UNISECO

UNDERSTANDING & IMPROVING THE SUSTAINABILITY OF AGRO-ECOLOGICAL FARMING SYSTEMS IN THE EU

Deliverable Report D6.4: Methodological Briefs

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1. INTRODUCTION

1.1. Purpose of the Deliverable

The main objectives of Task 6.4 were to utilize methodological insights from the transdisciplinary co-construction and analysis of strategies for agro-ecological transitions to provide methodological guidance for practitioners and scientists involved in the design, implementation or evaluation of sustainability of agro-ecological arming systems. The guidance is provided through a set of methodological briefs that provide short, step-by-step, guidance and lessons learnt on applying key methods used in the UNISECO project. The briefs are available in electronic form and can be accessed via the Agro-ecological Knowledge Hub (Work Package 8) as a part of information content for the different target audiences.

1.2. Methodological Briefs: Purposes and Process of Development

In recent years a number of handbooks and guides on sustainable farming systems and agro-ecological transitions have been developed. This includes the handbook 'On Agroecology: Farmer's Manual on Sustainable Practice' (George and Jafri, 2014), which is designed as a practical guide to educate and inform farmers about the diversity of possibilities of sustainable and safe food production methods and its techniques. However, this handbook has a specific geographic focus Asia and the Pacific region. Levard *et al.* (2019) developed a 'Handbook for the Evaluation of Agroecology' explaining a method to evaluate effects of agro-ecology and the conditions for its development using examples from West Africa.

A more global coverage provides the "Innovators handbook" on enabling sustainable food systems published by FAO and INRAE in 2020. This handbook builds on experiences that are changing the organizational structures of local food systems to make them more sustainable and is organized as a "choose your own adventure" story with topics arranged into four categories of innovations: engaging consumers, producing sustainably, getting products to market and getting organized (FAO and INRAE, 2020). In addition, substantial scientific efforts have resulted in new books on conceptual and theoretical research recommendations and guidance for analysing agro-ecological transitions (e.g. Anderson *et al.*, 2021; Caquet *et al.*, 2020).

In UNISECO, a focus was on developing transdisciplinary approaches for the assessment of the sustainability of agro-ecological farming systems, and to improve the integrated capacity of end-users, stakeholders and scientists engaged in the Multi-Actor Platforms to conduct such assessments and co-construct strategies for agro-ecological transitions of EU farming systems. The transdisciplinary approach integrated knowledge from across academic disciplines and the science-policy-practice nexus into the sustainability assessment of farming systems and places a strong emphasis on participatory processes to foster co-learning and co-construction. That approach was used in the development of the methodological guidance (Helin and Schwarz, 2019; D6.1).

The purpose of the methodological guidance described in Deliverable D6.1 (Helin and Schwarz, 2019) was critically reviewed by project partners and members of the Project Advisory Group. Those reviews were based upon the experiences of the application of the various methods and approaches in UNISECO, feedback on methods and guidance needed for their application from discussions at the different workshops with the case study and EU-level Multi-Actor Platforms, and evidence of interest and uptake of methods and approaches by members of the Multi-Actor Platform. Examples

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of the uptake of methods include the social network analysis and the development of network maps by advisors in the German case study, and the multi-criteria analysis of policy incentives by representatives of the Ministry of Agriculture in the Czech case study. The preferences expressed were for short guidance notes on the specific methods used for the different steps and elements of the transdisciplinary analysis and co-construction of strategies for agro-ecological transitions.

To design a handbook to structure a whole course as part of an expanded curriculum at vocational schools or educational organisations was a valuable recommendation of the project reviewers at the first Project Review. This recommendation informed discussions that led to a project level Policy Brief on "Supporting advice, education and lifelong learning to promote agroecological transitions", published on Zenodo (Schwarz *et al.*, 2021a). The idea has also been put forward for inclusion as one of the elements of capacity building in preparation of the new candidate Partnership on Agro-ecology.

For the purpose of UNISECO, the experience and discussions with participating stakeholders and experts and their interest and application of some of the methods revealed that greater impact and benefit would be achieved by a methodological guideline that consists of a set of briefs for the different methods used in the analysis.

The methodological guidance was developed for selected key methods and approaches used in the main steps of the logic model of assessing and co-constructing strategies agro-ecological transitions in a transdisciplinary setting. Figure 1 provides an overview of the methods and approaches selected for methodological factsheets. The methodological guidance builds on the methods and approaches used and lessons learnt in those steps including: transdisciplinary guide (Deliverable D7.2, Irvine *et al.*, 2019) and monitoring and evaluation framework for Multi-Actor Platforms (Deliverable D7.3, Smyrniotopoulou and Vlahos, 2021); application of the Decision Support Tools (Deliverable D3.1, Landert *et al.*, 2019a and b, Deliverable D3.5, Albanito *et al.*, 2021); data collection for assessing social-ecological systems (Deliverable D3.3, Prazan *et al.*, 2019, Deliverable D3.4, Schwarz et al., 2021b); social network analysis (Deliverable D5.2, Vanni *et al.*, 2019); participatory scenario development (Deliverable D4.2, Röös *et al.*, 2021); and the multi-criteria analysis of policy incentives promoting agro-ecological transitions (Galioto *et al.*, 2021).

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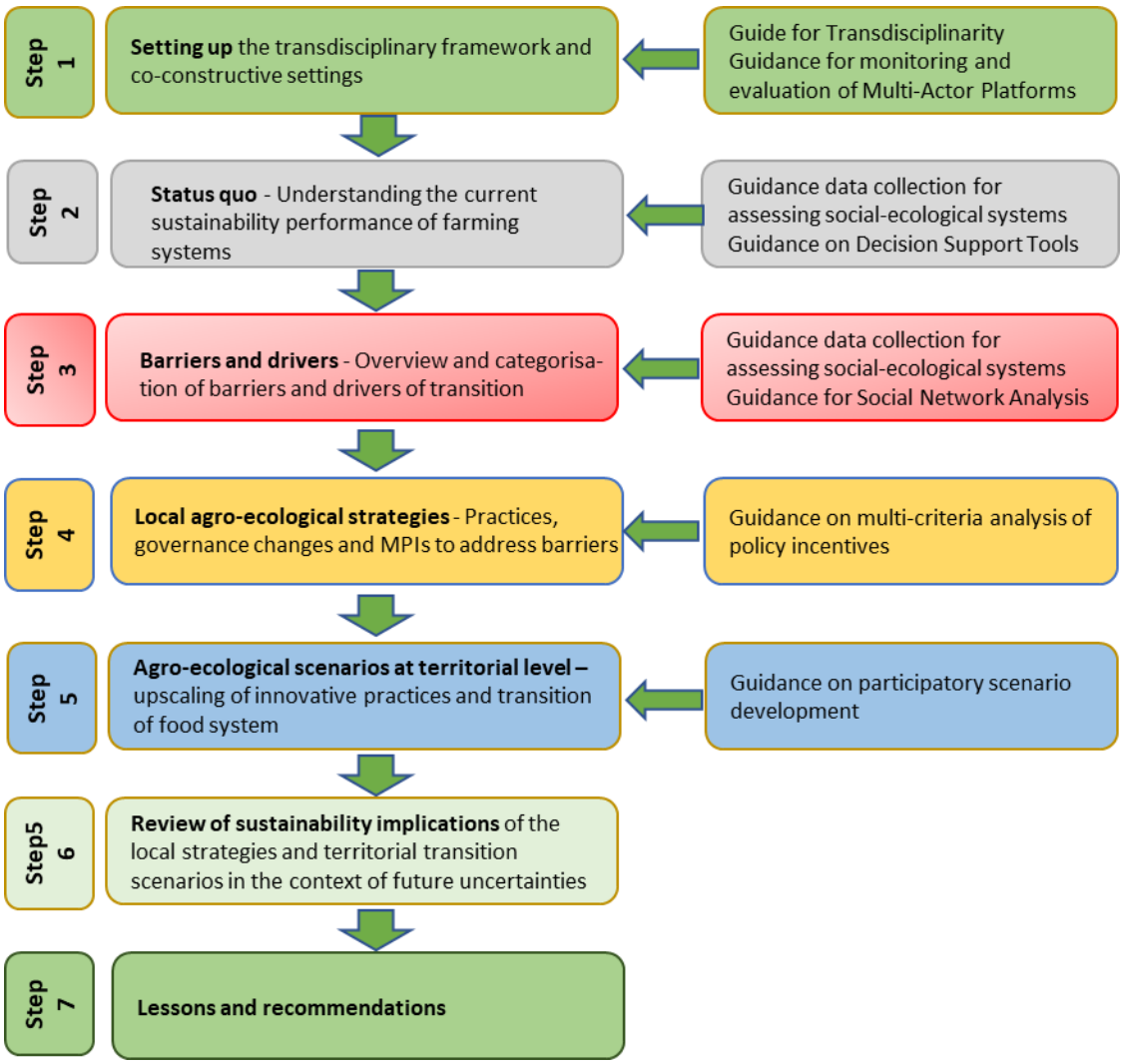

Figure 1. Logic model of analytical steps and methods selected for methodological factsheets

For each of the selected methods or approaches a methodological brief was developed, with step-by-step guidance that follows a common structure:

- **Purpose:** Brief description of the main purpose of the method or approach
- **Description:** Description and definition of the method and its main characteristics and contributions to the assessment.
- **Project background:** Explanation of the application of the method in UNISECO
- **Step-by-step guidance**: Guidance depends upon the subject of the methodological brief, including the main steps or approaches required for its application. An example of such guidance is of the application of the Decision Support Tools, covering: i) preparatory work, ii) farm selection, iii) data collection, iv) data generation and plausibility checks, v) result validation.
- **Additional information**: Short list of references with more detailed information, including related Deliverables of the UNISECO project.

The content of the methodological briefs exploits the investments in guidance documents provided for use by project partners in each of the principal stages of data capture and analysis (e.g. Social-

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Ecological Systems analysis, WP3; Decision Support Tools, WP3; development of story maps, WP3/WP6; collection and processing of market and policy incentives, WP5; and processes of working with the Multi-Actor Platforms, WP7). The methodological briefs are available on the Agro-ecological Knowledge Hub, e.g. the Brief on the Social Network Analysis and the Brief on the Multi-Criteria Analysis, targeted to specific target audiences and purpose.

Methodological briefs have been disseminated using project level channels of:

i) Project WWWsite news items

- https://uniseco-project.eu/news/172/
- https://uniseco-project.eu/news/173/

ii) Final UNISECO project Newsletter

Link to the methodological briefs in the newsletter published in April 2021:

https://uniseco-project.eu/assets/content/resources/03-newsletters/uniseco-newsletter-Nr06-vFINAL.pdf

iii) Project social media channels

Postings on Twitter and Linkedin posts.

https://twitter.com/ProjectUniseco/status/1413114252810915841
https://www.linkedin.com/feed/update/urn:li:activity:6818880838441213952/

iv) Dissemination events

Dissemination through #UNISECOresults campaign including policy seminar with DG Agri and at workshops in the partner countries with the Multi-Actor Platforms.

Agro-ecological Knowledge Hub

Methodological briefs are being linked to relevant sections in the Agro-ecology Knowledge Hub, such as: https://uniseco-project.eu/akh/science-and-innovation/results-and-tools-from-uniseco.

The following section provides the inventory of the methodological briefs.

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2. INVENTORY OF METHODOLOGICAL BRIEFS

Table 1. Overview of the methodological briefs and their purpose

Title of the method / approach	Purpose of the method / approach	Annex
Setting up a transdisciplinary framework: Brief step-by-step guide	The purpose is to ensure good practice for the development and implementation of activities that seek to include actors from across sectors and practice to inform the project's research and dissemination activities.	1
Monitoring and evaluating Multi-Actor Platforms: Brief step-by-step guide	Monitoring and evaluating stakeholder engagement and operation of the Multi-Actor Platforms gains insight to the effectiveness of these forms of engagement, to learn lessons, and to adapt the processes used in a project, on how to integrate knowledges from across the science-policy-practice nexus fostering co-learning and co-construction of transitions to sustainable farming systems.	2
Data collection for assessing social-ecological systems (SES): Brief step-by-step guide	The step-by-step process provides guidance on developing and carrying out the data collection for SES assessments including the identification of possible data sources and explanation of the variables to be collected.	3
Decision support tools (DST): Brief step-by-step guide	Along with other methods to describe the status quo in the case studies, the three decision support tools (DST) provide information sustainability performance of current agro-ecological farming systems and facilitate co-learning amongst actors.	4
Social network analysis (SNA): Brief step-by-step guide	The Social Network Analysis can be carried out to analyse governance structures. It mainly focuses on the local network structure (relations, influences, missing actors, etc.) and on the way actors and networks participate in the formulation and implementation of public policies and/or private initiatives.	5
Multi-criteria analysis (MCA) of market and policy instruments: Brief step-by-step guide	The purpose of a participatory multi-criteria analysis is to co-construct and co-assess market and policy instruments regarding their performance and relevance and to enhance the awareness and understanding of how to improve policy frameworks.	6
Participatory scenario development: Brief step-by-step guide	Participatory scenario development aims to increase knowledge and awareness of possible and uncertain futures of European food systems as a basis to enable a structured way of thinking about the future and effective decision making in supporting agro-ecological transitions. They are also used for discussing trade-offs and synergies, and handle conflicts of interest.	7

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3. ACKNOWLEDGEMENTS

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ANNEX 1 SETTING UP A TRANSDISCIPLINARY FRAMEWORK: BRIEF STEP-BY-STEP GUIDE[1]

By James Hutton Institute, Agricultural University of Athens, The European Landowners' Organisation and Thünen-Institute of Farm Economics.

Purpose. The purpose of this Brief is to inform good practice for the development and activities that seek to include actors from across society, science and policy to inform research and dissemination activities. The guidance is at a high level in order to avoid 'micro-management' of an activity, thereby leaving space for account to be taken of the particularities and local context of activities, and the types of participants. The guidance for the transdisciplinary Multi-Actor Approach contributes to comparability and robustness of implementation across engagement activities, with an underpinning set of common aims which include: i) the identification and interpretation of societal expectations using participatory processes with a range of actors (including end users); ii) the integration of knowledges across actors in the process of solution development for transitions to agro-ecological farming systems and in sustainability assessments; iii) guiding the efficient planning and implementation of engagement in line with the ethical and regulatory requirements (e.g. General Data Protection Regulation, GDPR); and iv) recognising time and labour requirements of engagements in Multi-Actor Platforms.

What is a transdisciplinary Multi-Actor Approach?
A Multi-Actor Approach should facilitate "demand-driven innovation through the genuine and sufficient involvement of various actors … all along the project: from the participation in the planning of work and experiments, their execution up until the dissemination of results and a possible demonstration phase (European Commission, 2016)." Through the cross-fertilization of ideas between actors from across sectors and practices, innovative solutions can be co-created with co-ownership of results (European Commission, 2017), and "foster the effective uptake, use, dissemination and deployment of research and innovation results" (European Commission, 2021). Expanding the Multi-Actor approach to a wider mechanism bringing together complementary perspectives of actors in practice, policy, science, innovation and society in transdisciplinary Multi-Actor Platforms provides forums to co-construct strategies for agro-ecological transitions, and their implementation.

Project background. The UNISECO project sought to promote the co-learning and the co-construction of new knowledge across academic disciplines, and with non-scientists associated in some way with agro-ecological transitions of farming systems. The UNISECO transdisciplinary framework comprises two levels of Multi-Actor Platforms (MAPs): i) EU level Multi-Actor Platform, a single European-level 'pool' of individuals, drawn from across organisations with European or international remits, and individuals with relevant expertise and availability; ii) 15 Case Study-level Multi-Actor Platforms, each one associated with a UNISECO case study.

For the Case Study MAPs, the pool of individuals is drawn from those of most relevance for the case study area, thus their frame of reference may be national, regional or farm-level. This structure reflects the levels at which the UNISECO project has been working and aimed for the creation of impact. The insight from the co-learning fed into the development of strategies and incentives for transitions to agro-ecological farming systems in the case studies and informed the assessment of environmental, economic and social impacts of agro-ecological practices at farm and territorial levels.

[1] If you have any questions about this methodological approach, please contact the author(s) by e-mail: Kate Irvine (HUT) kate.irvine@hutton.ac.uk, David Miller (HUT) david.miller@hutton.ac.uk

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Step-by-step guide to applying the methodology

1. Defining the remit and roles of the transdisciplinary Multi-Actor Approach

The remit for a Multi-Actor Approach (MAA) as envisaged by the EU is to provide more than what a stakeholder advisory board might deliver (e.g. facilitating impact), and to be more than a targeted dissemination mechanism (European Commission, 2017).

It is recommended to incorporate multi-actor engagement into all stages of the project, starting with the proposal development process (e.g. initial identification of actors and discussion with actors to define research questions and to identify practical implications). Different actors have different perspectives or 'stakes' in the issues that will be investigated through the project. The contribution of a variety of perspectives will strengthen the applicability and impact of findings. Thus, core to the remit of the Multi-Actor Approach is to 'bring these voices to the table' and not 'stay neutral' as might be expected in other situations (e.g. EU-level organisations associated with the support of research project proposals). Examples of roles of Multi-Actor Platforms within a project include:

- The contribution of different sources of information, knowledge and insight;
- The identification and refinement of specific direction and content for methods and tools;
- Discussion of, and feedback on, intermediate and end-of-project research findings;
- Probing the validity of research outputs;
- The co-construction and evaluation of the robustness of tools, results and recommendations; and,
- Reflective review of the MAP approach incorporated into the project.

2. Defining criteria for the identification and selection of actors

The identification and selection of individuals and/or organisations for the Multi-Actor Platforms needs to be based on a set of key criteria. Based on the experience in UNISECO we recommend the criteria explained in Table 1. Awareness of the possible participation of actor's in other similar projects will be considered, and where possible, synergies created with other stakeholders.

Table 1. Criteria for selecting actors to be applied for selection of EU-level and case study level MAP membership as appropriate.

Interest	Actors should demonstrate an interest in the topic. A knowledge of agro-ecology at the outset of the project is not required, but there should be an interest in learning more about the topic.
Availability /Commitment	Actors will be asked if they can make a commitment to being part of a MAP for the duration of the project lifecycle. It is valuable for the groups of people who make up each MAP to remain consistent over the course of the project so that the members get to know each other, build trust, and are more comfortable participating together in an open way. Too much change in the make-up of the groups over time may hinder the ability of the group to work together in an effective way.
Relevance	The relevance of each actor will be considered with respect to their relationship with the types of groups identified for the EU-level MAP (e.g. EU-wide environmental NGOs and sector organisations, EC), and the Case Study MAPs (e.g. companies along the supply chain, farming advisory services and local / regional administration). The balance of membership of the MAP as a whole will be considered to ensure that it represents the range of groups, views, approaches, etc; no one individual group

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	should make up a disproportionate proportion of a MAP which might render its purpose ineffective.
Appropriateness	Each actor should be well-suited to participation in a MAP, having no declared implacable opposition to a particular stance, open to considering credible scenarios of alternative futures, farming and land management options.
Representativeness	This criterion describes the extent to which an individual or body can be considered as representative of a particular group. This may be evaluated based on their participation in existing networks, or if they are part of a membership organisation. Invitations to actors will specify if they are representing an organisation or as individuals.
Willingness	Actors will be selected for their willingness to share their own knowledge, and to listen to others. For the MAPs to work effectively, actors need to be willing to share their own opinions, to listen to others and take the concerns or points of view of other actors into consideration.
Gender	Efforts will be made to ensure that no single gender dominates a MAP.
Age	Efforts will be made to ensure that the actors in the MAPs represent a broad range of ages.
Geographical spread	Efforts will be made to ensure that the members of the EU-level MAP are drawn from across Europe, enabling perspectives to be brought from different regions e.g. Eastern Europe, Central Europe, the Mediterranean, and North-West Europe. Efforts should be made to ensure that the membership of the case study MAPs represent locally significant geographical variations.

Source: Budniok *et al*. (2018)

3. Selection of members for Multi-Actor Platforms

To apply the selection criteria defined in Step 2, project partner teams will assess the proposed candidates for the MAPs (see Budniok *et al*., 2018, for examples of such assessments). The operation of the MAPs should be reviewed regularly (e.g. at six-monthly project meetings) to consider the fit of the members against the selection criteria. If it becomes apparent that a difficulty has arisen then a member could be asked to stand down from a MAP, and an alternative member sought, although not necessarily from the same organisation. Similarly, if a member requests to withdraw from a MAP, as above, an alternative member will be sought. The aim of the reviews will be to retain the balance of the MAP across the criteria set out above.

Identification of candidate members of the EU-level MAP:

1. Creation of a preliminary list of potential members of the EU-level MAP using the Selection Criteria for MAP Involvement.
2. Provision of an Information Sheet about the project, incorporating completed assessments against the criteria, explaining why individuals have been identified as candidate members of the EU-level MAP. This is followed by the development of a list of potential members. The compiled list of 'Candidates for the EU-level MAP', based upon the information provided by all partners, will then be refined by the Executive board of the project and a short list produced.
3. Invitation to Participate in the EU-level MAP: Candidate members will be provided with an Information Sheet about the project and note of the roles of members of the EU-level MAP. The official letter of invitation will be sent by the Project Coordinator.

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The identification of candidate members for each Case Study MAP:

1. Creation of a preliminary list of potential members for the Case Study MAP, taking into consideration the recommendations of the Champion Stakeholder. In line with the Communication, Dissemination and Impact Strategy and Plan of the project, each partner leading a case study will characterise individuals as 'Candidate for Case Study MAP' using the criteria defined in the previous step, and provide a short note of the assessment explaining why individuals have been identified as candidate members of the Case Study MAP.
2. Development of a short list: The final decision on membership of the Case Study MAPs is taken by the partner leading a case study in consultation with the leaders of the Multi-Actor Approach in the project, and with representatives of the Work Packages where the case studies will be used.
3. Invitation to Participate in a Case Study MAP: Initial contact with candidate members of the Case Study MAP will be made by the partner leading the local case study and/or the Champion Stakeholder. Candidate members will be provided with an information sheet of the project and the roles of the members of the Case Study MAPs. The official letter of invitation will be sent by the case study partner.

4. Designing activities with the Multi-Actor Platforms

A core set of issues should be formulated for used when designing and planning the implementation of project activities that require the involvement of actors, in a meaningful way, to enable knowledge co-construction. This set of issues can be used as a 'protocol' for thinking through the design of an activity. Figure 1 illustrates a set of decision points associated with each issue, including the types of sub-issues that might be considered for each.

Purpose of involvement: It is important to understand the type of involvement being incorporated into a particular activity. It is possible that an activity will include several type(s) of involvement, e.g. collecting information (i.e. data collection) and co-constructing solutions (i.e. partnering). The type(s) of involvement desired for any given activity can be selected by examining the aim of the activity, such as seeking stakeholder knowledge about drivers and barriers for the transition to agro-ecological farming systems. The mechanism for engagement should then be chosen that matches the purpose of the project activity.

Importantly, there should be clear consideration of how actors will benefit from each activity. Such benefits will be reflected in the outputs and outcomes identified for all activities for both the project itself and the actors. So, it is recommended to: i) set clear goals for the activity; ii) identify benefits for involvement; and, iii) communicate goals to participants and highlight their benefits from the engagement.

Who to include in a specific activity of the Multi-Actor Platform: The following set of guiding questions can be used to inform consideration of who to invite to participate from the Multi-Actor Platforms and the identification of additional participants to be invited:

- What are the objectives of the activity?, and 'what are the intended outputs and outcomes of the activity'?
- Who has the relevant knowledge, experience, and insight to contribute? Note that the individual or organisation identified as 'who' might change over time.
- Who could provide the richest insight and information relevant to acieving the objectioves of the activity?

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- Who is particularly well connected and could play a crucial role when it comes to networking and mediating (e.g. between actors with different stances)?
- What are the benefits of involvement for the MAP member or other individual?
- How can the involvement benefit actors (e.g. farms) and what incentive can be provided to them? Who is available to contribute?
- What are the ethical requirements to be met and best practice to be followed?

Format for involvement: Decisions need to be made about whether engagement will be face-to-face (in situ) or remote. For example, interviews can be done in person (e.g. at a farmer's home) or remotely (e.g. using online tools). Often, decisions will be driven by the purpose of the activity, the proposed method (e.g. focus group), and the time constraints of both potential participants and the 'lead time' for the partner(s) to implement the activity. The COVID-19 pandemic has increased the accpetance of, and expertise with, remote forms of engagements. Advantages of remote engagements are higher likelihood of availability to participate (e.g. saving travel time). If an intended purpose of an activity is to develop a shared understanding across different sectors of policy mechanisms to support agro-ecological farming systems, then face-to-face group-based contact (in situ or online) may be more appropriate than individual interviews or via mechanism such as an online survey.

Spatial and temporal context of activity: Issues for consideration in terms of where, when or how an activity might take place, as well as a non-exhaustive list of 'infrastructure' related topics for its implementation. Alongside these decisions, factor in the time and budget that might be necessary to arrange an activity; for example, for an *in situ* activity how far in advance does a venue need to be booked? What extra cost might be incurred to obtain necessary 'infrastructure' or to cover the cost of attendance? For an online activity, what platform has the appropriate functionality? What licences require to be purchased? Are there any cyber-security issues to be addressed to enable secure access by all paerticipants?

Information considerations: The flow and content of information can play a critical role in facilitating meaningful engagement with actors and the possibility for co-construction of new knowledge. As a general principle, information should be thought of in terms of the project, the activity, and the participants. It will be important that partners have a generally good knowledge of different steps and interactions/integration of results between the Work Packages within the project. Crucially, do not underestimate the amount of time it takes to prepare and distribute materials that can facilitate effective engagement.

Intended outputs and outcome: The activities are intended to have outputs and outcomes that are relevant to and benefit the project itself and participants. Outputs are considered short term, generally the 'things' created immediately after the end of the activity. Outcomes are a mid-term result, generally the 'things' (e.g. change or achievement) that occurred as a result of the activity which could be several months or longer after the activity took place. The outputs and outcomes might be process-related (e.g. willingness to participate in subsequent activities) or tangible (e.g. a co-constructed strategy). These will be valuable for the monitoring and evaluation of the engagement, and for the development of clear goals of, and expectations from, the activity as well as for individuals who take part in the activity. Allow sufficient time and resource to develop clear outputs and outcomes, and to incorporate monitoring and evaluation into the activities.

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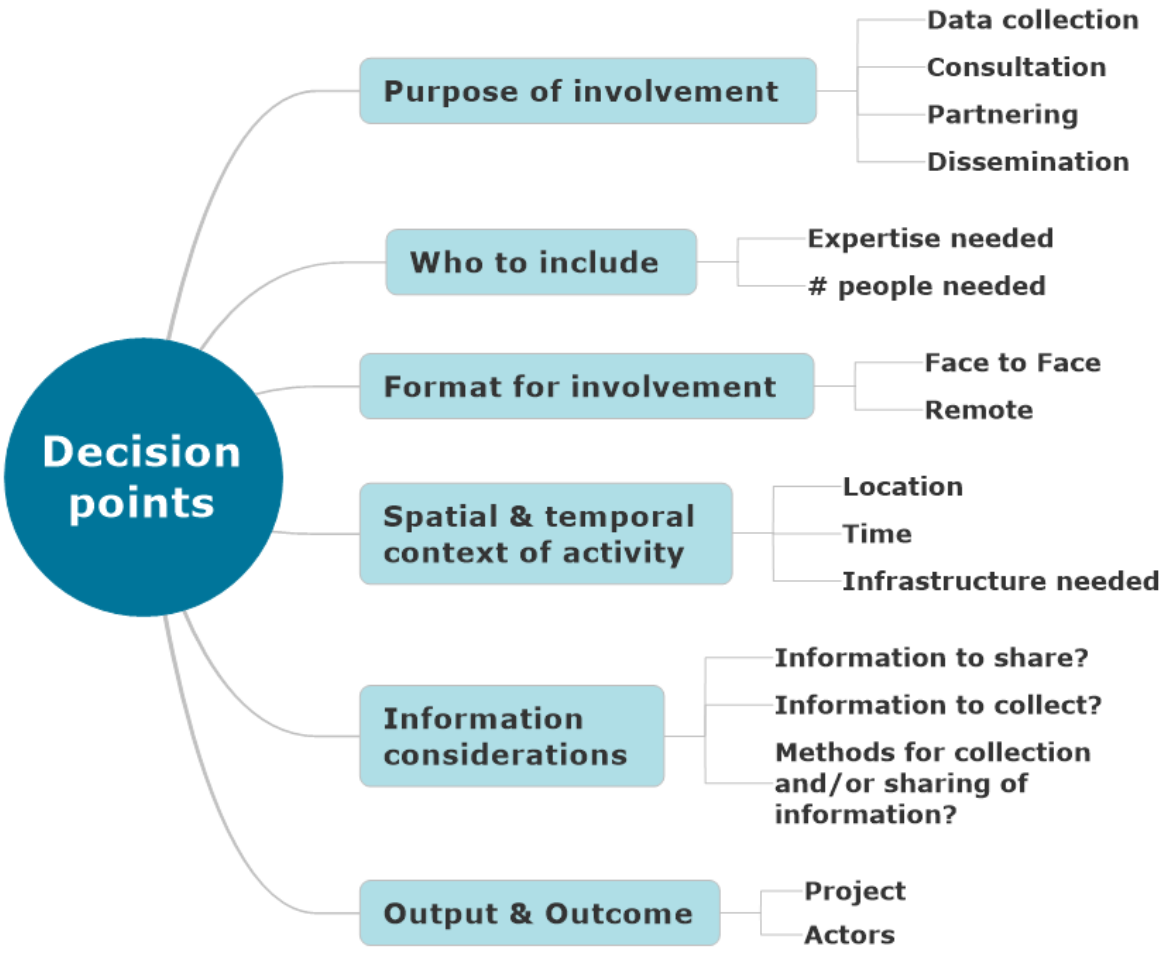

Figure 1. Decision points for stakeholder involvement in UNISECO project activities (Source: Irvine et al., 2019).

5. Facilitating Full Participation and Contribution to Co-construction

Table 2 contains a set of principles to inform the implementation of activities that involve actors from EU-level and Case Study MAPs and, more broadly, the transdisciplinary process as a whole. The principles will inform the operation and management of the MAP, providing a reference to which to refer if problems arise.

Table 2. Principles for engagement across disciplinary and sector boundaries within the UNISECO project, particularly in their application with the Multi-Actor Platforms

Respect	Multi-Actor Platforms have the explicit aim of bringing together what could be considered as divergent or disparate voices in order to share knowledge in all its forms. Respect one another and treat each other with decency regardless of differences of opinion.
Sharing	Actors are invited to join Multi-Actor Platforms because they have been recognised as having a relevant contribution to make. Encourage opinions to be shared and let everyone know their contribution is valued.

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Listening	Respect that each person has a contribution to make to the topic of the activity, and listen to the opinions of each another. A facilitator will intervene in situations where people are speaking over one another.
Attention	Being part of a Multi-Actor Platform is a participatory process. When the MAP meets, give full attention to the topic being addressed. In so far as possible, be "in the moment" and limit distractions from mobile phones, emails, etc.
Teamwork	Some participatory methods which will be used in facilitating the group will require teamwork. Participate in activities in a meaningful and 'whole-hearted' way.

Source: Irvine *et al*. (2019)

See Miller *et al*. (2021) for further reflections on the experience of working with Multi-Actor Platforms in a transdisciplinary project focused on agro-ecological transitions, and recommendations for its design and operation.

Additional information:

Budniok, M-A., Howe, M., Miles, B., Vlahos, G., Smyrniotopoulou, A., Irvine, K.N., Miller, D. and Schwarz, G. (2018). Guidelines for the Selection of Multi-Actor Platform (MAP) Members. Deliverable D7.1. Understanding and Improving the Sustainability of Agro-ecological Farming Systems in the EU (UNISECO), Report to the European Union, pp.19.

Irvine, K. N., Miller, D., Schwarz, G., Smyrniotopoulou, A. and Vlahos, G. (2019). A Guide to Transdisciplinarity for Partners, Deliverable D7.2. Understanding and Improving the Sustainability of Agro-ecological Farming Systems in the EU (UNISECO), Report to the European Union, pp. 48.

Miller, D., Smyrniotopoulou, A., Irvine, K., Vlahos, G., Schwarz, G. and Budniok, M.-A. (2021). Operation of a Multi-Actor Platform in a transdisciplinary project focused on agro-ecological transitions. Policy brief. Understanding and Improving the Sustainability of Agro-ecological Farming Systems in the EU (UNISECO).

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ANNEX 2 MONITORING AND EVALUATING MULTI-ACTOR PLATFORMS: BRIEF STEP-BY-STEP GUIDE[2]

By Agricultural University of Athens, 2021

Purpose. Monitoring and evaluating stakeholder engagement and operation of the Multi-Actor Platforms gains insight to the effectiveness of these forms of engagement, to learn lessons, and to adapt the processes used in a project, on how to integrate knowledges from across the science-policy-practice nexus fostering co-learning and co-construction of transitions to sustainable farming systems.

What are Multi-Actor Platforms?
Multi-Actor Platforms (MAPs) are forums which are increasingly used as a central element of a transdisciplinary approach in the EU research projects. MAPs are designed to enable meaningful co-learning amongst the project partners and all actors involved in the research activities, and the on-going involvement of individuals drawn from science, policy and practice at different levels.

Project background. The UNISECO H2020 project employed a Multi-Actor Approach (MAA) within a transdisciplinary framework in order to strengthen the sustainability of agro-ecological European farming systems. The main objective of the monitoring and evaluation framework was to assess the performance of the Multi-Actor Platforms in co-learning on the topics of the project at case study and EU levels, knowledge exchange, and building capacity. An on-going evaluation was developed and applied following each instance of engagement and interaction with the relevant actors, with particular attention paid to the processes of the participatory events carried out at European and case study levels. Qualitative and quantitative methods were used, through observations, reporting sheets, debriefing sessions and written questionnaires. Feedback was obtained from partners and external actors in order to adjust and improve the participatory processes as the project progressed, with the aim of fostering constructive multi-actor engagement. In the final stages of the UNISECO project, a final evaluation was carried out which aimed to explore the influence of participatory processes on the policy-science dialogue, and on the capacities of the case study actors

Step-by-step guide to applying the methodology

1. Setting up a monitoring and evaluation framework

A monitoring and evaluation framework will be designed with the aim to guide the steps for assessing the interactions with actors through the various participatory processes within the project. The framework sets the objectives of the processes, specifies the evaluation questions, and selects the assessment criteria. It also proposes a method for the assessment by defining a systematic process for collecting, analysing and reporting the data.

[2] If you have any questions about this methodological approach, please contact the author(s) by e-mail: Alexandra Smyrniotopoulou (AUA) alex_smyr@aua.gr

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Carrying out consultation process internal to the project identifies key research questions to be addressed for the elicitation of information required for the evaluation. Table 1 summarises key elements of the framework using the key research questions identified in UNISECO as examples.

Table 1. Framework with identified key research questions

Aspects Addressed		Key Questions
Assess the effectiveness of the Multi Actor activity	Engagement of participants	Did the research activity reach all relevant target groups?
	Achievement of intended objectives and outcomes	Did the actor engagement meet its objectives?
		Did the actor engagement achieve the intended outcome?
Methodological appraisal	Method(s) of engagement selected	Were the selected method(s) useful?
		Constraints/difficulties occurred through planning
	Preparation and execution process	What worked well?
		Challenges faced during the implementation process
Impact appraisal	Estimate of the degree to which the Multi Actor activity promoted transdisciplinarity and facilitated mutual learning	Did the activity promote mutual learning amongst participants and the co-construction of knowledge?
		What were the lessons learnt for the project team and participants involved?
		What should be changed for future activities?

2. Selecting evaluation criteria and methods

The evaluation criteria cover the steps of preparing and conducting the research activities in which actors have been involved, and the feedback from actors on the effectiveness of the process. The members of the MAPs are not involved in the design of the evaluation process, to avoid influencing the evaluations by awareness of criteria being developed whilst they are also working on other project activities.

The tools that will be chosen for collecting data include participant observation, a Reporting and Debriefing sheet completed by project partners and a feedback questionnaire completed by event participants. At the later stages of a project, semi-structured interviews with selected MAP members are suggested to collect in depth qualitative information. Table 2 summarises the set of evaluation criteria applied to the evaluations of research activities. It is suggested to differentiate between operational, process and impact criteria.

Table 1. Evaluation criteria

On-going evaluation		Final evaluation
Operational	**Process**	**Impact**
Participant profiles	Representativeness	Network building
Design of the process	Access to resources	Capacity building
Level of involvement	Group dynamics	Policy outcome

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Operational criteria set

Participant profiles: Quantitative information about the number of actors engaged in the activity, proportion of actors by gender, age, professional background, and geographic location.

Design of the process: Description of the preparation of the activities, including aspects related to information provision, identification and selection of actors, establishing transparent and objective justification of who is involved in the research activity and how the activity was planned and executed.

Level of involvement: The consistency and loyalty of participation of each MAP member, in the case of multiple project activities.

At the end of an event with the MAP a Debriefing/Reporting sheet will be completed by event organizers to provide quantitative and qualitative information on the operational criteria to evaluate the quality and effectiveness of the practicalities of each interaction (Step 3.1 below).

Process criteria set

Representativeness: When a participatory process takes place, it is essential to ensure that representatives of the key actor groups are involved, and that their legitimacy is recognized and respected by all participants. This contributes towards the representation of diverse viewpoints, interests and values.

Access to resources: Relevant and appropriate research information should be available and accessible to all participants. This is to aid the effectiveness of their participation. Sufficient time should be allocated for actors to be able to access the information, use it, and follow-up with any queries about its content.

Group dynamics: Actors should have the opportunity to participate and influence the process and its outcomes, with sufficient time allocated for interactions between all participants.

At the end of each MAP engagement questionnaires will be distributed to the MAP members to provide feedback on the activity in relation to representativeness, access to resources and group dynamics. The questionnaire comprises 16 questions, using a five-point Likert scale approach, with answers ranging from 'strongly disagree', to 'strongly agree'. Respondents could also make comments in responding to each question for further explanations and insight (Step 3.2 below).

Questions about interactions and dynamics of the events will be answered by project partners who organized the activities. Group dynamics will be assessed using 10 questions with a four-point Likert scale, answers to which are in the range: not at all, to a small extent, to a moderate extent, to a great extent. (Step 3.1 section on group dynamics below).

Impact Criteria set

Impacts can be evaluated at different levels depending on the level of actor involvement. In UNISECO actors were involved in a EU-level MAP and in case study MAPs (local level). Impacts are thus evaluated at the EU and case study levels. The first approach, used with the EU level MAP, focused on the influence of the overall project activities on a policy-science dialogue. The second approach, used with the local level MAPs, primarily examined issue related to the capacities and empowerment of participants.

At the European level

The EU level MAP provides an important interface for science-policy interactions, and co-production of knowledge. In-depth interviews will be carried out with selected members of the EU level MAP to explore the

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prospective influence of the participatory processes on policy making. These will be designed to obtain the views of actors on aspects of the processes such as openness, inclusivity of actors from different levels and sectors, the legitimacy of the knowledge, and usability of the co-produced knowledge.

Policy outcome: Conditions are created that influence the co-production of knowledge, and generate values or benefit from co-produced knowledge for policy making and governance practice (Frantzeskaki and Kabisch (2016).

At the local level

To avoid "stakeholder fatigue" and to allow for flexibility throughout the data collection process, case study partners can either use questionnaires or semi-structured interviews with members of their Multi-Actor Platforms. The aim will be to assess the extent to which there were changes in their networks, skills or knowledge, associated with their involvement in the project. Questions to be included in the questionnaire are shown under Step 3.3. Respondents can also make comments in responding to each question for further explanations and insight. The same questions will serve as a basis for the closed-ended questions posed during the semi-structured interviews.

Building networks: Professional opportunities can be created through the strengthening of existing social networks, or the formation of new networks or collaborations as a result of involvement in the project.

Capacity building and learning: An outcome of the process and content of the co-creation of knowledge, and its application in practice, builds capacity and learning. This leads to changes in knowledge, skills, relationships, understanding, and the development of trust which can lead to changes in behaviour, and engagement in on-going learning.

3. Applying the monitoring and evaluation framework

The monitoring and evaluation framework needs to be designed to enable consideration of both the process and impact of participatory research activities at the level of the EU and case studies.

Feedback on **on-going process of engagement** will be obtained from the actors participating in activities at European and case study levels, and the relevant project partners. At the EU level, a debriefing session will follow each MAP event. At this, partners will discuss and reflect on the positive and negative points of the process, providing written feedback with their observations of the interactions amongst participants during the workshop sessions. The actors who attended the workshop will also fill in a questionnaire to provide their feedback on the effectiveness of the process. The aim of this assessment procedure will be to revise the process and operation of the event based upon the lessons learnt, aiming for continuous improvement and better engagement of actors in the research process.

Towards the end of the project, a **final evaluation** will be undertaken with respect to the set of impact criteria of the transdisciplinary approach, and on the overall process. The elements of the monitoring and evaluation framework, evaluation aspects and criteria, are presented in Table 3.

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Table 3. Operational framework

Criteria / Aspects addressed	On-going evaluation		Final evaluation
	Operational	**Process**	**Impact**
Engagement of participants	Participant profiles	Representativeness	Network building
Accomplishment of intended objectives and outcomes	Level of involvement	Group dynamics	Capacity building
			Policy outcome
Method(s) of engagement selected	Design of the process	Access to resources	Capacity building
Preparation and execution process		Group dynamics	
Transdisciplinarity and mutual learning	Level of involvement	Group dynamics	Network building
			Capacity building

→ Step 3.1: Debriefing/reporting sheet to be filled out by the partner/organizer after the MAP event
→ Step 3.2: Participant Questionnaire to be filled in by participants after each MAP event
→ Step 3.3: Final evaluation of case study MAP members with multiple participations

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Step 3.1: Debriefing/reporting sheet to be filled out by the partner/organizer after the MAP event

Team member/organiser	
Activity/Task	
Purpose/objective of the meeting	
Date and location of event	

Participants' profile

1. Total number of participants involved in the activity (#)

2. By gender (#, %)

Female	Male

3. By age category (#, %)

<29	30-39	40-49	50-59	>60

4. By participants' types (based on their professional background) (#, %)

Farmers	Authorities	NGOs	EU, international bodies	Advisors	Consumers	Retailers

Other...

5. By origin (#, %)

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Other...

6. Level of involvement: For each participant, was it the first, second, third presence in an event?

Design of the process

7. Participants' identification/selection

Were all participants appropriately identified and selected from the pool of MAP members according to the selection criteria?

Yes No

Please clarify if some participants were self-selected or proposed by other participants.

8. Invitation process

a. Number of invitations sent

b. Invitation type selected (email, phone, mail, etc.)

c. Number of days before the event invitations sent

9. Participation rate

Number of individuals participated / Number of individuals reached (proportion of persons participate in the activity)

10. Practicalities

a. Did the meeting exceed its planned duration?

Yes No

If so, please explain why this happened.

b. Was there a facilitator who coordinated the discussion/activity?

Yes No

If so, please specify who was.

c. Was background information/material sent prior to the meeting?

Yes No

11. Other issues that need to be considered/reported

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Concerning the group dynamics, please indicate to what extent… (1. Not at all /2. To a small extent / 3. To a moderate extent/ 4. To a great extent)

	①	②	③	④	Comments
were all views well taken into account by others?					
did participants respect opposed opinions?					
did conflict/opposition occur during the activity					
did participants talk over each other?					
did all participants have the opportunity to communicate their opinions? (facilitator made a roundtable)					
were participants open to communicate and share their views with the project member (asking questions, providing feedback)?					
did participants collaboratively and constructively work?					
did participants start an open dialogue and discussion between them?					

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were some voices more dominant than others?					
did certain individuals have more influence over the decision-making process than others?					

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Step 3.2: Participant Questionnaire to be filled in by participants after each MAP event

Activity/Task: [……] Code: [……]

Gender: Female Male Prefer not to say

Professional background: Origin:

Please indicate the level of agreement or disagreement with the following statements, we would really appreciate a brief explanatory text with your evaluation.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Comments
Based on the information that was given when I was invited...						
1. The objective(s) of the meeting was/were clear to me.	①	②	③	④	⑤	
2. The information was relevant to the issues raised during the meeting.	①	②	③	④	⑤	
3. The information helped me understand the issues at stake.	①	②	③	④	⑤	
Considering that the [theme, objectives, ….] of the meeting was/were [……..]						
4. I think that all interests have been represented in today's meeting.	①	②	③	④	⑤	
5. I think that there were groups, associations, persons that could contribute to the discussion today but have not been invited.	①	②	③	④	⑤	
6. I think that all participants had a fair chance to express their opinion.	①	②	③	④	⑤	

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7. I think that there was overrepresentation of opinions, interests.	①	②	③	④	⑤	
During the meeting						
8. When today's meeting started, the objectives of the meeting and my role were stated clear to me.	①	②	③	④	⑤	
9. The content of the meeting was relevant and consistent to my needs and interests.	①	②	③	④	⑤	
10. There was enough time allowed to express views and pose questions.	①	②	③	④	⑤	
11. The facilitator was active in ensuring a good flow of the discussion.	①	②	③	④	⑤	
12. I felt that I could trust the team members with whom I collaborated.	①	②	③	④	⑤	
13. I felt comfortable in sharing my viewpoint.	①	②	③	④	⑤	
14. I had always the opportunity to express my point of view.	①	②	③	④	⑤	
15. I felt that all participants were open to constructive criticism.	①	②	③	④	⑤	
16. I felt being manipulated by powerful participants to accept their views.	①	②	③	④	⑤	
Other comments, issues you would like to mention						

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Step 3.3 Final evaluation of case study MAP members with multiple participations

Gender: **Female** **Male** **Code: [……]**

Professional background: **Origin:**

As a result of my involvement in the project activities

1. I have discussed the activities and outcomes of the project with colleagues, experts, family, etc.

Yes ☐ No ☐

Could you please give some examples?
……
……

2. I have used the resources provided to me over the course of the UNISECO project (webpage, briefs, newsletters) in order to communicate, inform or discuss with others issues related to my professional activity.

Yes ☐ No ☐

Could you please give some examples?
……
……

3. I have established communication links with persons for sharing information and experience on agro-ecology.

Strongly disagree ① ② ③ ④ ⑤ Strongly agree

Could you please give some examples?
……
……

4. I have participated at least in one meeting/activity/campaign for agro-ecological farming practices and sustainable agriculture (apart from the UNISECO workshops, meetings).

Yes ☐ No ☐

Could you please give some examples?
……
……

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5. I have joined at least one new group, organisation, network, partnership on agro-ecological farming practices (apart from the UNISECO project).

Yes ☐ No ☐

Could you please give some examples?
.....
.....

6. I feel that I have learned something new about agro-ecological issues.

Strongly disagree ① ② ③ ④ ⑤ Strongly agree

Could you please give some examples?
.....
.....

7. I will use the information/knowledge I acquired in my professional activities.

Strongly disagree ① ② ③ ④ ⑤ Strongly agree

Could you please give some examples?
.....
.....

8. I feel motivated to change my actions/attitude towards sustainable agriculture.

Strongly disagree ① ② ③ ④ ⑤ Strongly agree

Could you please give some examples?
.....
.....

Another more general or more specific comment you would like to mention:

.....
.....

Thank you very much for your collaboration.

Additional information:

Smyrniotopoulou, A. and Vlahos G. (2021) Report on the Assessment of Transdisciplinary Tools and Methods. Deliverable Report D7.3, UNISECO project

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 773901.

ANNEX 3 DATA COLLECTION FOR ASSESSING SOCIAL-ECOLOGICAL SYSTEMS (SES): BRIEF STEP-BY-STEP GUIDE[3]

By UZEI, ISARA, James Hutton Institute and CREA, 2021

Purpose. The purpose of the Social-Ecological Systems (SES) framework is to provide a theoretical foundation for explaining why some farming systems are able to succeed in transitioning to agro-ecological approaches, and to govern the use of a resource over time in a sustainable manner while other cases fail or never make the effort. The SES assessment aims to improve the understanding of barriers and drivers of agro-ecological transitions both at individual and collective scales. The step-by-step process provides guidance on developing and carrying out the data collection for SES assessments including the identification of possible data sources and explanation of the variables to be collected.

What is a social-ecological system assessment?
The definition of a Social-Ecological System (SES) is "an integrated complex system that includes social (human) and ecological (biophysical) sub-systems in a two-way feedback relationship" (Ostrom, 2009; Berkes *et al*., 2011). SES represents a framework under which several theories and natural rules (laws) are used to explain complex situations and create better targeted strategies and policies. The SES framework enables links between technical, environmental, social and economic and political dimensions of agro-ecological transition within a complex set of interactions. Changes in the Action Situation of the SES are sought to address dilemmas of agro-ecological transitions, which requires an improved understanding and knowledge of innovations at different levels of the SES and farming systems. For example, the replacement of pesticides could lead to unsustainable development, if only based on avoiding harmful substances and not supported by intensive knowledge transfer and learning at SES level and corresponding change in farm operations.

Project background. The SES assessment in UNISECO aimed at understanding barriers which make the transformation towards Agro-Ecological Farming Systems (AEFS) difficult or impossible. The assessment was made in case studies in 15 European countries covering a range of different production systems, socio-economic and policy contexts and different transition stages. The in-depth understanding of the farming systems in the case studies obtained from the SES assessment, and the assessment of the current sustainability performance, provided the basis for the co-construction of strategies to promote transitions to agro-ecological farming systems, and of the assessment of sustainability trade-offs of these strategies. Building the co-construction of the strategies on the application of the SES framework has advantages, in the context of the UNISECO project, of: i) a detailed consideration of the specific local context of each farming system in the proposition of suitable concrete actions to initiate or enhance agro-ecological transitions; ii) improved understanding of the processes behind the barriers and drivers that need to be addressed.

[3] If you have any questions about this methodological approach, please contact the author(s) by e-mail: Jaroslav Prazan (UZEI), prazan.jaroslav@uzei.cz, Audrey Vincent (ISARA) avincent@isara.fr

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Step-by-step guide to applying the methodology

1. Defining the research question

Every case study requires definition of tailored research question mirroring the typical sustainability challenge (e.g. loss in biodiversity, weak economic sustainability) and corresponding dilemma(s). In principle the research question could ask how to resolve the dilemma in the particular case study situation. Research questions of the Social-Ecological Systems (SES) assessment will explore drivers and barriers that have led to the current state of the sustainability of the farming system, and identify possible changes in the action situation that could facilitate transition towards AEFS.

Examples of case study specific research questions defined in the UNISECO project are:

- *How can good performance of arable land management be maintained in organic dairy farms in Vysočina region (Czech Republic) to reduce arable soil degradation and water pollution by pesticides while ensuring economic viability?*
- *How can cropping system diversification be promoted in a highly specialised and market-oriented winegrowing area via the adoption of agro-ecological practices, to increase biodiversity and improve landscape management while maintaining the profitability of farming through local value chains?*

Members of the Multi-Actor Platforms should be engaged for the identification of key challenges for the farming systems (SES), and for feedback on the object of the research question to ensure its relevance to the case study.

2. Defining the boundaries of the Social Ecological Systems

The reason for defining boundaries of system is to keep the focus of those elements which form the system, and to be able to distinguish between actors with direct roles within the farming systems and actors with supporting roles in the external settings of the system. Understanding the boundaries help with focusing data collection on answering the research questions and avoiding the collection of unnecessary data which could limit the manageability of the research.

The boundaries of the Social-Ecological Systems are defined by distinctions between the elements of the system, and its social, economic and political settings. They are determined by factors such as the geographic location of the resource system and the boundaries of the areas within which the same challenges are being faced. This is particularly relevant for spatially (regionally) defined case studies. However, the definition is more problematic with network-based case studies for which the boundaries of the resource system may not be clear. In such a case the resource system still plays a role in defining the boundary, but the definition should also take account of the common issue or dilemma faced by the management of the resource system (e.g. arable land managed in a way that leads to a water deficit) and the actors relevant to the Socio-Ecological System.

The definition of the boundary should stem from answering the questions:

- What land/farms deal with the same issue in the resource system management?
- Which actors are inside and which are outside the Socio-Ecological System?

If there is no close cooperation between farmers and other actors (e.g. the only governance structure is the market), the resource system management could be sufficient to distinguish the system boundary, and the farmers are taken as the key actors of the Social-Ecological System.

If there is some additional form of governance between farmers, or between farmers and other types of actors, then the boundary would be defined by the actors (e.g. those actors who commonly deal with the issue in the resource system management). For example, farmers could come together and regularly share

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knowledge and experiences of the management of the resource system (e.g. how to deal with drought in vineyards; Italian UNISECO case study), or to create informal or formal institutions to govern some common actions such as processing or marketing (e.g. Czech UNISECO case study). It is however important to recognise that boundaries are subject to change during a transition with new, or formerly external, actors becoming part of the system, e.g. due to new forms of collaboration between farmers and value chain actors.

3. Understanding the variables of the sub-systems and their different data sources

A SES is composed of interacting sub-systems, which are the top or first tier attributes of a SES. Each sub-system is described by a set of second-tier variables which in turn can be described in more detail by third-tier variables or indicators (quantitative or qualitative) (Del Mar Delgado, 2015).

What purpose do the different sub-systems have? The operationalization of SES for assessing agro-ecological transitions is designed around a core question: What are the most influential variables in each sub-system and how do these variables influence agro-ecological transition in focal action situations? Thus, it focuses on the sub-systems of the framework and understanding their interactions with the aim of analysing the focal action situation and, for UNISECO, the questions to be addressed (Table 1). For a more detailed overview of the variables see section 3.4 in Guisepelli *et al*. (2018), and Prazan *et al.* (2019).

Table 1. Main questions and objectives of each sub-system

Socio-Ecological Systems Sub-system	Questions of the Sub-systems Addressed in UNISECO
Focal Action situation, Interactions (I) and Outcomes (0) (environmental, social and economic performances and impacts)	What are the agro-ecological performances of the farming systems concerned? What are their transition 'patterns' and their drivers and barriers?
Resource systems (RS), farming systems (from conventional to agro-ecological)	How are farming systems organized and managed? (RS can concern all types of agriculture, conventional or agro-ecological)
Resource units (RU), agricultural production of the resource systems (RS)	What are the different factors of production and agricultural productions (at the farm gate)
Actors (A), Farmers; Agri-food value chain; Consumers; Science, innovation, advisory, capacity building; NGOs, civic society organisations, local community representatives; Authorities and Administration (Vanni *et al*., 2019; D5.2)	Who are the actors involved in agriculture governance? Who are the major actors able to influence?
Governance (GS), strategic decision-making bodies	What are the main governance systems (from state regulations to collective rules)? What are the main decision-making processes?
Transformation system (TS), secondary and tertiary transformation processes	How do the food systems work? Are the farmers the main beneficiaries of the added value?
Products (P), generated by processes in TS	What are the final marketed products?

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Socio-Ecological Systems Sub-system	Questions of the Sub-systems Addressed in UNISECO
Social, economic, and political settings (S)	The general context: economic development; demographic, social and cultural settings; political context and stability; markets, media, environment, etc.

Source: Guisepelli *et al*. (2018)

4. Collecting data through desk research

The purpose of the desk research is to collect as much information as possible about the different sub-systems of the SES (Resource system, Resource unit, Governance, Transformation and Products), and about the social, economic and political settings and the ecosystems related to the SES. The data to be collected include: i) information on policies directly influencing the resource management (including laws, regulations and grants); ii) farm economics (e.g. generalised data from FADN on farm type level), to complement qualitative answers of farmers on the economic situation on farm; iii) publicly available statistics on the farming systems studied; iv) environmental and socio-economic indicators at various territorial levels; v) information from recent research studies (e.g. about the main external drivers of the farming systems change).

The information obtained from desk research will reduce the topics and number of questions to be posed of the actors in the SES.

5. Designing questionnaires

The SES assessment requires specific sets of questions to relevant actors, targeted at the specific context and situation of each case study.

The availability of information in scientific, grey literature and official statistics will differ between countries and regions. In the UNISECO project, guidance was developed for case study partners that included a generic set of questions (section 3.4 in Guisepelli *et al*. (2018)).

These questions need to be adjusted to the specific case study context. The questions selected should focus on capturing information which cannot be obtained through desk research. Guidance is provided on conducting the interviews which includes: i) obtaining ethical clearance for the research with human participants; ii) introducing the project to prospective respondents; iii) explaining the purpose of the interviews, and the rights of interviewees (e.g. to withdraw, to anonymity, etc.); iv) opportunities for actors to benefit from the participation (e.g. learning possible ways to initiate or enhance agro-ecological transitions); v) how processes will adhere to all relevant regulations and best practice (General Data Protection Regulation, GDPR).

6. Carrying out interviews

A survey of key actors of the SES is undertaken using in-depth interviews. Initial contact with candidate members of the Case Study Multi-Actor Platform will be made by the partner leading the local case study, and/or a Champion Stakeholder if such an intermediary has been identified and engaged. Candidate members of the Multi-Actor Platforms receive an information sheet about the project, explaining the roles of the members of the Case Study Multi-Actor Platforms, the use of the data collected, and of the planned interview and the rights of interviewees. An official letter of invitation is sent by the case study partner.

A guiding question for the selection of actors to be interviewed is: “Who is important as an actor in the Social-Ecological System and farming systems to be studied?”.

The actors selected for interview will be informed by the desk research, and any other prior knowledge of the case study and the farming system to be studied. They are expected to cover a diversity of roles and functions

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in the system, and levels of experiences with agro-ecological practices (e.g. informed by the case study research question and dilemma). Examples of the types of actors to be interviewed at this early stage of the process are:

- Farmers and their representatives (e.g. to provide knowledge of the resource system and resource units, production and practices, and barriers to transition);
- Public administrations, municipalities, NGOs, processors, and marketing bodies (e.g. cooperatives);
- Researchers, advisors and consultants (e.g. to provide knowledge of economic viability of farms, wider socio-economic context, farming practices, and Resource system management);

The approach should be open to the involvement of any other actors with a stake in the Socia-Ecological System and farming systems being studied.

7. Processing data collected

Data from different sources are required for the assessment of the Social-Ecological System. The assessment is mostly qualitative, focussing on principles, systems dynamics, trends, links, processes, attitudes.

Interview records should be anonymised and numbered and coded for further use. The full interview can be recorded, if acceptable to the interviewees, or documented with written notes. A recorded interview should be transcribed and saved to a database of interview responses. An interview with notes would be best undertaken by two people, one to carry out the interview and the other to take the notes. Those notes also need to be formalised and saved to the relevant records database. The process of collecting and handling the data should enable information to be traced back through the records aid transparency and reliability. Note, that to comply with requirements for open data, appropriate metadata and documents will be required to accompany data stored in a repository, accessible under a suitable licence.

The number of respondents per case study is likely to be limited (e.g. c.10), and thus MS Excel is likely to be sufficient for the purpose of data storage. Common templates are required for standard approaches to data storage and reporting, which also facilitate consistent reporting across different case studies. Answers to questions should be grouped according to the type of sub-systems and variables of the Social-Ecological System, and enabling the tabular presentation of summaries.

8. Deriving conclusions

The development of conclusions should be guided by the research questions and additional specific questions as appropriate. The challenges to sustainability (environmental, economic, and social) and the transition pathways will differ across the set of farming systems being studied, as will be the current state of the farming system in terms of its levels of innovation and transition process (e.g. conventional to Integrated?). Therefore, the next step in the transition will also differ for each case study, as will the barriers to be addressed and the strategies required for transitions. The SES helps with gaining an understanding of how farmers manage relevant resources (e.g. arable land, grassland), why agro-ecological practices are implemented, and what influence and contributions other actors in the system have on the management decisions.

The assessment of the SES will provide information about how the farming system is governed such as the rules and coordination by market and regulatory policies, and additional and collective rules agreed by actors. Once there is an understanding of the processes and relationships within a system, the barriers to transitions can be identified and pathways planned to enable those transitions.

Figure 1 shows an example of a summary of the assessment of social-ecological system carried out in the Czech case study of the UNISECO project (see Schwarz *et al.,* 2021) for more details.

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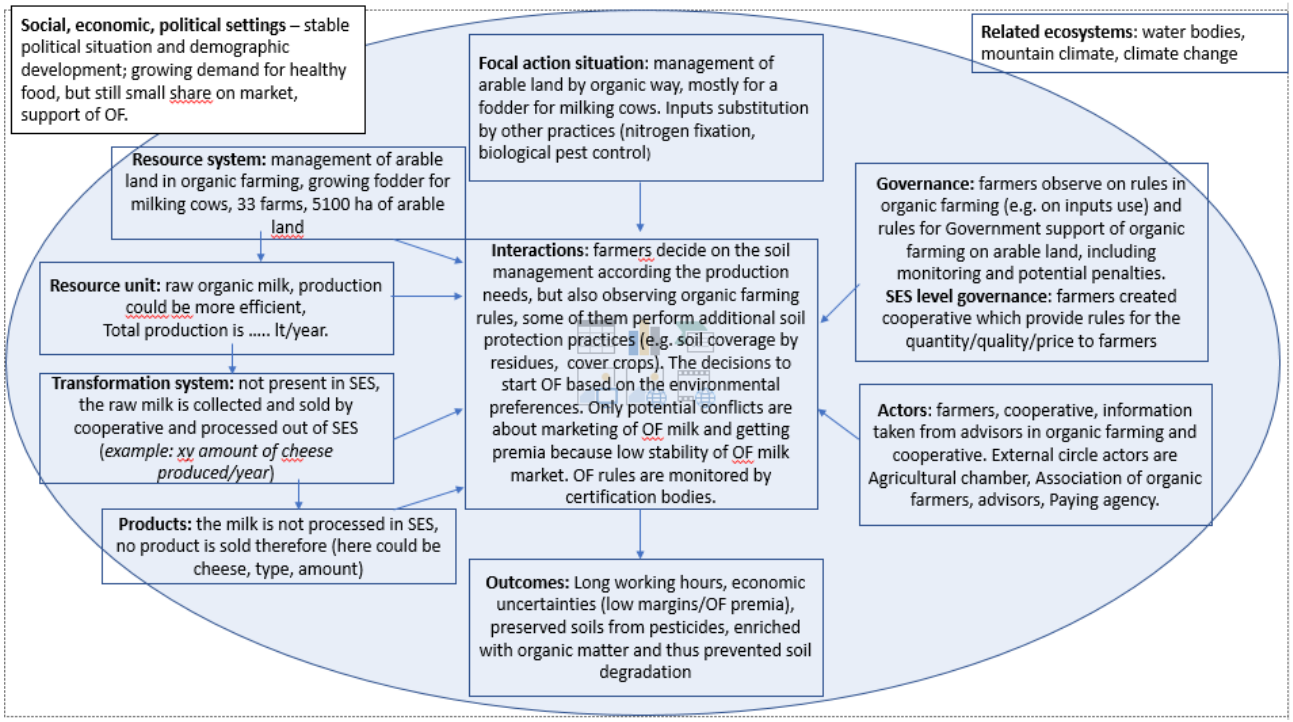

Figure 2. Overview of the social-ecological system - Czech case study (Source: own figure based on Ostrom and Cox, 2010; McGinniss and Ostrom, 2014).

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ANNEX 4 DECISION SUPPORT TOOLS (DST): BRIEF STEP-BY-STEP GUIDE[4]

By FiBL, University of Aberdeen, Thünen Institute of Farm Economics, 2021

Purpose. Along with other methods to describe the status quo in the case studies, the three decision support tools (DST) were applied to provide information sustainability performance of current agro-ecological farming systems.

What are decision support tools (DST)?
Decision support tools (DST), sometimes also referred to as sustainability assessment tools (SAT) provide information on the environmental, economic and social performance at farm level. The identified strengths and weaknesses can serve as a basis for the decision making of the farm manager and other stakeholders (farmer association etc.).
In UNISECO, three decision support tools (DST) were applied: SMART, COMPAS and Cool Farm Tool. Whereas SMART performs a multi-criteria analysis (MCA) and covers a wide range of sustainability themes, COMPAS focuses in depth on economic parameters, and Cool Farm Tool calculates the carbon and water footprint for a given farm enterprise. Cool Farm Tool also offers a biodiversity rating of the whole farm, based on a multi-criteria assessment, similar to SMART.

Project background. In the UNISECO project three decision support tools (DST), SMART, Cool Farm Tool and COMPAS, were applied in case studies in 15 European countries to provide information on the environmental, economic and social performance of current agro-ecological farming systems. This status quo assessment formed the basis for assessing sustainability trade-offs and synergies of the implementation of new agro-ecological practices. In each UNISECO case study area, the project partners defined pathways of agro-ecological transitions. Different stages of achievement of the agro-ecological transition characterized these pathways: stage 0 (not agro-ecological) served as the conventional baseline with which comparisons could be made. The subsequent stages defined represented states along the ecological transition pathway on a continuum from weak agro-ecological to strong agro-ecological, whereas strong agro-ecological represented a redesign of a system (Prazan and Aalders, 2019). From each of these stages, farms were assessed with the three decision support tools.

Step-by-step guide to applying the methodology.

1. Training phase

If the the three DST are applied by project partners not familiar with the tools, training needs to be carried out to ensure data quality. This training should optimally include:

- Introduced into the workflow and the three DST.
- Preparation webinars (theory part)

[4] If you have any questions about this methodological approach, please contact the author(s) by e-mail: Jan Landert (FiBL) jan.landert@fibl.org

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- Face to face training including practical on-farm training.
- Training webinar on how to interpret DST results

At least a full working week is recommended to allow sufficient time for training.

2. Farm selection

To ensure a common basis for the farm selection process in all case studies, the project partners will need a guideline outlining the preferred workflow. It should include a common farm typology[5] to define agro-ecological transition pathways and to conceptionally group farms in each case study according to their stage along the transition pathway. Figure *1* illustrates such a grouping of farms in a case study according to their stage along the transition pathway.

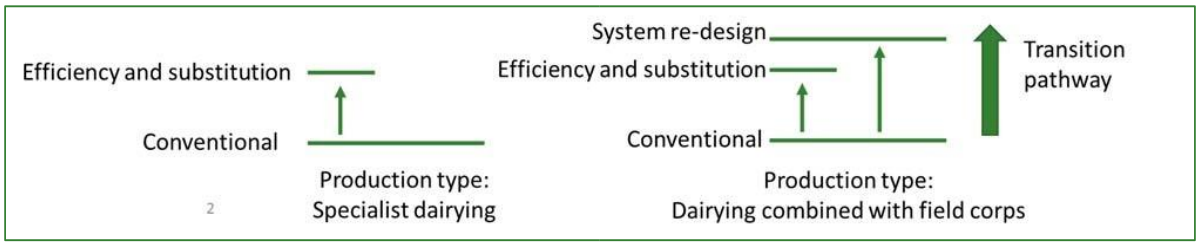

Figure 1. Example for two transition pathways for two farm production types defined in a case study (total of 5 farm groups)

To further characterise the different farm groups in the case studies, a set of attributes needs to be defined. In the UNISECO project the definition was driven mainly by key modelling input parameters (e.g. based on Muller *et al.*, 2017) of:

- Agro-ecological practices, structured in accordance to Prazan and Aalders (2019)
- Utilized agricultural area (UAA) in ha
- N- and organic fertiliser source
- Fodder source
- Irrigation
- Plant protection
- Yields of main product case study
- Crop rotation of the main crop
- Common crops
- Common livestock
- Broad socio- ecological contexts (dimension 3 from Prazan and Aalders, 2019).

Project partners can obtain the data from official statistics and expert interviews or, where data do not exist, estimate the missing values based on the first two sources. The aim of such survey is:

- to gain a structured overview of the farm groups being assessed with the DST across all case studies,

[5] See Prazan and Aalders (2019) for more information on the development of a typology.

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- to deepen understanding how the chosen farm groups represent the whole farming system with regard to certain attributes in the whole case study area,
- to provide information that can be used for the upscaling case studies to territorial level analysis.

For each farm group, at least two farms should be selected for the assessment with the DST. In some cases, the farm groups defined will need to be adapted later to account for the willingness of individual farmers in the farm groups initially selected to participate in the project. *Note:* If the analysis aims for representativeness, the farm number in the sample needs to be increased based to the number of farms in each farm group.

3. Data collection phase

The first step in the data collection procedure involves the collection of existing documents from the farmers to pre-fill the three DST as much as possible already before the interview with the farmer (Figure 2).

In a second step, a common data collection tool[6] ("Excel survey" in Figure 2) during an initial field visit and then transfer the data to Cool Farm Tool, and where relevant also to SMART. To avoid interview fatigue, it is recommended to visit the farm a second time to complete the SMART assessments.

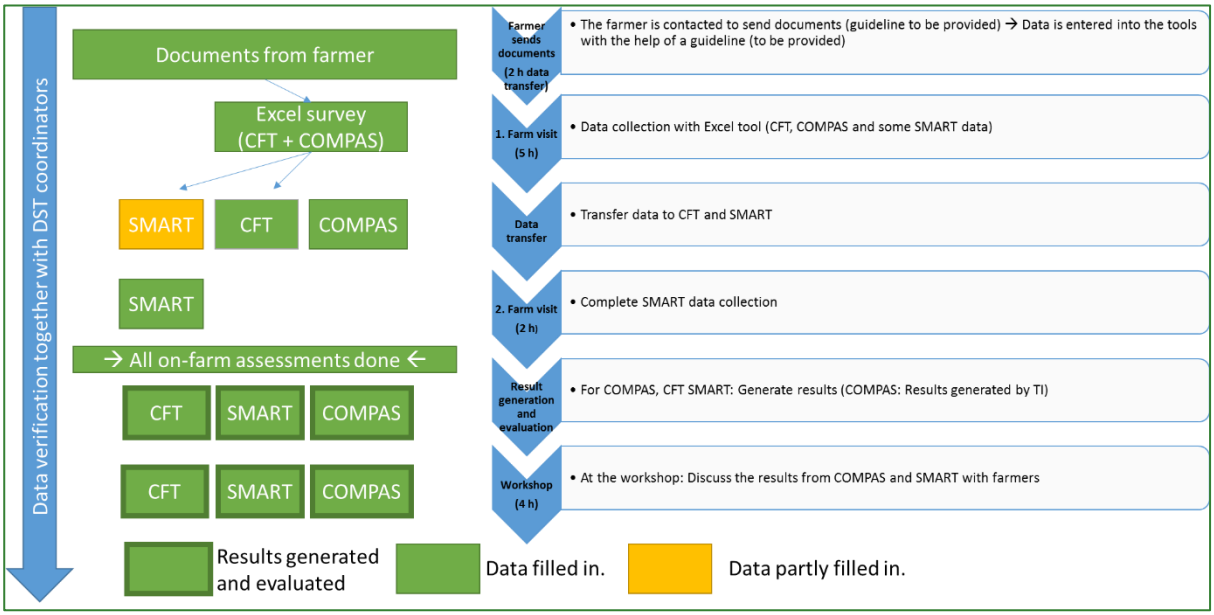

Figure 2: Workflow of steps of data collection and verification (the common data collection tool is referred to as "Excel survey")

During the data collection, project partners should have the possibility to engage in an online support forum to exchange on certain issues.

4. Data generation and plausibility checks

After the results are collected, the project partners will generate the results for SMART and Cool Farm Tool (see Figure 2) while the COMPAS calculations are done by the model coordinator (in the UNISECO project the model developer, the Thünen Institute (TI)). During the latter process, plausibility checks on the data will be done and feedback needs to be provided to project partners.

[6] Newly developed in UNISECO.

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For SMART, FiBL will provide at least one SMART questionnaire for plausibility in each case study and including a list of common errors to all partners to check. The same is the case for Cool Farm Tool for which the University of Aberdeen provide feedback to partners regarding data quality.

5. Result validation

To increase the potential of generalization for a sample with a low number of farms, project partners need to validate the results together with farmers and / or experts in the case studies and explored the extent to which they could be generalized with regard to typical farms in the region. The validation can be done through interviews or a workshop based on the key findings of the assessments which needed validation.

Additional information:

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SMART: https://www.fibl.org/en/themes/smart-en.html

Coolfarm Tool: https://coolfarmtool.org/

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ANNEX 5 SOCIAL NETWORK ANALYSIS: BRIEF STEP-BY-STEP GUIDE[7]

By CREA (Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria), with WWF-Romania 2021

Purpose. The Social Network Analysis can be carried out to analyse governance structures. It mainly focuses on the local network structure (relations, influences, missing actors, etc.) and on the way actors (and networks) participate in the formulation and implementation of public policies and/or private initiatives.

What is a Social Network Analysis (SNA)
The Social Network Analysis (SNA) has been defined as the mapping and measuring of relationships and flows between people, groups, organisations, computers or other information/knowledge processing entities. The SNA is also a means of visualising the power of connections between people, which allows the identification of how interaction and knowledge sharing is structured and how it can be optimised. The SNA views social relationships in terms of network theory consisting of nodes and ties (also called edges, links, or connections). Nodes are the actors within the networks, and ties are the relationships between the actors.

Project background. In the context of the 15 UNISECO case studies, the SNA was applied to answer the following general research question**:** ***Who are the actors and what are the social structures and governance processes that do (or could) influence the transition towards agro-ecological farming systems?*** This general research question was targeted at case study level by focusing on one specific challenge/dilemma for each case, with the objectives of:

- Providing a detailed analysis of the network currently involved in the key agro-ecological challenge/dilemma;
- Discussing on how such network should (or could) evolve - in terms of involved actors and relations amongst them - to better address the key agro-ecological challenge/dilemma in the future.

Step-by-step guide to applying the methodology.

1. Preliminary work

Identification of the key challenge/dilemma. The first and crucial step of the analysis will be the identification and clear definition of a significant and representative challenge/dilemma in your context**.**

Option choice. The second step of the preliminary phase will be the choice of the most suitable methodological approach for carrying out the SNA: option 1 - individual interviews with at least 3 key actors; option 2 - individual interviews with at least 3 key actors, followed by a workshop; option 3 - individual interviews with at least 8 actors.

[7] If you have any questions about this tool, please contact the author(s) by e-mail: Francesco Vanni (CREA) - francesco.vanni@crea.gov.it

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NET-MAP. In the context of all three options, the NET-MAP will be the toolbox used for the joint development of network maps with local stakeholders and for interactive analysis, with the objective of ensuring co-production of knowledge, joint learning and favouring transdisciplinary approaches (Hauck et al., 2015; Schiffer and Hauck, 2010). NET-MAP is a low-tech, low-cost, interview-based mapping tool that can be used by researchers, facilitators, and implementers to: (i) visualise implicit knowledge and understand the interplay of complex formal and informal networks, power relations, and actors' goals; (ii) uncover sources of conflict as well as potential for cooperation; (iii) facilitate knowledge exchange and learning processes; (iv) develop visions and strategies to achieve common goals.

Stakeholder involvement:

→ Identify the key actors - key actors are those involved in activities and/or decision-making processes that are relevant (or potentially relevant) to address the key challenge/dilemma;

→ Select and contact interviewees: a good starting point will be to identify a stakeholder "champion"/leader and then getting 3-4 additional recommended actors who hold in-depth knowledge of the area, the key challenge and of the stakeholders affecting the key challenge/dilemma;

→ Inform interviewees of the key objectives of the SNA as well as the key challenge/dilemma, and explain that the SNA could help local actors to gain a better understanding of how the network works, but also to make more informed decisions about their day-to-day practices/processes.

2. Interviews

Semi-structured interviews will be the core method to carry out the SNA and it will enable an analysis of the actors' goals, influences and flows, in order to develop a richer understanding of the governance structure (challenges, barriers, drivers, centrality of actors, institutional and policy issues, etc).

Questionnaire. The table below contains the 10 questions for the semi-structured interviews with stakeholders (to be used for all the three options above mentioned).

	Questions
Actors	Q1 - Please identify and discuss the number and role of actors who are influencing and/or who are influenced by the key challenge/dilemma.
	Q2 – Please describe the main goals and objectives of each identified actor in relation to the key challenge/dilemma.
	Q3 – Please can you briefly describe the decision-making process related to the key challenge/dilemma? *(e.g. how the policy and market incentives related to the key challenge/dilemma are managed and by whom)*
Power	Q4 - Please judge the influence (power, leadership, lobbying) of each actor in relation to the key challenge/dilemma: 0 - no influence; 1 - little; 2 - fair; 3 - good; 4 - high; 5 - very high.
Links	Q5 – Please identify and describe the main links amongst actors regarding the exchanges of goods, services, works. *Specify the type of goods, services, works exchanged amongst actors.*
	Q6 – Please identify and describe the main links amongst actors regarding the exchanges of information and knowledge. *Specify the type of information and knowledge exchanged amongst actors.*

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Relations	Q7 - Please discuss the relations amongst the actors involved in the network, with particular attention to the shared goals as well as to the climate of collaboration and trust.
	Q8 – Which are the main conflicts and controversial matters amongst the actors? And between which actors do these conflicts and controversial matters arise?
Overview	Q9 - Please can you comment on the system as a whole? Which is your interpretation of this network? Is there room for improvement regarding the communication, power relation and exchanges of goods/services/information to better tackle the challenge/dilemma?
	Q10 - Please identify and discuss the missing actors: those who could be affected/included (also in the decision-making process) but for some reason are currently out of the network.

The interview step-by-step:

→ **Assemble all actors on map**. An empty sheet of paper is placed in front of the interviewee and you can start with the first group of questions regarding the actors (mainly groups, associations, authorities or organisations) who affect/are affected by the key challenge/dilemma under analysis (Q1, Q2 and Q3). If a list of network members is prepared beforehand, the participants can choose from this list and discuss the list (confirm and add/eliminate actors from the list). Actors are then written on cards (post-its or small pieces of paper) and distributed on the empty map. To allow for a more defined visual structure, differently coloured actor cards can be used for different actor groups (e.g. governmental, NGO, civil society, and private sector).

Necessary equipment: sheets of A3 paper for drawing the network maps (one per interview); small, if possible multi-coloured, actor cards to note down the actor names, preferably adhesive paper (post-its); two differently coloured pens to draw different types of links between actors.

→ **Define influence/power of actors.** Each actor will be scored on each actor card (Q4).

→ **Define different links and draw network.** In the next step, you will collect data about how the selected actors are linked using the next group of questions (Q5, Q6). This is done by drawing differently coloured arrows between the actor cards. The colours represent two different kinds of links: exchanges of goods, services, works, and respectively exchanges of information and knowledge. The arrows indicate that "something" (goods, information, relations, etc.) flows from one actor to the other. If there is a mutual exchange, the arrow has two heads.

→ **Discuss relations.** Relations amongst actors should be discussed qualitatively (Q7, Q8).

→ **Final overview.** Interviewees are asked to provide a qualitative assessment of the system as a whole and if there is room of improvement regarding the communication, power relation, and exchanges of goods/services/information to better tackle the challenge; this final part also helps in identifying the missing actors and discussing how the involvement of such actors could change the governance structure and impact on the challenge (Q9, Q10).

→ **Interview NET-MAP (social network map).** At the end of each interview, together with the recorded notes and comments, you should have developed an interview NET-MAP, namely a visual overview of the network in place according to each interviewed actor (on the A3 paper). This map should include: all the identified actors with the influence score; all the missing actors; the links (arrows with one or two directions) between the identified actors representing (by using two different colours) flows of goods/services, and flows of information/knowledge.

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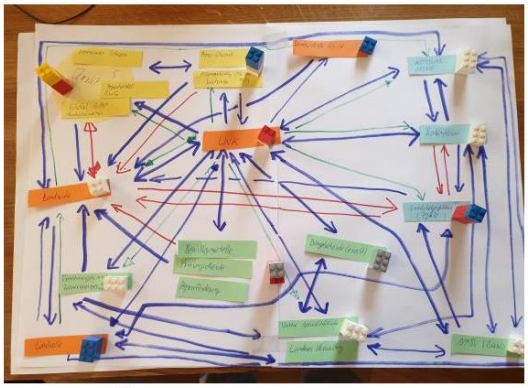
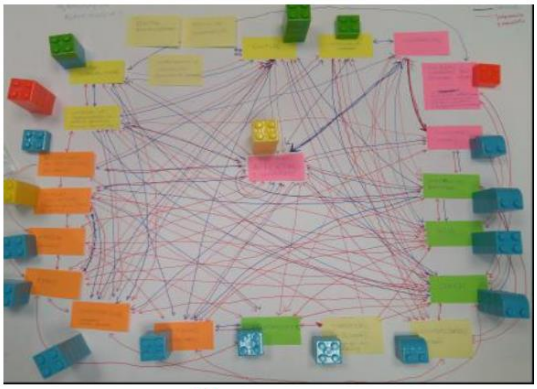
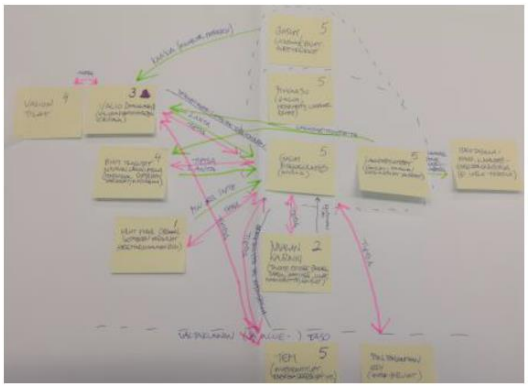
(1) (2)





(3) (4)



Picture of NET-MAPs in UNISECO case studies (1 - Germany, 2 - Spain, 3 - Finland, 4 - Hungary)

3. Data analysis

SNA summary. For option 1 and option 2, you will draw an SNA summary (template provided in Annex 1) that should include pseudonymised details of the specific answers of different interviewees as well as your own relevant comments on the different views of the interviewed stakeholders. You will also aggregate (including for option 3) the quantifiable data in 3 Excel tables (as in the examples below): 1 table with the list of actors and their influence scores (Q4) and list of missing actors (Q10), and 2 tables with the adjacent matrixes, one on the exchanges of goods/services/work amongst actors (Q5) and one on the exchanges of knowledge/information amongst actors (Q6). For Q4, the final score of each actor could be calculated as an average of the different scores.

! Be sure to use the same definition (coding) of actors and consistent information in all the documents/ tables in order to have clear, traceable data.

In option 1, the compilation of the SNA summary will be the basis for developing the final NET-MAP. In option 2, the SNA summary should be compiled after organising a workshop to draw collectively the final NET-MAP (see details below regarding the final NET-MAP).

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Example of table with the list of actors (with influence score and missing actors)

	A	B
1	Identified actors	Score
2	Actor 1	3
3	Actor 2	2
4	Actor 3	1
5	Actor 4	0
6	Actor 5	5
7	Actor 6	0
8	Actor 7	4
9	Actor 8	4
10		
11	Missing actors	
12	Actor 9	-
13	Actor 10	-
14	Actor 11	-

Example of adjacent matrix

	A	B	C	D	E	F	G	H	I	J
1			Target	Target	Target	Target	Target	Target	Target	Target
2			Actor 1	Actor2	Actor 3	Actor 4	Actor 5	Actor 6	Actor 7	Actor 8
3	Source	Actor 1	-	1	0	1	0	1	1	1
4	Source	Actor 2	1	-	0	0	0	0	1	0
5	Source	Actor 3	1	0	-	1	1	1	0	0
6	Source	Actor 4	0	0	0	-	0	1	0	1
7	Source	Actor 5	0	0	0	1	-	1	0	0
8	Source	Actor 6	0	1	0	0	1	-	1	1
9	Source	Actor 7	1	1	0	1	0	1	-	1
10	Source	Actor 8	0	0	0	1	0	0	1	-

Interview summaries. For option 3, you will compile a summary for each interview (template provided in Annex 2), where you can add additional relevant notes/comments regarding your interpretation of answers. The compilation of the interview summaries will be the basis for developing the final NET-MAP.

Final NET-MAP. The final NET-MAP will be obtained after the compilation of the SNA summary (in option 1) and of the interviews summaries (in option 3), which involves an accurate analysis and comparison of the information collected through the interviews, including the different interview NET-MAPs. In option 2, the final NET-MAP will be co-constructed with key stakeholders during a workshop. We suggest organising a workshop with well-informed and enthusiastic participants, possibly with the same actors selected for the interviews plus additional 3-4 key actors relevant for the analysed challenge/dilemma. The first step will consist of a short presentation of the single NET-MAPs produced during the interviews – these will be the starting point for a joint discussion with actors. The issues to be discussed are the same as during the interviews, but the objective is to a find an agreement amongst actors on all the questions.

Additional information:

Vanni, F., Gava, O., Povellato, A., Guisepelli, E., Fleury, P., Vincent, A., Prazan, J., Schwarz, G., Bartel-Kratochvil, R., …, Aalders, I. (2019). Governance Networks Supporting AEFS. Understanding and Improving the Sustainability of Agro-ecological Farming Systems in the EU (UNISECO), Deliverable D5.2. Report submitted to the European Commission, pp.65.

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Hauck, J., Stein, C., Schiffer, E., & Vandewalle, M. (2015). Seeing the forest and the trees: facilitating participatory network planning in environmental governance. Global Environmental Change, 35, 400-410.

Schiffer, E., & Hauck, J. (2010). NET-MAP: collecting social network data and facilitating network learning through participatory influence network mapping. Field Methods, 22(3), 231-249

NET-MAPs:

https://netmap.files.wordpress.com/2008/04/netmap_brochure.pdf

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 773901.

https://netmap.wordpress.com/

https://netmap.files.wordpress.com/2008/06/NET-MAP-manual-long1.pdf

https://en.wikipedia.org/wiki/NET-MAP_toolbox

ANNEX 1 - SNA summary (option 1 and option 2)

	Questions	Summary of interviewees' opinions and views	Comments
Actors	Q1	…	…
	Q2	…	…
	Q3	…	…
Power	Q4	Table with list of actors with influence score + actors' opinions and views: …	…
Links	Q5	Table - adjacency matrix + actors' opinions and views: …	…
	Q6	Table - adjacency matrix + actors' opinions and views: …	…
Relations	Q7	…	…
	Q8	…	…
Overview	Q9	…	…
	Q10	Table with missing actors + actors' opinions and views: …	…

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ANNEX 2 - Interview summary (option 3)

Interviewers name: ...

Interviewees name and organisation: ...

Date and place: ...

	Questions	Answers	Comments
Actors	Q1	…	…
	Q2	…	…
	Q3	…	…
Power	Q4	Table with the list of actors with influence score + opinions and views of the interviewed actor: …	…
Links	Q5	Table - adjacency matrix + opinions and views of the interviewed actor: …	…
	Q6	Table - adjacency matrix + opinions and views of the interviewed actor: …	…
Relations	Q7	…	…
	Q8	…	…
Overview	Q9	…	…
	Q10	Table with the list of missing actors + opinions and views of the interviewed actor: …	…

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ANNEX 6 MULTI-CRITERIA ANALYSIS OF MARKET AND POLICY INSTRUMENTS: BRIEF STEP-BY-STEP GUIDE[8]

By CREA (Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria), with WWF-Romania 2021

Purpose. Co-construction and co-assessment of market and policy instruments (MPIs) through a multi-criteria analysis (MCA), with the overall objective of improving existing policy frameworks. The target of the MCA assessment can be new MPIs which are being evaluated based on predictions of their functionality in a given socio-economic context (e.g. changes in the design of existing instruments or newly developed MPIs to bridge identified gaps/respond to certain issues in the policy and/or market framework) – this is an ex-ante assessment (as used in the UNISECO project), or existing MPIs – this would be a participatory check up on how they are performing, to have a basis for future policy decisions.

What is a Multi-Criteria Analysis (MCA)?
The Multi-Criteria Analysis (MCA) is a sound methodology to provide a choice, ranking, classification, and sorting of a set of MPIs, based on explicit objectives and a set of decision criteria. This allows reaching a synthetic judgment, especially when the criteria cannot be expressed in monetary terms, such as the effectiveness, efficiency and coherence of MPIs. MCA has been extensively applied to the evaluation of MPIs in agricultural/environmental fields, being able to capture the distributional impacts of MPIs (e.g. on different stakeholders, territorial levels) and the trade-offs between the criteria, and facilitating stakeholders' involvement in the decision-making process. Stakeholder involvement is especially important in the agricultural/environmental area, where conflicts exist between economically interested actors and actors that depend on agriculture/the environment for a living. Granting stakeholders more influence on the decisions about MPIs can provide a better understanding of the preferences of/impacts on local actors, thereby improving the quality of the decisions.
MCA is widely applied by national governments and international institutions and many officially released guidelines and ready-to-use tools exist. Here, the MCA builds on two key official documents, i.e. EC (2017) and UK-DCLG (2009).

Project background. In UNISECO, the application of this tool developed an ex-ante impact assessment for improving the knowledge about a list of proposed MPIs to remove the barriers to the adoption of key agro-ecological practices (AEPs) and to the necessary changes in the governance dimension of the farming systems in the 15 case study countries. This allowed us to understand: (1) the expected performance and relevance of the MPIs, including their strengths and weaknesses, with respect to the AE transition strategy; (2) the synergies and conflicts among MPIs, the most innovative MPIs and the trajectories in public and private decision making to support the AE transition.

Step-by-step guide to applying the methodology.

1. Preparation phase

Define your evaluation problem: this is a description of the issue(s) you identified in the market and/or policy framework and the envisaged changes needed to arrive to a better framework and impact on the ground; changes can be in a practice-related dimension and/or in the governance dimension. The evaluation problem

[8] This short guideline is to be used together with the "Multi-criteria Assessment matrix" (Excel table) provided separately. If you have any questions about this tool, please contact the author(s) by e-mail: Andrea Povellato (CREA) - andrea.povellato@crea.gov.it

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introduces and motivates the selection of MPIs. This part is essential to make the MPI assessment as accurate as possible.

Prepare a list of MPIs that will be assessed via the MCA. As mentioned above, these MPIs can be instruments built (ideally in a trans-disciplinary and multi-actor setting) on purpose to resolve certain issues in the policy and/or market framework or to fill gaps – in this case these MPIs are regarded as "innovative" (and they include changes in existing MPIs, e.g. in the eligibility/enforcement/ incentive rules), or they can be existing MPIs which you think need to be checked if they are still "fit for purpose".

Identify and engage with key stakeholders from your socio-economic and policy-related context, who are relevant for your evaluation problem and the MPIs, to carry out the assessment.

2. Assessment phase

Our proposed MCA is a mixed methods approach, integrating quantitative information about the performance and relevance of the MPIs, with qualitative information about their interactions (synergies and conflicts) and the applicability of the most innovative ones. The engagement can be carried out either through a workshop or interviews, or a combination of the two, and either online or face-to-face, depending on your circumstances and the profile of the stakeholders. **The flow of the assessment is as follows:**

→ **Introduction to the evaluation problem.** (est. time 20 min) Here, you should briefly introduce the evaluation problem and the changes required to address the problem, including the MPIs. The description of the MPIs must be functional to the implementation of the envisaged changes.

→ **Description of the assessment criteria** (est. time 20 min) with respect to which stakeholders will be asked to score the MPIs. The performance and relevance assessment aims to highlight best, worst and critical MPIs, with respect to the criteria and will be complemented by the qualitative analysis that will follow next.

Set of assessment criteria for the MCA

	Criteria	Description
Performance	**Effectiveness**	The extent to which the direct results of interventions contribute to the removal of specific barriers that hinder the achievement of the envisaged changes.
	Undesired side-effects	The extent to which undesired side-effects of the MPI (e.g. tightening of barriers) balance the desired effects directly promoted by the instrument (removal of barriers). MPIs may fail to produce expected results, or worse, set off unintended consequences which further exacerbate the problems faced in practice.
	Targeting	The extent to which the actors who can address the barriers are the target of the instrument.
	Efficiency	The extent to which the instrument is considered less costly/more beneficial compared with alternative options on the removal of issues/barriers. Efficiency considers the relationship between the resources used by an intervention and the changes generated by the intervention. Could other options achieve the same benefits at less cost or greater benefits at the same cost?
	Feasibility	Existence of conditions (e.g. technical capacity, economic strength, socio-cultural acceptance, potential conflicts with current legal settings) required to implement

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	Criteria	Description
		and enforce the MPI by the Regulator (i.e. public body/private actor in charge).
Relevance	**Urgency and priority**	The extent to which the MPI is considered important for the strategy. Specifically, *urgency* refers to the timeliness (whether the instrument should be implemented first) and *priority* - to the relative importance of the instrument in supporting the strategy (whether the instrument is essential).

→ **Filling in the assessment matrix.** (est. time 20 min) The assessment matrix (Excel table) is provided as an attachment to this guide and contains practical instructions. This step is carried out by each participant individually. The MPIs are the object of evaluation. Participants should enter the scores into a copy of the Excel worksheet and you would then insert the scores from all the participants' worksheets into a single master file, once the engagement is over. Stakeholder evaluation of the performance and relevance of each MPI is recorded via the elicitation of scores, to judge the ability of each MPI to remove the issue(s). Three elements contribute to defining the synthetic score attributed to an MPI - criteria weights, performance/relevance score of MPIs on criteria, level of confidence with the MPIs:

- *Criteria weights* allow stakeholders to weigh the relative importance of the assessment criteria. Participants are invited to distribute a fixed total of 100 points across the 5 criteria for the performance dimension.
- *Performance & relevance* score of MPIs allows stakeholders to judge the extent to which a criterion is satisfied by each MPI. Participants are asked to score the performance of each MPI and its relevance on a scale from "0. Very weak – the MPI performs very bad on this assessment criterion" to "5. Very strong – the MPI performs very well on this assessment criterion".
- *The level of confidence* allows stakeholders to give their evaluation on their competence/knowledge/familiarity with each MPI. Each respondent is asked to provide an indication about his level of "confidence" on a scale from "1. I know very little about this MPI" to "4. I'm very familiar with this MPI".

For each stakeholder, the synthetic score of each MPI is obtained by summing up the product of criteria weights and performances/relevance scores for all the assessment criteria.

→ **Open discussion.** (est. time 20 min) Having filled the assessment matrix, stakeholders will be asked to answer 4 open ended questions (below) that will enable you to develop a richer understanding of their choices and to avoid/correct any research bias or misunderstanding.

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	Questions
MPIs	**Q1 – Can you briefly indicate what are the main strengthens and weaknesses of the set of the MPIs that you have just assessed?** *This question aims at receiving a general feedback on the MPIs assessed though the MCA, in order to allow the experts to identify the key aspects of the scoring exercise that he/she has just carried out.*
	Q2 – Looking at the list of MPIs, can you identify possible synergies and conflicts amongst the instruments in addressing the issue(s) and the reasons they may occur? *This question aims at receiving some feedbacks on the synergies and conflicts amongst MPIs and on the coherence of the MPIs. Encourage participants to provide practical examples.*
Innovative MPIs, and policy and governance changes	**Q3 - Looking at the list of MPIs, can you briefly indicate what in your view are the most innovative MPIs and what are the key challenges for their implementation?** *This question aims at identifying the MPIs that show the greatest potential to address the issue(s), as well as new processes, tools and practices that should be adopted to better support the strategy.*
	Q4 - What are the key needs - in terms of knowledge, advice, resources (financial, infrastructures), governance (social capital, role, power, relations of some actors), or in the local/national policies - to effectively implement the most innovative MPIs? Would they require changes in any of these dimensions? *This question aims at exploring key changes needed to effectively implement the most innovative MPIs, including the role of key actors.*

→ **Sum up and concluding remarks.** (est. time 10 min)

Additional information:

Galioto, F., Gava, Oriana, Povellato, A. and Vanni, F. (2021). Innovative market and policy instruments to promote the agro-ecological transition strategies. Deliverable D5.4. Understanding and Improving the Sustainability of Agro-ecological Farming Systems in the EU (UNISECO)

Galioto, F., Gava, O., Povellato, A., Vanni, F., Schwarz, G. (2020) Guideline on the co-construction of innovative market and policy incentives and formulation of policy recommendations.

EC (2017). Better Regulation Toolbox, SWD (2017)350. European Commission, Bruxelles

3 UK-DCLG (2009). Multi-Criteria Analysis: A Manual. UK Department for Communities and Local Development, London

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 773901.

ANNEX 7 PARTICIPATORY SCENARIO DEVELOPMENT: BRIEF STEP-BY-STEP GUIDE[9]

By Swedish University of Agricultural Sciences, 2021

Purpose. The aims of participatory scenario development are to increase knowledge and awareness of possible and uncertain futures of European food systems, providing a basis for a structured approach to thinking about the future and supporting effective decision making relating to agro-ecological transitions. They are also used for discussing trade-offs and synergies, and handle conflicts of interest between different types of stakeholders. A qualitative scenario storyline or narrative explores different possible futures, providing a broader perspective than possible with quantitative modelling alone. This brief focuses on the development of the qualitative storylines with stakeholders.

What is participatory scenario development?
Scenario development has the goal of enabling a structured way of thinking about the future and enable effective decision making (Wiebe *et al.,* 2018). Scenarios are descriptions of plausible and possible futures that help investigate outcomes of different actions implemented today or in the future. A scenario has been defined as "plausible and often simplified description of how the future may develop, based on a coherent and internally consistent set of assumptions about driving forces and key relationships" (MEA, 2005). Scenarios can be either purely qualitative or quantitative or include both qualitative and quantitative elements. A qualitative scenario (scenario storyline) or narrative aims at creating an image of the future hence providing a broader perspective than quantitative modelling alone can do. Storylines describe the drivers of change, especially those for which the causal relationships within a system are not fully understood which prevents quantification of these in models. Storylines are especially useful for scenario studies covering longer timeframes as uncertainties are larger (Rounsevell *et al*., 2010).

Project background. In UNISECO, explorative scenarios were developed for EU food systems, with a focus on the incorporation of agroecological practices. Outcomes were compared to: 1) a baseline of a business-as-usual future based on the current situation; and 2) existing EU or global targets (e.g. EU greenhouse gas reduction targets and available agricultural land in the EU). A set of assumption covering reductions in food waste (e.g. assuming current levels, or waste reductions of 50%) and dietary patterns (e.g. current, projected, healthy diet) were included to illustrate how such changes affect outcomes in combination with implementation of case study innovations.

Scenario development in UNISECO followed a 'story and simulation' approach. This means that storylines that qualitatively describe alternative possible futures were articulated first with stakeholders. The storylines were translated into preliminary quantitative representations incorporating parameters such as greenhouse gas emissions, land, water, and energy use. The results were then presented to stakeholders one more, and their input was used to refine the scenarios for the assessment of territorial effects of a large-scale implementation of agro-ecological farming innovations in the EU. This brief focuses on the development of the qualitative storylines with stakeholders.

[9] This short guideline is to be used together with the "Multi-criteria Assessment matrix" (Excel table) provided separately. If you have any questions about this tool, please contact the author(s) by e-mail: Andrea Povellato (CREA) - andrea.povellato@crea.gov.it

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Step-by-step guide to applying the methodology

1. Creating the storylines

The storylines form the qualitative context (i.e. narratives) in which the qualitative outcomes from the modelling should be interpreted. The development of the storylines builds on the input gathered through the process of stakeholder participation (see Step 2), and review of relevant scientific literature of scenario studies.

The storylines were developed in an iterative manner, using the commonly used and well-established matrix approach to create the storylines (Rounsevell *et al.*, 2010). In this approach two important drivers or major uncertainties concerning the system under study are chosen and drawn out along two axis, forming a scenario cross. The scenario cross comprises four quadrants within which storylines can be developed, consistent with the characteristics of the axes (Figure 1).

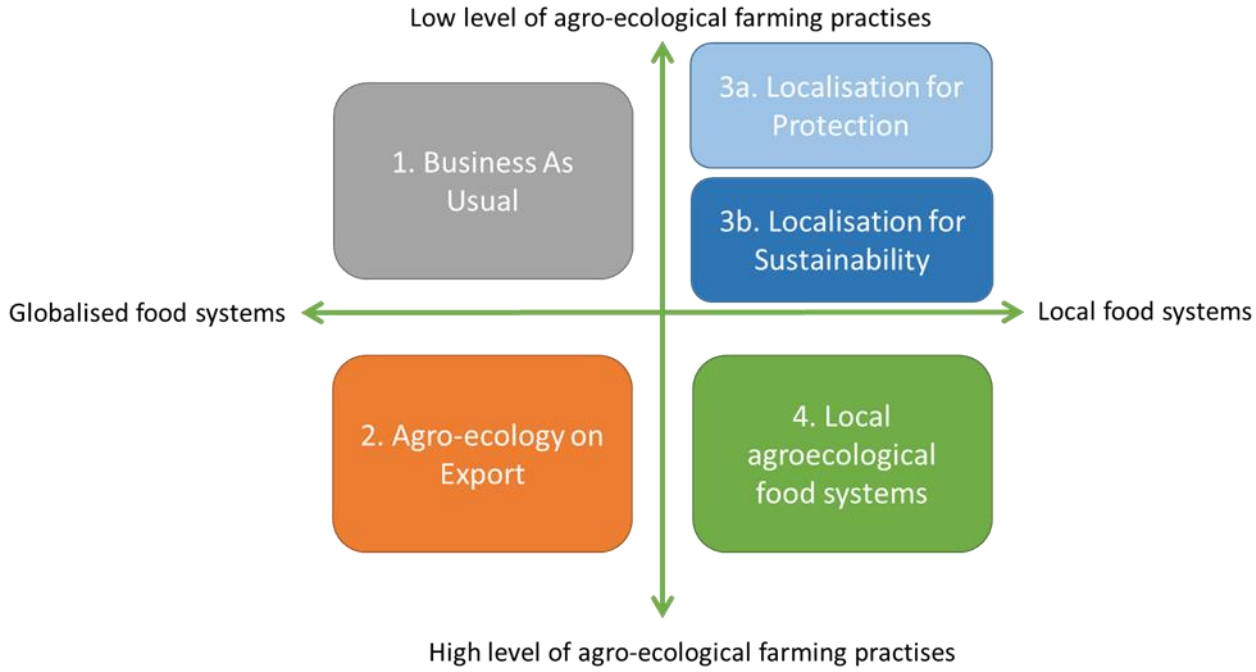

Figure 1: Example of the scenario cross from the UNISECO project

There are many challenges to be addressed in the development of storylines. They need to be salient (i.e. relevant to the policy question and stakeholders, and explore a range of plausible futures including what may be considered as surprises); credible (i.e. scientifically sound and consistent); and legitimate (i.e. societally accepted and transparent) (Pérez-Soba et al., 2015; Rounsevell et al., 2010).

To ensure storylines are salient, they should be developed in iteratively, involving EU level and local stakeholders. Stakeholder input can be used to: i) identify the uncertainties on the two axes; ii) iteratively refine the storylines. All project partners, representing different knowledge domains and views from different areas of Europe, should also be involved in the development of the storylines.

Stakeholder interactions and their objectives are described in Step 2, which can also be used to ensure the credibility and legitimacy of the storylines. Scientific credibility is gained through the process of publication of the scenarios in peer-reviewed journals and presentations at scientific conferences.

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2. Designing stakeholder interactions

Based on the experiences of the scenario development process, a set of recommended stakeholder interactions in the scenario development process and the purpose and main activities of each interaction were developed (Table 1).

Table 1. Overview of stakeholder interactions in the scenario development process.

Type of interaction	Purpose and Activity	Participants
Workshop	First stakeholder workshop with the objectives: • To develop a shared understanding of the scenario development purpose and process • To create an understanding of what analyses are possible with the models that will be used in the project, and their relevance to EU policy assessment and development • To collect input from stakeholders on what should be explored in the scenarios	EU-level stakeholders representing the European Commission and its agencies, farmer organisations, environmental NGOs, and other organisations with a stake in the topic, members of the Project Advisory Group, and project researchers
Workshop	Second workshop with the objectives: • To further discuss the identified critical uncertainties • To discuss the level and type of implementation of agro-ecology and wider economic settings and developments, e.g. level of trade	EU-level stakeholders representing the European Commission and its agencies, farmer organisations, environmental NGOs, and other organisations with a stake in the topic, case study level stakeholders representing different types of key actors of agro-ecological transitions, members of the Project Advisory Group, and project researchers
Written exchange	Written feedback from project partners on the storylines, answering the questions: • In what ways (if any) are the scenarios relevant or interesting? • Is the scenario plausible i.e. could the future develop in this direction? • Currently, is there evidence of developments in this direction in your country? • Are there any significant inconsistencies in the scenario are currently described?	Project partners

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	• What types of policy developments would be likely under this scenario? • How might your case study evolve under this scenario?	
Workshop	Third workshop with the objectives: • To collect feedback on the storylines. • To discuss issues of trade, case study innovations and policies.	EU-level stakeholders representing the European Commission and its agencies, farmer organisations, environmental NGOs, and other organisations with a stake in the topic, case study level stakeholders representing different key actors of agro-ecological transitions, members of the Project Advisory Group, and project researchers
Workshop	Fourth workshop with the principal objectives: • To discuss updated storylines. Participants focus on one storyline each, with guiding questions for group discussions of: • How might agro-ecological farming practices have evolved in this future in your country/context? (consider, e.g. extent, products, production systems). • How would conventional agricultural practices have changed in your country/context in this future? • What might human diets comprise? • What foods would be traded, from where and to where? • What policies or other developments could lead to this future? • Currently, in your country are there any signs of developments in this direction? • Do you consider this scenario: interesting, plausible, desirable? What are the reasons for your comments?	EU-level stakeholders representing the European Commission and its agencies, farmer organisations, environmental NGOs, and other organisations with a stake in the topic, case study level stakeholders representing different key actors of agro-ecological transitions, members of the Project Advisory Group, and project researchers
Written exchange	Written feedback from project partners on the refined storylines, answering the same questions as in the previous consultation.	Project partners

At the first workshop, discussion should focus on the usefulness of the scenario approach in general, its advantages and disadvantages, and potential limitations to be overcome. The purpose of the discussion will

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be to gain insights that would make scenario development relevant to the remits and responsibilities of the stakeholders. The discussion should also identify the scope of key issues which are relevant for consideration in the storylines, from the different perspectives of the stakeholders.

Most current food systems studies focus on environmental sustainability, so a particular challenge to be overcome is the inclusion of social and economic aspects of sustainability. In UNISECO, to find the critical uncertainties on which to base scenario development, stakeholders were asked to provide their views on the most important uncertainties related to future foods, and their supply. The issues identified were food security and sovereignty in relation to open-trade. There were differing views on the preferred situation, and to what degree food should be traded internationally. This is relevant at an EU scale, i.e. self-sufficiency of the EU in food supply versus reliant on global trade, and at national and regional levels within the EU (e.g. in relation to benefits of short supply chains).

Based on the discussions at the first stakeholder workshop, the two critical uncertainties should be selected to be the principal focus of scenario development. In the UNISECO project these were the level of implementation of agro-ecological farming practises, and the localisation of food system (i.e. level of trade within the EU and globally), see also Figure 1). A short follow-up workshop (second workshop) enables stakeholders to provide their view on uncertainties. The results of the second workshop provide the basis for drafting initial storylines (qualitative descriptions). These storylines are sent to project partners to reflect upon their relevance, plausibility and consistency, and to consider how their case study would evolve under the different scenarios. The feedback from project partners enable the storylines to be refined, and prepared for use in the third workshop.

In the third workshop the storylines will be discussed with the participants, in a large group. Depending upon the outcome of the discussion, an existing storyline will be refined, and additional storyline could be identified. Then, updated set of storylines will be discussed at a fourth workshop with stakeholders and project members. This workshop would be designed to be run in breakout groups, tackling one storyline each, focussing on finding inconsistencies in scenarios, and anchoring them in local contexts. The output from the workshop is final modifications of the storylines, which are then sent to project partners for their final reflections and suggestions. The outcomes from the fourth and final workshop provide storylines to be translated into inputs to quantitative modelling (Mayer *et al.*, 2021).

More details on the scenario development and modelling can be found in Röös *et al*. (2021).

Additional information:

Röös, E., Mayer, A.,Erb, KH., Kalt, G., Kaufmann, L., Matej, S. Theurl, M., Lauk, C., Muller, A., Ferguson, S., Hart, R., Smith, P. (2021) Report on Participatory Scenario Development of Agro-ecological Farming. Deliverable D4.2. Understanding and Improving the Sustainability of Agro-ecological Farming Systems in the EU (UNISECO).

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