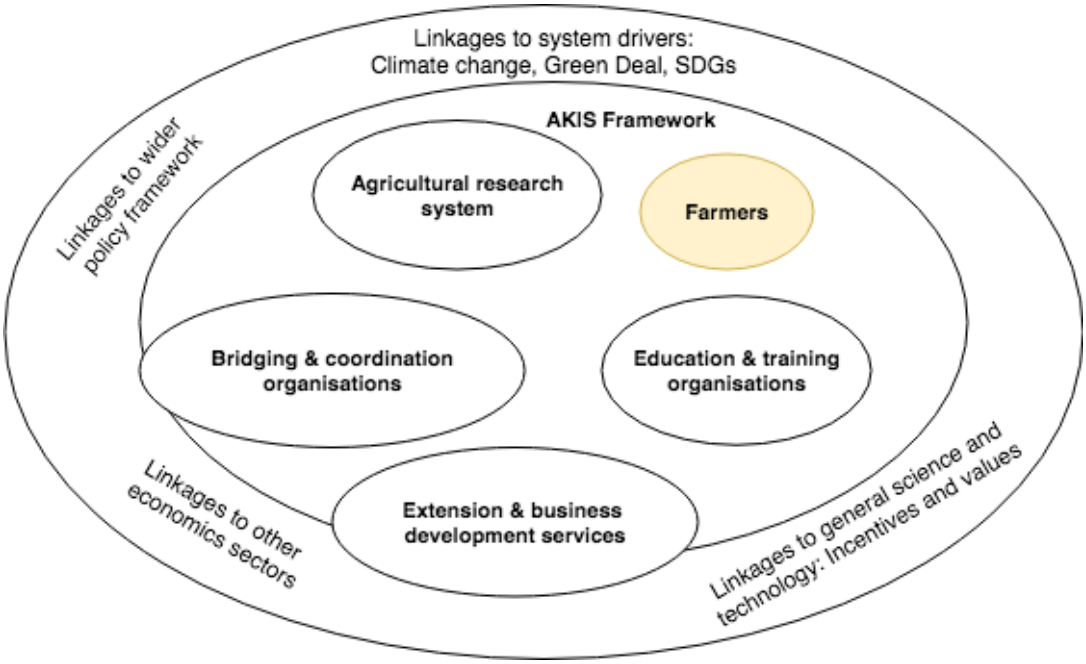

Figure 2: The AKIS Framework

Sources: Adapted by SCAR, 2015; Dockes et. al., 2011; Riviera et. al., 2005; Arnold, E. & Bell., M., 2008; Spielman, D. & Birmer, R., 2001; World Bank, 2007.

Methodology:

The task is to be performed through a round of workshops in the different partners country and especially connected to the NEXTFOOD cases studies to capture local (national and regional) education governance perspectives.

This document is intended to give some guidelines to organize the workshops in your country/local site. Please consider using the results/outputs from WP1 skills and WP2/WP3 case studies for proposing strategies for improvement of current educational policies in agrifood and forestry systems, referring to the recently released Farm to Fork objectives proposed in Annex 2.

1. **Organisation**: due to the pandemic, we expect all workshops to be held on-line; if the face-to-face option is possible, then it is preferred.
2. **Participants to be invited**: Invite 4-5 participants selected among experts of policies and/or authorities responsible for policies in the research and education sector working at local/regional/national or EU-level; please consider to have at least one farmer or farmers' representatives.
3. **Timing**: The workshop must be finalized by the end of September 2020 to receive the outputs (a summary of what has been discussed and the proposals/strategies that came out).
4. **Duration**: The time allocated should be about 2-2.5 hours for a precise and pertinent discussion, but please feel free to adapt to your needs.
5. **Themes to be addressed**: The discussion should consider the *Farm to Fork Strategy objectives* listed here (see also Annex 2):

7. Ensuring sustainable food production (in line with circular bio-based economy)
8. Ensuring food security
9. Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices
10. Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets
11. Reducing food loss and waste
12. Combating food fraud along the food supply chain

And for each of the above FtF aims the questions to be addressed are the following (consider using also the results from WP1 and WP2/WP3 tasks):

6. What lacking skills and competencies are needed to achieve these objectives?
7. How can education and training policy contribute?
8. What (changes in) education policy instruments are needed?
9. What roles can different AKIS (and other) actors play?
10. Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics (1-6)?

6. **Language**: the workshop can be held in the local language and the main findings then translated in English into a summary document to be sent to WP4 team (e-mail contacts at the end).

Planning of activities

Before the workshop

Send an invitation e-mail, with a short presentation of the workshop with instructions (use the ppt provided) and the table in Annex 2. Ask participants to fill it and return before the workshop (or come with the table pre-filled in)

At the workshop (Workshop outline)

Introductory round – 10 min

Ask each participant to introduce themselves (only name and organisation). Write down the names and the organisation of the participants in table in Annex 4.

Introduction and brief presentation of NEXTFOOD project and aims and brief presentation of Results from task 4.1 and aims for task 4.2 – 15 min

Use the ppt provided to give a short presentation of the NEXTFOOD project and its aims, and results of WP4 task 4.1 and the aims for task 4.2 (aims of the workshop).

Circulation of the AKIS framework and table in Annex 2 to be filled out individually by participants– 15 min

Circulate a note including the framework of AKIS (use Annex 1) and the table (use Annex 2) to be filled out individually by participants.

Suggest to participants to also use the outputs of WP1 and WP2/WP3 tasks (summarized also in the ppt provided to invite participants) for proposing strategies/policy instruments/recommendations for improving the actual educational policy framework according to the Farm to Fork strategy.

Ask participants if the instructions are clear and repeat if necessary.

Collection of individual inputs and discussion - 30 min

Collect the filled-out forms and summarize them.

IF YOU SENT THE FORMS IN ADVANCE AND COLELCT THEM BEFOREHAND, PLEASE SIMPLIFY THE STEPS ABOVE ACCORDINGLY. IF YOU COLLECT THE FORMS AT THE WORKSHOP, TAKE A BREAK AT THIS STAGE WHILE YOU COLLATE THE INPUT RECEIVED IN ONE TABLE

Presentation of Results – 15 min

Present to the participants the main comments/suggestions/recommendations came out.

Consensus discussion about new policy instruments to be proposed and designed – 30 min

Ask participants to discuss the improvements needed in educational policies for each Farm to Fork objectives and discuss which policy strategies or instruments they would suggest for improving each of the European objectives and how they could be designed/implemented.

Ask participants to make use of the AKIS policy transition framework presented in Annex 1, if they would like to.

Conclusions and follow up - 15 min

After the workshop

Write a summary of the main suggestions/proposals/recommendations for new policy strategies and instruments to be implemented in educational policies. You should refer to the main inputs provided by participants through forms filled-out and write down a summary using Annex 5 as a template. If possible, a recording of voices, without identification of the person, during the workshops could be useful. List also, if possible, affiliation/role/field of work of the participants without their name.

ADD THE FULL COLLATED TABLE FROM EXPERTS REACTIONS AT THE END IF POSSIBLE.

Finally fill out the table in Annex 3 about the details regarding to the workshop (Country, Town, Venue, Date etc.)

Contacts

UNIBO is also available to support the organization of the workshops by bilateral Skype interaction with the partner before the workshop. Contact us by e-mail to arrange a skype call.

Rubina Sirri: rubina.sirri2@unibo.it

Yaprak Kurtsal: yaprak.kurtsal2@unibo.it

Davide Viaggi: davide.viaggi@unibo.it

For questions related to Gender you can contact Nora Pistor: norapistor@yahoo.de

References

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Annex 1. Agricultural Knowledge and Innovation Systems (AKIS) framework

- The term Agricultural Knowledge and Innovation Systems (AKIS) is used to describe the whole knowledge exchange system: the ways how people and organizations join together and interact to promote mutual learning, to generate, share, and use agriculture-related knowledge and information within a country or a region.

- Farmers, advisors, researchers, education and training providers (secondary, tertiary, or life-long learning levels), input suppliers, retailers, farmer organizations, NGOs, business and enterprises, media services and ministries are all part of national or regional AKIS, since they all either need, produce or exchange knowledge and innovation for agriculture and interrelated fields (value chains, environment, society, consumers, etc.) The below figure shows the AKIS framework.

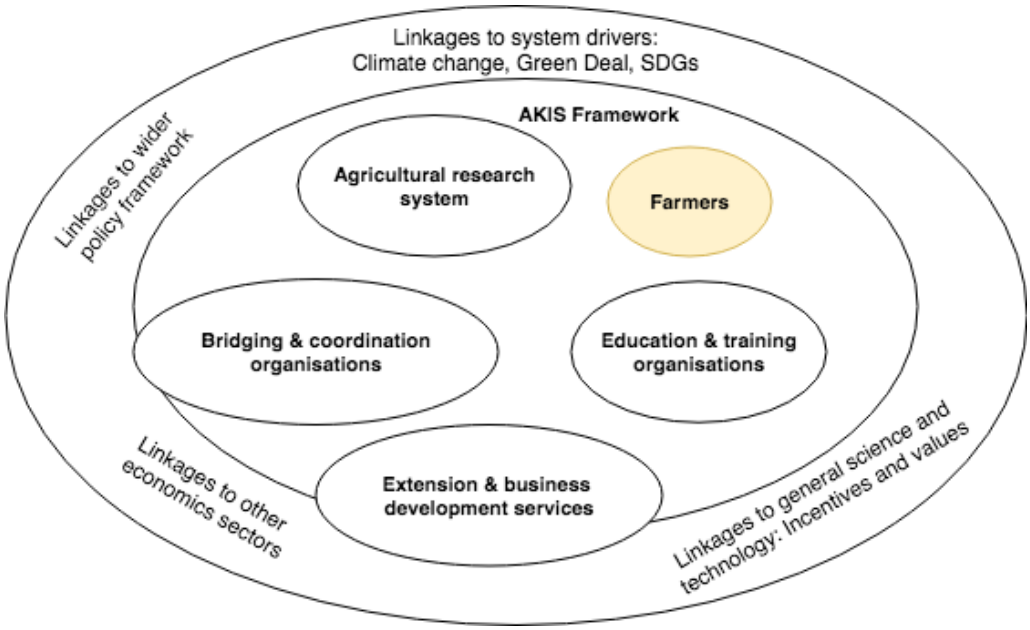

Figure 3: The AKIS Framework

Sources: Adapted by SCAR, 2015; Dockes et. al., 2011; Riviera et. al., 2005; Arnold, E. & Bell., M., 2008; Spielman, D. & Birmer, R., 2001; World Bank, 2007.

- Meanwhile, the below framework focuses specifically on the Education and Training component of the AKIS framework, showing the transition process of current education and training policies. The framework proposes that strategies, that are to be developed (in the context of Task 4.2), would address the identified gaps in the current policy framework (Task 4.1) towards creating desired policy outcomes, which then feed into the current educational policy system, in an iterative and circular manner.

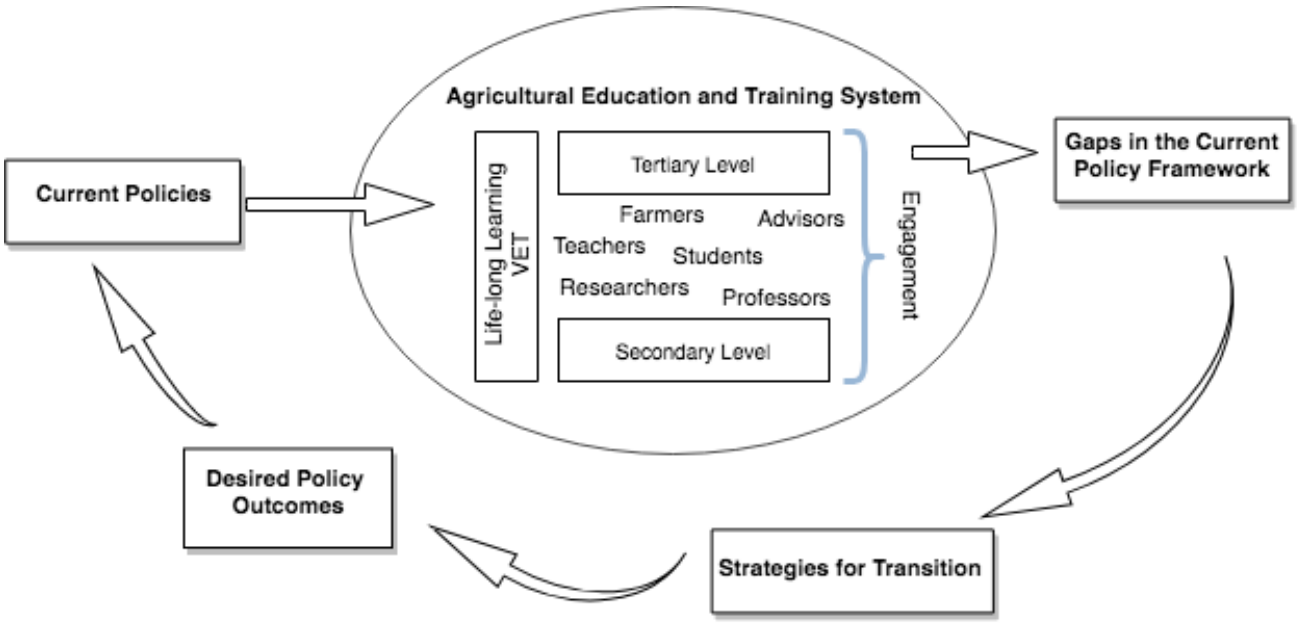

Figure 4: The proposed framework for educational policy transition process in the agrifood and forestry sector in relation to AKIS

Sources: Adapted by Standing Committee of Agricultural Research (SCAR) Policy Brief on New Approaches on Agricultural Education, 2017

Annex 2. Farm to Fork Strategy objectives needing new skills and educational policy interventions and instruments.

FtF topic (objective)	What lacking skills and competencies are needed to achieve these objectives?	How can education and training policy contribute?	What (changes in) education policy instruments are needed?	What roles can different AKIS (and other) actors play?	Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics (1-6)?
Ensuring sustainable food production (in line with circular bio-based economy)					
Ensuring food security					
Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices					
Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets					
Reducing food loss and waste					
Combating food fraud along the food supply chain					

Annex 3. Information about the Workshop

Country	
Town	
Venue of Workshop	
Date of Workshop	
Starting and Ending Time of Workshop	
Number of Participants and Gender rate	
Other notes (if any)	

Annex 4. List of Participants

#	**Name/Role**	**Affiliation/Institution**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

Annex 5. Summary of the discussion: main messages, recommendations, ideas, proposals

FtF objectives	Summary of main recommendations, ideas and proposals
Ensuring sustainable food production (in line with circular bio-based economy)	
Ensuring food security	
Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices	
Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets	
Reducing food loss and waste	
Combating food fraud along the food supply chain	

ADD THE FULL COLLATED TABLE FROM EXPERTS REACTIONS AT THE END IF POSSIBLE

Annex 2 – Pilot Workshop Report (University of Bologna, Italy)

Pilot Workshop: Identification of Strategies for Improvement in the Agrifood and Forestry Sector

30 July 2020, Bologna/Italy

Introduction

This document reports on the details and outcomes of a pilot workshop carried out within the context of Task 4.2. of the H2020 NextFOOD project, that focuses on identification of strategies for improvement in the Agrifood and Forestry Sector. In a nutshell, the task 4.2. aims to propose strategies for policy improvement of research and education in the field of agrifood and forestry, by identifying options for improved policy instruments in different context scenarios. Changing education means (e.g. action learning), use of perspective technology (e.g. digital instruments), forms of organisation (e.g. communities), as well as issues related to gender are specifically targeted. The task is being performed through a round of workshops that are conducted by the NextFOOD partners during the month of August/September 2020, in connection to the NextFOOD case studies or particular country contexts, and considering the results from WP1 and WP2 activities (skills needed and case studies outputs) to capture local education governance perspectives. For this task, stakeholders and the local, regional, national or EU-level authorities and policymakers responsible for policies in the research and education sector are particularly being involved. In order for these rounds of workshops to be conducted smoothly, and in a harmonious manner, the University of Bologna team has prepared and distributed to all NextFOOD partners, a workshop guidelines document that includes information about the steps to be taken during the execution of the workshops, as well as a power point presentation to be made at the beginning of each workshop to inform the participants about the aim of the NextFOOD project, as well as the workshop itself. Towards this direction, the aim of this pilot workshop has been to test the proposed guidelines and the workshop format in the case of Italy, to see the strong and weak points of the proposed format, and to suggest ways of achieving intended outcomes to the NextFOOD partners, who have agreed to execute a workshop in their own country context, or in relation to their case study. In addition, the workshop is aimed to yield results for Italy, with a focus on the Emilia-Romagna region. In the document, first, some details regarding the pilot workshop are presented, followed by key points of the discussions, as well as suggestions for the partners. Meanwhile, a more detailed presentation of the discussions held during the workshop is provided in the Annex section.

Details about the Workshop

Date and Time

The workshop has been conducted on 30th of July, 2020, online, through the use of Microsoft Teams, by the facilitation of the University of Bologna project team (Davide Viaggi, Rubina Sirri, Yaprak Kurtsal). The workshop started at 14.30 and lasted a total of 2 hours and 25 minutes.

Invitation of Stakeholders and the Participants of the Workshop

Originally, 11 experts who are either responsible for or are engaged in education and/or policies in the agrifood and forestry sector were invited to take part in the workshop. Some of these experts were initially contacted directly by the University of Bologna team, through their professional contacts, in order to ask for their participation, but also their recommendations regarding the invitation of other relevant experts were taken into account. Hence, following this initial phase, another set of experts have been contacted. Both the initial invitations as well as the follow-up of confirmation of attendance have been conducted through e-mail. Finally, an online meeting invitation has been sent to all participants that have confirmed their participation. The experts that were invited came from both the region and from either academic or higher level institutions. As a result, 5 experts (two officers from the Emilia-Romagna Region, two professors from UNIBO, and the director of a private advisor/training company) have participated in the workshop, affiliations of whom are presented in the table below.

Table 1: Participants of the Workshop

Participants	Institution
1	DISTAL, University of Bologna
2	DIMEVET, University of Bologna
3	DINAMICA
4	Regione Emilia-Romagna
5	PWC

Program of the Workshop

The workshop started with an introduction of the University of Bologna project team to the workshop participants, followed by the introduction of the workshop participants about their role and affiliation, and a brief power point presentation made by Prof. Davide Viaggi, the leader of WP4, on the NextFOOD project aims, and what is targeted to be achieved with the WP4, and specifically, the expected outcomes of the workshop. The presentation also briefly touched upon the Agricultural Knowledge and Innovation Systems (AKIS) framework and some insights about policy gaps identified in task 4.1 as well as in WP1, WP2 and WP3 deliverables. Finally, a presentation was given about a table to be filled during the workshop - which has been shared with participants prior to the workshop - that provides the *Farm to Fork Strategy objectives*, and hence a direction of the discussions to be held in the workshop. A more detailed program of the workshop is presented below.

Program of the workshop

14:30 – 14:40: Introduction of participants
14:40 – 15:00: Presentation of the project NextFOOD, and the aims and the direction of the workshop
15:00 – 17.00: Three rounds of discussions (one main round of discussion, followed by two shorter rounds to clarify further the possible strategies for the future)

Round of discussions

Questions directed at the participants

The first round of discussions has been initiated with the general questions of:

- How can education and training policies in the agrifood and forestry sector can be changed or improved to serve the needs of the future, in general, and to achieve the EU targets, in particular?
- Which education and training policy instruments and strategies can contribute towards achieving these objectives; and which skills and competencies are needed, and by which actors?
- Which steps can be taken to integrate gender equality into these strategies?

After these questions have been addressed by each of the participants, two additional questions were asked, to go deeper into some of the topics that were not already addressed in detail, in the first round, and to conclude the discussions:

- Would you be able to propose any specific public policies that could address these issues, already discussed;
- And finally, would you have any further insights about the skill needs of the sector, and the issue of gender equality, and proposals to integrate it better in the education and training policy contexts

Key messages emerging from the workshop

- There are too many different policies that regulate education and training in the agrifood and forestry sector, and the bureaucracy is too complicated and lengthy to permit adapting quickly to the need of the sector for new trained professionals. Thus, there is a need of policy harmonization, a more systematic and integrated policy, with a better coordination amongst General Directorates (agriculture, health, education and training), in addition to quick response mechanisms and procedures. There is also a need of simplification of bureaucracy in the academic context.
- Moreover, actual systems of controls of European funds takes too long, and are complicated, and rigid starting from the EU level. There is a need to simplify these procedures.
- Most of the current topics in the policy agenda e.g. sustainability, are already thought at University and as part of life-long learning.
- Soft skills are mostly missing in the sector. In addition, graduate students do not have sufficient competencies related to entrepreneurship and management. Also, the skills related to calculation and managing of large amount of data are lacking.
- In addition, in technical high schools in agriculture some specific new competencies are needed to be taught, i.e. precision agriculture, use of information systems to monitor and manage the agricultural activities as well as management of large datasets. Furthermore,

competencies in the fields of economics, statistics, mathematics and finance are also needed. Competencies, on the other hand, in the English language, as well as skills in marketing and communication are also needed in some cases, such as educational farms, which are important components of the Italian and regional food culture.

- Furthermore, a holistic approach is needed in the degree courses to help the future professionals to critically contextualize results, numeric data or laboratory data in the real context of a farm or a company. Hence, there is a necessity of enhancing dialogue and collaboration, implementing a more interdisciplinary approach and to enact new policies to implement this holistic approach in degree courses.
- More dialogue and coordination between the academia and stakeholders is needed to better improve the education of students as future professionals; for example, fostering practical activities of problem solving in all the production chain until consumers, and organizing more job placement occasions could be ways to stimulate students. Moreover, providing more educational programs that allow for practical training in companies, or more practical internships in the agricultural sector would help future professionals with the practical experience that they need to achieve.
- In order to make training effective, also improving related instruments is important. In particular, fostering also the AKIS functioning regarding the advisory services is necessary; it is currently very difficult to find freelance technical advisors and agronomists not bound to a farm or company. A role of the university in training future advisors seems important in this context. There is finally the need to have more dialogue between agricultural and training sectors and to have more efficient and quick responses of the public administrations to provide needed trained professionals with rapidity.
- There are practices where higher score is given to projects that include women. There are instances or cases, where the gender equality does not seem to constitute a problem in the sector. For instance, educational farms are generally managed by women. There is also an increasing demand for women forklift drivers, as they are considered more precise than men. University of Bologna has several projects on gender, and the agrifood degree courses are being predominantly attended by women in the last years. It is also possible to argue that there are still gender-related jobs, but mainly because they are not preferred by women or they are particularly physically tiring. However, some farms and companies still tend to ask for exclusively men for some type of job positions, maybe due to the fear of maternity leave.

Table 2: Farm to Fork Strategy objectives needing new skills and educational policy interventions and instruments.

Farm to Fork (FtF) topic (objective)	What lacking skills and competencies are needed to achieve these objectives?	How can education and training policy contribute?	What (changes in) education policy instruments are needed?	What roles can different AKIS (Agriculture Knowledge and Innovation Systems) actors (and others) play?	Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics?
Ensuring sustainable food production (in line with circular bio-based economy)	Data analysis, economics, statistics, mathematics and financing; transversal competencies (entrepreneurship, leadership…) and soft skills; ability to critically contextualize results; English language, marketing skills and customer communication	Holistic mindset, selected competencies	Coordination among different policies; higher flexibility of expenditure of EU funds and course design; simplification of controls. More dialogue between academia and stakeholders; and organizing more job placements occasions; integration among information platforms	Intervention is needed in a consistent way across AKIS actors; the role of extension is especially important	
Ensuring food security	More practical activities of problem solving in all the production chain until consumers, soft skills; ability to critically contextualize results	Holistic mindset, selected competencies	More dialogue between academia and stakeholders; and organizing more job placements occasions; integration among information platforms		
Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices	More practical activities of problem solving in all the production chain until consumers; soft skills; ability to critically contextualize results; English language,	Holistic mindset, selected competencies	More dialogue between academia and stakeholders; and organizing more job placements occasions; integration among information platforms		

	marketing skills and customer communication				
Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets	English language, marketing skills and customer communication	Holistic mindset, selected competencies	More dialogue between academia and stakeholders; and organizing more job placements occasions		
Reducing food loss and waste		Holistic mindset, selected competencies			
Combating food fraud along the food supply chain		Holistic mindset, selected competencies			

Suggestions for NextFOOD partners

- During the discussions, the participants may tend to concentrate more the current situation and gaps in relation to education and training in the agrifood and forestry sector. For this reason, it may be necessary to remind them to suggest or propose strategies or policy instruments in order to address these gaps.
- Strategies for generation of skills that are needed to fill the skill gap in the sector, as well addressing gender equality issues are also important aspects to keep in mind, and remind the participants to touch upon them.
- Table 2, namely "Farm to Fork Strategy objectives needing new skills and educational policy interventions and instruments" that is found above, has been filled by the UNIBO project team, in relation to the discussions made during the pilot workshop. We believe that the table provides a guidance, and may facilitate the steering of the workshop, as well as bringing the outcomes of discussions together; so, partners may choose to use it as a tool to facilitate discussion, although it is not an obligation. Furthermore, they may make any necessary modifications to the table as they see fit.

Next steps

- This document will be circulated to all NextFOOD partners in order to serve as a guidance and an example for the following workshops to be held during the month of September 2020. Any further questions that may arise from the partners will be answered by the University of Bologna project team, and any need for clarification will also be addressed if and when necessary.

Annex: Detailed Discussion Points from the Workshop

CURRENT SITUATION AND GAPS:

Emilia-Romagna Region Officers: regarding the Regional Educational and Training System, the Region has a catalogue of competencies and qualifications of professional profiles that includes also the agrifood area. Each professional qualification included in the catalogue has some minimum standard requirements that are needed to be certified.

Recently, due also to the Covid pandemic, the Region has started a revision of the catalogue about the new competencies and professions to be added or modified. For example, sanitization procedures and food safety traceability are competencies needed for some professional figures in the agrifood sector.

Generally, the procedure of revision/modification and updating of the new professional figures or competencies included in the catalogue starts with a request from stakeholders that ask to the Region for the updating of the catalogue; then the Region submit the proposal for a consultation of the social parts (Commissione regionale tripartita) that provides a binding opinion. However, the agricultural component is not well represented in this consultation, although the Agricultural Commission is also included in the process. This is an important gap and would need a higher involvement of stakeholders in this process especially for the agrifood sector.

The catalogue includes 9 types of professional figures with different levels of specialization. The higher positions refer to high-level technical figures that are increasingly updated by adding competencies also related to aspects of environmental sustainability and quality of food productions as new minimum standard requisites, in line with the National catalogue. However, some competencies, i.e. food fraud is still not included in these standards. Furthermore, in the Catalogue, there are only job security, English language, and digital and informative skills as soft skills. Thus, soft skills need to be included in the competencies of the different professional figures. The entrepreneurship is included only in high level figures like company management.

The training companies generally provide training paths that go beyond the minimum standard competencies required for certification of the professional; however, the competencies required to have a certification are not only provided by training companies but also the previous practical working experiences greatly contribute to the definition of the specific professional figure.

Training company: today we count 70.000 operators in the agricultural sector in the region. The training of employees is funded, organized and verified by FOR.AGRI (Fondo paritetico interprofessionale nazionale per la formazione continua in Agricoltura) through the adherent companies without specific regional levels.

The actual Regional Rural Development Programme (RDP) has spent a lot of financial resources for the education and training of agrifood professionals. However, there are actually too many different policies that regulate the education and training and the bureaucracy is too complicated and slow to permit to adapt quickly to the need of the agrifood sector for new trained professionals. For example, to train foreign workers, there is the necessity to present a project which has to be approved and inserted in the

green catalogue. Also, the green catalogue collects training programs for already hired workers but not people who are looking for a job. Thus, there is the need of policy harmonization and quick response mechanisms and procedures.

Another gap in the education is the absence in the Region of technical high schools in agriculture. In other words, there is a need in the sector for workers beyond those that are graduates or that have diplomas. Actual agrifood graduated students don't have sufficient competencies related to the entrepreneurship and management. Also, the skills related to calculation and managing of large amount of data are almost lacking completely. Furthermore, some specific new competencies are needed to be taught, i.e. precision agriculture, use of informative systems to monitor and manage the agricultural activities, management of large range of different datasets, as well as economic and financial competencies (they were more often provided in the past, bur are now almost lost).

The proposal could be to provide more educational programs that are organized as "school-work alternating programs", in order to insert more practical training in companies. Moreover, educational farms are currently the real ambassadors of Italian and regional food culture, so they need to be implemented by workers more prepared on English language, marketing skills and customer communication skills. Fostering also the AKIS functioning regarding the advisory services is mandatory; it is actually very difficult to find freelance technical advisors and agronomists not bound to a specific farm or company. The role of the university in training future advisors seems important in this context. There is finally the need to establish more dialogue between agricultural and training sectors and to have more efficient and quick responses of the public administrations to provide needed trained professionals with rapidity.

UNIBO academics: the topics of Farm to Fork related to sustainability, environmental impacts, sustainable technological processes, animal welfare as added value of animal products are all already inserted and taught in most of the degree courses at the University of Bologna and are part of several research projects. Several practical experiences in laboratory, curricular internships in companies and farms, and workshops with companies are widely added in all courses related to the agricultural, zootechnical and food sectors in UNIBO. However, more dialogue and coordination between the academia and stakeholders is needed to better improve the education of students as future professionals; for example, fostering practical activities of problem solving in all the production chain until consumers, and organizing more job placements occasions (now they are planned only every 2 years) could be ways to stimulate students.

The holistic approach should be addressed as it is an important added value for future workers and it could be reached by a more interdisciplinary approach and collaboration among academic colleagues. Actually, several optional teaching courses focusing on soft skills are also included in UNIBO degree courses and students are motivated to take them, including entrepreneurship. UNIBO also has a mandatory English language certification exam (B2) to be passed; however, it would be worth to foster foreign language competencies further, and to push students to perform foreign internships not only in research and academic institutions but also in farms and companies.

Furthermore, the UNIBO system for evaluation of teaching quality organizes every 3 years, meetings with stakeholders to ask for evaluation of the contents proposed by the courses, according to sector needs. Actually, it seems that the operative sector wants a graduated worker with solid basic skills as the company can further give the worker the specific technical training. Now the degree courses in UNIBO has added more credits and hours of curricular internships, and students in 90% of cases choose a farm or food company to do it, and the 1/3 of these companies finally hire these students.

2) POLICY IMPLEMENTATIONS PROPOSALS:

Emilia-Romagna Region Officers: actual systems of controls of European funds, including those on FSE, are too long, complicated, and rigid starting from the EU level and this impacts on all the administrative procedures at subsequence cascade levels until the Region. Needing of a simplification of procedures is mandatory starting from EU. All the informative platforms/systems of administrative management need to be integrated and shared, i.e. the informative system pertaining to education and training with agricultural green catalogue. There is a need to have a more systematic and integrated policy, with a better coordination amongst General Directorates (agriculture, health, education and training). The catalogue can be implemented for sure with new professional figures responding to the sector needs and more useful for people who are looking for a job.

Training company: there is a need for more practical curricular internships in agriculture, and a holistic vision of organizational processes both in academic courses but also in high school diplomates as well as non-diplomates. There is also the necessity to foster competencies of economics, statistics, mathematics and financing. The agronomist figure of the past who had a good basic background seems to be lost. Furthermore, food safety has actually too rigid policies and it would need to have a better balance among microbiological safety and food waste reduction. There is the need of new technicians' figures not only for food safety and quality, but also the need of more post-degree professionalizing courses, and more professionalizing bachelor degrees. The agricultural operator currently has a too generic profile.

UNIBO academics: also in the academic context, the need is the simplification of bureaucracy. Furthermore, a holistic approach should be inserted in the degree courses to help the future professionals to critically contextualize results, numeric data or laboratory data in the real context of a farm/company. There is the need to establish more dialogue and enact new policies to implement this holistic approach in degree courses. The actual policies don't go hand in hand with the academic research and innovation: for example, the innovative processing methods and new technology in the agrifood sector, already developed and tested in the academic context, can't be implemented and put in place in companies due to lack of specific regulations, which are too slow to adapt to innovation.
A lot of students from other regions come to study at UNIBO degree courses and, after graduation, they increasingly decide to be employed in a company in Emilia-Romagna. In this situation, there is the need to have more cooperation between UNIBO and the Region to organize professionalizing internships that reflect the real need of the agrifood sector, which is the most developed in our Region. It is mandatory to motivate students to select optional courses that provide them with transversal soft skills, including entrepreneurship.

3) SKILLS NEEDED and GENDER equality:

Emilia-Romagna Region Officers: The gender equality seems not a problem in the sector: for example, there is an increasing demand for female forklift drivers, as they are considered more precise than men. The actual policies give also higher score in projects that includes women. However, there are still some gender-related jobs, but only because they are not chosen by women or they are particularly physically tiring.

Training company: The gender equality does not seem to constitute a problem; especially referring to farmhouses and educational farms, as they are especially managed by women. Gender is not a priority to be put in policies in agrifood sector. Even if there are some jobs still related to gender, this is acceptable and not a worrying situation.

UNIBO academics: The gender issue seems not to be a problem among students: UNIBO has several projects on gender and the agrifood degree courses are being predominantly attended by women in the last years. However, some farms and companies still tend to ask for exclusively men for some type of job positions, maybe due to the fear of maternity leave.

Annex 3 – Workshop Reports

Annex 3.1. – Co-organized by Agronutritional Cooperation of the Region Central Macedonia and American Farm School (AFS)

12 November 2020

Workshop Report

The workshop was conducted on Thursday the 12th of November via ZOOM meeting. Co-organizers were the:

Agronutritional Cooperation of the Region Central Macedonia, with Ms. Dafne Kapsala and Ms. Lina Tsaltampasi. The AFS had present Dr. Vicky Krystallidou, Dr. Georgia Zafeiriou and Ms. Elisavet Papadopoulou.

The workshop lasted 3 hours and there were 13 participants present, coming from a wide variety of policy related sectors. These were:

1. Konstantinos Kiltidis, the former undersecretary of the Ministry of Agricultural Development and present chair in the Discrtict of Central Macedonia.
2. Anastasios Kapnopolis, Chair of the Chamber small-scale industry.
3. Stylianos Choutas, 1st vice chairman of the Chalkidiki Chamber.
4. Marco De la Pupa, General Secretary of the Hellenic-Italian Chamber.
5. Pantelis Tsakiris, Mayor of Oreokastro, Thessaloniki
6. Eleni Tsiomidou, Member of the Ministry of Agricultural Development and the Hellenic Agricultural Organisation “DEMETRA” (ELGO- DEMETRA).
7. Georgios Meleneklis, representative of the Chairman of the agricultural and stoc- farmer cooperative “MENIKIO”.
8. Kyrilidis Georgios, Vice Chair of the agricultural cooperative “ELASSONA UNION”.

9. Ioannis Pazios, Director of Services and Deputy General Director of the Agricultural Cooperative “MESSINIA UNION”.
10. Ioannis Mitsopoulos, Vice Chairman of the International Hellenic University, Agricultural Department.
11. Theofanis Papas. Chairman of the Organization for payments and regulation of Union reinforcements, guidance and assurance. Also, Former vice District Manager of Agro-economy in the Central Macedonia District.
12. Christos Goundenoudis, Town Councilor of Peonia, former Mayor of Peonia and former Vice District Manager of Agro-economy in the Central Macedonia District.
13. Christos Dordas, Chair of the Agricultural Department of Aristotle University of Thessaloniki.

The workshop begun with salutations and acknowledgements by the members of the Agronutritional Cooperation of the Region Central Macedonia and an introduction to the NEXTFOOD PROJECT and the themes of the workshop by the American Farm School.

The conversation stimulated significant interest among the participants and they were all eager to contribute to the conversation. It was difficult to stay on the subjects as they were presented in the workshop guidelines. However, we are presenting to you the main results of the meeting, grouped in skills/competencies that were identified as necessary across the spectrum of agricultural activities, hindering forces for the development of the agricultural sector and suggestions for improvement in both first elements.

Skills/competencies across the board of subjects

- Quality/up to date academic knowledge
- Practical training (experiential knowledge and ability to relate)
- Familiarization with all the levels of production
- Familiarity and ability to Utilize the experience of previous generations
- Goal Setting
- Visionary thinking
- Personal motivation

Hindering forces

- The communication between actors and legal entities is very limited. E.g. ministries, academia, chambers of commerce, districts, municipalities etc. The practicalities of such communication are profound.
- Bureaucracy
- Lack of systematic record keeping of needs
- Lack of resources and funds
- Lack of legal frameworks that can support multi-actor networks
- Lack of communication with other countries
- Over-abundance of academics (The familial mentality of wanting all our children to be degree holders and "well-studied")
- Present educational programs lack applicability

Suggestions:

- Collaborations between Universities and market actors
- Adaptation of University curricula to the new CAP
- Better collaboration/communication between ministries
- Creation of inter-ministry networks/entities.
- The different commercial chambers playing an active role in the formation of university curricula.
- Formation of networks with all the interested actors and entities (e.g. ministries, chambers, universities etc.)
- There is a need to utilize the experience and good practices of foreign bodies. This may be done by organizing placement abroad and utilizing the people with such experiences.
- Formation of annual goals which will also be assessed and reappraised annually.
- Placements and practical market experience should be obligatory throughout University, not only 6 months at the end (organizations often use the interns for doing jobs that are trivial and far from their subject).

Annex 3.2. - ISEKI-Food Association Focus Group on Policy

8 October 2020 9H30 to 11H30 CEST

Workshop Report

Organisers:	Katherine Flynn, Line Lindner. ISEKI-Food Association
Participants:	Daniele Rossi (CONFAGRICOLTURA) Michele Distefano (CONFAGRICOLTURA) Simon B. Heath (ABDN) Pauline Boivin (Life Long Learning Platform) Rui Costa (EQAS-Food) Iring Wasser (ASIIN) Christin Habermann (ASIIN)

Before the workshop: Invitation sent which included Annex 1. The AKIS Framework and Annex 2. The SCAR Farm2Fork objectives

Workshop Organisation:

Welcome

Round Robin Introductions including participants' work relate to educational policy

Introduction

To the NextFOOD project; to Outcomes of WP4; to ISEKI case in the NextFOOD project, International Student Competition; and to the ISEKI problem related to policy: no recognition of non-university activities for university credit, (in the broader picture, particularly a problem for skills training as applied to sustainable food systems).

First round of introductory questions: Any best practices in policy supporting education and extra-curricular credit?

- It was mentioned that several initiatives are already in place for the incorporation of non-university activities such as the ECTS-system and the recognition of prior learning and that there are several quality frameworks in place (the Bologna process for HE and the Copenhagen process for VET too.
- The example was given of Italy where higher technical institutes combine formal education (5 years) with 2 additional years of practical training.

- In theory every university can give credits for any activity the student does. A student doing work study can go to the university and ask that it is included in the diploma supplement. But this depends on the university. Recognition of non-formal learning. Implemented in a different way in different countries and different institutions.
- Accreditation may be easier than policy changes. Credit for volunteering in Luxembourg for example.
- ASIIN can certify particular modules. Different universities/educational providers offer modules certified by ASIIN and a student can shop and take the modules they need.
- The example was also given of Indonesia where students must spend 6 weeks as part of their study programmes in the field or doing local community work and that this is an integral part of the educational system.

Second round of questions: What is missing in a unified European educational policy towards incorporation of non-university activities?

- The Indonesian example above, where students must spend 6 weeks in the field or doing local community work - something like this is missing at EU level.
- It was mentioned that there are several initiatives in Higher Education (HE), however, that in the field of vocational educational training, there is a lack of recognition of diplomas and in general of learning experiences. Furthermore, there is a lack of comprehensive policies and that validation strategies are missing in some EU countries.
- There are gaps and problems are in quality assurance, trust, validation of learning outcomes. Distrust between academia and e.g., NGOs providing trainings. Micro credentials and Open Badges are high on the agenda. The question is how to ensure quality?
- An integrated qualification framework is missing – there are now 2 or 3 separate systems. Bologna, Copenhagen, EAPA (European alliance professional accreditation).
- In Higher Education there may be more recognition of extracurricular activities, but NOT in vocational education nor in secondary education.
- A learning experience abroad is very hard to recognize by any formal educational system at any level.

- It might take several years for the hundreds and thousands of initiatives (companies are offering courses) to be recognized by universities. There may be a lot of initiatives in higher education.
- Cooperation between universities and NGOs is needed. We should explore how universities can contribute to the local community through extracurricular activities of students and faculty.

Third round of questions: What specific policy instruments could enable extra-curricular activities to provide credits for participating students / lifelong learners and for instructors?

- Several instruments were mentioned such as the fostering of projects on skills (soft skills, digital skills); ESCO as a policy instrument; and more and better cooperation among universities and external stakeholders.
- For instructors, instruments are at the university level. All staff is evaluated every year. Research record, pedagogical record, participation in scientific/management activities, student view. There is room for other things instructor does, such as extracurricular activities.
- University degree programs are accredited by a national agency. Must convince the accreditation agency that extracurricular activities (for students and faculty) should be included among accreditation requirements.

Consensus discussion: Farm 2 Fork objectives and about new policy instruments which could address the F2F objectives and gaps, organizers make a summary of new policies and instruments.

- Here it was questioned how degree programmes can accommodate the Farm2Fork goals and that 20-25 years ago the goals were much narrower and that the perspective has widened today to encompass the whole circular economy perspective.
- Concrete ideas were brought up relating to the promotion of research initiatives that examine the way in which and the extent to which HE is integrating sustainability aspects in their study programmes and curricula. Having information about the baseline will enable us to set concrete targets. It was also mentioned that there are already competence frameworks for sustainable

development in place and that the European Skills Agenda considers digital transition but that there is no mentioning of a green education plan.

- It was mentioned that several guidelines are already in place in HEIs to integrate sustainability in existing programmes covering the Farm2Fork goals, but that there is a knowledge gap at the secondary education level about agriculture.
- A competence framework for education for sustainable development is needed, one tailored to agrifood. There is now a European skill agenda for digital education –but not for green education. This will require cooperation between DGs.
- And finally, there was agreement among the participants that it is positive to see the Farm2Fork goals has a holistic approach integrating several EU authorities and responsibilities.

Annex 3. Information about the Workshop

Country	**Austria, but an international workshop**
Town	online
Venue of Workshop	GoToMeeting
Date of Workshop	8 October 2020
Starting and Ending Time of Workshop	09H30 to 11H30
Number of Participants and Gender rate	7: 5 males and 2 females
Other notes (if any)	Summary of the meeting above.

Annex 4. List of Participants

#	Name/Role	Affiliation/Institution
1	Daniele Rossi	(CONFAGRICOLTURA)
2	Michele Distefano	(CONFAGRICOLTURA)
3	Simon B. Heath	(ABDN)
4	Pauline Boivin	(Life Long Learning Platform)
5	Rui Costa	(EQAS-Food)
6	Iring Wasser	(ASIIN)
7	Christin Habermann	(ASIIN)
8		

Annex 3.3. – Norwegian University of Life Sciences - NMBU

8 October 2020

Workshop Report

Information about the Workshop

Country	**Norway**
Town	
Venue of Workshop	Digital (Zoom)
Date of Workshop	08.10.2020
Starting and Ending Time of Workshop	13:00-14:30
Number of Participants and Gender rate	4 (2 female, 2 male)
Other notes (if any)	

List of Participants

#	**Name/Role**	**Affiliation/Institution**
1	Employee	AgriAnalyse (research community)
2	Employee	Norwegian Agency for International Cooperation and Quality Enhancement in Higher Education
3	Employee	The Norwegian Farmer's Union
4	Employee	Norwegian Agricultural Cooperatives

Summary of the discussion: main messages, recommendations, ideas,

Note from interviewer: It was very challenging to keep the participants focused on certain objectives and questions, so therefore I've just left all the main points in one box. Many of the points are true for many objectives. I would say that in the Norwegian context, and based on the input from the participants, the food security and food fraud was not so relevant.

FtF objectives	Summary of main recommendations, ideas and proposals
Ensuring sustainable food production (in line with circular bio-based economy)	-All recommendations need to take the local context into account. For instance, the Norwegian agricultural political situation is not like the rest of Europe and is very important to take into account when making new suggestions. - One thing is to take students out into the field for field trips, however students should ideally be working in a farm for a couple of months. Participation should be very concrete. It would be good that students should document practical experience in order to get their certification for their education. -In all levels of education there should be increased use of practical training. Due to the cost of this, many institutions don't do it and then pushes it to the next level, for instance trying to get businesses to take on students for practical experience. This may be good, but the education should also be practical on its own. - Before anything else, there needs to be a better understanding of the terms and goals at the different levels of the AKIS system. We need a common understanding of the term sustainability, sustainable food production, a common understanding of the FtF goals etc. As of now, it is not clear. - If you stimulate the extension service in agriculture, and the motivation is very clear, then this can be used actively. We should then pay for a number of positions that have this responsibility and have the right competencies. - The main problem lies in the first column [skills and competencies needed], it concerns what we really want, while the other columns are more bureaucratic. If we want change to happen, we need to motivate farmers to change and then we need to focus on the things that motivate them. Everything should be motivated from economic and social part. It necessitates a very political understanding. The economic and political part needs to be put forward.

FtF objectives	Summary of main recommendations, ideas and proposals
	- How shall the existing primary producer develop his/her future competencies? The extension service is very central to this in Norway. Now we work a lot with building up a good vocational school sector, with possibilities for shorter education, courses etc. That's because farmers might notice that they need training in a certain, specific competence. People become farmers at a middle age (around 43 on average), so we would like to also motivate young people to take education to become professionals in agrifood and forestry. There should be a clear career path for them and not that they have to wait until they are middle aged. -We should build on existing structures, those that people already know and trust. - There are different educational levels here, but at the same time there is a constant flow of new knowledge. There will be a much larger spectrum of competencies that will need to be trained, so we need systems that support continuous learning. - There is now a focus on further learning of teachers, to keep them updated. But that's a challenge now. Also, a challenge of recruiting teachers. - We are now working on life-long learning. We are trying to bring that into the different levels of education and different systems. But how shall me do that? How shall we create incentives for international programs, either in Norway or EU programmes. The international programmes are easier to access. Life-long learning will be important to achieve the desired change. -Problem statement around teachers' power. Academics and teachers often don't really know the farmers' world. Is the recruitment good enough in relation to the local context? Academics can talk well etc., but they need to know the language etc. It is very difficult to recruit people in permanent positions. -The incentive system in academia (publishing articles) is actually wrong, it should change and should be based on what you contribute to society.

FtF objectives	Summary of main recommendations, ideas and proposals
	- In EU language: co-creation of knowledge: Across several levels and disciplines. That's a method to create a good connection to the local society. Triangle→ rectangle: education, research, business and the local society. This is the new dimension. The local society. It needs to be relevant for the local society too, directly. In projects done with local actors. -One really good example of a transdisciplinary school where there is good connection between different sectors etc is Mære landbruksskole. - Digital learning platforms: How will those be used to transfer knowledge to different settings and in different ways? It will be essential to get good at using digital learning platforms in the future. And this is pushed very abruptly with the situation now also. -Build further on the Erasmus+ projects, here one puts different people from different sectors together. Short, flexible, digital courses. -Regarding gender equality, role models are important. However, at high school level, there is an equal amount of female and male students. Summarising from each participant: -Focus should be on the farmers who will actually do the job. It is important that those who will teach them have the necessary practical experience and knowledge of the local agricultural political context. -Life-long learning is very important. + Make it attractive to start specialising towards food and farming/forestry early in the education track.

FtF objectives	Summary of main recommendations, ideas and proposals
	-Life-long learning is important. Create a niche-programme for educating people in sustainable food production/processing/consumption etc. + Flexible education routes. Allow people to cross disciplinary boundaries more easily. -Important that governmental institutions set a clear definition of the terms from an early point in time.

ADD THE FULL COLLATED TABLE FROM EXPERTS REACTIONS AT THE END IF POSSIBLE

Table from one participant:

FtF topic (objective)	What lacking skills and competencies are needed to achieve these objectives?	How can education and training policy contribute?	What (changes in) education policy instruments are needed?	What roles can different AKIS (and other) actors play?	Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics (1-6)?
Ensuring sustainable food production (in line with circular bio-based economy)	• Connection between theory and practice • Sector-specific knowledge and adequate training • Cross-sectoral approach, when needed • Digital skills • Motivation • Awareness • Teamworking, interpersonal skills, and communication • Involving the local community. • Networking • Knowledge about proper funding instruments • Lifelong learning • Leadership	Develop suitable tools and incentives	Cross-sectoral, interdisciplinary approaches Problem-based approach (real cases to solve which meet the needs of companies or organisations) Instruments promoting student active learning Instruments promoting the inclusion of students into research projects	Facilitator and policy developer and adviser (guidelines)	Co-creation (different actors working in teams based on concrete needs) Gender equality, digital transformation and environmental awareness as horizontal priorities in programmes
Ensuring food security	Same as above	Same as above	Same as above	Same as above	Same as above

Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices	Same as above	Same as above	Same as above	Same as above	Same as above
Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets	Same as above	Same as above	Same as above	Same as above	Same as above
Reducing food loss and waste	Same as above	Same as above	Same as above	Same as above	Same as above
Combating food fraud along the food supply chain	Same as above	Same as above	Same as above	Same as above	Same as above

Table from another participant:

FtF topic (objective)	What lacking skills and competencies are needed to achieve these objectives?	How can education and training policy contribute?	What (changes in) education policy instruments are needed?	What roles can different AKIS (and other) actors play?	Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics (1-6)?
Ensuring sustainable food production (in line with circular bio-based economy)	Clear and common understanding of what we mean by sustainable food production. Understanding of benefits and risks related to implementing sustainable food production. How will future markets and policy frameworks regulating sustainability look like?		Education policy needs to be developed parallel to policies stimulating sustainable food production (market development, legislation, incentives etc). Emphasis should be put on training and advisory services	Authorities should, in close collaboration with the private sector and scientific community, develop the political framework for sustainable food production. This include definition, policies, legislation, market instruments etc. Producers need a clear framework. It is also necessary for the producers to imagine profitability if changing behaviour. Otherwise, they will not be motivated to acquire new knowledge.	

Table from another participant:

FtF topic (objective)	What lacking skills and competencies are needed to achieve these objectives? Tolkning: Hos den	How can education and training policy contribute?	What (changes in) education policy instruments are needed?	What roles can different AKIS (and other) actors play?	Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics (1-6)?
Ensuring sustainable food production (in line with circular bio-based economy)	Competence regarding sustainability and climate. Adaptation to climate change on several levels.	More food producers who are competent in agriculture and able to acquire ne knowledge. They need to be more offensive, adaptable etc. Better connection throughout the entire education system in agriculture and food production. Today there is little connection between high school, occupational schools, universities etc.	Technology development + better access to modern equipment in schools Better inclusion of research/new knowledge in the education systems Hinder the decrease of practice arenas in resource demanding courses related to agriculture. Strengthen vocational school education Strengthen collaboration/connection between the different levels in the education track	Ministry of agriculture should push the agenda to the ministry of education. Make strategies coherent.	
Ensuring food security			Knowledge about climate change adaptation and risk prevention measures in the educations.		

Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices		Access to shorter education tracks to top off the competence people already have within food, local food, travel etc.	High schools: Look to the study programs in nature, restaurant management and food. Make a better connection between the fields. Less silo thinking.		
Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets		Schools should become better at communicating their key competence from their activities to the public. Avoiding that the usual public speakers dominate the «truth». This counts for multiple other points as well.	High schools: Strengthening of recruitment to studies focused on nature exploitation (farming, fishing, forestry etc.)/increase the general knowledge within this area. (This is already partially dealt with through new curriculum plans where a new transdisciplinary theme on sustainability is included.)		
Reducing food loss and waste			Same as above + circular resource use should be included in school. Higher education: courses focusing on circular strategies/resource exploitation.		
Combating food fraud along the food supply chain			Awareness among those who is educated to handle food. (I have little competence on this subject)		

Annex 3.4. – Roskilde University

21 September 2020

Workshop Report

Identification of Strategies for Improvement in the Agrifood and Forestry Sector

21 September 2020, Roskilde, Denmark

Introduction

This document reports on the details and outcomes of a pilot workshop in Denmark, carried out within the context of Task 4.2. of the H2020 NextFOOD project, that focuses on identification of strategies for improvement in the Agrifood and Forestry Sector. In a nutshell, the task 4.2. aims to propose strategies for policy improvement of research and education in the field of agrifood and forestry, by identifying options for improved policy instruments in different context scenarios. Changing education means (e.g. action learning), use of perspective technology (e.g. digital instruments), forms of organisation (e.g. communities), as well as issues related to gender are specifically targeted.

Details about the Workshop

Date and Time

The workshop has been conducted on 21st of September, 2020, in a conference room at Roskilde University and according to the Corona restrictions and meeting guidelines at that times. It was facilitated by Roskilde University (Niels Heine Kristensen and Pernille Nielsen). The workshop started at 11.00 and lasted till 13.20. A light lunch was served.

Invitation of Stakeholders and the Participants of the Workshop

Originally, 7 experts who are either responsible for or are engaged in education and/or policies in the agrifood and forestry sector were identified and invited to take part in the workshop. They were all contacted by phone by the Roskilde University team, with a follow up on e-mail.
The experts that were invited came from either academic, higher level institutions and industry organisations. We had two cancellations of participation the day before the workshop should be conducted. As a result, 5 experts (two from vocational education, a university professor, one industry officer, one food policy officer) participated.

Table 1: Participants of the Workshop

VL: **[University professor, educator, agronomist]**
RW: **[Vocational educator, agro production, primary producer]**
CK: **[Leading position, Danish Veterinary & Food Administration*, Sustainable food and health]**
*representing the demand side of education. Not representing the Danish Veterinary & Food Administration's official stand.
MJ: **[Member of the educational committee of vocational gastronomic educations, trained chef]**
MEJ: **[Leading position, Vocational education of food and gastro fields, trained chef]**
NH: **[workshop responsible, university professor, educator, food studies]**

PN: **[Workshop responsible, Ph.D. fellow, modern food systems]**

The discussion revolved around two central themes: The ability of students whether that be gastro or agro oriented, to understand and utilize the understanding of their position and knowledge in a larger value chain/system context and the need for continuing education/lifelong learning in regards to sustainable practice certificates or courses. The discussion was kept on a broad level within the areas of vocational gastro and agro education as well as academic agro education – thus not covering the specificity of sustainable practice but to a larger extent the framework of education.

FtF objectives	**Summary of main recommendations, ideas and proposals**
Ensuring sustainable food production (in line with circular bio-based economy) Ensuring food security	**A: What lacking skills and competencies are needed to achieve these objectives?** **[University professor, educator, agronomist]** highlights students' lack of ability to contextualize, put their knowledge into play in different contexts and reflect on own skills and competencies. Most central, the lack of ability to act and use the sometimes very specific knowledge they gain to bring change. If they are trained in how to approach problems they are not familiar with, they learn how to apply their knowledge and what sort of questions to ask. **[Vocational educator, primary production, primary producer]** State that vocational agro education is often challenged by conservative students. Highlights a difference between the very young students, affected by an upbringing in agro industry and an industrial approach and then the more seasoned students having had the time to orient themselves in society. How to break through to the business as usual conservatism characterizing the students of the first group? Points out that this is a challenge that goes beyond education. Also highlight the need to strengthen the ability of students to apply holistic thinking, inclusion of LCA. Sustainability in the current educational context is characterized by niche thinking (now everything needs to be about insects or vegetarian food) and often removed from a larger context, allowing it to be utilized as people please without consideration of systemic context. **B: How can education and training policy contribute?** **[University professor, educator, agronomist]** + **[Vocational educator, agro production, primary producer]** pay more attention to getting students off campus and into the reality of production to test their knowledge and tools and learn to how apply them. **C: What (changes in) education policy instruments are needed?** **[Vocational educator, agro production, primary producer]** points to a need for continuing education/lifelong learning in regards to sustainable practice. Many primary producers and agro professionals are educated in their start 20ies and rely on further acquisition of knowledge through profession specific literature/magazines. Although controversial, emphasizes the need for more degree of obligatory continuing education/lifelong learning in regards to sustainable practice. How are we to change a society if the majority of people occupying positions are not trained to combat new types of challenges the next 40 years of their remaining time on the job market? Reproducing the old paradigms. Compares with regulations such as mandatory and points out that we should not be afraid to address this issue, that people generally would like to improve their skills and knowledge. Perhaps combined with some kind of award for doing so. Highlights the need for this to be a top down arrangement. **D: What roles can different AKIS (and other) actors play?**

FtF objectives	Summary of main recommendations, ideas and proposals
	[University professor, educator, agronomist] challenge the concept of the AKIS model, stating the division of actors as either needing, producing or exchanging knowledge. Everybody does all and should be considered as such. Identifies the divided perception as one of the problems within research communities such as universities: educating candidates that "deliver" specialized knowledge to the people putting that knowledge into use. The candidates need to know how to utilize their knowledge, put it into play in society. Dream about more actual *From farm to fork* exercises where farmer and chef are put into each other's production realities. Has experience with a large degree of "eureka effect" amongst students/professionals about practices elsewhere in the value chain affecting their own area of expertise and that this understanding is long term. Emphasizes the ability of understanding foreign vantage points and viewpoints to affect own practices. However, such learning initiatives are not rewarded today in terms of resources spend on planning and executing. Furthermore, peer-reviewed research is far more valued than candidate output of courses thus reducing the occurrence of such beneficial initiatives (as the one described above). Stresses the importance of awarding this form of education, perhaps through stating that all large EU projects on the subject of sustainable food should include deliverables of cross chain engagement education locally in the education institutions. **[Vocational educator, primary production, primary producer]** Also within agro professions, candidates and professionals need to come out of their specialized silo and see the larger value chain. If they are to take responsibility of sustainable practices, they are to experience different contexts. It is not enough just to verbally tell them. **[Leading position, Vocational education of food and gastro fields, trained chef]** In many cases, vocational gastro students have had to actually stand in a field (the agro production reality) to understand that sustainability is not a product, but a process. **[Member of the educational committee of vocational gastronomic educations, trained chef]** concurs on actual *farm to fork experience* and emphasizes similar restrictions on the vocational gastro educational side. With a finite length of the education, more focus on sustainability will result in less focus on something else – why a re-evaluation of the length might be necessary. **E: Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the FtF topics (1-6)?** **[Vocational educator, primary production, primary producer]** No experience of issues with inequality of gender. **[University professor, educator, agronomist]** Mentions an overrepresentation of female students and underrepresentation of female educators.
Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices --- Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets ---	**A: What lacking skills and competencies are needed to achieve these objectives?** **[Leading position, Vocational education of food and gastro fields, trained chef]** highlights students' lack of ability to put professional knowledge into a larger context amongst vocational gastro students. As well as their ability to see their own profession and position in a sustainable food production. Points out a separation of sustainability and sensory quality discussion often leading to the two being perceived as opponents. **[Leading position, Danish Veterinary & Food Administration*, Sustainable food and health]** have long hired strictly nutrition professional candidates but acknowledges that the demand for candidates that are also knowledgeable on climate- environmental and resource knowhow are increasing within own organization. **B: How can education and training policy contribute?**

FtF objectives	Summary of main recommendations, ideas and proposals
Reducing food loss and waste	**[Member of the educational committee of vocational gastronomic educations, trained chef]** are currently in the early stage of developing the basis of a vocational sustainability gastro education (post-education) seeking to standardize educational metrics so courses are easier to market for the schools and easier to navigate for the demand side. Emphasizing the challenge choosing to be proactive in the supply of candidates with sustainability competencies or having to wait for national/corporate demand to crystalize. **[Leading position, Vocational education of food and gastro fields, trained chef]** In vocational education in xx country, for sustainable practices to be sufficiently included in the education, employers need to demand candidates with said competencies. Very demand driven. **C: What (changes in) education policy instruments are needed?** **[Leading position, Vocational education of food and gastro fields, trained chef]** sustainability is not a large part of the vocational gastro education. This could be emphasized stronger in the educational executive orders from the ministry. Emphasizing that sustainability needs to become more of the target than just the means. **[Member of the educational committee of vocational gastronomic educations, trained chef]** concurs with sustainability being more of a means than a target at the moment and that this should change however emphasizing that gastro candidates should not become experts in sustainability- more that sustainability should resemble hygiene - deeply intertwined in all processes of the operations. **[Member of the educational committee of vocational gastronomic educations, trained chef]** points to a pivotal problem of resources in the educational sector. Vocational education is market driven. Without strong demand for courses in sustainable practices, classes are not filled and courses are not held. Points to the need for (lifelong learning/continuous learning/post-education) being mandatory to a larger extent, or nudged more than it is today. Currently it is optional and many are not taking the time although they have the right of a certain number of days of post-education. **[Member of the educational committee of vocational gastronomic educations, trained chef]** compares with mandatory certificates in the transportation sector to be renewed within given intervals and points to the need for politically decided measures in this area – everybody working with food should be obliged to have a profession specific sustainability course/certificate to be renewed within given intervals. **D: What roles can different AKIS (and other) actors play?** **[University professor, educator, agronomist]** points to the possibility of a corporate driven regulatory frame like e.g. Global Gap in terms of lifelong learning/continuous learning/post-education or sustainable practice certificates. In this way, focus is shifted away from national regulation, which is unattractive for many people. Perhaps combined with a larger degree of on-site company education, it would feel like less of a state intervention, historically known to discourage the more conservative target group – less prone to change. Schemes such as Global Gap are already in process many places and perhaps the education of staff could be included relatively easy. (Applicable both for agro and gastro education). **[Leading position, Danish Veterinary & Food Administration*, Sustainable food and health]** Are increasingly working in mutually binding partnerships with cross value chain actors driven by a shared purpose and therefore concurs with the above. Although having so far revolved around health, partnerships on sustainable practices are gaining in numbers. However, points to the importance that sustainability practice certificates/courses are thoroughly quality checked and regulated so that they are

FtF objectives	Summary of main recommendations, ideas and proposals
	not watered down or subject to fraud. **[Member of the educational committee of vocational gastronomic educations, trained chef]** Points to the need for the certifications/courses to be rooted in person as opposed to online, in order to strengthen the capacity to engage people in discussion of the subject of sustainability. One thing is to have a course, another thing is getting people to act -this requires engagement. **[Leading position, Danish Veterinary & Food Administration*, Sustainable food and health]** Points to the need to acknowledge the abilities of the target group when discussing obligatory certificates. Some in these professions are perhaps inproficient in the native language. **[Member of the educational committee of vocational gastronomic educations, trained chef]** Emphasizes that organizations/corporations/institutions can require certain standards for staff sustainability practice certification prior to buying a service, e.g. a catering scheme. This would be demand driven procurement practices and is already evident amongst some of the large retail and hospitality chains in terms of sustainability measures and certification schemes because they can see the market moving in this direction. **[Leading position, Vocational education of food and gastro fields, trained chef]** Concurs with certification idea and points out that training and education are often better accepted when done on-site in the company/organization, however this can be a costly method for the vocational schools. **E: Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the FtF topics (1-6)?** **[Member of the educational committee of vocational gastronomic educations, trained chef]** Mentions equal representation on the admittance and completion of vocational gastro education but overrepresentation of men in the professional gastro business due to long and weekend-based workhours incompatible with current social division of work in the home. Reports that female candidates tend to be moving to more meal oriented professions such as public institutions and food service. **[Leading position, Vocational education of food and gastro fields, trained chef]** Reports fairly equal representation of students. **[Leading position, Danish Veterinary & Food Administration*, Sustainable food and health]** Reports that recruiting male candidates are a challenge for the organization. Primarily due to the overrepresentation of females amongst nutritional candidates.

FtF objectives	Summary of main recommendations, ideas and proposals
Combating food fraud along the food supply chain	**A: What lacking skills and competencies are needed to achieve these objectives?** **B: How can education and training policy contribute?** **C: What (changes in) education policy instruments are needed?** **D: What roles can different AKIS (and other) actors play?** **E: Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the FtF topics (1-6)?**

Annex 3.5. – Skogforsk and Lund University

26 August 2020

Workshop Report

Pilot Workshop: Identification of Strategies for Improvement in the Agrifood and Forestry Sector

August 26, 2020 - Skogforsk and Lund University, Sweden

Introduction

This document reports on the details and outcomes of a workshop carried out within the context of Task 4.2. of the H2020 NextFOOD project, that focuses on the Swedish Forestry Sector.

The purpose was to identify and propose strategies for policy improvement of research and education in the field of forestry

The workshop was conducted as a collaboration between two of the NextFOOD partners in Sweden; Skogforsk and Lund University.

Adaptation of themes to be addressed
According to the original instructions, the workshop is based on objectives of the Farm and Fork Strategy. However, the topics addressed are not directly applicable to the forestry area.

To be able to discuss education and policies from a forestry perspective we have adapted the matrix and included themes and questions of relevance for Swedish forestry (see Appendix 1).

Focus will be on identifying options and strategies for creating a bridge between industry and forestry education on different levels in Sweden (see Appendix 2) in the light of target areas from the Swedish National Forest Programme. It is also possible for participants to add additional issues that are not directly covered by the National Forest Programme.

The strategy for the National Forest Programme focuses on objectives for five main areas:
1. Sustainable forest management with improved climate mitigation
2. Multiple uses of forest resources for more jobs and sustainable growth throughout the country
3. World-class innovation and processed forest products
4. Sustainable use and conservation of forests as a profile issue in Sweden's international cooperation
5. A knowledge leap to ensure the sustainable use and conservation of forests

Details about the Workshop

Date and Time

The workshop has been conducted on August 26, 2020 online, using Zoom by the facilitation of Håkan Jönsson at Lund University together with the Skogforsk project team (Magnus Thor, Tomas

Johannesson and Lotta Woxblom). The workshop, which started at 13.00 lasted 2,5 hours, was conducted in Swedish.

Invitation of Participants of the Workshop and Consent

Six experts who are either responsible for or are engaged in education, policies and/or skills supply in the forestry sector were invited to take part in the workshop. All these experts were initially contacted directly by the Skogforsk team to ask for their participation. Both the invitations as well as the follow-up of confirmation of attendance have been conducted through e-mail. Finally, an online meeting invitation has been sent to all participants that have confirmed their participation. The experts that were invited came from both academic institutions and industry. In addition to these six experts, the Skogforsk team participated in the workshop. The workshop was led by a member of the Nextfood-project from Lund University. In total 10 persons participated in the Workshop. Organizations represented and professional roles of the participants are presented in Table 1.

Table 1: Participants of the Workshop

Organisation	Institution /department / unit	Professional role
Swedish University of Agricultural Sciences, SLU	School for Forest Management	Director of studies and lecturer at Bachelor of forestry program
Swedish University of Agricultural Sciences, SLU	School for Forest Management	Head of department and senior lecturer
Swedish University of Agricultural Sciences, SLU	Department of Forest Ecology and Management; Forest and Health Unit.	Lecturer and chairman of the Committee of gender equality and equal opportunities at Faculty of Forest Sciences
Swedish University of Agricultural Sciences, SLU	Department of Forest Biomaterials and Technology	Professor and vice dean for basic educations at Faculty of Forest Sciences
Swedish University of Agricultural Sciences, SLU and Skogforsk	School for Forest Management (SLU), Value chains (Skogforsk)	Adjunct lecturer (SLU), Project leader (Skogforsk)
Skogforsk	Forest operations	Researcher
Skogforsk	Management	Director Research and Innovation
Lund University	Department of Food Technology, engineering, and Nutrition	Associate Professor, senior lecturer, researcher
Holmen Skog	Management	HR Manager
The Swedish Federation of Green Employers	Labour market and skills supply	Expert

All participants gave their consent to voluntarily participate in the NextFood research project and that the workshop was recorded. (The recording for internal use by the Swedish research team only).

Program of the Workshop

The workshop started with a presentation of the participants, followed of a short introduction to the Nextfood project, WP 4 and the objective of this workshop and the details regarding a table to be filled during the workshop by the moderator/facilitator from Lund University. The table was shared with participants prior to the workshop. An introduction of participants and consent was followed by a discussion based on questions in the matrix

Round of discussions

The first round of discussions was initiated with the general questions of:

- Supply of skills – educational system, recruitment base
- How can educational policy improve forestry sector and young professionals' needs?
- Which policy instruments could be proposed to achieve this goal?
- Strategies for creating a bridge between forest industry and education

After a 10 min break, the second session was more dedicated to the objectives of the national forest program, and future oriented actions to be taken.

Key messages emerging from the workshop

THE MAIN MESSAGE WAS ELEGANTLY FORMULATED BY ONE OF THE PARTICIPANTS:

We must give ourselves the chance to be the future!

In addition, the following messages emerged from the workshop:

1. ***Flexible teaching and geographical accessibility to broaden the recruitment base***

The geographical profile of forestry education (schools and campuses are mostly based in small cities in remote areas) is a major impediment to attract groups outside the traditional base for forestry work. To increase diversity in terms of socio economics, ethnicity and gender, measures should be taken. Distance learning approaches have been promising for broadened recruitment. More flexible learning approaches than rigid programmes with prerequisites, fixed semesters, limited or no work placement during the programmes etc was recommended as a way forward.

2. ***Find a balance between theory and practice.***

In recent years, a gradual" academization" of forestry education is noted. To some extent this has been beneficial in terms of critical thinking etc, but there is a risk that practice based learning elements are downplayed. Closer collaboration between educational bodies and industry was recommended.

3. ***Joint efforts to develop work placement and applied projects***

The meeting concluded that it is not possible to include more elements in most programmes or put more pressure on students. Supervising students is a time-consuming task for people in the industry, characterized by lean management. "Work smarter" by joint efforts rather than "work harder" was recommended as strategy.

4. ***Avoid "more of everything" approach***

The knowledge area (modern forestry) is complex and includes potentially many aspects. But there is a risk when programmes try to deal with all aspects related to forestry. Specific focus areas should be defined for each education course/programme.

5. ***The 1-year introductory program should be permanent and communicated***

The program has been a good way to broaden the recruitment base of students (more women and males from non-traditional forestry student groups). Since this type of program is uncommon in university education, the funding has been insecure. Long term funding should be guaranteed, and the benefits of the program clearly communicated to students and stakeholders.

6. ***Campus based learning vs lifelong learning and free-standing courses.***

At SLU, main focus has been on campus-based learnings. Free standing courses and lifelong learning courses have been given lower priority and/or seen as compensatory activities when there have been few students on the regular programmes. To be able to focus more on lifelong learning a clear policy decision must be taken. Free standing courses can be a good way to give a forestry profile to students and professionals with education in business administration, natural sciences etc.

7. ***Increased attractivity***

The industry must be perceived as attractive. The participants agreed on the need to find ways to attract more students. This is not solved by a new pedagogical model or that you have education at a distance or on campus, a broader approach must be taken.

8. ***Storytelling - a way to communicate with new target groups***

To increase the number of students applying, we must reach and attract those who interested in forestry but who do not find their way to SLU. It was emphasized that the forest industry, with sustainable raw materials and the circular economy approach, has a fantastic story to tell and that this should be used in a better way! To make education and work life in the forest industry attractive, it is important to create a belief in the future and show that forestry is actually something that belongs to the future. Anyone studying a forestry education should know in advance that there are summer jobs and internships and that you have a future to go out to.

9. ***Engage and interact with the outside world***

There are many critical voices when it comes to both agriculture and forestry that one must learn to meet in a dialogue. To handle the polarized debate on issues of both agriculture and forestry, a broader competence needs to be built in these industries. In the broader education programmes, it should be encouraged to critically examine different perceptions of modern forestry and agriculture, to encourage a fruitful dialogue with actors outside the forestry sector.

10. ***Broader competence through collaboration and mixing competencies***

In order to cover the various target areas within the national forest program - sustainability, logistics, nature conservation, innovation, etc. - and to create the innovative force needed to meet changes in the outside world, ways must be found to collaborate with other disciplines and industries. Already at the educational stage, students should be given the opportunity to collaborate with other higher education institutions, in courses or in various projects, to expand their competence even outside the forest core competencies.

11. *Multi-faceted forestry entrepreneurship*

There are many who want to conduct various forms of business in forest and land. The areas can be used to create income and jobs, without being managed in traditional ways, by a landowner. Such entrepreneurship is currently mostly based outside the traditional forestry business and education. It is important that SLU and the forestry industry collaborate and communicate with the new entrepreneurs. At SLU in Alnarp, there is a master's program called Outdoor environments for health and well-being. The application rate is high and the students who join this program do not belong to the traditional group that so far has completed the forestry educations. Many are career changers and several of the students want to start different forms of outdoor or nature experience companies. They have no prior experience of forestry, but they become very interested a different perspective than the traditional group, they talk about forest spas etc. It is important that forestry actors are aware of these thoughts because this may create a conflict around, for example, the balance between production and more social values.

12. International outlook and collaboration

Policy already encourages international collaboration, which was reinforced as an important part of future policy by the meeting. During the study period, SLU students get international connections and contexts both in individual courses and on international trips that are part of various educational programs. In one of SLU's policy documents, there is a stated goal that a certain proportion of students' study part of their education abroad. This also means that SLU must adapt the educations to receive foreign students. In 2021, a new program will start in collaboration with Wageningen University in the Netherlands. The idea is that the students start their studies at SLU for two years and then are offered to study their third year in Wageningen. The program is in English and the hope is that it will attract an international group of students at the bachelor's level, something that you do not have today.

13. Changes of policies – recommendations

- The increased focus on traditional academic approaches to education has ultimately made collaboration between education and companies more difficult. A policy shift to more flexible forms of education that are linked to universities but are not traditional educational programs was recommended
- Prerequisites (prior knowledge requirements) exclude many potential candidates to forestry education. A Swedish paradox is that it is easier to go from a practical upper secondary school to a theoretical university education with practical elements than the other way around. Change to more flexible ways to evaluate prior knowledge.
- Static education volumes make it difficult for universities and universities to adapt when the industry changes. More flexible ways of determining the number of students should be installed to facilitate structural changes in industry.
- Difficult to change profession in Sweden, lifelong learning has been a buzzword, but not been encouraged in practice. Change policy and encourage courses for people that want to change profession in midlife.

Appendix 1.

The matrix used to prepare and conduct the workshop, and an attempt to sort the outcomes in the pre-defined fields.

Area of objective (from the Swedish national forest programme)	What lacking skills and competencies are needed to achieve these objectives? Among e.g.: - *Teachers* - *Students* - *Researchers* - *Professionals* - *Companies*	How can education and training policy contribute? - *Internships* - *Authorizations/approval to public agencies and authorities* - *" Academization" of education programs*	What (changes in) education policy instruments are needed? - *The importance of the forestry preparation year in the Swedish context*	What roles can different AKIS (and other) actors play? - *SLU* - *The sector* - *Public actors (career guides in schools/public authorities/ministries)*	Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics (1-6)? - *#metoo and #slutavverkat – what has happened and what remains?*
Sustainable forest management and improved climate mitigation (*forest production, retention, biodiversity,…)*	"Work smarter" by joint efforts rather than "work harder"	Closer collaboration between educational bodies and industry			
Multi-objective forestry for more jobs and sustainable growth throughout the country (*multi-functional forestry, gender equality, …)*	Engage and interact with the outside world		Specific focus areas should be defined for each education course/programme (avoid "more of everything"). This is		

			applicable for most cells in this column.		
World-class innovation and processed forest products *(building with wood, supply systems, value chains, digitalization, circularity…)*	Engage and interact with the outside world. Broader competence through collaboration and mixing competencies.	Closer collaboration between educational bodies and industry			
Sustainable use and conservation of forests as a profiled item in Sweden's international cooperation			International outlook and collaboration, e.g. Wageningen case.		
Competence supply, Attractivity of the sector	"Work smarter" by joint efforts rather than "work harder". Story-telling – a way to communicate with new target groups of prospective students and stakeholders. Multi-faceted forestry entrepreneurship	Closer collaboration between educational bodies and industry. Increased focus on life-long learning. Free standing courses can be a good way to give a forestry profile to students and professionals with education in business administration, natural sciences etc. Multi-faceted forestry entrepreneurship.	Distance learning and teaching. Less rigid programmes. The program has been a good way to broaden the recruitment base of students (more women and males from non-traditional forestry student groups). Secure long-term funding communicates the benefits of the	We must give ourselves the chance to be the future! Prerequisites (prior knowledge requirements) exclude many potential candidates to forestry education. A Swedish paradox is that it is easier to go from a practical upper secondary school to a theoretical university education with practical elements than the other	Distance learning and teaching. Less rigid programmes.

		More flexible forms of education that are linked to universities but are not traditional educational programs.	program clearly to students and stakeholders. Prerequisites (prior knowledge requirements) exclude many potential candidates to forestry education. A Swedish paradox is that it is easier to go from a practical upper secondary school to a theoretical university education with practical elements than the other way around. Change to more flexible ways to evaluate prior knowledge.	way around. Change to more flexible ways to evaluate prior knowledge. Static education volumes make it difficult for universities and universities to adapt when the industry changes. More flexible ways of determining the number of students should be installed to facilitate structural changes in industry.	

Appendix 2

6.1 Forestry education in Sweden – overview

Upper secondary school
Natural Resources – Forestry
- 3 years
- several locations in Sweden

Preparatory year before Bachelor of Science in Forest Management
- 1 year
- students with a background other than Natural Resources – Forestry
- at 2 upper secondary schools in collaboration with SLU

Higher Vocational Education (HVE)
A post-secondary form of education combining theoretical and practical studies in close cooperation with employers and industry. Programmes offered in specific fields where there is an explicit demand for competence.

For example:
- Forestry planning, forestry machine engineer

University level
Swedish University of Agricultural Sciences (SLU)

Degree of Bachelor of Science in Forest Management
- 3 years
- on campus-education
- 60 students per year admitted

Master of Science in Forestry
- 5 years
- on campus-education
- 80 students per year admitted

Linnaeus University (LNU)
Bachelor of Science in Forest Sciences Program
- 3 years
- Distance learning

Annex 3.6. – University of South Bohemia

26 August 2020

Workshop Report

Information about the Workshop

Country	**Czech Republic**
Town	České Budějovice
Venue of Workshop	Prague, Brno, České Budějovice (on-line)
Date of Workshop	25.8.2020, 27.8.2020
Starting and Ending Time of Workshop	10:00 - 14:00 (25.8.2020) 10:00 - 12:00 (27.8.2020)
Number of Participants	3 (25.8.2020), 1 (27.8.2020)
Other notes (if any)	

List of Participants

#	**Name**	**Affiliation/Institution**
1	Ing. Pavel Smetana, Ph.D.	University of South Bohemia in České Budějovice
2	Bc. Anna Packová	The National Institute of Public Health
3	Ing. Marta Mrnuštík Konečná	Institute of Agricultural Economics and Information
4	Ing. Martin Charvát	Ministry of Agriculture

Summary of the discussion: main messages, recommendations, ideas, proposals

FtF objectives	Summary of main recommendations, ideas and proposals
Ensuring sustainable food production (in line with circular bio-based economy)	Sustainable food production is threatened by the imbalance of the sustainability pillars in practice. Primary agricultural production, as well as processing, are permanently under economic pressure from the global market. The level of knowledge is relatively good in all the fields concerned, however, what is often a problem is well-established practice and fear of change, and sometimes also long-term contracts with input suppliers. Many farmers underestimate negative externalities and lack the ability to eliminate them. There is also a problem in the abundance of documents and regulations, whether at EU or national level. Spreading best/good practices examples would help with harmonization of regulations and the thinking and actions of producers. We need more examples of the fact that it is possible to harmonize the economic and environmental aspects of food production and find new agroecological methods in cooperation with practice. For researchers, educators and counsellors, this implies the need for close collaboration with practitioners, cyclical learning, a holistic approach, support for creativity and innovative thinking. The education about a sustainable life beginning in primary school and the progressive change of lifestyle gradually bring a society-wide and long-term effect. Consumer demands motivate suppliers to change. Educators must choose the right ways of informing (individual approach to individual groups of people and their ability to understand the topic) to provide truthful information, advice and help.

FtF objectives	Summary of main recommendations, ideas and proposals
Ensuring food security	Food security depends not only on the primary production stage, but also on processing and distribution. All stages influence one another. The preference of the economic effect in any of them reduces food security. Food security relies on the ability to produce food while reducing residues of pesticides, drugs and other substances used in primary production and especially in processing. What currently increases food security are changes in standards. They can lead to a prohibition or sanctioning of unhealthy foods (similar pressure as with alcohol and tobacco). The change in consumer requirements is an important factor. Attitudes of consumers depend on permanent education at school and public awareness. Education and upbringing should emphasize environmental aspects. The consumers' knowledge and their interest in paying for better and healthier food puts pressure on supermarkets not to artificially/disproportionately increase the price of better-quality products. (E.g.: Bioproducts).
Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices	Currently, a radical solution may be to ban or sanction unhealthy foods (similar pressure as with alcohol and tobacco). In the long run, however, a change in the lifestyle of consumers is necessary. Their demand will fundamentally affect retail chains in the supply of sustainable food. A key tool for the sustainable production (processing) of food is the use of the potential of a developed school canteen system for education on healthy eating and lifestyle. This is helped by practically and manually oriented supplementary teaching at elementary and primary school. For basic education and general consumer awareness, it is important to know what ecological footprint individual technological procedures have. Creating a form of visualization of the "ecological footprint of production and distribution" displayed on the product. At a general level, wide distribution of the knowledge of nutrition and the importance of individual nutrients and the recommended daily intakes. It is not necessary to introduce the values that food is supposed to have. Rather, I lean towards the so-called traffic lights, which they have in the GB, where it is visually shown on the goods which nutritional values exceed the recommended dose. The market will take care of the rest. At the level of vocational education, teaching about the options of production of nutritionally valuable products and their distribution with a minimal "ecological footprint" It is important to create a greater connection between science and practice and to share good practice, which will motivate entrepreneurs to cooperate with research. To support sustainability, it is important

FtF objectives	Summary of main recommendations, ideas and proposals
	to study the preservation of nutritional values and, in cooperation with practice, to introduce new agroecological methods of production, packaging and distribution, further analyse the composition of waste from the processing of agricultural products and food production and promote the possibilities of its further use. Reduction of waste from the processing of agricultural products and food. There is a lack of professionally trained staff at all levels involved in catering services. Education policy is too focused on university education and high expertise – focus should be placed on practice and training of field workers – chefs. Making more attractive the fields preparing a new generation for catering services, focusing on secondary and apprenticeship education Recognition of farmers and food producers for working with scientists and teaching other farmers and food producers by example (demonstration farms, etc.)
Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets	It is a society-wide process. The ability to distinguish sustainable and healthy foods at all levels (producers, control, and especially consumers) plays an important role. Promoting "simple" solutions – the needs of metabolism, the contribution of individual foods to the development of the organism at different stages of life, and physical and mental stress. Deepening the awareness of the contribution of individual foods to the state of organism in relation to metabolic processes in it. Using, for example, social networks to focus on different groups of the population and acquaint them with the physiological process during metabolism and the ways in which they can positively influence this process towards better health Limitations of aggressive advertising and offers, especially for children, restricting business with unsuitably processed products, appealing to the health economy. Also finding an answer to the question why, for example, nutrition therapists or university-educated people in a similar field do not participate more in activities towards eating together. Focus on supporting the education of regular workers working in the operation, practice.

FtF objectives	Summary of main recommendations, ideas and proposals
Reducing food loss and waste	The basic means is a widespread call for personal responsibility through higher awareness. Knowledge of how much can be saved if food is not wasted – not only in one's own wallet, but in relation to the environment (food waste disposal), how to utilize waste in one's own household. Information on the usability of food waste for one's own household, knowledge about the production and the economy of the whole chain from production through manufacture and use in nutrition Use available methods and connect them with the possibilities of social networks, focus on "producers - wasters" awareness through waste disposal companies. In the case of production, this includes, for example, bad batches, non-completion of the production process, or poor quality/unsaleable product. For farmers, it is a poor estimate of sales, poor storage options, poor crop quality and unprofitability to harvest such crops. Processing involves the knowledge of utilization of "waste", or rather the knowledge of how to handle ingredients and semi-finished products so that they do not become waste. In the case of restaurants, it is the early preparation of food that must be discarded after a certain period of time. Or unused ingredients. The problem is the complex system of giving opportunities to the ones in need. It is better for restaurants to throw it all away and pay a fine. It is necessary to motivate and educate employees in the possibilities and conditions of donating unused food. Clarification of conditions for food donation from restaurants and production facilities. Combining research with practice in the development of production technologies with minimal waste, technology improvement, rational consumption behaviour, best-before standards, use-by dates Social aspect - support of zero waste technologies, public awareness, education. Increasing knowledge (explanations of why, benefits…) and pressure on the responsibility of individual employees. Involvement of teachers, managers of catering facilities… Education among diners, general public awareness (shopping behaviour/preferences).

ADD THE FULL COLLATED TABLE FROM EXPERTS REACTIONS AT THE END IF POSSIBLE

“Farm to Fork” Strategy objectives needing new skills and educational policy interventions and instruments.

FtF topic (objective)	What lacking skills and competencies are needed to achieve these objectives?	How can education and training policy contribute?	What (changes in) education policy instruments are needed?	What roles can different AKIS (and other) actors play?
Ensuring sustainable food production (in line with circular bio-based economy)	Knowledge of the relationship between the environment and the possibilities of breeding (cultivation)	Deepening theoretical knowledge and combining it with practical possibilities of their application	Greater emphasis on the ability of analytical thinking	Emphasis on analytical thinking
Ensuring food security	Knowledge of processing technologies and their influence on the behaviour of food in different temperature conditions of storage and distribution	Understanding the connections of food production and storage (microbial and technological stability), practical examples of bad practices	Practical examples and the possibility of first-hand experience of individual processing methods and their impact on the “behaviour” of food	Greater emphasis on the possibility of working in the manufacturing sector – motivating entrepreneurs to hire students
Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices	Analysing the composition of waste from the processing of agricultural products and food production and promoting the possibilities of their further use	Reduction of waste from the processing of agricultural products and food. Broader range of professional knowledge of graduates	Deepening the cooperation with entrepreneurs. Emphasizing economic and environmental benefits	Motivating entrepreneurs to cooperate with research
Promoting sustainable food consumption and facilitating	Promoting “simple” solutions – the needs of metabolism, the	Deepening the awareness of the contribution of individual foods to the state	Defining space for this activity	Using, for example, social networks to focus on different

the shift to healthy, sustainable diets	contribution of individual foods to the development of the organism at different stages of life, and physical and mental stress.	of organism in relation to metabolic processes in it		groups of the population and acquaint them with the physiological process during metabolism and the ways in which they can positively influence this process towards better health
Reducing food loss and waste	Knowledge of how much I can save if I do not waste food – not only in my own wallet, but in relation to the environment (food waste disposal), how to utilize waste in my own household	Information on the usability of food waste for one's own household, knowledge about the production and the economy of the whole chain from production through manufacture and use in nutrition	Using available methods and connecting them with the possibilities of social networks	Focusing on "producers - wasters" awareness through waste disposal companies
Combating food fraud along the food supply chain	Impossibility of "on-line" control of food composition. Increasing consumers' knowledge of the composition of food and its relationship to shelf life	Increasing consumers' knowledge of how food "behaves" in a standard environment and how food fraud influences it (e.g. it will prolong its shelf life, smell, taste and more).	Producers' interest in promoting food, which is more expensive, but in terms of the needs of the body (metabolism) is beneficial.	Influencing retailers to focus more on food quality and not primarily on pricing policy

“Farm to Fork” Strategy objectives needing new skills and educational policy interventions and instruments.

FtF topic (objective)	What lacking skills and competencies are needed to achieve these objectives?	How can education and training policy contribute?	What (changes in) education policy instruments are needed?	What roles can different AKIS (and other) actors play?
Ensuring sustainable food production (in line with circular bio-based economy)	I cannot competently comment on this area - perhaps insufficient information, education, opportunities, complications in obtaining “bio” certificates, little support	Education of teachers and students in a patient and comprehensible way, making study fields dealing with this issue more attractive	True and comprehensible provision of information, including a list of negative impacts of current farming methods.	Focusing one’s own activities on correctly chosen ways of informing oneself (individual approach to individual groups of people and their ability to understand the topic) providing truthful information, advice, help, not be interested only in profit, but also in the result that will benefit all
Ensuring food security	Honesty ?? at work		Not only control, but also help	
Stimulating sustainable food processing, wholesale, retail,	There is a lack of professionally trained staff	Making more attractive the fields preparing a new generation for catering	Education policy is too focused on university education and high	

hospitality and food services practices	at all levels involved in catering services	services, focusing on secondary and apprenticeship education	expertise – focus on practice and training of field workers - chefs	
Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets	Appeal to economics, health.	Again – directing education at "regular" workers. Also finding an answer to the question why, for example, nutrition therapists or university-educated people in a similar field do not participate more in activities towards eating together	Focus on supporting the education of regular workers working in the operation, practice	
Reducing food loss and waste	Increasing knowledge (explanation of why, benefits…) and pressure on the responsibility of individual employees	Call for personal responsibility		
Combating food fraud along the food supply chain	Explanations, fines…	At this point it is necessary to unequivocally appeal to the "higher moral principle"	Motivating people not to prioritize private business interests over common ones, to have a real interest in supporting this strategy	

"Farm to Fork" Strategy objectives needing new skills and educational policy interventions and instruments.

FtF topic (objective)	What lacking skills and competencies are needed to achieve these objectives?	How can education and training policy contribute?	What (changes in) education policy instruments are needed?	What roles can different AKIS (and other) actors play?
Ensuring sustainable food production (in line with circular bio-based economy)	Add Action 4 and 6: The issue of pesticides is very intensively addressed in our country. I see a problem in the frequent discrepancy between good practice and regulations. Add Action 5: In my opinion, knowledge of plant protection products is also spread. Demonstrations of alternative and close-to-nature methods of plant protection would help. Add action 7 and 8: animal production is addressed I think that our knowledge about all of the above points is very good, what is a problem is the well-established practice and the fear of changing beaten tracks and long-term contracts with input suppliers. We need more examples showing us that this is possible and that it pays off.	At a general level, there needs to be a broad awareness of what is and is not worth it. At the level of vocational education, teaching about the possibilities of sustainable production In research studying the use of waste for agriculture and zero waste agriculture. Furthermore, to find new agroecological methods in cooperation with practice.	Greater connection between science and practice Recognition of farmers for working with scientists and teaching other farmers by example (demonstration farms)	Teachers – general public awareness university professors – methods of agroecological practices researchers – research into the use of waste for agriculture, zero waste agriculture and new agro-ecological methods. public – shopping behaviour/preferences
Ensuring food security	See above + Consumers' knowledge and their interest in paying for better and healthier food. + pressure on supermarkets not to artificially/disproportionately increase the price of higher quality products. (E.g.: Bioproducts).	See above	See above	See above
Stimulating sustainable food processing,	Add Action 15 and 16: I do not think that it is necessary to introduce the values that food is supposed to have. Rather, I lean towards the so-called traffic lights, which they have in the GB,	At a general level, wide distribution of the knowledge of nutrition and the importance of	Greater integration of science with practice and sharing of good practice	

wholesale, retail, hospitality and food services practices	where it is visually shown on the goods which nutritional values exceed the recommended dose. The market will take care of the rest. Add Action 17: there is a lack of knowledge and willingness to know the ecological footprint of individual technological processes. Creating a form of visualization of the "ecological footprint of production and distribution" displayed on the product.	individual nutrients and the recommended daily intakes. At the level of vocational education, teaching about the options of production of nutritionally valuable products and their distribution with a minimal "ecological footprint" In research, studying the preservation of nutritional values and, in cooperation with practice, new agroecological methods of production, packaging and distribution.	Recognition of farmers and food producers for working with scientists and teaching other farmers and food producers by example (demonstration farms, etc.)	
Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets	See comment on action 15, 16 and 17	dtto	dtto	dtto
Reducing food loss and waste	Add action 26: The knowledge of utilization of "waste", or rather the knowledge of how to handle ingredients and semi-finished products so that they do not become waste.	Education in the possibilities and conditions of donating unused food. Research with practice should try to develop production technologies with minimal waste	Clarification of conditions for food donation from restaurants and production facilities.	Teachers – general public awareness (awareness that "everyone matters") university professors – methods of

	In the case of production, this includes, for example, bad batches, non-completion of the production process, or poor quality/unsaleable product. For farmers, it is a poor estimate of sales, poor storage options, poor crop quality and unprofitability to harvest such crops. In the case of restaurants, it is the early preparation of food that must be discarded after a certain period of time. Or unused ingredients. The problem is the complex system of giving opportunities to the ones in need. It is better for restaurants to throw it all away and pay a fine.			agroecological practices researchers – research into the use of waste for agriculture, zero waste agriculture and new agro-ecological methods. public – shopping behaviour/preferences
Combating food fraud along the food supply chain	This is a question of responsibility and personal/business conscience			

With regard to the action steps outlined for each of the F2F objectives (see boxes below),[1] I have drafted this proposal.
In general, I believe that the propagation of best/good practices through examples would help in the overabundance of documents and regulations, whether at EU or national level. However, the fundamental problem is that no one is able and willing to take responsibility in order to label this or that practice as worth following, mainly due to the uncertainty of a change in some legislation.

[1] https://research4committees.blog/2020/06/17/the-farm-to-fork-strategy-implications-for-agriculture-and-the-cap/

BOX 2

THE FARM TO FORK DRAFT ACTION PLAN (ANNEX OF F2F COMMUNICATION) - I

ACTIONS RELATED TO THE F2F OBJECTIVES INVOLVING DG AGRI (9 actions in total)

- **HORIZONTAL OBJECTIVE. Legislative framework improving sustainable food systems and ensuring food security**

  Action 2. *Develop a contingency plan for ensuring food supply and food security (Lead DG: (DG involved:* ***AGRI****, MARE & HEALTH) (Timetable:* ***Q4 2021****).*

- **FOOD PRODUCTION OBJECTIVE: Ensuring sustainable food production (All actions led by DG AGRI)**

  Action 3*. Adopt recommendations ta each MS addressing the nine specific objectives of the CAP, before the draft CAP Strategic Plans are formally submitted (Other DG involved: ENI & SANTE) (Timetable:* ***Q4 2020****)*

  Action 9*. Proposal for a revision of the Farm Accountancy Data Network Regulation to transform it into a Farm Sustainability Data Network with a view to contribute to a wide uptake of sustainable farming practices (Timetable:* ***Q2 2022****)*

  Action 10*. Clarification of the scope of competition rules in the TFEU with regard to sustainability in collective actions (Other DG involved: COMP) (Timetable:* ***Q3 2022****)*

  Action 11*. Legislative initiatives to enhance cooperation of primary producers to support their position in the food chain and non-legislative initiatives to improve transparency (Other DG involved: COMP) (Timetable:* ***2021-2022****)*

  Action 12*. EU carbon farming initiative (Other DG involved: ENVI) (Timetable:* ***Q3 2021****)*

- **FOOD PROCESSING AND DISTRIBUTION OBJECTIVE: Stimulating sustainable food processing, wholesale, retail, hospitality and food services' practices (All action led by DG AGRI)**

  Action 18. *Proposal for a revision of EU marketing standards for agricultural, fishery and aquaculture products to ensure the uptake and supply of sustainable products (Other DG involved: MARE) (Timetable:* ***2021 - 2022****)*

- **FOOD CONSUMPTION OBJECTIVE: Promoting sustainable food consumption, facilitating the shift towards healthy, sustainable diets (All actions lead by DG AGRI)**

  Action 24*. Review of the EU promotion programme for agricultural and food products with a view to enhancing its contribution to sustainable production and consumption (Timetable:* ***Q4 2020****)*

  Action 25*. Review of the EU school scheme legal framework with a view to refocus the scheme on healthy and sustainable food (Timetable:* ***2023****)*

BOX 3

THE FARM TO FORK DRAFT ACTION PLAN (ANNEX OF F2F COMMUNICATION) - II

ACTIONS RELATED TO THE F2F OBJECTIVES LED BY DG HEALTH AND FOOD SAFETY

- **HORIZONTAL OBJECTIVE. Legislative framework improving sustainable food systems and ensuring food security**

  ***Action 1**. Proposal for a legislative framework for sustainable food systems (DG involved: ENVI & GROW) (Timetable: 2023)*

- **FOOD PRODUCTION OBJECTIVE: Ensuring sustainable food production**

  ***Action 4.** Proposal for a revision of the Sustainable Use of Pesticides Directive to significantly reduce use and risk and dependency on pesticides and enhance Integrated Pest Management (Timetable: Q1 2022).*

  ***Action 5.** Revision of the relevant implementing Regulations under the Plant Protection Products framework to facilitate placing on the market of plant protection products containing biological active substances (Timetable: Q4 2021)*

  ***Action 6.** Proposal for a revision of the pesticides statistics Regulation to overcome data gaps and reinforce evidence-based policy making (Timetable: 2023)*

  ***Action 7.** Evaluation and revision of the existing animal welfare legislation, including on animal transport and slaughter of animals (Timetable: Q4 2023)*

  ***Action 8.** Proposal for a revision of the feed additives Regulation to reduce environmental impact of livestock farming (Other involved DG: ENV) (Timetable: Q4 2021)*

- **FOOD PROCESSING AND DISTRIBUTION OBJECTIVE: Stimulating sustainable food processing, wholesale, retail, hospitality and food services' practices**

  Action 15. *Launch initiatives to stimulate reformulation of processed food, including the setting of maximum levels for certain nutrients (Timetable: Q4 2021)*

  Action 16*. Set nutrient profiles to restrict promotion of food high in salt, sugars and/or fat (Timetable: Q4 2022)*

  Action 17*. Proposal for a revision of EU legislation on Food Contact materials to improve food safety, ensure citizens' health and reduce the environmental footprint of the sector (Other DG involved: ENVI) (Timetable: Q4 2022)*

  Action 19*. Enhance coordination to enforce single market rules and tackle Food Fraud, including by considering a reinforced use of OLAF's investigative capacities (Timetable: 2021-2022)*

- **FOOD CONSUMPTION OBJECTIVE: Promoting sustainable food consumption, facilitating the shift towards healthy, sustainable diets**

  Action 20*. Proposal for a harmonised mandatory front-of-pack nutrition labelling to enable consumers to make health conscious food choices (Timetable: Q4 2022)*

  Action 21*. Proposal to require origin indication for certain products (Timetable: Q4 2022)*

  Action 22*. Determine the best modalities for setting minimum mandatory criteria for sustainable food procurement to promote healthy and sustainable diets, including organic products, in schools and public institutions (Other DG involved: GROW) (Timetable: Q3 2021)*

  Action 23*. Proposal for a sustainable food labelling framework to empower consumers to make sustainable food choices (Timetable: 2024)*

- **FOOD LOSS AND WASTE PREVENTION OBJECTIVE: Reducing food loss and waste**

  Action 26*. Proposal for EU-level targets for food waste reduction (Timetable: 2023)*

  Action 27*. Proposal for a revision of EU rules on date marking ('use by' and 'best before' dates) (Timetable: Q4 2022)*

“Farm to Fork” Strategy objectives needing new skills and educational policy interventions and instruments.

FtF topic (objective)	What lacking skills and competencies are needed to achieve these objectives?	How can education and training policy contribute?	What (changes in) education policy instruments are needed?	What roles can different AKIS (and other) actors play?
Ensuring sustainable food production (in line with circular bio-based economy)	Agricultural primary production underestimates negative externalities and the ability to eliminate them is lacking.	Education about sustainable living, gradual change of lifestyle beginning in primary school,	Cyclical education, holistic approach, support of creativity, innovative thinking, flexibility	The whole society, Ministry of Agriculture, Ministry of Education, Youth and Sports, Ministry of the Environment, IAEI, family
Ensuring food security	The ability to produce food while reducing residues of pesticides, drugs and other substances used in primary production and especially in processing. Changes in standards, norms	Emphasis of environmental aspects in general and professional subjects	Permanent education at school I raising of public awareness	Government, parliament Prohibition or sanctioning of unhealthy foods (similar pressure as with alcohol and tobacco)
Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices	Motivating retail chains	Utilization of the potential of a very developed system of school canteens for education about healthy eating and lifestyle	Practically and manually oriented supplementary teaching at elementary and primary school	dtto
Promoting sustainable food consumption and facilitating	The ability to distinguish sustainable and healthy food	See above	Society-wide system	

the shift to healthy, sustainable diets	(producers, control, and especially consumers)	Limitations of aggressive advertising and offers, especially for children	Restricting business with unsuitably processed products	
Reducing food loss and waste	Improvement of technology, rational behaviour in consumption Best-before standards, use-by dates	Involvement of teachers, managers of catering facilities… Education among diners	Social aspect - support of zero waste technologies	Ministries (see above)
Combating food fraud along the food supply chain	Shortening distribution channels, Harsher punishments for cheating, education	Ethics, morality as a part of upbringing and education.	Examples of good practice versus fraud cases and their resolution	Parliament (laws) Government, application of laws, sanctions against cheaters

Annex 3.7. – CIHEAM

18 November 2020

Workshop Report

Workshop: Potential policy strategies for improvements in sustainable agriculture and forestry education

CIHEAM Bari
18/11/2020

Introduction
This document reports on the outcomes of a virtual workshop carried out by CIHEAM within the context of Task 4.2. of the H2020 NextFOOD project, to capture local education governance perspectives and propose potential strategies for improvement of current educational policies in agrifood and forestry systems, referring to the recently released Farm to Fork objectives.

Methodology
Based on the results of activities carried out in WP1-gaps analysis in education and research- and WP2-case studies research- the workshop has conducted a participative discussion guided by a matrix where the aims of the European From farm to fork strategy were linked to 5 specific questions that should contribute to identify, through the answers given by the participants and plenary discussion, what are the needed new skills and educational policy interventions and instruments to fulfil them. A gender perspective was also taken into consideration across the topics of the workshop.

Participants
The workshop has involved 4 participants representing different stakeholders: academic-Universita di Bari, a vocational institution- Istituto Tecnico Agrario, a local authority linked to rural development-GAL Alto Salento, a farmer representative. Three Nextfood team members at CIHEAM were involved as facilitators.

List of participants

#	Name/Role	Affiliation/Institution
1	Gianfranco Ciola	GAL, president. Agronomist, occupied with rural development. Has long experience in implementation of development projects and plans for rural and territorial development. Before engagement with GAL, had experience in different local development and conservation initiatives, in structures such as national parks
2	Vincenzo Pugliese	Farmer/public officer. Works in National Institute of Social Security, and has its own farm where he works as farmer. Agronomist by education, has strong interest to transfer his knowledge to youth and people who have in general interest for local communities' development.
3	Professor Spagnuolo Matteo	Professor at Bari University. Agronomist with PhD in Agricultural Chemistry. Has abroad experience, at Cornel University. Works as a lecturer since 2001. Deals with all aspects related to soil, quality, fertility, pesticides behaviour in soil, etc. Gives also lectures at the

		University of Lecce. Interested to improve quality of education and has experience in projects related to education.
4	Professor Nicola Calella	High school teacher, agronomist and researcher, specialized in quarantine diseases. Since 2001 gives lectures at the high school, where they have more than 150 students. Has experience experimental projects related to teaching in agriculture. Was involved in the education reform called "Gelmini", on aspects related to technical education. Support employment of youth in the sector.
5	Virginia Belsanti-facilitator	CIHEAM Bari
6	Suzana Mdzaric-facilitator	CIHEAM Bari
7	Patrizia Pugliese-facilitator	CIHEAM Bari

Key messages emerging from the workshop

- Students appreciate the relationship with the real world and this should be a driver for designing new educational programmes also because it responds to the stakeholders' needs.
- There is a need to integrate different competencies to educate a new generation of sustainable agricultural operators and this leads to designing multi-disciplinary programmes. Moreover, designing new educational approaches and programmes can have a positive impact on traditional courses that can be pushed to innovate.
- It is very important to involve stakeholders like private companies and businesses in the design of the new courses and increase the chances for traineeship. However, at policy level, there is a bottleneck because there are no enough incentives and adequate regulations to promote traineeship and involve enterprises, both at secondary and university level of education.
- Secondary education, including vocational, has several organizational problems, which prevent it from responding to the several sustainable farming and food challenges: reduced investments, fragile systems for teaching appointments, limited resources for technological updates. This leads to the failure in preparing technicians ready to face real context requirements in agriculture. Teachers need to be continuously updated so that they can better identify students' needs. This combined with a better integration of farmers and farming and food system entrepreneurs in the development of courses could provide students with all the necessary tools for employment. Technological update is also necessary, because without the right tools students cannot be educated as needed. More laboratory time should be included I normal courses.
- Teachers and lecturers should design courses where they interact directly with experts and business and these kind of interactions, like seminars, should be facilitated by a simplified bureaucratical process for organization. Very often this kind of interaction is provided by external instruments, like targeted funding, but this is not sufficient, it needs to be institutionalized in the normal programming iter.
- Businesses need to be incentivized to cooperate with schools by providing a normative framework that does not penalizes or increase the financial burden if they accept trainees.
- The collaboration between school and business is necessary to initiate a virtuous circle that will improve education and consequently improve the service/expertise provision to enterprises and, through their needs' identification continue to foster programme design with the requirements for skills update.
- Gender equality does not represent a problem either in the courses' attendance or in farms management and farming activities. Actually, their participation in agriculture increased by 20% as reported by the participants' experience in education and farming.

Farm to Fork Strategy objectives needing new skills and educational policy interventions and instruments.

During the workshop it was made clear by the interventions of the participants that all the objectives of the policy "from farm to fork" need similar methodological and policy approaches, targeting the educational domain, to be satisfied by a new generation of professionals.

What lacking skills and competencies are needed to achieve these objectives?	⇒ Circular economy, social capital, group work needs more attention. We should send people abroad to obtain experience, and also to support more life-long learning. ⇒ We need to bring more passion to education – from my experience relate to education, despite not being professor, I see that we need to educate profiles that can immediately after education support the sector. ⇒ We need to make young people to love production, to recognize food quality, to appreciate they land. ⇒ We lack technical innovations, we do not teach our students about them. All this confirms that we are having gaps, and we make only what we are limited to. In conclusion, when students finish the school they are not ready for work, not sufficiently prepared. ⇒ Schools need significant investments in new technologies, laboratories, instruments, etc. Further, we need continues training of the trainees. Education of teachers is very important, and to increase interaction work realities-school. ⇒ Field visits should be interactive, students need to participate, explore, and not only to be observers. ⇒ Knowledge of languages and marketing skills. ⇒ There is a need to diversify education offer, giving more space to aspects such as commercialization, etc.
How can education and training policy contribute?	⇒ **Hands on problem approach** - Students appreciate direct connections with the actors in the field, it is important to listen territorial actors, to see what are the real problem, and after to transfer this to educational programs. ⇒ We need to stimulate students to get interested for course contents, in way to have innovative course, which will bring together innovative competencies in addition to traditional (standard). ⇒ Different stakeholders should be more involved in education programmes and as well to participate in the creation of new curricula. ⇒ If we want change, education should be changed from primary school. Kids should have their small garden to get familiar with plants and soil from early age, we see now in time of pandemic how this connection is important. ⇒ We need change from the base, we need to increase transfer of experience during education. ⇒ Currently topics and competencies to be delivered in the high schools are defined by the Ministry of education. This is the place were changes should start and were we need revisions. ⇒ Policies should promote and stimulate discussion among students and experts and be coupled with funds to enable these processes.
What (changes in) education policy instruments are needed?	⇒ Education should not only focus on knowledge transfer, but as well to convey local cultures and stories behind the food. ⇒ We cannot study just small part of the problem, but to be holistic, interact with others, thus creating new professional figures, open for changes.

	⇒ We need to increase the quality of education, we need to change policies. It is pity that we cannot find enough practical activities for students. Even administrative support is not existing on this segment, so we need to institutionalize connections on the line school-work (private sector actors and their involvement). ⇒ Education system does not function well, and yes we need new policies. There were ideas to adapt education to local needs by some actions in our policy systems, some bodies are established but they do not function. So it is obvious that we have various problems. ⇒ In our conditions we do not have at our experimental farm conditions – protocols for safety at work. So do we speak about lack of practical work, or we are simply obsolete. All this aspect should be defined by the policies.
What roles can different AKIS (and other) actors play?	⇒ It is not necessary that you go to filed and you know everything, instead you work in group and you have different profiles, some only supporting innovations development… ⇒ Teachers and educators are still in some cases very traditional, resistant to changes. This must be treated as problem and we need to have instruments to move them from the box and request from them life-long learning and flexibility. ⇒ It depends from enterprises culture, but we need to have mechanisms to get them more involved in education. We should favour collaboration, ask enterprises to have organigram with appropriate people to work with students, include system of awards, or to support to have higher visibility due to their engagement in education. Participation could be as well awarded in form of tax reduction, and similar measures.

Conclusions: Some recommendations/proposals

According to each objective "from Farm to fork objective" some recommendations / proposals were suggested, which highlighted a common understanding of the problems, at educational, policy and farming level and a common position on the conclusions.

FtF objectives	Summary of main recommendations, ideas and proposals
Ensuring sustainable food production (in line with circular bio-based economy)	⇒ We should aim to produce with less input as possible. We should place focus on innovations, it is time to be less traditional, with new core disciplines which can bring changes. ⇒ We need higher availability of modern technologies during practical education activities. Solution could be to increase connections with enterprises. Currently they do not respond to the expected rate, so we need to stimulate this participation and to provide motivation for them to participate. Recommendation is to have ITS in agri-food sector, with different members and thus to increase students' knowledge and practical skills. Like this they will be ready to face immediately after education the world of the work. ⇒ We need referent points, so to know which kind of profiles to educate, and this should be based on the needs of the sector. Only if these two ways will come along we can become more sustainable, with holistic approach to production. ⇒ Agriculture is dynamic sector, schools and education system has problem to follow it. It would be good to have more free courses, nowadays to be offered in online format. This would help us to not be so far from the needs of the sector.
Ensuring food security	⇒ Enterprises can even invest in schools, in form of instruments and technical support to lecturers. In this way they support formation of their future resources, etc. For this we need regional and country support, strategies and investments.
Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices	⇒ Technical (practical) education is currently not sufficient in number of hours, it is even reduced in the last year. Country does not invest enough to practical education, thus our practical education can be indicated as fragile. The main recommendation here is to increase the contribution of practical work in educational activities, thus contributing later on to sustainability.
Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets	⇒ We are losing identities of our products, due to the large holders. Each of us should promote local agriculture, we should all change something. If we know mistakes from past, we can change something in the future. ⇒ We need to transfer values to kids/scholars, not only knowledge and to increase parent's connection to school.
Reducing food loss and waste	

FtF objectives	Summary of main recommendations, ideas and proposals
Combating food fraud along the food supply chain	

Annex 3.8. – University of Chile

24 September 2020

Workshop Report

Educational policies in the Chilean and Latin-American agri-food sector: identifying strategies to promote the transition towards sustainable systems.

24 September 2020, Santiago/Chile

Details about the Workshop

The workshop was aim to yield results for Chile and the Latin-American Region. The workshop was performed in Spanish and counted with the participation of five experts.

Date and Time

The workshop has been conducted on 24th of September 2020, online, using Zoom Platform, by the facilitation of Claudia Rojas from the University of Chile project team. The workshop started at 10.00 am., and lasted a total of 2 hours and 30 minutes.

Invitation of Stakeholders and the Participants of the Workshop

The University of Chile (UCH) team invited 7 experts involved with educational and/or policies in the agri-food sector, 5 of them could participate on the activity (Table 1).

Table 1: Participants of the Workshop

#	**Name/Role**	**Affiliation/Institution**
1	Fernando Uribe	Extensionist and Agronomist, Fundación Biodiversidad Alimentaria (Food biodiversity foundation)
2	Rebecca Kanter	Assistant Professor, Faculty of Medicine, University of Chile.
3	Alberto Ramirez	Agronomist, Consulting Professional, FAO Regional Office for Latin America and the Caribbean.
4	Pilar Eguillor	Agronomist, Office of Agrarian Studies and Policies, Ministry Of Agriculture, Chilean Government.
5	Sofia Boza	Associate Professor/Chief, Department of Rural Management and Innovation, Faculty of Agricultural Sciences, University of Chile. Professor Institute of International Studies, University of Chile

6	Claudia Rojas (Moderator)	Assistant in International Collaboration Networks, Agronomist, Faculty of Agricultural Sciences, University of Chile.

Program of the Workshop

The workshop started with a power point presentation (Annex 1) of Claudia Rojas, from the University of Chile project team to the workshop participants. The first part of the presentation included the workshop´s program, followed by a quick round for each participant to present him or herself. Then, the NextFood project was briefly presented: main aim, specific objectives, and relevant information for the discussion (results from WP4, WP1 and WP2/WP3 deliverables). Then, Claudia presented an image of the AKIS Framework and explained it to the participants. The final slide was about the main aim of the workshop and the methodology to use during the activity, specifically how to fill the table in line with the Farm to Fork Strategy.

Workshop Program:

10:00 -10:10: Brief introduction of participants

10:10 – 10:20: Relevant information for the discussion and workshop structure.

10:20 – 11:00: Participative discussion.

11:00 – 11:05: Break

11:05 – 11-45: Participative discussion

11:45 – 12:00: Main conclusions and closure

Round of discussions

Questions directed at the participants

The participative discussion was organized according to the 6 Farm to Fork objectives. We presented each objective and then participants collectively answered each question proposed in the table of the Annex 2, of the Document “Workshop Guidelines”. The main aim was to fill in the table in a participative way, including the opinions and agreements of all the participants.

Questions addressed in the discussion:

- What lacking skills and competencies are needed to achieve these objectives?
- How can education and training policy contribute?
- What (changes in) education policy instruments are needed?
- What roles can different AKIS (and other) actors play?
- Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics (1-6)?

The first round of participative discussion started with:

1. Objective: *Ensuring sustainable food production.*
2. Objective: *Ensuring food security*

3. Objective: *Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices* and
4. We merged two topics due to time constrains and because the discussion leaded to similar results. Objective: *Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets* with Objective: *Combating food fraud along the food supply chain.*
5. Objective: *Reducing food loss and waste.*

Key messages emerging from the workshop

- There are no clear educational policies within the agri-food sector in Chile. Policies are independent regarding the subject: agriculture, health and nutrition, environment. There has to be a multidisciplinary and interdisciplinary approach.

- There is a weak link between political sector and universities. There is a need to include these key topics in the Universities curriculums. There is also a need to involve students with their local environment and field reality during their early years of studies in order to acquire skills related to knowledge integration, interdisciplinary work and communication.

- Consumers have a key role on the public policies and political instruments regarding food production and sustainability in agri-food systems. There is a need to empower consumers regarding the importance of healthy and sustainable diets.

- There is no relation between health & nutrition and sustainable production. It´s time to understand the link between both concepts when we talk about food and nutritional policies, including educational policies.

- The socio-sanitary crisis brought new and interesting topics regarding food systems policies. There is a need to acquire digital skills in order to facilitate the food marketing for entrepreneurs and to facilitate the consumption using digital tools. There is a gap in this topic that affects older people and women.

- In Chile, we are facing a new constitutional process. Healthy diets and sustainable production are topics that have been brought into discussion, and many times participants highlighted “the right to consume sustainable and healthy food”, it is a concept that must be included into our laws and political/social organization.

6.2 Table 2: Farm to Fork Strategy objectives needing new skills and educational policy interventions and instruments.

Farm to Fork (FtF) topic (objective)	What lacking skills and competencies are needed to achieve these objectives?	How can education and training policy contribute?	What (changes in) education policy instruments are needed?	What roles can different AKIS (Agriculture Knowledge and Innovation Systems) actors (and others) play?	Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics?
Ensuring sustainable food production (in line with circular bio-based economy)	Skills to make good diagnoses Be able to communicate and transfer to farmers appropriate techniques to achieve sustainable production. Knowledge on sustainable production from University education. Digital and technological skills	Farmers training (vocational training): education on how to do sustainable production without losing income or markets. More focus on production and extension. More contact between academy and local communities. Promote educational policies inside Universities: promote the change from conventional to sustainable production. Install an educational policy about	Public programs that involve farmers with experts in sustainability. During the early years of students' education (at the University), link their training with the field and local reality. More contact between political sector and Universities. To include sustainable production into all food and nutrition policies. The education must consider the	Consumers have a key role, the change depends on what they demand. Political sector: availability of a healthy diet for consumers. More information about the subject. Universities: to include some of the public policies into their curriculums.	Include women as a decision maker into the production, not only as a contribution for home. Include a gender perspective into the political instruments. Start including gender perspective into the political sector work teams. Digital skills are necessary considering sanitary crisis, which has had a bigger impact on entrepreneur women. Digital skills can help in this new context.

		sustainability at all levels of education. Including all population. To promote agroecology, explaining that it´s based on practices that have existed for centuries. Promote healthy and sustainable diets facilitating access not just physically but also economically.	inseparable link between healthy eating and sustainable production.		
Ensuring food security	Knowledge about the concept of food security and give the importance that requires for professionals Include ethical dimension (or values) of food production and nutrition. Knowledge integration and interdisciplinary work.	Include mixed teams and mixed approach to the creation of new policies. To consider healthy eating as a human right, including food production and consumption. Policies that promote self-consumption production.	Support research on this subject. Consider transfer of knowledge and technologies in a long-term work, including interdisciplinary work teams. More support to small farmers. Multidisciplinary approach in public policies considering food production and health.	More coordination from public sector More emphasis on the role of consumers Know the role that each actor has into agri-food systems, in order to learn how to work with each other,	There has to be an education towards the need to share the tasks between men and women. More opportunities for women to have a political role in the food production and consumption. Consider gender issues including women and men. Give more tools to men on how to feed their families considering cooking and/or nutritional aspects, not only financially speaking.

Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices	Know how to add value to the product Better education at the University about food processing and marketing, not only focusing on exports. Digital skills (social networks management): very important in this socio-sanitary crisis. People who are more affected are small producers and old people (consumers). Knowledge about how diversify the market. Revalue the idea of small entrepreneurs. Not just producers but entrepreneurs.	Education must be centred on: Strengthen local distribution markets and shorten value chains in the agri-food system.	More promotion and support to companies that have sustainable practices and services. Local food markets must be valued as providers of healthy food. Introduce the concepts and importance of local food markets (in Chile called “Ferias libres”, which are the most traditional way to buy fruits and vegetables) into the Universities curriculums.	Consumers play a key role on what they demand. From the political sector: Promote certification of companies that make a responsible marketing. From the industry perspective: to have an ethical “conduct code” and to have a corporate social responsibility.	

Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets **and** **Combating food fraud along the food supply chain**	Multidisciplinary approach. The skill to work with different professions. Have the communication skills to empower consumers regarding this topic. Know how to work with local communities and territories. Organizational capacity through digital platforms.	More information for consumers about the food they eat and buy: Food labelling law or policy To include this topic into Universities curriculums Promote the access to local food markets.	Greater dissemination of food nutrition and its cultural aspect. Selection of varieties of vegetables based on their nutritional value. Cultural aspects: we are very biased in our diet and the different varieties that are available for our consumption Policies about the right to know what our food actually contains and its traceability. For example. Transgenic. Money given by the government to buy food at schools should be useful to buy at local markets. This generates a major change from a small modification. Food and nutrition guides: include the concepts sustainable diets, local production, maintaining and providing biodiversity in countries. Include the right to healthy and sustainable food into the constitution.	To empower consumers in this topic	

Reducing food loss and waste	Knowledge about the issue: to really know how much is lost (from the production until market). Skills on social and technical innovation: Eg. To develop in students the ability to add value to the different vegetable parts.	Information and training at all levels, in different contexts and opportunities. Incorporate the subject into Universities curriculums. Work on information about food grabbing in crises. Work on research and policies about how to recover food from local markets in a freely and safely way.	Law for supermarkets to donate their waste. Eg. Food banks.	Work with the private sector; give a role to small and medium-sized enterprises.	

Summary of the discussion: main messages, recommendations, ideas, proposals

FtF objectives	Summary of main recommendations, ideas and proposals
Ensuring sustainable food production (in line with circular bio-based economy)	**What lacking skills and competencies are needed to achieve these objectives?** Failure to make good diagnoses and to be able to transmit appropriate techniques to achieve sustainable production. Sustainable food production is understood as the technical-productive part. But the issue of the economic sustainability of the production is not touched. The small farmer's reality is the level of indebtedness. They work based on credit, because agriculture is risky. There is a very specific knowledge, sustainability is understood only from a technical-environmental perspective without always considering the social and / or economic factor. Much information is lacking on sustainable food production: a package ir a recipe is applied, farmers are not asked about anything: information and knowledge are lacking. Become aware of a new way of doing things. The concept of sustainability is not installed in professionals; it does not come from the university. Settles at work. Producers must make the link between climate change and production, but not between production and climate. There is also a lack of digital literacy **How can education and training policy contribute?** Farmer training: transmitting them how to produce but without losing income or markets. The academic-research sphere is much closed; extension is still a secondary activity. There is no focus on production and extension. You have to focus on the real problems of production. Greater contact of the academy with the local environment. Policies that promote changes in universities from traditional agriculture are lacking. It should be installed at all levels of education. Also educate the population in sustainability.

FtF objectives	Summary of main recommendations, ideas and proposals
	Promote agroecology, but also explain practices that have existed for centuries. Promote healthy diets through sustainable diets. Access physically but also economically. **What (changes in) education policy instruments are needed?** Public programs with contact with farmers, specialists in this matter are needed. Link the training of students from their early years with fieldwork and local reality. More contact between the political sector and universities. Revalue the role of the State. Incorporate the issue of sustainable production into all food and nutrition policies that do not include how to teach healthy eating linked to sustainable production. Have everything together in one policy. **What roles can different AKIS (Agriculture Knowledge and Innovation Systems) actors (and others) play?** The engine of change comes hand in hand with what consumers ask for. Very few conscious consumers. The role of consumers is highlighted, lack of availability of a healthy diet or only learning about the subject. Each actor could promote his vision of sustainable diets from his area. **Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics?** The woman farmer is in smaller productions, women see it as a way to contribute at home. It is necessary to work looking for a greater implication in the decision making. If the political instruments are not changed with a gender perspective, it is difficult to see a change. It should start in the level of the work teams and then transmit it to the field. Digital literacy. There is a gap between ages and gender. It will continue to grow considering the environmental

FtF objectives	Summary of main recommendations, ideas and proposals
	and sanitary crises.
Ensuring food security	**What lacking skills and competencies are needed to achieve these objectives?** - Internalize the concept and what it means for the work of professionals. - Absence of the ethical dimension of food production and nutrition. - More than talking about food security, we should talk about food sovereignty (people choose their food policies in their territory). Involve the people in political decisions. - There is little knowledge of knowledge. - Interdisciplinary work learning. **How can education and training policy contribute?** Focus on more mixed teams. Incorporate mixed approach. Human rights to healthy eating: includes production and consumption Encourage self-consumption production, give greater emphasis on this aspect. **What (changes in) education policy instruments are needed?** Support research, transfer that is not short-term, that has complexity and mix of different professions. Interdisciplinary work. Leave the green revolution behind Support small farmers more: 80% of the supply of fruits and vegetables comes from them. Avoiding food losses goes hand in hand with safety. Greater multidisciplinary approach in public policies: production and health

FtF objectives	Summary of main recommendations, ideas and proposals
	What roles can different AKIS (Agriculture Knowledge and Innovation Systems) actors (and others) play? Public sector: lack of will to coordinate. Put more emphasis on the role of consumers. Learn the work between different actors of the agri-food system. They have to learn to work with each other. **What (changes in) education policy instruments are needed?** Still the tasks are not shared, there has to be an education towards the need to share the tasks. There is a lack of evidence that reinforces the role of gender in the part of food security. Accompanied by organizations in which there is participation of women, women need a political role in the production and consumption of food. Open that opportunity in public policy. Consider the gender issue considering men and women. Human nature is more concerned with food safety, at least in a non-economic way. More tools to man on how to feed his family, but not financially: cooking, nutrition
Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices	**What lacking skills and competencies are needed to achieve these objectives?** The large company works and is profitable by volume. If we want to promote processing to the farmer, we must teach them to add value. Student knowledge of food processing and marketing is very poor. In commercialization it is highly biased towards exports. As a result of the pandemic and social crisis in Chile, this topic has been widely discussed. The use of digital tools to market products is important. They will depend on intermediaries who manage social networks. There is a vicious cycle of digital literacy, affecting small producers who want to add value to their products. It is also important for older adults who do not have access to food, but as consumers do not have those tools.

FtF objectives	Summary of main recommendations, ideas and proposals
	Skills for professionals (not only agronomists but also economists): virtues of having a decentralized market, breaking the paradigm of a large food supplier. We have to diversify the market. Revalue the importance of Small Enterprises. They are not producers but they are also small entrepreneurs. **How can education and training policy contribute?** Local markets: they are basic. It is important to consider this factor, especially considering our geography. Shorten marketing chains and strengthen local distribution markets. There are a lot of middlemen - in the supply and distribution chain. Therefore, it is necessary to promote shorter circuits and teach how to add value. **What (changes in) education policy instruments are needed?** Provide promotion to companies that do sustainable practices and services. Local food markets are an entity that must be valued and take advantage of the conclusions of the COVID-19, that retail markets have a role as providers of healthy food. Capitalize on it and introduce it into student curriculum. **What roles can different AKIS (Agriculture Knowledge and Innovation Systems) actors (and others) play?** Consumers play a fundamental role. Codes of conduct, corporate social responsibility. Certification of companies that are responsible for marketing.

FtF objectives	Summary of main recommendations, ideas and proposals
Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets And Combating food fraud along the food supply chain	**What lacking skills and competencies are needed to achieve these objectives?** Emphasize the idea of a multi-disciplinary approach. Practical work that forces students to relate to other professions. Eg Agronomist with nutritionist. Let go the paradigm that is only producing food, we are feeding the population. Professionals must empower consumers, in their citizen participation. Know how to work with territorial and local groups. Organizational capacity through digital platforms. **How can education and training policy contribute?** Participants mention the food label law, a pioneer law created in Chile (more information in: https://www.minsal.cl/ley-de-alimentos-nuevo-etiquetado-de-alimentos/). However, what does a person with a low socioeconomic income do? Someone who does not have time to access food market with healthier foods. What is done in that case? Is it effective? **What (changes in) education policy instruments are needed?** The role of the State is very important in this area, to influence the curriculums of the Universities. Greater dissemination of food nutrition and its cultural aspect. There is a lot of research about selection of varieties of vegetables based on resistance to drought or diseases, but not based on their nutritional value. Cultural aspects: we are very biased in our diet and the different varieties that are available for our consumption. Eg Different varieties of chickpea. It is not known only for a cultural theme. Policies of the right to know what our food actually contains and its traceability. For example. Transgenic. Take into consideration the Chilean experience: labelling law. We were Pioneers in this subject. Food guides: there is food advice but there is no link with other concepts: sustainable diets, local production, maintaining and providing biodiversity in countries, there is no intention to link with the local aspect.

FtF objectives	Summary of main recommendations, ideas and proposals
	National food and nutrition policy: there is no mention of sustainable diets, but there are threads that could be applied that go along the lines of sustainable diets. It is the way of engaging local production, but it is a guide for local markets and the production of vegetables. From the social crisis in Chile, many assemblies were seen in which the issue of the right to healthy and sustainable food was discussed. It is important to include it in the new Chilean constitution.

FtF objectives	Summary of main recommendations, ideas and proposals
Reducing food loss and waste	Visibility of the issue of food loss and waste. Now there is an international day to combat this issue. Information is important here. There is no consciousness: Farmers waste, domestic waste, hotels, supermarkets. There are only 3 food banks in the country, but it is something incipient. This is a good way to start. Very invisible theme. It is something that needs to be addressed. Students and professionals, but they do not consider how much is lost from the food that is produced and marketed. Take it to an ethical issue and mark it strongly. Social innovation in professionals: learn to use more parts of food. As part of students' education. Information and training at all levels. In different contexts and opportunities: Farmers, marketers, citizens. Incorporate the subject without a doubt in university curricula. Reinforce short value chains, local markets and self-consumption. Important to work on information regarding food grabbing in crises contexts (Eg. COVID-19 situation)

Annex 3.9. – Calcutta

8 September 2020

Workshop Report

Information about the Workshop

Country	**India**
Town	Kolkata
Venue of Workshop	University of Calcutta (Online meeting)
Date of Workshop	8th September 2020
Starting and Ending Time of Workshop	11:00 AM to 2:00 PM
Number of Participants and Gender rate	9 (1 Female)
Other notes (if any)	Invited 12, but others could not join.

List of Participants

#	Name/Role	Affiliation/Institution
1	Dr. Swarnali Bhattacharya	Associate Professor, Visva Bharati University, Santiniketan
2	Prof. Pranab Hajra	Dean and Professor, State Agriculture University, West Bengal
3	Dr. Rambilas Mallick	Associate Professor, University of Calcutta
4	Prof. Santanu Jha	Professor, State Agriculture University BCKV, West Bengal
5	Prof. Dinesh Abrol	Professor, Institute for Studies in Industrial Development, New Delhi
6	Dr. UM Rao	Principal Scientist (Agricultural Extension) Retired. Division of Agricultural Extension, ICAR-IARI NEW DELHI
7	Prof. Parthiba Basu	Professor, University of Calcutta/Director, Centre for Pollination Studies, Kolkata
8	Mr. Anshuman Das	Program Manager, Welthugerhilfe, Germany
9	Dr. Ritam Bhattacharya	Research Associate, NEXTFOOD

Summary of discussion - Farm to Fork Strategy objectives needing new skills and educational policy interventions and instruments.

FtF topic (objective)	What lacking skills and competencies are needed to achieve these objectives?	How can education and training policy contribute?	What (changes in) education policy instruments are needed?	What roles can different AKIS (and other) actors play?	Which skills, competencies and policy instruments are needed, and by which actor(s), to contribute to improved Gender Equality in each of the F2F topics (1-6)?
Ensuring sustainable food production (in line with circular bio-based economy)	- Farm resource planning - Traditional knowledge validation - Participation of producer in decision, planning and implementation	- Transform technocentric agriculture education to system thinking orientation - Bring in more stakeholders in the process of education and training.	- Creating cohort of education innovations and advocacy with education council. - Involving stakeholders, especially industry in content and curriculum development	- Various actors to be involved in pedagogic processes	Gender angle in agriculture education in grossly missing. Need to bring it in from scratch.
Ensuring food security	- National and global policy analysis - Understanding of politics of food and agriculture and its influence on food security - Food security or nutrition security	- The food security is not only a function of productivity enhancement. Education can help in bringing this multisectoral understanding of food security.	- Brining policy analysis and policy history as a tool/topic in UG/PG course	- Researchers, policy analyst to be part of the course	- Women are heavily impacted of food insecurity in global south. These are part of gender studies – but not part of agriculture education.
Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices	- Study of value chain operation, especially which is suitable for small holder farmers - Sustainable business standards for food	- A holistic understanding and system perspective in food processing/ marketing will make future actors more	- Include apprenticeship - Advocacy for opening up courses from knowledge providing to critical thinking and problem solving	- More multi actor inclusion in transaction	- Gender sensitive and gender-neutral value chain will be a new topic, which should be actually be taken from much lower grade in education system.

	processing and food vendors - Holistic understanding of value chain from production to consumption	sensitive towards sustainability. - Addressing the entire value chain will help understanding pain points of all the stakeholders involved.	- Incubation centre for passing out students		
Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets	- Nutrition sensitive agriculture - Understanding relation between food and nutrition, diet diversity	- Awareness on consumption pattern - take agriculture out of productivity regime to more sustainable & nutrition focused paradigm - Courses for food entrepreneur	- Involve small businesses as cases for study - Communication, awareness raising on sustainable consumption - Study of consumption behaviour	- Include skill and competencies required by the industry	This topic is often linked to women – major challenge is to make it more gender neutral.
Reducing food loss and waste	- Review of Food storage and distribution policies	- Awareness on consumption pattern - Focusing of local procurement, storage and distribution	- Communication, awareness raising - Study of consumption behaviour - Policy advocacy on local storage and distribution	No specific response	No specific response
Combating food fraud along the food supply chain	- The topic itself is ignored in the content of agriculture education, in general - lack of understanding of industrial processes and requirement	- Awareness of safe food - Standardise food processing	- Courses on food safety standards	- Inclusion of stakeholders from the industry	No specific comment

Main messages, recommendations, ideas, proposals

FtF objectives	Summary of main recommendations, ideas and proposals
Ensuring sustainable food production (in line with circular bio-based economy)	- Sustainable production should focus more on ecological issues – currently it is driven by economy. - Compartmentalisation to avoided as much as possible and bring in more system perspective. - Creating scope of network, so that stakeholders from farming community and industry are also able to participate in the pedagogic processes. - Incubation centre for passing out students – as it has often been experienced that agriculture university students can't work directly in the farm. An intermediatory institutional hand over process is necessary. - Focus on inductive approach rather than deductive. - Experiential learning to be brought in – scope for construct new knowledge need to be created. - Technology transfer Farming community need to be fully handed over to the user – reduce top down scenario as much as possible.
Ensuring food security	- How the producer community will be food secure? - Move out from technocentric solutions to system centric understanding. - How can we bring in perspective of food security from a food system angle? Currently it is focused on food production only.
Stimulating sustainable food processing, wholesale, retail, hospitality and food services practices	- Creating scope to include indigenous knowledge in food processing and value chain operation - Include stakeholders from industry and market network - Course should also focus on entrepreneurship development with specific focus on food entrepreneurs. - Creating situations where student's innovation can be encouraged further
Promoting sustainable food consumption and facilitating the shift to healthy, sustainable diets	- Awareness about healthy diet, nutrition to be incorporated. - Nutrition link to agriculture. - Include food education from school level.
Reducing food loss and waste	- The centralised idea of food storage and distribution needs to be challenged and debated.
Combating food fraud along the food supply chain	- Involve the actors in food chain operation in the course content and transaction - Tools and methods of food fraud identification is not part of agriculture education currently - Women's role and knowledge to be acknowledged.

*There was discussion around the AKIS framework and how should we look at agriculture education/extension framework. The discussion is summed up below.

- AKIS framework is built purely from a structural perspective. Many actors are missing.
- AKIS miss transformational perspective - transition from one state to other state. The framework describes from a non-agroecological perspective, very compartmentalised itself.
- The education system is too much focused on job creation – so transformation or systemic changes are not part of the outcome, in general.
- Drivers and dynamics of the education system is highly corporate/market dominated. The food/farm system had faced a transition from pubic to private and ecological challenges are marginalised already. Participation of various stakeholder has experienced dilution over the time. Such sources of challenges are not discussed much. Need to understand that perspective first, before going to F2F strategy discussions.
- Research and education need to go through a political contestation – knowledge will emerge out of such debate and dialogue.

EU-Level Workshop: Identification of Strategies for Improvement in the Agrifood and Forestry Sector

4 March 2021, University of Bologna, Italy

Introduction

This document reports on the details and outcomes of a European-level workshop carried out within the context of Task 4.2 of the H2020 NextFOOD project.

The purpose was to discuss the outcomes of the previous local-level workshops and collect suggestions for strategies for policy improvement of research and education in the field of agri-food and forestry (AFF).

The workshop was held by the University of Bologna (UNIBO) team, leader of WP4.

Table 1: Details about the workshop

Country	**Europe**
Town	-
Venue of Workshop	Online
Date of Workshop	04.03.2021
Starting and Ending Time of Workshop	13:10 - 15:00
Number of Participants	20
Other notes (if any)	The meeting has been conducted with no breaks

Details about the Workshop

Date and Time

The workshop has been conducted on March 4, 2021 online, using Microsoft Teams by the facilitation of the UNIBO team. The meeting, which started at 13.10 lasted one hour and fifty minutes, and was conducted in English.

Invitation of Participants of the Workshop and Consent

Sixteen experts who are either responsible for or are engaged in education, policies and/or skills supply in the AFF sectors were invited to take part in the workshop. In these experts list two groups can be outlined: - a group of selected experts found through different channels and contacts; - a group of partners from the NextFOOD project (in particular, all the WP's leaders). All these experts were initially contacted directly by the UNIBO team via email to ask for their participation with an agenda of the workshop and the link to participate. One day before the workshop the executive summary of Deliverable 4.2 was sent to all the invited experts – both confirmed and not confirmed - to better introduce them to the theme of the workshop. The selected participants that were invited came from universities, research institutions, farmers organizations, food industry, and the European Commission. From the first round of emails, ten confirmed, five declined and one did not answer. A general request from confirmed participants to extend the invitation to some of their colleagues was made. In this vein, a final number of twenty participants was reached and they are reported in Table 2. In addition to these twenty experts, the UNIBO team participated in the workshop with four members.

Table 2: Participants of the Workshop

Participant	Affiliation/Institution
1	Swedish University of Agricultural Sciences
2	Swedish University of Agricultural Sciences
3	University of Hohenheim
4	University of Hohenheim
5	Copa-Cogeca
6	University of South Bohemia
7	University of South Bohemia
8	Lund University

9	European Council of Young Farmers (CEJA)
10	European Council of Young Farmers (CEJA)
11	Council for Agricultural Research and Economics (CREA)
12	Council for Agricultural Research and Economics (CREA)
13	Council for Agricultural Research and Economics (CREA)
14	American Farm School
15	American Farm School
16	American Farm School
17	Norwegian University of Life Sciences
18	Norwegian University of Life Sciences
19	Norwegian University of Life Sciences
20	European Commission

Program of the Workshop

The workshop started with a presentation of the participants, followed by a short introduction to the NextFOOD project made by the project coordinator, Professor Martin Melin from the Swedish University of Agricultural Sciences. After that, the presentation of the outcomes of the ten local expert workshops followed by a synthesis of potential identified key points was made by Professor Davide Viaggi (UNIBO team). The presentation focused on cross-cutting themes than specific Farm to Fork objectives found in the local workshops.

No breaks were made, and after the presentation of findings, a round of discussions was immediately introduced.

Round of discussions

The round of discussions was initiated with the general question of additional comments about findings, especially to WP leaders, who held the local workshops. A general request of suggestions, questions, or comments was made to all the participants to discuss the results. The detailed minutes of the workshop can be found under Annex 1, while a summary of main themes that were discussed during the workshop are listed below.

Summary of main themes discussed during the workshop

- Importance of actors coming together to discuss issues was underlined. In this way, even actors that have contrasting views can discuss common concerns and possibly arrive at common solutions.
- Importance of collaboration further underlined by several participants. In this regard, several themes were addressed:
    - Importance of building coherence between different frameworks.
    - Co-creation is also critical, and co-creation methodology still needs to be developed. Although it is being discussed and acknowledged, the actors still do not have the skills and knowledge to apply this methodology.
    - Collaboration of education system within the AKIS framework also needs to be worked on, education system is still not engaged in multi-actor approaches.
    - Increasing collaboration in the CAP strategic planning was also argued to be important. In this regard, especially the relationship between two ministries and two disciplines (education and agriculture) needs to be developed.
    - Peer to peer learning also came forth for enhancing the practical skills of farmers; yet there are limitations across regions (e.g. it is more challenging in remote areas). In this regard, the importance of digitalization was underlined.
        - Digitalization is also critical for skill generation.
- Participants further addressed the importance of the AKIS framework; yet pointed to the need of some improvements. AKIS concept is not well-defined, and still not owned by actors and especially is not perceived as a system, but more as a list of actors. In order for AKIS to be applied and to operationalized, it is important for actors to own it.
- The importance of the advisory system, and the need to improve it was also a theme discussed during the workshop. The need to establish a system, where both public and private advisory services are both presented, and can collaborate was also underlined.
- In terms of skills, on the other hand, it was noted that economic-financial skills (entrepreneurship) are missing: a lot of young farmers are not able to prepare a business plan and to get a loan from banks. Further, young farmers are having difficulties reading the market and orienting themselves accordingly. It was also noted that higher order learning skills are very important to realise FtF

objectives. This also points to the need to have more action learning approaches in the education system.

- For the design of the curricula, and to meet the needs of the sector, the need to adopt long-term thinking, and to see beyond the current or the future CAP was suggested. It is, hence, critical to think about the future skill needs (both expected and unexpected ones) while designing the education system. It was also argued that there is currently no systematic approach in recording the needs of the market, and this needs to be also improved.

Annex 1: Minutes from the meeting

[**Participant from American Farm School**] highlights that she agrees with the findings coming out of the local workshops. She also finds it surprising to see that the outcomes obtained from other workshops were very similar to those obtained in the case of Greece. In this line, there was a brief discussion about what were the main differing aspects between country workshops.

She further notes the importance of various actors coming together, discussing issues together. As, "even when various actors seem to have contrasting views, if you put them around a table they will find common concerns and, possibly, common solutions: it doesn't happen often that different actors meet each other". She adds that conducting this workshop was a great opportunity for actors to get together and speak.

Finally, she argues that one of the most important themes that was attained in the workshop for the Greek case, was that there is no systematic approach in recording the needs of the market, underlining that a more systematic way of recording the needs of the market and the educational system is necessary. She, hence, proposes to shift from problem solving/policy making approach (situational nature) to a constructive approach (systematic nature).

[**Participant from CREA**] notes that she appreciates the conceptual framework used in the project, namely, how AKIS framework is used in a policy-making concept, and very targeted to the point. She confirms, providing examples from two main projects she is part of, that AKIS concept is not well-defined, and still not owned by actors and especially is not perceived as a system, but more as a list of actors. She highlights that AKIS needs to be owned by actors, in order to work. If the concept is not owned, then it is difficult to apply and to operationalize, underlining that allowing this is the role of policy-makers.

She further underlines that co-creation is very important, and that the co-creation methodology still needs to be developed. Although it is being discussed and acknowledged, the actors still do not have the skills and knowledge to apply this methodology. Along this line, she also notes that collaboration of education system within the AKIS framework is also something that needs to be worked on. "Education system is still not engaged in multi-actor approaches."

In this context, she argues that it is important to engage young people in technical areas. Hence, in the AKIS we're still far from engaging technical high schools: a gap to fill soon as possible. Furthermore, she addresses the need for major effort towards increasing collaboration the CAP strategic planning. In this regard, especially the relationship between two ministries and two disciplines (education and agriculture) is critical.

[**Participant from Lund University**] highlights an important theme that emerged in the Swedish workshop. He argues that engaging untraditional people in AFF education and training system can give different points of view that could help the overall system to improve. In order to explain this comment, he notes that the traditional way in the forestry sector consisted of actors who were interested in big and loud machinery. But now, people who choose to work in a forest, are people who are interested in forests, and not necessarily those that like big machinery. Hence, he underlines that he recognizes that there is a new interest in the education system in people that are interested in other things (untraditional things), rather than the traditional background expected in the past. This is an interesting challenge, and needs to be considered in the policies, in order to adapt the educational system in the right direction, and also to be able to attract talented young people to the sector.

[**Participant from CEJA**] underlines that the outcomes that came out of the national workshops are very much in line with what they are working on in European Council of Young Farmers (CEJA).

She notes that for their organization, building coherence between different frameworks is very important.

She also notes that lack of advisors is a very big problem/issue for them. Also depending on the geographical area located in, in some cases it is very difficult to access them. She highlights that digitalization, in this regard, can really be the solution; however, also accessing digitalization is still and issue and challenge, which needs to be tackled.

She further points to the importance of skill generation, and digitalization, in which, collaboration is key. She notes that there are many farmers who are not able to gain some of the skills they need during formal education, but then try to acquire them through internships. Universities are also pushing for this to happen, and more and more students are interested in doing so. In this regard, she underlines the importance of peer to peer learning, with regard to gaining practical skills. Peer to peer learning works in a very informal way (e.g. when a farmer decides to switch to organic farming they may need to learn about how to use a new machinery). So, the farmer can go to the neighbour farm to achieve practical skills; however, the geographical area may constitute a limit. A farmer in a remote area may find this difficult. For this reason, platforms connecting farmers would be very critical (and this point also links closely to digitalization). On this topic, it was also noted by another participant that although peer to peer learning is a traditional and a very old and well-known way to learn for farmers, now with the advances in technology and need to use new machinery and have new set of skills, it is gaining a new dimension.

Another point is economic-financial skills (entrepreneurship) are missing: a lot of young farmers are not able to make a business plan and to get a loan from banks. Further, young farmers are having difficulties reading the market and orienting themselves accordingly.

[**Participant from European Commission**] underlines the importance of having a long-term approach in policy-making; and the ability to look ahead, while designing the curriculums. In other words, the necessity to look beyond each CAP, or legislation. Because otherwise, by the time the current CAP is integrated into the curricula, it is already time to change it. In this regard, she points to the importance to understand not only the skill needs of today, but also skill needs of the future (both expected and unexpected ones). Hence, she notes that the way to address the CAP and the New green deal and Farm to Fork strategy should be more on systems-oriented approach.

She points out the unbalanced relationship between education and agriculture into the EU: Education is mostly national responsibility, Agriculture is European. This bond does not help to have common policies frameworks and in some cases common goals.

She further notes that there is a strong focus on AKIS in the future CAP.

There is a requirement in strategic plans of every nation state to have a strategy around AKIS. These should focus on all actors, and their engagement with each other. In this regard, thinking how can NF project can feed into this process would be important. For

the countries which are already part of the project, it is easier to establish the links; and for other countries that are not covered, other networks can be utilized to collaborate.

Finally, with regard to the issue of advisors, she argues that it is necessary to establish a system, where both public and private advisory services are both presented, and can collaborate.

[**Participant from Swedish University of Agricultural Sciences**] highlights that the outcomes of the WP4, in terms of necessary skills and necessary steps to take, in order to achieve these, are in line with the rest of the outcomes from the NF project; hence there is a good coherence across WPs. He further notes that higher order learning skills are very important to realise FtF objectives. This also points to the need to have more action learning approaches in the education system. These need to be developed by the learners' themselves according to their needs. He, finally, mentions the contacts made with the Newbie project, where a number of areas for collaboration with the NF project were identified and discussed.

Furthermore, in the end of the discussions, some participants shared some links through the chat window, which were agreed to be interesting sources of information for the NF project, and for the work ahead:

https://i2connect-h2020.eu/
https://blogs.ec.europa.eu/eupolicylab/portfolios/farmers-of-the-future/
https://rubizmo.eu/project