



D1.2

Facilitation guidelines for practice hubs and the multi-actor platform

August 2024



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Purpose and Scope

The importance of co-creation, collaboration and stakeholder ownership when striving for sustainability in farming is well known (Wielinga et al. 2007; Ensor & de Bruin 2022; Velten et al. 2021) and is fundamental to the PATHWAYS project. This deliverable report, D1.2, describes the participatory processes and tools developed to mobilise national farmer groups in Europe (Practice Hubs) and a European platform of non-farmer stakeholders (MA). The processes, supported by WP1, established the mechanisms for all other WPs' interactions with the National Practice Hubs of farmers and industry actors, and the members of the European platform (MA). The report presents the six co-creation methodologies (1) Mobilising Practice Hubs; 2) Co-designing the back-casting visioning Tool; 3) Evaluating and Maintaining Practice Hub Activity; 4) Co-designing the Public Good Tool; 5) Developing the Pathways Living Lab Approach; and 6) Facilitating PH and MA Platform Feedback on Pathway Storylines, including the final toolkits (Tools#1-6) applied by National and European level facilitators. Reflective recommendations are also made at the end to inform the development of best practice for facilitating future participatory multi-actor processes.

Introduction

This deliverable describes the co-design facilitation process which enabled two levels of multi-actor (MA) participatory engagement and innovation, implemented by trained Pathways facilitators, to mobilise National Practice Hubs of farmers and industry actors, and a European MA platform of actors. To maximise the MA approach and success of the process, the European MA platform consisted of actors with diverse and complementary expertise from across the supply chain, whose major role has been to support the development of scenarios and transition Pathways for sustainable food (WP2).

Facilitation is a process where groups of stakeholders are supported to work collaboratively towards a common goal, e.g. solving co-defined problems, working creatively in an innovation process and/or collaborating to achieve sustainability goals (van Dijk et al. 2017). Facilitation has been found highly cost and output effective in several projects (Cronin et al. 2021; Lambcombe et al. 2018; Stokes et al. 2022) to facilitate farming innovations and progress sustainability goals.

The tasks of the Practice Hubs and the MA platform within PATHWAYS were, and are, multiple and diverse, however one of their first steps was to create visions for sustainable livestock husbandry in 2050. A method previously found successful for visioning without the boundaries of the current state is back-casting (Quist and Vergragt, 2006) where stakeholders collaborate to find ways of both uniting around a vision and also the way to reach the vision. The next task of the Practice Hubs was to collect on-farm data from their innovative farms, to assess their strengths and areas for improvement towards sustainability goals. The data collection process was developed and adapted through a collaborative process with facilitators. The third task was to come up with new innovative ideas to test in practice which would address areas of improvement, known as Living Labs. Living labs have a great potential to spark innovation and foster sustainability break-through under certain circumstances (Berberi et al. 2023), where facilitation is one of these circumstances. Supported by WP1, PATHWAYS facilitators co-created the process of innovation and then facilitate this process within their practice hubs.

To manage the tasks and achieve the goals of PATHWAYS, training and supporting facilitators throughout the process, by developing and applying well-designed tools and methods in collaboration with facilitators has previously been found to be a key factor for innovation success (Stokes et al. 2022).

The training of facilitators needed to include key PATHWAYS components which mobilised the multi actor approach: the ability to mobilise people, the ability to create and/or support enthusiasm, the ability to create a sense of security and trust within a group to work together towards common goals, and the ability to inspire innovation and creativity. Furthermore, in order to be able to evaluate the impact of the project, the facilitators needed to document both the process and outputs from the group activities. Again, these systems and templates were developed in conjunction with facilitators.

This deliverable therefore describes the process of facilitator training and the tools co-created with facilitators which the WP1 team led.

Methodology & Results

This section introduces each of the six Pathway Tools and their use, which facilitators co-designed and were trained to use to achieve project goals. Each process for tool development and its use is presented, followed by the detailed approach used by facilitators for each tool, set out in a Pathways Tool Kit.

Method 1a: Mobilising Practice Hubs

To start this process, at project initiation, facilitation leads coordinated an online co-design workshop (December 2021) to develop the first set of guidelines and tools to enable the mobilisation of Practice Innovation Hubs with facilitators (Pathways Tool Kit #1). Practice Hubs were mobilised (M6) and their first meeting was carried out in year 1 (M8) of the project.

A total of 15 Practice Hubs were mobilised across Europe in Pathways' first year (September 2021-2022). The inclusion criteria were that the farmers worked innovatively in at least one of the innovations defined by the OECD (2015: product, process, management/organisation or marketing) and with one of the major livestock species under focus within the EU. Pathways first facilitators Tool Kit #1 describes the co-design process and guidelines facilitators utilised to mobilise both existing and newly formed Practice Hubs. Practice Hubs were mobilised by month 6 in order to facilitate the first Hub meeting from month 8. Figure 1 describes the system and innovation diversity of Practice Hubs for the majority livestock species. One potential Practice Hub, "More from less pork through improved system design" (Practice Hub 7: Denmark) was not mobilised due to a lack of engagement from producers and industry on this innovation theme. The complete process is detailed in Pathways Tool #1.

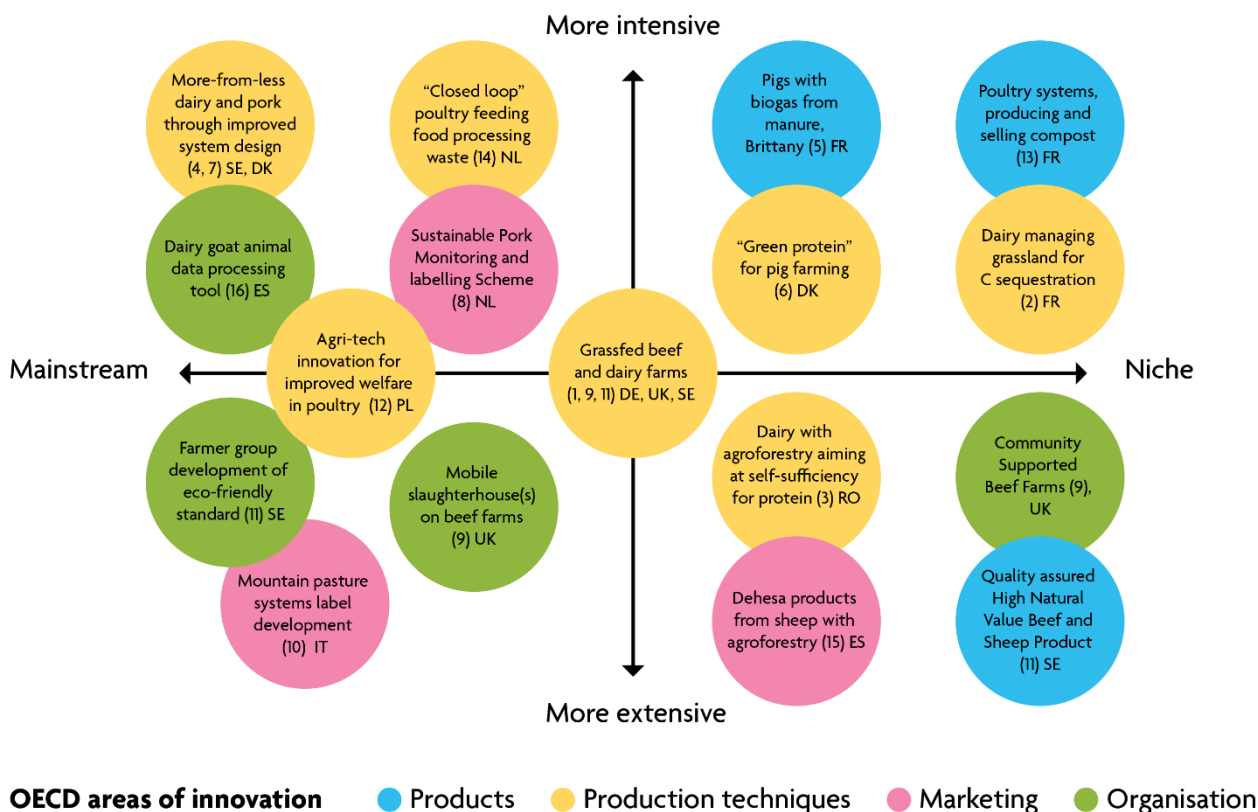


Figure 1 System and innovation diversity of Pathways Practice Hubs for the major livestock species

Method 1b: Mobilising the Multi-Actor platform (MA)

The European MA platform was mobilised at project initiation through MA selection criteria from consortium hot contacts. Hot contacts in this case were contacts where there was an ongoing communication and/or collaboration, relevant for sustainable livestock production, with consortium members or close collaborators with consortium members.

The focus of the first MA platform meetings in year 1 was to facilitate the development of visions for sustainable husbandry in 2050 (Pathways Tool Kit #2). As a result of this process WP2 developed storylines and scenarios for Pathways to sustainable food. The focus of the second MA platform meeting in year 2 was to receive iterative feedback and input on the storylines and scenarios, to support the ongoing construction and co-development of Pathways for sustainable food (Pathways Tool Kit #6). Facilitators led these meetings online (year 1) and in person (year 2) to ensure active participation and input from all MA members. Through the MA platform the project outputs were also communicated and disseminated extensively across Europe, to maximise project visibility and impact.

Method 2: Co-designing the back-casting visioning Tool

During the first online facilitation workshop (M4, December 2021) facilitation leads introduced the concept of back-casting to facilitators and gave the group an opportunity to practice carrying out a back-casting exercise in the context of developing visions for sustainable husbandry by 2050. The facilitators identified and discussed changes needed to apply this concept and tool within their Practice Hub context, and the tool was adapted accordingly. This tool was then applied by all Pathways facilitators in the first Practice Hub meeting in year 1 (between M8-12), as well as used to develop visions for sustainable husbandry by 2050 with the MA platform (M9, meeting 1). Figure 2

provides an overall diagrammatic representation of the back-casting exercise. The full detailed process is presented in Pathways Tool #2.

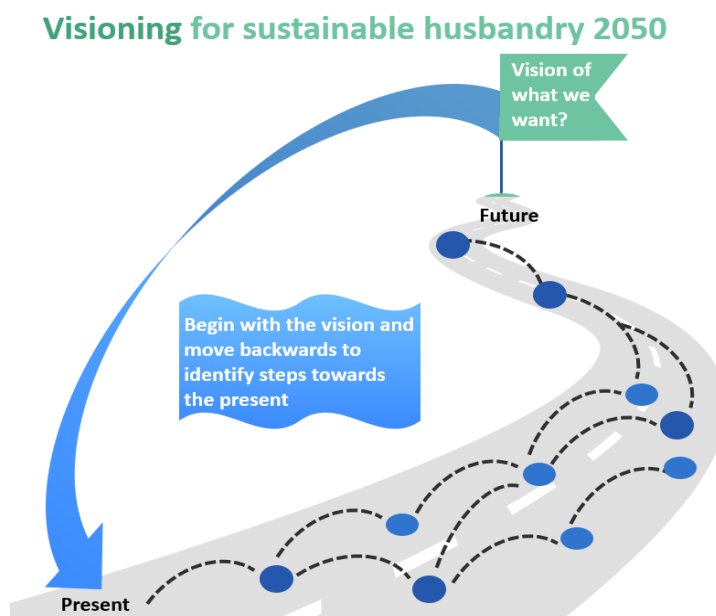


Figure 2 Diagrammatic representation of back-casting exercise employed to co-develop visions for sustainable husbandry by 2050 with Practice Hubs and the MA Platform

Method 3: Evaluating and maintaining Practice Hub activity

Once Practice Hubs were mobilised and the first meeting and visioning exercise had been carried out, facilitators met at the first face to face Pathways consortium meeting (M9). Mobilising groups of actors is only the first step in facilitating a Practice Hub and Living Lab process. Key to the success of Practice Hubs is understanding the motivations of actors and the value that Practice Hubs can bring to them individually but also as a collective learning network. It was therefore key to provide facilitators with the opportunity to reflect on the successes of mobilisation and meeting 1, as well as analysis both enabling and hindering factors to the continued engagement of Practice Hub actors. Two tools were therefore designed to provide facilitators with the opportunity to come together and facilitate a peer to peer sharing exercise. The first tool was designed to animate the composition or Persona of each Practice Hub, enabled facilitators to share and compare experiences across Practice Hubs, identify commonalities and shared innovation interests for potential collaboration. The second tool was applied to enable a force field analysis (Lewin 1951), which evaluated the hindering and enabling factors for continued actors' engagement in Practice Hub activities. This led to a discussion and clearer understanding of the value of Practice Hubs for participating actors. As part of a group share and feedback session on the force field analysis, facilitators then considered and identified how to maximise the value of Practice Hub to maintain momentum and activity from actors throughout the life of Pathways. The tool process for evaluating and maintaining Practice Hub activity is presented in detail in Pathways Tool #3.

Method 4: Co-designing the Public Goods Tool

The visioning exercise (Pathways Tool #2) identified the sustainability aspirations and potential of Practice Hub farms. In order to inform the next phase of Practice Hub activity, development of innovation through the facilitation of living lab ideas, it was important to understand the current sustainability status of participating Practice Hub

farmers. This process took an evidence and data informed approach to identify the economic, ecological and social sustainability performance of participating Practice Hub farmers. Through this process individual farmers and collective Practice Hubs could understand where they were performing well, and which areas were best placed to trial new practices and innovate to address development gaps. A Public Goods Tool, originally developed by Gerrard et al. (2012) was therefore adapted for this purpose and facilitators worked with the work package leader to modify the tool to be applied in the Pathways context. An interactive education and co-design workshop were held online in October 2022 (M15) to facilitate this process which is described in the Pathways Tool #4.

Method 5: Developing Pathways Living Lab approach

In order for Practice Hubs to develop innovative practices which fill gaps identified by the Public Good Tool exercise and accelerate their sustainability impact at farm level, a systematic exercise was co-developed and practiced by Practice Hub facilitators, before implementation in Practice Hubs at their second-year meeting. The Innovation Wheel enabled groups to identify existing practices around a theme or innovation idea, and move outwards through a series of process steps in order to discover where gaps in practice are missing and innovation is needed. Practice Hub facilitators used this tool to help participants identify several living lab ideas which were then developed into proposals for Pathways funding to trial and evaluate the innovation in practice. Tool #5 Innovation Wheel describes the process in detail.

Method 6: Facilitating feedback on Pathways storylines and scenario development

A central objective of Pathways was to use a participatory approach to co-develop storylines and scenarios for transition pathway for sustainable livestock husbandry. Storylines are a way of unifying stakeholders from very different backgrounds towards sustainability (Gordon et al. 2023). The building blocks of this process were founded by the facilitation of Practice Hubs and MA platform participants through the co-design of visions for sustainable husbandry in 2050 (Pathways Tool #2). Pathways has facilitated an interactive, iterative feedback approach with actors across the value chain in order to finalise storylines and scenarios which best inform policy, research and business strategies that facilitate the transition to sustainable livestock production and consumption. The final tool presented in this tool kit and facilitation guidelines are the facilitation process used by facilitations to gain input, feedback, and validation of the storylines from across Practice Hubs and the MA platform. This methodology is presented in Pathways Tool Kit #6.

The Facilitators Tool Kit co-developed and applied within Pathways

The six tools which make up the facilitators Tool Kit were: Pathways Tool #1 - Mobilizing Practice Hubs, Pathways Tool #2 – Back-casting exercise, Pathways Tool #3 - Evaluating and maintaining Practice Hub activity, Pathways Tool #4 – Public Goods Tool, Pathways Tool #5 - Innovation wheel, and Pathways Tool #6 - Feedback on Storylines and Scenario development. These tools are now all described in detail below.



PATHWAYS TOOL #1

MOBILISING PRACTICE HUBS

Created by facilitation leads in collaboration with Pathways facilitators and task leaders. Guidelines for mobilizing Practice Hub meetings and monitoring Practice Hub performance, Winter 2021.



Facilitation workshop - co-designing the Practice Hub process

A facilitation workshop was held for Practice Hub facilitators in December 2021, to share expertise on facilitation, strategies for mobilizing Practice Hubs and co-create tools for Practice Hub workshops. The facilitation exercises and outcomes from the facilitation workshop can be found [HERE](#)

Below is a list of other useful facilitation resources utilized:

Videos

[What do facilitators do?](#)

[Hennovation: multi-actor, practice led innovation networks in the laying hen sector](#)

[Introduction to the EURAKNOS Explorers Guide to thematic networks](#)

Podcasts

[Workshop facilitation – Handy advice from a social psychologist](#)

[Podcast: Facilitating farmer led innovation – Jessica Stokes in conversation with Russ Carrington](#)

Facilitation Guides

[Practice Led Innovation networks in agriculture: a guide for facilitators](#)

[Engaging farmers & growers in innovation projects: A guide - Centre for Effective Innovation in Agriculture](#)

[The EURAKNOS Explorers Guide to thematic networks](#)

[Energising networks with Eelke Wielinga](#)

Mobilizing practice hubs

Understanding the value of Practice Hubs for Farmers

At the initial facilitator’s co-creation workshop, an exercise was carried out to enable facilitators to identify the value for farmers and Pathways in joining Practice Hubs. This information was then utilized by facilitators to work with and promote Practice Hubs to industry partners, and in the mobilization of farmers to join Pathways Practice Hubs. This exercise also provided an example of how to engage and co-create value with a Practice Hub group, to build the groups capacity and buy in to the process. After an introduction to Pathways, facilitators then carried out a similar exercise with farmers at the first practice hub meeting, to harvest and share value of Practice Hubs for farmers at the first workshop.

Table 1. Facilitator defined advantages of Practice Hub engagement

OPPORTUNITY TO START A LIVING LAB WITH 20K EUROS	STRENGTHEN SUSTAINABILITY OF PRODUCTION/PRODUCTS	THE HELP AND INSPIRATION IN ON FARM SUSTAINABILITY WORK
TO AID IN SOLVING CURRENT PROBLEMS AND HAVE ACCESS TO OTHER EXPERT KNOWLEDGE	LEARN FROM INNOVATIONS ON OTHER FARMS	DEVELOP WAYS TO POSSIBLE REDUCE COSTS, IMPROVE ANIMAL WELFARE, BECOME MORE SUSTAINABLE
TO GET INSPIRED BY LEARNING ABOUT NEW POSSIBILITIES FOR SUSTAINABLE DEVELOPMENT	AN OPPORTUNITY TO THINK OUTSIDE THE BOX AND THINK ABOUT THE FUTURE OF THEIR FARMS	OPPORTUNITY TO DISCUSS AND HAVE A GLOBAL VIEW OF SOCIETY DEMAND ON LIVESTOCK IN THE FUTURE: WELFARE, CIRCULARITY, EMISSIONS
DEVELOP FEASIBLE SOLUTIONS TO IMPROVE THEIR SUSTAINABILITY AND VISIBILITY	A BOTTOM UP APPROACH AND OPPORTUNITY TO TESTIFY THEIR OWN VISION OF LIVESTOCK SYSTEMS AND PRACTICES	SHARE THEIR IDEAS ABOUT THE FUTURE OF FARMING AND INFLUENCE POLICY. BEING IN THE DRIVING SEAT OF POLICY DEVELOPMENT
BE PART OF A LEARNING AND DISCUSSION FORUM AND	SHARE THEIR PASSIONS AND REASONS WHY THEIR WAY OF FARMING IS THE BEST WAY TO	ANSWER QUESTIONS ABOUT SUSTAINABILITY AND UNDERSTANDING HOW

NETWORK TO SHARE IDEAS AND KNOWLEDGE	DO THINGS FOR SUSTAINABILITY	FOR SUSTAINABILITY CONNECT	ISSUES
FINANCIAL AID TO TEST IDEAS AND IMPROVE THEIR INCOME FROM SOLVING SUSTAINABILITY ISSUES	BEING PART OF SOMETHING BIGGER. MAKE THE WORLD BETTER.	FEELING A SENSE OF BELONGING WITHIN A SAFE SPACE FOR SHARING CREATIVE, INNOVATIVE IDEAS AND PRACTICES	

Recruiting farmers to practice hubs

Facilitators worked in small break out groups to discuss how best to mobilize practice hubs. The following stages of mobilization and process steps emerged:

1. Facilitators were at different stages of mobilization. Some farmer groups were already engaged, and mobilized to a practice hub, and all that was required was organizing the first practice hub meeting as part of existing workshops, to maximize time and existing engagement.
2. Where formulation and mobilization of farmers to Practice Hubs was required, facilitators agreed to make contact and work with industry partners and farmer organisations to engage and recruit the same small group of farmers to work with throughout the Pathways process. Depending on the sector and hub, this required mobilizing up to 15 farmers to each Practice Hub. Working with groups of 8-12 farmers was optimal for group cohesion, but where larger groups of farmers were recruited, activities within meetings were split into smaller groups in order to meet goals and facilitate as much inclusion as possible.
3. Facilitators used the Pathways practice hub and living labs information sheet below and the outcomes of values exercise above to seek buy in from industry partners, farmer organisations and farmers, highlighting the key benefits of farmers being in the driving seat of influencing policy and co-creating innovation to address their specific sustainability needs.
4. A catch-up meeting with facilitation leads (WP1) for any facilitators who were having any issues with mobilization was implemented, in order to provide support to unblock this stage of the process. Furthermore, monthly catch up meetings were provided for the whole facilitation team, to access progress, unblock issues, and support each other as a community of practice.

Pathways Practice Hub and Living Lab information sheet

Pathways
FOR SUSTAINABLE FOOD

PATHWAYS PRACTICE HUBS

DESIGNING SUSTAINABLE FOOD SYSTEMS

About PATHWAYS
PATHWAYS is a 5-year (2021-2026) Horizon 2020 project aiming to reduce negative environmental impacts while addressing societal demands for safe, nutritious and affordable meat, eggs and dairy products by identifying and increasing sustainable practices along the whole chain of the European livestock sector.

To do so, the project will design future scenarios and pathways for sustainable livestock husbandry and food systems by facilitating dialogues with farmers in Practice Hubs all over Europe. In these Hubs, farmers will discuss ideas and innovations, be given the option of testing innovations in Living Labs and feed their ideas to other stakeholders from farm to fork to support sustainable livestock production and consumption.

PATHWAYS Practice Hubs
Practice Hubs are national groups of farmers organised around a theme of innovation in practice. Innovations may cover any of the following areas: products, production types, marketing or organisational innovations.



PATHWAYS Practice Hubs will be activated all over Europe, stretching from extensive to intensive production and covering all major livestock species. Hubs will be led by a trained facilitator, who will organise workshops and lead discussions to identify challenges, find solutions, and gather feedback on scenarios to take the ideas of innovation forward. The Hubs will identify innovative configurations that work in specific contexts while addressing economic, environmental and social sustainability perspectives.

Why join a PATHWAYS Practice Hub?

NETWORK & SHARE EXPERTISE WITH OTHER INNOVATORS
There are five workshops in the Hubs over the duration of the project. If these workshops are face-to-face, your travel and accommodation will be covered by the project. By joining a Practice Hub, you will network with other farmers, fostering knowledge exchange and the sharing of best practices that could directly benefit your production activities. Are you curious what other farmers are doing to improve their economic and environmental efficiencies or increase the welfare of their animals? The Practice Hub is your place to find out. The Practice Hub is where you can discuss with other farmers the current challenges, drivers and barriers to innovation and see what innovations work.

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 1010001395.

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Pathways
FOR SUSTAINABLE FOOD

ENVISION THE FUTURE OF SUSTAINABLE FARMING

Joining a Practice Hub will allow you to envision and influence what the future of farming will look like by 2050 and how to get there. You will do this by working with your facilitator on your visions for sustainability. PATHWAYS will also analyse the sustainability of a number of farms using a well-validated and adapted Public Goods Tool (PG-Tool). This data collection and analysis will be carried out on your farm. If you are willing to participate in this, the time required for data collection will be compensated by the project budget.



TEST NEW INNOVATIONS IN LIVING LABS
Where solutions to current and future problems cannot be drawn from research, you will work with your facilitator to test new ideas and innovations in Living Labs. The Living Labs may, for example, address a gap in market knowledge or innovative husbandry in practice. These Living Labs will trial, monitor and demonstrate factors affecting the uptake and success of innovations based around your sustainability needs.

All Practice Hubs are encouraged to test the innovations of their interest in Living Labs. Living Labs are farmer-initiated trials (on- or off-farm) to find practical solutions to sustainable gaps or needs in farming practices. Living Labs run over a period of 12 to 24 months and will be implemented in close collaboration with the research and industrial partners of the Practice Hub. The PATHWAYS project will provide financial support with a budget of 15.000-20.000 EUR for each Living Lab. Living Labs will be selected on criteria such as (a) feasibility of completion within the project timeframe (b) total cost (c) reproducibility/transferability of the results (d) equipment / expertise availability and (e) coverage of the livestock sectors and countries in PATHWAYS.

What is expected of you?
Practice Hubs will meet and discuss in groups, either face-to-face or online, at least five times over the course of the five-year project at a central location in your country and in your own language. Information from other Practice Hubs and the whole project will be shared at these Practice Hub meetings. Through the Practice Hubs the PATHWAYS project will provide financial and practical support to you when contributing to data collection and practical testing of innovations.

For more information, contact your facilitator or Work package leader Jenny Yngvesson: jenny.yngvesson@slu.se

PATHWAYS PRACTICE HUBS – DESIGNING SUSTAINABLE FOOD SYSTEMS

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Figure 3: Practice Hub and Living Lab information sheet

Planning Practice Hub meeting one

THE PRINCIPLE: MAKE AGREEMENTS WITH PARTICIPANTS

Facilitators worked in small break out groups to discuss how to prepare for the first meeting before feeding back to the whole group. With regards to the process for preparing for the first practice hub meeting, the following principles were identified:

1. Facilitators designed meetings to facilitate optimal engagement from farmers and industry partners. It was noted that for mature groups online meetings were possible but to build capacity and momentum for newly forming groups, the first meeting was face to face if at all possible. However, where travel was required, digital meetings were more beneficial to farmer's time. The principle therefore was to co-design the meeting venue/format with the farmers involved to ensure optimal engagement.
2. Facilitators need guidelines on how to deliver the workshop, harvest content, as well as monitor and learn what went well/where adjustments needed to be made for the next meeting. Using the content generated at the facilitation workshop as a start, facilitation leads prepared this material and shared with facilitators at the subsequent facilitation workshop before the first practice hub meeting. An emphasis was on the co-design of meeting formats to maximize the efficiency and outcomes of Practice Hubs, but facilitators also recognized that seeking input and consensus from industry partners, farmer organisations and farmers

involved was also important. This was therefore sought in advance of the meeting or at the beginning of each meeting.

3. Facilitators provided some information or introduction to the focus of each meeting in advance of each Practice Hub meeting. For example, for meeting 1, this included an introduction of the vision exercise. This material prepared and manage farmer's expectations, communicated what was feasible and started to stimulate ideas in advance of the meeting activities.

THE PROCESS: LIMIT YOURSELF TO WHAT IS FEASIBLE

With regards to the process of the first meeting, facilitators identified and implemented the following:

1. Practice hub meetings were no longer than 2 hours in length for facilitator practicality and to maintain buy in and engagement from farmers, particularly where farmers had to travel to attend, or maintain energy and momentum online.
2. The aim of the first meeting was to create a space where farmers **valued** and **trusted** coming together to share and engage in the process of creating visions for sustainable food, and ensure subsequent engagement in data collection and idea generating for trialing new innovations.
3. Farmers should have fun, feel relaxed, feel heard and understood, learn something new, be inspired and value contributing towards the collective goals of the group.

THE CONTENT: SUCCESSFUL FACILITATION STARTS WITH PREPARATION

With regards to the content and format of the first meeting, the following needs of facilitators and Pathways emerged for the first meeting, and tools were created accordingly:

1. **Introductions, icebreaker and grounding** – who are we and why are we here? Purpose: getting to know each other individually and as a group and preparing to trust and work together. Time: 10 minutes. Tools: Workshop presentation, Mentimeter and Miro.
2. **Getting to know Pathways and Practice Hubs** – to inspire and energize the participants – presentation was in the farmer's native language. This was also an interactive presentation, where facilitators sought farmers input and ideas on how Pathways addressed the needs of participants, for example, "now you have heard about Pathways, what value might this Practice Hub have for you?" "What sustainability needs can this Practice Hub help you address?" Purpose: informing about Pathways and the Practice Hub process, its opportunities and starting to address farmer's needs and building value. Time: 10-20 minutes. Tools: Workshop presentation, Mentimeter and Miro.
3. **Co-creating a shared vision of sustainable food.** Purpose: To define "practice vision statements" for livestock husbandry in 2050, participants identified existing and future potential problems and solutions for realising their vision(s), and identified past problems that have been solved effectively (to share with other practice hubs and WPs). Using a back-casting method practiced at the facilitator's workshop, facilitators led Practice Hubs through an exercise which identified the steps that need to be taken to deliver a preferred sustainable future - looking backwards from the future to the present in order to strategise how that future could be achieved, including the identification of barriers and enabler. Time: 90 minutes with a 10-minute break in the middle or an appropriate point given group energy. Tool: Pathways Tool #2.

4. **Feedback and next steps.** Purpose: For the facilitator to check in on all participants for brief feedback on the satisfaction and success of the meeting, as well as ways to improve activities next time. The facilitator summarized the results and links to the next steps in the project. Time: 10 minutes. Tools: Workshop presentation, Mentimeter and Miro.

THE METHOD: BE CLEAR ABOUT THE EXPECTED RESULT, THEN CHOOSE THE APPROPRIATE METHOD

Guidelines for facilitating each stage of the first meeting are provided below:

Introductions, icebreaker and grounding

Purpose: who are we and why are we here? Getting to know each other, build trust and work together.

1. Facilitators gave a warm welcome to participants, introducing themselves and their role in supporting the needs of the group and outcomes of the project accordingly. An icebreaker exercise was used as a verbal share and discussion going around the group one by one, or via Teams/Zoom using for example Miro board to capture everyone's responses, followed by the facilitator reading them out and asking participants to elaborate.
2. The icebreaker exercise consisted of asking each group member to a) introduce themselves b) share why they joined this Practice Hub (value) c) Tell ONE Personal, Professional or Peculiar fact about themselves (trust) and d) what they would like to get out of the Practice Hub meeting. Note: where this was shared verbally, the content was captured through recording or scribe.

Getting to know Pathways and Practice Hubs

Purpose: to inspire and energize the participants, presentations were given in the farmer's native language with interactive components where facilitators sought farmers input and ideas on how Pathways can address the needs of participants, for example, "now you have heard about Pathways, what value might this Practice Hub have for you?" "What sustainability needs can this Practice Hub help you address?" Purpose: informing about Pathways and the Practice Hub process, its opportunities and starting to address farmer's needs and building value. The presentation deck below illustrates the structure of meeting one.

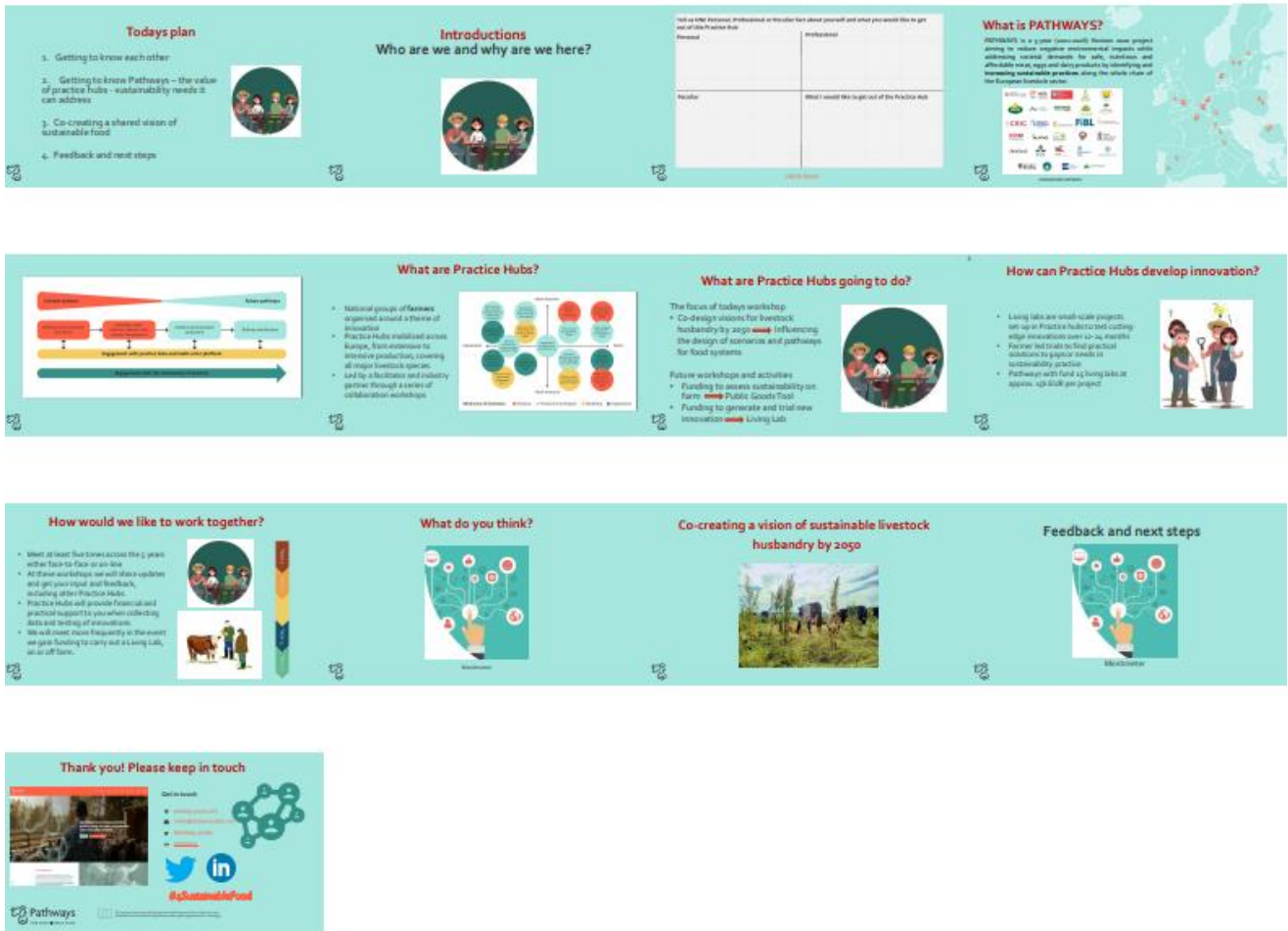


Figure 4. A pre-prepared presentation of Pathways and facilitation activities for meeting 1

Co-creating a shared vision of sustainable food

Purpose: design sustainability visions for 2050 to feed into the design of future scenarios and pathways to sustainability livestock husbandry and food systems. See Pathways Tool #2.

Feedback and next steps

Purpose: Feedback from farmers on content and delivery of meeting and discuss next steps. See Practice Hub Meeting Facilitation Reflection Report below.

Practice Hub Meeting: Facilitation Reflection Sheet

Date:

Time:

Location:

No of members present:

No/type of actor's present:

Purpose of the meeting:

What went well?

What didn't go that well?

What would you do differently next time?

<i>How would you score your facilitation skills?</i>		Strongly disagree	Disagree	Agree	Strongly agree
1	I made sure the PH members understood the purpose of the meeting.				
2	I listened and responded to questions and comments.				
3	I was able to handle disruptive PH members				
4	I encouraged participation from all PH members				
5	I enjoyed facilitating the meeting				

Reflect on your scores - what skills would you like to improve in the next meeting & how will you do this?

<i>How would you rate the performance of the PH</i>		None	Low	Moderate	High
1	Level of enthusiasm and energy of the PH				
2	Level of trust & knowledge sharing between members				
3	Equality of PH members contributing to discussion				
4	Level of clarity of purpose and shared objectives				
5	Level of facilitators intervention required				

Reflecting on the PH performance scores, what will you do in the next meeting to improve or maintain high levels of performance?

--

<i>Reflect on the living lab process step you are currently in and where you would score each criterion – if you are in 2 steps of the LL process reflect on both</i>		None	Low	Moderate	High
1	Identifying common goal				
	Level of clarity of purpose and shared objective as a PH - common goal identified based on shared need				
	Market or other actors' value of the common goal (relevance)				
	Capacity of PH to find practical solutions to the problem identified (perceived capacity of the PH by the facilitator)				
2	Idea(s) generation				
	Level at which the idea/solution is shared by the group				
	Feasibility of the idea according to application criteria				
	Level of diversity of knowledge (resources) used: science, advisors' input, practical experience etc.				
	Capacity of the PH to trail the practical solution(s) selected (perceived capacity of the PH by the facilitator)				
3	Planning and resource management				
	Robustness of the action plan including timeframe and task division (everyone knows what is happening, when and by whom)				
	Level of clarity on anticipated result and system/criteria in place for to monitor/ measure results (e.g. viability)				
	Level of resources the members within the practice hub have to commit towards trialing the innovation				
4	Experiment and development				

Level and rate to which the innovation is applied in the experiment – was the plan followed?				
Willingness to monitor, discuss and share successes and failures - to learn from failures and use data to inform decision making				
5	Scaling up across practice hub			
To what extent was the innovation successful? Can it be applied on farm to progress sustainable husbandry solutions?				
Level of satisfaction of members with regard to relevance and affordability of solution(s) developed				
Number of PH members applying the innovation as common practice across their farm				
Farmers pride of what they achieved - wanting to share the idea and upscale				
6	Embedding within sector			
Relevance of the innovation to the rest of the sector				
Relevance of the innovation to other sectors				
Capacity of PH, partners and pathways to disseminate innovation across the sector and beyond				

Any other comments:



PATHWAYS TOOL #2

BACKCASTING EXERCISE

Guidelines for visioning exercise in Practice Hub meetings of February/March 2022



Introduction

This tool was created for use by facilitators to define practice vision statements for livestock husbandry in 2050 within Practice Hubs and the MA platform which were used to inform the storyline and scenarios developed by WP2.

Purpose of the tool

The first Practice Hub meeting (March 2022):

- (a) defined practice vision statements for livestock husbandry in 2050,
- (b) identified existing and future potential problems and solutions for realising the vision, and
- (c) identified past problems that have been solved effectively.

This tool defines the visioning process facilitators used to develop visions for sustainable husbandry in 2050. Each facilitator collected qualitative data from each Practice Hub to generate “practice visions” for future sustainable livestock farming in a range of regional/national contexts. The learnings from the visioning exercise run in Practice Hubs were shared, to ensure that solutions to the problems were identified and policy visions are developed by the MA platform to address current and future challenges of livestock production.

Method and approach

A participatory back-casting approach was used to look backwards from the future to the present in order to identify strategies to achieve that future, including the identification of barriers and enablers, see figure 1. This led to answering (a) and (b) above. Additionally, Practice Hub members were asked to identify past problems that have been solved to address (c) above.

Back-casting is a different kind of thinking that can help us solve our sustainability problems. As opposed to forecasting, back-casting suggests visualising and thinking from a successful future and then asking the question “*What did I do to get there?*” An example of a back-casting whiteboard animation can be found here: <https://youtu.be/DeDm-HTFuiY>

Back-casting works best when developed collectively through a participatory process. A participatory process allowed for a rich range of inputs to shape scenarios, enabling stakeholder learning and buy-in. Back-casting reminded participants that the future is not linear, and can have many alternative outcomes depending on decisions made and the impact of external events.

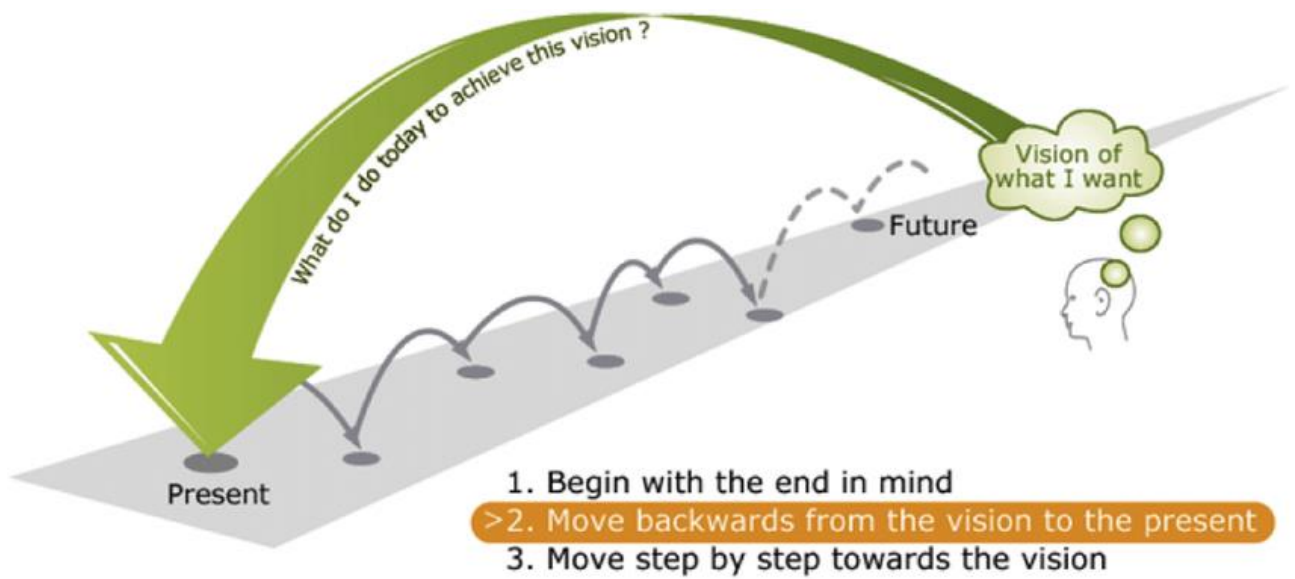


Figure 5 Visual representation of the back-casting process. Source: www.naturalstep.ca/backcasting

Reinventing pathways to close the gap between the current state and our desired outcome Henry Ford is often quoted as saying, “If I had asked people what they wanted, they would have said faster horses.” Or perhaps it would have been horses that create 50 percent less manure. Back-casting doesn’t focus on solving a root problem by substituting iterative ‘good enough’ solutions that make the situation we already have more manageable. Instead, it sets us on a path of creative innovation, squarely focused on tackling the systemic causes (why?) and working towards an eventual purpose (e.g. improved and safe mobility for all). This way we will often come up with new solutions that we may not yet be able to fully articulate or conceive.

TOOLKIT OVERVIEW SHEET TOOL #2 BACKCASTING

Back-casting is a method for determining the steps that need to be taken to deliver a preferred future

Aims:

- Agree a preferred future
- Identify what needs to change between the present and the preferred future
- Build a timeline that sets out the key changes
- Determine and address the key internal and external factors that might affect the timing or scale of change

Approach: Workshop discussion that builds on scenarios or on a vision

Participants: Practice Hub participants

Number of participants: 12 is optimal, but the process can be adapted to more or fewer participants

Time required: 90 min

Output: A shared vision of the future and the steps required to deliver it

Outcome: A short report following the vision exercise using the reporting template

Preparation required:

- If the meeting is face-to-face, organise a meeting venue with sufficient space to move around.
- If the meeting is online, identify tools to capture participants input (see below)

Materials:

- Flipcharts, post-it notes and pens
- Miro, Mural or similar virtual white board (if the meeting is online)

Facilitation process

Back-casting is an effective way of connecting a given future to the present and identifying what needs to be done to deliver it. Participants therefore worked backwards from the future and identified the key steps, events and decisions that can make their vision happen. This was both achievable online and at face to face meetings.

The back-casting exercise was facilitated in 4 or 5 steps:

Step 1: Development of vision for livestock husbandry in 2050

Step 2: Identify the key differences between the present and your future vision

Step 3: Build a timeline that sets out the key changes needed to move from the present reality to the preferred future

Step 4: Identify what the enablers and barriers are for realizing this vision

Where Practice Hubs had more than 8-10 participants, members were split into more than one group to do the exercise. In this case, a consolidating step was added at the end of the process:

Step 5: To get participants from each group to present back to the whole Practice Hub and discuss similarities and differences in visions.

Step 1 Developing a vision for livestock husbandry in 2050

45 to 60 minutes

One of the biggest challenges is to build trust among the practice hub members. Trust among members is developed over time, but the trust building process started at this first meeting and the job of the facilitator was to enable that to grow and form. Therefore, instead of diving straight into the back-casting exercise, facilitators conducted a 'warming up' exercise to initiate the process of discussing and sharing. This initial exercise helped facilitators to decide whether to do the back-casting exercise in one group or in 2 smaller groups. In Practice Hubs that have been formed around a common innovation within one livestock sector their preferred future was seen as a single vision. However, in some Practice Hubs there was more diversity, and therefore, to capture this diversity, facilitators adapted the process for developing several future visions in smaller groups.

Exercise 1: Your farm, your future (30 minutes)

This exercise was based on the work of Loveluck, W., Aubert, P.-M. (2019) to initiate reflection and sharing on the preferred future for the farm/sector of Practice Hub members.

- a. On a flipchart or on Miro draw the figure below showing contrasting futures,
 - "Full" liberalisation versus "Controlled" liberalisation through non-tariff barriers, and
 - High global demand versus Moderate global demand.

Each individual member was asked to reflect on how (s)he sees the preferred future, in which quadrant would (s)he situate him/herself and why? Each individual put a sticky note with their name of his/her farm on the flipchart/miro board where (s)he would like to be in 2050 (10 minutes).

- b. The Practice Hub members formed small groups of 3 to 4 and within each group introduced

themselves - where (s)he was from, explained their farm enterprise etc., and where they situated themselves on the diagram and why (15 minutes).

- c. The outputs on the flipchart/miro board were then presented in plenary (the whole group) and reflected on. Facilitators asked members whether they expected to see this diversity or similarity in visions and why this diversity or similarity was present (5 minutes).

This exercise and discussion enabled facilitators to decide whether to do the back-casting exercise in smaller groups or as one group. Even if participants initial visions were aligned, if they had a larger group (10+), facilitators divided the group into at least two groups, to ensure all members actively participated in the exercise, and that all possible input was captured.

Four contrasting narratives used to introduce the vision exercise:

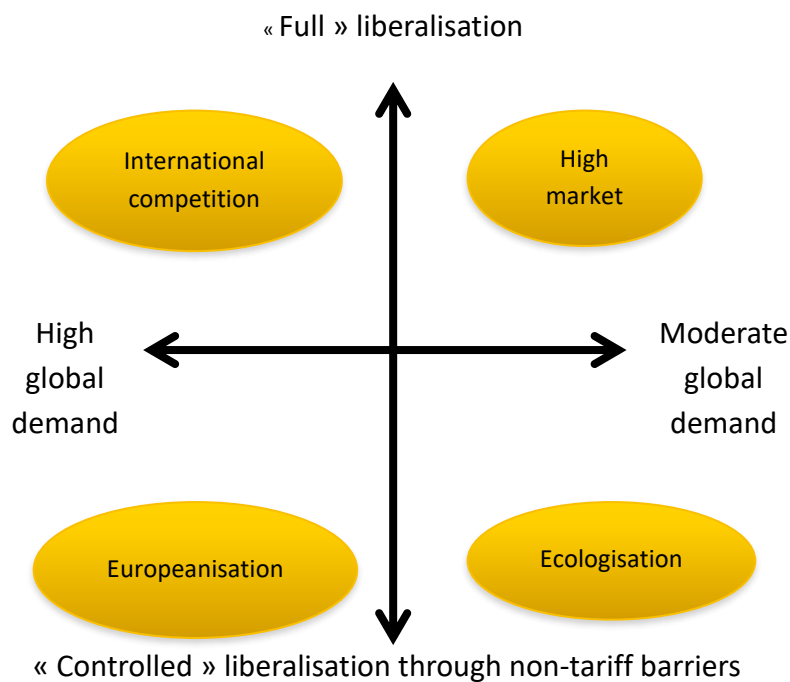


Figure 6: Four contrasting vision narratives

Narrative 1: International competition

This narrative focuses on an increased liberalisation of world food markets and strong internationalisation of value chains. Competition with new global players from emerging countries (often more competitive) increases, while food prices become more volatile. World demand for food products rises, leading to relatively high prices. At the same time, the majority of EU consumers favour low-priced foodstuff, taking health and environmental issues as second order issues, (the market share of organic products remains marginal). Technological development is mainly driven by the private sector and geared towards productivity gains through yield increases (resilience or mitigation with respect to climate change impacts remain secondary). Alternative strategies for rural development or production differentiation are only partially maintained, except in very specific circumstances (e.g. in mountainous or “high natural value” areas).

Narrative 2: Europeanisation

Under this narrative, very high levels of food safety are demanded by consumers and, to a lesser extent, environmental sustainability criteria. Most of the public norms are introduced as non-tariff barriers in bilateral trade agreements under civil society pressures. These norms create new constraints for producers, mostly resulting in higher production costs, inducing a loss of competitiveness, not compensated by public subsidies. Consequently, European producers concentrate on the EU market and lose their role on global markets. EU products still have a good reputation in terms of sanitary quality and maintain exports for niche markets. The food market is shaped by the increasing demand for convenience food (highly transformed) by EU consumers while the market share for organic food is not very significant. The development of technology is dominated by private research, focusing on higher productivity and food safety.

Narrative 3: Ecologisation

In 2050, trade is mostly ruled by bilateral agreements, with a decrease in global trade compared to the present time. EU consumers are aware of the safety and the environmental impact of food products. NGOs are very vocal on issues like animal welfare, healthy diets and the role of agriculture in environmental degradation. The market share for organic and other certified high-quality products reaches 20%. The fifth nutrition transition is well engaged, with a strong reduction in the demand for animal proteins in favour of a rise in the demand for plantbased proteins. Supply chains are shorter and less commodified, while in France for example, the market share of the five biggest national retail brands falls down to roughly 40%. An important part of the research and innovation system is oriented towards agroecology and system innovation and is well-funded, mostly by public money.

Narrative 4: High market segmentation

In 2050, global markets are liberalised and EU agri-food actors are competing with new global players from emerging countries (often more competitive). The EU market is highly segmented (within retail groups but also across retail groups). One of the five largest European retail brands have specialised in discount products, while another one has specialised in high-quality, certified products. The oligopolistic structure of the retail sector is consolidated, strengthening their bargaining power within the food chain. Consumption patterns are strongly fragmented but the overall demand for quality food is high and continues to grow, while demand for discount products is also high. NGOs recognise retailers as important market players and push the segmentation by continuously asking for higher standards while scrutinising certification processes. The research and innovation system are balanced between public and private investments.

Exercise 2: Vision 2050 (30 minutes)

Based on exercise 1 Practice Hub members were divided into groups of a maximum of 6 to 8 members to develop a vision of their preferred future for livestock husbandry in 2050. The scope (or boundary) of the vision varied based on the preference of each group e.g., sector, regional, national and/or international. The groups imagined their desired or ideal future, regardless of whether it was achievable with the technology, resources or policies of today. The process steps were as follows:

- a. Facilitators asked each individual to reflect on his/her vision and jot down ideas on a sticky note where one idea was shared per sticky note, readable from a distance (10 minutes).
- b. Once all members had contributed, facilitators ran through the contents on all sticky notes and ask members whether they could group similar ideas on the sticky notes together. When all sticky notes had been sorted, the facilitator asked the group to develop a statement that captures all visioning ideas in that theme (15 minutes).
- c. The facilitator then consolidated step 1 of this process (Vision 2050) by reading through the vision 'statements' as a group and creating one overarching vision statement for the group (5 minutes).

Step 2 Identifying the key differences between the current state and future vision

Exercise 3: Differences between present and future (15 minutes)

Now that the Practice Hub had established a vision of the preferred future, members were invited to reflect and describe the key differences between the present state and their future vision.

This exercise was facilitated by using the following key questions. What are the key differences between the present and future vision in terms of:

- the contextual environment now and in the preferred future
- the economic environment now and in the preferred future
- the sociocultural environment now and in the preferred future
- the technological environment now and in the preferred future
- the ecological environment now and in the preferred future
- the policy or strategy area now and in the preferred future
- the enabling environment that facilitates policy application now and in the preferred future

The facilitator asked Practice Hub members to discuss these as a group, and write down key differences on sticky notes.

Step 3 Build a timeline that sets out the key changes needed to move from the present reality to the preferred future

Before starting this next step, the group were given a break to rest and reenergise.

Exercise 4: Critical changes (15 minutes)

The next step in this process allowed the group to identify the key changes required to realise the preferred future/vision.

- a. Members were asked to discuss the key changes (events and/or steps) that need to occur to achieve their preferred future/vision. Facilitators gave examples, based on one of the key differences identified in step 2, to make sure that it was clear to the group. After an initial discussion the group was asked to identify the most critical changes and wrote these on sticky notes (one event/step per sticky note) (10 minutes).
- b. Once the group had exhausted their discussion they were asked to map these critical changes that must occur in order for the vision to be realised. This was done using a timeline.

Step 4 Identify what the enablers and barriers are for realizing this vision

The final step was to identify the enablers and barriers for realising the groups vision.

Exercise 5: Enablers and Barriers (15 minutes)

Members reflected back on the previous three steps and discussed the barriers and enablers for realising their preferred future. Facilitators provide two flipcharts or space on a Miro board, one which captured barriers and one which captured enablers for realising the groups vision.

If the facilitator carried out this exercise in more than one group, once each group had gone through the 4 process steps, the facilitator asked them to come back in plenary and briefly present their work back to the whole Practice Hub. Once all groups had presented back, the facilitator initiated a discussion of differences and similarities in the visions by asking members what differences and similarities they see between groups, and why they think these differences and similarities occurred. Finally, facilitators explained how the Practice Hub would build on this work in the next meeting to generate innovation ideas that can be tested in Living Labs (Pathways Tool #4).

1. What is your vision for livestock husbandry by 2050?

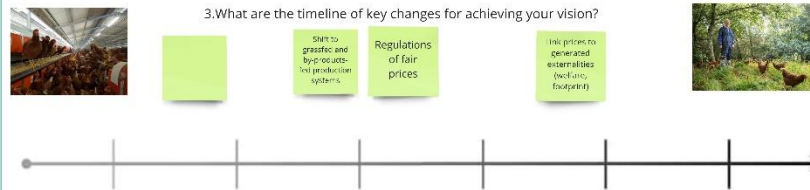
- Spatially distributed mixed farming systems
- Fair distribution of economic revenue
- Production within planetary boundaries
- Closing the loops of production & consumptions at the local scale
- Positive welfare for animal and consumers
- No feed-food-energy competitions
- Climate-smart livestock production

Group 2

2. What are the key differences between the present and your future vision?



3. What are the timeline of key changes for achieving your vision?



4. What are the barriers and enablers for realising this vision?

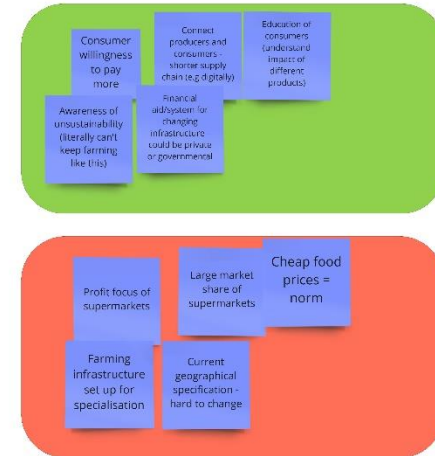


Figure 7. Example of Miro board used to develop the back-casting tool during the Facilitator training

Further examples can be found at https://miro.com/app/board/uXjVOfhN4pA=?invite_link_id=293473384717

Reporting template for visioning exercise of Practice Hubs

We are collecting qualitative data from each Practice Hub to generate “practice visions” for future sustainable livestock farming in a range of regional/national contexts. The learnings from this visioning exercise are shared with the Multi-Actor platform facilitators, to ensure that solutions to the problems are identified and policy visions are developed by the Multi-Actor platform to address current and future challenges of livestock production. Please use the reporting sheet below:

REPORTING SHEET #1 VISIONING EXERCISE

Practice Hub:

Name facilitator:

Date:

1. Vision 2050

1.1 Please describe the vision(s) of your Hub for livestock husbandry by 2050.

(300-500 words)

1.2 Please describe the barriers AND enablers for reaching this vision(s)

(500 words)

1.3 Please list the key changes needed for achieving this vision

(500 words, if possible put these changes in a timeline)

2. Links to PATHWAYS themes

How does the vision(s) link to the overarching cross-cutting learning themes of PATHWAYS that will be discussed in the Multi-Actor platform?

2.1 Trade-offs and synergies in sustainability and circularity

This first learning theme will focus on the complex interaction of the environmental with the economic, social and governance domains focusing on the multifaceted role of livestock in terms of ecosystem service provision and circularity

Did the group address trade-offs and synergies in sustainability and circularity?

If so, in what way?

2.2. One welfare

This second learning theme will use welfare as an entry point based on the ‘one welfare’ concept that recognises the interconnections between animal welfare, human wellbeing and the environment.

Did the group address one welfare to increase well-being?

If so, in what way?

2.3 Enabling transition

This theme will reflect the potential of innovations to effect change in livestock systems

Did the group address enabling transition?

If so, in what way?

3. Solved problems (inspiration for others)

Please describe past problems that have been solved effectively and how they have been solved by your Practice Hub members (1000 words)

4. Further comments



PATHWAYS TOOL #3

EVALUATING AND MAINTAINING PRACTICE HUB ACTIVITY

Guidelines for the identification of Practice Hub profiles, evaluation of value and sustaining Practice Hub activity, facilitators peer to peer workshop, May 2022.



Introduction

Once Practice Hubs had been mobilised and the visioning exercise had been carried out, this tool was designed to provide facilitators with the opportunity to come together and facilitate a peer to peer share exercise which animated the composition of Practice Hubs. This enabled facilitators to share and compare experiences of facilitating their Practice Hubs, and identify commonalities. A force field analysis also enabled the evaluation of hindering and enabling factor for Practice Hub activities, which led to a clearer understanding of the value of Practice Hubs for participating actors. Facilitators then considered how to maximise that value to maintain Practice Hub momentum and activity throughout the life of the Pathways project.

Purpose of the tool

1. Animate and share the composition and profiles of Practice Hubs across the Pathways project
2. Evaluate the enabling and hindering forces for Practice Hub activity going forward
3. Evaluate the value of Pathway activities and strategise as a peer group of facilitators for mechanisms to maximise engagement from Practice Hub members

Methods and approach

At the first consortium meeting towards the end of year 1, facilitation leads (WP1) facilitated an in-person peer to peer practice workshop with Pathway facilitators (M9). Two discreet exercises were carried out: 1) Practice Hub Personas and 2) Force Field Analysis. The methods for each exercise are now described below.

Practice Hub Personas

Facilitators were asked to complete the persona profiles of their Practice Hubs using the Persona Cards (Figure 8). This exercise not only helped facilitators to understand the Practice Hub users' needs, experiences, behaviours and goals, but also provides an opportunity to share and discuss these reflections with other facilitators, to gain further reflection, and deeper insight. Each facilitator placed their completed Persona Cards on a map of Europe and took it in turns to present their Practice Hub to the group. The Persona Card is shown below.


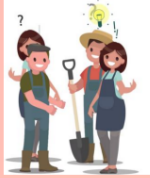

	<p>PRACTICE HUB NAME:</p> <p>PRACTICE HUB STORY:</p> <p>INNOVATION INTERESTS:</p> 	<p>GROUP DYNAMICS</p> <p>Existing group ←→ New group</p> <p>Low energy ←→ High energy</p> <p>FACILITATION</p> <p>Low enjoyment ←→ High enjoyment</p> <p>Low Confidence ←→ High confidence</p>
<p>Country:</p> <p>Sector:</p> <p>Size of group:</p> <p>Type of farmers/systems:</p>		
		

Figure 8. Facilitators described their Practice Hubs according to the custom designed Persona card



Figure 9. The Pathways Italian facilitator shares his Practice Hub story and key reflections from mobilising their group, facilitating meeting one, and the key innovation interests of his Practice Hub

Force Field Analysis

Force Field Analysis (Lewin, 1951) is a technique and tool that can be used to visually identify and analyse both enabling and hindering forces affecting a situation. This analysis enables the user(s) to then plan to make a positive change in order to overcome hindering factors within their control. Force Field Analysis is applied in a diverse range of fields from organisational change to self-development. The tool is simple to use and visual in nature which lends itself well to group work.

Once facilitators had presented their Practice Hub Personas, they were asked to form small (4-6 facilitators) groups, based around the similarities of their Practice Hub composition and interests. Each group then used large flip chart paper to identify the key enabling and hindering forces for facilitating and maintaining their Practice Hub engagement and ongoing Pathway activities. Facilitators used post it notes to arrange the enabling and hindering factors, the output of which are shown in the following Figures.

Facilitating and maintaining Practice Hub activity

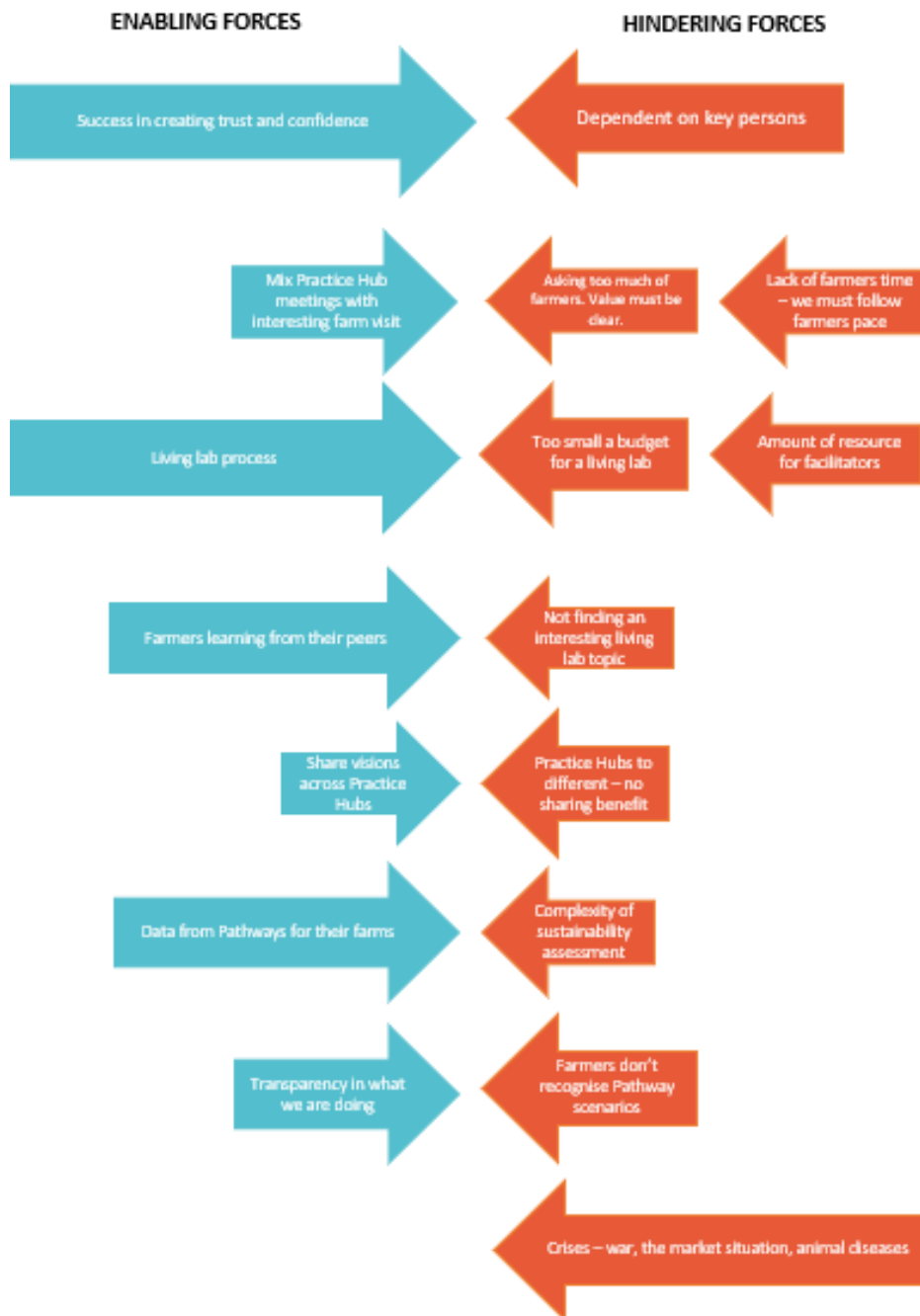


Figure 10. Output from facilitators force field analysis at peer to peer workshop

Facilitating and maintaining Practice Hub activity

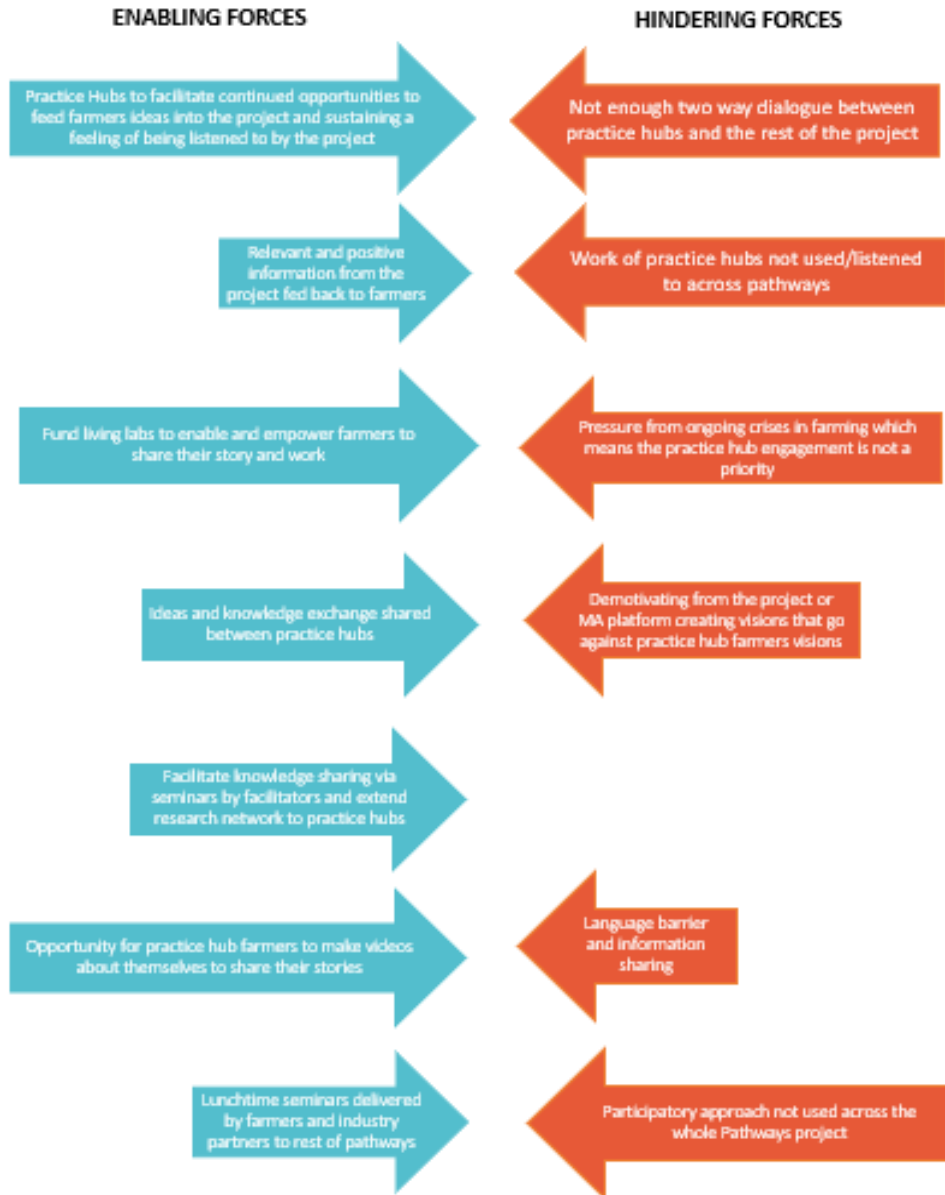


Figure 11. Output from facilitators forces field analysis at peer to peer workshop

Facilitating and maintaining Practice Hub activity

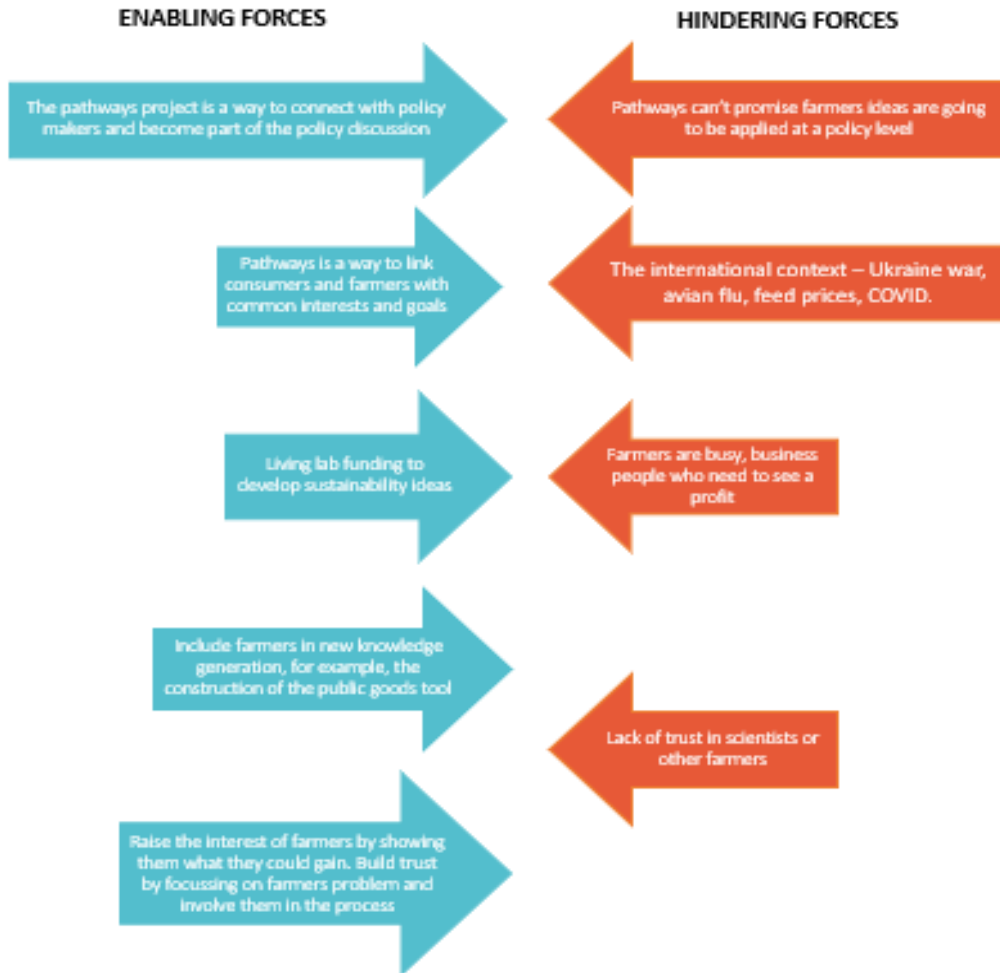


Figure 12. Output from facilitators forces field analysis at peer to peer workshop

Each group then presented their force field analysis and a plenary discussion consolidated the key hindering and enabling factors. This exercise helped identify the key values for Practice Hub participants engaging in Pathways activities. The main values which facilitators identified were participation in policy and scenario development, sharing and learning new ideas from across Practice Hubs, raising the profile of their innovative practices, engaging in the living lab process, and funding for developing and applying new innovation on farm to advance their visions towards sustainable husbandry in 2050. In Figure 13 below, one group is feeding back on their enabling forces, presenting how they will mitigate their hindering forces, and identifying the value for actors to maintain Practice Hub engagement and activity.



Figure 13. Force field analysis discussion during a facilitator workshop



PATHWAYS TOOL #4

PUBLIC GOODS TOOL

Guidelines for the co-design and application of the Public Goods tool, October 2022.



Introduction

The Public Goods Tool is a Microsoft Excel-based form which was initially developed by Gerrard et al. (2012) to analyse the contribution of public goods from organic farms in England. It was selected and adapted for the purposes of Pathways and Practice Hub evaluation, to provide estimates on a participating farm's sustainability through analysing ecological, economic, and social dimensions, in accordance with the FAO's definition (2014).

Purpose of the tool

1. Identify the ecological, economic, and social performance of participating Practice Hub farms and provide feedback to participating farmers on the sustainability status of their farms according to the Public Goods Tool
2. To identify sustainability strengths and gaps in order to inform the development of Living Lab innovation ideas

Methods and approach

Adaptation of the tool and education on its functions was conducted in an iterative process with Practice Hub facilitators and industrial partners. Experts in different areas were also consulted. This resulted in two main adaptations to the approach: 1) a shift in the aim of the data collection to provide an estimate of a participating farm's sustainability characteristics by analysing its ecological, economic and social dimensions, and 2) adapt the data collection process to be applied within a diverse range of Practice Hubs after participating European countries and system, which represented the major animal species and nation-specific characteristics. The modifications concerned economic and social issues and agri-environmental management are reported in the Table below.

Table 2: Data required for a farm assessment using the Public Goods Tool; elements of difference with the original version of the tool (Gerrard et al., 2012) are highlighted in *Italic font*; each spur's activities are listed below the spur's name, and the related questions summarized in parenthesis.

Spur/worksheet name and associated data ¹	Units/data format
Initial data (data used in several spurs)	
Dominant soil type	List of soil types
Annual rainfall	mm of rainfall
Altitude	metres above sea level
Total UAA (utilisable agricultural area)	area (ha)
Crops (arable; vegetables/horticulture; energy crops; others)	area (ha), marketable yield (tonnes/ha), yield (total tonnes), import and export (tonnes), energy content (MJ), NPK content (kg/tonne)
Forage (e.g. lucerne, red clover ley, temporary leys, fertilized <i>and unfertilised</i> permanent pastures)	area (ha), yield (total tonnes)
Other land (non agricultural)	area (ha)

Farm woodland (e.g. conifer, broadleaved, mixed woodlands)	area (ha), export (tonnes), energy content (MJ), NPK content (kg/tonne)
Built-up land including roads	area (ha)
Imported seeds	import (tonnes), energy content (MJ), NPK content (kg/tonne)
Imported and exported animal feeds -forage	import and export (tonnes), energy content (MJ), NPK content (kg/tonne)
Imported animal feeds - arable crops/straights	import (tonnes), energy content (MJ), NPK content (kg/tonne)
Imported animal feeds - compound	import (tonnes), energy content (MJ), NPK content (kg/tonne)
Other imported animal feeds	import (tonnes), energy content (MJ), NPK content (kg/tonne)
Other animal feeds (forage, protein, energy, mineral supplement)	import (tonnes), energy content (MJ), NPK content (kg/tonne)
Arable straw	import and export (tonnes), energy content (MJ), NPK content (kg/tonne)
Organic manures, slurries, sewage sludge/biosolids	import and export (tonnes), energy content (MJ), NPK content (kg/tonne)
Inorganic fertilisers (nitrogen, phosphate, potassium, others)	% of N, P, K, concentration, import (tonnes), energy content (MJ), NPK content (kg/tonne)
Livestock type and yearly average numbers of stock	Numbers and average liveweight (kg) per type
Headage import / export for livestock type(s)	Numbers and type of stock
Livestock products (e.g. milk, eggs, wool)	'ooos of litres milk, tonnes of egg and wool
Energy data (data used in Energy and Carbon spur)²	
<i>Renewable energy production on the farm (e.g. wood fuel, wood residues, biogas)</i>	m ³ , and Energy content (kWh, MJ)
Energy in livestock and crop products leaving the farm	Energy content (MJ)
<i>Total energy production</i>	MJ
Own energy consumption on farm	m ³ , %, kg, ton and Energy content (kWh, MJ)
Contractor's energy consumption	hours, ha, %
<i>Energy consumption from manufacturing fertiliser (fertiliser production modality, N, P, K)</i>	Ton, MJ
Energy in inputs entering the farm	MJ
<i>Total energy production, consumption and net production (energy production - energy consumption)</i>	MJ, MJ/ha, kWh/ha
Renewable energy used on farm	%
<i>Energy produced compared to energy consumed</i>	%
Economic data (data used in Profitability and Farm Business Resilience spurs)³⁻⁹	

All items below were requested for livestock, crops for sale, and other enterprises, respectively:

Receipts (sales of livestock, derived products, payments)	National currency
Agricultural practices beneficial for climate and environment	National currency
Costs (labour, upkeep of machinery and equipment, rents, depreciation)	National currency
Assets (cash, value of stock, livestock, machinery, liabilities and owners' equity)	National currency
Own input (company owner's labour time, interest company owner's equity, annual cost of capital)	h/year, %, national currency
Key figures similar to FADN (results before depreciation, labour, rents paid and financial net result)	National currency
Extra key figures (net result to company owner's labour/h, local currency and €)	Labour/h, national currency, €

Profitability

Farm owner's net result per worked hour compared to national results corrected for purchasing power parity for livestock enterprise*	
Farm owner's net result per worked hour compared to EU results corrected for purchasing power parity for livestock enterprise*	
Farm owner's net result per worked hour compared to national results corrected for purchasing power parity for whole company*	%
Farm owner's net result per worked hour compared to EU results corrected for purchasing power parity for whole company*	

Farm business resilience

Farm resilience (ability to carry out investment, variations in the profit margin from year to year, sources of farm income, frequency of business review, collection of business and performance data, and related management, expectation about farm continuing in next year and next decade)	Lists of options
Readiness (flexibility in inputs/outputs choices, business plan, presence of benchmarking activities and future plans)	Lists of options
Financial viability (perception of the fairness of the farm products' prices and their coverage of the production's cost, changes in last five years, financial solidity)	Lists of options, %

Soil management^{10,11,12}

Soil analysis (analysis frequency, trend of the soil organic matter levels)	List of options
Soil management (description of the crop rotation, presence and description of woody plants, percentage of arable land left as bare ground, land management to avoid soil compaction)	Lists of options, %
Winter grazing	Lists of options
Erosion (description of the type of erosions that affect the utilisable agricultural area)	%
Erosion reducing measures (if risk of erosion is present)	Lists of options, %

Water management

Minimising pollution and maximising efficiency of water (presence and quantification of arable land containing buffer strips/field margins, performance of non-inversion tillage or contour ploughing)	Lists of options
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Flood defence and runoff prevention conditions	List of options
Water harvesting (quantity of recycled water is used on farm, quantity of rainwater/groundwater is harvested for use on farm)	Lists of options
Irrigation (irrigation management, type and conditions of the application system)	Lists of options

Manure and Fertilisers

<i>Manure management in barn (biofilter etc, slurry management, alleys management and cleaning, litter usage, manure management and removal)</i>	Lists of options
Nutrient planning (nutrient application for crops, staff training, NPK content of manure/compost applied)	Lists of options
Manure storage (modality, storage facilities' conditions and frequency inspections)	Lists of options
Manure application (slurry spreading modality, solid manure and slurry incorporation)	Lists of options
Fertiliser management (inspections' frequency of fertiliser spreaders and of fertiliser application rates, time of the year when manufactured nitrogen fertiliser is spread)	Lists of options
Farm waste disposal (recycling, dispose modality of unused/unwanted medicines, presence of a written waste strategy)	%, list of options

Energy and carbon¹³⁻¹⁶

<i>Energy consumption (energy use per ha agricultural land, and compared to national and EU average, monitoring, energy audit) *</i>	MJ/ha, %, lists of options
<i>Renewable energy (share of renewable energy compared to national and EU average, and in relation to the farm's energy consumption) *</i>	%
<i>Greenhouse gases (forage losses from field to muzzle, enteric emissions, manure handling efficacy, completion of greenhouse gas audit)</i>	Lists of options, livestock units of ruminants vs. monogastrics
Land use (conversion of wood/grass land to arable land and vice versa in the last 20 years, soy bean used for animal feed, carbon sequestration)	List of options, %

Agri-environmental management¹⁸⁻²³

<i>Intensity (stocking rate on the farm) *</i>	Livestock unit/ha
<i>Habitat (arable land, permanent pasture, land for fruit, energy crops, etc)</i>	%
<i>Management of arable land (number and description of the crops, field size)</i>	Number of crops, lists of options
<i>Management of pastureland (percentage of unfertilised permanent grassland, percentage of permanent pasture regarded as having high nature values, percentage of permanent pasture covered by bushes and trees)</i>	%, lists of options
<i>Management of other land (farm woodland, wildlife habitats, soybean for animal feed)</i>	%, lists of options
Pesticide use (control measures and sprayer management)	Lists of options

Landscape and heritage²⁴

Historic features (presence, conditions, maintenance)	Lists of options
Landscape features (farm's traditional characteristics in the area, proportion less favoured area)	Lists of options
Management of (on farm) boundaries (presence, proportion of boundaries with high environmental value)	Lists of options
Genetic heritage (farming of rare, traditional livestock breeds, usage of heritage varieties of crops)	Lists of options

System security and diversity

Production (farms' yield and comparison with similar farms, <i>number of products of the farm</i>)	Lists of options
Reliably (<i>farm's ownership state of the interviewed, percentage of feed bought off-farm</i>)	List of options, %
Cultivated diversity (plants, animal species, breeds)	Number of plants, animal species and breeds
<i>Farm's products (added values, certification, own processing and selling)</i>	List of options, %
Market (number of outlets, geographical area)	Lists of options

Animal welfare^{25,26,27}

<i>Staff resources (inspections of healthy and risk animals, skills in welfare inspection and euthanasia, claw trimming routines, feed rations planning, emergencies plans)</i>	Lists of options
<i>Animal health (management, cooperations with professionals of the sector, somatic cells count in milk, mortality rate among growing and adult animals, cassation at the abattoir due to pathologies/lesions/drug residues)</i>	Lists of options
<i>Animal behaviour (grazing, access to outdoor areas, presence of environmental enrichments, cannibalism, and sows' fixation around parturition)</i>	Lists of options
<i>Housing (access to litter, solid floor, space available for growing and adult animals)</i>	Lists of options, kg, and m ²
<i>Biosecurity (management of new animals, public access to the animals)</i>	Lists of options

Social wellbeing²⁸⁻³¹

<i>Health and safety of workers (numbers of injuries and full-time workers, actions taken to preserve workers health from biological, chemical, ergonomical, physical, physiological, and safety hazards) *</i>	Numbers, lists of options
<i>Public's health and safety (cassation at abattoir due to pathologies/lesions/drug residues, minimization of hazardous substances in water, soil and manure)</i>	Number of non-accepted animals, list of options
<i>Fair competition (perception of the fairness of the farm products' prices and their coverage of the production's cost, relationship with the customers)</i>	Lists of options
<i>Local employment (short- and long-term workforce, family work, and local workforce, goods and services)</i>	Lists of options, %

Each spur characterised in the table above contained three to six activities (for a total number of 52) which, in turn, were composed of a list of questions, assigned a score from 1 (poor sustainability) to 5 (excellent sustainability) based on the answers provided by the participating farmer. There were questions with quantitative answers retrieved from farm recordings and questions with semi-quantitative and qualitative answers designed as multiple-choice questions with lists of options. A single spur's overall score was calculated as average of the scores of its activities which, in turn, represented the weighted average of the scores assigned to its questions. An example of the visual presentation of each farms Public Good Tool data output is show below for illustration (Figure 14).

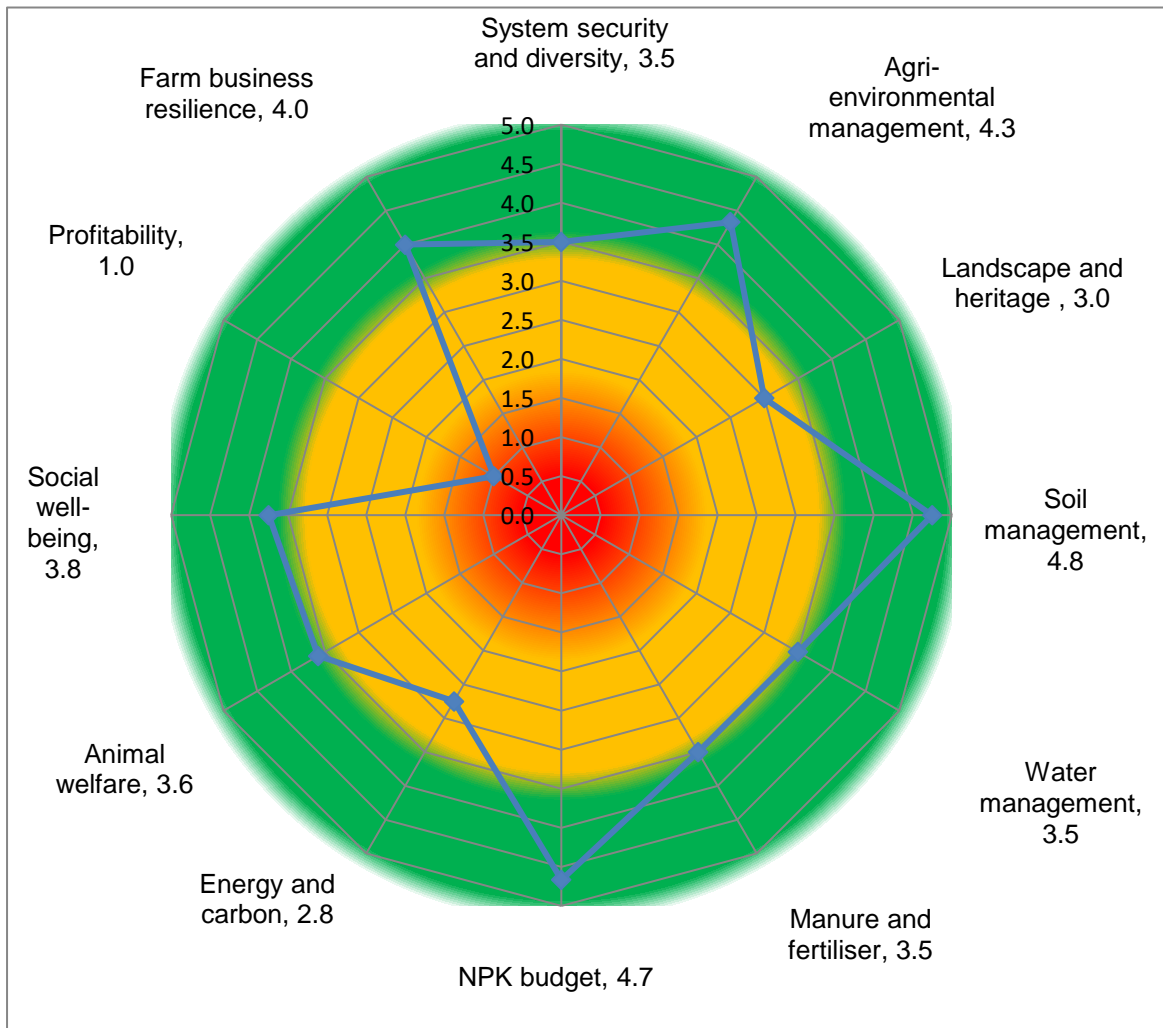


Figure 14. An example of the output from the PG tool, showing strengths and weaknesses of different sustainability aspects

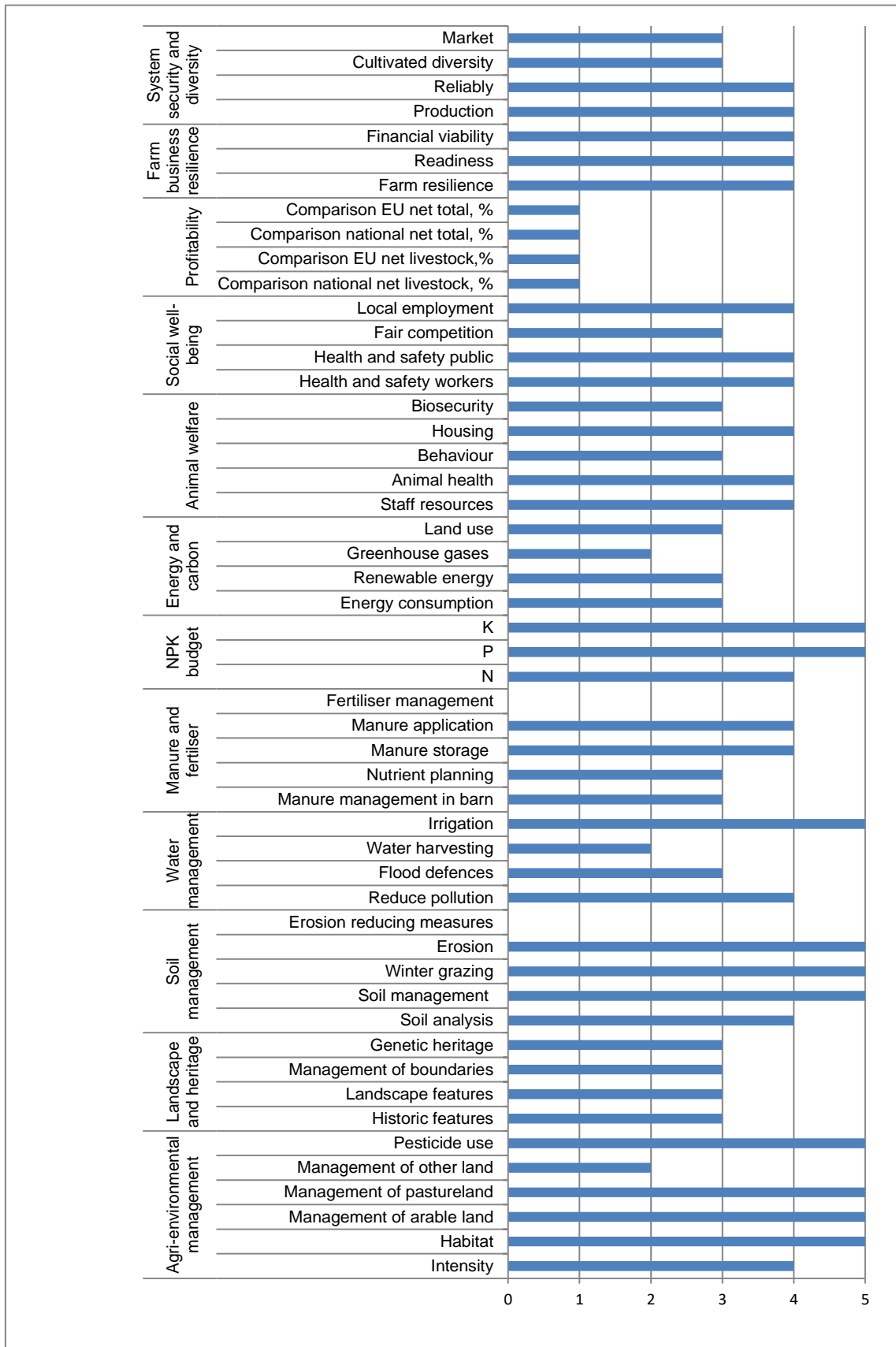


Figure 15. An example of the output of the PG tool, showing how a farm performed from poor to excellent sustainability in each of the spurs and associated activities

In order to feedback the economic, ecological and social sustainability results to each individual participating farm and reward farmers for engaging in this process, Pathways designed and distributed a Certificate to each participant farmer across the Practice Hubs. Farmers were also sent a Pathways t-shirt to thank them for their time and facilitate ownership and engagement in the project. An illustration of the Certificate sent to farmers is presented below (Figure 16). The collective Practice Hub results were also discussed at the next meeting, in the context of generating Living Lab ideas.



Figure 16. The Pathways Certificate for farmers participating in the PG tool data collection



PATHWAYS TOOL #5

INNOVATION WHEEL

Guidelines for the identification of innovation needs and ideas by Practice Hubs,
January 2023.



Introduction

This tool was designed to help facilitators undertake a systematic and standardised exercise, to collectively identify where each Practice Hub was in terms of existing sustainability practice, to where they need to go, identifying key gaps in practice and therefore areas to work on to develop Living Lab innovation ideas and an application for funding.

Purpose of the tool

Getting rich discussion with farmers is often a bit challenging especially at the beginning when a Practice Hub is still forming and everyone is not as comfortable to share openly with each other. Using a visual tool helped in the group discussion, creating a higher level of engagement. This tool introduces a visual circular (wheel) tool which was used to further explore the challenge and innovation area each Practice Hub was working on. It enabled the sharing of practices and helped identified a concrete and innovative idea to take forward in for further planning and development/experimentation. This was the initial step in the Living Lab innovation process, as shown see below in Figure 17.

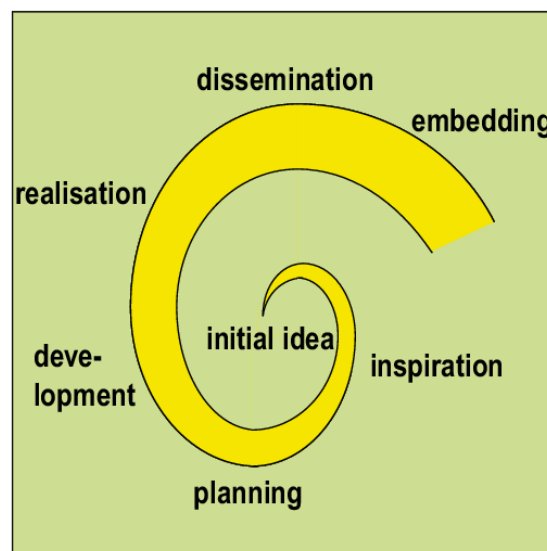


Figure 17. The different stages of the Innovation Spiral

Source: H.E. Wielinga (2014): "Network Dynamics"

At the session facilitator training session in Pisa, January 2023, facilitators adapted the innovation spiral and developed their own innovation steps, as follows:

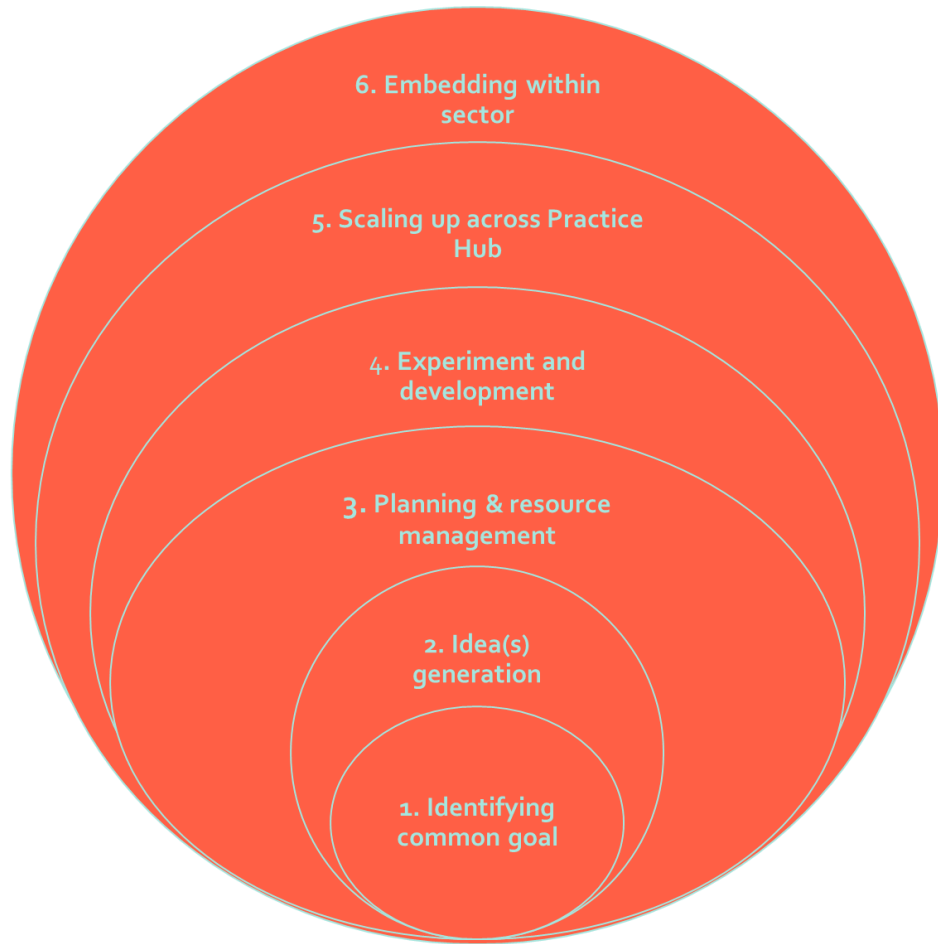


Figure 18. The co-created innovation steps developed by Pathways facilitators

Facilitation process

The process described here is based on Practice Hubs having already agreed the overall idea(s) or ambition(s) they wanted to work on which Practice Hub members were mobilised around. For example, reducing respiratory and digestive health issues during the early life of sheep or reduction of greenhouse gas emission by utilising manure for biogas in conventional pig farming.

Step 1: Practice Hub members started by drawing a circle in the middle of the flipchart or online whiteboard, wrote one of their main ideas/ambitions on a sticky note and put this in the centre for example introducing green proteins in pig production system.

Step 2: Practice Hub members then identified all their current practices related to the idea/ambition. Facilitators asked participants to write one practice per sticky note and arrange them around the centre. The facilitator sorted the post-it notes so there were no duplicates and the meaning of all of them was clear to all members of the Practice Hub.

Step 3: Once all current practices were identified and clarified the next question was to identify the challenges and/or barriers which applied and/or increased the various practices on farm. Limitations would include for example concern over climate requirement for establishing the trees e.g. site is too windy. Practice Hub members write one per post-it note and arranged the challenges/barriers next to the related practice ensuring there were no duplicated and all sticky notes were clear to everyone. This led to a lot of discussion on the challenges and limitation for each practice as some farmers had very different experiences. This discussion was encouraged as it allowed Practice Hub members not only to share and learn from each other, but start to come together and seek consensus around the innovation idea.

Step 4: After the discussion on challenges and barriers, the group moved onto identify the cause of each challenge/barriers such as gaps in knowledge, resources or information available to overcome the challenge. This included a discussion with all members potential gaps for each challenge/barrier mentioned. Members wrote on each challenge/limitation what was causing the gap (K)nowledge, lack of (R)esources, lack of (I)nformation and elaborated on this further by adding sticky notes describing the specific gaps. For example, a lack of knowledge about optimum climate to establish orchards was a barrier for not establishing trees on farm.

Step 5: Based on the gap analysis facilitators then asked the farmers to come up with solutions to bridge the gaps identified. The solutions could be as easy as asking the vet, share a specific tool that one farmer made or as challenging as testing something new in a field trial or Living Lab.

Step 6: In the final step, Practice Hubs decided which solutions are most viable to take forward to trial as part of a Lb Lab. The facilitator therefore facilitated a discussion around the solutions and agreement was sought on whether this was something they wanted to action. A ranking system was used (High-Medium-Low) in plenary based on the outcome of the discussion, or individual members were asked to rank each potential solution to find out what was perceived as the highest priority and/or seen as most viable by the group. Once there was agreement on one (or two) particular solutions, facilitators worked with their Practice Hub to write the idea up into a more detailed proposal, to apply for Pathways innovation funding.

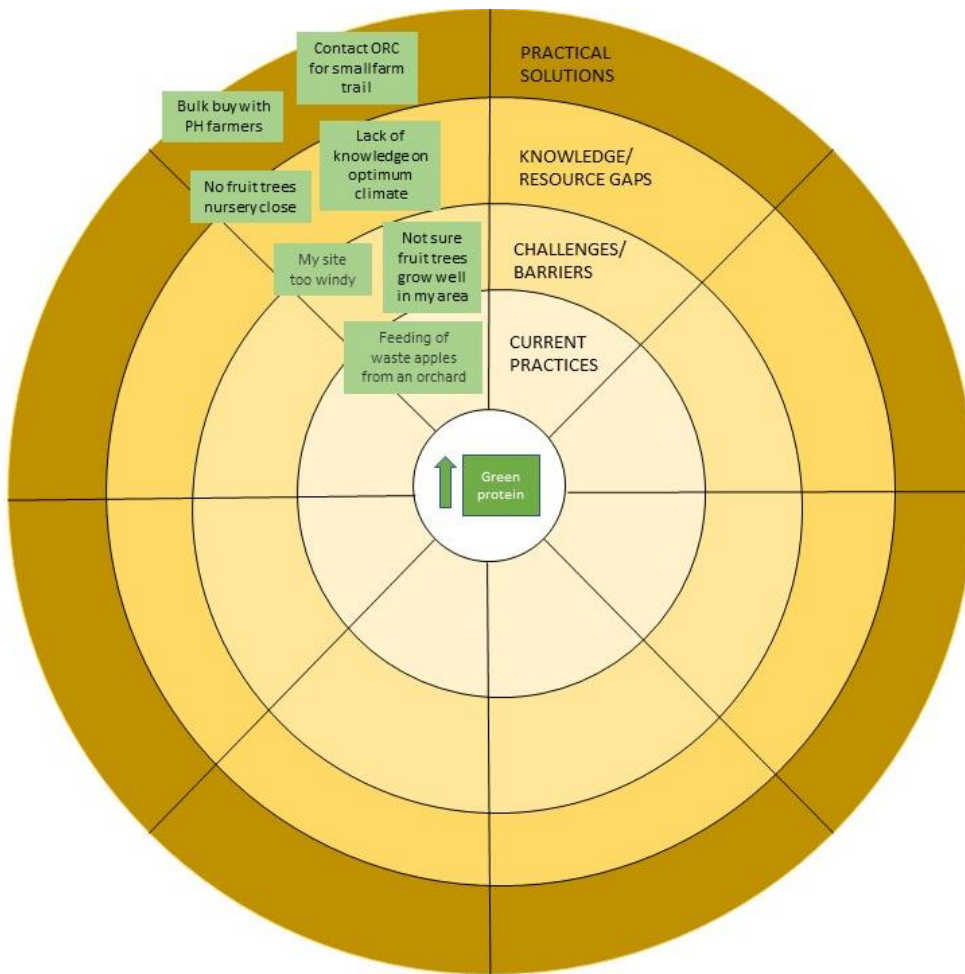


Figure 19. Theoretical example of the Innovation Wheel for implementing green protein on farm

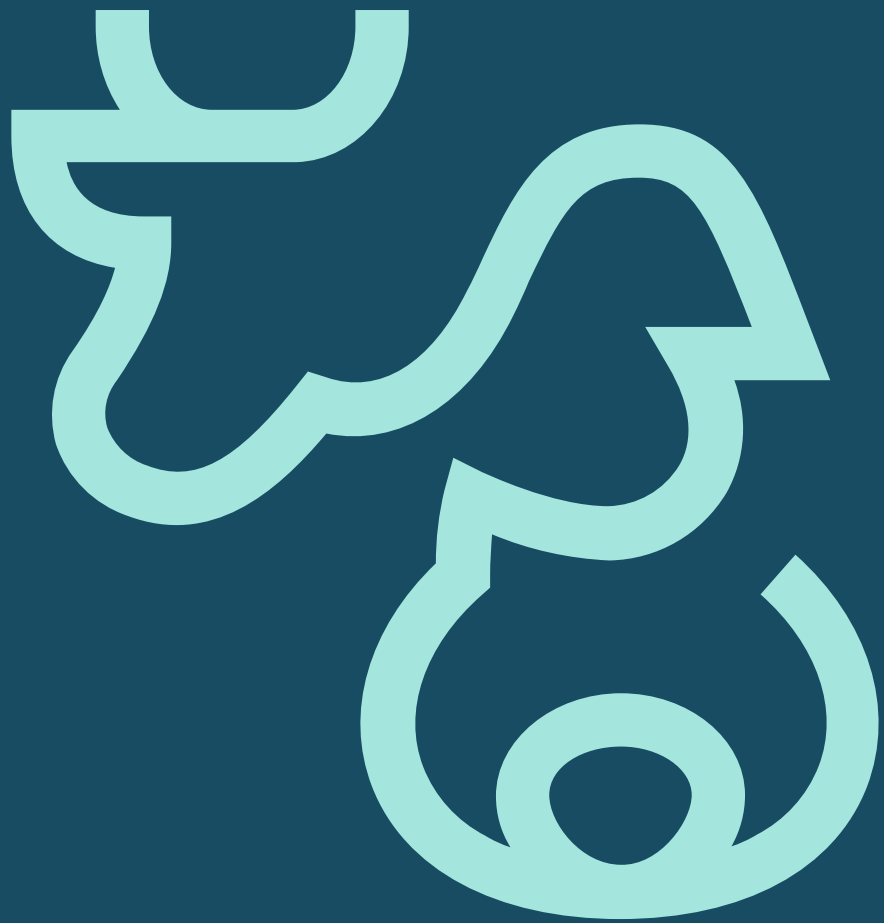


Figure 20. Practical example of the Innovation Wheel to develop ideas around implementing green protein



Figure 21. Facilitators' show and tell - sharing and giving each other feedback during training

Facilitators used the innovation design wheel (Pathways Tool #5) with Practice Hubs to identify ideas and co-designed living labs to trial and develop innovative bottom up solutions towards their sustainability visions (Figures 19-21).



PATHWAYS TOOL #6

FEEDBACK ON STORYLINES & SCENARIO DEVELOPMENT

Guidelines for Practice Hub and MA Platform facilitators to present and collate feedback on Pathway storylines and scenario development, June 2024.



Introduction

At the 3rd year workshop with Practice Hubs (June, 2024), and the MA Platform (Autumn, 2024), the focus was on presenting the storylines that had been co-developed by WP2 using an iterative process with Practice Hubs, MA Platform and the Pathways consortium. The storylines and scenario development have been constructed based on the visioning exercise which both Practice Hub and MA platform participants contributed to in year 1 (Pathways Tool #2). The storyline and scenario development had now got to a stage where Pathways needed further input and validation from Practice Hub farmers and MA platform participants. A headline summary descriptor of the Storylines were as follows:

- **Feed no food:** Feed-food competition is reduced to its minimum, while agrobiodiversity conservation is integrated into agricultural practices;
- **Efficiency first:** The focus is on increased feed conversion efficiency of animal productions as a key lever to reach environmental performance. The search for efficiency extends beyond the livestock systems, to the processing industry, that transitions following a strong “industrial ecology” approach;
- **Rural renaissance:** Livestock sector transformations contribute to revitalize rural communities through the maintenance of a strong agricultural dynamics across landscapes, a greater level of autonomy for farmers that deliver not only food but also a range of ecosystem services;
- **High animal welfare:** The objective is to maximize the positive experience of animals throughout the value chains, and to increase animals’ agency over their own lives, e.g., by providing interesting indoor and outdoor spaces or robotic milking, which encourages individual choice;
- **A stock free Europe:** The progressive disappearance of production-oriented livestock systems across Europe, and with it of the industrial production capacity at all stages. (note: need to see it as a “counter-factual” reflection / scenario in order to identify “what we miss” when livestock disappears from a variety of viewpoint: biophysically, socially, economically, politically).

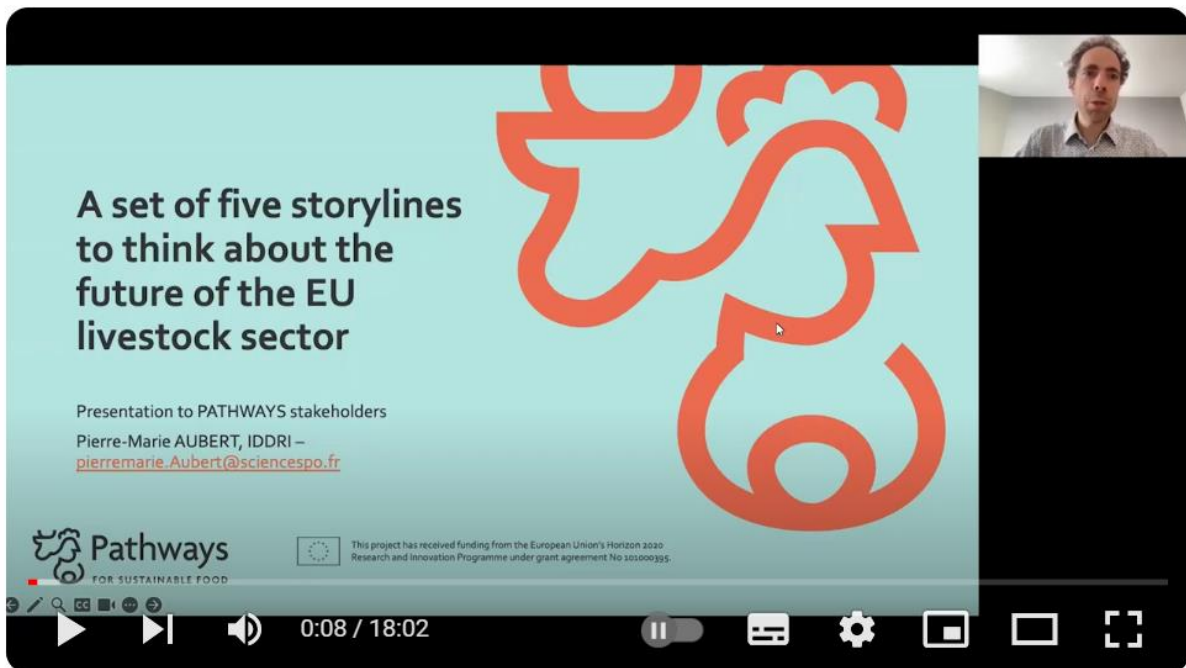
Purpose of the tool

- To present the findings of Pathway storylines which Practice Hub and MA platform participants contributed to as part of the visioning exercise
- To give Practice Hub and MA platform participants a further opportunity to feed into the storyline and scenario development, as well as validate the existing storyline development
- To highlight any major issues or barriers identified by practitioners and actors across the value chain
- Identify which innovative practices can help meet elements of each storyline

Facilitation process

The Practice Hub and MA platform workshops this year have taken place between June 2024 and the annual consortium meeting of Pathways (September 2024). Each individual workshop aimed at approximately two hours and the local language was used. Depending on the group size, parts of the meeting were either conducted in plenary or in subgroups. This workshop sought to find consensus on Pathways storylines and to identify which innovative practices would help achieve the different storylines. It also provided insight into how the Practice Hub members see themselves as part of this process, and what steps are needed to reach a storyline according to Practice Hub members.

Facilitators used the pre-recorded presentation available here [Storyline Development](#) or by clicking on the visual below. Here Pierre-Marie Aubert explains the different storylines in English (subtitling in local languages is available via automatic translations, Figure 22).



Storyline development | PATHWAYS Seminar

Figure 22. Image depicting the Storyline presentation used to introduce the storylines and gain feedback from Practice Hubs and MA platform members

Content and format of the workshop

- Icebreaker (and where needed) around the table introduction (15 minutes)
- Presentation of the five storylines, using the preparatory material (30 minutes)
- Plenary questions, feedback and discussion on all storylines (15 minutes)
- Break (15 minutes)
- Discussion on a pre-defined question (15 minutes)
 - Which storyline is or which storylines are relevant for your Practice Hub? Possible supporting questions:
 - how do your practices contribute to the storyline?
 - how do you see the current practices in your Practice Hub meet the storyline?
- Exercise which defined innovative practices that are needed to fill the gaps between the current situation and the envisioned storyline (30 minutes). Practice hub members reflected and described the key differences between the present situation and the storyline that was most relevant for the Practice Hub. Facilitators asked members to write down key differences on sticky notes (5-10 minutes), then discussed the results as a group (20-25 minutes). Supporting questions that were used to facilitate the discussion included: What are the key differences between the present situation and the storyline in terms of:
 - the contextual environment now and in the storyline
 - the economic environment now and in the storyline
 - the sociocultural environment now and in the storyline
 - the technological environment now and in the storyline
 - the ecological environment now and in the storyline
 - the policy, governance, or strategy area now and in the storyline
 - the enabling environment that facilitates policy application now and, in the storyline.

The content and progress of these workshops was discussed during the monthly online check-up meetings with facilitators of Practice Hubs, and the results will be presented and discussed during the General Assembly of Pathways (September 2024), and used in the further development and refinement of scenarios and transition Pathways to sustainable food.

Reporting template: Feedback on Pathway storylines and scenario development

Practice Hub:

Name of facilitator:

Date of meeting:

1. Storylines relevant for your Practice Hub

Which storyline is or which storylines are relevant for your Practice Hub?

- how do your practices contribute to the storyline?
- how do you see the current practices in your Practice Hub meet the storyline?

2. Gaps between the current situation and the storyline

Which innovative practices are needed to fill the gaps between the current situation and the envisioned storyline? What are the key differences between the present situation and the storyline that is most relevant for the Practice Hub? Examples to consider:

- the contextual environment now and in the storyline
- the economic environment now and in the storyline
- the sociocultural environment now and in the storyline
- the technological environment now and in the storyline
- the ecological environment now and in the storyline
- the policy, governance, or strategy area now and in the storyline
- the enabling environment that facilitates policy application now and, in the storyline.

3. General feedback

Feedback on the Storyline process

Please provide any feedback or input your Practice Hub members have on the Storyline process – for example, do the steps being taken in this process to construct the storylines and the scenario development make sense, is there anything missing, you would do differently, or would like us to also consider?

Feedback on links to your vision

Please provide any feedback your Practice Hub members have on the links to their visions created in year one, and the outcomes of the storylines – for example, do they see their visions animated within the storylines? Is there anything major missing in the storylines which are in their visions?

Feedback on each Storyline

Please provide any feedback or input your practice hub members have on each storyline. For example, do they have a preference, or do they see the importance of in acting several storylines? If so, which ones and why? Is there anything major missing from a particular storyline? Are there any barriers or enabling factors we have not considered that need to be thought through as part of this process?

a) Feed no feed

b) Efficiency first

c) Rural renaissance

d) High animal welfare

e) A stock free Europe

4. Any further comments or feedback

Conclusion and recommendations for future research and co-innovation processes

At a national level, Pathway facilitators mobilised, recruited and facilitated 15 Innovative Practice Hubs of farmers and industry actors across participating European countries. National Practice Hubs were selected to represent the major livestock species and production systems along a spectrum of innovation types, from products, production techniques, marketing and organisation (OECD, 2015). At a European level, to ensure participatory MA engagement from across the supply chain, Pathways mobilised a European MA Platform organised under core sustainability themes (trade-offs and synergies; enabling transition – leverage points; and one welfare), to develop visions for sustainable husbandry in 2050, and enabling the creation and co-development of storylines and scenarios for Pathways to sustainable food (Pathways Tool #1).

None of these processes or outcomes would have been possible without the capacity building and application of core competencies by a team of facilitators. Each stage of this process was led by facilitation leads (WP1), but crucially co-designed with the facilitation team and, where relevant, other consortium members. This was to ensure ownership and buy-in through shared decision making, and ensure the process outcomes were relevant, effective, and satisfying to the facilitators, farmers and other actors using, delivering and/or engaging in the process.

To identify and increase sustainable practices through the co-creation of visions for sustainable husbandry in 2050, a back-casting exercise (Quist and Vergragt, 2006) was adapted and co-designed with facilitators, and applied at the first meeting of Practice Hubs and the MA platform in year 1 (Pathways Tool #2). Practice Hub and MA platform visions were then utilised and synthesised into five core Storylines for sustainable husbandry (WP2).

At the first Pathways consortium meeting (M_g) facilitation leads led a reflection workshop, to enable facilitators to characterise and share the profiles and experiences of mobilising and facilitating their Practice Hubs, and consider the value of the process through completing a force field analysis (Lewis 1951). This evaluated the value and purpose of Practice Hubs, and considered how to maintain their engagement and project activities over the course of Pathways (Pathways Tool #3).

In order to support Practice Hubs to understand how to achieve their sustainability visions, each Practice Hub farm needed to understand the existing sustainability attributes as well as gaps in sustainability practice. The PG Tool Task leader facilitated a collaborative education workshop (October 2022) with facilitators to adapt the public goods tool, in order for facilitators to characterise and animate performance against key sustainability metrics on Practice Hub farms (Pathways Tool #4). PG Tool data was then collected across Practice Hub Farms and the data was shared with individual farms, and discussed as a group, in the context of the next step, which was to develop innovative living lab ideas to address needs and gaps

towards sustainable husbandry (See Deliverable 1.3, Public Goods Tool based holistic sustainability evaluation of practice hubs).

In order to co-develop the Pathways innovation approach, facilitation leads mobilised an in-person workshop (January 2023) to bring facilitators together, share and develop creative practices to take a Practice Hub from ideas generation through the living lab process (Pathways Tool #5).

Our work with the Practice Hubs and the MA platform, around mobilising farmers and value chain actors in shared vision creation, complex Public Goods on-farm data collection, innovation creation for Living Labs and scenario formulation requires capacity to build and facilitate complex multi-actor processes (Ingram et al. 2020).

As Fielke et al. (2017) identified, to foster co-innovation, networks of actors must have adequate capabilities and legitimacy, as well as a shared understanding of priorities between actors, as well as fundamental resources (van Dijk, 2017). In our experience resources in the co-innovation process not only include access to finance or analytical skills, but fundamental the capacity and competence of a facilitator whose primary role is to support the group to work together around a shared vision and design innovation which will test common goals.

In order for co-innovation around shared visions to succeed and be as applicable and palatable as possible, these processes should include a mixture of actors, with unique perspectives and experiences but complimenting expertise. Here the facilitators primary role is to create and encourage spaces of open and honest dialogue, in order to develop common understanding, and mobilise actors around a shared sustainability vision. To increase inclusion across co-innovation processes, Pathways would recommend completing an actor mapping exercise, to identify and address gaps before mobilising innovation networks.

Facilitation of co-creation processes has been found to build trust, creativity and efficacy, and has the power to increase the uptake of new practices by bringing actors together to share challenges and co-create new practices and innovations relevant to their farms, sectors and geographical locations. When evaluating the impact of co-innovation processes, evolve processes as projects evolve, and share impact, learnings and next steps, the output's need to include both the co-innovation results, but also reflective evaluation on the process. This includes both the progress of co-innovation, the tools utilized, and the skills and capacity of the facilitator. Facilitation processes can be built on previous research, practical experience and practitioners' continuous improvement and reflection process, but also need to be adapted and transformed in collaboration with all end users of the tools, to create and fit the aims and objectives of the project and ensure ownership, buy-in and palatability for all tool users.

Facilitation of multi-actor shared visions and co-innovation has the power to transform the food system. What the sector needs now is more multi-actor projects and facilitators applying these processes to scale up widespread implementation to accelerate action towards sustainable food systems.

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