# NextFOOD

## EDUCATING THE NEXT GENERATION OF PROFESSIONALS IN THE AGRI-FOOD SYSTEM

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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Published by Strategic Project Management Office (SPMO), American Farm School (AFS), Thessaloniki, Greece



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# TABLE OF CONTENTS

# INTRODUCTION

Climate change is a major threat to human wellbeing and planetary health. Rising temperatures already have a severe impact on agriculture, jeopardising food safety and nutrition for millions of people, according to the latest IPCC report, Climate Change 2022: Impacts, Adaptation and Vulnerability. More frequent and more extreme droughts and floods are causing acute food and water insecurity in several regions of the world and if emissions of climate gases continue to rise, current farmland will become increasingly unsuitable for agriculture. Also, forest production is facing challenges due to rising temperatures with pests and tree deaths severely hampering production potential in some areas.

Education plays a key role to meet the threats of climate change and to support a transition to more sustainable production of food and other bio-based products. Education, including transdisciplinary, learner-centred, and challenge-based approaches is an important means to make learners prepared to address links among production, economic, and societal issues with environmental degradation, and be ready to take responsible action that will contribute to a more sustainable world. By incorporating change-oriented projects and involving a wide variety of stakeholders in the process of learning, students are presented with problems and situations similar to what they will have to deal with later in their professional lives.

NextFOOD was initiated in 2018 as a collaborative project bringing together 19 partners in an international network with the aim of designing a research-based learning strategy to enhance learner understanding of complex situations and develop the competencies needed to drive the transition towards more sustainable agri-food and forestry systems (www.Nextfood-project.eu). Central to the project were twelve case studies that involved the implementation of action learning approaches in practice, in the context of courses and programs related to food, agriculture, and forestry, covering a wide geographical area and different levels of education. Our research interest was to identify and implement strategies to overcome the barriers presented to students, teachers, and institutions engaging in action-oriented education.

With this book, where research outcomes and case studies of NextFOOD are briefly presented, we hope to inspire teachers, students and others with a role in education to become a part of the transformation towards student-centred and action-oriented sustainability education.

Martin Melin
NextFOOD coordinator

Student and agricultural professionals in joint activities on a tomato farm
(Photo: Anna-Maria Krooupa and Elisavet Papadopoulou, AFS, Greece)

# INVENTORY OF THE SKILLS NEEDED FOR A TRANSITION TO MORE SUSTAINABLE AGRICULTURE, FORESTRY AND ASSOCIATED BIO-VALUE CHAINS

**Work Package 1**
Lead Partner: Roskilde University (RUC), Denmark.

This work aims to create an inventory of the skills and competencies needed for a transition to more sustainable agriculture and forestry, develop a self-assessment tool targeting educational actors that supports reflection on whether a specific educational activity caters for the identified skills and competencies, and to develop a roadmap for sustainable agriculture and forestry education and training activities for educational programmes.

Through a thorough review of literature, focus group interviews with professionals, practitioners and academics in the agri-food and forestry system in Europe, Africa, Asia and South America, and a questionnaire survey conducted by various NextFOOD partners in their respective regions, we created the inventory of skills and competencies needed for the transition to more sustainable agriculture and forestry. A gap analysis of the inclusion of sustainable principles and methods in existing education within agri-food and forestry systems was integrated in the survey.

Based on this work, we carried out analyses of existing educational gaps, thus evaluating whether the education within and external to the NextFOOD project catered for the identified skills and competencies. In turn, the inventory of skills laid the foundation for developing the online NextFOOD Audit Tool for universities and other educational institutions to document and assess how they cater for the identified skills in their research capacities, curricula, education strategies, and collaborations. Furthermore, the NextFOOD Audit Tool encourages individual and/or group reflection on ways to develop educational activities, further providing educational actors insight regarding their capacities to contribute towards developing next generation agri-food and forestry professionals.

**To cultivate the identified skills, we developed a roadmap that may serve as a guide for the transformation of existing programmes or development of new education in food studies, sustainable agriculture, forestry, and other relevant fields.**

The comprehensive review of skills pointed out that a sustainable transition in the agri-food system is characterized by complexity and continuous change. All involved actors need to have the skills to keep adapting to new challenges and possibilities, and also to push such development through skills in life-long learning, problem-solving, and innovation. It also highlighted that the complexity requires solutions developed across current divisions, such as those between the scientific and practical, and divisions by sector, institution, culture, geography, or generation, leading to a need for skills in working collaboratively and in understanding the agri-food system as a larger whole. Thus, in order to support a sustainable transition, educators should ensure that the identified skills are catered for in relevant educational offers. This includes a holistic and synchronized re-design of knowledge institutions to support interdisciplinary collaborations and holistic systems perspectives. Furthermore, practitioners within the area of agriculture or associated bio-value chains, should maintain an open mindset amongst themselves and their employees/colleagues, and seek lifelong learning.

The recommended future policies and practices are gathered in a roadmap for strengthening policy level structures that support a transition to more learner-centric and action-based learning environments drawing on the reports and research conducted. This covers the following thematic priorities based on the findings:

- A shift of mindset – from traditional lecture-based teaching to action learning
- Construct learning arenas that support acquisition of the needed skills and competencies
- Build capacity among teachers
- Involve external stakeholders in education
- Build institutional support
- Gender equality to be applied in the whole food chain and related education
- Coherence between academic and non-academic educational policies
- Harmonizing procedures and eliminating bureaucracy for cooperation within and beyond the educational sector
- Common understanding and strategy for sustainable development within the sector.

Social farm event - end of students' projects
(Photo: Jan Moudrý, USB, Czech Republic)

Dialogue during transect walk
(Photo: Mohammed Tilahun, Mekelle University, Ethiopia)

# ACTION RESEARCH FACILITATION

**Work Package 2**
Lead partner: Norwegian University of Life Sciences (NMBU), Norway.

The aim here was to facilitate action research in twelve educational cases with a high diversity of learners, topics, and educational activities. This implies supporting the cases, which are located on three continents, in their transition to the NextFOOD action learning approach. It also implies guiding their collection and analysis of data for documenting the transition process and its outcomes.

The action part of this two-fold aim is important because a transition to the NextFOOD educational approach demands a structured process of planning, implementing, reflecting, and finally planning again for the next cycle of educational activity. Such a cycle is not only needed for transforming the cases themselves, but also for guiding the phenomenon-based action learning that takes place among the students within each case. Thus, guiding the case leaders and other stakeholders through this cycle is important to make them acquainted with the overall process and its key elements. Furthermore, it trains them in core competencies that their students need in order to deal with sustainability challenges. The research part of the aim is for each case to be developed and to extract knowledge that is transferable to similar cases elsewhere.

We prepared a master manual to guide the process of developing educational activities towards the NextFOOD approach in all cases. In parallel, we made a common protocol for how to collect and process data at each step of planning, implementing, reflecting, and re-planning. Throughout the NextFOOD project, the cases planned, implemented, and reflected on their educational activities and, according to the master manual and the research protocol, respectively, did research on this process and its outcomes. To facilitate this two-fold procedure, we first organised joint workshops for all cases where all participants could become acquainted with the overall mindset and key elements of the NextFOOD approach. They also practised the five core competencies, shared experiences and learned from each other. Next, we facilitated a kick-off workshop in each case with all relevant stakeholders. The cases then incorporated training in the five core competencies (observation, reflection participation, dialogue, and visionary thinking) in their education, and they pursued

shifts from (1) lecture hall to a diversity of learning arenas, (2) lecturing to co- and peer-learning, (3) syllabus to a diversity of learning sources, (4) textbook to a diversity of teaching aids, (5) written exam to a diversity of assessment methods, and (6) lecturer to learning facilitator.

From the second project year onwards, we had monthly individual meetings with all cases to closely follow up their achievements, challenges, and on-going activities. From the third project year onwards, we also facilitated online peer-to-peer learning activities for the cases. These activities covered challenges that several cases faced and consisted of idea sharing among peers on how to handle them. Through these workshops, we aimed to create a shared understanding of the approach and its implementation and to align the action research activities across cases. In the yearly Case Development Report, each case presented their results of the on-going transition to action learning. Preceding the finalisation of this report, we closely followed up each case through feedback on their draft reports.

The facilitation of action research as described above shows that it is possible to move all twelve educational cases towards the same conceptual and methodological understanding when it comes to case development as well as research on the transition process. Not surprisingly, several participants were initially unfamiliar with action learning and action research. Nevertheless, through the mix of information and the interactive processes described above, major achievements were made. These pertain both to transition to action learning and to collection of data on what it requires from teachers, institutions, students, and other stakeholders (e.g., farmers involved in student projects). Notably, the achievements were accomplished despite the differences that exist between the twelve cases relating to geographical location, culture, subject area, institutional setting, and type of learners. The proximity of each case to the NextFOOD action learning model, e.g., as described by the six shifts listed above, naturally differs depending on factors such as initial understanding, institutional conditions, availability of people and financial resources, and impact of circumstances beyond control, e.g., covid-19. Nevertheless, all cases have been able to gather, process, and report data largely as described in the action research protocol. These data were forwarded to NextFOOD colleagues, where they proved useful for answering NextFOOD research questions about the process of transitioning to action learning, its outcomes, and prerequisites for action learning to be effective.

For those who set out to implement the NextFOOD approach in education, we recommend doing it iteratively in action learning or research cycles of planning-implementation-reflection. We recommend those involved in setting up the educational activity to familiarise themselves with the approach by exploring the need for a shift in mindset when facing sustainability challenges and by training the five core competencies as well as facilitation and systems thinking.

To facilitate this process, one should strive for a shared understanding of the NextFOOD educational approach at the institutional level, at the teacher/facilitator level, at the student/learner level, as well as amongst external stakeholders. Ideally, all actors should participate in the process for the implementation to be a success. It is wise to seek and maintain ties with all stakeholders that can enrich student learning and themselves benefit from participating.

**The NextFOOD toolbox, which can be found on the NextFOOD platform and website, can serve as a resource for everyone interested in this approach.** We should build further on the positive experiences from adapting education to an online setting.

Learners and facilitators dialogue about ideas for managing a forest site
(Middle Photo: Lotta Woxblom, Skogforsk, Sweden)
Students working on the farm
(Left Photo: Anshuman Das, Welthungerhilfe, India/Germany)

# STUDENTS BECOME AGENTS OF CHANGE STUDYING AGROECOLOGY IN NORWAY

**Case 1**
Partner: Norwegian University of Life Sciences (NMBU), Aas, Norway.
Location of activities: NMBU.

University students from many different backgrounds incorporate their real-life experiences into this agroecology course and they are immersed in the experiences of many others in agri-food systems, including:

- farmers
- high school canteen and administrative staff
- local and regional policy makers
- food entrepreneurs
- staff of NGOs
- private and public food system actors
- teachers/professors

Students practise the NextFOOD core competencies, linking them to theory, as they deal with sustainability challenges in farming and food systems. The students take charge of their own learning, while teachers and other facilitators are very committed (putting in lots of extra hours) and the institution administration is supportive to the action-oriented and phenomenon-based learning approach.

Students finish this course able to think systemically; they see interactions and dependencies and have a wide understanding of complex situations. The teachers put emphasis on student growth and encourage their students to view their roles as agents of change.

Students on a farm visit
(Photo: Tor Arvid Breland, NMBU, Norway)

Students in action
(Photo: Tor Arvid Breland, NMBU, Norway)

# MIXED TEAMS COMPETE FOR THE BEST NEW AGRI-FOOD PRODUCT IN ROMANIA AND OTHER NEIGHBOURING COUNTRIES

Demonstration of students' products
(Photo: Timar Adrian, University of Oradea, Romania)

Demonstration of students' products
(Photo: Timar Adrian, University of Oradea, Romania)

**Case 2**
Partner: University of Oradea, Romania.
Location of activities: High schools and universities in Oradea, Galati, and Suceava Romania, Rzeszow Poland, and Debrecen Hungary.

Teams compete to develop new and innovative agri-food products. The teams are mixed, containing

- teachers and students from high schools and universities,
- along with people from
- public institutions, and
- companies.

The teams work together to develop new and innovative agri-food products in a competition that requires them to physically demonstrate their product. We found this to stimulate performance and innovation. Many different activities served as inspiration, including :

- workshops,
- summer schools,
- conferences,
- field trips,
- competitions,
- theoretical, and
- practical courses

The students develop social and communication skills good for their career (and for their life), by working with people of many levels and backgrounds. Our high school students also embrace food science, sometimes not seen as the most inviting career, and all students meet players and get real experience in the working world.

# FARMERS ARE CLIENTS FOR STUDENTS IN ETHIOPIA

**Case 3**
Partner: Mekelle University, Ethiopia.
Location of activities: Farmers' Training Centres (FTC) and the College of Dryland Agriculture at Mekelle University.

Students engaging in dialogue
(Photo: Mohammed Tilahun, Mekelle University, Ethiopia)

Students engaging in dialogue with residents
(Photo: Mohammed Tilahun, Mekelle University, Ethiopia)

Master program students work with FTC instructors and farmers to understand the present situation of the farming and food systems. Each student has a case site and client farmer. Through participation with the farmer and their colleagues, students collect data for a report on their understanding of the current situation of the farm with visions and recommendations for future actions. The student presents this to the farmer. This interaction allows farmers to learn from peers and students and allows students to learn from the farming community.

Following the NextFOOD approach, practitioners can strive to meet their future wanted situation by continuously learning from present and past experiences. Thus, learning in a multi-stakeholder platform provides advantages in terms of diversity of views, experiences and local situations. However, it also requires care to meet the diverse needs of the stakeholders. In the process of generating future agricultural professionals, it is necessary to link real-life problems with the education system.

Higher education institutions in agriculture should use this opportunity to co-learn from existing and new practices among stakeholders. Education programs designed in this way can provide insight for academic institutions to revise and develop new curricula that can address local needs on a sustainable basis.

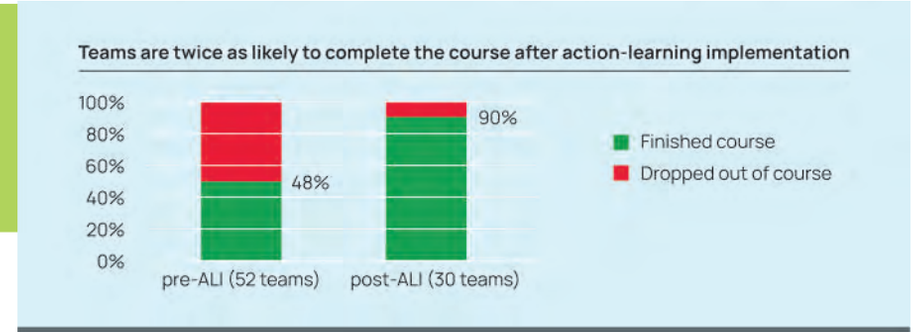
# STUDENTS ADDRESS AN AGRI-FOOD CHALLENGE IN A WORLDWIDE COMPETITION

**Case 4**
Partner: ISEKI-Food Association (IFA), Austria
Location of activities: Online with worldwide participants managed by IFA.

Teams of Masters students compete to find the best innovative solution to a current challenge in sustainable agri-food business. The IFA facilitators work with university faculty, students, and company representatives to decide the competition topic and, with input from the students in the competition, the content of the six student trainings. The teams present their projects at a virtual conference open to the public and evaluated by a diverse group of experts. The winners receive a (sponsored) money prize and guaranteed attendance at a conference to present their project.

When competitions began to follow the NextFOOD approach, student teams were more likely to participate until the end, improving the number of innovative solutions shared with the agri-food community. Before Action Learning Implementation (pre-ALI), 48% of registered teams completed the competition, and after ALI, 90% completed.

Although it's a competition, we stress teamwork and dialogue, and student reviews suggest an effect. At the start of the competition on Valorizing Food Biodiversity, for example, students thought "skills" were most important for supporting sustainable development in agri-food systems, and after the six trainings of the 5-month competition they believed "values" were most important, suggesting a shift in their view on how to be agents of change and work for a common goal.




Outcomes of action-research for reflection workshop
(Katherine Flynn, ISEKI-Food Association, Austria)


Call for student participation
(Photo: Line Lindner, ISEKI-Food Association, Austria)

Winners of the FoodFactory-4-Us Cycle 3 on Biodiversity
(Katherine Flynn, ISEKI-Food Association, Austria)

# MANY AGRI-FOOD PROFESSIONALS CONTRIBUTE TO ACTION-LEARNING IN GREECE

Students and agricultural professionals engaging in joint activities in a sheep farm
(Photo: Georgia Zafiriou and Vicky Krystalidou, AFS, Greece)

**Case 5**
Partner: American Farm School (AFS) and International Hellenic University (IHU), Thessaloniki, Greece.
Location of activities: IHU, and plant and animal farms across Central and Northern Greece.

Student and farmer collecting samples for analysis in an oregano farm
(Photo: Georgia Zafiriou and Anna-Maria Krooupa, AFS, Greece)

The input to our sustainable agri-food course came from various people from different backgrounds:

- Undergraduate students in agriculture and nutrition,
- university professors,
- advisors,
- plant and animal farmers,
- farm managers,
- veterinarians,
- nutritionists,
- food scientists,
- food waste NGO representatives, and
- cooks.

All of us work together on solutions to real-world agri-food challenges and this enriches our existing university courses and curricula.

University professors and working professionals were trained in the NextFOOD approach of action-learning at internal workshops. Teachers at the university were inspired and aim to continue this innovative approach to teaching/learning. Students agree that action-based learning is a missing link in their education. Professional colleagues claim gaining new knowledge from the experience. Time and resources are needed to continue this fruitful educational path.

Facilitator introduces the core competencies to a group of learners
(Photo: Lotta Woxblom, Skogforsk, Sweden)

Meeting at one of Skogforsk's test sites
(Photo: Malin Juter, Skogforsk, Sweden)

# MIXED ACTIVITIES WITH FOREST OWNERS AND FORESTRYPROFESSIONALS IN SWEDEN

**Case 6**
Partner: Skogforsk; the Forestry Research Institute of Sweden, Sweden
Location of activities: Forestry sites in the middle and north of Sweden, and online (during Covid-19).

Private forest owners and forestry professionals from forest owner associations participate in mixed activities to share their knowledge. Depending on the theme of the activity, different kinds of forest areas are used as learning arenas. For example, for the theme retention forestry and continuous cover forestry, we use an old growth forest, ready for harvesting. The team includes the course leader and assistant, experts, and researchers from Skogforsk.

In this learning arena we may:

- sit together and talk about skills
  move around the forest to observe different things and talk
- about what we see.

Between meetings we:

- use an app for communication – for questions and answers, reflections, knowledge transfer among participants and to upload photos for sharing.

Using nature as a learning platform brings many positive outcomes:

- the group is more active than we normally observe when using traditional indoor meetings.
- being in the forest and observing the same thing is a prerequisite for gaining a consensus,
- what we learn from each other becomes more practically relevant when we are at the same forest site, see the same trees and surroundings, instead of a presenting our own ideas based on just words or descriptions, and
- being out in nature enhances curiosity and the desire to learn more.

Most of the participants own their own forests and since we visit their forests, we also get an interaction among the learners as they can relate to each other as forest owners with similar questions and needs for knowledge.

# INSPIRING AGRI-FOOD ACTION-LEARNING IN THE CZECH REPUBLIC

**Case 7**
Partner: University of South Bohemia in České Budějovice (USB), Czech Republic.
Location of activities: Faculty of Agriculture, USB.

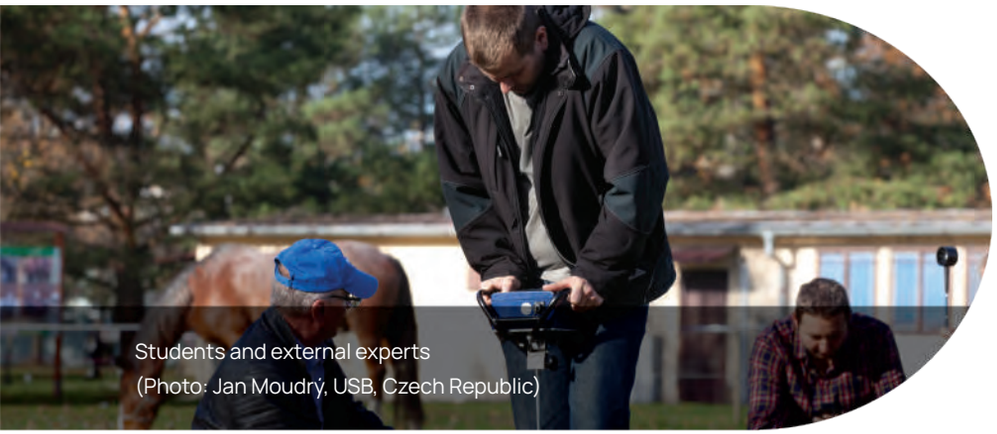
Students work with professional colleagues as partners for discussion, evaluation, and advice as they complete projects focusing on three agroecological spheres:

- agricultural,
- environmental, and
- social.

These colleagues are researchers from USB, together with external actors such as farmers, environmental experts, external university experts, social workers and advisors. Farmers and social workers also make their organisation available for practical parts of the student projects.

Before the start of the course, in meetings with most of the involved external actors, we explain and clarify their role in the course and the NextFOOD approach. Involving different people in the educational process is inspiring for professors and encourages further types of collaboration and interaction. Two professional colleagues in the course hired students and we received very positive feedback and offers for further cooperation from them!

In another course, "NextFOOD" students interacted with "non-NextFOOD" students and the former were much more engaged in dialogue and active in the course, significantly surpassing other students. Such inspiring moments bring motivation for further development of our course!



Students and external experts
(Photo: Jan Moudrý, USB, Czech Republic)

Discussion meeting among students, farmers, advisors, and social workers
(Photo: Jan Moudrý, USB, Czech Republic)

# WORKING WITH AGRI-FOOD PROFESSIONALS IN ITALY

**Case 8**
Partner: University of Gastronomic Sciences (UNISG), Italy.
Location of activities: UNISG campus, and different locations in Italy and around the world.

Actors involved in experiential learning activities include: Italian and international students from different educational programs, professors from UNISG and other universities, professionals from different parts of the agri-food system (farmers, processors, retailers, etc).

Agri-food professionals are engaged in activities by sharing their practical experiences and/or dialoguing with academia. Some professionals have a long-term partnership with the university and we build our course on several different types of professional-student interaction:

- One-day study visits with or without hands-on activities where the professional demonstrates his/her farm, infrastructure, and talks about his/her approaches;
- Professionals come to the university as speakers and share their experiences (as presentations or through dialogue with the students); and
- Professionals host students in their community for three months and supervise their action research.

All interactions are useful for students, particularly for those without an agricultural background, and for professionals, who also share their social perspectives, i.e. relations with employees and their contribution to the social life of the community. Farm visits and field work highlight regional approaches in food production and processing. Despite challenges relating to language barriers and limited time frames, each interaction inspires both students and professionals and gives them ideas for further development.

Interview with stakeholders at Melitakes Community in Crete (Photo by Alessandro Bono, UNISG, Italy)

The magic circle: First day ceremony at the Master in Agroecology and Food Sovereignty at UNISG, 2020 edition at the Educational Garden (Photo by Natalia Rastorgueva, UNISG, Italy)

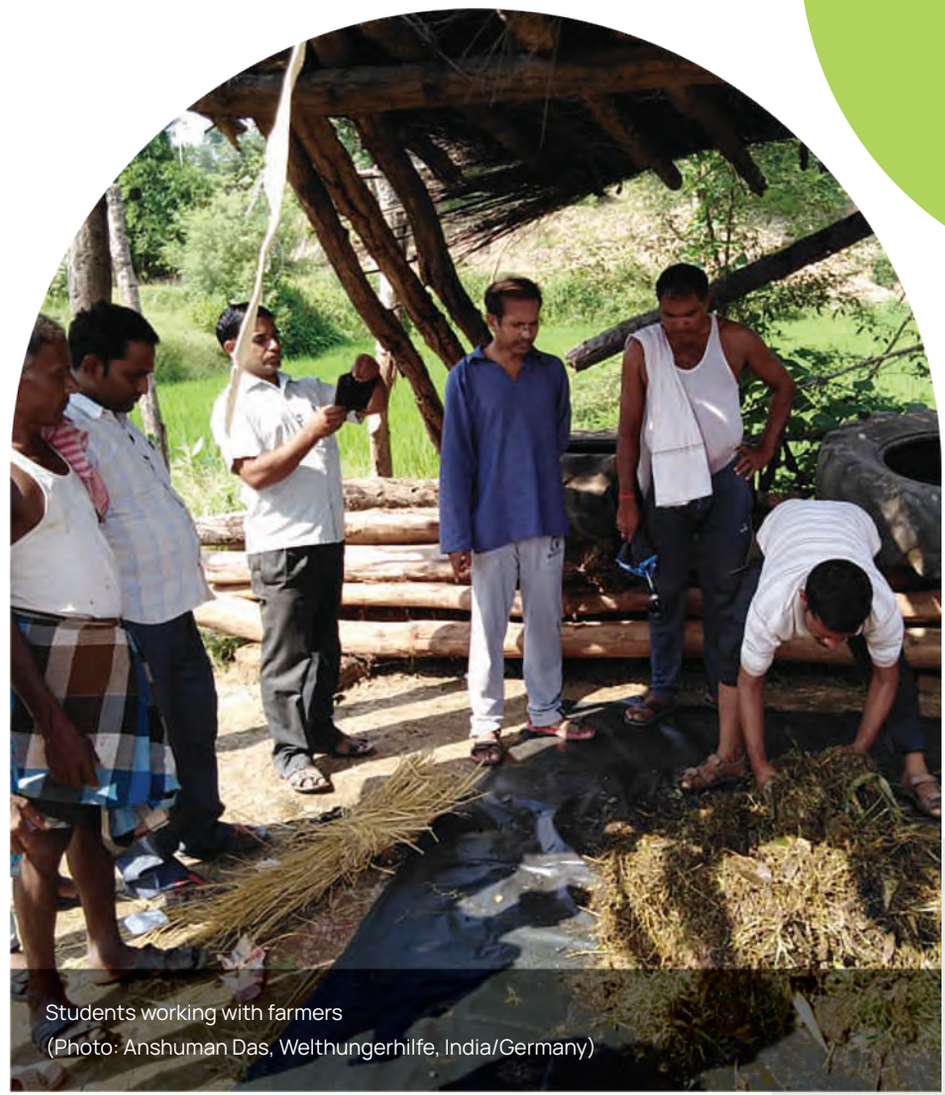
# STUDENT – FARMER VISIONS TO REJUVENATE AGRICULTURE IN INDIA

**Case 9**
Partner: Welthungerhilfe, Germany in collaboration with the University of Calcutta, India.
Location of activities: University of Calcutta.

Throughout this 3-month course in Agroecology, students are connected to a farm where they observe the farming process, analyse it, and develop a vision for the farm in discussion with the farmer. Students are encouraged to think independently and then work in groups.

This is student-led research on the farming system where students also do their own research on the food system and the food value chain. We, at the same time, do research on knowledge transmission through action learning.
Students are farmer leaders, extension workers, researchers, and entrepreneurs in food. Professors, activists, and practitioners are also involved in the course which aims to develop human resources for rejuvenation of agriculture, food security, and the rural local economy in India.

Students come from different backgrounds and take time to adapt to action learning, however, they soon enjoy the process. They become more confident in handling complexity and change and better at communication and facilitation. These students are now ready to be change agents, able to work independently and be lifelong learners.



Students working with farmers
(Photo: Anshuman Das, Welthungerhilfe, India/Germany)

# MINI-FARMS FOR STUDENTS ON A WORKING FARM IN EGYPT

Students interviewing farmers
(Photo: Anshuman Das, Welthungerhilfe, India/Germany)

Students visiting the Quarry site as one of their activities of Biodynamic training
(Photo: Reham Fathy Aly, Sekem Development Foundation, Egypt)

Students and teachers in biodynamic training at the Sekem farm, Belbeis, Sharkia governorate
(Photo: Reham Fathy Aly, Sekem Development Foundation, Egypt)

**Case 10**
Partner: SEKEM Development Foundation in collaboration with the Faculty of Organic Agriculture, Heliopolis University for Sustainable Development, Egypt.
Location of activities: Classrooms and the Sekem Farm.

We organise different types of training at the Sekem Farm for different categories of learners such as undergraduates, graduate students, start-ups and small business owners with the participation of staff members from Heliopolis University, international and national experts in agriculture and farmers from the Sekem Farm.

The training activities take place in classrooms, in the field, and at multiple visits to the farm where our learners are introduced to agricultural practices such as compost production, the hydroponic unit, greenhouses and domestic livestock farming. In the 2-week course, learners design their own “mini-farms” by planting seedlings and observing how their farms are growing.

Learners interact effectively with other learners and with staff and farm members through discussions and dialogue in working groups and using case studies as practical examples. There are useful, practical, and effective activities related to soil structure, soil fertility and the principles of organic agriculture, and biodynamic farming. This holistic approach increases understanding of the relationship between soil and plants.

Discussion with learning facilitators
(Photo: Virginia Belsanti, CIHEAM, Italy)

On-site stay in the field
(Photo: Virginia Belsanti, CIHEAM, Italy)

# WORKING ON-SITE WITH AGRI-FOOD PLAYERS IN ITALY

**Case 11**
Partner: CIHEAM Bari, Italy
Location of activities: CIHEAM Bari and other farms and location in the Apulia region.

International students in the Master course "Organic Agriculture" work with six kinds of agri-food coaches:

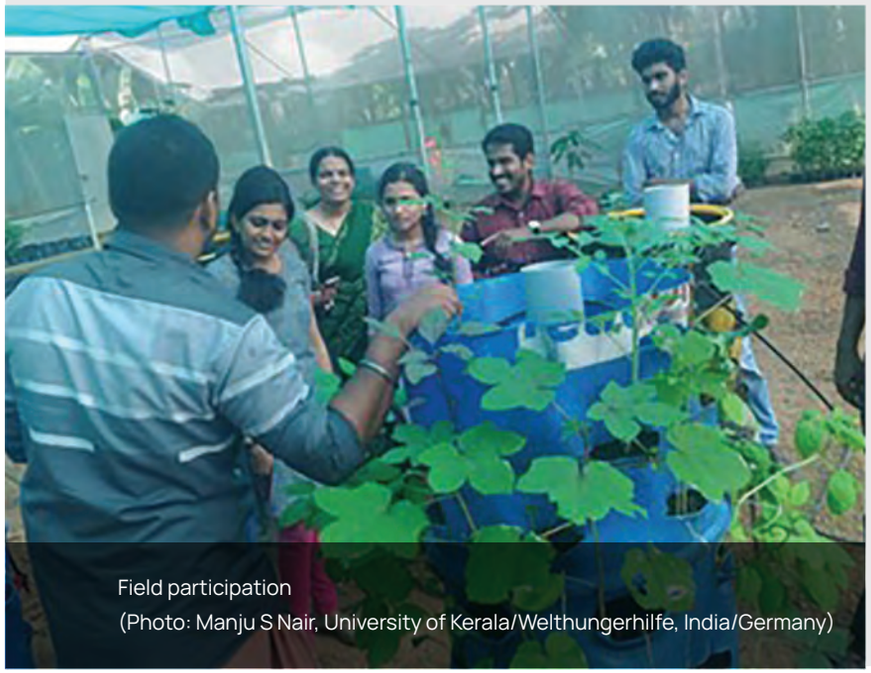
- the "Local Action Group – Alto Salento",
- farmers,
- tourist operators,
- cooperatives,
- the Slow-food association, and
- restaurants.

Using action learning methods, students study social capital: its development pathways and strategies, its role in organic agriculture, and the skills needed to work with the people involved. Students are involved in real-life problems and are committed to finding concrete solutions by combining investigative tools and methods. Specifically, students:

- hold interviews with agri-food players in their home countries,
- have meetings with Italian agri-food representatives,
- attend seminars and lectures,
- engage in group work and give presentations,
- discuss with learning facilitators,
- participate in exercises on the core competencies and on assessing social capital.

Students appreciate the combination of learning methods and learning arenas. The most valuable part, they say, is managing real issues with real professionals in the agri-food world. We now aim to extend on-site/on-field activities so students can stay one or two days on a site working directly with the actors. When students used rich pictures and visioning diagrams to visually express themselves, we were pleased to see their appreciation of Italian culture and natural heritage and their willingness to transfer their knowledge to their home countries.

Mind-mapping
(Photo: Manju S Nair, University of Kerala/Welthungerhilfe, India/Germany)



Field participation
(Photo: Manju S Nair, University of Kerala/Welthungerhilfe, India/Germany)

# AGROECOLOGY COURSE IN INDIA SHIFTS ATTITUDES

Case 12
Partner: Welthungerhilfe, Germany in collaboration with the Department of Economics, University of Kerala, India.
Location of activities: University of Kerala.

Postgraduate students with different backgrounds from India and abroad participate in our 28-day "Certificate course on agroecology: Action research and education". We use NextFOOD teaching approaches based on participation and student-centred action and promote a wide view of agri-food.

Our course includes diverse learning arenas such as:

- transect walks,
- field participation, and
- exposure visits

and we practice many peer learning techniques, including:

- rich picturing,
- mind mapping,
- joint visioning,
- photo novella and
- peer evaluation.

Teachers and mentors (including selected alumni) are supported by university officials to organise and run the course with facilitators from outside of university, including:

- farmers,
- local self-government officials,
- social activists and
- agriculture officers.

The course has shifted roles, responsibilities, and attitudes as students and teachers co-create knowledge with experts from the 'real world'. Students are graded based on their written work, documents which benefit farmers as they transition to agroecology. Faculty, authorities, and students now view action learning as a platform for working with food producers to transform learning and research. The course has been running since 2018 with 12 students per year.

# FUTURE CURRICULUM, EDUCATION AND TRAINING SYSTEM

Students at a farm visit
(Photo: Reham Fathy Aly, Sekem Development Foundation, Egypt)

**Work Package 3**
Lead partner: Norwegian University of Life Sciences (NMBU), Norway.

The aim was to develop and test new relevant curricula and training methods in order to:

- spur innovative development of action learning in the twelve NextFOOD cases of formal and informal education related to sustainable agri-food and forestry systems and
- reach out to other educators and organisations in agri-food and forestry systems.

This is important because the complexity of agri-food and forestry systems —in which 'wicked problems' of sustainability challenges are inherent— require a participatory, holistic systems approach not yet common in mainstream curricula. Further, understanding sustainability problems, let alone mitigating them, requires acquisition of cross-cutting competencies that cannot be learned from theory only, but must be trained in relevant agri-food and forestry situations.

The implementation and testing of curricula had the further aim to provide data for answering research questions within the following topics:

- Student learning and competency development in educational cases in transition to the NextFOOD action learning approach
- The process of transition to the NextFOOD approach in the twelve educational cases

This is important —in the NextFOOD cases and beyond— for the continual improvement of action learning approaches and for planning, installing, institutionalising, and further developing action learning as such.

Based on the NextFOOD educational model, we developed guidelines for the design and implementation of action learning curricula. With space for necessary adaptation to specific needs in each educational case, the major elements in these guidelines are:

- An agri-food or forestry case —including its stakeholders— forms a major learning arena and starting point for co-learning, where learners are free to do what they want with what they experience.
- The course is structured according to sequential steps in a cycle of experiential and action-oriented learning.
- Necessary instructions, exercises and theory are introduced in synchrony with the specifics of the case (ontology) as well as the necessary approaches for how to explore and improve it (epistemology) at each step of the action learning cycle.
- Cross-cutting competencies such as participation, observation, dialogue, visionary thinking, reflection, systems thinking, and facilitation are systematically trained.
- A diversity of formative and summative evaluation methods, such as self-assessment, peer feedback and teacher assessment of written assignment and oral presentations, is used.

The guidelines and needs for data on implementation were fed into the action research, respectively, according to the Master manual for case development and the Research protocol for data collection, analysis and reporting. We also produced a Review report of educational approaches and A toolbox for teaching practitioners, which are accessible online beyond the NextFOOD consortium. To further support curriculum development and implementation, in tandem with colleagues, we facilitated on-site and online advisory and training sessions at NextFOOD consortium meetings, in workshops with individual cases, and in one-to-one communication with case leaders and educators.

From colleagues, we received the Annual case development reports. The contents of these were analysed inductively with the data analysis software NVIVO (QSR International). The case development reports were coded structurally according to the NextFOOD research questions to enable horizontal reading of the reported findings and to enable cross-case analyses, where the qualitatively coded case development reports were used to uncover similarities and differences in responses to the research questions. Through exploration of those similarities and differences, with reference to relevant scientific literature, the NextFOOD educational approach or signature pedagogy was updated on a yearly basis.

The Annual case development reports analysed as described above, together with notes and transcripts from training sessions and workshops organised with all cases, made up the empirical material for the yearly Report on educational strategy.

The development and testing of new relevant curricula and training methods has spurred a substantial shift in most NextFOOD cases

- from theory to experience with real-life phenomena as the starting point for learning
- from knowledge transfer to training of competencies needed to take informed and responsible action in the pursuit of sustainable agri-food and forestry systems

Many cases reported, though, that it takes time to adapt, understand, and accept the NextFOOD educational approach.

In addition to internal use for development of cases across the NextFOOD consortium, the implementation of action learning has yielded material and experiences relevant to other educators and organisations in agri-food and forestry systems.

The competency development among learners in the cases can be summed up in four main findings, which are presented in detail in the NextFOOD project paper, Report on educational strategy, year 3:

- Competency development is intrinsically linked to experiences in the world out there.
- Structured reflection, individually and in groups, is crucial to enhance learning and competency proficiency.
- Competency development depends on the student feeling of being supported and part of a safe and stimulating learning environment.
- Online learning complicates training of some competencies, although it fosters digital literacy and skills.

Regarding case transition to the NextFOOD approach, several common supporting or hindering factors have been reported. The recurring factors are individual (intrinsic) motivation, openness, and willingness (to change, to participate), 'red tape' (i.e., institutional culture, structure and support), resources (time, effort, financial means), and relationships between stakeholders in 'the field' and the educational institutions. The cases also emphasised the importance of building trust through interaction with the students and the need to familiarise students, facilitators, institutions, and external stakeholders with the approach. A way to address these points could be to conduct training sessions, workshops, or presentations, to encourage participation and engagement and to create platforms for interaction.

The NextFOOD cases -which also include recently launched master's programmes in Agroecology at the University of Gastronomic Sciences (Italy) and University of Chile, respectively- should draw on the findings from the cross-case analyses to further refine the current action learning activities and scale out the approach to courses other than those included in NextFOOD. Further, the efforts to reach out to other agri-food and forestry educators and organisations should be maintained. Future efforts should also focus on how to widen the applicability of the NextFOOD educational approach.

**For the NextFOOD partners and others transitioning to action education, the NextFOOD homepage and platform contains a variety of resources such as practice abstracts, case presentations and an online toolbox, which should serve a wide community of teaching practitioners. This requires regular updating in line with arising needs.**

Wider application of the action learning approach needs more institutional support and appropriate legislation framework at all levels (from educational institutions to the EU).

# POLICY ASSESSMENT AND RECOMMENDATIONS: NEW POLICIES IN SUPPORT OF INNOVATIVE EDUCATION SYSTEMS


The WP4 process; gaps, strategies, new desired policy outcomes and a new current situation (UNIBO, Italy)

**Work Package 4**
Lead partner: University of Bologna (UNIBO), Italy

Professionals are facing challenges that require new and different skills and competencies in their everyday life which requires them to adapt to rapidly evolving social and environmental challenges. To prepare professionals to deal with this multitude of challenges and strive in this rapidly evolving sector, agri-food and forestry professionals need access to innovative education systems. The main objective here was to assess existing policies related to education and training in the agri-food and forestry system and propose policy instruments for farmers, forest professionals, advisers, and other key actors at the regional, national, and EU-level, supporting the transition towards action- and practice-oriented learning methods and improving the overall agri-food and forestry system considering sustainability and gender equality challenges.

With the aim of gathering information about the effectiveness of and gaps in existing policies in the education and training sector, we carried out a diagnostic of existing policies through a pan-European online survey with the participation of an array of stakeholders, including researchers, educators, advisors, policymakers, and local and EU authorities, supported by extensive desk research, in the context of which the current EU education and training policies and programs in the agri-food and forestry sector were reviewed. The findings of this activity were the starting point for identifying options for improved policy instruments in different context scenarios (EU/national/regional). Thus, we held workshops at local and European levels. The local workshops were conducted by the Consortium Partners in their own country contexts: 10 countries, with the participation of 60 participants. The EU-level workshop gathered 24 European experts to discuss the preliminary results of the local workshops.

In parallel, for the purpose of generating knowledge on diversity and reducing barriers to gender equality in the agri-food system, we conducted an assessment of partner gender capacities and produced a Gender Reference Guide and Gender Policy Recommendations for Education in Agri-food Systems. To build on the insights obtained, we developed concrete guidelines for policymakers and education managers to strengthen the EU education and training system providing for new instrument design and implementation options. The activity was conducted through extensive desk research with the involvement of partners in the process.

The diagnostic of existing policies highlighted that policies are often not perceived as effective; indeed, there is poor awareness on the existence of strategy documents matched with insufficient coordination among policy fields (EU, national, and regional) and actors (university & industry). Furthermore, policies are not very effective in promoting sustainability, entrepreneurship, and innovation and not effective in addressing sector needs.

With regard to the identification of new strategies for improvements, the most relevant strategies identified were: i) increasing practical knowledge and experiences; ii) improving skills and competencies, mostly in the field of digital skills; iii) enhancing collaborations among different actors involved in the educational process (schools, professional institutes, universities, research

institutes, ministries, advisors, etc.); and iv) setting up a dialogue with stakeholders external to academia. Moreover, widespread opinion showed both the importance of attracting new targets (e.g. young urban people) and making the sector gender-neutral (breaking down barriers for females).

Furthermore, viable solutions, particularly including the need for a prioritised discussion on gender among partners, highlighted the need for a sound monitoring system to create accountability on gender and finally the importance of a strengthened top-down approach for the integration of gender in the project. Based on these findings, we identified policy objectives and concrete policy tools addressing key actors responsible in the process, and best practices to guide the transition to an improved policy framework. Our findings reveal the importance of approaching education and training policies in the agri-food and forestry system on different levels, namely local, national, and EU, focusing separately on key actors (learners, students, farmers, entrepreneurs, advisors, educators, education managers, and policy-makers), identifying and proposing new policy instruments on different educational levels. For this reason, policy instruments were proposed at the identified educational levels, namely Pre-University, University, Vocational Education and Lifelong Learning, considering different key actors. At the same time, however, our findings suggested that there are specific critical overarching issues that need to be considered throughout all functions and levels of the education and training system to improve the policy framework of the agri-food and forestry sector. Making such distinctions at the policy-level would allow policy-makers to create tailor-made solutions necessary to guide the transition toward sustainability of the agri-food and forestry system given its large scale and scope. In this regard, some of the overarching policy objectives identified were: integrating the notion of sustainability into the education and training system; allowing gender equality across the agri-food and forestry sector; enhancing skills and competencies matching the needs of the sector; increasing collaboration among actors in policy-making especially strengthening ties with industry; integrating local communities and farmers in decision-making; and adopting simplified administrative procedures and better coordination policies. Key strategic issues will be the coordination between education, innovation, and sector policies (e.g. the CAP), as well as the role of policy as facilitator of bottom-up initiatives.

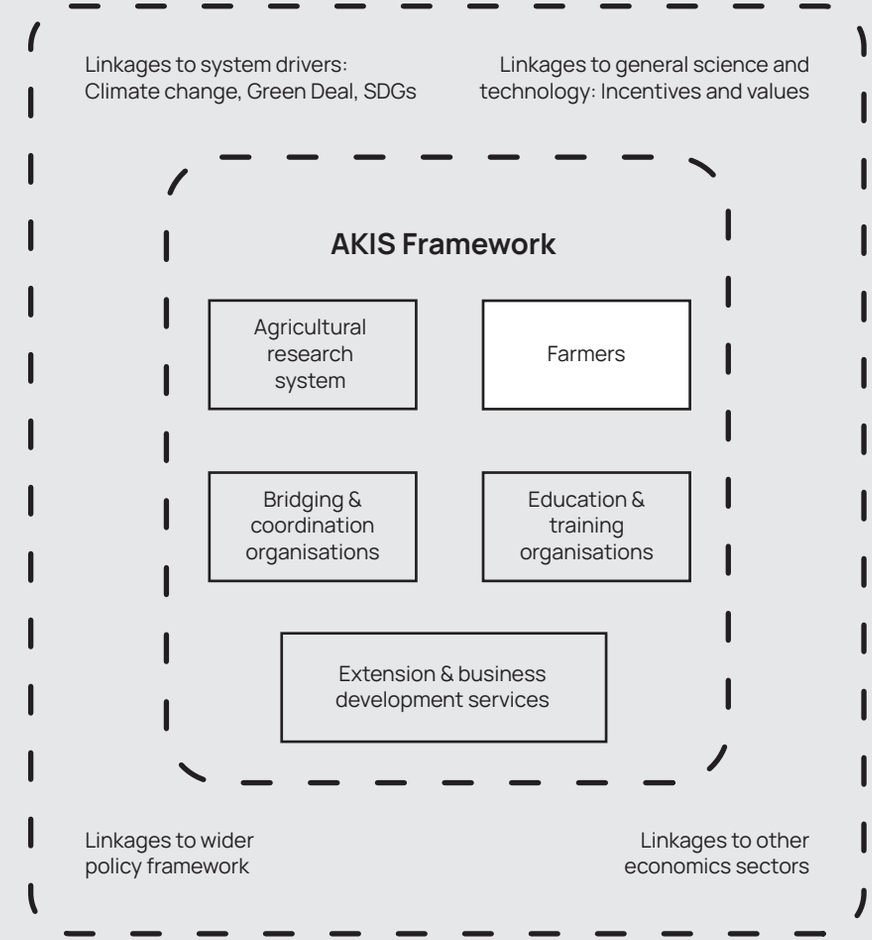



Figure: The AKIS framework (UNIBO, Italy)

# QUALITY ASSURED KNOWLEDGE TRANSFER: ASSESSING SOCIETAL IMPACT OF PRACTICE-ORIENTED RESEARCH AND EDUCATION

**Work Package 5**
Lead partner: University of South Bohemia in České Budějovice (USB), Czech Republic

The evaluation of applied research outputs should be practice-focused, rather than focusing merely on their economic usefulness or their scientific quality, and the criteria used to evaluate education should be widened. Seen in that light, the objectives here were to 1) provide an overview and create a list of the best practices of standards and criteria for quality assessment of applied research and education, 2) develop a framework for monitoring and reporting practice-oriented outputs and for enabling peer review of practice-oriented outputs, and 3) involve expert groups in testing and refining the developed framework.

Through a three tiered approach, we 1) conducted a literature review of existing frameworks for evaluating practice-oriented research and education, 2) developed a framework for the monitoring, reporting, and evaluation of innovations and practice-oriented research and education outputs, and 3) tested and evaluated this framework. The literature review, prepared in the first year of the project, formed the background for the succeeding steps in which we prepared the NextFOOD Sustainability Impact Framework, which was tested in three pilot countries: Sweden, the Czech Republic, and Greece. The Swedish pilot focused on testing the framework in the context of agricultural research, mobilising several ongoing projects at the Swedish University of Agricultural Sciences (SLU). The Czech pilot examined ways and the extent to which the framework can be used for assessing the impacts of practice abstracts, mobilising practitioners and agricultural experts from the Czech Republic. The Greek pilot tested the usability of the framework in the context of education, focusing on educational activities at the American Farm School (AFS) in collaboration with the International Hellenic University (IHU) in Thessaloniki, Greece.

Students and external experts
(Photo: Jan Moudrý, USB, Czech Republic)


Procedural components of the NextFOOD sustainability impact framework (USB, Czech Republic)

The literature review emphasized the understanding of agricultural systems as complex and it pointed to a shift from positivist to constructivist approaches in the evaluation of agricultural research. **At the heart of this is the idea that to measure the impact of agricultural research adequately, evaluators must take the specific contexts of research projects into account.** Finally, the literature review demonstrated a need for engaging seriously with the societal impacts of agricultural research. These findings formed a basis for developing the NextFOOD Sustainability Impact. In its existing version, the Framework can be used to identify indicators and assess societal impacts of applied research projects. While using the Framework would require some form of moderation (e.g., a facilitator), it has a relatively easy-to-use format that allows usage on a wider scale. The Czech pilot tested the Framework in relation to the usefulness of published practice abstracts. The results thus far indicate a low relevance of the abstracts to practice and practitioners. The Swedish pilot is testing the Framework in relation to applied research projects, which resulted thus far in an understanding of the importance of an adequate process between stakeholders for enabling impact. In the Greek pilot, the Framework was tested within an educational setting and resulted in insights as to the uses and educational value of adopting an impact-oriented stance in research conducted by students.

The three pilots add different perspectives on societal impact of action-oriented research and education. A rich set of data from interviews and focus group discussions with stakeholders were collected from the pilots and will form the basis for a revised and final version of the framework to be delivered in 2022. The updated NextFOOD Sustainability Impact Framework will provide a nuanced approach to the evaluation of applied outputs, strengthening the social, economic, and environmental dimensions of evaluation. Scientific articles that give further depth to the findings and put the development of the impact framework in a scientific context are under development.

# COMMUNICATION, DISSEMINATION AND EXPLOITATION: ENGAGING AND EXCHANGING WITH A MULTITUDE OF AUDIENCES

**Work Package 6**
Lead partner: American Farm School (AFS), Greece

By communicating the activities and disseminating the results of the NextFOOD project to a multitude of audiences and through a variety of channels, we developed networks for the exchange of knowledge, experiences, tools, methods, and strategies in the fields of education, agri-food and forestry, and public policy. A number of communication and dissemination channels were developed and utilised to reach diverse audiences. These are:

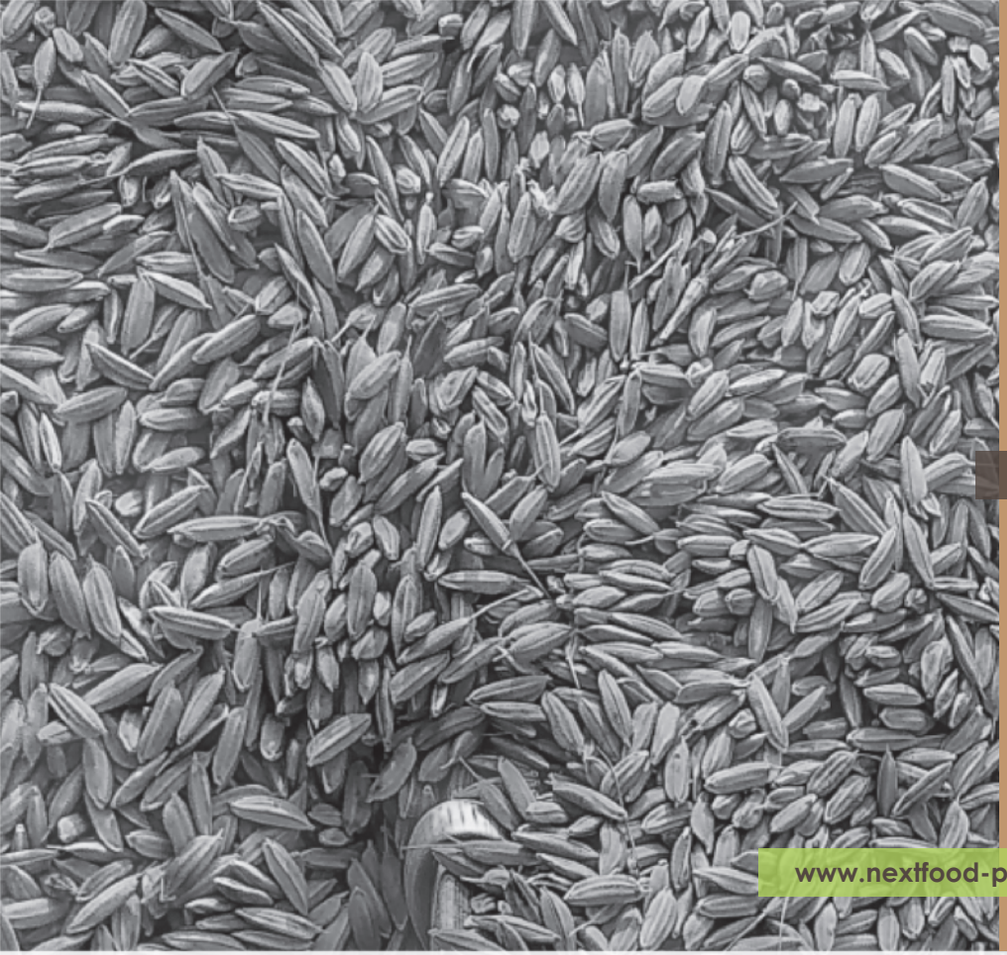
- The project website and platform (https://www.nextfood-project.eu/) as the main operational and communication tools disseminating the latest project news, experiences from cases, teaching tips, and learning materials. Social media including a Facebook page ("NextFOOD"), Instagram account (NextFOOD_H2020), Twitter account (@NextFOOD_H2020), and a LinkedIn page ("NextFOOD project"), to reach out and engage both the general public and specific project stakeholders.
- YouTube channel ("NextFOOD project") serving as the main audio-visual dissemination channel.
- Newsletters circulated every six months in an electronic form to inform interested parties and stakeholders about the progress of the project.
- Press releases serving as the main communication channel to mass media about project activities.
- Leaflets, brochures, and posters translated in all partner languages to maximise the communication of project activities.
- EIP-AGRI practice abstracts containing the resulting project knowledge and outcomes communicated in an easy-to-understand format and fed into the EIP-AGRI website for broad dissemination.
- Scientific publications in the form of articles published in peer-reviewed journals targeting the academic community.
- Non-scientific publications in the form of articles published in specialised press media (printed and online) targeting professional audiences in the agri-food sector.
- Promotional events organised by the project and events in which NextFOOD partners participate with the aim to enhance identified and potential stakeholder engagement with the project.
- Synergies with other projects that are active in similar fields to build new stakeholder networks and enable cross-project collaborations.

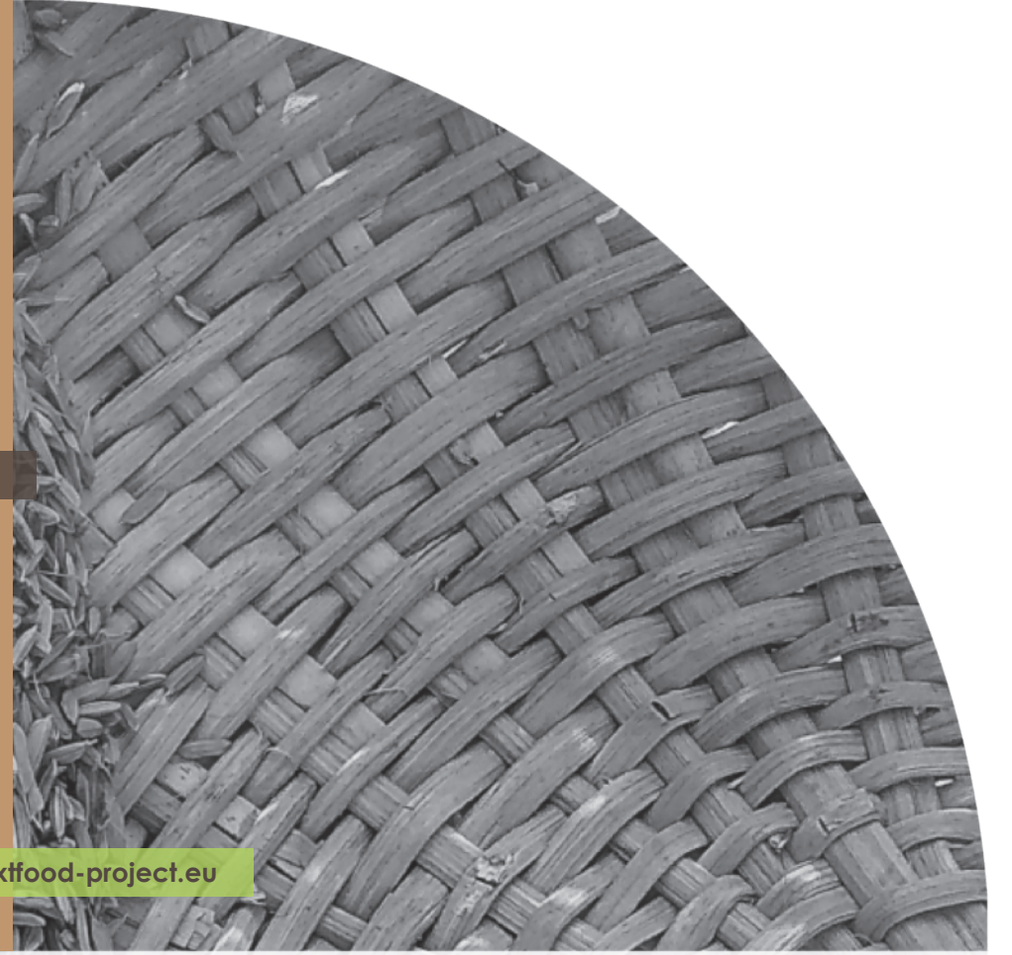
The communication, dissemination and exploitation activities reached large numbers of diverse audiences and promoted the engagement of various stakeholders with the project. In close collaboration with the case activities, the NextFOOD Platform was developed as a repository for the case responsible partners to share their experiences implementing action-oriented, learner-centered and transformative learning in line with the NextFOOD approach. Here, teaching practitioners have documented how they train the core competencies, how they implemented the multi-actor approach, the institutional barriers they encountered in the early stages of aligning with the NextFOOD Approach, what the shift to facilitation entails, and many more topics. Much of this material was appropriated to make the "NextFOOD toolbox". The Toolbox on the NextFOOD Platform, provides a broad set of tools and models for teaching practitioners at any level of the educational system (from high school, vocational training, to higher education), as well as extension specialists devoted to experiential learning approaches. It is intended for courses and programs in the area of sustainable agri-food and forestry systems, but can be also applied to other educational settings. The production of Practice Abstracts was actively encouraged throughout the duration of the project. All Practice Abstracts can be found on EIP-AGRI and on the NextFOOD website and in the Toolbox.

NextFOOD dissemination event held in Greece
(Photo: Dafne Kapsala, AC-RCM, Greece)

After the project's end, all data and outputs generated through the project will be freely available for all interested parties to access. Specifically, the NextFOOD website and platform host all main project findings including learning tools and materials. Moreover, the project's social media featuring resulting materials will remain accessible, while anonymised data and deliverables will be made available through the Zenodo repository. In this way, all knowledge generated through NextFOOD could be easily accessed and used after the project's lifetime.


NextFOOD Kick-Off Meeting May 2018, SLU, Sweden
(Photo: Tor Arvid Breland, NMBU, Norway)





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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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