WP5 – Quality assured knowledge transfer

D5.5 Launch of ready to use peer review system

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EXECUTIVE SUMMARY

This report presents the NextFood Sustainability Impact Assessment Framework, intended for the monitoring, reporting and evaluation of quality assured knowledge transfer through practice-oriented research and education. The approach is intended to support the planning for a desired impact, the inclusion of relevant actors, and the fostering of interaction and mutual learning between actors. As existing frameworks for evaluating impact resulting from agri-food and forestry research provide little incentive for interactive innovation, there is a need to devise alternative ways of reviewing and measuring performance in this context.

The NextFood Framework is described broadly in order to allow for applicability in various contexts, such as to evaluate the impacts of applied research, to assess 'practice abstracts' produced from research and educational activities, and to evaluate the impact of research embedded in educational activities. In all of these contexts, the purpose of the NextFood Framework is to inspire diverse actors to meet and collaborate in the research process, and to jointly consider the implications (impacts, benefits, etc.) of their work. In each of these contexts, specific purposes can be developed, such as the highlighting of the impact merits of researchers and other involved stakeholders, to be used as a basis for writing 'practice abstracts', or to be used for evaluation of ongoing education in institutional settings.

The structure of the NextFood Framework provides for the evaluation of process and product related impacts in relation to social, environmental, and economic sustainability. The structural components of the framework are to be used as an organisational tool for articulating "impact" in the process of evaluation. The users are asked to reflect on four interrelated impact levels, namely the individual level, project level, intermediary level, and systemic level. The project manager, group leader or facilitator can use the NextFood Framework as a means to structure the outcomes of the group discussions, and for organising the impact indicators.

The process of the NextFood Framework constitutes a method of organising stakeholder interaction around potential and actual impacts. The five procedural components jointly constitute a way of operating the NextFood Framework in practice; Prepare, Assemble, Involve, Plan, Execute and Reflect. For each step, practical tips for users are provided, as a guide to the work of implementing the framework. In this process, users are expected to identify the indicators that best describe the sustainability impacts stemming from their project work and results, both in terms of indicators specific to the focal project, and general indicators which are comparable between projects.

The report is divided into two parts. Part A is a user's guide to the NextFood Framework, while Part B details the work behind it and acts as an example of how the framework can be used in different settings. Here, the theory behind the framework is presented along with the three pilots used to test the framework: the research case, the 'practice abstract' case, and the education case.

A preliminary version of this deliverable was sent for review by experts in the field of evaluating practice-oriented research. The comments from the reviewers, listed in Appendix 4, have been integrated into this final version of the deliverable.

1. INTRODUCTION

This deliverable presents the final outcome of NextFood Work Package 5 (WP5), which aims to develop and test a framework for quality assured knowledge transfer. Specifically, the task is to develop a framework for monitoring, reporting and evaluating practice-oriented education and research, and to launch a ready-to-use peer review system which includes areas of impact and indicators. The presented framework is described broadly in order to allow for applicability in various ways. In other words, every user should be able to apply the principles of the framework to their projects. The approach suggested in the framework below could help to increase impact planning, as well as allowing for actors to be taken into account in a systematic way and could foster the learning of individuals involved in the project.

In practice-oriented research and education, impact assessment frameworks play a double role. On the one hand, their explicit purpose is to account for the social, economic, and environmental effects of research results and educational processes. On the other hand, they motivate and incentivise particular forms of research and educational interaction. For example, introducing social components to impact assessment has had profound implications for how research and education are organised and operationalised today (see Deliverable 5.1: https://www.nextfood-project.eu/deliverables/).

While substantial theoretical effort has gone into developing the evaluative dimensions of impact frameworks, in this process, less attention has been focused on their interactional and reflexive aspects. Thus, existing frameworks for evaluating the impacts resulting from agri-food and forestry research provide little incentive for interactive innovation. Thus, there is a need for devising alternative ways of reviewing and measuring performance in this context. Addressing this need, the objectives of WP5 were:

1) To provide an overview and create a list of the best practices of standards and criteria for the quality assessment of applied research and education (Deliverable 5.1)

2) To develop a framework for monitoring and reporting practice-oriented outputs and for enabling peer review of practice-oriented outputs (Deliverable 5.2)

3) To involve expert groups in testing and refining the developed framework (Deliverable 5.3, 5.4)

4) Present a ready-to -use framework for the evaluation of quality assured knowledge transfer (this document, Deliverable 5.5.)

The results of the work following these objectives is presented in this deliverable. The deliverable is divided into two parts.

Part A presents the ready-to-use NextFood Sustainability Impact Assessment Framework, from here on referred to as the NextFood Framework, and is written as a user manual. It defines the intended users and uses of the framework, presents its structural and procedural components with tips for users, and provides guidelines for users regarding impact areas and ways to assess them, including impact indicators. All EU-funded research initiatives, such as those which are part of the Horizon 2020 programme, are required to write and publish 'practice abstracts' - the EU format for disseminating knowledge in ways that convey relevance to practitioners, for an example of this, see https://ec.europa.eu/eip/agriculture/sites/default/files/eip_common_format_-_14_oct_2015.pdf.

This has been taken into account. The NextFood Framework integrates the 'practice abstracts' format into the impact assessment process, in this way facilitating the writing of 'practice abstracts' as well as enabling the assessment of specific 'practice abstracts' as contributors to impact.

Part B presents a summary of the work, results, and recommendations that contributed to developing the framework. This work was conducted in three pilots: the research pilot in Sweden, the 'practice abstract' pilot in the Czech Republic, and the education pilot in Greece. These pilots can also act as examples of how the framework can be adapted for the three different purposes outlined above.

A preliminary version of this deliverable was sent for expert review by three experts in the field of evaluating practice-oriented research, located in Sweden and the Czech Republic. The experts were working at an innovation funding agency, an agricultural research funding body, and a government body for agricultural development and innovation. The comments from the reviewers, listed in Appendix 4, have been integrated into this final version of the deliverable.

1.1. A readers' guide to the report

This report presents the NextFood Sustainability Impact Assessment Framework, intended for monitoring, reporting and evaluating quality assured knowledge transfer through practice-oriented research and education. The approach is intended to support impact planning, increase the inclusion of relevant actors, and foster interactions and mutual learning between actors.

The report consists of Part A and Part B. Part A is a user's guide to the NextFood Framework, while Part B details the work behind it and acts as an example of how the framework can be used in different settings.

Part A presents the ready-to-use NextFood Framework and is written as a user manual. The NextFood Framework acts as a tool for organising stakeholder interactions around potential and actual impacts, and can be used in different contexts. In section 2, the three different methods of using the NextFood Framework are presented: to evaluate the impacts of applied research, to assess 'practice abstracts' produced from research and educational activities, and to evaluate the impact of research embedded in educational activities.

Next, the structural components are presented in section 2.1.1, which consists of process and product related aspects, divided in four levels. Thereafter, the procedural components are presented, namely the Prepare, Assemble, Involve, Plan, Execute and Reflect steps. In the following section, the indicators are presented, these are project specific indicators and general indicators. The time frame of when to measure indicators is discussed in 2.2.3.

Part B presents the work behind the NextFood Framework, as well as acting as an example of how the framework can be used and adapted for the three different purposes outlined above. It starts with the theoretical work to develop a first version of the framework in 3.1. Then the three pilots testing the framework are presented: the research case in 3.2, the 'practice abstract' case in 3.3, and the education case in 3.4. Finally, the experiences from the pilots and suggested developments of the framework are summarised in 3.5, and the indicators in 3.6.

2. PART A. A READY-TO-USE FRAMEWORK

The NextFood Framework constitutes a model for organising and executing sustainability impact assessment. Taking into account the complexity of agriculture, food and forestry systems, the NextFood Framework provides users the possibility to specify the impact areas and related indicators that matter in their specific contexts. It enables the measuring of impacts in ways which encourage networking and interactive innovation towards sustainability in the agri-food and forestry sectors.

Intended users of the NextFood Framework

The NextFood Framework can be used in three different contexts: to evaluate the impacts of applied research, to assess 'practice abstracts' produced from research and educational activities, and to evaluate the impact of research embedded in educational activities.

In the applied research context, the purpose of the NextFood Framework is:

1) To inspire diverse actors to meet and collaborate in the research process
2) To help actors to jointly consider the implications (impacts, benefits, etc.) of their common work
3) To highlight the impact merits for researchers and other involved stakeholders, providing a basis for an "impact portfolio" (to be used for funding and career applications, etc.)

The NextFood Framework can be used at different stages in the applied research process. It can be used in the creation and setup of new research projects, for assembling a relevant group of actors to prepare a project and to develop impact-oriented activities. The framework can also be used in the evaluation of ongoing research. In this respect, the framework is useful both for specific research projects and research groups, and for the evaluation of broader units (e.g., on the faculty or the university level). Finally, the framework can be used as part of a long-term evaluation of impact, responding to questions such as: "What impact has been made by applied research starting X years ago?"

In the context of EU-funded agricultural research projects, the NextFood Framework has been designed to facilitate work with 'practice abstracts' in two major ways.

1) It can be used as a basis for writing 'practice abstracts'. By engaging stakeholders in the evaluation process, researchers may learn what impacts matter to those stakeholders and how such impacts may best be conveyed in the 'practice abstract' format.
2) The Framework also enables an assessment of the impact of the 'practice abstracts' themselves once they are published. In other words, it puts the impact of the 'practice abstracts' on the evaluation agenda, as one of the impact areas to be assessed.

One may also consider the production of 'practice abstracts' as a means to signify stakeholders' motivation to disseminate their work, their engagement in the project and their understanding of a project. As such, the number and quality of 'practice abstracts' may become an indicator of impact in itself, measuring levels of engagement, motivation and understanding.

In the educational context, the goal is to facilitate the development of an impact-oriented mindset and practices. In more traditional conceptions of "what students do", their activity is categorised as mere learning, leading to professional qualifications (namely grades and degrees). More recent approaches, however, emphasise how student activities can also be made useful to stakeholders outside the educational system. Thus, apart from grades and degrees, student work can in fact lead to useful results for a variety of stakeholders. While students nowadays are taught to consider the impacts of research, they lack experience in the practices underlying "thinking", "achieving", "reporting", and "assessing" impact. The Framework is crucial to enable educational actors to tackle this challenge. Additionally, in the educational

context, the NextFood Framework has the potential to align pedagogical activity with EU frameworks for knowledge dissemination.

The NextFood Framework can be used in different stages in the development of educational programs:

1) In the setup of new educational programmes to develop impact-oriented activities. The goal of these activities would be to involve and engage students in the process of establishing impact indicators for their work and to practise evaluating their own progress through them.
2) In the evaluation of ongoing education in institutional settings. The framework is useful both for specific departments and for the evaluation of broader units (e.g., on the level of faculty or on the university level).
3) In long term evaluation of impact, responding to questions such as: "What impact has been made by an education starting X years ago?"

In each case, it is important to determine context in which the framework will be used and make the necessary adaptations. Nevertheless, the involvement of the students in the evaluation is highly recommended as those students will soon become important stakeholders and thus wil also be users of the results. They can therefore bring outcomes and knowledge into their practical careers.

2.1. THE STRUCTURE OF THE FRAMEWORK

The NextFood Framework has the following structural components. The framework allows for the evaluation of process and product related impacts in relation to social, environmental, and economic sustainability dimensions. The users are asked to reflect on four interrelated impact levels, namely an individual level, a project level, an intermediary level, and a systemic level. In this reflection process, users are expected to identify the indicators that best describe the sustainability impacts stemming from their project work and results. The structural components of the framework are graphically presented below (see table 2.1).

The structural components of the framework are to be used as an organisational tool for articulating "impact" in the process of evaluation. The structural components are meant to be used by the project manager, group leader or facilitator as a means to structure the outcomes of the group discussions, and for organising the impact indicators.

Four levels of impact

The framework is divided into four impact levels. The impacts of a project can be identified on a scale spanning the individual level, the project level, the organisational level, and the systemic level.

Individual level: this level concerns the personal and professional development of the individuals directly involved in the project.

Project level: this level concerns the individuals involved in the project working groups, reference groups and/or stakeholder groups.

Organisational level: this level concerns the organisations that are represented by the individuals that are part of the project level.

Systemic level: this level refers to impacts related to the broader relevant food system.

Individual level: This level concerns the personal and professional development of the individuals directly involved in the project. It was added after consideration of certain indicators that related to the effects of processes on personal qualities, capacities, competences and values. It is particularly relevant to educational settings where the personal development of students is often a desired educational outcome. However, the individual level is also a way to validate system changes or network effects, not just “effects for the individual”.

The project and organisational levels are commonly referred to in existing evaluation models and literature.

Regarding the systemic level, the definition of a relevant food system needs to be discussed and defined in a way that makes sense to the stakeholders involved in the particular case. A useful starting point in food related projects is to look at the UN’s definition of the food system as "the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption, and disposal (loss or waste) of food products that originate from agriculture (incl. livestock), forestry, fisheries, and food industries, and the broader economic, societal, and natural environments in which they are embedded" (Food Systems - Definition, Concept and Application for the UN Food Systems Summit). Alternatively, the food system can be defined through the concept of “the value chain”. Value chain actors are usually defined as the actors involved in transactions of goods and services along a certain value chain. Actors that are indirectly concerned with the value chain could also be included, such as authorities and NGOs.

Two categories of impact - research process and product

The four impact levels are complemented with two impact categories, namely process and product related impacts.

1) Process related impacts articulate the effects concerning social, environmental, and economic sustainability seen to result from work practices and activities, i.e., the research or education process itself.
2) Product related impacts articulate effects regarding social, environmental, and economic sustainability stemming from the research or educational results.

Each category contains the sustainability dimensions of economic, environmental or social sustainability, i.e., as they relate to either the research process or its products.

The above-stated levels and categories are depicted as a matrix in Table 2.1 below. For each box, indicators can be formed (see section 2.2).

	Process related impact category. Economic, environmental, social.	Product related impact category. Economic, environmental, social.
Individual level The personal and professional development of the individuals directly involved in the project.	Indicators of how the process creates value for the involved individuals, in economic, environmental or social terms.	Indicators of how the results/products create value for the involved individuals, in economic, environmental or social terms.
Project level The group of individuals involved in the project working group, reference group and/or stakeholder group.	Indicators of how the process creates value on the project level, in economic, environmental or social terms.	Indicators of how the results/products create value on the project level, in economic, environmental or social terms.
Organisational level The organisations that are represented by the individuals that are part of the project level.	Indicators of how the process creates value on the organisational level, in economic, environmental or social terms.	Indicators of how the results/products create value on the organisational level, in economic, environmental or social terms.
Systemic This level refers to impacts related to the broader relevant food system.	Indicators of how the process creates value on the systemic level, in economic, environmental or social terms.	Indicators of how the results/ products create value on the systemic level, in economic, environmental or social terms.

Table 2.1. The structural components of the framework are based on four levels and two categories of impact. Each category may contain the sustainability dimensions of economic, environmental or social sustainability.

2.2 Using the framework - 5 steps to assess impact

The procedural components of the framework constitute a way of organising stakeholder interaction around potential and actual impacts. The following procedural components jointly constitute a way of operating the NextFood Framework in practice. The five major components of the process are elaborated below. Under each step, we provide practical tips for users, as a guide for implementing the framework.

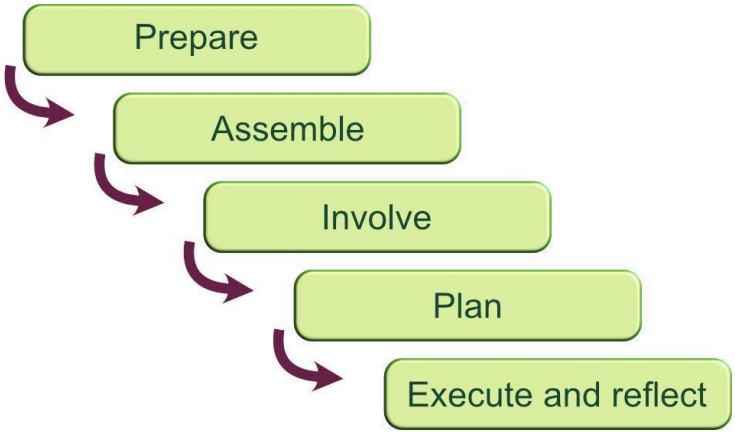

Figure 2.1. The five procedural components of the framework.

1. Preparing for impact assessment work

To prepare for the impact assessment work, it is important to create the best environment/conditions for such a work to be successful. Take time to understand and redefine the terms and dimensions of the framework to fit the project at hand before actual stakeholder engagement. Some bibliographic research should be done beforehand so that project leaders and managers have a good idea of the areas of impact that are most relevant to the project. It is also advised to start to consider alternative methods of testing indicators of impact at this stage.

An important part of the preparation for impact assessment is engaging a stakeholder network. Think through the stakeholder network and communicate with stakeholders as early as possible, preferably before the funding stage. Stakeholders can often be important contributors to a project, in terms of resources such as networks and experiences, as well as in enabling the future impact of the project through, for instance, utilising their own networks.

Appoint a project manager, group leader or facilitator (according to what fits the purpose of the work). A facilitator is important for introducing the concepts of impact assessment and how they may be translated into indicators of impact. This is because most groups are not familiar with these concepts or with the procedures of impact assessment. Such a facilitator will assist the group in moving forward with the tasks of agreeing on a set of indicators relevant for the project, how these should be measured, and to help them delegate responsibilities in the group regarding the assessment process. More details on the facilitator role are given below.

The concept and format of 'practice abstracts' (PAs), if relevant, should be introduced at the beginning of the project. Participants should be encouraged to find PAs that are relevant to their project. This allows participants to become familiar with the format and the aim of the PA's before they are asked to produce one for themselves. Facilitators should offer ample support and guidance in this task. Project participants should cooperate on PAs with the help of the relevant stakeholders. The set of indicators will be important for producing the best quality 'practice abstract' as well. Start to think of the PAs content in relation to indicators at this stage of the project.

As mentioned above, a set of tentative indicators should already be clear to the project manager from the start of the project. These would be indicators which are relevant to the project objectives. They would act as the starting points of conversation with the stakeholders and a tool for keeping the project and the stakeholders on track. However, during the conversation, stakeholders can add indicators that are more relevant to their involvement and to their interests. Although the project manager may have an idea of a point in time when indicators should be tested, stakeholders may give their input on this, since they may have a more accurate idea of indicators' capacity to change. They should also be able to decide on the time when their own indicators should be assessed. Thus, the project managers can have a timeframe for testing ready beforehand, but one which remains flexible in the light of stakeholder input and evidence. See more about indicators in section 2.2.

Set aside adequate time and resources in the budget. Time and other costs for the participating stakeholders performing the impact assessment below, need to be covered.

The role of the facilitator

Given the relative inexperience of groups in impact assessments and the complexity of multi-stakeholder settings, facilitators will play a significant role in the process of applying the framework. As mentioned above, the project management team will need to have a very good grasp of the framework beforehand and will have made a detailed plan of how they need to adapt the framework to the particularities of their project. However, the facilitator should be intimately involved in implementation and the data keeping of the sessions that are dedicated to the framework. This means that they should prepare all the relevant documents that will aid them.

During the first implementation sessions, the facilitator will be responsible for introducing the framework to the stakeholders. Special care needs to be taken to how the impact assessment is framed in terms of the project aims and objectives. Stakeholders need to understand the relevance and the importance of the impact assessment in order to develop a framework that is meaningful to them and to create motivation, involvement and adherence to the project. As the sessions progress, the facilitator will need to clarify the concepts that are most difficult for the participants to understand. That is, many participants will not be immediately able to grasp the difference between process and product. Thinking about which impacts are systems related and which are social impact related may be quite difficult at times. So, the facilitator must be able to provide examples, to simplify the concepts and to demonstrate their relevance to project aims and objectives. It is worth mentioning here that it is not advisable for the facilitator to overwhelm the participants with paperwork, forms to be completed and technical language. The implementation is best done by means of casual conversation, with the results documented later. Here, the role of the facilitator may be to interpret what was said in the session using language that can be used to complete the framework, tick appropriate boxes, etc. If the facilitator is not the researcher, they will need to keep accurate notes in order to aid the researcher in this job.

Finally, during the implementation, the facilitator will be responsible for good communication practices. They need to facilitate an open conversation environment where all stakeholders feel safe and are encouraged to express their views and interests. It may be a taxing task to create a balance between personal views and interests, and project interests. It may also be taxing to ensure that all stakeholders are held equal in the expression of project indicators. It is often the case that some individuals are more dynamic than others or that they believe they represent a more important stakeholder group for projects. Thus, the facilitator will need to take care to include everyone in the conversation. Within the groups, they will need to directly ask questions to individuals who are more reluctant to participate, share speaking/participation time equally, direct conversations to relevant issues and generally keep the environment safe and productive for everyone.

2. Assembling Relevant Stakeholders

Impact is not just a measurement. *Impact is work*. Moreover, impact is a socially embedded activity; actors have stakes when articulating how research work influences society, the economy and/or the environment. This step in the process of evaluation aims to organise “impact work” so as to enable the taking of joint action towards and joint responsibility over what is viewed as process and product-related effects or impacts.

The step consists of assembling a group of stakeholders who would participate in the evaluation process itself. To ensure diversity, this step may include stakeholders at various levels of involvement, for example, directly involved stakeholders (e.g., participating researchers, etc.), indirectly involved stakeholders (e.g., supporting organisations, etc.), and non-involved but affected stakeholders (e.g., consumers, users, etc.).

This group of stakeholders will be responsible for articulating impact as a group, as well as for the process of measuring impact itself. The group should be open, i.e., allowing for the possibility of including additional actors as the evaluation process requires it. Framework Stakeholders can be users as well as part of the target group, allowing for the adaption of the Framework based on their specific needs.

Tips for users:

Be aware of possible conflicting interests within the group and try to include personal discussions (i.e., personal interviews) in the process of indicator production.

The framework model emphasises the assembly of a group of varying stakeholders when performing the impact assessment. If stakeholders are not already included in the project from the start, the assembly of a group of stakeholders can be a tricky step. Thinking through and including stakeholders as early as possible, preferably already before writing a funding application, will facilitate the impact work and impact assessment of the project later. Stakeholders can be important contributors to the project in terms of resources such as networks and experiences, and not least in enabling future impact on the project, e.g., through their networks.

To produce the best quality 'practice abstract' (PA), the key stakeholders should be potential users. The stakeholders can give the most valuable thoughts on what you should aim towards when writing PAs. Directly involved stakeholders (e.g., participating researchers) can then help to formulate how to articulate these ideas in the most understandable way for potential users. These are the most important stakeholders when it comes to the production of PAs. However, indirectly involved stakeholders (supporting organisations) can also provide invaluable thoughts, for instance, on aspects of market conditions, etc.

3. Involving in the impact evaluation

This step is about involving the assembled actors in the details of the impact evaluation. The quality of engagement is as important as the assembly of stakeholders. That is, for active engagement to take place it is important that stakeholders have common interests and that the setting of communication promotes open sharing and trust. The discussion of indicators is a good way to establish these common interests by establishing common indicators. As much as possible, stakeholders should be held responsible for assessing their development and for deciding the best time intervals for this assessment. The facilitator can play an important role in helping with this. Introducing general indicators to the stakeholders and asking for their input as soon as there is trust and commitment built between project participants is an essential task for the facilitator.

Allow more than one session to apply the Framework. It works best if it takes the form of an on-going conversation. This is because it takes time for participants to understand the different dimensions of the framework and to apply them in their thinking and reflections. By the end of the project, participants should have a good picture of how their expectations for project level indicators have been met and what to be aware of in the future in relation to the organisational and systemic level indicators.

Tips for users:

Co-design the project assessment process with project stakeholders, based on as many general indicators as possible.

Introduce general indicators to stakeholders and ask for their input as soon as there is trust and commitment built between project participants. Pre-deciding and offering a set of indicators will help

participants build a conceptual context for impact indicators and will establish an “impact mindset” regarding the project processes.

Be sensitive to potential conflicts, motivations, interests and dynamics within a multi-stakeholder group. Remain flexible as to the method of data collection (i.e., group discussion vs. personal interview).

4. Planning a Course of Action

Once the impact indicators are in place, the assembled group of stakeholders should articulate a plan of action. Practically, this translates to deciding what will be measured/looked into, when this will be done, for how long, and the resources necessary for doing this. This step also speaks to the temporality of impact, not all effects are easily “measurable” at any one time.

For the evaluation of ‘practice abstracts’, the stakeholders should be presented with drafts. Read and think about whether the questionnaire for evaluating the impact of the ‘practice abstract’ (see Appendix 2) can be fully applicable. If yes, proceed to step 5, the evaluation and reflection phase. If not, step 3 (Project participants should cooperate on PAs together with the help of the relevant stakeholders) needs to be repeated.

Tips for users:

Plans of action should be directly related to the decided indicators and timeframes. The timeframes of the assessment process should be decided as soon as possible.

Be as precise as possible and positive that every stakeholder leaves with a clear idea of what they need to do and when. If the interval between actions is long, consider following up on actions to be taken. It is the role of the facilitator to organise stakeholder meetings with a clear plan for what happens next.

5. The evaluation and reflection phase: Putting the Evaluation Plan into Motion and Reflecting on Results and the Evaluation Process

At this stage, the involved stakeholders will implement the methodologies for measuring impact and organise their individual findings. The stakeholders will be requested to keep notes of the emerging challenges, possibilities, and identified tensions (applies to ‘practice abstracts’ as well).

The reflection component includes two aspects. Firstly, at this point, the stakeholders are expected to advance their individual inputs to impact evaluation. They report their results to the group, explaining what they have done, what has been impacted and to what extent.

Secondly, the stakeholders are expected to reflect jointly on the evaluation process. It is key to exchange experiences, what has been learned, the difficulties encountered in the process, and so on. At this stage, the stakeholders may also specify impacts that remain hypothetical; impacts that are contested, who contests them and on what basis. These results will contribute to outlining the "impact landscape" of your project, i.e., a description or a visual representation of the impacts related to your project and the socio-economic and environmental setting in which those impacts take effect. This additional aspect could be called “mapping the impact landscape”.

If applicable, the participants may want to consider the time dimension of the project, e.g., how are the early events of the project (e.g., in year 1) connected to the development of events later in the project (e.g., in year 3)? This relates to the question of how ‘change journeys’ can be captured. How can “chance” be directed? Or rather, how can we evaluate the effects of guiding the direction of search? This points to

the need for setting a “good direction”, and to the ways in which this may be evaluated or at least reflected upon by the actors.

The “impact landscape” should be presented to the ‘practice abstract’ writers, who should modify the final version of their PA.

Tips for users:

During the evaluation phase, stakeholders will require additional support if corrective measures should be taken. This should be part of the on-going conversation mentioned above, in that relevant stakeholders should jointly make decisions on corrective measures as they jointly decided on indicators.

The facilitator's role in this may be important in things like creating templates for stakeholder data collection if needed. It would also be helpful if the facilitator was familiar with implementing problem solving methodologies.

2.2. IMPACT INDICATORS

The testing of the framework in the three pilots presented in Part B, resulted in a list of indicators which users can utilise to assess the impacts of their projects. The assessment is focused on the project running time, in terms of processes and products, with the assumption that a good process between relevant actors, and the production of relevant products, increases the likelihood of societal impacts. In addition, it builds on the assumption that evaluation involving relevant stakeholders, with a focus on learning, contributes to the likelihood of societal impacts.

The indicators are divided into *project specific indicators*, and *general indicators*. The project specific indicators are often gathered from the description of project goals and objectives. The general indicators serve to facilitate the development of an impact assessment model that would allow for comparability between projects by assessing comparable parameters across several projects. That is, these are indicators that can be generalised to cover multiple projects and settings. The definition of an indicator is as follows: “An indicator is an observable and measurable entity that serves to define a concept in a practical way” (Social Research Glossary). Hence, it should be possible to *observe* and *measure* indicators in some way.

Indicators can be of both a quantitative and qualitative nature. Quantitative indicators are assessed through the use of quantitative methodologies in the process of evaluation. These numerical values can be used to create pie-charts, for example, to give a visual demonstration of the relevant achievements (e.g., the number of publications produced, etc.). Qualitative indicators are indicators requiring a descriptive account (e.g., the level of engagement between stakeholders, etc.). This could contain a specification and justification for the selected impact areas, and a specification of the impacts assessed through qualitative evaluation methodologies. The qualitative account may also include a reflection on the evaluation process itself.

A number of the indicators can be used to create an impact index. The impact index could consist of both a quantitative part, with numerical values, and a qualitative part, with a description of how the indicator was met. Note that there can be descriptions added to quantitative indicators as well. These can also serve as a basis for expressing the academic merits of achievements of stakeholder interactions.

2.2.1. Project specific indicators

The project specific indicators are based on the projects' own goals, such as the ones stated in the original project description. Hence, these indicators will measure if and how the project has delivered its aims. The fulfilment of project specific aims can be measured in terms of whether or not the project reached its goals. It can also be measured using a Likert scale.

Project specific indicators can change during the project runtime, for example, if the project aims are adjusted for some reason. Examples of project specific indicators can be found in Part B, table 3.3.

Many project specific indicators can be predicted at the beginning of projects and can offer significant reference points for the duration of the project. These should be discussed with the stakeholders as soon as they are selected. Other indicators will emerge during the project and the time for testing should be decided in cooperation with stakeholders.

Project specific indicators can either be reported individually, or, alternatively, be summarised into one indicator measuring whether the project specific goals were met, or the degree to which the goals were met. In this case, there will only be one project specific indicator, and the outcome will be expressed as a numerical value, for example, the project goals were met to 75% or 100%.

2.2.2. General indicators

While it may be easier to identify project specific indicators, some general indicators are required in order to provide comparability between projects. The work of testing the framework resulted in the following suggested general indicators. The general indicators can be seen as a guide towards fostering a process between the involved actors that is fruitful to all involved, and to the production of relevant outputs. They build on the assumption that evaluation involving relevant stakeholders, and focused on learning, contributes to societal impacts.

Furthermore, it is clear that the selection of indicators, as well as scales for how to measure the selected indicators, can and will differ between different contexts. As the framework is designed for use in a wide number of contexts (as described under "Intended users of the framework", p6.), there may be a number of possible sets of indicators. In order to have time for assessments and evaluations, it is recommended that project managers decide at the beginning of the project on a set of general indicators to be tested, as well as on a methodology regarding how to measure these indicators, based on the indicator's capacity for change. Project managers need to decide, based on project characteristics, both on the specific indicators and the time interval that is suitable for them to test (see details on time scale in section 2.2.3).

Hence, the indicators presented in this section should be viewed as suggestions and examples of indicators, intended to be used as inspiration. Also, these indicators are the product of cross-analysis between the case pilots and should not be considered exhaustive. Based on section 3.6, the general indicators are grouped into five impact areas, within which several indicators are possible (see table 2.2. below).

Impact area	Possible indicators	Ways to measure	Comment
Individual skills and personal development of people directly connected to the project and targeted actors	Development of teamwork competencies (communication, collaboration, networking).	Self-assessment by learners/ targeted actors, and professor assessments (e.g., use of a 5 grade or 7 grade Likert scale).	Individual skills and personal development is adequate (or even compulsory) in an educational setting. However, it is also relevant in other types of settings as well, as individuals learn and grow throughout their lives.
	Students and academics making contact with market factors/influences/ realities.	Number of meetings/connections accomplished.	
	Extended knowledge on sustainability issues.	Performance in formal assessments (e.g., grades, professor logs) performance in multi-actor settings (e.g., observation logs, reflection logs, interviews) self-assessment methods (e.g., Likert scale).	
	Increased empowerment (feeling of choice, competence, meaningfulness and agency).	Evidence of changes in decision making processes and the competences of communication, facilitation and participation (e.g., marked increases in self-assessment tools, relevant questions in reflection guides, interviews etc.).	
	Broadening of vision/systemic thinking competences.	Evidence of an ability to envision alternative/improved future states, evidence of the ability to include different systems in reflections. Including relevant questions in reflection guides, interviews, etc.	
Engagement and commitment of stakeholders	External actors are involved in the project initiative from the start and throughout the whole research process.	Number and Attendance records for members of a reference group or similar, Use of a 5 grade or 7 grade Likert scale.	
	Resource commitments by individuals and organisations in the project (e.g., funding, time, materials, other resources).	Quantitative (e.g., percentage of total project budget).	
	Stakeholders or other external groups are engaged in the project evaluation process and the evaluating 'practice abstracts'.	Participation records, Use of a 5 grade or 7 grade Likert scale.	
Cooperation and knowledge exchange between different actors	The number of meetings in the project, face-to-face or via zoom/teams/video.	Quantitative.	
	Number of meetings and interactions in addition to project meetings (i.e., in contexts other than the project).	Quantitative.	
	Active use of a number of 'practice abstracts' (applicable for EU agricultural projects only)	Quantitative (e.g. Likert scale questionnaires) and the inclusion of relevant questions in reflection guides, interviews etc.	
Dissemination of results	Number and type of project publications, e.g., 'practice abstracts', and other publications and materials, such as films.	Quantitative.	
	Dissemination of these publications and materials	Quantitative (e.g., number of hits and downloads documents, plays on YouTube, etc.).	
	Research results used directly in education.	Number of students in courses/lectures.	
Enabling a continuation	Providing a basis for further innovative research by other researchers/market.	Use of a Likert scale. Stakeholder interviews, focus groups etc.	This can only be done once the project is over, requires that the project impact assessment design makes provisions for it.
	Development of cooperation between the involved individuals and or/represented organisations.	Number of collectives/collaborative events, etc. that resulted from the project.	
Social sustainability	Increase of social capital	Qualitative	
	Measure of the diversity of the involved stakeholders	Quantitative	
	Level of acceptability of results to stakeholders	Qualitative and quantitative	
	Increase of capacity/ willingness to cooperate	Qualitative and quantitative	

Table 2.2. General indicators, grouped into five impact areas.

It is also vital to include an environmental area of impact in any project that is related to sustainable agriculture. They are not included in the table above as general indicators related to the environment did not emerge from the cross-analysis of the pilots. The Environmental area of impact should include indicators that emerge from the project objectives and can relate to issues like soil health, water health, environmental physical alterations, gas emissions, use of resources, ecological impact, indicators of environmental footprint, etc. These indicators usually lend themselves readily to quantitative measuring (e.g., rates of adoption of precision technology among stakeholders, precise measurements of environmental indicators, etc.) Provisions should also be made for long-term assessments as well, as many environmental indicators cannot be measured immediately.

In addition, resource commitments by individuals and organisations can take place outside the project itself, while still contributing to effects in the targeted system on a systemic level. These resource inputs are a potential indicator for measuring value creation on the systemic level, a level where impacts may otherwise be hard to pinpoint. The indicator may include defining the role and contributions of funding that does not go directly into the focal project.

Tips for users

Indicators at different levels may be easier to imagine and elaborate on than others. For example, during the pilot testing of the NextFood Framework, the impacts on the individual and the project level were found to be easier to imagine and pinpoint than on the organisational and systemic level. Allow the group of stakeholders to focus on the levels that seem the most meaningful for the assessment of the project. Similarly, impacts are not always easily divisible into the general categories of “social”, “economic”, and “environmental”. While allowing the group to focus on what makes the most sense for them with regard to the impact assessment of the project, be sure to include in the conversation the indicators that are necessary for the project objectives.

The user is advised to consider environmental indicators as they pertain to the impact levels specified in table 2.1. For example, on the project level, users may consider various ways of measuring the environmental footprint of project activities. These may include printing volume, frequency and means of travel, and electricity consumption, among others. Environmental indicators can also be specified by considering the ways in which project processes and products benefit the environment. For example, if project activities lead to conversion of conventional farms into organic land, this has clear environmental implications. The indicators in this case may be the number of farms or the total area of conversion.

The number and quality of PAs produced can be an indicator in itself. This is because PAs can be an indicator for learning and understanding, for engagement in the process and for commitment to project goals.

While writing or improving the ‘practice abstracts’ the diversity of possible end-users needs to be considered. Rigorous cooperation with the stakeholder group when evaluating the PA can help.

2.2.3. Time frame for indicators

In order to have time for assessments and evaluations, it is recommended that project managers decide at the beginning of the project on a set of general indicators that are to be tested, as well as the testing time frame, or the time interval that is suitable for them to test.

Some of the indicators must be measured either during or at the very end of the project, and some indicators are best measured at a certain time after the projects have finished, such as the spreading of results. Based on the experience with the testing of the NextFood Framework, it is recommended that the

number of indicators measured later is minimised to as few as possible, as it is potentially problematic to suggest actions to be taken after the project has finished. The following four different time frames are suggested for measuring indicators:

1. In intervals during the project
2. At the completion of the project (at the time of the final report)
3. Post project (<2yrs)
4. Long-term Effects (>2yrs)

Effects on the systemic level are likely to take more time, but they may (and perhaps should) be included in the impact assessment of, for instance, education programs, research programs and long-term student career development. To simplify the process, we suggest that indicators measured as long-term effects should be restricted to the systemic level.

3. PART B. TESTING THE FRAMEWORK

Part B reiterates the original framework (as given in 5.2), describes the testing phase, and emphasises the main insights and results from the pilots that contributed to refining the framework.

The aim of the pilot test phase was to discover ways of refining the Nextfood Impact Framework developed in WP5. To do this, the framework was tested and further revised in two rounds. The Deliverable 5:3 demonstrated the plan for the operationalisation of the first round for the two pilots in the Czech Republic and Sweden. The Deliverable 5:4 demonstrated the operationalisation of the second rounds in the Czech and Swedish pilots, and the first round in an additional pilot in Greece, evaluating an educational pilot case. The testing of the NextFood Impact Framework in the three pilots is now concluded, and the findings are summarised here in Deliverable 5.5.

3.1. THE ORIGINAL FRAMEWORK

The NextFood Sustainability Impact Framework was developed following a constructivist approach to impact. Thus, it builds on the idea that social, environmental, and economic impacts are intrinsically tied to the circumstances of their production. The constructionist approach brings attention to the social interactions and material practices that enact how technologies and knowledge have effects in specific local contexts. In line with this broad principle, the NextFood Sustainability Impact Framework specifically considers:

- That *impact is work*: it takes time and the collective effort of individuals who apply their knowledge, skills, and resources to identify, assess, and report impacts.
- That different and often unrelated actors have multiple and sometimes conflicting *stakes and interests* in the articulation and assessment of impacts.
- That *impact is a layered phenomenon*: it matters how far actors are (in terms of involvement and participation) from the circumstances of knowledge/technological production.
- That impact is as much the effect of knowledge and technologies (the “products” of work) as it is the effect of the activities, relationships, and collective efforts that have entered their production (the “processes” of work).

This theoretical basis, combined with empirical knowledge generated through the research activities of Work Package 5 in the NextFood project, calls for the creation of a dynamic and open framework, which takes temporality and subjectivity seriously and thus, a framework which provides for a joint deliberation on and assumption of accountability for future impacts.

Assuming shared responsibility for impact necessitates a particular model of stakeholder interaction, as explained in the NextFood’s Research Protocol (Steiro et al. 2019). This approach advocates: 1) a shift from theory to phenomenon as the starting point for the evaluation process and 2) a shift in focus from knowledge to the competences needed to take informed and responsible action as the ultimate goal of evaluation. Practically, these two shifts translate to engaging stakeholders in a dialogue over 1) actual/potential impact areas, 2) ways to assess those impact areas, and 3) delegation of responsibility concerning monitoring and assessment. The testing process has followed the framework presented in Deliverable 5.2. The original framework consists of structural and procedural components, detailed in Deliverable 5.2, and presented below in a summary.

The structural components build on process-related and product related impacts, using the environmental, economic and social sustainability aspects to describe the impacts. It further elaborated impact effects on three levels: the project level, intermediary level and systemic level (see table 3.1 below).

	Process-related Indicators of Impact	Product-related Indicators of Impact
Project Level Effects	Include such indicators of social sustainability as stakeholder participation, trust, accountability, involvement, etc. Include economic sustainability indicators demonstrating, for example, the extent to which a project's processes provide for the entrepreneurial capacity of its participants, stronger transparency of invisible work (and workforce), the stakeholders' ability to participate in the local economy, etc. Include environmental sustainability indicators expressing the stakeholders' changes in awareness concerning how their own activities affect the environment, changes in their work practices in this relation, etc.	Include social sustainability indicators which exemplify the number of users of a new technology, for example, but also, importantly, the extent to which those users are better off as a result of using that technology. Include indicators of economic sustainability, expressing the extent to which a project's results or products enter innovation processes, turn into patents or broadly used concepts, etc. Include environmental sustainability indicators showing, for example, the performance of a project's results and products in relation to the production and consumption of environmental services.
Intermediary Level Effects (Use the same sets of indicators for both process and product related impacts).	Include such indicators of social sustainability as collaboration with external actors, e.g., gender-equality networks, various governmental and non-governmental organizations working with social issues, etc. Encompass indicators showing the extent to which a project engages external stakeholders with their results and products, e.g., citations outside academia, social media presence, etc. Include such economic sustainability indicators as collaboration with funding bodies, the local/national innovation system, etc. Encompass the number and the quality of the relationships of a project with external economic actors, who provide technological replication, follow-ups, innovation processes, etc. Include such environmental sustainability indicators as collaboration and communication with external actors, such as environmental organizations, societies for nature conservation, etc. Encompass indicators expressing how a project enables the use of its results and products for environmental purposes.	
Systemic Level Effects	Include social sustainability indicators showing, for example, the extent to which a project's processes address broader societal concerns, such as consumer ethics, decision-making capacity, etc. Include economic sustainability indicators expressing the extent to which a project's processes lead to changes in economic policies, changes in the distribution of market actors, etc. Include environmental sustainability indicators expressing the extent to which a project's processes lead to changes in environmental policies, consumer use of nature friendly products, etc.	Include social sustainability indicators pointing to the extent and ways in which a project's products are embedded in broader systemic/cultural issues, such as ethics, food security, etc. Include economic sustainability indicators showing the degree to which a given project's results or products steer the creation of new markets, their visibility in existing markets, etc. Include environmental sustainability indicators expressing the extent to which a project's results or products affect, for instance, the relevant industry towards the production of more environmentally friendly technology, etc.

Table 3.1. The structural components of the original framework presented in Deliverable 5.2, used as a template for testing in the three pilots.

The procedural components present a model for organising the work of impact assessment in five steps (see figure 3.1 below). The five procedural steps are:

1. Assemble: Put together a group of actors, aiming for a diverse set of stakeholders. Alternatively, select one actor/organisation and then ask them to assemble a group of diverse stakeholders to be involved in the evaluation.
2. Involve: Introduce the actors to the Impact Framework as defined in deliverable 1.2. Explain the structural and the procedural components of the Impact Framework. Be aware that it is the job of the assembled group of stakeholders to decide what they should evaluate, how, and with which criteria. As facilitator, preliminary suggestions of themes for evaluation can be provided, but make sure to leave space for the group. Ownership of the impact process must be given to the group.
3. Plan: Make a plan of action. Define impact themes, evaluation tools and responsibilities. The facilitators from the NextFood project will of course have an important role here, but ownership of the process is crucial for checking the workability of the framework in action. Encourage the participants themselves to do the planning.
4. Execute: The assembled group of stakeholders will do the actual evaluation of the project/s and/or 'practice abstracts' in this phase. They will use the results to formulate an impact index. Ask them

(if possible) to keep notes of this process. They can either give these notes to you or bring them to the reflection stage to discuss with the group.

5. Reflect: Assemble the stakeholder group. Reflect on the process and the outcome. Summarise the reflections and share with the WP5 group for further refinement of the framework.

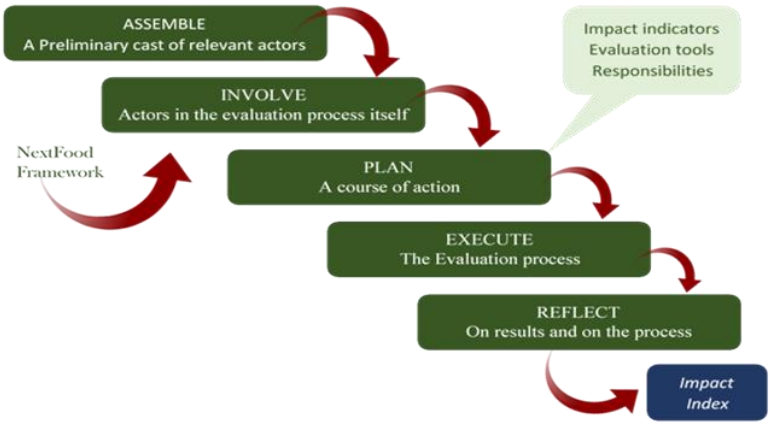

Figure 3.1. The procedural steps of the original framework.

These structural and procedural components were used for testing the framework in a research context, in the Swedish pilot, and in an educational context in the Greek pilot. The evaluation of 'practice abstracts', in the Czech pilot, is facilitated by the framework in two ways: Firstly, the model creates the groundwork for articulating 'practice abstracts'. By engaging stakeholders in the evaluation process, researchers may learn what impacts matter to those stakeholders and how such impacts may best be achieved. Secondly, the model enables an assessment of the impact of the 'practice abstracts' themselves once they are produced. The work and experiences of the three pilots are presented below.

3.2 THE RESEARCH PILOT - SWEDEN

3.2.1. Methods

In the Swedish pilot, the test was conducted in relation to four applied agricultural research projects based at the Swedish University of Agricultural Sciences (SLU). The four projects involved industry stakeholders as well as university researchers. The stakeholders were farmer and advisory organisations, companies, other research bodies, and authorities.

The projects were asked to engage in the testing of the NextFood impact framework by jointly addressing the impacts of their research work. This process was done through individual interviews with participants and through focus groups. A total of 20 individuals were interviewed, each interview lasting 20-45 minutes, all of them by phone or online meeting. The interviews were recorded and transcribed.

Two rounds of focus group discussions were conducted with each of the four projects. Specifically, this involved a total of 8 focus group interviews with a total of 22 individual participants (not including the moderators), lasting 20-70 minutes each. One of the focus groups was held as a combined physical and online meeting, the remaining 7 were held as online meetings. The participants were the individuals

involved in the project groups and reference groups from each research project. The discussions were moderated by two of the NextFood researchers and were all audio-recorded and transcribed.

The aim of the interviews was to understand the various roles of the participants in the respective projects and the participants' experiences, as well as to initiate a dialogue over impact. An adapted version of the framework was introduced at this stage. In the focus groups, the aim was to mobilise diverse participants for each project separately, involve them in joint reflections around the expected and desired impacts of their activities, and to generate discussions around impact indicators.

The results of the interviews and first round of focus groups were used by the NextFood researchers to adapt the refined version of the framework to each of the research projects, as described further in *Step 2* below. The analysis of this material yielded a list of impact indicators; this was then presented to the various participants in the context of the second round of focus group interviews.

3.2.2. Results

Adaption of the framework structure

The first step entailed adapting the framework model to fit the test pilots, i.e., the four applied agricultural research projects. Two main modifications were made.

Firstly, the framework levels were re-specified, and the content of the general impact indicators relative to the three levels was re-specified.

It was determined that *the project level* concerned the individuals involved in the project working group and reference group.

The "intermediary level" was re-specified as *the organisational level* and defined as the organisations that the involved individuals represent. Hence, the organisational level concerned the organisations that were represented by the individuals that were part of the project level.

The "systemic level" was in this case specified as *the value chain level* or *extended value chain level*. Value chain actors are usually defined as the actors involved in transactions of goods and services. This level encompassed the actors in the value chain concerned with the project. Extended value chain actors also include the actors who were indirectly concerned by the value chain, such as authorities and NGOs.

Secondly, the product and process related categories for all three levels were redefined. These changes are illustrated in table 1, and details are given in Appendix 1. Below is an example of the change. In the framework proposed in the Deliverable 5.2 framework proposal, the intermediary level is defined as:

> "Intermediary-level Effects: contain the indicators selected to express sustainability effects stemming from the work of bridging the project level with the systemic level. Since parallel forms of mediation work achieve product and process-related impacts simultaneously, the indicators on this level cut across both categories." (Deliverable 5.2, page 22).

We can see that the intermediary level specified above had no division of indicators related to process and product but saw the indicators here as cutting across both process and product related impacts. The level was re-specified as follows:

> "Intermediary level: The organisations that are represented by the individuals who are part of the project level."

Then, the intermediary level effects were separated as being either process and product-related, encompassing the three sustainability aspects of economic, environmental and social sustainability. The details of the new version of the intermediary level are presented in table 3.2. below. The full details of the adaptations are presented in Appendix 1.

		Process-related impact indicators	**Product- related impact indicators**
Intermediary level. I.e., including the organisations that are represented by the individuals who are part of the project level.	Economic	Indicators of how the project creates economic value with its processes. For example, the number of contacts and the quality of the relations between the project and external economic actors, and how the project enables the use of its processes for financial purposes at the intermediate level.	Indicators of how the project creates economic value with its results and products. For example, the number of contacts and the quality of the relationships between the project and external economic actors, and how the project enables the use of its results and products for financial purposes at the intermediate level.
	Environmental	Indicators of how the project creates environmental value with its processes. For example, the number of contacts and the quality of the relationships between the project and external environmental actors and how the project enables the use of its processes for environmental purposes at the intermediate level.	Indicators of how the project creates environmental value with its results and products. For example, the number of contacts and the quality of the relationships between the project and external environmental actors, and how the project enables the use of its results and products for environmental purposes at the intermediate level.
	Social	Indicators of how the project creates social values with its processes. For example, the number of contacts and the quality of the relationships between the project and external social actors, and how the project enables the use of its processes for social purposes at the intermediate level.	Indicators of how the project creates social value with its results and products. For example, the number of contacts and the quality of the relationships between the project and external social actors, and how the project enables the use of its results and products for social purposes at the intermediate level.

Table 3.2. Example of framework development towards indicators: The intermediate level. For the full details of the adapted framework, see Appendix 1.

Reflections on pilot testing

The main reflections from testing the adapted framework onto the four applied agricultural research projects, are summarised below.

Stakeholder group constitution

The framework model emphasises the assembly of a group of variegated stakeholders to perform the impact assessment. If stakeholders are not already included in the project from the start, the assembly of a group of stakeholders can be a tricky step.

In the four pilot research projects, multiple stakeholders were already included in the projects' working groups and reference groups from the start. Still, one of the projects decided to include an extra stakeholder during the assembly discussion, illustrating how this may be a good point to re-evaluate, even if stakeholders are already tied to the project. Including stakeholders as early as possible, preferably before writing a funding application, will facilitate the impact work and impact assessment of the project later. Stakeholders can be important contributors to the project in terms of resources such as networks and experiences, and not least in enabling future impact of the project through their networks, etc.

Many of the tasks for the stakeholder group may require a facilitator or leader, who can assist the group in moving forward with the task. The framework aims to involve the assembled group in agreeing and deciding on a set of indicators relevant for the project, how these should be measured and who in the group is responsible for measuring each indicator.

Set aside adequate resources

Set aside resources in the budget for the participants in the assembled group if they do not already have financial coverage for their time spent in the project, and for any other costs of performing the impact assessment, including the appointment of a facilitator or group leader. Without this it is hard to expect the group to deliver the desired work.

Impacts on different levels

The framework model defines impacts on three different levels: 1) the project level, 2) the intermediary level and 3) the value chain level or extended value chain level. In practice, some levels are easier to imagine and elaborate on than others. The impacts on the project level were found to be considerably easier to imagine and pinpoint than on higher levels by the focus groups in this study. Especially for the value chain level, effects can be difficult to measure due to the 'attribution problem', i.e., participants finding it hard to ascribe a certain effect to a certain cause, as many factors were thought to account for any identified impact. The focus groups seemed to find it more meaningful to discuss impacts and indicators at the project level and, to an extent, the organisational level.

Impacts on economic, environmental and social dimensions.

The framework model defines impacts on the dimensions of the economic, environmental and social. In practice, impacts are not always divisible into these general categories.

This is illustrated by one of the projects' indicators in table 2, which reflects an uneven distribution between the economic, environmental and social dimension. Most of the project specific indicators were listed within the economic and social dimensions, with none in the environmental dimensions. For other projects, the distribution of the project specific indicators was different. For example, the plant health project had several indicators in the environmental dimension.

In addition, some levels and categories shared the same indicator, as it was found to be relevant to more than one sustainability dimension. As shown in table 2, a specific indicator can be valid for both economic and social dimensions.

3.2.3. Developing indicators

The next step of the pilot test involved identifying the individual indicators for each of the four research projects.

This was done on the basis of the 20 individual interviews, followed by the first round of focus group interviews, in three of the four projects. The interviews were transcribed, analysed, and, based on this analysis, a range of preliminary impact indicators were listed for each pilot case, specifically. Below is an example of the process:

The social process indicators for the intermediary level are presented in Table 1 as:

"Indicators of how the project creates social values with its processes. For example, the number of contacts and the quality of the relationships between the project and external social actors, and how the project enables the use of its processes for social purposes at the intermediate level."

The adaption of these indicators to a specific project was guided by the fact that the interviewees mentioned presentations or communications of the project in their organisations. In the example below, farmers' organisations, advisory organisations or university educational organisations, both at undergraduate and graduate levels, were mentioned. The presentations or communications happened either before the project started, during the project's runtime, or at the end, while presenting the results.

There were also examples of this happening after the project was finished, hence, the spreading of the results continued after the project runtime.

Examples of interview statements:

> "There is another important part of it too /.../. This material is used in teaching. So, it has been in a lot of lectures, everything from undergraduate to advanced level to doctoral students, associate professor lecture, et cetera." (Researcher)

> "After the project has ended, more people, at the farmers' organisation and also at county administrative boards, are working with simplification of rules, with the food strategy. So, they have had presentations about it with the results, so that we have spread this further, even after the project time was over." (Advisor)

The second excerpt above also mentions presentation to the county administrative boards, i.e., the regional authorities, who were not involved in the project. This provides an example of how the project results were communicated within the extended value chain. This led to the formulation of the following indicator on the intermediate level:

> "The number of meetings and interactions involving individuals from any of the participating organisations, other than the individuals directly involved in the project."

Some of the indicators established during this step were project specific, relating to a particular projects' goals and objectives. Others were more general, i.e., relevant to more than one examined project. In the analyses, we actively strove to find general indicators across several projects in order to facilitate the development of an impact assessment model that would cater to the need for comparability between projects.

The project specific indicators were based on the projects' own goals, such as the ones stated in the original project application. Hence, these indicators measure if and how the project has delivered its aims. Project specific indicators can change during the project runtime, for example, if the project aims are adjusted for some reason.

These were the project specific indicators for one of the projects (see table 3.3.):

A. Show time and costs for bureaucracy in different [agricultural] branches.
B. Suggest concrete simplifications and recommendations for less bureaucracy.
C. Communicate the results to politicians, authorities and entrepreneurs.
D. Investigate experience of mental strain [for the farmers due to excessive bureaucracy]. Investigate opportunities and obstacles for business development and the future.
E. Contribute to lowering the burden and costs of bureaucracy in agricultural holdings.

The general indicators were based on findings in all of the four projects, or at least most of them. While the project specific indicators are not applicable to any other project, the general indicators are important for mapping comparable parameters across several projects. These were the general indicators for one of the projects (see table 3.3.):

1. External actors are involved in the project approach from the beginning.
2. Financial commitments by external organisations in the project
3. The number of meetings in the project, face-to-face or via zoom / teams / video.
4. Learning, empowerment and social capital among the people in the project.
5. Project reports and other publications and the dissemination of these.

6. Possible continuation and development of cooperation between the involved individuals.
7. Number of meetings and interactions in addition to project meetings.
8. How do the organisations continue with the ideas of the project based on the project results, individually and/or together?

Based on both project specific and general indicators, a list of indicators was made for each of the research projects.

The next step of the pilot test focused on reaching an agreement amongst the participants regarding a set of indicators for their projects, respectively. In this step, the list of suggested indicators developed for each of the projects in the previous step was presented by the NextFood researchers in focus group workshops with each of the research projects. Modifications were made according to group discussions, mostly involving minor changes in the listed project-specific indicators.

A presentation of the list of indicators mapped into the adapted version of the framework, (presented in appendix 1 and table 3.2), is given in table 3.3 below.

		PROCESS-RELATED IMPACT INDICATORS. HOW THE WORK PROCESSES IN THE PROJECT AFFECT THE FACTORS BELOW.	**PRODUCT-RELATED IMPACT INDICATORS. HOW THE PROJECT RESULTS AND PRODUCTS AFFECTED THE FACTORS BELOW.**
PROJECT LEVEL. THE INDIVIDUALS PARTICIPATING IN THE PROJECT WORKING GROUP AND REFERENCE GROUP	Economic	1. Financial commitments by external organisations in the project	A. Show time and costs for bureaucracy in different agricultural branches. B. Suggest concrete simplifications and recommendations for less bureaucracy. C. Communicate the results to politicians, authorities, and entrepreneurs. D. Investigate how mental strain is experienced, as well as opportunities and obstacles for business development.
	Environmental		
	Social	2. External actors are involved in the project initiative from the start. 3. The number of meetings in the project, face-to-face or via zoom/teams/video. 4. Learning, empowerment and social capital among the individuals in the project.	The same project specific indicators as above applies in this box. A. Show time and costs for bureaucracy in different agricultural branches. B. Suggest concrete simplifications and recommendations for less bureaucracy. C. Communicate the results to politicians, authorities, and entrepreneurs. D. Investigate how mental strain is experienced, as well as the opportunities and obstacles for business development. 5. Project reports and other publications, and the dissemination of these. 6. Possible continuation and development of cooperation between the involved individuals.
INTERMEDIARY LEVEL. THE ORGANISAT-IONS OF THE PROJECT LEVEL	Economic		
	Environmental		
	Social	7. Number of meetings and interactions in addition to project meetings.	8. How do the organisations continue working with the question based on the project results, individually and/or together?
VALUE CHAIN LEVEL, OR EXTENDED VALUE CHAIN LEVEL	Economic		E. Contribute to lowering the burden and costs of bureaucracy in agricultural holdings
	Environmental		
	Social		The same project specific indicator as above applies in this box. E. Contribute to lowering the burden and costs of bureaucracy in agricultural holdings

Table 3.3. A list of indicators for one of the research projects, related to the adapted version of the

framework. The indicators labelled A-E are project specific indicators, and the indicators numbered 1-8 are general indicators.

During the focus groups, the responsibilities of the participants relative to each indicator were determined.

The focus group discussions in this step allowed the NextFood researchers to compare indicators between the four research projects. This comparison formed the basis for generating a list of eight suggested general indicators, presented as indicators number 1-8 in table 3.3 above.

Reflections on developing indicators

The main reflections from developing indicators are summarised below.

Flexibility versus comparability of indicators

While the framework model mainly encourages flexibility, i.e., project specific indicators, there is a need to develop general, comparable, standard indicators as well. Flexibility allows for context specific and project specific indicators. General indicators are required in order to provide comparability between projects, for the development of a peer review standard and merit systems. In addition, general indicators can help in guiding the thoughts of impact evaluators in relation to a certain level or category. The 'productive interactions' approach (Spaapen and Van Drooge 2011) could be used to inspire general indicators, however, it needs further adaption in order to provide for detailed indicators.

When to measure the indicators

The framework model does not mention a specific time frame. Some of the indicators are aimed at measuring during or at the very end of the project. However, some indicators are best measured at a certain time after the project has finished. The question is then how much time this should be. In addition, it is potentially problematic to suggest actions be taken after the project has finished. To minimize the number of indicators measured later, and to limit the maximum time after the project's end to measure these to, for example, one year after the end of the project's runtime, can facilitate the impact assessment process.

3.3. THE PRACTICE ABSTRACT PILOT – THE CZECH REPUBLIC

3.3.1. Methods

One of the 'products' of EU-funded agricultural research projects are so-called 'practice abstracts'. In addition to being able to assess the impact of research products and processes, the framework should, as specified in deliverable 5.2, be able to estimate the impact of the 'practice abstracts'. The Czech pilot was designed to test the latter aspect of the framework. The test involved farmers, agricultural advisors, and practitioners, as processors or employees of control and certifying bodies in organic farming. For participants recruitment, the official database of advisers and other relevant practitioners in the register of the Ministry of Agriculture of the Czech Republic was used (https://eagri.cz/ssl/nosso-app/DataKeStazeni/Poradci and https://eagri.cz/public/app/eagriapp/EKO/Prehled/Prehled.aspx?clear=A&stamp=1644393677725). Informal contacts in this sector were also used.

The participants were asked to choose a 'practice abstract' relevant to their expertise and to evaluate it with the use of a questionnaire. This approach can also be used the other way round, with researchers employing a relevant practitioner who addresses PAs qualities based on the questionnaire and provides relevant feedback during the PA development phase. Additionally, the 'practice abstracts' selected by the researchers (based on the common agreement) were offered to the participants of the workshops for

evaluation. The two-hour workshops of small groups were facilitated by Nextfood investigators (namely: Jan Lehejček, Jan Moudrý jr. and Jan Moudrý sr.) and notes from the discussions were taken. The participants first evaluated the PAs orally and within the discussion and afterwards were asked to fill in the questionnaire. The questionnaire was updated on the basis of the feedback from the participants, with the main issues for the participants being connected to the formulation of clearer questions and with evaluation scales modification.

3.3.2. Results

During the data gathering, finding farmers who would be willing and able to read PAs and evaluate them appeared to be very problematic. This is far beyond most farmers' usual routine. Another often mentioned hindering force is the language barrier, in terms of the knowledge of different languages of farmers and other stakeholders, and also in terms of technical language (some of the 'practice abstracts' were perceived as difficult to read and understand by different groups of stakeholders). Perception of 'practice abstract' is also affected by the variability of the respondents in the frame of the group. There are differences in skills, knowledge, priorities, etc. between participants in the farmer and other groups. In some cases the same 'practice abstract' was evaluated positively by one farmer and negatively by another farmer with a similar focus and farming background.

As the findings from the first two testing phases showed, the Questionnaire[1] needed to be slightly reformulated into the current version (see Appendix 2). Scales from 1 to 4 have been mostly replaced with percentage scales and supported by colour differentiation. This can help to judge each criterion more precisely. Some new questions have been added after the pilot test of the Questionnaire based on individual discussions with practitioners as well as on preliminary results.

Based on the findings from the first phase of testing, the relevance of 'practice abstract' and other criterions were not evaluated well for practical usage (see Fig. 3.2). This remains one of the most important findings. For that reason, the NEXTFOOD project has constructed new guidelines on how to write useful and practical 'practice abstract' (see Appendix 3 – Guidelines 1).We decided to merge forces with researchers from WP 6 and develop new guidelines for PA writers to communicate their work more practically to possible users, see Guidelines 1. A plan of how to encourage NextFood PA writers to write highly relevant PA was prepared. Adjusted guidelines on how to write useful and practical 'practice abstract' for all new Horizon projects is provided in Appendix 4.

[1] The Questionnaire was developed based on the need for data gathering about the overall usefulness of 'practice abstracts'. The Questionnaire can show the suitability of criteria (such as Relevance, Efficiency, Importance, Innovativeness, Sustainability). These criteria have been selected based on the standard evaluation practice. The Questionnaire has been tested within the community of practitioners, farmers, agriculture advisors, lectures, and other PA's potential users. The first round of testing was done in Czechia.

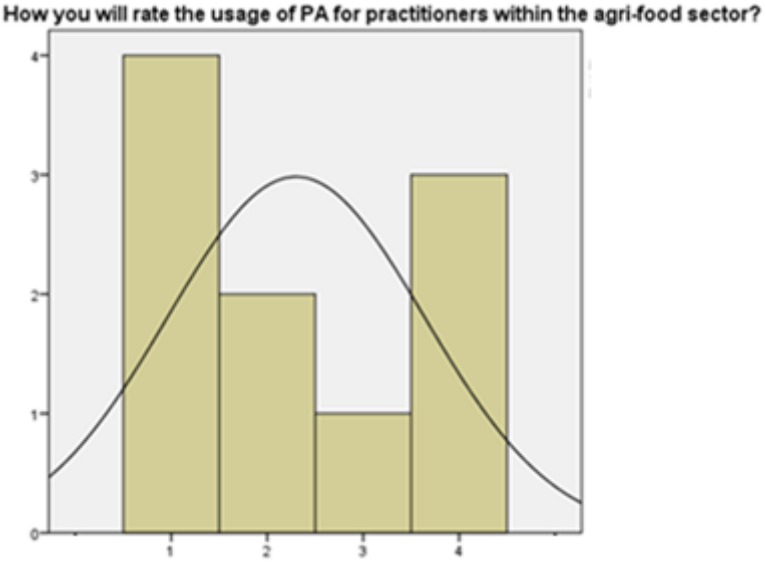

Figure 3.2. Test results on the relevance of PAs for practice, a mean of 2.3, std. dev. 1.3 on a 1-4 Likert scale. The X axis shows the level of usefulness of PA's according to practitioner's evaluation represented by numbers 1-4, where 1 = 0 – 25 %; 2 = 26 – 50 %; 3 = 51 – 75 %; 4 = 76 – 100 %. The Y axis shows respondents of individual focus group. Source: Own elaboration[2]

Repeating the testing process in another country is highly dependent on having experienced and keen facilitators. In order to test applicability, the Greek Education Pilot used guidance on how to test findings from the Czech pilot (as can be seen in the next chapter).

We would like to also point out here potential problematic issues with the approach used in the pilot.

- It is relatively time consuming and demands a decent level of professional facilitation. This may challenge the applicability of the framework as the level of expertise of the facilitator needs meet a specific standard. In this context, the reviewers (for the CZ approach) have to be selected according to their particular expertise, or proper evaluation might lack relevance. Therefore, when using this tool in the future, it is necessary to pay attention to the time frame for the assessment procedure and appropriate skill setting of reviewers.
- The complexity of the agri-food sector, including geographical and climatic differences within Europe or even globally, presents an important constraint on framework applicability. A robust pool of experts is needed to process the evaluation framework in an appropriate manner. This fact gets even more complicated when considering the generally low quality of a significant parts of many practice abstracts, creating the potential to discourage experts from further collaboration and evaluation.

The above mentioned obstacles were the subject of research in the last year of the project in order to suggest ways to overcome them. From current knowledge, we hypothesize that the training of the facilitators, as well as a basic set of evaluating experts, would require future budgetary allocation. However,

[2] The interpretation of evaluations from the questionnaire results has two dimensions. This histogram represents the Quantitative part of outputs. Quantitative results can show the appropriate criterion for the future PA user once there is an established mechanism for overall PA ranking. A ranking of over 76% of relevance indicates that the selected criterion is particularly decently represented. A 50% or lower ranking of relevance indicates that the selected criterion is not represented well. In this particular output you can see that the assessed PA has some positive readers, but overall usage has limited impact.

a ready-to-use framework allows an experienced and engaged project manager to take the role of the facilitator. This person should establish the appropriate Stakeholder groups for evaluating the PA. In general, there is a similar procedure as in the Swedish Applied Research Pilot. First, a preliminary cast of relevant actors needs to be ASSEMBLED. Then, all relevant actors should be brought together and INVOLVED in the discussion regarding the topic of evaluated Practice Abstract. After this, the relevant actors PLAN and decide what they should evaluate, how and with which criteria. Once there is no further discussion, they should be guided with questions from the questionnaire to evaluating the impact of the practice abstract (see Appendix 2). By doing this, and through note taking, the actual evaluation of the practice abstract is EXECUTED. Finally, the draft of the discussed practice abstract can be modified to the final version based on the REFLECTIONS of the stakeholder groups of peer-review experts, as well as by following guidelines for PA writing (Appendix 3 and 4).

A method for PA evaluation and guidelines for writing PAs were developed in the Czech pilot. This tool is a partial contribution to the overall Impact Evaluation Framework within this WP5. When implemented in practice, a higher quality of processed PAs can be expected and, as a result, higher usability of new knowledge in practice. Accordingly, this tool could have long-term implications within the agrifood sector.

Reflections on the results – highlights from the previous text and a recommendation to policy makers and/or European officers

- **The database of practice abstracts is hidden to all online searching tools and is not easily accessible for potential end users. Promotion and visibility should be provided.**
- **Current practice abstracts in the database generally lack quality**
- **In order to enhance their quality, we have created guidelines for how to write useful practice abstract (annex 3 and 4)**
- **Before abstract submission, we also call for feedback reflection from the practitioners, using questionnaires (annex 2) given to the facilitated focus group (see the indicators below)**
- **These methods of reflection on practice abstract development are crucial for effective use of practice project results, in line with the NF promoted action learning approach and similar approaches developed in other WPs.**

3.3.3. Developing indicators

A broader perception of the societal impact is framed by a set of criteria directly employed in the Czech Pilot. These are relevance, efficiency, importance, innovation, and sustainability (For more details, please see section 3.3.).

The number and quality of the PAs produced can be an indicator in itself. This is because PAs can be an indicator for learning and understanding, for engagement in the process and for commitment to project goals.

While writing or improving practice abstracts, a diverse group of possible users needs to be considered. Rigorous cooperation with the stakeholder group when evaluating the PA can help. To fulfil the criteria of the practice abstract, the following areas of consideration should be met and elaborated on within the text of the PA:

Relevance
a) As high relevance of the PA's topic to practitioners within the field of expertise in the agri-food sector as possible.
b) As high usage of the PA for practitioners within the field of expertise in the agri-food sector on a regional

level as possible.
c) As low barriers of usage of PA for practitioners within the agri-food sector as possible.
d) As low barriers of usage of the technology or knowledge described in the PA as possible.

Efficiency
a) Time-efficient transfer of the innovation from the PA to practise.
b) Money-efficient transfer of the innovation from the PA to practise.
c) Efficiency of other relevant identified crucial levels of resources.

Importance
a) As high Importance of the PA to the creation of new markets or increasing visibility in existing markets as possible.
b) As high Importance of the knowledge and/or technology described in the PA for environmentally friendly behaviour as possible.
c) As high Importance of the knowledge and/or technology described in the PA for socially responsible behaviour as possible.

Innovativeness
a) As high a level of innovation of the PA for all potential users as possible.

Sustainability
a) As high importance of the PA to economically sustainable solutions for potential users as possible.
b) As high importance of the PA to environmentally sustainable solutions for potential users as possible.
c) As high importance of the PA to socially sustainable solutions for potential users as possible. (if relevant)

The stakeholder group for evaluating the PA can evaluate the level of usefulness of each area of consideration on the scale: 0 – 25 %; 26 – 50 %; 51 – 75 %; 76 – 100 %. As every PA will focus on a different topic, rather than specific indicators in absolute numbers, the relative level (%) of areas of consideration of PA is desirable. By averaging individual usefulness of all areas of consideration together, the overall usefulness of each criterion is established. A ranking of over 76% of relevance indicates that the selected criterion is particularly decently represented in the PA. A 50% or lower ranking of relevance indicates that the selected criterion is not well represented.

By averaging all criteria together (same weight for each) the final usefulness of PA is known. This final level is the relevant indicator.

3.4. THE EDUCATION PILOT - GREECE

3.4.1. Methods

The *American Farm School* was responsible for executing the Greek pilot, where the framework's applicability in an educational context was tested. They did this as part of "multi-actor learning set activities". These involved mixed assemblages of farmers, students, professors, and advisors working together on practical farming-related issues. The educational aim was to support the participating farms, simultaneously providing a basis for producing academic dissertations by the students. Substantively, the Greek pilot was diverse, including a farm producing oregano, another focusing on tomato production, two milk production farms, and one lab-based nutrition project addressing the use of hemp protein in bread.

In the 'Action learning sets' (ALS), the participants used the framework to address the impacts of working collaboratively in mixed educational settings. To keep track of this process, the participants were asked to write 'reflection logs'. In the logs, they recorded their learning experiences and the experiences relative to the framework. The framework was applied and discussed more directly over the 4th and 5th learning set sessions in each case. It was decided that the framework would be tested during the last two ALSs

meetings, when the participants would have had sufficient time on the project to be able to discuss impact indicators. In addition, interviews were organised with each participant of the ALS cases to engage the participants individually in more directed reflection on impacts, impact indicators, and assessment strategies. These materials were transcribed and thematically coded. Finally, the participants of each ALS were asked to develop a practice abstract about best practices in their project.

This pilot started in April 2021 and was completed in the fall of 2021.

3.4.2. Results

The present results are based on the completed LS cases, a series of interviews with ALS participants and the writing of 7 PAs by the participants.

The results were produced within multi-actor group discussions that were embedded in the ALSs, through individual reflections and personal interviews that specifically addressed impact. More specifically, participants were asked questions like: “What are the outcomes that mean that the project was successful?”; “How has the ALS process impacted you personally and as a group?”; “What effects do you think the project could have on sustainability (social, economic, environmental)?”; and more.

Some of the indicators were inferred by the researchers during the analysis of observation logs and the discussions of the ALSs, even if the conversation was not specifically on impact. Specifically, in the lab ALS, we had a sense that there may be conflicting interests within the group, i.e., the measures of success for the professor were not the same or might even be contrary to the desires of the students and the lab technician (e.g., the production of publications vs. student personal/academic development, successful completion of the dissertation). During the conversation we had the feeling that the participants were hesitant to express their views freely within the group. This indicated a need for us to address impact in the individual interviews more extensively.

Another parameter to be considered during the implementation of the framework was the degree to which indicators may be inferred from the data obtained from the project. That is, within the data from interviews, reflection logs and observation logs, researchers may infer a number of significant indicators for project development that may not be directly expressed by the participants. The researcher may have a birds-eye view on the project and may be able to make observations on dynamics and factors that may affect project and product impact.

For example, during the ALS case of plant protection in the tomato production farm, there was the total destruction of the farm crop by the insect “tuta absoluta”. This happened at the time planned for discussing impact and testing the framework. Again, discussing this in the group could potentially damage the relationships between the participants. The professor insisted that the insect should be dealt with from the very first signs of infestation (potential indicator: ability to deal with problems holistically and in a timely manner) and that they had highlighted the problem to the farmer in the previous ALS. However, the disappointment of the farmer was so great that they were inclined to see the whole project as a failure. In this instance, the researchers were able to see that the project impact could have been significant for crop viability had the farmer been more responsive to the professor’s instructions (potential indicators: crop sustainability and profitability throughout its natural cycle, increased farmer responsiveness and adoption of practices). The same would have happened if the professor or the students had followed up on the instructions shortly after the visit when the insect was first observed (potential indicator: increased student involvement, improved communication between actors). In this instance, talking about indicators may have damaged the relationship between the farmer and the rest of the actors as it could signify divergent interests/a lack of common interests in a setting where establishing common motivators is very important.

These observations were significant for the researchers in terms of assessing the way ALSs work and for improving future ALSs. However, the impact of the project case lacked a very serious component, the ability to translate into improved practices and better sustainability. In short, applying the framework was valuable for assessing ALS activity within the NF project through the eyes of the researchers, but the case project lacked significant impact.

Having said this, we found that applying the framework on an individual interview basis brought up significant areas of impact that were not necessarily project related. For example, one of the farmers in this ALS signified the positive psychological impact of communicating and expressing their views and problems within a group. One of the students of the group also mentioned that the ALS context gave her valuable experience in multi-actor communication which they could use in any professional context.

This may signify two issues: First, the issue of conflicting interests may be significant for other multi-actor settings as well. Since social dynamics and social relationships play a crucial role in the development and sustainability of multi-actor projects (i.e., issues of trust, authority and building common motivators), it is important for the facilitators to be sensitive to the emergence of possible conflicts and to address them appropriately.

Secondly, it raises the need for clarifying the degree to which the assessment of impact is a purely co-creative process. That is, we saw the need to clarify and further standardise the procedures of using the framework and the processes by which the indicators are produced. There is also a question of whether to include researcher insights and indicators in the assessment.

Another finding that was believed to be significant is the difficulty that participants had in thinking of and producing indicators that were related to i) the intermediary and systemic levels in terms of economic impact and ii) social and environmental impact on all levels. In simple terms, the most readily seen impact was economic and personal development on a project level. Discussions beyond that were a matter of the facilitator prompting and indicating example indicators for the participants to agree/disagree on and maybe elaborate a little bit on. At present, the systemic level investigative conversations have not produced indicators directly through the impact assessment sessions. However, during regular ALS sessions, participants referred to systemic environmental, social and economic issues that could easily be translated into project impact indicators. These are included in the indicator table below.

The above-mentioned issues may signify a general lack of knowledge and ability to reflect on social and environmental matters. An exception to this was the tomato farmer who was very sensitive and responsive to such issues on a personal level. This may also signify the need to further clarify and simplify the way in which these issues are proposed and discussed by the facilitators.

In this sense, the framework of impact may become an important opportunity for the development of reflection, visionary thinking and systemic thinking on an educational level. For this to develop further, there is a need to differentiate between activities that are designed for competence development based on the framework's theoretical backdrop and activities/processes that are designed for impact assessment. That is, there is significant potential in including discussions on impact indicators, as set in the framework, in the working processes of educational activities from early on in projects. It was observed that students had the opportunity to reflect on aspects of the project that would normally be outside their educational scope.

The framework's capacity for training in systemic thinking is considerable through the intermediate and systemic components of impact indicators. If the framework is applied from early on in educational projects and in set intervals, it may also serve as a valuable tool for professors to set learning goals and to assess

their teaching impact and their students' abilities and competence development. It is recommended that each project designs or co-designs a specific process by which the project will be assessed, based on the framework and the unique features of the project. In this sense, the flexibility offered by the framework is a very beneficial feature.

Finally, at least in an academic setting, we recommend the inclusion of further dimensions to be considered and discussed with regards to the development of competences. That is, project impact on personal, academic and professional development, and the project's impact on the development of skills and competences.

The table below presents indicators that have been produced so far by the project cases, indicatively divided into the framework categories. In many instances these categories, as well as the categories that we recommend that are more personal than social, are not clear cut, which adds a complexity to the analysis of the framework results. These distinctions may be very useful as explanatory and application tools for the facilitators but not as useful as differentiating/analysis tools of indicators. Also, we found that, for social research purposes, the sources that the indicators come from may be useful in providing insights into motivating factors for each group of stakeholders. Thus, after each indicator the source is provided (Students = S, Professionals=PR, Teachers=T, Advisors=A). In our case the category 'Professionals' includes farmers, lab technician and farm manager.

		Process-related impact indicators, i.e., how the work processes in the project affect the factors below.	**Product-related impact indicators, i.e., how the project results and products affected the factors below.**
Project level, i.e., the individuals participating in the project working group and reference group	Economic	1. A chance for students and academics to contact market factors/influences/realities (S, PR)	A. Crop profitability throughout the season (PR) B. Is the basis for further innovative research by other researchers/market (S, PR)
	Environmental	1. Extended knowledge on sustainability issues. (S, PR)	
	Social	1.Development of teamwork competencies. (S) 2. Ability to organise thoughts (S) 3. Time economy in terms of time spent with students with regards to competence development and practical experience (LSs are a dense practical experience for students. They gain a lot of knowledge and insights in a short time) (T, PR). 4. Cooperation and knowledge exchange between different stakeholders /Broadening of vision and systemic thinking competencies [A2] (S, PR, T, A) 5. A chance for students and academics to contact market factors/influences/realities (S, PR) 6. Extended knowledge on sustainability issues (S, PR) 7. Positive psychological impacts. Opportunity to talk about personal/professional hardships. (PR)	A. Timely completion of the research project (dissertation) (S) B. Higher quality of dissertation in terms of diverse themes covered and included (S, T) C. Production of scientific publications (T) D. Is the basis for further innovative research by other researchers/market (S, T, A)
Intermediary level, i.e., the organisations of the project level	Economic	1. The project was extended by the students to include a stage of organoleptic assessment which was optional for the students. This may lead to the product (hemp enriched bread) to be closer to market readiness and ready for further innovations by other researchers or market representatives (T, PR)	
	Environmental		

	Social	1. The project was extended by the students to include a stage of organoleptic assessment which was optional for the students. This may lead to the product (hemp enriched bread) to be closer to market readiness and ready for further innovations by other researchers or market representatives (T, PR) 2. Competences developed (communication with different stakeholders, inter-cultural and inter-generational communication, problem solving and more) that will be valuable for professional development in any area. (S)	
Systemic level/ Value chain level, or extended value chain level	Economic		A. Further dissemination of best practices through students who will be the next generation of professionals (PR, T, A)
	Environmental		A. Further dissemination of best practices through students who will be the next generation of professionals (PR, T, A)
	Social		A. Further dissemination of best practices through students who will be the next generation of professionals (PR, T, A) B. The use of cannabis products has negative social connotations which may have hindered the use of a plant with very high nutritional potential. This project will help to highlight this potential (T, PR, A)

Table 3.4. Preliminary Indicators established in the Greek pilot.

Regarding the inclusion of practice abstracts (PA) in the Framework, the Greek pilot decided to ask each LS to produce one practice abstract relating to the project they were working on. in some cases, more than one PA was produced. On one occasion, the process of writing a PA was relatively easy and participants were quick to accept the invitation. They were given detailed instructions, the PA template, and we briefly discussed the subject they would like to write about. They decided that they would like to present their research project. The Lab technician, who was supervising the experimental part of the project, helped them briefly. The communication between them was efficient, and in general, the students took the lead in the task. They produced a PA in about half an hour with one of us confirming that they were on task once and prompting them to write a little more on the Process of the Learning Sets. The primary motivator for doing this was that it would mean that their work would become public.

In the other cases, writing PAs was a bit more challenging, even with extensive explanation and guidance. Participants had no experience in this domain and mostly found it difficult to understand and follow the objectives of a PA. They used overly academic language and their PA was not oriented towards offering best practice suggestions. The PAs that were produced were more generic than specific and in some cases were smaller than expected. Most PAs needed considerable editing and a lot of prompting in order to be completed. Furthermore, our project didn't manage to produce a farmer-written PA. The exception to this was from a farm manager, who is an educated and very articulate person in general.

Overall, the Framework needed a few clarifications of its terms, the dimensions considered and the process by which it should be carried out. In its present form, and in our case, a facilitator who is able to prompt and direct the conversation is considered essential as participants were often confused and couldn't understand what was required of them. A lot of explanations and examples were generally required, and indicators were often inferred from their answers and rephrased for them to confirm (e.g., I hear you say that…, could we say that… etc.). The flexibility in circumstances and in the timeframe in which it can be applied is considered to be a major advantage. This is mostly due to the lack of experience on the part of

project participants in thinking about impact. A significant advantage of the framework is its potential to look at long term and systemic impacts, which is not immediately visible to most stakeholders. For an academic setting, it also had significant educational potential in training competences, widening of students' world view and systemic thinking.

Reflections and Insights on pilot testing

The Framework as an educational Tool:

Applying the Framework could prove to be a valuable tool for teachers as it provided a context for the reflection processes of the action learning sets and, more importantly, the context was decided/developed by the participants themselves. It also aided the development of the competences of reflection, observation, participation, visionary thinking and systemic thinking. It could further act as a tool for co-creating study goals, assessing the achievement of study goals and assessing teaching strategies

As an educational tool it would profit from further adjustments in the dimensions offered. For example, dimensions such as personal development, professional competences and academic achievements could easily be added. With such alterations, it could be a very useful tool as it can collect evaluations on educational processes and project products in one place. This would allow for direct comparisons and easy inferences to be made by teachers and Institutions.

Stakeholder group makeup and engagement.

The framework model emphasises the assembly of a group of variegated stakeholders to perform the impact assessment. It further emphasises co-creation and group discussion. However, the experience of the Greek pilot testing indicates the need for a varied data collection process in order to maximise freedom of expression and avoid conflicting group dynamics. Group discussion, as well as private reflection and private interviews, allowed richer reflection results.

In our case, the group makeup was set from the beginning. However, in other settings, it may be possible to include different stakeholders at different levels. It is not clear whether this would create problems in the process.

Impacts on different levels.

The different levels of impact were a useful feature for engaging participants in discussion beyond the project level. In this sense it was valuable as a systemic and visionary-thinking tool. As the results suggest above, it was considerably harder to discuss the intermediary and systemic levels, which may indicate the need to develop this capacity more in the minds of students and other stakeholders, especially since sustainability issues are very much systemic issues.

As the Swedish pilot mentioned before, the framework model defines impacts on three different levels; 1) the project level; 2) the Intermediary level; and 3) the value chain level or extended value chain level. In practice, some levels are easier to imagine and elaborate on than others. The impacts on the project level were found to be considerably easier to imagine and pinpoint than on higher levels by the focus groups in this study.

Impacts in economic, environmental and social dimensions.

As the Swedish pilot mentioned before, the framework model defines impacts in the dimensions of economic, environmental and social. In practice, impacts are not always divisible into these general categories.

In the Greek case, it is also clear that there is uneven distribution between categories. In many cases it was also difficult to distinguish the category in which an indicator belonged. They may also belong to more than one category. However, this distinction aided the data collection process as it helped participants to enlarge their frames of reference and start thinking about issues that they had not thought of before. For example, while the project and intermediate financial impact level was the easiest and most obvious category of reference, asking about the other categories enriched the results greatly, even if indicators were not produced at the time.

On an educational level, further dimensions may be introduced, such as personal development, professional competences, academic achievements, etc.

Including production of PAs in the Framework

In the Greek pilot we attempted to have professionals produce one or more practice abstracts about the project after the completion of the Learning Sets. This had varied results in that they needed considerable editing before they could be accepted, but, in many cases, it was a task that intrigued participants.

This signifies the possibility that the quality of PAs produced may act as a good indicator for a project. That is, the quality of PAs produced by stakeholders may serve as an indicator of impact on engagement, motivation and understanding.

3.4.3. Developing indicators

The Greek pilot attempted to develop a series of indicators for the ALS cases. The indicators produced were based on the ALS session observation logs and on interviews conducted shortly after the cases were over. The observation logs were notes taken by a researcher who was present in the ALSs and took notes on different aspects of the meetings. The interviews were one-on-one meetings between the stakeholders and a researcher. They were later transcribed and analysed for possible indicators, among others.

As mentioned before, since most participants were not accustomed to talking about impact, some of these indicators were inferred by the facilitators and then validated with the participants. An example of how indicators may arise can be seen in the following conversation. The facilitator asked:

"So, after participating in a few learning sets, what do you think is successful about them?" (facilitator).

The teacher took the lead by saying how appreciative the students should be for having the opportunity to participate in such a setting. The student agreed and so the facilitator offered back,

"So, would you say that the chance to cooperate and exchange knowledge with all these different actors has been important to you?" (facilitator)

All participants agreed readily, so the indicator was set (Cooperation and knowledge exchange between different stakeholders). It was broadened by further similar statements in other ALSs to include the development of competences on systemic thinking and visionary thinking. Then, the facilitator went on in an attempt to widen the conversion to other dimensions of impact,

"This can have an important impact on the project, since it gives you the opportunity to get in touch with people from other backgrounds and different viewpoints, right?" (facilitator).

Upon agreement the facilitator asked,

“Does this have any further implications? We might think of finances for example, or the environment.” (facilitator)

Then the lab technician, who is also a teacher, offered,

“It gives us the opportunity to get in touch with the market. Who knows what opportunities might arise from that.” (Teacher).

And so, the researcher set an indicator (A chance for students and academics to make contact with market factors/influences/realities) on the economic dimension of project level indicators. From here, another indicator might have arisen if it were applicable to the project. For example, profitable collaborations between the Institution and external actors.

On another occasion, in one of the student interviews, the student stressed that they were not interested in continuing with agricultural professions. So, the researcher repeated the question in a different way,

“So, how do you think that the ALSs impacted you, if not on a strictly academic or professional basis?” (facilitator)

The student answered:

“I was surprised at how intelligent and cultivated the farmer was. It changed my view, I didn’t expect it. I never expected that I would hold a serious conversation with a person so much older than me either. I didn’t think I could (...)I thought that their views would be very old, but I was wrong” (student)

and the researcher continued,

“So, you think that these are things you could use in other settings as well?”

The student was definite about it, so, based on this and other similar statements, the researchers produced the indicator ‘Competences developed (communication with different stakeholders, inter-cultural and inter-generational communication, problem solving and more) that will be valuable for professional development in any area’, on the social dimension and on an intermediate level.

All the above are given as examples of indicators that can be generalised and used in different educational settings and projects that utilise multi-stakeholder settings. Below is a list of such indicators:

- A chance for students and academics to make contact with market factors/influences/realities (process related, economic, project level).
- Is the basis for further innovative research by other researchers/market (product related, economic, project level).
- Extends knowledge on sustainability issues (process related, environmental, project level).
- Development of teamwork competencies (Process related, social, project level).
- Cooperation and knowledge exchange between different stakeholders/broadening of vision and systemic thinking competences (Process related, social, project level).
- A chance for students and academics to make contact with market factors/influences/realities ((Process related, social, project level).

The more project specific indicators that were produced in the pilot were valuable for the particular setting and for creating a process of personal and project specific evaluations. An example list of such indicators are:

- The project was extended by the students to include a stage of organoleptic assessment which was optional for the students. This may lead to the product (hemp enriched bread) being closer to market readiness and ready for further innovations by other researchers or market representatives (process related, economic and social on an intermediate level).

- The use of cannabis products has negative social connotations which may have hindered the use of a plant with very high nutritional potential. This project will help to highlight this potential (product related, social on a systemic level).

- Positive psychological impact. Opportunity to talk about personal/professional hardships. (Process related, social on project intermediate level).

These indicators may be meaningful to all participants or to only a sample of participants. This means that they could either be decided in collaboration or they can be set as individual impact indicators for each participant to self-evaluate. This illustrates well that, at least on an educational level, a framework of impact should also include a 'personal level' that will allow for setting personal goals on self-development, academic development, professional development, etc. In an academic environment, this is an important dimension that may have a positive impact on student engagement and motivation, as well as providing the ability to self-regulate and self-evaluate. The fact that the 'positive psychological impact' indicator was offered by a farmer, may be indicative that the 'personal' dimension may also be applicable to other, more professional settings as well.

Reflections on developing indicators

When to measure the indicators

On an educational level, the Framework should be woven into the activities from an early stage. In the Greek case, it was applied in the last two sessions of the learning sets as well as in the individual interviews, shortly after the sessions were over. However, there was a sense that it would be more valuable if there was more time for the participants to interact with the framework concepts. It is best introduced once the group has had a chance to bond and build trust but before specific goals have been set.

Flexibility versus comparability in indicators

As has been mentioned before in the Swedish pilot:

"While the framework model mainly encourages flexibility, i.e., project specific indicators, there is a need to develop general, comparable, standard indicators as well."

The flexibility offered by the framework is what makes it a great educational tool for co-creation of learning goals. It allows for the addition of indicators that are important for specific circumstances and for empowering students to engage in the learning process more. However, it is equally important to begin with a good set of indicators that reflect educational standards, and institutional or teacher values and methodologies.

Levels and dimensions of indicators

As mentioned before, the levels and dimensions of indicators should not be treated as strict categories, since some indicators may belong to more than one level or dimension. Instead, they should be treated as the starting points of a dialogue that includes systemic dimensions. Having said this, it may be important to include dimensions that are related to personal goals, personal development, academic development and professional development. This may have a positive impact on the engagement, motivation and empowerment of the stakeholders and ultimately on the quality of project outcomes. Although this was made apparent in an educational setting, it may also be relevant and worth developing in other settings as well.

3.5. REFINING THE ORIGINAL FRAMEWORK

This section summarises the suggested refinements of the framework based on the three pilots presented above. The testing of the framework in the three pilots resulted in adaptations of the procedural and structural components of the framework, as summarised below. These adaptations are integrated in the final version of the framework, as presented in section 2.1.

3.5.1. Structural components

Framework levels

A suggestion was made to add a framework level, the individual level. This would allow for dimensions such as personal development, professional competences, and academic achievements, which are useful for educational purposes. These dimensions are not only useful for students, but also for professionals. The motivations and details are presented in section 3.4.2.

The framework levels were clarified and the content of the impact indicators relative to the three levels was re-specified. The motivations and details are presented in section 3.2.2.

Content of categories

Secondly, the product and process related categories for all three levels were clarified. The motivations and details are presented in section 3.2.2.

3.5.2. Procedural components

Adding a first step to prepare for the impact assessment work. This step would include:

- Stakeholder group constitution - the earlier the better.
- Appointing a facilitator or group leader.
- Setting aside adequate time and resources for the impact assessment work.
- The project manager (or equivalent) should prepare a set of indicators to suggest, and a time when to measure them.

3.6. DEVELOPING INDICATORS TOWARDS AN IMPACT INDEX

This section summarises the suggested indicators from the three pilots presented above. The testing of the framework in the three pilots resulted in suggested indicators, presented in earlier sections. These indicators are summarised below. The final version of the indicators is presented in section 2.2.

<u>Project specific indicators</u>

The project specific indicators can be based on the projects' accepted results or products. Hence, these indicators will measure if and how the project has delivered to its aims. The project specific indicators were

valuable for the particular setting and for creating a process of personal and project specific evaluations. Project specific indicators can change during the project runtime, for example, if the project aims are adjusted for some reason. The project specific indicators are often gathered from the project description of aims and goals. They can be adapted to the needs of the project, such as changing conditions during the projects' runtime.

Pilot	Project specific indicator	Comment
Research - Sweden	Show time and costs for bureaucracy in different agricultural branches.	A quantitative measure.
	Suggest concrete simplifications and recommendations for less bureaucracy.	A quantitative number; a qualitative list.
	Communicate the results to politicians, authorities and entrepreneurs.	
	Investigate how mental strain caused by excessive bureaucracy.is experienced by the farmers	
	Contribute to lowering the burden and costs of bureaucracy in agricultural holdings.	Measured both quantitatively and qualitatively.
Practice abstracts - Czech Republic	Level of PA Relevance	Measured both quantitatively and qualitatively.
	Level of PA Efficiency	
	Level of PA Importance	
	Level of PA Innovativeness	
	Level of PA Sustainability	
Education - Greece	The project was extended by the students to include a stage of organoleptic assessment which was optional for the students. This may lead to the product (hemp enriched bread) being closer to market readiness and ready for further innovations by other researchers or market representatives.	Process related, economic and social on an intermediate level. Quantitative (degree of product market readiness, number of research projects that evolved from this, number of market actors that showed interest in the product)
	The use of cannabis products has negative social connotations which may have hindered the use of a plant with very high nutritional potential. This project will help to highlight this potential	Product related, social on a systemic level. Qualitative (interviews with the people involved in the organoleptic testing)
	Positive psychological impact. Opportunity to talk about personal/professional hardships.	Process related, social on a project and intermediate level. Qualitative/quantitative (e.g., participant interviews, reflection logs, Likert scale questionnaire)

Table 3.5. Project specific indicators from the pilots.

General indicators

While it may be easier to identify project specific indicators, some general indicators are required in order to provide comparability between projects. Inspiration can be found in the general indicators suggested in this study (see tables 3.2 and 3.4), which are summarised in table 3.6 below.

Pilot	General indicators	Comment
Research - Sweden	Financial commitments by external organisations in the project	
	External actors are involved in the project initiative from the start.	
	The number of meetings in the project, face-to-face or via zoom/teams/video.	

	Learning, empowerment and social capital between the people in the project.	
	Project reports and other publications and the dissemination of these.	
	Possible continuation and development of cooperation between the involved individuals.	
	Number of meetings and interactions in addition to project meetings.	
	How do the organisations continue to work with the question based on the project results, individually and/or together?	
Practice abstracts - Czech Republic	Level of PA overall Usefulness	Measured both quantitatively and qualitatively.
	Number of PAs* produced *(with an overall usefulness of 50% and higher)	A quantitative number; a qualitative list.
Education - Greece	A chance for students and academics to make contact with market factors/influences/realities.	(Process related, economic, project level)
	Provides the basis for further innovative research by other researchers/market.	(Product related, economic, project level)
	Extended knowledge on sustainability issues.	(Process related, environmental, project level)
	Development of teamwork competencies	(Process related, social, project level)
	Cooperation and knowledge exchange between different stakeholders/broadening of vision and systemic thinking competencies.	(Process related, social, project level)
	A chance for students and academics to make contact with market factors/influences/realities	(Process related, social, project level)

Table 3.6. General indicators from the pilots.

APPENDIX 1. Modifications to the framework based on the research pilot test

In the Swedish pilot, the test was conducted in relation to four agricultural research projects. The first step entailed adapting the framework model to fit with the test pilot. Two main modifications were made. Firstly, the framework levels were re-specified, and the content of the general impact indicators relative to the three levels was re-specified. Secondly, the product and process related categories for all three levels were redefined. The results are presented below.

		Process-related impact indicators. That is, how the work processes of the project affect the factors below.	**Product-related impact indicators. That is, how the project results and products affected the factors below.**
Project level, i.e., the individuals participating in the project working group and reference group.	Economic	Indicators of how the project processes create economic value for the participants, e.g., new financial/entrepreneurial opportunities, ability to participate in the local economy.	Indicators for how project results and products create economic value, e.g., entering into innovation processes, becoming patents or commonly used concepts, etc.
	Environmental	Indicators for how the project processes create environmental value for the participants, e.g., awareness of the environmental impact of their own work, changes in working methods.	Indicators of how the project's results and products affect the environment, e.g., more environmentally friendly behavior, production or consumption.
	Social	Indicators for how the project processes create social value for the participants, e.g., participation in meetings and in the project in general, trust building, relationship building between actors/individuals.	Indicators of how the project's results and products affect social values, such as more socially sustainable behavior, production and consumption.
Intermediary level, i.e., the organisations that the project level individuals represent.	Economic	Indicators of how the project creates economic value with its processes. For example, the number of contacts and the quality of the relations between the project and external economic actors, and how the project enables the use of its processes for financial purposes at intermediate level.	Indicators of how the project creates economic value with its results and products. For example, the number of contacts and the quality of the relationships between the project and external economic actors, and how the project enables the use of its results and products for financial purposes at the intermediate level.
	Environmental	Indicators of how the project creates environmental value with its processes. For example, the number of contacts and the quality of the relationships between the project and external environmental actors, and how the project enables the use of its processes for environmental purposes at an intermediate level.	Indicators of how the project creates environmental value with its results and products. For example, the number of contacts and the quality of the relationships between the project and external environmental actors, and how the project enables the use of its results and products for environmental purposes at the intermediate level.
	Social	Indicators of how the project creates social values with its processes. For example, the number of contacts and the quality of the relationships between the project and external social actors, and how the project enables the use of its processes for social purposes at the intermediate level.	Indicators of how the project creates social value with its results and products. For example, the number of contacts and the quality of the relationships between the project and external social actors, and how the project enables the use of its results and products for social purposes at the intermediate level.

Value chain level and extended value chain level	Economic	Indicators for how the process has led to, for example, changes in the value chain's economy or economic structure, i.e., actors, networks, economic behavior, etc. Have the method of working and work processes had an impact?	Indicators of how the project's results or products affect the economy, economic actors, networks, and economic behavior in the value chain.
	Environmental	Indicators of how the process has led to, for example, changes in the value chain's environmental policy and environmental effects from manufacturing to the consumer. Have the method of working and work processes had an impact?	Indicators of how the project's results or products affect the value chain in a more environmentally friendly direction. For example, environmental organizations, nature conservation organizations, authorities that monitor environmental interests, etc.
	Social	Indicators of how the process has led to changes of a social nature in the value chain from manufacturing to consumer. Have the method of working and work processes had an impact?	Indicators of how the project's results or products affect the value chain in a more socially sustainable direction. For example, external actors for social sustainability such as authorities and NGOs that work with social issues, networks for gender equality, equal treatment, etc.

APPENDIX 2. Questionnaire for evaluating the impact of practice abstracts

Criteria for evaluating practice abstracts – CZE draft for pilot test

All criteria will be evaluated on a scale from 0 to 100 % (relevance rate)
+ commented on by agro-environmental specialists. Both levels will be analyzed.
All criteria carry the same weight.
All criteria can be statistically evaluated (mean, median, variability etc.)

1) Relevance of the practice abstract (PA) for practitioners.

a) How do you rate the relevance of the PA's topic for practitioners within your field of expertise in the agri-food sector?

0 – 25 %	*26 – 50 %*	*51 – 75 %*	*76 – 100 %*

Could you please briefly describe your assessment?

b) How do you rate the usefulness of the PA for practitioners within your field of expertise in the agri-food sector?

b.1) on a regional level

0 – 25 %	*26 – 50 %*	*51 – 75 %*	*76 – 100 %*

Could you please briefly describe your assessment?

b.2) How do you rate the barriers to use of the PA for practitioners in your country within the agri-food sector?

0 – 25 %	*26 – 50 %*	*51 – 75 %*	*76 – 100 %*

Could you please briefly describe your assessment?

b.3) How do you rate the barriers to use of the technology or knowledge described in the PA??

0 – 25 %	*26 – 50 %*	*51 – 75 %*	*76 – 100 %*

Could you please briefly describe your assessment?

2) Efficiency

a) Time

How time demanding will the transfer of the innovation from the PA to practice in the context of your working routine be?

too demanding	*demanding*	*less demanding*	*not demanding*

Could you please briefly specify and describe your opinion?

b) Financial costs

How high will the financial costs of transfering the innovations from PA to practice be?

too expensive	*expensive*	*less expensive*	*not expensive*

Could you please briefly specify and describe your opinion?

c) Resources

Apart from financial and time costs, what other crucial levels of cost regarding transfer from PA to practice are there?

……..

Please evaluate:

0 – 25 %	*26 – 50 %*	*51 – 75 %*	*76 – 100 %*

3) Importance of PA's:

a) How important is the PA for the creation of new markets or increasing visibility in existing markets?

0 – 25 %	*26 – 50 %*	*51 – 75 %*	*76 – 100 %*

Please specify why/how?

b) How important is the knowledge and/or technology described in the PA to environmentally friendly behavior?

0 – 25 %	*26 – 50 %*	*51 – 75 %*	*76 – 100 %*

Please specify why/how?

c) How important is the knowledge and/or technology described in the PA for socially responsible behavior?

0 – 25 %	*26 – 50 %*	*51 – 75 %*	*76 – 100 %*

Please specify why/how?

4) Innovation of the PA:

Please, rate the level of innovation of the PA:

0 – 25 %	*26 – 50 %*	*51 – 75 %*	*76 – 100 %*

Could you please briefly describe what specifically is innovative within this PA?

5) Sustainability

Can you rate the importance of the PA for sustainable solutions for practitioners?

a) economically

0 – 25 %	*26 – 50 %*	*51 – 75 %*	*76 – 100 %*

b) environmentally

0 – 25 %	*26 – 50 %*	*51 – 75 %*	*76 – 100 %*

c) socially

not relevant	*0 – 25 %*	*26 – 50 %*	*51 – 75 %*	*76 – 100 %*

APPENDIX 3. Guidelines for writing practice abstracts

Write a NextFOOD practice abstract to Communicate Your Work

1. What are practice abstracts?

Practice abstracts (PA) are a means of dissemination of project results which encourage practitioners to contact project partners who have innovative and useable results because results are presented in a short, concise, interesting and easily understandable way.

The European Innovation Partnership-Agricultural Productivity and Sustainability (EIP-AGRI) developed the PA format which all Horizon 2020 projects must use to give research result visibility not only among peers but also to a wider audience. You can benefit by widely sharing your research results!

2. For whom are practice abstracts intended and where are they published?

Practice abstracts should be of interest to practitioners: in the case of NextFOOD, this is farmers/foresters and educators, administrators, policy makers, and local authorities in these sectors.

The NextFOOD PAs will be published

• on the EIP-AGRI website, along with PAs from other H2020 projects,

• on the NextFOOD platform where they will be highlighted as News,

• as part of a potential peer review system, which will use PAs to assess project impacts

PAs are also suitable for press releases, as the basis of short articles for the mainstream press or as a way to publicise your activities to potential partners.

3. How do I write an interesting practice abstract?

Practice abstracts are like appetisers, they are small, easy to digest and they leave you wanting more!

Here are some tips (and rules) for writing an interesting and appetising PA:

• Stick to *why, what and how*. Include *who, when, where* if necessary.

o Use between 1000-1500 characters (not counting spaces)

• Focus on what is most innovative and most important. Why is your result interesting? Describe the innovation of your results: process/product/marketing/organisation/etc.

Describe the value/benefit of what you did. Why might someone else want to do the same?

o Relate to the market: creation, advantage, increasing visibility, etc. (if relevant)

o Relate to sustainability compared with conventional approaches (if relevant)

o Identify potential legislative barriers on regional/national/worldwide levels (if known)

• Be objective. Describe what you did and how someone else can repeat it or something similar.

o How time consuming will it be to transfer your result into practice?

o Describe ideal conditions: climate, technical equipment, etc.

o How expensive (moneywise) will it be?

• Use specific yet easily understandable words. Avoid jargon and academic words and phrases.

• Ensure your language is gender-sensitive, i.e. for pronouns, use the plural form where possible (“they”, “them” etc.), or explicitly state both genders in the pronouns (e.g. "s/he" or “she and he”, “him or her” etc.), or use gender-neutral terms where appropriate (e.g. “land-owner” instead of “landlord”, or “firefighter” instead of “fireman”) to avoid reproducing gender stereotypes through your writing. You can also directly address gender inequalities by explicitly mentioning those gender groups that are typically underrepresented or even excluded, e.g., “women farmers” or “male nurses” etc.

A more detailed guide on how to write a PA developed by the EC can be found **here**.

We are looking forward to receiving your appetizing Practice Abstracts!

APPENDIX 4. Expert reviews

A preliminary version of the Deliverable was sent to three experts in the field for review and comments, in accordance with what is stated in the proposal. The experts were working at a government body for agricultural development and innovation, an innovation funding agency, and an agricultural research funding body. Below is a table of suggested modifications from the reviewers and the actions taken.

Expert reviewer comments and action points.

Reviewer comments and action points	Action taken
Educational aspects of the framework are worthy and should not be neglected. The involvements of students seem to be quite an innovative solution.	Revised text.
When speaking about sustainability, some remarks could be made on a social pillar of sustainability indicators, were applicable of course (and some examples could be proposed, e.g., increase of social capital? Measuring the diversity of stakeholders involved? Level of acceptability of results to stakeholders? Increase of capacity/willingness to cooperate?).	Revised text.
Yes, (the framework) could be applicable. But some simplification could be helpful. Even the description of the framework could contain suggestions to simplify where feasible.	Revised text.
(This) approach could increase the impacts (improved impact planning), could increase the dissemination effects (taking actors into account in a systematic way), and could foster the learning of individuals involved in the project (e.g., impact assessment could increase awareness of the benefits of the project).	Revised text.
Sometimes, the interests of stakeholders are very diverse, their integration into the evaluation team might be challenging. The role of a facilitator is often overlooked and underestimated.	Revised text.
In some projects, the contribution to social capital could be a useful indicator. For example, actors could be asked whether “their willingness to cooperate” or “trust level” increased while using the Likert scale in assessment.	Revised text.
The clarity of the text could be improved, maybe it could take the form of a handbook. Now the text is still not easy to read. Perhaps some graphs/pictures to show the dimensions/components of the impact assessment could help at the beginning of the text.	Revisions of text and tables.
Not sufficiently clear: Pg. 8, section “Two categories of impact – process and product, the second paragraph: the distinction between process/product impact is not clearly demonstrated – at least in this paragraph. It becomes clearer in the paragraphs below… Suggestion to rename the section “Two categories of impact – **research** process and product” and to specify the distinction in para two of this section. Examples associated with the description of the framework could help a lot or at least reference to the examples presented in later sections. Suggestions: When practice abstract is mentioned and its abbreviation, the abbreviation should be introduced first. Section 3. At the beginning of section 3 the discussion of indicators is a good way to establish these common interests by establishing common indicators. Later in this section, there is a suggestion to introduce general indicators to stakeholders and ask for their input as soon as there is trust and commitment built between project participants. It could look like a small inconsistency in the process (common interest was introduced together with trust-building at the beginning). Suggestion: why not to keep the common interest and trust-building associated with the Indicator discussion process? Planning a Course of Action and the “tools for addressing them, and the individual responsibilities“ are mentioned the first time, but it should be explained how to get/build them in chapters before.	Revisions of text and added text.
Examples associated with the description of the framework could help a lot or at least reference to the examples presented in later sections.	Refer to part B.
Clarify: Which system is to be affected? Also, the system must be defined - where does it start and end? The procedural step of “Involve” brings involving in the project to mind, whereas it is intended to mean involve in the assessment. This needs to be clarified. In addition, I am thinking, could these procedural steps be used from the very start of a project, in creating it?	Revised text.
Action point: Emphasise that the individual level is a way to validate system changes or network effects, not just “effects for the individual”	Revised text.

Reviewer comments and action points	Action taken
Effects on the systemic level is super important but difficult to measure. Funding is a potential indicator to measure value creation. Define the role and contributions to funding, especially when the funding does not go directly into the organisation that is leading in the project/program. Action point: Check if funding should be acknowledged as an indicator and describe this.	Revised text.
Remember that actors come and go in complex projects - how does the model for this work? Consider the time dimension – How is what happened in year 1 connected to the fact that something important actually happened in year 5 - how are change journeys captured? How do we direct chance? Or how can we evaluate the effects of having influenced the gaze or direction? Includes both execute and reflect – but I am not sure what questions are asked at this stage? It is fundamental that a project comes from a system approach and not the other way around. Action points: Start with clarifying that a fundamental aspect is collaboration from the beginning. Involve in our framework means involvement in evaluation, not involvement in research or education (that must have been done at an earlier stage). Try to be more specific about how we can evaluate a "good direction", check if this can be highlighted in execute and reflect.	Revised text.
In what contexts is it supposed to be used? What kind of systems is it intended to influence? Clarify how it can be lifted up to a more general level, to evaluate large and complex initiatives or organisations Action point: Define the target group and try to reduce some of the complexities to make it more accessible.	Revised text.
A bit difficult to understand the mission for the framework, is it a research training project, education or system effects that is at the heart of the framework's intention? Hard to see from a quick glance how it can be lifted to another level. Action point: Clarify where we have started and how it can be applied. Exemplify that it can be used as a tool for ***the design of*** an entire program for, for example, applied research.	Revised text.
In table 2.1, it was easier to understand the higher levels of organisational and systemic level, how these could be used in evaluations of the kind of projects we fund. It seems more difficult with, for example, the individual level. Are all levels as important? Action point: Clarify the purpose of the levels.	Revised text.
It would require some support/guidance in how to plan the work with this framework. Now it is a bit broad, covering both research, education and practice abstracts. It would be good to boil it down further, for practical use, at least in our context. Action point: (a)Clarify the purpose of the framework, (b)define the intended users/target groups and (c)how the framework can be adapted to the users' purposes.	Revised text.
Action point: Clarify the intended timeframe for using the project.	Revised text..
The report is a bit heavy to read. Action point: Insert a "Readers' guide" and revise the structure of Part A to make it more accessible. Revise table 2.2.	Additions and clarifications in the text. Revision of tables.