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1 Abstract

Farming systems operate in biophysical, political, social, economic and cultural environments which are often far from stable. Frequently or unfavourably changing conditions can affect FS performance, i.e., the delivery of FS functions (such as food production or ecosystem services). A farming system is a system hierarchy level above the farm at which properties emerge resulting from formal and informal interactions and interrelations among farms and non-farm actors to the extent that these mutually influence each other. The environment can then be defined as the context of a farming system on which farming system actors have no or little influence. In task 6.1, we identified 6 principles for an enabling environment to foster resilience of farming systems in Europe. These guiding principles indicate how to (re)design institutions and build and mobilise resources in order to enhance resilience enabling attributes of FS (and remove resilience constraining attributes). In this task 6.2, these principles were translated into 10 case study specific roadmaps that contain recommendations for both public and private actors and institutions in the farming system and the enabling environment on how to support farming system resilience. Case study farming systems covered different regions, sectors, farm types, and challenges. Roadmaps have been developed by using a participatory approach, mainly based on online workshops. Due to covid-19, in some case studies, an alternative approach was chosen, based on a desk study, whether or not completed by interviews. During the workshop and/or desk study, a list of actions has been developed to operationalize the general principles for a resilience enabling environment. Although recommended actions within the roadmaps are case-study specific, we identified 14 common themes which were repeatedly found in multiple case studies. Our findings additionally suggest the need for a mix of actions. The coordination of these different actions and collaboration between a multitude of stakeholders, which follows from this, is therefore a prerequisite for a resilience enabling environment.

2 Introduction

To increase the resilience of farming systems in Europe, an enabling environment should be developed that increases the capacity of farming systems to face a diversity of challenges and to adapt to rapidly changing circumstances. Farming systems can be defined as a hierarchy level above the farm at which properties emerge resulting from formal and informal interactions among farmers and non-farmers to the extent that they mutually influence each other (Meuwissen et al., 2019). The enabling environment is the context surrounding the farming system, consisting of actors that influence the farming system but are themselves scarcely influenced by the system. To foster resilience, actors in this environment allocate resources in order to produce and support



the production of public and private goods and/or to invest in developing resilience attributes of the farming system. Resources that are invested and mobilised can be both of financial or non-financial nature. How these resources are allocated and accessed among farming system actors depends on institutions both inside the farming system and the environment. Formal and informal institutions influence how resources (knowledge, money, power) are allocated to activities supporting farmers in establishing resilience capacities. For specific examples and categorization of resources and institutions and their relation with resilience, we refer to Deliverable 6.2 (Mathijs et al., 2021).

In previous work, a set of 6 principles was developed to guide the enabling environment to foster resilience of the farming systems. For 11 farming systems across Europe, a 5 step methodology was used to analyse how resources and institutions were mobilised in both the farming system and its environment and how they affected resilience capacities in the past, that is, following a set of challenges and adverse events in the past 10 years. By using the lens of system archetypes (Kim et al., 2000), 4 patterns have been identified to which these challenges were insufficiently addressed to foster resilience of the farming system. These patterns can be seen as behavioural patterns that occur repeatedly in several of the case studies or for multiple situations in a single case study. Besides diagnosing problems, they additionally allow to identify high-leverage interventions to find a way out of these patterns of system failure. This ultimately resulted in the formulation of six guiding principles for fostering resilience.

However, these principles for a resilience enabling environment have been formulated at a relatively abstract level to be applicable to all case studies included in the study. The aim of this task is to operationalise these principles into concrete recommendations for the actors, both in the farming system and the enabling environment, within specific farming systems. This deliverable first provides a brief overview of the results from Task 6.1, namely the 4 system archetypes and the 6 principles for a resilience-enabling environment. It then describes the approach to translate these principles into case study specific recommendations. In the results section, an overview is given of 14 recommendations that were observed across case studies. These recommendations illustrate how the principles can be operationalised in the different case studies. In other words, how the actors in the farming system and the environment can contribute to resilience in the future by reformulating institutions and redistributing resources. In the case study specific reports, which follow this general overview, the results are explained in more detail.



3 From behavioural patterns of system failure to guiding principles for a resilience enabling environment

Using the lens of systems archetypes (Kim, 2000), 4 patterns of system failure in fostering resilience of farming systems could be identified. These archetypes resulted from a cross-case study analysis of the mobilised resources and existing institutions that impacted farming systems' capacity to deal with the main challenges in 11 farming systems in the past 10 years (Figure 1). A first archetype is the 'fixes that fail' archetype which is closely linked with 'shifting the burden'. This archetype is characterized by a response to mitigate the symptoms generated by the challenge rather than providing a structural solution to the challenge (fixes that fail). As a consequence, less (or no) resources are made available to invest in structural solutions in the long run. If symptomatic solutions are provided by external interventions (mainly government), farming systems might become addicted to these kind of interventions (shifting the burden). A second archetype is called '**Success to the successful**'. In this behavioural pattern, resources are allocated to a limited number of apparently successful actions, and thus not in other actions. A side-effect may be that investing too much in one solution may backfire into a fix that fails. The third archetype, **eroding goals**, occurs when there is a gap between a goal and the actual condition. Rather than taking actions to improve conditions to achieve the goal, actors adjust the goal (e.g. downplaying the challenge, redefining or reinterpreting the problem differently) in order to justify lack of action. In the final archetype, '**Limits to growth**', actions taken by the farming system, for instance to address challenges, are inhibited or slowed down by actions or conditions in the enabling environment. The diagramme of these patterns are presented in Figure 3.1. Deliverable 6.2 provides many illustrating examples across different case studies (Mathijs et al., 2021).

In Task 6.1, many examples were found to illustrate the different archetypes as described above. But besides examples of how these archetypes emerged, several examples also prevailed actions to address these patterns and to act on them. Besides case study specific examples, general literature on system archetypes (Kim et al., 2000), also describes how to break these patterns. Based on this, in Task 6.1, 6 case study wide principles could be described for a resilience enabling environment. Three of these principles are based on the allocation of resources. More specifically, to invest resources in coping with the consequences of shocks and challenges versus supporting resilience to deal with future, sometimes unforeseen, challenges. One of the principles states that the actors in the enabling environment should provide temporary resources when the farming system cannot cope with the adverse consequences of a shock, but only to buy time while working on the real remedy (fundamental solution) (**PRINCIPLE 1**). Especially when shocks keep on

reoccurring, resources should be shifted to enable adaptation of the farming system, to prevent addition to external interventions and to increase robustness of the farming system in the future (**PRINCIPLE 2**). This is summarized in an additional principle, stating that the ensemble of the farming system and its enabling environment should develop a sufficient degree of ambidexterity, that is, find a balance in putting resources in immediate versus future challenges (**PRINCIPLE 5**). Besides investing in immediate versus future challenges, resources should be invested in a diversity of responses. This is summarized in a fourth principle, stating that the enabling environment should foster a potential diversity of response, rather than focussing too much on a limited set of actions strengthening resilience (**PRINCIPLE 4**). In addition to these principles that focus on resource allocation, two principles were formulated to help farming systems and their enabling environment to be more prepared for future challenges, or in other words, to improve anticipatory and responsive capacity. This can be done in the first instance by getting a grip on the deeper, actual cause of challenges. A fourth principle addresses the need to do more systemic in-depth analysis of the root causes of challenges on the one hand, and of the drivers of farming system vulnerability on the other hand (**PRINCIPLE 6**). Secondly, the enabling environment should assist the farming system to detect, assess and address long-term trends that challenge future resilience of the farming system. Potential impact of these trends on future resilience should be forecasted to raise awareness and create a sense of urgency to invest resources in adaptation of the farming system (**PRINCIPLE 3**).



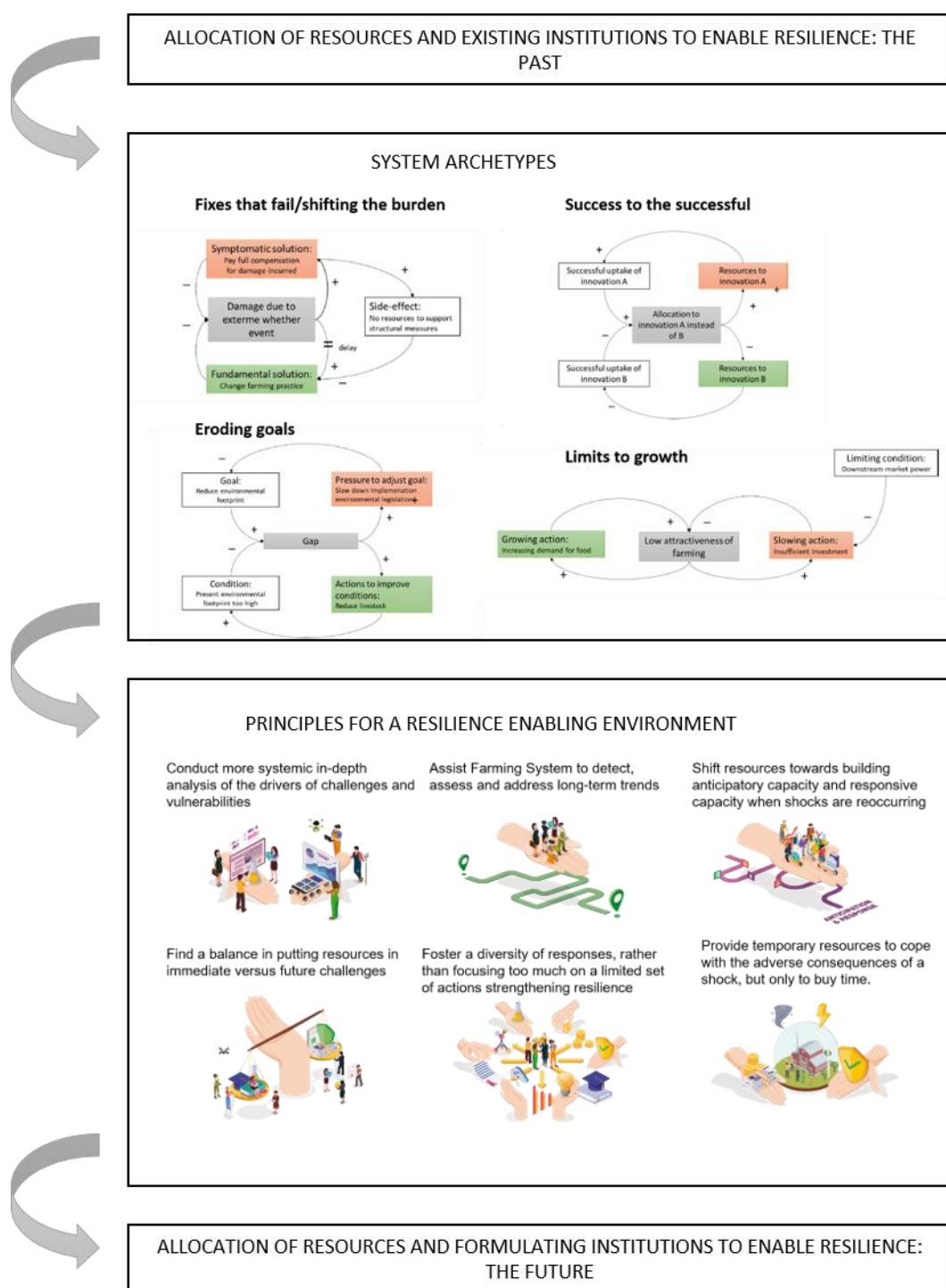


Figure 3.1: Overview of the development of 6 guiding principles for a resilience enabling environment (task 6.1) and the link with developing case study specific recommendations for a resilience enabling environment in the future.

4 Methodology

Case study specific recommendations for a resilience enabling environment have been identified by using a participatory approach. Case study farming systems covered different sectors, farm types, products and challenges, and included large-scale arable farming in Bulgaria (BG-Arable), intensive arable farming in the Veenkoloniën region in the Netherlands (NL-Arable), large-scale corporate arable farming with additional livestock activities in East Germany (DE-Arable&Mixed), intensive dairy farming in Flanders, Belgium (BE-Dairy), extensive beef cattle systems in the Massif Central, France (FR-Beef), extensive sheep farming in northeast Spain (ES-Sheep), high-value egg and broiler systems in southern Sweden (SE-Poultry), small mixed farms in Nord-Est region in Romania (RO-Mixed), small-scale hazelnut production in central Italy (IT-Hazelnut), and fruit and vegetable farming in the Mazovian region, Poland (PL-Horticulture).

In 8 of these case study farming systems, an online workshop has been conducted during March/April 2021. Due to covid-19, physical meetings were not possible and the workshop had to be held online. In 3 of the case studies, organising an online workshop at that time was also impossible (Table 4.1). In Germany, the main reason was the lack of a good internet connection in rural areas. In Sweden and Bulgaria, it was very difficult to motivate stakeholders for an online workshop. In these case studies, an alternative approach was chosen, mainly based on a desk study, completed by interviews for the Bulgarian case study. For more details, we refer to the case study specific reports. In the UK case study, it was difficult to get stakeholders involved. Due to this and a lack of resources to conduct a desk study, the examples from the UK included in this report are therefore based on current strategies, and not on stakeholders' reflections on potential future strategies for a resilience enabling environment.

The objectives of the workshop were twofold:

- The first objective was to validate the system archetypes identified in task 6.1. together with the stakeholders. Did the stakeholders recognize the system archetypes? Did they agree on the prevalence of the system archetypes in the case study? Did they have additional examples fitting particular archetypes?
- The second objective was to identify actions on how the actors in the farming system and enabling environment can avoid or act on these system archetypes in the future. More specifically, stakeholders were asked to think about how resources can be better distributed, based on the causes of system archetypes, and/or how institutions must change in order to deal with these system archetypes.



Preparation of the workshop

Preparation of the workshop mainly consisted of identifying relevant stakeholders to invite for the workshop, just as preparing an introductory presentation. Participants represented important stakeholder groups in the enabling environment and the farming system. A variety of stakeholder groups was recommended as different perspectives on system archetypes, stimulates reflexivity within the group. Presence of policy makers is key, as they have most knowledge on existing policies, which often have a substantial role in the prevalence of system archetypes. The introductory presentation focused on introducing the 4 system archetypes to the participants.

Outline of the workshop

The actual format of the workshop varied between the case studies. The general guidelines are provided in Annex 1. The use of an online whiteboard was recommended to capture ideas. Not all case studies used this. The duration of the workshop, according to the guidelines, was 3 hours. In Spain, for example, the archetypes were delivered to the participants in advance so that the workshop could be shortened.

Reporting

During the workshop, only the archetypes were introduced to the participants. The principles, and the link with resilience attributes and capacities were deliberately not introduced, in order not to overwhelm the participants. In this way the focus could be kept on the archetypes. The link between the actions and the principles, the resilience attributes (annex 2) and the capacities was done after the workshop by the research team itself.

Table 4.1: Overview methodology (workshop versus alternative approach, followed in the different case studies.

Case study	Workshop	Alternative approach
BG-Arable		Interviews (skype, phone) with 11 stakeholders, complemented by desk study
NL-Arable	Online - 12.04.2021 – 9 participants	
DE-Arable&Mixed		Online -1.04.2021 – 4 participants: internal discussion within research team completed with insights from previous deliverables
ES-Sheep	Online – 16.04.2021 – 7 participants	
FR-beef	Online - 06.04.2021 – 3 participants	Preparatory online discussion within the research team - 26.03.2021 – 12 participants to

		have a more tailored discussion with stakeholders afterwards
SE-poultry		Desk study: integrating findings from SURE-Farm deliverables by applying a systems approach
PL-horticulture	Online – 1.04.2021 – 12 participants	
IT-Hazelnut	Online workshop – 24.04.2021 - 8 participants	
BE-Dairy	Online workshop – 2.04.2021 – 8 participants	
RO-Mixed	Online workshop – 28.04.2021 – 12 participants	

The guidelines are provided in annex 1. Deviations from guidelines, just as more detailed information on the stakeholder groups represented in the different workshops, are available in the individual case study reports. In addition to these case study specific workshops, we organized an online workshop (one hour and a half) at EC level on 28th of May, 2021. About 10 EC staff members participated. The archetypes and principles were presented. This was followed by a validation of the archetypes and discussion on how the principles could be translated in the European policy, with CAP in particular.

5 Results

This section provides case study wide insights on the validation of the archetypes just as a general description of how the different principles for a resilience enabling environment (Matthijs et al., 2021) can be translated into case study specific actions. For a detailed description of the case study specific results, we refer to the case study specific reports.

5.1 Validation of system archetypes

The 4 archetypes were discussed across the case studies, but not every archetype was addressed in each of the case studies (see Table 5.1). Archetypes that could not be linked directly to specific challenges in the farming system were usually not further discussed. Both challenges and archetypes could not be separated, and so were often discussed as one.

In general, challenges and archetypes were recognized and validated by the participants. In several case studies, most of the discussion was on challenges that have been characterized as ‘fixes that fail’. For that archetype, responses to particular challenges are seen as symptomatic solutions rather than structural solutions that address the real cause of the problem (fixes that fail). Participants did not always agree among each other on what to be found as a fundamental solution. Discussions illustrated that what is interpreted to be a fundamental or symptomatic

solution can vary across individuals and farming system actors. Importantly, it seems that the crucial step for preventing or resolving a fixes that fail archetype, is to first identify and fully understand the mechanisms underlying the problem that needs to be addressed. Only after achieving a clear idea of the true driving causes of the archetype, a correct identification of effective fundamental solutions can be made. This illustrates how archetypes stimulate the participants to reflect on the root cause of the challenge including the role of system boundaries.

In many case studies, although archetypes were recognized by the participants, participants indicated that several actions were already undertaken by actors in the farming system and the enabling environment to act on the system archetypes. In the Netherlands, for example, participants agree on the fundamental solutions to act on particular challenges and indicated that change towards these solutions was already ongoing. Also in Belgium, some participants indicated that the focus already shifted to more structural changes instead of quick symptomatic fixes to deal with the immediate impact of price drops.

Finally, discussing the archetypes with the participants clearly showed the spill-over effects from one system archetype to another. This reflection was made in the Swedish case study report as follows: 'Responses to trends are often characterized as fitting the archetype 'eroding goals', as the system is not able to detect the impact of the challenge at the beginning. When the impact on functions is getting more clear, the impact is so great that the measures performed by the farming system and the enabling environment are of a symptomatic rather than structural nature. These interventions ultimately are recognized as a fix that fails archetype.'



Table 5.1: Overview of the system archetypes and the challenges for which these archetypes have been observed in each of the different case studies

Case study	Challenge	Linked to system archetype
BG-Arable	Extreme weather events	Fixes that fail
	Success of non-agricultural activities for well-educated young people	Success to the successful
	constantly changing policies and regulation	Limits to growth
	society's expectations for production of safety and healthy food without damaging the nature	Eroding goals
NL-Arable	2013 abolishment of EU subsidies	Fixes that fail
	Volume of starch potato production in the region	Limits to growth
DE-Arable&Mixed	privileges urban areas over rural ones what contributes to the ongoing process of marginalization of the already marginalized rural areas in the Altmark	Success to the successful; Limits to growth
	Climate change; inequitable global food system	Fixes that fail
ES-Sheep	Low farm income, profitability	Shifting the burden
	Depopulation in the region, low attractiveness of the area, poor rural life conditions in rural areas	Eroding goals
FR-beef	Droughts, social distrust	Fixes that fail
	Low prices	Eroding goals
	Low succession rate	*
SE-poultry	High standards (high cost of production) increase competition with imported eggs	Success to the successful
	Changing consumer preferences: increased demand for organic production	Growth and underinvestment
	Power imbalance in the value chain	Limits to growth
	Low generational renewal	Eroding goals
PL-horticulture	Extreme weather events	Fixes that fail
	directing support to only one form of cooperation (producer groups)	Success to the successful
IT-Hazelnut	Environmental sustainability	Fixes that fail
	High specialization and lack autonomy (power of confectionary industry)	Success to the successful
BE-Dairy	Extreme weather events, reoccurring milk price drops	Fixes that fail
	Environmental challenges, consumer preferences	Eroding goals
RO-Mixed	Extreme weather events	Fixes that fail
	Change of agricultural policies and regulations	Limits to growth
	Business development, diversification and integration	Success to the successful
	Poor integration of small farms in agri-food chains	Growth and underdevelopment

*could not be linked to any of the archetypes



5.2 Recommendations for a resilience enabling environment

During the workshop and/or desk study, actions to prevent or resolve the system archetypes and the corresponding challenges were identified for each of the different case studies. All actions and the link to the archetypes, principles and resilience attributes are listed in detail in the individual case study reports further on. The number of actions identified differs a lot between different case studies (see Table 5.2). This is mainly explained by the level of detail at which actions have been formulated. In this section we illustrate 14 common themes which were identified after cross case analysis.

Table 5.2: Number of actions/recommendations for a resilience enabling environment identified during the workshop/desk study

Case study	Number of actions
BG-Arable	12 actions
NL-Arable	38 actions
DE-Arable&Mixed	16 actions
ES-Sheep	39 actions
FR-beef	24 actions
SE-poultry	5 actions
PL-horticulture	18 actions
IT-Hazelnut	7 actions
BE-Dairy	7 actions
RO-Mixed	47 actions

1. Develop new institutional arrangements within the value chain and new business models

Farm income and low profitability due to (temporary) low prices have been addressed as a challenge in many of the case studies. Multiple actions regarding improving the position of farmers in the value chain have been proposed to improve future coping capacity. In France, making contractualization more operational for beef cattle was mentioned as important as this allows farmers to have a long(er) term vision of future costs and revenues. For some of the case studies, where export is important (Italy, Belgium, Spain), new institutional arrangements also involve actors beyond national borders. In Italy, great importance is added to the role of producer organisations in improving their position towards confectionary industry by setting up supply chain agreements. However, at European level, trade policies need to be adapted to improve competition with imported products. Also in Sweden, balanced standards for animal welfare at the EU level, will be essential for the development of the Swedish high-value egg and broiler market. In several case studies, the need for investing in alternative sale channels has been indicated. In Italy, farmers largely depend on confectionary industry abroad, making the farming

system too dependent on them. Therefore, resources should be used to promote short supply chains at the local level and on-farm processing.

2. Invest resources in product differentiation and exploring new markets

In addition to improving the position of the farmer in the value chain, better positioning the product in the market or exploring new markets was also mentioned in multiple case studies. In Spain, action is needed to introduce lamb meat in public purchase procedures such as schools and hospitals. In the Netherlands, the farming system should improve connection with consumers, as this could lead to better commodity prices and more sustainable farmer practices. Also in Romania, promoting healthy food products, is needed to support farmers involved in production of vegetables and fruits. In Italy, resources should be invested in communication campaigns on the health and nutraceutical properties of hazelnut-based products and new ways of consumption (e.g. healthy snacks), and in France, the extensive character of beef production in the region should be valued more.

3. Increase investment in rural development and improve the attractiveness of rural areas, especially to the young generation

In several case studies, among which Bulgaria, Germany and Spain, it is difficult to attract young people to agriculture. The number of successors is decreasing. Young people are looking for other opportunities outside agriculture and are increasingly moving to the cities. In some areas, this phenomenon is reinforced by the lack of good infrastructure in rural areas. There is therefore a great need to make agriculture more attractive again. In Bulgaria, participants suggested the need for in-depth analysis to understand what motivates and prevents people to become a farmer.

4. Improve entrepreneurship of farmers

A multitude of actions has been mentioned across case studies to improve entrepreneurship of farmers and other actors in the value chain. During the discussion about the root causes of several challenges and archetypes, the lack of entrepreneurship was often mentioned. From there, many actions were listed that could contribute to improving entrepreneurship of farmers and other actors in the value chain. In Germany, it was mentioned that more resources are needed for start-up financing for investments in digitization and technology. In the Netherlands, it was mentioned that farmers need to be more involved in developing innovation, bottom-up instead of top-down approaches. There was also case-study wide agreement on the need for further training of farmers, training on the sustainable use of natural resources but also on farm economics and



interpretation of accountancy data. In the UK, it was emphasized that the role of advisors evolves over time evolved over time, from simple advice on plant protection products to having a much broader knowledge of the agri-environmental scheme landscape. Advisory services should provide a range of services, including advising, mentoring, supporting, facilitating and coaching. During the EU workshop, it was mentioned that there, besides resilience of the farm and farming system, there should be additional focus on the personal resilience of the farmer. Participants stressed that advisory services should go beyond traditional economics and agronomic advice but also address wellbeing of the farmers.

5. Invest resources in adaptation of agricultural production and marketing modes

In some case studies this remained rather general, while in others it was made very concrete. In Germany, it was stated that there is a need for developing more equitable support schemes which set incentives for sound adaptation and transformation strategies of farmers. In France, participants agreed that investing in agroforestry and building water reserves contribute to providing structural solutions to extreme drought. Simplification of 'rural development program' was mentioned several times in order to make it more accessible to farmers. Research should also tailor the activities to support adaptation strategies, for example adapt fruit and vegetable varieties resistant to climate change in Poland. Policies should be institutionalised to stimulate particular innovative solutions. In the Netherlands, participants ask for adjusted GMO policies that allow genetic improvement techniques such as Crispr-Cas. In some case studies, efforts need to be undertaken to understand root causes of challenges to identify pathways of change and adaptation. In France, for example, in-depth understanding of the functioning of the value chain is needed to understand how to fix elements and dynamics that result in lower prices. Furthermore, efforts need to be undertaken for dissemination and upscaling of innovation. In Belgium, this was illustrated by the example of contracts between farmers and a certain retailer that guarantees a fixed milk price for part of the production of the farmers. This is still adopted by a minority of farmers.

6. Create awareness about long term trends and challenges within the farming system

In several case studies, actions are needed to stimulate awareness and create a sense of urgency to address long term trends. For example, in the Netherlands, efforts are needed to stimulate awareness about soil quality and water availability among farmers. In Bulgaria, participants indicated the importance of the availability of up to date data and science based evidence. They indicated that the last inventory on soil fertility dates from 25 years ago and might explain the popular belief that soils are fertile. During the workshop with EC staff members, participants



emphasized the role of the European Commission to create awareness among the Member States of the importance of having a long-term vision. However, they indicated that the political system makes it difficult to focus on the long term and to balance between current and future challenges. At the European level, it is a difficult exercise to reduce direct (symptomatic) support in favour of long-term solutions. It is a continuous exercise to point actors and Member States to long-term trends and motivate them to spend resources on building anticipatory capacity. Furthermore, they indicated that improving anticipatory capacity is not only about addressing future challenges but also about dealing with what is happening now, about current developments. EC provides instrument that allow close follow up of the markets by providing up to date prices of all products. Further efforts need to be taken to trickle down to the level of the farmer.

7. Reward farmers for their contributions to public functions

The archetype of eroding goals is very often linked to trends, including the abandonment of rural areas, environmental challenges and the reduction of succession which were mentioned in many of the case studies. Therefore, in many case studies, actions are tailored to recognize and reward farmers for the public functions they perform. They themselves can invest in making the countryside more attractive, but here a strong supporting policy is also important. In Germany, policies should invest in incentives to raise attractiveness of agricultural education.

8. Develop and maintain a long term vision at farm, farming system and policy level

According to the participants, a clear long-term vision is needed to bring about adaptation and to address long term trends. However, in many case studies, it was emphasized that a long term vision at farm and farming system level, starts with a long term vision at policy level. Brexit illustrates this very well as the Brexit process will have a determinant role in shaping the future farming system. Due to the uncertainty associated with the Brexit, some farmers are holding back on further investment in the farm until they have a clearer picture of what the future of British farming will look like, while others are investing in expensive machinery now while they still have the single farm payment. Also with regard to climate change, policy makers are believed to play a pivotal role in fostering resilience of farming system against droughts and floods by prioritizing in the policy agenda the climate change issue and therefore support long-term strategies. In several case studies, participants also emphasized the need for investing in more consistency between policies with a reduction of bureaucratic barriers. In Poland, participants indicated the a need for improved organization process of policies, to enable better implementation of policy programs. During the EU workshop, participants stressed the importance of projects as 'farmers for the future', just as the role of AKIS, in supporting farmers to have a long term vision. However, the participants also emphasized that this long term vision should go beyond a long term vision for

the farm or the farming system, but should additionally address a long term vision for rural areas as a whole. The EC acknowledge their major role of showing long term challenges, especially as Member States and politicians have a more short term focus. So, they agree on their role in ensuring that this long-term vision does not disappear when translating European policies, and more particular the CAP, into regional legislation.

9. Invest in impact assessments of policies and alternative farming systems/practices

As mentioned earlier, during some of the workshops, it was not easy to establish the direction of change. Moreover, policy makers sometimes introduce regulations that are repealed after a short period of time because they are not as effective as expected. Participants stressed the need for impact assessment, both of policies and of innovative practices. In order to improve impact assessment, several case studies emphasized the need for improving data availability and transparency. In some cases, there seems to be too much information (“too much noise”) and that the right information is not being disseminated effectively. In Belgium, there is a need of transparency of market data, just as data on logistics to improve vertical collaboration within the value chain. If useful market intelligence is delivered in a timely manner, this can lead to more effective, better-informed decision making and increased efficiencies. In Italy, participants mentioned the added value of point climate monitoring by means of installation of agro-meteorological stations connected to a digital network. In Bulgaria, they emphasized the need to develop understandable and easy to apply indicators for biodiversity control at farm level. In the Belgian case study, they also emphasized the need for multiple level impact assessment (local vs global impacts of innovation). During the workshop at EU level, participants indicated that great importance is attached to impact assessment of European policies. Besides assessing impact of policies on resilience, they emphasized that geopolitical dimensions and multiple competitive forces (democratic dimensions), should additionally be taken into account.

10. Develop institutions that allow more flexibility to farming systems

Although long term planning is a prerequisite for stimulating adaptation, participants stressed that long term planning and continuity must not hinder flexibility. On the one hand, a clear vision is needed, which sets ambitions, but gives the farming system sufficient freedom to realise or elaborate these ambitions. When making legislation operational, the local and socio economic context in which a farming system operate, should be taken into account. Participants were also in favour of policy that is based on results instead of measures, so that the farmer is given more freedom to make his own decisions/strategy.

11. Stimulate a diversity of pro-active risk management strategies

The risk of European farms is increasing. In multiple case studies, participants agreed on the importance of a diversity of measures to pro-actively act on these risks. In addition, policies should also support a diversity of risk management solutions and not only focus on a few solutions. In Belgium, for example, farmers only receive a particular form of subsidies, only if they can show that they have considered various alternatives (e.g. at the moment of generational renewal). During the EU workshop, participants indicated that the CAP also aims at stimulating diversity. But they emphasized the need for diversity at multiple levels: from diversity of crops at farm level, diversity of business models (precision farming, organic farming, agro-ecology, etc) at farming system level, land use diversification at regional level to diversification of farming systems at European level.

12. Facilitate access to land and labour

In many of the case studies, lack of land and/or labour are hindering farming systems in optimally addressing all functions of the farming system. Several actions were mentioned to facilitate access to land and to labour, and more specifically skilled labour force. In Bulgaria, changes in legislation on land rent are needed to stimulate long-term contracts and land consolidation, as this would give more freedom to farmers to build a long-term vision.

13. Support for horizontal and vertical cooperation in rural development programmes

In several case studies, actions were mentioned to enforce horizontal and vertical collaboration. In Spain, there is a need for cooperatives to provide inputs more efficiently and better prices. Both in Italy and Belgium, producer organisations were also perceived as valuable instruments to improve farmers' position in the value chain, under the precondition that the initiative is taken by the farming community.

14. Involve multiple actors in concerted efforts and address the institutional and structural mix rather than to rely on single instruments

During the workshops across case studies, we did not always explicitly ask participants which actors play a role in dealing with archetypes. Although the nature of specific actions reveals who is mainly responsible, often a combination of actions is needed to address a system archetype. This has been mentioned and illustrated with specific examples in several case studies. For example, on order to avoid extreme weather events in the Polish farming system, the following actions are needed to avoid to get trapped into the 'fix that fails' archetype: 1) to increase awareness of farming system on the future climate change trends and the benefits of insurance against their effects, 2) changing regulations to provide farming system with more specific



compensations in line with anticipated future damage, 3) launching more public-private partnerships for expansion of mutual insurance funds, and 4) mobilizing financial and human resources for investments in innovative technologies increasing farming system's information on and protection against the climate change.

The coordination of these different actions and collaboration between a multitude of stakeholders, which follows from this, is therefore very important to successfully act on system archetypes. In the Italian case study, they emphasized that proposed actions should be taken by means of partnerships of actors that are using a systemic approach. Proposed collaborations often include collaboration at multiple levels. In Spain, as an example, to deal with low profitability of the farming system, there is a need of changing market mechanisms in general but also a change in global commercial policies. So, both at the micro level and macro level, action is needed simultaneously. The importance of this multi-actor collaboration has been confirmed in many case studies as many forms of collaboration have been suggested to be improved or established. In Italy, participants indicated that a network between research organization, local technicians and POs is required to foster and introduce technological innovations. Similarly, the autonomy of the FS can be increased by reinforcing the cooperation between farmers, POs and the confectionary industry. In the Netherlands, there is a need for closer involvement of farmers in the development of innovation. There needs to be more attention (and appreciation) for bottom-up initiatives, as currently, too many innovations are top-down.

To enable all these types of collaboration, resources should be invested in the facilitation of dialogue and communication. These should be achieved by 1) improving communication channels. Both in Poland and Germany, participants mentioned that there is a need for more online tools for dissemination of information. In Poland, they suggested the establishment of a digital educational platform to help farming system's actors communicate. 2) In second instance, dialogue can be improved by investing in transparency. In several case studies, more transparency within the value chain is needed to improve vertical collaboration within the value chains. In Sweden, they emphasized the role of meat associations to facilitate the dialogue between these actors to enhance constructive debate. Also in Belgium, there is a need to reorient the debate from 'defending own interests' towards 'working together starting from shared interests'. At EU level, participants were convinced that further investing in science based decision making can contribute to this, as there is often a disconnection between science and policy making. At European level, there should be invested in building trust and confidence between Member States as well. How member states deal with particular crises, needs to be much more shared between each other. This is hampered by a lack of mutual trust and confidence between Member States.



6 Discussion

During the participatory workshops across case studies, four patterns of system failure in fostering resilience, resulting from earlier SUREFarm work, were validated. All case studies reflected on how these could be avoided in the future by identifying actions contributing to the 6 principles for a resilience enabling environment. In many case studies, it was concluded that more investments should be tailored to adaptation instead of robustness. This is consistent with earlier work in this project. Earlier SUREfarm research showed that farming systems mainly focus on robustness, just as policy (Feindt et al., 2019; Reidsma et al., 2019). The archetype ‘fixes that fail’ is one that occurred in all case studies. Fundamental solutions are mainly focusing on adaptation of the farming system, so improving responsive capacity of the farming system. Nevertheless, in many of the case studies, they found actions linked to investing in anticipatory capacity most urgent. The enabling environment should support the farming system in setting long-term goals, identifying trends and future challenges and providing a regulatory framework for working towards them. By not taking these long term trends into account, ‘quick fix interventions’ are required when the impact of the challenge becomes too great. In other words, the fixes that fail are also largely caused by insufficient anticipatory capacity of the farming system and its the enabling environment. In all case studies, participants agreed that a long-term vision is an absolute necessity. At the policy level, a consistent integrated policy is central to this. At the level of the farming system, there seems to be a need for more entrepreneurship among farmers and other actors in the value chain. Investing in multi-actor cooperation is key to support this.

Methodological reflection:

Through participatory workshops, we have identified actions that should contribute to an enabling environment fostering future resilience of farming systems across Europe. The system archetypes were found to be a good starting point to initiate discussion. They allow us to approach challenges from a (different) systems perspective. Certain case studies also emphasised the importance of system boundaries in assessing the impact of challenges: “If we look at the given problematic from a holistic, hence multi-sectoral, societal and global perspective, we estimate the system failure “fixes that fail” and its associated causes, such as climate change and an inequitable global food system, as most pressing. These causes or challenges are overarching and if fixes continue to fail, they have the potential to endanger the resilience of all farming systems in the world.”



System archetypes stimulated reflection on **how** the farming system and its enabling environment respond to challenges and show how we repeatedly fall back into specific behavioural patterns. As these results are based on participatory workshops, the nature of stakeholder groups represented ultimately affected the outcome of the workshop. Different perspectives are known to stimulate reflection, so a diversity of actors, with often different interests, enhanced discussion and reflection during the workshop. Although actions from the literature provide levers to deal with these patterns of system failure, in several case studies, it was not easy to formulate concrete actions to deal with archetypes. It sometimes proved easier to reason from concrete challenges. As facilitator of the workshop, it was therefore important to ensure that actions are not only aimed at discussing the ‘what’ question e.g. what are fundamental solutions to particular challenges, or what do we consider as future challenges, but mainly focus on the ‘how’ question. How do we identify fundamental solutions, ‘how’ do we assure to invest enough in anticipation and adaptation, ‘how’ do we anticipate potential future challenges, etc.

7 Conclusions

The objective of this task 6.2 was to operationalise six general principles for a resilience enabling environment into concrete recommendations for all actors involved (FS and enabling environment, public and private) organised into roadmaps at case-study and European level. Roadmaps have been developed by using a participatory approach, mainly based on online workshops. These roadmaps contain case study specific recommendations that mainly relate to actors, resources and institutions. The specific actions that each actor needs to implement are specific to farming systems and the region and cannot be generalized. Although recommended actions within the roadmaps are case-study specific, we identified 14 common themes which were repeatedly found in multiple case studies. The recommendations clearly show that improving resilience is not a task of farmers only. Indeed, other actors such as policy makers, banks and insurers, technology and input providers, researchers, extension agents, retailers and processors, advisors, contractors and many more can affect the resilience of farming systems through their actions. Even more, not only do multiple actors have a role to play, this also needs to be done in cooperation with others – both horizontally and vertically – and not independent from each other. Indeed, the effectiveness of actions taken by one actor will depend on what other actors do. So, implementing the principles for a resilience-enabling environment and translating these into concrete actions and strategies requires concerted efforts from all actors in the farming system and the enabling environment. The actual implementation should be subject to regular monitoring and reflection, and is thus a continuous process rather than a once-only endeavour.



References

Kim, D.H. (2000). Systems Archetypes I: Diagnosing Systemic Issues and Designing High-Leverage Interventions. Pegasus, Waltham (MA).

Feindt, P.H., Termeer, K., Candel, J., Lievens, E., Mathijs, E., Midmore, P., Manevska-Tasevska, G., Léger, F., Bardaji, I., Soriano, B., Bertolozzi, D., Sorrentino, A., Severini, S., Sidorini, L., Daskiewicz, H., Balmann, A., Voicilas, D., Luca, L., Penava, M., Valchovska, S., Ciechomska, A., Zawalinska, K., Buitenhuis, Y. (2019). D4.2: Assessing how policies enable or constrain the resilience of farming systems in the European Union: Case study results. Sustainable and resilient EU farming systems (SURE-Farm) project report, EU Horizon 2020 Grant Agreement No. 727520.

Meuwissen, M.P M., Feindt, P.H., Spiegel, A., Termeer, C.J A M., Mathijs, E., de Mey, Y., Finger, R., Balmann, A., Wauters, E., Urquhart, J., Vigani, M., Zawalinska, K., Herrera, H., Philippa, N-D., Hansson, H., Paas, W., Slijper, T., Coopmans, I., Vroege, W., Ciechomska, A., Accatino, F., Kopainsky, B., Poortvliet, P.M., Candel, J.J L., Maye, D., Severini, S., Senni, S., Soriano, B., Lagerkvist, C.J., Peneva, M., Gavrilescu, C., Reidsma, P. (2019). A framework to assess the resilience of farming systems. *Agricultural Systems*, 176, Art.No. 102656.

Mathijs, E., Bijttebier, J., Accatino, F., Feindt, P., Gavrilescu, C., Manevska-Tasevska, G., Meuwissen, M.P.M., Ollendorf, F., Peneva, M., San Martín, C., Severini, S., Spiegel, A., Vigani, M., Zawalińska, K., Wauters, E. (2021). D6.2 Report on combinations of conditions for successful and unsuccessful fostering of resilience in agricultural sectors SURE-Farm Deliverable 6.2. Sustainable and resilient EU farming systems (SURE-Farm) project report, EU Horizon 2020 Grant Agreement No. 727520.

Reidsma, P., Spiegel, A., Paas, W., Accatino, F., Antonioli, F., Appel, F., Bardaji, I., Berry, R., Bertolozzi, D., Bijttebier, J., Black, J., Buitenhuis, Y., Coopmans, I., Courtney, P., Feindt, P., Gavrilescu, C., Hansson, H., Jendzejewski, B., Khafagy, A., Krupin, V., Lagerkvist, C., Larson, S., Lievens, E., Mathijs, E., Manevska-Tasevska, G., Maye, D., Ollendorf, F., Peneva, M., Pettit, A., Pinsard, C., Rommel, J., Senni, S., Severini, S., Slijper, T., Soriano, B., Urquhart, J., Valchovska, S., Vigani, M., Weuters, E., Zawalińska, K., Meuzissen, M., 2019. D5.3 Resilience assessment of current farming systems across the European Union. Sustainable and resilient EU farming systems (SURE-Farm) project report, EU Horizon 2020 Grant Agreement No. 727520.



8 Implementation roadmap for the implementation of enabling environment principles in Germany (large-scale arable farming in the Altmark)

Introduction

Table 8-1. Workshop introductory data

Date	1 April 2021
Venue	online
SURE-Farm team involved (names)	Franziska Appel, Florian Heinrich, Franziska Ollendorf, Christine Pitson

Deviations from guidelines:

We did not conduct a workshop but hold a three hours research team internal discussion based on desk studies of the SURE-Farm deliverables. The deviation from the format was necessary because due to the very bad internet connection in the rural areas of the Altmark and also weaker internet connections even in the urban centers there, the online format is not feasible in our case study region.



Farming system and enabling environment

Table 8-2. Actors and its enabling environment (institutions and resources) in the Altmark

Actors	Formal institutions	Informal institutions	Financial resources	Non-financial resources
Enterprise domain: <ul style="list-style-type: none"> Farms Cooperatives, farmer associations Input suppliers, traders, processors Banks, insurance companies 	<ul style="list-style-type: none"> Cooperatives Companies Type of farm: corporate or family farm 	<ul style="list-style-type: none"> Attitudes towards cooperatives Attitudes towards private companies Actors' interests 	<ul style="list-style-type: none"> Own investments Loans 	<ul style="list-style-type: none"> Knowledge & skills Coordinative capacities Representation & lobbying Self-organization
Government domain: <ul style="list-style-type: none"> European Union Federal government Local government Federal and regional ministries of food and agriculture and their subsidiaries, Politicians 	<ul style="list-style-type: none"> CAP Statutes (minimum wage statute) Regulations (biogas directive, reduction milk price quotas, ban of poultry cage) 	<ul style="list-style-type: none"> Accountability Decision making Farmer participation Societal participation Actors' interests . 	<ul style="list-style-type: none"> Direct payments (Basic payment, Greening, Young farmers, Redistributive payment, Additional optional schemes) Project-specific funds 	
Intermediary domain: <ul style="list-style-type: none"> Authority for Agriculture and the Reorganisation of Land State Institute for Agriculture, Forestry and Horticulture in Saxony-Anhalt, Funding providers (mainly public) 	<ul style="list-style-type: none"> Public and private organizations Individual companies Contracts between farmers and traders and/or processors 	<ul style="list-style-type: none"> Value chain relations and forms of coordination Governance Weak farmers negotiating power Weak exchange platforms 	<ul style="list-style-type: none"> Project-specific funds 	<ul style="list-style-type: none"> Support schemes for planning and implementation
AKIS domain: <ul style="list-style-type: none"> Consultants Academic and research institutes Farmers specialized agricultural services agricultural journals, specialised radio/TV broadcasts, trade press 	<ul style="list-style-type: none"> Universities, research centres Schools, Training institutes Private companies Associations Media 	<ul style="list-style-type: none"> Innovations and R&D Technology adoption Attitudes towards technologies Infrastructural conditions Actors' interests 		<ul style="list-style-type: none"> Knowledge & skills Information Support during implementation

Societal domain: <ul style="list-style-type: none"> • Farmers' movements • Other farmers • Consumers • Civil society organisations 	<ul style="list-style-type: none"> • NGOs • Public organizations • Citizens • Media companies 	<ul style="list-style-type: none"> • Societal visions on farming • Environmental attitudes • Consumers preferences • Actors' interests 		<ul style="list-style-type: none"> • Experiences for peer learning processes • Willingness to pay for specific production attributes
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Validation of system archetypes

In general, the team members recognize the archetypes but see a difficulty in discussing them without referring to their case study specific contents, hence the challenges which were the basis of the previous pattern analysis. Thus, in the following, we still mainly base our discussion on these specific empirical insights and seek to accommodate them in the somehow artefactual archetypes (however, we think this is in line with the “fixes that fail” example you provided in the PPP which draws on the challenge of drought).

All team members agreed with the existence of the three system archetypes “fixes that fail”, “success to the successful” and “limits to growth” in the farming system (FS) of the Altmark (the system archetype “eroding goals” has not been identified for the Altmark in the research step T6.1). We consider the urgency of action to be dependent from the perspective we apply to our discussion. If we look at the given problematic from a holistic, hence multi-sectoral, societal and global perspective, we estimate the system failure “fixes that fail” and its associated causes, such as climate change and an inequitable global food system, as most pressing. These causes or challenges are overarching and if fixes continue to fail, they have the potential to endanger the resilience of all farming systems in the world.

However, when discussing archetypes specific to our FS, we consider the archetype “limits to growth” as most relevant. Yet, we identify the solutions to it to be mainly external to the FS. In addition to the causes lack of farm workers and lack of successors which had been identified in the previous task, team members identified the low levels of profitability, the rigid bureaucracy, and the frequently changing policies and regulations as important “limits to growth”. While low levels of profitability of the farms hamper important investments as e.g. in machinery and other automatization technologies, strong bureaucratic barriers or frequently changing policies and regulations provide disincentives for farmers to make investments or engage in activities of diversification which would allow their farms and therewith the FS to grow.

Closely related to the archetype “limits to growth” and sometimes overlapping in causes and effects, the team members agreed with the archetype “success to the successful” as a system

failure that continuously privileges urban areas over rural ones what contributes to the ongoing process of marginalization of the already marginalized rural areas in the Altmark. The resulting infrastructural deficits hamper a dynamic development process of the FS in many ways, as for instance farmers' diversification attempts and the development of alternative value chains. Therefore, and this is a new aspect that came up in the team discussion, the archetype "success of the successful" contributes to the locking-in of farmers in the Altmark in the position of providers of established mainstream products instead of encouraging their engagement into niche products and their independency from the powerful players in the established value chains.



Actions for an enabling environment

Table 8-3. Actions/strategies by actors of the enabling environment/farming system to act/solve on system archetypes contributing to principles for resilience enabling environment and resilience attributes

ACTION/ACTOR	SOURCE	Contribution to resilience enabling principles/archetype	Contribution to resilience attributes
FORMULATE ACTION AND WHICH ACTOR MIGHT BE RESPONSIBLE	SOURCE (WORKSHOP; SUREFARM DELIVERABLE; OTHER LITERATURE)	INDICATE ARCHETYPE THIS ACTION WILL SOLVE/PREVENT AND HOW, AND TO WHICH PRINCIPLE THIS ACTION MIGHT CONTRIBUTE AND HOW	INDICATE TO WHICH RESILIENCE ATTRIBUTE(S) THIS ACTION MIGHT CONTRIBUTE AND HOW
Political will for consequent climate change mitigation strategies, improve inclusion of scientific advice in agenda setting: All FS and enabling environment actors	Team discussion	Fixes that fail, to RP6 by defining cause and solutions based on scientific evidence	To Production couples with local and natural capital by setting a sound, consequent but locally aligned regulatory framework, to Legislation coupled with local and natural capital by basing legislation on scientific advice
Need holistic integrated multi-sectoral, global societal solutions: All stakeholders (public, Civ soc, private); avoid over-representation of private sector in multi-stakeholder policy deliberations	Team discussion	Fixes that fail, to RP6 by acknowledging the multi-dimensionality of systems and challenges	to Legislation coupled with local and natural capital by basing on well balanced multi-stakeholder deliberations, to Appropriately connected with actors outside the FS



			by implementing real participatory measures
Develop more equitable support schemes which set incentives for sound adaptation and transformation strategies of farmers: CAP, implementation at national levels	Team discussion	Fixes that fail, to RP3 by setting structural incentives to address long-term trends	To Diverse policies by also taking the capacities of adaptation and transformation into account
Mechanisms of costs sharing, compensation for policy and regulatory changes: Negotiations between all relevant actors (farmers associations, political representatives)	Team discussion, D2.4	Fixes that fail, to RP2 by compensating farmers for needed regulatory changes and therewith supporting their response diversity	To Reasonably profitable by reducing the burdens of adaptation and transformation related costs
Change towards result-oriented subventions for climate change adaption and mitigation measures: CAP, implementation at national levels	D2.4, Team discussion	Fixes that fail, to RP2 by allocating resources to support farmers' response capacities	To Legislation coupled with local and natural capital by binding subventions on local specifics and needs
Avoid politically motivated short-term agendas and thereby improve long-term planning and continuity but allow for flexibility and local alignment: All political actors from local up to EU	D5.3, D2.4, Team discussion	Fixes that fail, to RP3 by proving an enabling administrative structure	To Diverse policies by stimulating long-term planning and therewith adaptability and transformability capacities
Improve rural infrastructure: Politicians, civil society, private sector	D 5.2, D5.3, Team discussion	Limits to growth, Success to successful, to RP3 by supporting FS to address long-term trends	To Supports rural life by creating the needed structures for the rural areas to become more attractive, to Infrastructure for innovation by proving the infrastructure needed for innovation

D6.4. Implementation roadmaps for the implementation of the enabling environment principles



Incentives to raise attractiveness of agricultural education (e.g. wages, working conditions) (spiral>increase profitability): Multi stakeholder approach, media, diverse educational institutes	D3.1, Team discussion	Limits to growth, to RP2 by allocating resources to capacity building	To Reasonably profitable by contributing to reduce lack of workforce
Provide start-up financing for investments in digitization and technology: Governments, banks	D2.4, Team discussion	Limits to growth, Success to successful, to RP1 by allocating finance for immediate action	To Diverse policies which stimulate innovation and therewith contribute to resilience capacities
Tackle high asymmetries of value added distribution supply chains: Politicians, civil society, farmers' associations	Team discussion, Team discussion	Limits to growth, Success to successful, to RP6 by addressing and overcoming root causes of system failures	To Reasonably profitable by increasing the share of value added for the upstream segments
Reduction of bureaucratic barriers, more local alignment and flexibility of regulations, streamlining processes: Government and administration	D2.4, Team discussion	Limits to growth, to RP4 by easing farmers' strategies of diversification	To Diverse Policies which improve the resilience capacities
Promote niche products and organic farming, education offers for diversification: Farmers, farm associations, BMEL, media, educational institutes	D5.2, Team discussion	Success to successful, to RP4 by fostering response diversity of farms	To Response diversity by supporting diversification of farms
Develop alternative value chains and new markets: Labelling organisations, industry partnerships between producers, processors and manufacturers	Team discussion	Success to successful, to RP4 by creating the structures for response diversity	To Response diversity by supporting diversification of farms
Publicly organised training on climate change adaptation and mitigation measures: Ministry of Food and Agriculture, multi-stakeholder, agricultural agencies, DLG, farmers' associations, educational institutes	D2.4, Team discussion	Fixes that fail, to RP3 by assisting to address long-term trends	To Production couples with local and natural capital by improving access to latest scientific evidences



D6.4. Implementation roadmaps for the implementation of the enabling environment principles



<p>Create online tools for dissemination of information: Ministry of Food and Agriculture, multi-stakeholder, agricultural agencies, DLG, farmers' associations, educational institutes</p>	<p>D2.4, Team discussion</p>	<p>Fixes that fail, to RP3 by assisting to address long-term trends</p>	<p>To Production couples with local and natural capital by improving access to latest scientific evidences</p>
<p>Formalize existing partnerships and engage in new and more systematic ones, for instance via creation of best practice platforms regarding succession and training: Farmers, farm associations, BMEL, diverse educational institutes</p>	<p>D5.2, D 5.3, Team discussion</p>	<p>Limits to growth, Success to successful, to RP3 by assisting to detect and assess long-term trends</p>	<p>To Socially self-organized by fostering knowledge exchange between stakeholders</p>



Discussion

As our analysis indicates, most of the causes for system archetypes prevalent in the Altmark are located outside the immediate range of the farming system and are embedded in the political culture at the most relevant levels of political action that is the EU, the German federal government and the governments of the Länder. As representatives in these governments, politicians are hence among the actor groups which are key resource persons for tackling these archetypes. However, they are not necessarily also the reason for the existence of system failures since those are result of more complex intertwined processes of path dependencies, reinforcing structures, institutional boundaries and individual decisions. Especially for the root causes of the system archetype “fixes that fail”, that we identify to be most strongly relevant for overarching global challenges such as climate change and an inequitable global food system, the process of developing sustainable solutions needs to be a multi-stakeholder process where all stakeholders’ needs are carefully considered and outweighed against the pressure of climate change. The development of consequent mitigation strategies would contribute to the resilience principle 6, by establishing a process of in-depth analysis of causes and solutions based on scientific advice which go beyond short-term fixes and avoid possible negative side-effects. This analysis comprises the search for exit options for unsustainable economic behaviors and broader system changes including needed transformation of farming systems. The development of a respective regulatory framework would foster the two resilience attributes “production coupled with local and natural capital” and “legislation coupled with local and natural capital” and strengthen all three resilience capacities but particularly the capacities to adapt and transform. In addition, in order to overcome the archetype “fixes that fail”, we identify various funding mechanisms which have the potential to foster the needed shift towards a more resilient farming system which contributes to the overarching goal of mitigating and adapting to climate change. For instance, the change towards result-oriented subventions for climate change adaptation and mitigation measures or mechanisms of cost sharing and compensation for losses arising from implementing mitigation measures can provide important incentives to farmers. The major actors here, too, are politicians in the EU who would need to re-design the CAP, and politicians at the federal and local government levels, who are in charge of converting it into the national and local contexts. The resilience principle which would mainly benefit from such actions is the resilience principle 2, by allocating resources to support farmers’ response capacities and compensating them for needed regulatory changes. Therewith the resilience attribute “response diversity” is strengthened which has the potential to improve the attribute “reasonably profitable” by reducing farmers’ burdens of adaptation and transformation related costs. In addition, the attribute “legislation coupled with local and natural capital” would be fostered by binding comprehensive and flexible result-oriented subventions with local specifics and needs. Furthermore, the development of more equitable



support schemes for farmers to adapt to climate change and mitigate their emission contributes to the resilience principle 3 by setting structural incentives to address long-term trends. Therewith, the resilience attribute “diverse policies” would be improved by also including long-term issues such as adaptation and transformation capacities into account, which would then be positively affected, too. Nevertheless, such structural incentives need to be embedded into a transparent long-term planning process and a sound and flexible administrative structure in order to be able to unfold sustaining effect. Therewith, the attribute “diverse policies” would be fostered by stimulating long-term planning and thereby improving the capacities of adaptability and transformability.

Looking at the other two system archetypes, that is “limits to growth” and “success to the successful”, we consider as the most pressing action the improvement of the rural infrastructure (transport, communication, social services and cultural offers) in the Altmark since this has the potential to break the negative spiral of privileging “success to the successful” and would remove major “limits to growth” by giving room for several actions which farmers could then apply to overcome these two archetypes. There is a prevailing urban bias which systematically advantages urban areas over rural ones and which needs to be overcome politically and socio-culturally in order to attract people to live in rural areas such as the Altmark. The resulting dynamic development processes in the region would benefit the farming system in many ways. Yet, while politicians have to develop a dedicated financial and programmatic strategy, actors of change are equally civil society and the private sector who complement these efforts with actions in their range (as e.g. social and cultural offers by civil society, and services by the private sectors). Infrastructural improvements would contribute to the resilience principle 3 by supporting the farming system in many ways to address long-term trends. Linked to this, the attributes “supports rural life” and “infrastructure for innovation” would be improved by creating the needed structures to become more attractive and innovative. In turn, this would benefit again the two capacities of adaptability and transformability.

The improved infrastructure directly positively impacts the farms’ capacities to innovate and engage into new digitization technologies. In addition, for solving the archetypes “limits to growth” and “success to the successful”, the farming system would benefit from start-up financing which stimulates farmers’ investments into new technologies and strategies of diversification. Governments and banks should play a major role here: governments by creating efficient subvention schemes and banks by providing attractive loans. Such programs would contribute to the resilience principle 1 by allocating finance to immediate action, and to the



attribute “diverse policies” which stimulates innovation and therewith contributes to all three resilience capacities.

However, innovation in new technologies and diversification strategies often rely on the availability of workers who are trained for the respective tasks. While the Altmark region in general suffers from a lack of attractiveness for young people due to the low level of infrastructure, there is also a lower level of attractiveness of pursuing an agricultural education and which needs to be raised in order to boost sector dynamics and solve the archetypes. This could be mainly achieved through the increase of wages and the improvement of working conditions by farm owners and managers, but due to the low level of profitability of farms, this is a real challenge for them. Thus, we find here one of the major negative spirals of the farming system in the Altmark which needs to be overcome. Hence, support from diverse actor groups and institutions, such as media and educational institutes, to improve the attractiveness of agricultural education is important to get out of this trap. In general, more resources need to be allocated to capacity building of the sector (resilience principle 2). These efforts to reduce the lack of workforce would positively contribute to the attribute “reasonably profitable” and again improve all three resilience capacities.

As we learned in the several workshops we organized, farmers also see a major impediment for their innovation and diversification projects in the rigid bureaucratic framework. In addition, regulations were often perceived as being far from local contexts and administrative processes seen to be too complicated and time-consuming. Hence, these are important aspects of “limits to growths” and governmental and administrative actors would contribute to overcome these failures by developing a more streamlined but locally aligned and flexible administrative structure. Thereby, they would actively contribute to the resilience principle 4 by easing farmers’ diversification strategies and to the attribute “diverse policies” which improves mainly the capacities of adaptability and transformability.

Once there is an improved infrastructure and the region becomes more attractive for instance for young entrepreneurs and their families, the potential for direct marketing arrangements and the development of new markets for niche products improves. New ties between such a “new civil society” in the Altmark and the metropolises could also lead to the creation of alternative value chains next to the existing large established ones. In this process, all stakeholders can play an active role. The approach of improving resilience by diversifying farm activities should be recognized and promoted by farmers associations, research institutions, and ultimately also by the Ministry of Food and Agriculture and the relevant educational institutes; while farmers

themselves and their associations would promote their niche products. Labelling or certification organizations could support the establishment of alternative value chains, for instance by labelling regional attributes or certifying particular product characteristics. Such efforts have particular high potential to reverse the trend of the archetype “success to the successful” and strongly contribute to the resilience principle 4 of fostering potential response diversity, which at the same time is a resilience attribute which would be improved and which would enhance the adaptability and transformability capacities of farms and therewith the farming system.

Finally, new structures for improved dissemination and exchange of information are needed and have potential to support the reduction of all three system archetypes. For instance, there is a need to organize an easy access to training on climate change adaptation and mitigation measures, there is a need to facilitate access to information on existing public and private programs, to improve exchange on best practices and lessons learned, and to support partnerships among farmers themselves and between farming system stakeholders and their enabling environment. The creation of online tools or the formalization of partnerships would be important multi-stakeholder actions which can support such developments. Next to farmers themselves, driving actors should be the Ministry of Food and Agriculture, farmers associations, and educational institutes. Such an improved institutionalization of partnerships and dissemination of information would support the resilience principle 3 by assisting the farming system to detect and address long-term trends. It would also contribute to the attributes “production coupled with local and natural capital” by improving access to the latest scientific evidences, and to “socially self-organized” by fostering knowledge exchange between stakeholders. All three resilience capacities would benefit from such a development.

Conclusions

The actions that we identified based on the desk study of our previous deliverables most strongly contribute to the resilience principles 3 and 6. Since these imply the active engagement of the enabling environment, this reflects that most of the causes of the system failures in the farming system of the Altmark lie outside the immediate range of the farming systems’ actors. At the same time, it becomes clear that one of the main causes of all three archetypes is that the resilience capacities adaptability and transformability receive far too little attention in current policy measures and that the assessment and addressing of long-term trends is widely neglected in mostly short-term oriented policies. These capacities would therefore strongly benefit from all suggested actions. However, the transition to a more resilient farming system needs broader



systemic changes which cannot be undertaken by the farming system but have to be anchored in a broader societal change and debate, for instance on overcoming the urban bias which systematically privileges the urban metropolises instead of creating an attractive rural environment. This would not only trigger many positive dynamics in the farming system but also reduce the pressure on the urban metropolises.



9 Implementation roadmap for the implementation of enabling environment principles in Belgium (Intensive dairy farming in Flanders)

Introduction

Table 9-1. Workshop introductory data

Date	2/04/2021
Venue	online
SURE-Farm team involved (names)	Erik Mathijs, Erwin Wauters, Jo Bijttebier, Isabeau Coopmans

Table 9-2. Workshop participants

Institution	Gender
1. Retailer (Colruyt)	F
2. Flemish government - Agriculture and Fisheries Department	M
3. Flemish government - Agriculture and Fisheries Department	F
4. Advisory service of farmer organization (Innovatiesteunpunt)	M
5. NGO (Voedsel Anders)	M
6. Farmer organization (ABS)	M
7. Milk Trading Company	M
8. SALV	M

Deviations from guidelines:

The workshop mostly followed the proposed timeline and workshop design. The first part of the workshop was moderated in Teams, so that participants could see and interact with each other while providing feedback on the presented archetypes. For the second part of the workshop, MURAL was used as online whiteboard. During this part, it appeared that formulating actions was very challenging and therefore the participants were stimulated to make notes about more general ideas to improve the resilience of the Flemish dairy sector. Consequently, the focus of the discussion led by the moderator was not on actions but on those idea's/inputs from the post-its triggering an inclusive and rich discussion. Yet during the analysis, the research team was able to derive general resilience-enhancing actions corresponding to the input provided during the focus group. The formulation of the actions, as well as the identified links with resilience attributes and system archetypes, was in some cases also informed by findings from previous SURE-Farm work.



Farming system and enabling environment

Table 9-3. Actors in the dairy farming system in Flanders and its enabling environment (institutions and resources)

Actors	Formal institutions	Informal institutions	Financial resources	Non-financial resources
Enterprise domain: <ul style="list-style-type: none"> - Producer organisations (PO BesteMelk, PO Dairycam, PO Milcobel) - Input suppliers (feed, technology, fertilizer, pharmaceuticals) - banks, insurance companies - Distribution and retail - Processing companies (Inex, Friesland Campina) - Sector association (BCZ) - Interbranch organisation (MilkBE) 	<ul style="list-style-type: none"> - Legislation on Producer organisations - Economic regulations - taxation - EU cohesion policy - Green deal, FTF, biodiversity strategy, CAP - Federal: food safety (FAVV) - Regional: manure regulation, PO legislation, tenure legislation 	<ul style="list-style-type: none"> - (im)balance of power / bargaining positions of chain actors 	<ul style="list-style-type: none"> - Loan capital - Debt ratio - Equity capital 	<ul style="list-style-type: none"> - Infrastructures for milk and dairy products processing, production and transportation
Government domain: <ul style="list-style-type: none"> - Europe - Federal - Regional - Municipalities 	<ul style="list-style-type: none"> - Futures, IKM, interbranch 	<ul style="list-style-type: none"> - Involvement of sector actors in decision-making processes 	<ul style="list-style-type: none"> - Subsidies - Direct income support - Pillar 2 support - VLIF - Young farmers support - Funding for research and innovation 	<ul style="list-style-type: none"> - Access to land - Access to economic and structural data
Intermediary domain: <ul style="list-style-type: none"> - Accountancy: Liba, DLV, SBB, MTC - Quality assurance and animal health: IKM, veterinarians, DGZ - Branche Oranisation: MilkBE 	<ul style="list-style-type: none"> - Contracts - Dialogue between food chain actors 	<ul style="list-style-type: none"> - Attitudes toward scale enlargement vs. diversification - Indicators for animal welfare 		<ul style="list-style-type: none"> - Knowledge, know-how,

AKIS domain: - Ilvo, UGent, KU Leuven Thomas More, hooibeekhoeve	- Agrolink	- Visions about sustainable farming practices - Attitudes toward scientific knowledge vs practical/ tacit knowledge		- Research infrastructure - Extension activities (demo's, learning networks, etc.) - Data
Societal domain: - NGOs (Rikolto, Wervel, Greenpeace) - Agricultural organisations: Boerenbond, ABS, Bioforum - Press & media (Vilt, landbouwleven, etc.)		- Societal visions on sustainable farming (e.g. attitudes toward large farm sizes, organic farming)		- Promotion campaigns - Social media



Validation of system archetypes

Shifting the burden/fixes that fail

This archetype was presented to the participants by use of two examples. The first example considered the phenomenon that farmers' income losses caused by increasingly frequent and severe droughts have been compensated by governmental exceptional payments. The researchers stated that such external income support might diminish incentives to implement adaptations to this climate-related trend and that these finances would maybe better being spent on more fundamental solutions, such as research on and implementation of more drought tolerant crops. Another disadvantage is that this reduced the perceived need for adaptation or transformation, which left the farming system equally vulnerable to future droughts. The second example indicated that former market interventions and pillar 1 income support have acted as so-called symptomatic solutions to low, volatile milk prices in the past. More specifically, it was insinuated that the existence of such aids have increased coping capacities within the dairy system particularly in the years 2009, 2012 and 2016, and as such, temporarily supported resilience. However, it reduced the perceived need for anticipation to future bad price years by use of more targeted responsive actions to deal with this trend, and as such left the farming system equally vulnerable to future price shocks. Both examples, as well as the theoretic archetype, were very much recognized by the participants. Yet two major points suggested to refine this problem statement.

First, it was emphasized that the system is not solely supported by so-called symptomatic solutions (which were indeed acknowledged by the respondents as symptomatic) and that there is no complete absence of fundamental solutions. Several respondents provided examples to demonstrate that (examples of) fundamental solutions are already present and to some extent implemented within the system. These examples mainly illustrated that seeds for enabling change are already present in the farming system, yet are currently still on a theoretic level or only practiced in small-scale 'pilot initiatives' which have only marginal effects at the system level. Some of these examples raised during the workshop mostly related to challenge 2 (price volatility): the use of futures market, a pricing system between a certain retailer and a dairy company to provide a fixed price to the farmers for a vast part of their production, and an initiative relating to alternative value chain organization supported by a targeted pillar 2 aid.

Second, respondents pointed out that the archetype presentation is suggesting a radical shift in focus towards the development of structural solutions whereby symptomatic solutions should be entirely eliminated. However, according to the participants, such an approach would not be

feasible in the agricultural sector. Farm business models are often based on long investment horizons and payback periods and many production systems have limited ability to adapt in the short term. Furthermore, food production practices are influenced by many external factors such as weather conditions and the global market system. Participants believed it would not be smart to totally eliminate symptomatic solutions due to the strategic and crucial nature of the agricultural sector.

The discussion illustrated that what is interpreted to be a fundamental or symptomatic solution can vary across individuals and farming system actors. Importantly, it seems that the crucial step for preventing or resolving a fixes that fail archetype, is to first identify and fully understand the mechanisms underlying the problem that needs to be addressed. Only after achieving a clear idea of the true driving causes of the archetype, a correct identification of effective fundamental solutions can be made. This supports the importance and priority of principle 6 (annex 1). Similarly, the discussion pointed out that the extent to which the archetype is considered a prevalent problem can vary according to the role of a stakeholder. For instance, since governmental market interventions have been systematically phased out during the last decades, many farmers view the government as partly responsible for price volatility and therefore expect their support. Younger farmers may be less relying on the government compared to older farmers who have operated under the milk quota regime. Such differing interpretations of archetype dynamics and causes, as well as what would be appropriate solutions and who is responsible for implementing these solutions, result in different knowledge of, opinions about, and attitudes to solutions for the archetype across individuals and system actors. This reveals the need for constructive dialogue between farming system stakeholders (actions 1 and 6 in next chapter).

Eroding goals

This archetype was presented to the group accompanied by the example of climate, health and soil degradation related issues. When changing demands from society (often with associated more strict environmental regulations) are being observed, many actors have the tendency to try to counteract these demands (using for instance campaigns that highlight improvements in environmental performance and/or to tune down more strict environmental regulation). Whereas this can work for some period of time, the gap between current environmental performance and demands from society is not addressed (and could in fact even increase), which leaves the system even more vulnerable to changing demands or more regulation. Also for this archetype, respondents showed recognition and they could confirm it corresponded with their experiences. Some comments, however, were raised.



First, on-farm adaptations/transformations often require considerable investment, which in turn requires financial buffers. This is, according to the respondents, in sharp contrast with the income situation of many farmers and the margins that can be made within the current market system. It was stated that in many cases, the inadequate/volatile economic performance as well as uncertainties about legal security at farms are currently preventing actual adaptive behaviour, despite farmers' personal motivations or societal steered incentives for adapting towards more environmental neutral farming practices. Hence financial resources combined with formal regulations are perceived to be the main limiting conditions for implementing solutions to this archetype. Second, cultural and psychological factors (e.g. risk-aversion, preference for business-as-usual situation, maintaining a farming tradition, low openness to change) were also mentioned as possible obstacles for implementation of adaptations/transformations, and hence, an explanation for the tendency to counter changing societal demands rather than to adapt to it. Third, participants emphasized that adaptations and transformations demand time. In addition, observations of the effects of adapted practices are also lagged and based on proxy indicators that often do not allow to identify the isolated effect of measures that were taken in the agricultural sector.

Limits to growth

There was not much reaction after presenting this archetype (using the example of the amount of milk production and payed milk price) nor much time left to discuss. However, during another part of the discussion a participant provided another example for his archetype which is presented in figure 9.1.

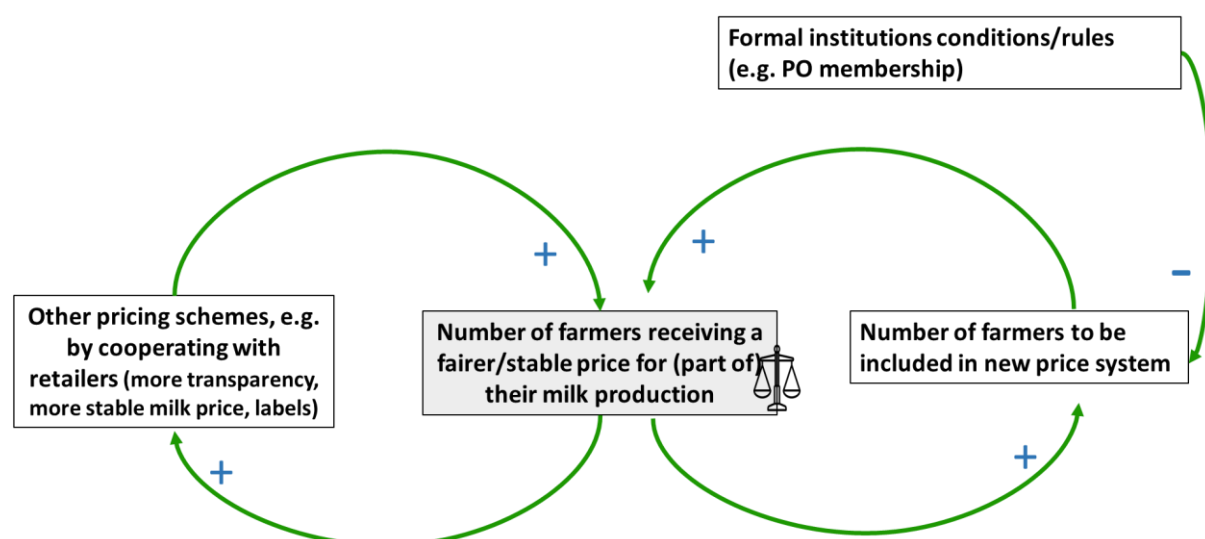


Figure 9.1: The problem of upscaling alternative vertical organisations that guarantee a more fair or stable income for farmers

Success to the successful

This archetype is recognized and two additional examples were given: the focus on eco-efficiency and scale enlargement. Two main causes for the archetype were emphasized. First, many requirements are imposed on the farmers, and they often (feel like they) must increase in scale in order to be able to meet the requirements (certain investments require a certain scale). This confirms previous SURE-Farm findings stating that the farming system and its enabling environment are more focussed on maintaining the status quo and supporting robustness (Coopmans et al., 2019b; Fowler et al., 2019; Lievens and Mathijs, 2018). It emphasizes the relevance of principle 4. Second, most societal interest goes to the function ‘producing cheap and affordable foods’, while other functions receive less social recognition, which again confirms findings from a previous SURE-Farm workshop (Coopmans et al., 2019a). This archetype may lead to a loss of diversity in the farming system, constraining the resilience attribute ‘spatial and temporal heterogeneity of farm types’. Again, the participants emphasized that decisions (e.g. about requirements imposed to farmers) must be based on objective arguments (not e.g. political motives), supporting the urgency and importance of principle 6.



Actions for an enabling environment

Table 9.4. Actions/strategies by actors of the enabling environment/farming system to act/solve on system archetypes contributing to principles for resilience enabling environment and resilience attributes

ACTION/ACTOR	SOURCE	Contribution to resilience enabling principles/archetype	Contribution to resilience attributes
FORMULATE ACTION AND WHICH ACTOR MIGHT BE RESPONSIBLE		INDICATE ARCHETYPE THIS ACTION WILL SOLVE/PREVENT AND HOW, AND TO WHICH PRINCIPLE THIS ACTION MIGHT CONTRIBUTE AND HOW	INDICATE TO WHICH RESILIENCE ATTRIBUTE(S) THIS ACTION MIGHT CONTRIBUTE AND HOW
<p>1. Establishing more and better vertical cooperation by i.a.:</p> <ul style="list-style-type: none"> - allocating more resources to the setting-up and development of collaborative structures. Mainly non-financial resources seem important based on the workshop discussions (initiative and engagement of actors) - Better exploit existing formal and informal institutions - change formal institutions (more frequent, structural and consequent dialogue between various actors across the food chain 	workshop	<ul style="list-style-type: none"> - Fixes that fail/shifting the burden (resilience to milk price volatility: this action is seen as an enabler for fundamental solutions) - Principle 2: shift resource allocation to anticipatory and responsive capacities - Principle 3: it is a way of addressing the long-term trend of disconnection between the production side and marketing side of the food chain 	<ul style="list-style-type: none"> - can increase profitability of farms and food industry firms - increases level of social self-organization of FS, which enables the development of (1) coping capacity through anticipation (e.g. decrease vulnerability of farmers to price drops because they receive a vast price for part of their produce following a specific sales contract); (2) responsive capacities (more established linkages between food system actors enables taking collaborative response actions in times of crisis - Infrastructure for innovation



- **change informal institutions: enable positive attitudes towards vertical cooperation (motivational incentives)**
 - **workshop participants stated that main responsible actors are the food producers and processors. Other actors should perform a supportive role**
- | | | | |
|--|----------------------|--|--|
| <p>2. Creating more transparency (logistic, market) throughout the food chain</p> | <p>worksh
op</p> | <ul style="list-style-type: none"> - Success to the successful (market knowledge is necessary to discover alternative marketing methods) - Fixes that fail/shifting the burden (resilience to milk price volatility) - Principle 6: transparency contributes to insights into markets and therefore root causes of vulnerabilities - Principle 2: such knowledge should enable the shift towards building anticipatory and responsive capacities | <ul style="list-style-type: none"> - Reasonably profitable: should promote entrepreneurship by the farmers and enhance vertical collaboration within the chain - Infrastructure for innovation |
| <p>3. Supporting farmers' entrepreneurship by i.a.:</p> <ul style="list-style-type: none"> - Development and dissemination of knowledge about marketing, business models (relates to previous action 'creation of transparency') - Bring in more knowledge about (drivers of) entrepreneurship and supporting the development of entrepreneurial skills (e.g. trainings) | <p>worksh
op</p> | <ul style="list-style-type: none"> - Shifting the burden (this action is a more fundamental solution compared to e.g. direct payments to boost farm income) - Eroding goals: create bottom-up motivations to and entrepreneurial capacities that enable adaptations - Success to the successful (market knowledge among farmers is necessary to discover alternative marketing methods) | <ul style="list-style-type: none"> - more spatial and temporal heterogeneity of farm types - higher profitability on farms (increases coping and responsive capacities) - Optimally redundant farms - Infrastructure for innovation |

- **Shifting attitudes towards more open-minded, confident, less risk averse farmers**
- **Detect pathways for improving financial remuneration according to private and public goods produced/maintained by farmers**
- **Establishing new business/revenue models on farms which increase profitability**

- **Principle 2:** supporting entrepreneurship means investing in anticipatory and responsive capacities
- **Principle 3:** addressing long-term stresses: supporting entrepreneurship will trigger farmers to include strategies in their business plans to face long-term stresses
- **Principle 4:** foster a potential diversity of responses by improving farmers' agency power
- **Principle 5:** supporting farmers' entrepreneurship implies supporting their capability of both optimizing current profitability and future adaptability (ambidexterity)

4. Developing a more integrated policy
- **increase coherence across domains (environment, agriculture, spatial planning, etc.)**
 - **increase coherence across scales (regional, municipality, federal, national)**

Worksh
op,
previou
s SURE-
Farm
results
(WP3)

- **Eroding goals:** a more integrated policy is needed for addressing certain challenges (e.g. regulation to reduce emissions)
- **Fixes that fail:** coherent policy making can result in more fundamental solution instead of current policy measures that tend to be more symptom reduction
- **Principles 3 & 5:** more integrated policy is needed to address complex challenges with long-term effects

- Diverse policies
- Production coupled with local and natural capital

5. Investing in impact analyses (to assess effects of innovations, policies, etc.)

Worksh
op

- **Fixes that fail:** this action will help to determine to what strategies/ innovations the resources should go

- production coupled with local and natural capital
- legislation coupled with local and natural capital
- Infrastructure for innovation

- | | | | |
|---|-----------------|--|--|
| <ul style="list-style-type: none"> - To determine the real underlying drivers of vulnerability and root causes of challenges (principle 6) - To determine what actions could make a real change, and distinguish such actions from ‘noise’ (which is abundant in these globalised, turbulent world, also due to social media) - Assessments should be performed at multiple scales and levels (local vs. global impacts of innovations) | | <ul style="list-style-type: none"> - Principle 2: this action will help determining how and which resources should be allocated in order to build anticipatory and responsive capacities - Principle 3: impact analyses help detecting important long-term challenges to future resilience, as well as assessing potential coping, responsive and anticipatory strategies to face these challenges - Principle 6: create profound understanding of (the underlying drivers of) challenges and potential strategies to solve them | |
| <p>6. Facilitate producer-consumers connection and dialogue</p> | <p>Workshop</p> | <ul style="list-style-type: none"> - Archetype: eroding goals - Principle 3: assess long term trends - Principle 6: communication and dissemination about evidence-based knowledge of challenges and strategies to solve them | <ul style="list-style-type: none"> - Appropriately connected with actors outside the farming system |
| <p>7. Create an enabling environment that supports diversity of solutions and practices, by i.a.</p> <ul style="list-style-type: none"> - Use of advices/guidances which describe possible paths - Advisors should take up the role of a coach rather than a decision provider - E.g. policy that is based on results instead of measures, so that the farmer is given more freedom to make his own decisions/strategy | <p>Workshop</p> | <p>Archetype: Success to the successful</p> <p>Principle 4: diversity of responses</p> | <ul style="list-style-type: none"> - Diverse policies - Legislation coupled with local and natural capital - Response diversity - Functional diversity |

8. Improving risk management strategies by

- **Improving financial buffer capacity**
- **Improved access to market information**
- **Technological optimisation**
- **Hedging**
- **Vertical cooperation**

Previous work on improving risk management strategies

Archetype: Shifting the burden

Principle 5: find balance in putting resources in immediate versus future challenges

- Reasonable profitability
- Response diversity

Discussion

In the second part of the workshop, the direct formulation of actions appeared hard for the participants. However, based on the discussion about driving forces of the archetypes, the research team was able to identify seven major actions, that each hold the potential to operationalize one or more of the six principles listed in the annex. These seven actions were elaborated in Table 3-1 and can be clustered according to their potential contribution to three major themes, as explained hereafter.

A first set of actions (2, 5, 6 in Table 3-1) contributes to **building and disseminating scientific, evidence-based knowledge about (1) trends and challenges that may affect the long-term resilience of the system and (2) what factors determine vulnerabilities**, hence relating to principles 3 and 6. Challenges must be appropriately identified, described, as well as broadly and consistently acknowledged by stakeholders from the farming system and the enabling environment, otherwise ambitions are prone to reduction, resulting in an eroding goals archetype.

Firstly, for identification and description of root causes for vulnerabilities and potentially threatening stressors/trends, actions 2 (creating more market and logistics transparency throughout the food chain) and 5 (investing in impact analyses) are relevant. Transparency is mainly about data availability and the speed with which data are collected and made available. Availability of data is a prerequisite to research and innovation practices. Content-wise, two major needs were identified during the workshop. First, transparency of market data provides insights to farmers about how markets work, which enables them to appropriately react on market trends (either by anticipating, coping or responding), hence stimulating entrepreneurship (action 3). Second, transparency about logistics can help improving flows of products and capital, enabling more efficient vertical collaboration (action 1). Besides farmers and food system actors, policy-makers would also benefit from more transparent data provision, as it helps making evidence-based decisions about the expenditure of financial resources. Following the primary need for transparency, participants valued independent, objective research practices for conducting impact analyses (action 5).

Secondly, for achieving broad acknowledgment and shared interpretations of trends, challenges, and their driving forces, actions 1 (establishing more and better vertical cooperation), 3 (supporting farmers' entrepreneurship) and 6 (facilitate producer-consumer dialogue) are relevant, as these actions enhance both formal and informal connections between actors from the farming system and the enabling environment. Farmers and actors outside the farming system (intermediary food companies, retailers, consumers) must enter into dialogue with each other to increase awareness about various food system challenges and related societal concerns. Such

connectivity at system level strengthens the resilience attributes ‘socially self-organized’ and ‘appropriately connected with actors outside the farming system’. More connectivity could open up the way towards constructive, fundamental solutions.

A second set of actions (actions 1, 3, 4 and 5 in Table 3-1) contributes to **reducing dependencies on external interventions**, as well as on **finding an optimal balance in the allocation of resources (1) to coping versus responsive capacities, and (2) to tackling current versus future stressors** (principles 1,2,4 and 5). The workshop discussion emphasized that finding fundamental solutions is cumbersome and not straightforward, amongst others because of rapidly changing innovations and technologies in the field of agri-food businesses. Besides, participants believed that the way societal debates are currently conducted and presented in the media are blurring the archetype dynamics, making it even more challenging to distinguish symptoms from the real causes. This is why action 5 (conducting impact analyses to assess effects of innovations, policies, etc.) and action 6 (facilitate dialogue and connection) are important, as explained above. Once more clarification and consensus about core causes of vulnerabilities and threatening long-term challenges is achieved, various actors from the farming system and the enabling environment must take action to address these challenges. For example, farmers themselves should act as entrepreneurs, e.g. by using market knowledge when determining their strategic and tactical business plans. They can be informed and assisted by extension agents. Importantly, the policy framework determines to a large extent the balance of resource allocations. One participant mentioned that it is difficult to reconcile the commitment to environmental sustainability with current policies on fair trade practices and the pursuit of cheap food, thus the policy structure needs revision. Also the other workshop participants agreed that a more integrated policy (action 4) based on a shared vision is needed for resilience. Additionally, the discussion pointed out that policy-makers should invest in fundamental solutions that really contribute to resilience. This means that the farming system should find a way to transform the outputs from action 5 (impact analyses) into inputs for action 4, as the participants highly valued (independent) evidence-based knowledge about how to tackle system archetypes. Lastly, better collaboration between food chain actors (action 1) was identified during the workshop as a promising pathway for solving the fixes that fail archetype and better allocate resources towards building anticipatory and responsive capacities; thereby reducing the need to rely on coping capacities in times of change.

A final set of actions (3, 4, 7) contributes to the **promotion of diversity**, being a universal enabler of resilience. It is important to create an enabling environment that provides farmers with a diversity of responses to potential challenges, avoiding a situation where all farmers apply similar strategies (success to the successful). By setting up such a framework, entrepreneurship is stimulated. Farmers can choose how to fulfil certain ambitions based on personal, company, environmental, and other contextual factors. Entrepreneurship could also lead to more or new

vertical/horizontal collaboration, which allows spreading risks and diversify strategies. This generic strategy to enhance resilience has also been underlined by previous SURE-Farm research. For example, the participatory workshop from WP2 showed that diverse risk management strategies were needed to tackle various challenges that the dairy farming system in Flanders is currently facing, and that the enabling environment plays an important role in supporting and advocating such strategies in order to stimulate uptake.

The actions defined in Table 3-1 can strengthen more than one **resilience attribute** at the same time. Based on the input obtained during the focus group, a first attribute that needs to improve in order to increase the dairy system's resilience, is adjusting production levels so that they fit with natural capital in Flanders. This relates to the archetypes eroding goals and success to the successful (for which participants indicated that eco-efficiency and scale enlargement are largely seen by farming system stakeholders as 'successful'). Investing in impact analyses (action 5) and developing a more integrated policy (action 4) mostly contribute to the coupling of production with local and natural capital, whereby action 5 focusses on identifying environmentally-related challenges relevant for the agricultural sector and action 4 emphasizes the crucial role of policy in tackling such challenges that require an integrated, sector-overarching and consistent approach. A second crucial attribute for improving the resilience of this farming system is 'reasonably profitable'. Establishing more and better vertical cooperation (action 1), supporting farmers' entrepreneurship (action 3), and creating more transparency (action 2) are key actions for improving profitability in the sector. An improvement of the profitability on dairy farms was particularly seen as a priority action by the workshop participants, since this is a base for improving responsive capacities of farmers. Also promoting a diversity of business models (action 7, resilience attributes 'functional and response diversity') was largely interpreted as a system-level pathway for improving profitability, as a way to address the success to the successful archetype. Indeed, profitability allows for building financial buffers, which was seen as necessary for realising adaptations and transformations. A third and final resilience attributes that was put forward by the workshop participants to be in need for improvement was 'appropriately connected with actors outside the farming system'. Current and future challenges for this farming system (for example, the shift towards more plant-based human diets) are indeed currently not widely acknowledged by all actors from the enabling environment. Conversely, not all challenges that farmers need to tackle are fully understood by the actors from the enabling environment. Facilitating the connection and dialogue between these actors (action 6) could help building anticipatory capacities, as well as fundamental solutions.

The discussions during the second part of the workshop largely illustrated that all **actors** from the farming system should take agency, preferably in an open and collaborative way. Relating to the shifting the burden archetype (volatile milk prices), the retailers and intermediary food companies

were interpreted by the participants to be able to rebalance power imbalances in the food supply chain, however, primary producers should also take initiative for strengthening their bargaining position. Research institutes play a major role in addressing principles 3 and 6 which are needed for finding fundamental solutions of fixes that fail archetypes. Policy makers should give priority to finding the right balance between making the policy framework more coherent towards a clear vision (also by creating more coherence across different policy domains), while at the same time allowing and stimulating diversity of solutions and policies.

Conclusions

The two most relevant archetypes for the Flemish dairy system are ‘eroding goals’ and ‘fixes that fail/shifting the burden’. With regard to the ‘fixes that fail’ archetype, the detection of root causes and underlying drivers of vulnerability was framed as a prerequisite to identifying and developing effective fundamental solutions. Participants agreed that this identification should happen in an objective, evidence-based way. For this, higher transparency was identified as a key priority, which requires action from institutions that collect and interpret data. In case data is gathered by private companies, issues could arise relating to how content is made available to actors from the farming system (through raw data or by reports publishing analytical results) and how data collection and data processing is financed (what kind of data should be publicly available versus paying services?). This relates to the resilient attributes ‘openness’, ‘tightness of feedbacks’, ‘socially self-organized’, and ‘infrastructure for innovation’. With regard to the eroding goals archetype, financial constraints to implementing adaptations/transformations seemed to be the main obstacle, however, it was also suggested that some more informal or non-rational aspects can prevent adaptations and transformations that are needed (e.g. farmers focused on maintaining a farming tradition, low openness to change). Thus, the discussion during part 1 of the workshop mainly highlighted the importance and urgency to put principles 3 and 6 into practice. Furthermore, the discussion supported principle 1: there was consensus among the stakeholders that a minimal share of current ‘symptomatic’ support measures will be needed to maintain, however in an as targeted and delineated way as possible. At the same time, stakeholders agreed that shifting resources (both financial and cognitive, social) in a way that the enabling environment better supports structural solutions is crucial for strengthening the long-term resilience of the Flemish dairy system.

During the second part of the workshop, a lot of attention was paid to profitability within the sector, which was perceived to be too low by the participants. Increasing profitability was framed as an urgent goal because this would help solving other issues, such as creating more room for manoeuvre for farmers to engage in permanent learning and experimentation. The discussion

also illustrated that there is still room for improvement when it comes to disseminating and upscaling structural solutions already present in the dairy farming system, but on a too marginal scale to make the difference at system level. The main example for this raised during the workshop was the existing contract between a dairy and a certain retailer that guarantees a fixed milk price for part of the production of the member farmers. Thus, the enabling environment should also allocate resources to the diffusion of knowledge and the sharing of best practices.

10 Implementation roadmap for the implementation of enabling environment principles in Spain (extensive sheep farming)

Introduction

Table 110-1. Workshop introductory data

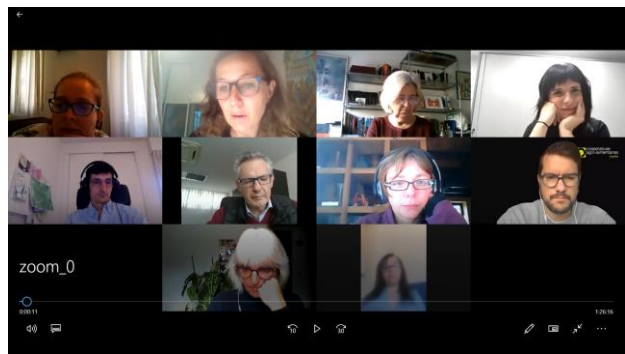
Date	16 th April 2021
Venue	On-line
SURE-Farm team involved (names)	Bárbara Soriano, Isabel Bardají, Alberto Garrido, Carolina San Martín

Table 110-2. Workshop participants

Number	Institution	Gender
1	COAG-National Farmers Association	Female
2	GAN-NIK- Extensive farming agricultural consultancy	Female
3	Fundación Entretantos- Extensive farming Foundation	Female
4	Ganaderas en red- National extensive farmers' association	Female
5	WWF- Environmental NGO	Male
6	CITA- Research Institute	Male
7	CAE- National Agricultural Cooperative	Male

Deviations from guidelines:

A workshop approach is the following. Seven stakeholders were invited to participate in the workshop. Four out of seven already knew and participated in SURE-Farm workshops. Two weeks before the workshop, a document with information summarizing the archetypes found in the extensive sheep farming system in Huesca (Aragón) was sent to the participants. Thus, the duration of workshop could be shortened (90 minutes) and participants could contribute with more intended ideas. In this document, they were asked to think about actions and actors involved to stop the archetypes. The archetypes addressed were “shifting the burden” and

[illegible]



Farming system and enabling environment

Table 2-1. Actors and its enabling environment (institutions and resources) in the sheep extensive farming system.

Actors	Formal institutions	Informal institutions	Financial resources	Non-financial resources
Enterprise domain: <ul style="list-style-type: none"> • Farmers • <i>Oviaragon, Ainsa</i> • Slaughterhouses, retailers • Technical service providers • Input suppliers (feed) • Financial services providers 	<ul style="list-style-type: none"> • Cooperatives 	<ul style="list-style-type: none"> • Attitude towards cooperatives • Attitude towards retail • Environmental vision of the sector 	<ul style="list-style-type: none"> • Cash • Bank loans • Insurances against losses caused by droughts, attacks, diseases, etc. • Farmer's savings 	<ul style="list-style-type: none"> • Time and effort of farmers • Research and innovation (prolificacy, production) • Production contracts • Opening to new distribution channels • Campaigns to promote the sector • Promotion of certificates of origin and labels • Attention to livestock health • Technology to improve production and grazing • Technical support in new technologies • Land for grazing (and agreements for its use) • Transmission of sector's knowledge
Government domain: <ul style="list-style-type: none"> • European Union • Central and Regional agricultural and environmental administration • Municipalities 	<ul style="list-style-type: none"> • CAP: direct aids, greening aids Rural development programs • Wild fauna protection measures • Sanitary legislation (slaughterhouses) • Urban legislation • Natural parks protection legislation 	<ul style="list-style-type: none"> • Accountability • Farmer participation • Societal participation 	<ul style="list-style-type: none"> • Financial aid for farmers • Economic aid for region (rural areas) • Disaster funds • Subsidies for health defense groups • Resources for research 	<ul style="list-style-type: none"> • Infrastructures and services for the region (RDP) • Legislation of certificates of origin and labels • Campaigns to promote the sector • Legislation to improve the position of the farmer in the value chain • Environmental legislation • Monitoring and control programs (wildlife, health) • Labor legislation (foreign labor) • Shepherd schools • Provision of data



D6.4 Implementation roadmaps for the implementation of the enabling environment principles

<i>Intermediary domain:</i> <ul style="list-style-type: none"> • Producers' organizations (PO): <i>Agroseguro, Interovic, ASAJA, COAG, UPA</i> 	<ul style="list-style-type: none"> • PO • Interbranch 	<ul style="list-style-type: none"> • Ideal form of chain collaboration • Ideal farmer type 		<ul style="list-style-type: none"> • Technical support in technologies • Improvement of connections between actors • Lobby for protection of the sector (protection against fauna, political measures) • Transmission of sector's knowledge
<i>AKIS domain:</i> <ul style="list-style-type: none"> • CITA; University of Zaragoza 	<ul style="list-style-type: none"> • Research centres and Universities • Cooperatives/POs 	<ul style="list-style-type: none"> • Technical vision on farming • Farmers' attitude to learn and openness to innovation 		<ul style="list-style-type: none"> • Research (new technologies, sector productivity, pasture management) • Health tools and protocols • Transmission of sector's knowledge • Monitoring and control programs (wildlife, health)
<i>Societal domain:</i> <ul style="list-style-type: none"> • Consumers • Environmental NGOs • Media 		<ul style="list-style-type: none"> • Societal vision on farming • Environmental vision of the sector 		<ul style="list-style-type: none"> • Information on consumption • Research (new technologies, sector productivity, pasture management) • Dissemination of information on the sector.

Validation of system archetypes

We have addressed two of the archetypes: shifting the burden and eroding goals. Both archetypes were recognized by the participants and agreed with their prevalence in the extensive farming system. The most important challenges of the farming system trigger the two mentioned archetypes.

Stakeholders identified the low profitability as the main problem of the sector, especially derived from the global economic and productive system model oriented to the markets (how it is organized, the competition with other cheaper meats, etc.), and therefore, the one on which the actions are more needed. Different symptom solutions have been addressed to solve the problem of the farm incomes (for example the economic support to incomes, the export of living animals, which has kept the prices, promotion of the sector products), within the aforementioned limitations imposed by the global food system model. They pointed out that these short-term solutions (symptom solutions) are still necessary for the sector's survival (before the effects of structural solutions appear). Besides, they lead to a deeper understanding of the problem and the design of better long-term solutions. For general long-term (structural) solutions, they suggested that actions have to be addressed outside the farming system, related to a change in the global commercial policies, and specially, the improvement of the value chain functioning (that is, that all the actors of the value chain perceive benefits fairly).

In the actions related to the value chain improvement, administrations need to intervene and influence the markets. The involvement of administrations requires the collectivization of the sector, in which the alliance sector-consumers is a requirement. To achieve this alliance, it is necessary to eliminate the gap between the urban and rural worlds. Bridging this gap is also fundamental to stop the other important archetype of the sector, the eroding goals archetype. Actions related to the reduction/elimination of the gap will improve life conditions of the rural areas, increasing the attractiveness of areas, but also attractiveness of the sector (sector profitability's improvement). The increase of the attractiveness will solve the problem of the depopulation in the region.

Farm profitability is essential for the sector resilience, so actions addressed to improve it are critical. The improvement of the farm profitability will have a positive impact in other sector's challenges (e.g., the depopulation).



1. Actions for an enabling environment

Table 3-1. Actions/strategies by actors of the enabling environment/farming system to act/solve on system archetypes contributing to principles for resilience enabling environment and resilience attributes. The most important actions identified by participants are the ones highlighted in grey

ACTION	ACTOR	SOURCE	Contribution to resilience enabling principles/archetype	Contribution to resilience attributes
FORMULATE ACTION	WHICH ACTOR MIGHT BE RESPONSIBLE	Source (workshop; SURE-Farm deliverable; other literature)	INDICATE ARCHETYPE THIS ACTION WILL SOLVE/PREVENT AND HOW, AND TO WHICH PRINCIPLE THIS ACTION MIGHT CONTRIBUTE AND HOW	Indicate to which RESILIENCE attribute(s) this action might contribute AND HOW
Changes in the global commercial policies (GENERAL)	World trade organization, public administration	Workshop	Shifting the burden: the alarming situation of the sector is caused by the current global commercial policies that are hampering the appropriate functioning of the sector/P3	Reasonably profitable, Appropriately connected with actors outside the farming system
Greater presence of farmers in the decision making and politization of sector problem	Farmers, Nacional and regional administration, PO, cooperatives	Workshop	Shifting the burden: the greater power of farmers in the value chain will improve their anticipatory capacity and their involvement in structural solutions/P3	Reasonably profitable
Improvement of short channels of commercialization	All value chain actors	Workshop	Shifting the burden: the improvement of short channels offers new opportunities for sales/P3/P4	Reasonably profitable, functional diversity
Improvement and consolidation of the exportation model (meat instead living animals, variety of customers)	Cooperatives, PO, National administration	Workshop	Shifting the burden: the improvement of exportation channels offers new opportunities for sales/P3/P4	Reasonably profitable, functional diversity
Fair payments to all actors in the value chain, especially to farmers	All value chain actors	Workshop	Shifting the burden: the greater profitability of farmers in the value chain will improve their anticipatory capacity and their involvement in structural solutions/P2	Reasonably profitable, Appropriately connected with actors outside the farming system
Information to the consumers regarding benefits of extensive farming system to environment and rural life	Cooperatives, PO, Public administration	Workshop	Shifting the burden: this can lead to an increase of the sales (structural measures) and the improvement of profitability/P3	Reasonably profitable, functional diversity, supports rural life
Product certification and differentiation by improving the product labelling (e.g., indicating the extensification origin for added value)	All value chain actors, especially public administration and farmers	Workshop	Shifting the burden: this can lead to an increase of the sales (structural measures) and the improvement of profitability/P3	Reasonably profitable, supports rural life, production coupled with local and natural capital

D6.4 Implementation roadmaps for the implementation of the enabling environment principles



Introduction of the lamb meat in public purchase procedures (schools, hospitals)	Public administration, PO, cooperatives	Workshop	Shifting the burden: this lead to an increase of the sales (structural measures) and the improvement of profitability/P3	Reasonably profitable, supports rural life
Promotion of new consumption' habits	Public administration, media, PO	Workshop	Shifting the burden: this can lead to an increase of the sales (structural measures) and the improvement of profitability/P3	Reasonably profitable
New cuts and meat products	Cooperatives, PO, research centres	Workshop	Shifting the burden: this can lead to an increase of the sales (structural measures) and the improvement of profitability/P3	Reasonably profitable
To identified new "sales niches"	Cooperatives, PO	Workshop	Shifting the burden: this can lead to an increase of the sales (structural measures) and the improvement of profitability/P3/P4	Reasonably profitable
Bureaucracy reduction	Public administration	Workshop	Shifting the burden: this lead to better management of farms/P4	
Greater involvement of the administration to solve the problems	Public administration	Workshop	Shifting the burden: the involvement of administration improve the situation of farmers within the value chain (e.g., regulation of the value chain) /P1	
Redistribution and increase of aids, as temporary resources while working on real solutions	Public administration	Workshop	Shifting the burden: the increase of the farm incomes improve the robustness capacity of the farms, which is necessary until structural measures are implemented/P2	Reasonably profitable, Optimally redundant farms
Modification of aids: aids focused on "what farmers do" instead on "what farmers have"	Public administration	Workshop	Shifting the burden: the perception of incomes because of the provision of public goods allows farmers to diversify their incomes and solve their problems of solvency/P3/P4	Reasonably profitable, production coupled with local and natural capital, Optimally redundant farms
To price the provision of public goods	Public administration	Workshop	Shifting the burden: the perception of incomes because of the provision of public goods allows farmers to diversify their incomes and solve their problems of solvency/P3/P4	Reasonably profitable, production coupled with local and natural capital
To foster the local infrastructures in order to reduce production cost (e.g., reduction of transportation cost with movable slaughterhouses)	Public administration, PO, cooperatives	Workshop	Shifting the burden: the reduction of costs increase the profitability of farmers/P2	Reasonably profitable, functional diversity, supports rural life



D6.4 Implementation roadmaps for the implementation of the enabling environment principles



Farmers' training in the sustainable use of natural resources (e.g., regenerative agriculture)	Farmers, PO	Workshop	Shifting the burden: the improvement of the pasturelands management will reduce the inputs costs and increase profitability of farmers/P3	Production coupled with local and natural capital, Socially self-organized
Cooperatives to provide inputs more efficiently and better prices	Cooperatives, farmers	Workshop	Shifting the burden: the reduction of costs increase the profitability of farmers/P2	Reasonably profitable
Improvement of zootechnics (sanitary conditions, feeding) to reduce costs	Cooperatives, research centres	Workshop	Shifting the burden: the use of technification can lead to the reduction of costs and increase the profitability of farmers/P3	Reasonably profitable, functional diversity
Professionalization of the sector: business vision of farms	Farmers, cooperatives, Public administration	Workshop	Shifting the burden: the better knowledge of the sector, especially regarding the functioning of the value chain might reduce of the costs but also might help farmers to anticipate shocks and detect trends/P3/P4	Reasonably profitable
Agreements between farmers for stubble fields use and promotion of the use of other agronomic surfaces	Farmers, public administration	Workshop	Shifting the burden: the improvement of the access to lands allows farmers to have more alternatives to use the natural resources and reduce feeding costs/P3	Reasonably profitable, production coupled with local and natural capital
To shift to a sustainable intensification of the sector	All value chain actors	Workshop	Shifting the burden: the sustainable intensification might be an alternative to problems presented by the extensive sector (distance to distributors, lack of lands, etc.)/P4	Reasonably profitable, functional diversity
Financial support for preventive measures implementation in order to avoid wild fauna attacks (fences, dogs, etc.)	Public administration, cooperatives, PO, farmers	Workshop	Shifting the burden: Preventive measures help to avoid losses caused by the wild fauna (anticipatory capacity)/P2	
Improvement of farm practices	Farmers, PO	Workshop	Shifting the burden: improving the management, especially referred to pasturelands, lead to the reduction of costs/P3	Reasonably profitable, production coupled with local and natural capital
Support of administration to sustainable farming (pasturelands use)	Public administration	Workshop	Shifting the burden: improving the management, especially referred to pasturelands, lead to the reduction of costs/P3	Production coupled with local and natural capital
Improvement of permanent pasturelands	European union, National and regional administration	Workshop	Shifting the burden: improving the management, especially referred to pasturelands, lead to the reduction of costs/P4	Production coupled with local and natural capital



D6.4 Implementation roadmaps for the implementation of the enabling environment principles

			Eroding goals: the main problem of the	
Reduction of the gap between urban and rural life (GENERAL)	Public administration, consumers (civilians), media	Workshop	depopulation of the rural regions is the great difference between urban and rural conditions. Reducing the gap will lead to the recognition of the contribution of the rural world by the urban areas/P5	Support rural life, Appropriately connected with actors outside the farming system
Improvement of infrastructures and basic public services (schools, health centers, internet)	Public administration	Workshop	Eroding goals: Infrastructures improve the rural areas, which decreases the urban-rural gap/P3	Support rural life
Economic support (incentives of RDP) to other business (restaurants, cultural business) to employment generation and to make more attractive the rural areas	Public administration	Workshop	Eroding goals: New businesses improve the rural areas, which decreases the urban-rural gap/P1/P3	Reasonably profitable, Support rural life, Appropriately connected with actors outside the farming system
Cooperative as an instrument for improving the rural life (strong agronomic activities)	Cooperatives	Workshop	Eroding goals: The reinforcing of cooperatives provides better conditions and quality of life, which improve the rural life/P3	Reasonably profitable, Support rural life, Socially self-organized
To improve the knowledge of urban areas regarding the rural life	Public administration, consumers (civilians), media, PO, cooperatives	Workshop	Eroding goals: Awareness of rural lifestyle and benefits it provides by the urban people helps to reduce the gap/P3	Support rural life, Appropriately connected with actors outside the farming system
To eliminate the bad image of the rural life (cultural perception)	Public administration, consumers (civilians), media, PO, cooperatives	Workshop	Eroding goals: Awareness of rural lifestyle and benefits it provides by the urban people helps to reduce the gap/P3	Support rural life, Appropriately connected with actors outside the farming system
To encourage a responsible and conscious rural tourism	Farmers, Public administration, consumers	Workshop	Eroding goals: this kind of tourism produces an incomes source and help to creates awareness regarding rural life/P3	Reasonably profitable, Support rural life, Appropriately connected with actors outside the farming system
Improvement of fiscal policies regarding succession and change of RDP aids to new entrants	Public administration	Workshop	Eroding goals: Economic support to succession guarantees that people stay in rural areas/P3	Reasonably profitable, Support rural life, Socially self-organized

D6.4 Implementation roadmaps for the implementation of the enabling environment principles



To encourage the access to lands of new entrants	Public administration, PO	Workshop	Eroding goals: The facilitation to land's access support succession and guarantees that people to stay in rural areas/P3	Reasonably profitable, Support rural life, Coupled with local and natural capital
To achieve that the extensive farming is the main occupation and income source	Farmers, PO, Public administration	Workshop	Eroding goals/P3	Reasonably profitable, Support rural life, Coupled with local and natural capital, Socially self-organized
To dignify the shepherd job	Farmers, PO, Public administration, consumers	Workshop	Eroding goals: Awareness of contribution of shepherding to natural resources and rural lifestyle by the urban people helps to reduce the gap/P3	Support rural life, Coupled with local and natural capital, Socially self-organized
Improvement of shepherds schools and creation of a shepherd job center	PO, Public administration	Workshop	Eroding goals: it contributes to the professionalization of the sector and facilitates the search of workforce in the region/P3	Support rural life, Coupled with local and natural capital, Socially self-organized



Discussion

The most important actions are the ones related to the improvement of the profitability of the sector. On the one hand, participants identified the need of changes in the global commercial policies by international institutions, which will allow the reinforcing of the sector value chain.

There are some actions focused on the improvement of the value chain in the long-term (structural actions) that contribute to the increase of farms' profitability. Those actions contribute to the principle 3, as they entail the adaptation of the value chain. In those actions, all actors of the value chain play a role, however, the implication of administration to perform these actions is essential. Besides, administration need to contribute to the robustness of the system through payments (principle 1), although the payments needs to improve.

Some of the actions are focused in the increase of the farm incomes through the promotion of sales, the reduction of costs and the improvement of the natural resources' use (that come with the costs reduction) in the long-term. Most of the suggested actions contribute to the principle 3. In the promotion of sales, again, the administration plays an important role, but media become the link between the consumers and the extensive farming system, which is necessary for sales' increase. In the reduction of costs, on-farm (farmers), cooperatives' and PO's actions are also important.

Actions for the reduction of the gap between urban and rural life constitute the other group of actions that need to be addressed. Participants pointed out that this gap is a strong challenge that affects the extensive sector. Most of the actions necessary to reduce the gap have to be with the improvement of the perception that urban centers have regarding rural areas, the improvement of the rural life and the attractiveness of the sector in the long-term. All the actions contribute to the principle 3.

For the attractiveness of the sector, it is essential that it is profitable. For that, actions aforementioned are necessary. Moreover, obstacles that hinder the succession and new entrants to join the sector need to be fixed. The improvement of rural life is mainly related to improvement of services and infrastructures.

Public administrations participate in all suggested actions and play the most important role. In the perception of rural life media and consumers (and civilians in general) are important to reduce the gap. Farmers and PO's also take part of the actions related to succession in the sector.

Related to resilience attributes, the majority of actions contribute to that the sector is reasonably profitable. Improvements in the value chain and in the links between the rural and urban life lead



to a better connection with the actors outside the farming system. Besides, the actions related to the urban-rural gap reduction mainly involve the support of rural life, but also the improvement of the production coupled with local and natural capital. Actions related to the succession also improve the socially self-organization of the farming system.

The actions related to the economic support of the sector, at least until other actions are implemented or their effects appear, are aimed at improving the robustness of the farming system. The rest of the actions contribute to the adaptation of the farming system (changes in the value chain, in the relationship with urban areas, etc.).

2. Conclusions

Actions suggested by participants are aimed at improving the low profitability of the sector. The increase of farms' profitability lead to the improvement of sector and rural regions attractiveness, and thus, the reduction of the urban-rural gap, which in turn, will contribute to increase the incomes of the sector.

The main challenge that triggers the archetypes in the farming system is the low profitability. And the actions were focused on the actions towards structural solutions (shifting the burden) and making the rural areas more attractive (eroding goals)

From one side, a common perception arose regarding that there is a need of changing of market mechanisms in general and the global commercial policies in concrete. The extensive farming is not profitable as it is not valued in the (national/international) markets. So, changes at macro level performed by the enabling environment are requested. From the other side, additional actions were suggested at national level regarding bridging the gap between rural and urban people and making more attractive the rural areas and the extensive farming in which the enabling environment is crucial as well as the farming system.

We found some difficulties to link the actions to the resilience principles as the actions could be linked with several principles simultaneously. Despite this difficulty, it can be said that the actions identified are mainly related to the principle 3. The enabling environment should assist the FS to detect, assess and address long-term trends that challenge the FS, in a way that increases future robustness, including through adaptation or transformation to that trend in the long run. This is explained by the fact that the participants made the effort to provide actions to stop the archetype "shifting the burden" and looking for long-term structural actions. The actions identified are also related to the principle 4. The enabling environment should foster a potential



diversity of responses, rather than focusing too much on a limited set of actions strengthening resilience, showing the relevance of the diverse responses to stop the archetypes. Other relevant principles emerging from the actions proposed in the workshops are the principle 1, 2 and 5.



11 Implementation roadmap for the implementation of enabling environment principles in the Netherlands (arable farming in Veenkolonien)

Introduction

Table 11-1. Workshop introductory data

Date	12 April 2021
Venue	Online (teams)
SURE-Farm team involved (names)	Wim Paas, Yannick Buitenhuis, Abel van Hoeven, Miranda Meuwissen, Pytrik Reidsma

Table 11-2. Workshop participants

Name & Institution	Gender
Henneman, Ko, Chair de Nieuwe Leefstijl	m
Land, van 't, Henk, Chair Agrarisch Natuur Drenthe	m
Roelfes, Gerard, Projectleider Gemeente Westerwolde	m
Smit, Bert, WUR, Wageningen Economic Research	m
Visscher, Iris Onderzoeksassistent proefboerderij 't Kompas	f
Vree Egberts, René, Agrarische Natuur Drenthe - directeur	m
Mulleneers, Erik, Ministry of Agriculture, Nature and Food Quality (LNV)	m
Mennega, Frank, Regiodeal natuurinclusieve landbouw	m
Jan Reinier de Jong, akkerbouwer	m

Deviations from guidelines:

- Was a different format chosen than the online workshop? No.
- Was an online whiteboard used during the workshop? No, we did not use the online whiteboard because we did not want to lose time explaining it. Moreover, the group was quite small. We invited participants to write comments in the chat.
- Were the specified time indications respected? We used the following outline: Introduction (15 min), acknowledgement of patterns/archetypes (30 min), discussion on whether five suggested alternative systems will interrupt patterns (30 min), setting priorities (30 min).

Farming system and enabling environment

Table 11-3. Actors and its enabling environment (institutions and resources) in the Veenkoloniën farming system. Asterisks refer to financial resources (*) and non-financial resources ().**

Actors	Formal institutions	Informal institutions
Enterprise domain: Arable farmers Livestock farmers Avebe (starch potato cooperative)	Contracts	Informal norms and patterns of collaboration between arable and livestock farmers** Informal networks**
Government domain: Water boards Province Ministry LNV European Union	EU CAP – Direct income support (Pillar I) and Rural Development (Pillar II) (co-financed by national governments)* EU Water Framework Directive and Nitrates Directive and national implementation (Dutch: <i>Meststoffenwet</i>) EU Habitats Directive and the Birds Directive (Natura2000) Legislation on plant protection products (European Regulation (EG) No. 1107/2009; de Wet gewasbeschermingsmiddelen en biociden (Wgb)) Legislation on food safety and quality (European Regulation (EG) No. 178/2002 laying down the general principles and	Dutch governmental vision on Agriculture (Dutch: <i>Visie kringlooplandbouw</i>) National transition visions (energy transition, protein transition) Informal networks between farm system actors and policy makers, mediated through interest groups, political parties, other societal associations, and private contacts and encounters**

Actors	Formal institutions	Informal institutions
	<p>requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety (PbEG L 31); De Nederlandse warenwet)</p> <p>Constitutional competences of the Provinces and the ensuing regulations**</p> <p>Statutory competences of the Waterboards and the ensuing formal resolutions**</p>	
<p>Intermediary domain:</p> <p>Cosun Beet Company (sugar beet cooperative)</p> <p>Agrifirm (wheat processor and feed supplier)</p> <p>Farmers labour organisation</p> <p>Achmea, Rabobank and other financial institutions</p>	<p>Contracts</p>	<p>Informal norms of reciprocity that mobilise assistance in case of need, e.g. diseases**</p> <p>Informal associations that enable regular encounters and trust-building, e.g. study clubs**</p>
<p>AKIS domain:</p> <p>InnovatieVeenkoloniën</p> <p>WUR incl. experimental farm Valthermond in the region</p> <p>Research/innovation projects (agro kalender noord nederland; http://www.agroagendann.nl/)</p>	<p>The Dutch Rural Development Programme (POP) (InnovatieVeenkoloniën is partly financed by national/provincial government and CAP Pillar II)*</p>	<p>Informal networks and knowledge exchange between FS and AKIS actors, e.g. study clubs**</p> <p>Shared cognitive and normative beliefs, e.g. perceptions of FS problems and visions on farming</p>
<p>Household domain:</p> <p>Farm household members</p> <p>Non-farm neighbours</p>	<p>Formal intra-household contracts, e.g. marriage, inheritance contracts, debt guarantees*</p>	<p>Norms of reciprocity and solidarity within farm households**</p> <p>Shared cognitive and normative beliefs, e.g. problem perceptions and visions on farming**</p>
<p>Civil society domain:</p> <p>Environmental organisations</p>	<p>Formal memberships</p> <p>Formalized commitments</p>	<p>Norms of reciprocity**</p> <p>Shared cognitive and normative beliefs**</p>

Validation of system archetypes

Based on case study reports of the Veenkolonien in D5.3 (Reidsma et al., 2019), the ‘Dutch annex’ to D5.5 (Paas et al., 2020), the reporting protocol of D6.1 (Spiegel et al., 2020) and the Dutch chapter in the SURE-Farm book (Spiegel et al., 2021) we selected two archetypes:

1. Fixes that fail / shifting the burden
2. Limits to growth

Stakeholders recognised the archetypes to some extent. However, they did not fully agree:

- a. On the ‘fixes that fail’ (in connection to innovations by Avebe as response to 2013 abolishment of EU subsidies): this might indeed have increased dependence on Avebe, but: (i) it also led to improved self-confidence in the Veenkoloniën (boost for region and sector); (ii) dependence is not regarded as a problem as “Avebe is a great innovator”, and capital stays in sector as there are no shareholders).
- b. There may be limits to growth, but (i) there are still opportunities to grow further, e.g. by further innovating/extracting ingredients from the potato (vitamin C); (ii) the area indeed focuses on starch, but that fits the soil type, and enabled Avebe to become a large and important player (also other regions are known for some specific products such as dairy in Friesland).
- c. There have been many (small) changes in the past 30 years, e.g. towards improving environmental issues. So there is change, albeit it not disruptive. Rather than aiming for direct and radical change, participants argued that gradual change, largely initiated through grassroot innovation, within the farming system is more suitable - not every farmer is (financially) able to change their business immediately.

Overall, participants were aware of the archetypes, but perceived that the archetypes emphasise a negative view on the farming system. Instead, the participants recognised room for mainly continuing with the current functionalities of the farming system by focusing on innovation, creativity, small wins and incremental change.

Actions for an enabling environment

Stakeholders did not regard the archetypes as problematic as change was already ongoing. Therefore, the actions in Table 11.4 are **not counteracting** archetypes, but reflect the actions related to the four alternative systems from Fopia-SURE-Farm 2 (Paas et al., 2020). Stakeholders



regarded these as four relevant (and already somewhat ongoing) development trajectories for the Veenkolonien. They stressed that these systems should co-exist as “the one fits one farmer, while the other fits another farmer”.



Table 11-4. Actions by actors of the enabling environment and the farming system to further enhance change in the farming system. Actions are derived from Fopia-SURE-Farm2 (Paas et al., 2020). Actions (weakly) relate to principles 3 (address I-t trends), 4 (diversity of responses), and 5 (ambidexterity), and attributes 1 (profitability), 2 (production coupled with local and natural capital), 3 (functional diversity), 11 (legislation coupled with local and natural capital), 12 (infrastructure for innovation), and 20 (reflectivity and shared learning).

Actions (random order)	Alternative crops	Precision agriculture	Nature inclusive	Collaboration & water
Extend knowledge on soil & varieties	V	V	V	V
Better varieties (starch content, nematode resistance)	V	V	V	V
Precision agriculture		V	V	V
Exchange land with dairy farms		V	V	V
Changing crop rotation	V		V	
Protein crops for animal and human consumption	V			
Different way of fertilizing (alternative) crops	V			
Increasing water use efficiency	V			V
Applying drones (for early risk detection and damage assessment)		V		
Improve circularity	V	V	V	
Scaling up		V		
Increase value of starch products	V	V	V	V
Reduce costs (in general)				
Reduce crop inputs		V	V	
Have land available outside contract farming				
Developing new business models	V	V	V	
Introduction of new value chains	V			
Having a good marketing strategy	V			
High value products	V	V		
Improve soil quality	V	V	V	V
Maintain water locally in canals				V
Take lower laying lands out of production				V
Actively replenishing ground water levels				V
Land consolidation / redesign of the landscape			V	V
Nature friendly interventions at field level (buffer strips, strip cropping, green manures etc.)			V	
Customized water levels				V

Relax constraining regulations (water management, collaboration, taxes)				V
Rewarding services with regard to nature	V		V	V
Adapting trading policies			V	
Allowing genetic improvement techniques (Crispr-Cas)		V		
Raising awareness about soil quality	V	V	V	V
Raising awareness about water availability				V
More contact between consumers and producers	V			
Precision agriculture as shared responsibility of processors and farmers		V		
Collective action	V			V



Discussion

Based on the workshop and Fopia-SURE-Farm 2 results, the Veenkolonien region is found to have interest to continue to change towards more diverse and environmentally friendly production methods – while keeping starch potato as their main crop. Initiatives towards the four development trajectories (alternative crops, precision agriculture, nature inclusive, collaboration & water management) are already ongoing but need further incentives. In doing so:

- There needs to be more attention (and appreciation) for bottom-up initiatives, i.e. farmers need to be involved. Currently, too many innovations are top-down. Some
- Initiatives can be worked out with “the frontrunners and the peloton”; laggards often do not attend meetings and hold up the process. (They’ll disappear anyway.)
- Radical transition does not seem to be a feasible route. Gradual change in 10-20 years guided by consistent policy is preferred. (Gradual change can lead to a transition in 20 years.)
- Innovations do not only refer to the farm level but also pertain to Avebe (e.g. extracting vitamin C from potatoes). Some level of subsidies would be adequate to stimulate innovations.
- It does not seem to be wise to reduce the volume of starch potato production in the region as that will hamper the position of Avebe.
- More connection with consumers would be beneficial, even though Avebe’s products are not really visible for consumers. Nevertheless, more connection with consumers could lead to better commodity prices and more sustainable farmer practices.

Related actions were derived from Fopia-SURE-Farm2 (Paas et al., 2020). Actions (weakly) relate to principles 3 (address long-term trends), 4 (diversity of responses), and 5 (ambidexterity), and attributes 1 (profitability), 2 (production coupled with local and natural capital), 3 (functional diversity), 11 (legislation coupled with local and natural capital), 12 (infrastructure for innovation), and 20 (reflectivity and shared learning). Actions mostly ‘come in small steps’ and ‘start with some pioneers’, i.e. they are regarded as adaptation, not as radical transformation (although this may be the result after 20-30 years).

(In the workshop we started out from the archetypes and four development trajectories, i.e. we did not discuss which “principles are most urgently in need of action”.)



Conclusions

Results of the workshop were in line with results of the Fopia-SURE-Farm 2 workshop and point towards interest in changing to more diverse and environmentally friendly production - while keeping starch potato as the main crop.

Related actions come from multiple FS and enabling environment actors. It was stressed to involve farmers from the beginning (grassroot innovations, bottom-up approaches), to not make changes too drastic (better to work in small steps), to have a consistent policy, and to have some level of subsidies to stimulate innovations.

Reflection on the workshop:

1. The workshop enabled to reflect again on alternative systems retrieved from the Fopia-SURE-Farm2 workshop. These were not regarded as reactions to archetypes, but as (to some extent already ongoing) development trajectories to deal with challenges (extreme weather, nematodes, too intensive farming).
2. Actions do not address all principles, nor all attributes. For instance, attributes related to human capital, rural life, and connectedness with actors outside the FS, were not addressed. (We did not probe any questions towards these.) This raises the concern whether suggested trajectories and actions are sufficiently comprehensive.
3. In line with the previous point: elicited actions from the Fopia-SURE-Farm 2 workshop seem logical components of the roadmap to enhance resilience. However, they need to be complemented with lessons learned from the domains of risk management, farm demographics and labour issues, and policy.

References

Paas, W., Meuwissen, M.P.M., van de Wiel, I., Reidsma, P. (2020). *FoPIA-Surefarm 2 case study report the Netherlands*. Annex to D5.5: Accatino, F., Paas, W., Herrera, H., Appel, F., Pinsard, C., Shi, Y., Schütz, L., Kopainsky, B., Bańkowska, K., Bijttebier, J., Black, J., Gavrilesco, C., Krupin, V., Manevska-Tasevska, G., Ollendorf, F., Peneva, M., Rommel, J., San Martín, C., Severini, S., Soriano, B., Valchovska, S., Vigani, M., Wauters, E., Zawalińska, K., Zinnanti, C., Meuwissen, M., & Reidsma, P. (2020). *Impacts of future scenarios on the resilience of farming systems across the EU assessed with quantitative and qualitative methods*. Deliverable 5.5, SURE-Farm.

Reidsma, P., Spiegel, A., Paas, W., Accatino, F., Antonioli, F., Appel, F., Bardají, I., Berry, R., Bertolozzi, D., Bijttebier, J., Black, J., Buitenhuis, Y., Coopmans, I., Courtney, P., Feindt, P., Gavrilesco, C., Hansson, H., Jendrzewski, B., Khafagy, A., Krupin, V., Lagerkvist, C., Larson, S., Lievens, E., Mathijs, E., Manevska-Tasevska,



G., Maye, D., Ollendorf, F., Peneva, M., Pettit A., Pinsard, C., Rommel, J., Senni, S., Severini, S., Slijper, T., Soriano, B., Urquhart, J., Valchovska, S., Vigani, M., Wauters, E., Zawalińska, K., & Meuwissen, M.P.M. (2019). *Resilience assessment of current farming systems across the European Union*. Deliverable 5.3 SURE-Farm.

Spiegel, A., Meuwissen, M.P.M., Feindt, P.H., Paas, W., Buitenhuis, Y., Slijper, T., Candel, J. and Reidsma, P. (2020). Case reporting protocol, part of Deliverable 6.1.

Spiegel, A., Reidsma, P., Buitenhuis, Y., Slijper, T., de Mey, Y., Feindt, P.H., Candel, J., Poortvliet, P.M., Meuwissen, M.P.M. (2021). Chapter 12. Realising transformation in response to future challenges. In: Meuwissen, M.P.M., Feindt, P.H., Garrido, A., Mathijs, E., Soriano, B., Urquhart, J., Spiegel, A. (eds), *Resilient and sustainable EU-farming systems; exploring diversity and pathways*, Cambridge University Press (in press).



12 Implementation roadmap for the implementation of enabling environment principles in Italy (Hazelnut production in Viterbo)

Introduction

Table 12-1. Workshop introductory data

Date	24-03-2021
Venue	Online – Meet platform
SURE-Farm team involved (names)	Simone Severini, Saverio Senni, Cinzia Zinnanti

Table 12-2. Workshop participants

Institution	Gender
Government	Male
Government	Female
Researcher	Male
ONG	Female
Farmer	Male
Producer's Organization (<i>Coopernocchie</i>)	Male
Producer's Organization	Male
AKIS	Male

Deviations from guidelines:

The design of the workshop did not deviate from the established guidelines. 11 stakeholders were invited, thus missing an additional government member of the Local Action Group who would certainly have contributed constructively to the workshop. The team respected the format chosen for the online workshop. However, the introduction of the objectives and presentation of the farming system and its enabling environment has been done through the MURAL platform,



without any presentation on PowerPoint. The team created illustrative panels following the outlines set in the MURAL itself.

The time suggested by the organisers was partially respected. On the one hand, we shortened the time dedicated to the initial presentation because most of the stakeholders had taken part in the FoPIA-SURE Farm workshops and were already well informed about the FS and the SURE Farm project. On the other hand, we devoted more time to the presentation of the archetypes being new to them. We mentioned the archetypes dictated by the guidelines, but the archetypes we realised in D6.1 were worthy of further discussion from the stakeholder's point of view.

As there were 8 participants in total, we organised only one session to discuss the suggested actions to solve the two archetypes.

In general, we reduced the planned time a little because it requires a lot of attention for the development of these activities, but the online performance limits it. This is also on the back of some technical problems related to the poor connection of some participants.



Farming system and enabling environment

Table 12-3. Actors and its enabling environment (institutions and resources) in the Hazelnut farming system.

Actors	Formal institutions	Informal institutions	Financial resources	Non-financial resources
Enterprise domain: Farming system actors: <ul style="list-style-type: none"> – PO («Assofrutti», «Coopernocchie») and cooperatives – Local processor «BioNocchie» – Farms – Farm households Other actors: Confectionary industry («Ferrero Commerciale Italia s.r.l» and «A. Loacker s.p.a») Input supplier (machinery): «Facma», «G.F Costruzioni macchine agricole»	Producers' organizations, Cooperatives, Processing industry	Attitude towards cooperation	Resources of the confectionary industry; CMO funds (POs and associated farmers); RDP funds (farmers).	Attention to the environmental impact of the products confectionary industries use; Technical knowledge owned by the POS'; Improved technical knowledge on organic farming; opportunity to cooperate among actors along the value chain.
Government domain: European Union Italian government - Ministry of Agricultural, Food and Forestry Policy Common Market Organization (CMO) Regione Lazio (Rural Development Program-RDP) Province of Viterbo (water and environmental issues) Chamber of Commerce Municipalities (public health safety)	Agricultural policies including CAP, Food, environmental and human health safety laws PDO and other marks management and certification	Accountability Farmer participation	CMO funds (POs and associated farmers); RDP funds (farmers).	Simplifications of RDP procedures.
Intermediary domain: Banks, Credit Institutions, Insurances	Consulting, credit	Protection against risks, save money	Not mentioned.	Not mentioned.

AKIS domain: PO, University of Tuscia (Viterbo), ARSIAL (Regional Agency for Research and Development), agronomists/advisory staff	Research, consulting	Technical vision on farming, information' flow	EU and national funds for research; RDP funds for applied research developed together with farmers and farmers' organizations.	Linkages between the AKIS and technicians mostly working in the POs.
Societal domain: BioDistrict of the "Via Amerina and Forre", local and environmental NGOs such as WWF and Slow Food. Hazelnut fairs and festivals organizers, "Pro loco", Local Action Group.		Societal and ecological vision on farming	Not mentioned;	Ability to lobby for introducing more constraining environmental regulations.

Validation of system archetypes

Through a diagnosis of the enabling environment, two main archetypal patterns have been identified in D6.1. according to which challenges are insufficiently addressed to foster the resilience of the farming system (FS). These have been discussed during the workshop. The first can be ascribed to “Fixes that Fails” archetype and addresses the issue of environmental sustainability. The second can be ascribed to “Success to the successful” and concerns the system's autonomy.

These two main archetypes include two groups of challenges that the FS is compelled to face.

The first one (hereafter referred to as 'Environmental sustainability archetype') concerns the consequences of the challenges of the FS on the environment (see annex 3 for an in-depth description). These challenges concern the growing extreme weather events, the reduction of the profitability of other crops, the increasing societal demand for eco-friendly practices as well as the growing quality standards. They all affect the stock of natural resources and may reduce the provision of environmental services that are part of the public functions played by the system.

The second archetype (hereafter referred to as 'Autonomy of the FS archetype') includes two challenges - the growing power of the confectionery industry and the reduction of the profitability of other crops - that may have negative implications leading to high specialization and reducing the autonomy degree of the system (see annex 4 for an in-depth description). This is seen as constraining the resilience of the system to possible future shocks.

Stakeholders recognised the two system archetypes developed from reflections in previous workshops. They have been provided with some background material including the graphical representation of the two archetypes some days before the workshop.

For the 'Environmental sustainability archetype' actions are most needed by virtue of the most problematic for the resilience of the farming system (FS). Stakeholders agree on the prevalence of the system archetypes in the case study and provided additional examples to confirm system archetypes in the FS and its enabling environment.

Regarding the introduction of new species of bugs that may threaten the qualitative and quantitative production in the system, stakeholders asserted the local system records: a potential (but not yet established) presence of Asian bedbugs, which, however, adds to the bedbugs already present (needing similar phytopathological control), recrudescence of *eryphides* (a bedbug already present in the area, with an increase in the populations also linked to the spread of the



Tonda Giffoni cv, which is very susceptible). In addition, there is the resurgence of powdery mildew (fungal disease) due to increasing climate change. Concerning the reduction of the profitability of other crops, stakeholders pointed out that land prices have also risen in recent years due to the favourable performance of hazelnut cultivation. Therefore, nowadays, due to the current land prices, it is hard to recover the investments except for the hazelnut cultivation.

Other stakeholders highlighted the attention that some institutions, also in the policy domain, are paying to the spreading of hazelnut cultivation in terms of landscape impact. In the FS crop specialisation is shifting the average farm size towards medium to large. Generally, farms with a different cropping pattern, which are in critical economic conditions, are purchased by farm operators who shift to specialised and mechanised cultivations, mostly hazelnut. This has provoked discussions in some public institutions and among the general public, with reference to the changes of the countryside landscape. Therefore, in addition to considering environmental sustainability, the question arises as to how the landscape could be changed or preserved. Similarly, the phenomenon is increasing the price of bared land causing the expansion of arable crop farms more difficult. These critical elements fostered reflections during the workshop.

Moreover, the growing demand for eco-friendly agriculture may impose constraints on production and quality. The system, through new technologies or cultivation choices, can make different strategies that make it more compatible with the growing societal demand for eco-friendly farming practices. This calls for reducing chemical treatments and for introducing organic or integrated pest management).

In addition, stakeholders suggest a positive correlation between the increasing societal demands for eco-friendly practices and adaptation strategies (irrigation and chemical treatment) (see Annex 3). Indeed, even if constraints on such practices are imposed, the system through new technologies or cultivation choices is able to pursue strategies that make production more compatible with the eco-friendly demand. In other words, some participants claimed that these new technologies (including precision farming) could reduce chemical treatments and foster the shift to organic or integrated pest management practices.

Specifically on the scheme of system autonomy, on the other hand, stakeholders proposed to consider that the problem of dependence of the FS from on the big players of the confectionary industry is changing over time. Such a phenomenon occurred until the 2000s. The risk of a commercial hazelnut crisis and a vertical price collapse is always alive. However, the last twenty years have witnessed a new scenario: the big industry has moved into the Viterbo area, investing in it also purchasing some processing plants. At the same time, the local system is showing several

attempts to develop short supply chains, farmers setting up processing activities on their own and generating finished food and cosmetic products based on hazelnut. This is a positive factor that suggests resilience capacity. The presence of new companies has not diminished the turnover of the existing ones. This is a new sector that will grow alongside the traditional one and can benefit from the RDP support to farm investments. In other words, stakeholders suggest that there is no dichotomy between these two systems: but they are two paths that can coexist.



Actions for an enabling environment

Table 12-4. Actions/strategies by actors of the enabling environment/farming system to act/solve on system archetypes contributing to principles for resilience enabling environment and resilience attributes

ACTION/ACTOR	SOURCE	Contribution to resilience enabling principles/archetype	Contribution to resilience attributes
FORMULATE ACTION AND WHICH ACTOR MIGHT BE RESPONSIBLE	SOURCE (WORKSHOP; SUREFARM DELIVERABLE; OTHER LITERATURE)	INDICATE ARCHETYPE THIS ACTION WILL SOLVE/PREVENT AND HOW, AND TO WHICH PRINCIPLE THIS ACTION MIGHT CONTRIBUTE AND HOW	INDICATE TO WHICH RESILIENCE ATTRIBUTE(S) THIS ACTION MIGHT CONTRIBUTE AND HOW
ENVIRONMENTAL SUSTAINABILITY (Archetype “Fixes that Fails”)			
Encouraging sector agreements and the promotion of the PDO <i>Nocciola Romana</i> . Responsible actors: PO, government.	WORKSHOP	PRINCIPLE 5: THE ENSEMBLE OF THE FS AND ITS ENABLING ENVIRONMENT SHOULD DEVELOP A SUFFICIENT DEGREE OF AMBIDEXTERITY, THAT IS, FIND A BALANCE IN PUTTING RESOURCES IN IMMEDIATE VERSUS FUTURE CHALLENGES.	SUPPORTS RURAL LIFE. REASONABLY PROFITABLE. SOCIALLY SELF ORGANIZED. COUPLED WITH LOCAL AND NATURAL CAPITAL (PRODUCTION).
Enhancement of point climate monitoring and implementation of irrigation systems aimed at environmental sustainability. Improving the integrated crop production techniques. Responsible actors: PO.	WORKSHOP	PRINCIPLE 2: WHEN SHOCKS OCCUR, RESOURCES SHOULD BE SHIFTED TOWARDS BUILDING ANTICIPATORY CAPACITY AS WELL AS RESPONSIVE CAPACITY, TO PREVENT ADDITION TO EXTERNAL SOLUTIONS AND TO INCREASE FUTURE COPING CAPACITY OF THE FS. THIS SHOULD BE DONE JOINTLY BY ALL TYPES OF ACTORS IN THE FS AND THE ENABLING ENVIRONMENT	COUPLED WITH LOCAL AND NATURAL CAPITAL (PRODUCTION). FUNCTIONAL DIVERSITY.
Research investments: more suitable and resistant cultivars. Institutions (e.g. the region) could take advantage.	WORKSHOP	PRINCIPLE 3: THE ENABLING ENVIRONMENT SHOULD ASSIST THE FS TO DETECT, ASSESS AND ADDRESS LONG-TERM TRENDS THAT CHALLENGE THE FUTURE RESILIENCE OF THE FS IN A WAY THAT INCREASES FUTURE ROBUSTNESS, INCLUDING THROUGH ADAPTATION OR TRANSFORMATION TO THAT TREND IN THE LONG RUN.	APPROPRIATELY CONNECTED WITH ACTORS OUTSIDE THE FARMING SYSTEM.

Responsible actors: government, AKIS, research institutes.			
Introduction of precision farming systems and related dissemination and awareness-raising activities towards society. Responsible actors: research institutes and PO.	WORKSHOP	PRINCIPLE 2: WHEN SHOCKS OCCUR, RESOURCES SHOULD BE SHIFTED TOWARDS BUILDING ANTICIPATORY CAPACITY AS WELL AS RESPONSIVE CAPACITY, TO PREVENT ADDICTION TO EXTERNAL SOLUTIONS AND TO INCREASE FUTURE COPING CAPACITY OF THE FS. THIS SHOULD BE DONE JOINTLY BY ALL TYPES OF ACTORS IN THE FS AND THE ENABLING ENVIRONMENT.	DIVERSE POLICIES. COUPLED WITH LOCAL AND NATURAL CAPITAL (PRODUCTION).
AUTONOMY OF THE SYSTEM (Archetype “Success to the successful”)			
Setting up supply chain agreements between farmers and the confectionery industry through POs. Responsible actors: farmers, PO, confectionery industry.	WORKSHOP	PRINCIPLE 5: THE ENSEMBLE OF THE FS AND ITS ENABLING ENVIRONMENT SHOULD DEVELOP A SUFFICIENT DEGREE OF AMBIDEXTERITY, THAT IS, FIND A BALANCE IN PUTTING RESOURCES IN IMMEDIATE VERSUS FUTURE CHALLENGES.	DIVERSE POLICIES.
Simplifying the RDP. Responsible actors: government with all stakeholder representatives.	WORKSHOP	PRINCIPLE 3 AND PRINCIPLE 6: THERE NEEDS TO BE MORE SYSTEMIC IN-DEPTH ANALYSIS OF THE ROOT CAUSES OF CHALLENGES ON THE ONE HAND, AND OF THE DRIVERS OF FS VULNERABILITY TO THESE CHALLENGES ON THE OTHER HAND, TO AVOID A REDEFINITION OF THE PROBLEM AND THE IMPLEMENTATION OF SOLUTIONS THAT DON’T FIX THE REAL PROBLEM.	DIVERSE POLICIES.
Investments for the promotion of short supply chains at the local level (territory and typicality). Investments for on- farm processing.	WORKSHOP	PRINCIPLE 4: THE ENABLING ENVIRONMENT SHOULD FOSTER A POTENTIAL DIVERSITY OF RESPONSES, RATHER THAN FOCUSING TOO MUCH ON A LIMITED SET OF ACTIONS STRENGTHENING RESILIENCE.	SOCIALLY SELF-ORGANIZED

Discussion

Actors who play a major role in explaining the system archetypes in the case study were government institutions, researchers and PO representatives. They match the actors who should play a role in addressing the system archetypes in the future.

Two similar actions were identified for both the archetypes and considered as priorities.

The first action is encouraging sector agreements and the promotion of the PDO *Nocciola Romana*.

The second action is setting up supply chain agreements between farmers and the confectionery industry through POs. Both contribute to principle 5 by virtue of the FS and its enabling environment should develop a sufficient degree of ambidexterity and investing resources in strategies enhancing the coping capacity of the FS against challenges in the current state and in the future. These actions, by requiring a reorganisation of the socio-political and economic structure through diverse policies, allow the FS to become socially self-organized, reasonably profitable and that promotes rural living. This mainly contributes to the robustness of the FS and, to a lesser extent, to adaptability and transformability.

The enhancement of point climate monitoring (by means of installation of agro-meteorological stations connected to a digital network) and the implementation of irrigation systems aimed at optimizing water use are among the most urgent actions stakeholders have identified to address the environmental issues affecting the FS. POs should make their technical facilities available and introduce certification standards for integrated production in their operational programs. This could be supported by means of the CMO resources they have assigned. This should be done jointly by all types of actors in the FS and by several actors of the enabling environment. According to principle 2, this action allows building anticipatory capacity as well as responsive capacity, to prevent addiction to external solutions and to increase the future coping capacity of the FS. Additional action is the introduction of precision farming and related dissemination and awareness-raising activities towards society could involve together research organisations, POs as well as all other operators of the FS. This is expected to improve the environmental sustainability of the FS. These two actions contribute to some relevant resilience attributes: coupled with local and natural capital (production) and functional diversity as well as appropriately connected with actors outside the farming system. This mainly contributes to the robustness and the adaptability of the FS.



However, investments in know-how and research absolute to principle 3 too. It has been suggested that governmental institutions (e.g., the Regional administration) could take advantage of EU and national public funds and also foster the development of public-private partnerships involving the confectionery industry. This action contributes to making the FS more coupled with local and natural capital resilience attributes.

The proposed actions to simplify the RDP procedures involves first of all government institutions (i.e. the regional administration in charge of the RDP program) and other stakeholders. During the workshop, it has been proposed to start by establishing a technical round table aimed at addressing the issue. This action contributes both to principles 3 and 6. Essentially the enabling environment should assist the FS to detect, assess and address long-term trends that challenge the future resilience of the FS. This is in a way that increases future robustness, including through adaptation or transformation to that trend in the long run. Furthermore, a systemic in-depth analysis of the root causes of challenges is needed. This is to avoid a redefinition of the problem and the implementation of solutions that don't fix the real problems. This action contributes, in turn, to diverse policies' resilience attributes and to enhance the adaptability and transformability resilience capacities of the FS.

The action to invest in the promotion of short supply chains at the local level (by recurring to the valorization of the territory and typicality of the local product) is also desirable from the stakeholder's point of view. It includes investments for on-farm processing. This should be accompanied by a communication campaign on the health and nutraceutical properties of hazelnut-based products and new ways of consumption (e.g. healthy snacks). Thereby, the enabling environment should foster a potential diversity of responses, rather than focusing too much on a limited set of actions. This is expected to strengthening resilience absolving at principle 4 and enhancing the socially self-organized resilience attribute in the FS and the capacity to adapt itself when facing challenges. Principles that are most urgently in need of action in our case study are mainly principle 5 following by principle 3.

Conclusions

Workshop conclusions confirm that stakeholders have recognized the two discussed archetypal schemes and have judged these as relevant. They are relatively optimistic regarding the possibility to ameliorate the situation and identified a set of actions for doing so. They all believe that technological innovation can ameliorate the environmental situation of the FS. They suggested this can provide a fix that does not fail. Participants also suggested that there is already a slow but

steady trend toward a growing autonomy of the system from the large confectionary industries located outside the FS. In particular, they have seen an increasing trend towards the local valorization of the product by single farmers and some POs.

In all cases, the participants see that the proposed actions should be taken by means of partnerships of actors that are using a systemic approach. This seems to confirm the key role of the enabling environment for the development of the FS. In particular, they stated that a network between research organization, local technicians and POs is required to foster and introduce technological innovations. Similarly, the autonomy of the FS can increase by reinforcing the cooperation between farmers, POs and the confectionary industry. According to the participants, the latter has shown to be more prone than in the past to take into consideration the needs of the farming systems. This is by investing in local processing plants (one large company) and requiring farmers to follow integrated production practices (another large company).

They also see that there are financial resources (mostly from EU and national governmental policies) that could be used to support these actions. However, it has been stressed that in the case of the RDP funds these may not be easily accessible for the complexity of the administrative process that, according to them, should be simplified.

The proposed actions seem very useful to increase the adaptability of the FS but less its transformability. This latter statement seems coherent with the perennial nature of the crop and the high specialization of the study area.

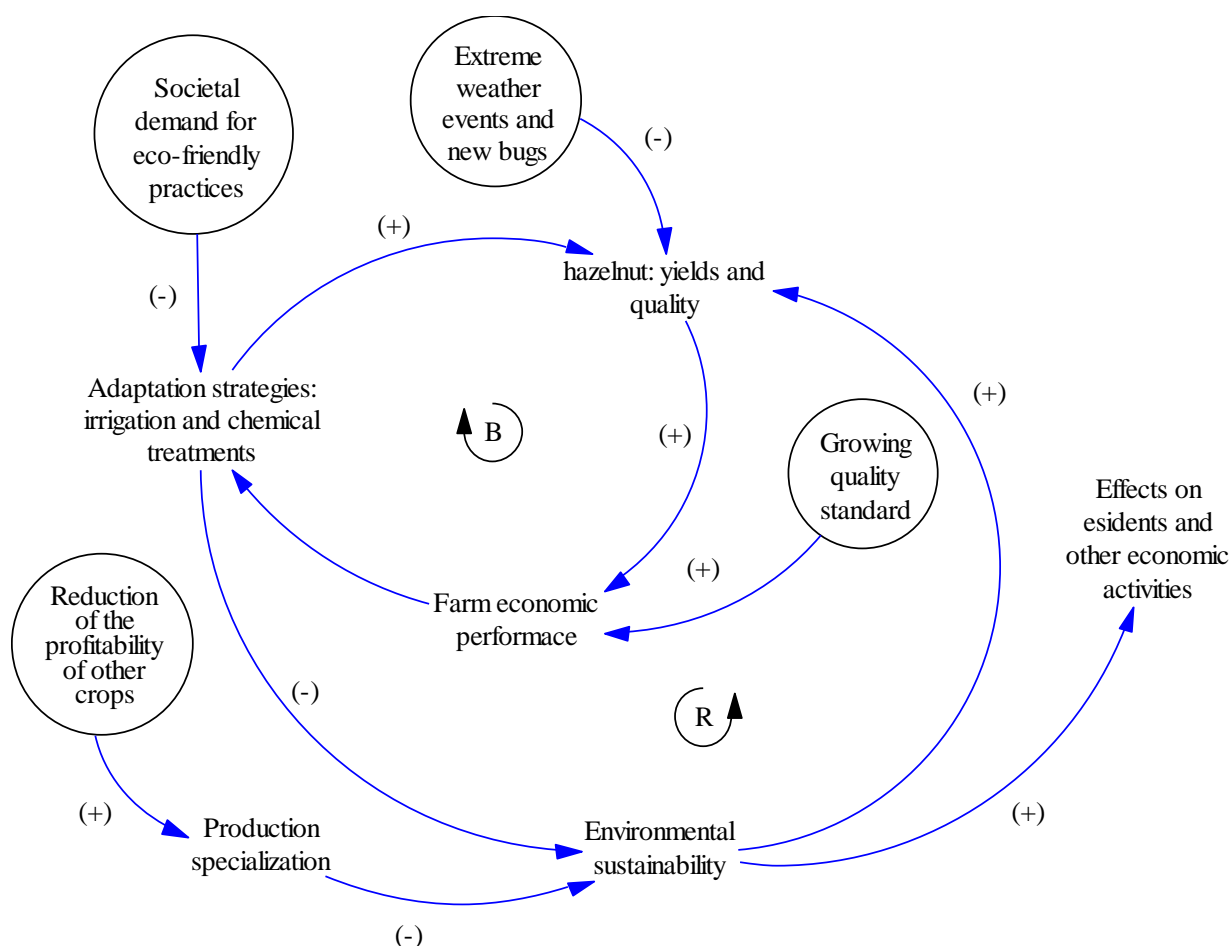
In the end, the results of the workshop suggest that some actions can be taken to foster the resilience enabling environment and, in turn, to address the issues described by the two archetypes.

The workshop has been useful, first of all, to test and to update the results of previous analysis (e.g., FOPIA2 workshop). While the digital nature of the meeting has posed some problems, participation has been active. The workshop has permitted us to identify potential actions for a resilient enabling environment even if it has been difficult to provide many details of the actions, actors and resources. This limits the possibility to directly use the workshop results to develop concrete and detailed actions. However, we believe that the discussion has fostered the attention of the participants to the issues affecting the FS and what is needed to improve its sustainability and resilience.



ANNEX

Figure 12.1 – Consequences of four challenges affecting the FS and its relations with the environment.



Challenges linked to the changing climatic conditions, such as extreme weather events and the entrance of new bugs, have a negative impact on hazelnut yields and quality (Figure 12.1). Long periods of drought, heat waves, or frosts threaten the development of the natural life cycle of plants. In addition, the new Asian bug recently sighted in the fields increase the share of aborted nuts.

These problems explain a decrease in yields and product quality. Farm economic performance strongly depends on these parameters given that revenues are defined both by the number of hazelnuts produced and by a price modulated according to the quality of the fruits. Therefore this has negative consequences on the provision of private functions, noticeably farm profitability and the economic viability of the FS related to farmers and to other operators of the local chain.

Farmers implement adaptation strategies to improve their economic performance (e.g. the profitability of farmers and the enabling environment): irrigation to resist long drought period and chemical treatments against bugs. Such strategies allow to balance the effects of the previously mentioned challenges and, in particular, allow to maintain satisfactory yields and product quality. However, these strategies put under pressure the natural capital especially groundwater and air quality. The former is becoming an increasingly scarce resource. The latter can be threatened by the pollution generated by the chemical treatments. This is expected to reduce the environmental sustainability of the FS and can have negative consequences on the health of the residents and on other agents operating in the area but not directly involved in the FS as the agents operating in tourism activities. In addition, in the long run, the depletion of natural resources could also have negative effects on the producers too. This is due to the increasing opportunity cost of water extraction, although it is not possible to make predictions given the limited scientific evidence on the topic.

The growing quality standards required by the confectionary industry can negatively affect the economic results of those farms that are not able to meet such standards (Figure 1). Indeed, the price paid to producers is modulated according to such standards that makes the confectionary industry unlikely to buy products below a given quality level. This becomes a relevant incentive for farmers taking actions to increase product quality as already seen. While ensures farm economic performance (e.g. profitability), this loop is in contrast with the preservation of natural resources and the environmental sustainability of the FS.

The reduction in the profitability of other crops is, also, another challenge that affects the provision of public functions. The FS is adapting to this situation by increasing the specialization on hazelnut production and this allows to maintenance of high farm profitability. Hence, the FS adapts very well to this challenge in this regard. In contrast, the subsequent high production specialization results in increasing pressure on natural resources and threaten environmental sustainability. This is due to a reduced overall biodiversity and a negative effect on the landscape less diversified. However, a growing specialization seems to reinforce the negative effects generated by the two previously discussed challenges.

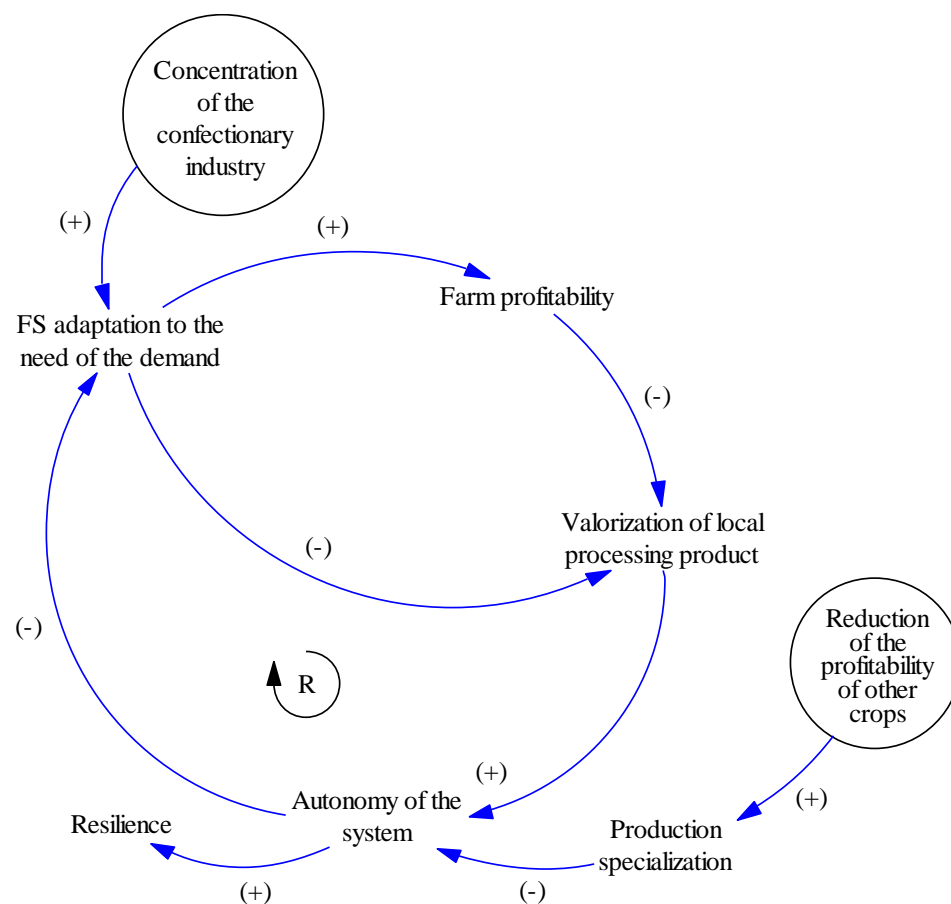


In this regard, it is useful to underline that both extreme weather events and the entrance of new bugs, and the growing demand for high quality standards are synergic. Both challenges negatively affect the environmental sustainability of the system if no corrections are taken. Furthermore, the growing specialization of the FS is expected to exacerbate the problem. The realization of the three challenges at the same time has therefore the potential to generate a not negligible reduction of the provision of public environmental functions.

This is the background that motivates the growing concern represented by some environmental groups and some municipalities. They demand stopping the expansion of hazelnut cultivation, for larger use of eco-friendly production practices and for introducing constraints to some production practices potentially harmful for the environment and the local residents (Liberti, 2019) (Figure 1). This is seen as a challenge because it may reduce farmers' reputation, can negatively affect farm profitability, reducing the room of maneuver in terms of the range of adaptation strategies toward the previously seen three challenges, as well as posing a halt to the growth of the business of post-farm local operators. In contrast with the previously described three challenges, imposing tight production constraints is expected to reduce the provision of private functions but to reduce the pressure of the FS on the natural capital.



Figure 12.2 – Effect of the concentration of the confectionery industry and reduction of the profitability of other crops on the autonomy of the system.



This adaptation strategy has guaranteed an increase in the economic profitability of farmers who sell raw hazelnuts and, more in general, it has ensured the profitability of the overall FS over time. In this regard, such a strategy had very positive implications for the provision of private goods and the economic success of the FS. However, the positive results of these strategies have avoided that the FS evolved also toward a strategy based on the valorization of the product locally. For example, very few post-farm local operators process hazelnuts or sell hazelnuts and hazelnut-based products using the logo of the PDO “Nocciola Romana”. This had the indirect effect of reducing the degree of diversification and of autonomy of the FS. In this sense, the process reinforces itself because being able to adapt to the changing needs of the confectionery industry allows ensuring high profitability over time. Therefore, while this has not so far caused negative

consequences on farm profitability, this may reduce the room for maneuver in case the confectionery industry will change its buying strategies in favour of other production areas.

Note that the reduction of the profitability of other crops, leading to a higher production specialization, exacerbated the process that leads to a reduction of the autonomy of the system (Figure 12.2).

The reduction of the autonomy of the system, making farmers more vulnerable to decisions taken elsewhere, together with the permanent nature of the crop which implies an intrinsic slowness to change, makes the system vulnerable and, according to some of the stakeholders involved in the workshops carried out within the project, reduces its resilience.



13 Implementation roadmap for the implementation of enabling environment principles in Poland (fruit and vegetable farming in Mazovian)

Table 13-1. Workshop introductory data

Date	1.04.2021
Venue	Webinar – Zoom platform
SURE-Farm team involved (names)	Katarzyna Zawalińska, Piotr Gradziuk, Vitaliy Krupin, Błażej Jendrzejewski, Adrianna Wojciechowska

Table 13-2. Workshop 12 participants

Institution	Gender (50% male and 50% female)
The National Federation of Juice Producers (Barbara Groele)	Female
Fruit farmer (Piotr Gołasa)	Male
The Marshall's Office of Lubelskie region (Krzysztof Antoń)	Male
The Agency for Restructuring and Modernisation of Agriculture (ARMA)/ Department of Agricultural Markets (Anna Blacharska)	Female
ARMA/ Department of Plant Markets (Aneta Burghardt)	Female
ARMA (Jakub Jasiński)	Male
The Marshall's Office of Mazowieckie region (Daniel Łaga)	Male
Research Institute of Horticulture (Dorota Konopacka)	Female
National Center for Agricultural Support (Martyn Myczkowski)	Male
National Center for Agricultural Support (Marzena Trajer)	Female
The Ministry of Agriculture and Rural Development (Wanda Chmielewska-Gil)	Female
European Rural Development Network (Paweł Chmielewski)	Male

Deviations from guidelines:

Our team organized online workshop according to established guidelines, with 12 participants from different institutions, with equal participation of man and women (gender ratio equals 1:1). The only deviation from the requirements was resignation from use of Mural online whiteboard which was replaced by other solution. To facilitate the progress of the workshop we created an online document in Google platform using the Google Docs (Figures 13.1, 13.2) with the analysed archetypes presented in the graphical form. We were writing the ideas of participants to solve the presented problems live, so they could follow the progress of the exercise. After the discussion was finished, we organised voting for the most urgent system improvement ideas according to our participants – the results are presented in the Figure 13.5 and 13.6.



This Project has received funds from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 727520

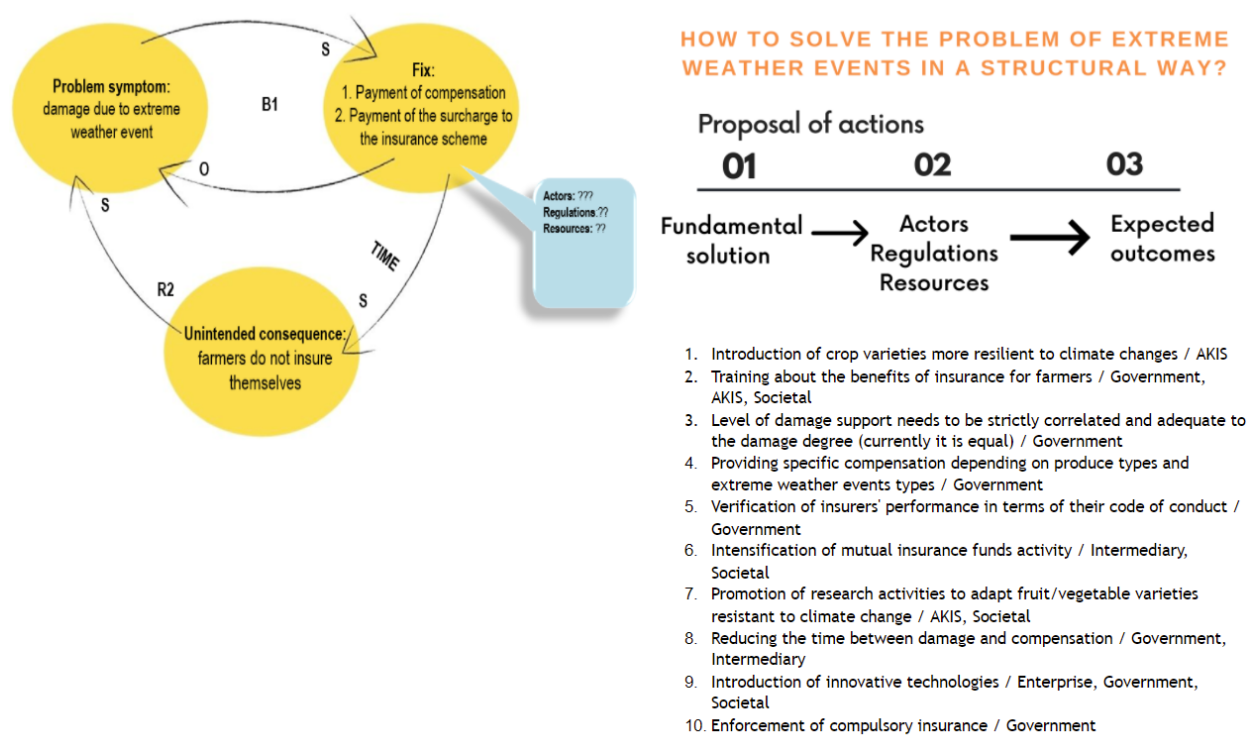


Figure 13.1. Exercise of finding fundamental solutions to the archetype “Fixes that fail”

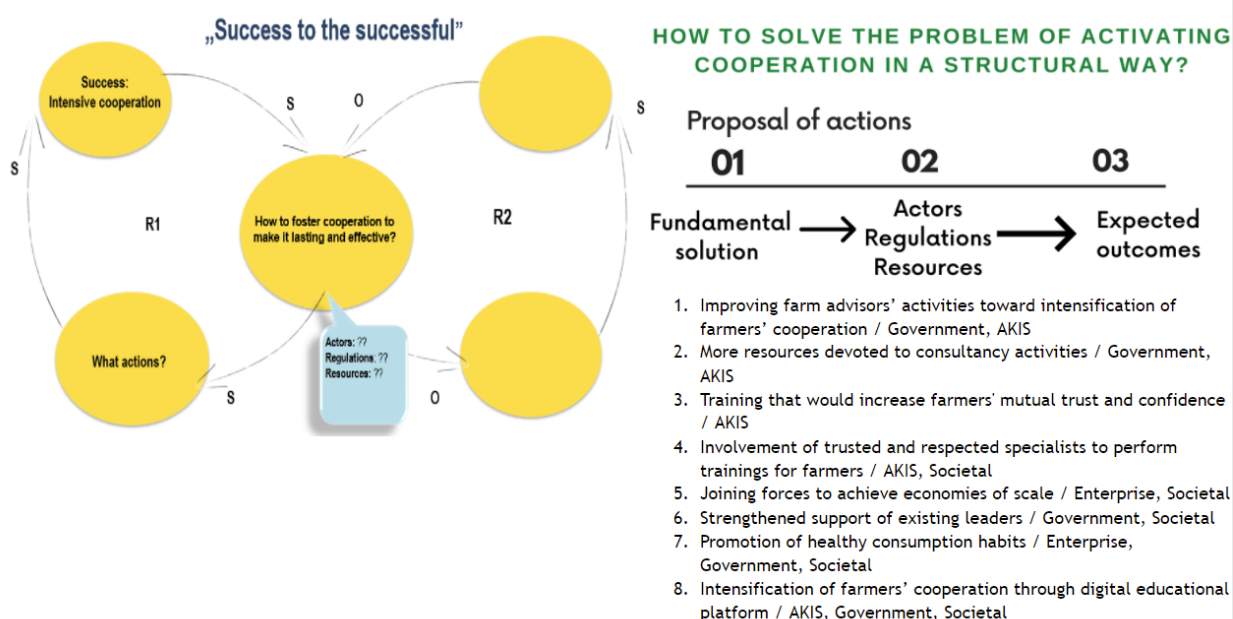


Figure 13.2. Exercise of finding fundamental solutions to the archetype “Success to the successful”

Farming system and enabling environment

Table 13-3. Actors and its enabling environment (institutions and resources) in Poland

Actors	Formal institutions	Informal institutions	Financial resources	Non-financial resources
<p><i>Enterprise domain:</i></p> <p>Procesor LA-SAD, Sad Na Zapieckach, Wiatrowy Sad Grażyna Wiatr.</p> <p>Input suppliers (Agrosimex, Syngenta Polska Sp. z o.o., Agrosimex, Syngenta Polska Sp. z o.o.).</p> <p>Technology providers (Techsad, Kuhn, Arysta Lifescience, Longobardi, Greefa, Valdysa, Besseling).</p> <p>Wholesalers (Tompres S.C., AGROSTAR group, POL-AGRO</p>	<p>Economic regulations, taxation, EU Cohesion policy, CAP</p>	<p>Economic relations</p> <p>Attitude toward cooperation</p> <p>Attitude toward advisory and technology</p> <p>Attitude toward retail</p> <p>Attitude toward environmental pollution (agricultural inputs)</p>	<p>Own financial contribution to co-funded measures</p> <p>Support under Pillar II of the CAP, ERDF, ESF, and other programs</p>	<p>Distribution channels</p> <p>Long-term commercial agreements</p> <p>Vast product range</p> <p>Innovative products</p> <p>Reliable distribution systems</p>

<p>S.A., Świeży Owoc Sp. z o.o., Green Fresh, BUKAT, Sadex group) Retail (Green Fresh, BUKAT, Sadex group).</p>				<p>Experienced advisors Facilities with innovative technologies</p>
<p><i>Government domain:</i> European Union, Ministry of Agriculture and Rural Development, Ministry of Environment, National Center for Agricultural Support (KOWR), Agency for Restructuring and Modernisation of Agriculture (ARMA), Main Inspectorate of Plant Health and Seed Inspection (PIORIN), Central Statistical Office (GUS), National Rural Development Network (KSOW), local self-governance.</p>	<p>CAP, Nitrates Directive Food Law, Water Directive, Green Deal, Farm to Fork, Climate Action</p>	<p>Awareness and acceptance of farmers Farmer participation Societal participation Pro-environmental activities</p>	<p>Pillar II of the CAP, ERDF, ESF, and other programs</p>	<p>Well prepared personnel, both at national and regional level Access to databases (Central Statistical Office, National Center for Agricultural Support, Paying Agency) Network of strategic breeding enterprises in the field of plant and animal production</p>
<p><i>Intermediary domain:</i> Producer groups (Idealsad Sp. z o.o., Rozumki Sp. z o.o.), NGOs: Association “Sady Grójeckie”, Farmers’ organizations (Izby Rolnicze, Fundacja Europejski Fundusz Rozwoju Wsi). Labour intermediaries (Labour Office, domestic and foreign employment intermediaries). Banks and financial intermediaries (BGŻ BNP Paribas, Spółdzielczy, Santander, PZU).</p>	<p>Producer groups measure within CAP RDP. Employment regulations, minimal wage, work and residence permits for foreigners.</p>	<p>Informal producers’ groups or associations Informal (verbal) job agreements</p>	<p>Own financial contribution to co-funded measures Support under Pillar II of the CAP ERDF, ESF, The National Centre for Research and Development (NCBR), bank loans, loan funds</p>	<p>Experienced personnel An extensive network of field offices Technical facilities</p>

AKIS domain:				
Research Institutes: IUNG-PIB, IHAR-PIB, IERiGŻ-PIB, CDR (advisory services), Educational Institutes: IRWiR PAN, SGGW, UW, agricultural universities	Polish Association of Agricultural and Agribusiness Economists (SERiA), technical and technological support, Patents, rural development directions, economic and market analysis, programmes' monitoring and evaluations	Best farming practices	Horizon 2020, NCN, NCBR	An extensive network of public and private consulting facilities Very well-equipped laboratories of scientific institutions Extensive agri-business secondary and higher education system
<i>Societal domain:</i> NGOs: (International Union for Conservation of Nature - IUCN), FDPA agricultural media: farmer.pl, agropolska.pl, consumer unions.	Green News, campaigns, anti-GMO movements	Societal expectation toward food quality and safety	Own funds	Well-organised network of NGOs Wide range of publications Well-functioning information network via internet

Validation of system archetypes

Prior the workshop we sent to all our participants the materials explaining the basic ideas and examples of various archetypes. Then we explained the archetypes during introductory PowerPoint presentation on the topic and discussed it with them according to the questions suggested in the guidelines. The stakeholders of our workshop recognised and confirmed existence of main system archetypes. The examples chosen to be presented from our case study

were the “Fixes that fail” for extreme weather events and the “Success to the successful” for the issue of directing support to only one form of cooperation (producer groups).

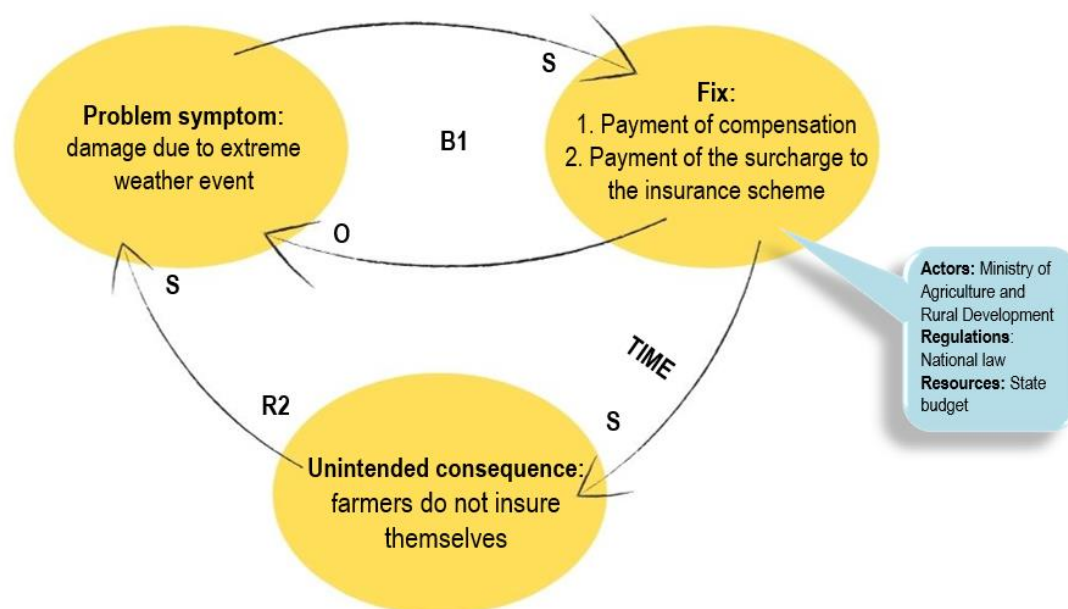


Figure 13.3. “Fixes that fail” – Extreme weather events

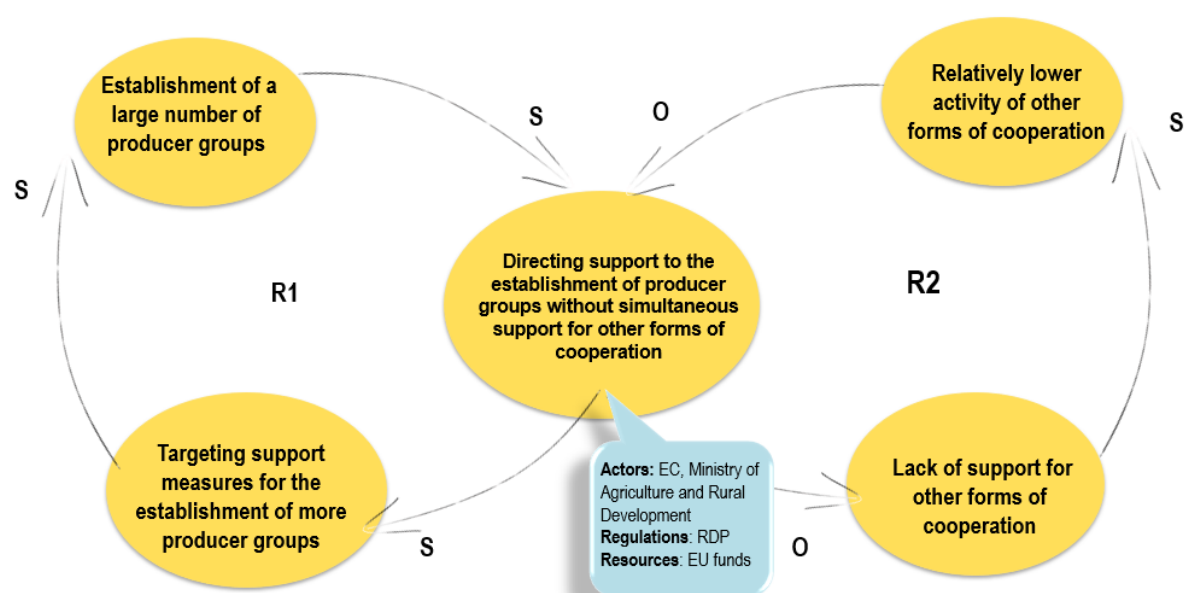


Figure 13.4. “Success to the successful” – Directing support to only one form of cooperation

There was a wide discussion around the topics of the extreme weather events and support of producer groups. The stakeholders participating in the workshop agreed that these problems are significant, and they gave us some practical insides on the topic. Firstly, the losses due to extreme weather events are a growing problem that needs to be tackled, as such events are especially damaging for the horticulture farming system. The occurrence of these events is expected to intensify due to the climate change, while the stakeholders perceive that the currently implemented solutions are rather temporary fixes that are an additional state budget burden, and do not bring closer to fixing the core of the problem. Key proposed actions go to the direction of improving the insurance system, making it more beneficial and available to farmers, switching the farming practices and technologies to withstand the possible shocks, while helping the farmers implement such approaches through trainings and advisory support. Another key issue the stakeholders mentioned is that the support system to producer groups shows the low level of

organisation – the system in this and other cases should be adapted to the reality present in each sector in different markets and there should be space for more elasticity when it comes to creating the support policy. As an example, one of our participants mentioned “Farm to Fork Strategy” and the fact that Polish market is unprepared compared to the specialised fruit and vegetable production of the Western Europe. The sector examined in our case study is diversified, there are a lot of small farms that in comparison to large-scale farms are less structured, they have fewer financial resources for support of specialists and for development. The proposition from our participants was gradation of support approaches to different groups as well as change in financial support system to the one that encourages the long-term cooperation. There was a great emphasis placed on looking for solutions that are suited to the horticulture sector, participants claim that this sector is very specific and the experience from other sectors or markets cannot be transmitted to it.

The participants of our workshop provided us with a lot of examples to confirm system archetypes in the farming system and its enabling environment. To begin with other issues associated to “Success to the successful” archetype, the interpersonal relations were underlined. On one hand, farmers of smaller holdings seem not to trust each other, which can lead to the disintegration of producer groups. On the other hand, large-scale framers are distrustful to the government, which leads to dishonesty of business activities. There should be clear rules of producer groups operational activity. Next, the problem of bureaucracy was underlined. According to our stakeholders the administrative body is putting too much focus on the set goals for value of chosen indicators instead of positive effect of the given activity. The approach to support programmes is too theoretical, instead of being adjusted to practical needs of beneficiaries.

Another example was the fact that there is not enough time for consultations with beneficiaries in order to explain how the support system works. The information is not clear for farmers and the policy makers show lack of practical experience when creating control indicators, that later are impossible to achieve (as an example here participants mentioned agri-environmental



commitments, that right now farmers must adapt to, in 3 years instead of 5). In addition, agricultural advisors are insufficiently trained, and this area seems to be underfunded. Further problem mentioned in the discussion was the planning structure, the stakeholders claim that the organisation process of policymakers is not long enough, which makes the implementation of some policy programmes prolonged as they are not prepared correctly.

Next example to confirm system archetypes in horticulture sector is the lack of consumer encouragement to purchase fresh fruits and vegetables from the local sources. Our participants claimed that there is an urgent need for educational programmes concerning the training of eating habits and the promotion of the fruit and vegetable sector. In addition, the participants that are associated with the field of research stated that access to funds for running such programmes is limited. Participants debated on communication problem as well. In their opinion the Polish horticulture sector is inadequately promoted on foreign markets and the prevalence of fresh products are allocated to processing sector. Other areas discussed were support of farmers' income and its structure that doesn't encourage non-waste agricultural crops, the problem of generational turnover, poorly valued environmental costs, need of systematic informational tools, the difficulty with the lease and issue associated with water retention.



Actions for an enabling environment

Table 13-4. Actions/strategies by actors of the enabling environment/farming system to act/solve on system archetypes contributing to principles for resilience enabling environment and resilience attributes

ACTION/ACTOR	SOURCE	Contribution to resilience enabling principles/archetype	Contribution to resilience attributes
<p>1 Promotion of research activities to adapt fruit/vegetable varieties resistant to climate change / AKIS, Societal</p> <p><i>Sharing of knowledge about such varieties is needed to reach all types of farmers. The <u>research institutions</u> need to change the priorities in their research and its dissemination, <u>advisors</u> need to transfer that knowledge to the farming system, and <u>societal institutions</u> need to be the link between the other two mentioned enabling environment actors.</i></p>	WORKSHOP	<p>FIXES THAT FAIL – EXTREME WEATHER EVENTS.</p> <p>LONG TERM SOLUTION COMES THROUGH LINKING THE KNOWLEDGE TRANSFER BETWEEN THE SCIENCE (AKIS), IMPLEMENTERS (ADVISORS) AND THOSE WHO BUILD AWARENESS ON CLIMATE RESISTANT CROPS (NGOS, MEDIA, ETC.).</p> <p>CONTRIBUTES TO PRINCIPLE 5: THE ENABLING ENVIRONMENT HELPS TO FIND BALANCE IN PUTTING RESOURCES IN IMMEDIATE VS FUTURE CHALLENGE RELATED TO CLIMATE CHANGE BY COOPERATION BETWEEN THE FARMING SYSTEM AND THE ENABLING ENVIRONMENT ACTORS, THROUGH THE EXCHANGE OF KNOWLEDGE, INCREASED AWARENESS OF AND CULTIVATION OF WEATHER RESISTANT PLANTS.</p>	<p>PRODUCTION COUPLED WITH LOCAL AND NATURAL CAPITAL BY CULTIVATION OF THE RESISTANT TO CLIMATE CHANGE VARIETIES, AS THEY NEED TO TAKE INTO ACCOUNT THE PARTICULAR SOIL FERTILITY, WATER RESOURCES, EXISTING NATURE PECULIARITIES AND OTHER LOCAL CONDITIONS.</p>



D6.4 Implementation roadmaps for the implementation of the enabling environment principles



2 Training about the benefits of insurance for farmers / Government, AKIS, Societal

Farmers are generally underinformed about the benefits and possibilities of insurance against extreme weather events. The actors need to show to FS the benefits of the insurance mobilising human capital and media resources.

WORKSHOP

FIXES THAT FAIL – EXTREME WEATHER EVENTS.

MORE TRAINING WOULD HELP TO UNDERSTAND THE ROLE OF INSURANCE IN CASE OF OCCURRENCE OF EXTREME WEATHER EVENTS AND THEIR NEGATIVE CONSEQUENCES. MORE PROMOTION WILL ENCOURAGE FARMERS TO TAKE PART IN INSURANCE PROGRAMME.

CONTRIBUTES TO **PRINCIPLE 3** – ENABLING ENVIRONMENT IS ADDRESSING LONG TERM GOALS – PROTECTION AGAINST NEGATIVE CAUSES OF EXTREME WEATHER EVENTS.

DIVERSE POLICIES BY STIMULATING ROBUSTNESS – THE

FARMING SYSTEM WOULD RECEIVE AN ADEQUATE COMPENSATION AFTER POSSIBLE EXTREME WEATHER EVENTS.

REASONABLY PROFITABLE THROUGH SECURING THE FARMERS' FUTURE INCOME IF THE LOSSES ARE COVERED BY THE INSURANCE AND ALSO BY STIMULATING INTERNALISATION OF FARM INSURANCE IN THE FARMING SYSTEM'S PRODUCTION DECISION.



3 Introduction of innovative technologies
/ Enterprise, Government, Societal

Innovative farm technologies, such as crop damage protection systems, digital tools for soil conditions and market situation. All actors need to mobilise financial, human resources (specialist in IT, in data collection, in dissemination strategies) and infrastructural resources (digital platforms, devoted clouds, online drivers, websites, emailing systems, help desks etc.)

WORKSHOP

FIXES THAT FAIL – EXTREME WEATHER EVENTS.

THIS ACTIVITY WILL HELP SOLVE THE PROBLEM AS THE FARMING SYSTEM WILL BE BETTER EQUIPPED IN CROP PROTECTION SYSTEMS, BETTER INFORMED ON WEATHER FORECASTS AND MORE AWARE OF POSSIBLE IMPACT OF THE CLIMATE CHANGE IN THE FUTURE, THUS WILL KNOW MORE HOW TO MINIMISE THE POSSIBLE IMPACTS UNDER THEIR PARTICULAR CONDITIONS.

CONTRIBUTES TO PRINCIPLE 3: THE ENABLING ENVIRONMENT HELPS THE FARMING SYSTEM TO ADDRESS THE LONG-TERM TREND (CLIMATE CHANGE) BY RAISING ITS AWARENESS AND CREATING INCENTIVES TO INVEST FS RESOURCES IN ADAPTATION MEASURES (E.G., CROP DAMAGE PROTECTION SYSTEMS) RATHER THAN RELY ON SHORT TERM FIXES FROM GOVERNMENT (SUCH AS COMPENSATION AID).

INFRASTRUCTURE FOR INNOVATION: THE FARMING SYSTEM INCREASES ITS RESILIENCE THROUGH TIMELY ADOPTION OF DAMAGE PROTECTION TECHNOLOGIES AND DIGITALISED INFORMATION THAT REACHES THE FARMING SYSTEM FASTER AND IN A MORE TARGETED WAY. THE EXISTING FACILITIES ARE UPGRADED AND EXPANDED, BUT ALSO NEW ONES ARE IN PLACE WHICH MAKES THE SYSTEM MORE FLEXIBLE.

4 Enforcement of compulsory insurance /
Government

Crop insurance is compulsory by the law, yet its requirements are not fulfilled by the farmers. One of the issues are the oral land lease agreements, which are an obstacle to insurance. The government needs to engage human capital resources on one hand to increase enforcement of the law, and on the other investigate why the law is not respected (what are the obstacles,

WORKSHOP

FIXES THAT FAIL – EXTREME WEATHER EVENTS.

MAKING AN ORDER WITH ALL REGULATIONS RELATED TO RISK INSURANCE WOULD INCREASE THE MOTIVATION OF THE FARMING SYSTEM ACTORS TO INSURE THEIR RISKS. SOLELY AN ENFORCEMENT OF THE CURRENT LAW WOULD NOT SOLVE THE PROBLEM, BUT ONLY INCREASE THE DISAPPOINTMENT OF THE FARMING SYSTEM'S ACTORS DUE TO INEFFICIENCY AND UNEQUAL TREATMENT OF THE FARMERS BY THE EXISTING INSURANCE SYSTEM.

CONTRIBUTES TO PRINCIPLE 4: THE ENABLING ENVIRONMENT FOCUSES ON A WIDE SET OF STRUCTURAL SOLUTIONS, SO NOT ONLY ON THE

LEGISLATION COUPLES WITH LOCAL AND NATURAL CAPITAL: THE FARMING SYSTEM BENEFITS FROM CONSISTENCY OF THE REGULATIONS, WHICH ALTOGETHER WOULD CREATE PROPER INCENTIVES FOR RISK INSURANCE AND REMOVE THOSE OBSTACLES THAT DISCOURAGE THE FARMING SYSTEM ACTORS FROM INSURING THEIR RISKS.



D6.4 Implementation roadmaps for the implementation of the enabling environment principles

disincentives). So also, regulations outside the insurance systems are needed, both formal (i.e., in lease agreements, in regulations on insurance, etc.) and informal (e.g., that is still the owner of plot who takes the direct payments not a leasing farmer which decreases his incentives to insure the farm).

INSURANCE LAW AND ITS ENFORCEMENT, BUT ALSO ON ALL THE RELATED REGULATIONS AND LAWS – SUCH AS MORE BOUNDING AGREEMENTS, RELATIONSHIPS BETWEEN THE OWNER OF THE AGRICULTURAL LAND AND THE ACTUAL FARMER CULTIVATING IT.

- 5 Reducing the time between damage and compensation / Government, Intermediary

Currently the time between the inflicted damages and the payouts of state support and private insurance companies are highly delayed (in some cases over one year). Both government and private insurance companies need to work on faster implementation of the procedures, which requires more human resources and simpler procedures (change of regulations).

- 6 Verification of insurers' performance in terms of their code of conduct / Government

Typical problems are the unwillingness of insurers to insure weather risks, long documentation processing, selective approaches to pay-outs, unsure or delayed pay-outs. Also, insurance offer should be more suited to farmers' needs. Government needs to improve the control over the implementation of the law with use of its human resources and regulations.

WORKSHOP

FIXES THAT FAIL – **EXTREME WEATHER EVENTS.**

THE EFFECTIVELY WORKING PROCEDURES INCREASE THE TRUST OF FARMING SYSTEM'S ACTORS TOWARDS THE INSTITUTIONS (GOVERNMENT AND PRIVATE INSURANCE COMPANIES), WHICH INCREASES THEIR MOTIVATION IN INSURING THEIR RISKS.

CONTRIBUTES TO PRINCIPLE 2: ENABLING ENVIRONMENT BUILDS ANTICIPATORY CAPACITY – THE FARMING SYSTEM STARTS BELIEVING IN THE INSTITUTIONS AND INCREASES ITS PARTICIPATION IN THE INSURANCE SYSTEM.

WORKSHOP

FIXES THAT FAIL – **EXTREME WEATHER EVENTS.**

BETTER PERFORMANCE OF INSURANCE COMPANIES WOULD INCREASE THE FARMERS MOTIVATION TO INSURE THEIR RISKS.

CONTRIBUTES TO **PRINCIPLE 6** BY OPTIMISING THE LAW AND MAKING REGULATIONS MORE FRIENDLY THE FARMING SYSTEM, WHICH WOULD HELP TO ADDRESS ONE OF A ROOT CAUSES WHY THE ACTORS IN THE FARMING SYSTEM ARE NOT CURRENTLY EAGER TO INSURE THEIR RISKS – BEING THE UNDERPERFORMANCE OF INSURANCE COMPANIES AND THEIR UNBENEFICIAL APPROACHES TO FARMERS.

EXPOSED TO DISTURBANCE – **INSTITUTIONAL DISTURBANCE DECLINES AND THE FARMING SYSTEM RECEIVES THE TIMELY RESPONSES ACCORDING TO ITS NEEDS.**

LEGISLATION COUPLED WITH LOCAL AND NATURAL CAPITAL – THE FARMING SYSTEM RECEIVES THE AID ADAPTED TO THEIR PARTICULAR NEEDS.

LEGISLATION COUPLED WITH LOCAL AND NATURAL CAPITAL BY ENHANCING THE ENFORCEMENT OF THE REGULATIONS AND MAKING THE REGULATIONS MORE FARMING SYSTEM ORIENTED.



D6.4 Implementation roadmaps for the implementation of the enabling environment principles



7 Intensification of mutual insurance funds activity / Intermediary, Societal	WORKSHOP, EXPERT KNOWLEDGE	FIXES THAT FAIL – EXTREME WEATHER EVENTS.	EXPOSED TO DISTURBANCE BY INSTITUTIONAL
<p><i>Activities of two (2) existing mutual insurance funds are not sufficient to support the agricultural sector. More such institutions are needed on the market.</i></p>		<p>AS A RESULT OF EXPANSION OF THE SYSTEM OF MUTUAL INSURANCE FUNDS THERE WOULD BE HIGHER COMPETITION AND BETTER INSURANCE OFFERS TO THE FARMING SYSTEM ACTORS – SO CAPACITY BUILDING INVESTMENTS ARE NEEDED INSTEAD OF QUICK FIXES BY THE STATE FINANCIAL AID.</p> <p>CONTRIBUTES TO PRINCIPLE 3 – PUBLIC-PRIVATE INVESTMENTS ARE NEEDED TO CREATE A GOOD SYSTEM OF MUTUAL INSURANCE FUNDS, SO THAT THE ENABLING ENVIRONMENT COULD SUPPORT THE FARMING SYSTEM'S ADAPTATION TO THE LONG-TERM TREND OF CLIMATE CHANGE.</p>	<p>DISTURBANCES WILL BE LOWERED WHEN THERE ARE MORE INSURANCE FUNDS SO THE FS CAN HAVE A HIGHER CHOICE AND BETTER OFFERS DUE TO THEIR COMPETITION.</p>



- 8 Level of damage support needs to be strictly correlated and adequate to the damage degree (currently it is equal) / Government

Currently the state support is not correlated directly with the damages due to extreme weather events. A farmer is currently eligible for fixed state weather damage compensation if the losses exceed 30%, but the pay-out is not flexible. The government needs to apply human, financial and regulatory resources to properly evaluate environmental costs and damage degree.

- 9 Introduction of crop varieties more resilient to climate changes / AKIS

Diversification of production structure allows to diminish losses from extreme weather events. AKIS can shift financial resources and research priorities towards development and popularisation of climate resilient crops.

WORKSHOP

FIXES THAT FAIL – EXTREME WEATHER EVENTS.

CORRELATION OF SUPPORT INTENSITY WITH THE ACTUAL DAMAGES WOULD OVERALL HELP SHIFT RESOURCES FROM TEMPORARY FIXES TO REAL REMEDY.

CONTRIBUTES TO PRINCIPLE 1: THE ENABLING ENVIRONMENT PROVIDES TEMPORARY RESOURCES AND PROPER INCENTIVES, ENABLING THE FARMING SYSTEM TO COPE WITH THE CHALLENGE, BUT NOT MAKING THE FARMING SYSTEM ADDICTED TO THE AID.

DIVERSE POLICIES BY STIMULATING FARMERS' ADAPTABILITY IN SEARCH OF WAYS TO PREVENT LOSSES DUE TO CLIMATE CHANGE AND EXTREME WEATHER EVENTS.

WORKSHOP/ SPECIALIST KNOWLEDGE

FIXES THAT FAIL – EXTREME WEATHER EVENTS.

ADAPTING TO CHANGING ENVIRONMENTAL CONDITIONS AND PREVENTING THE LOSSES OF CROPS.

CONTRIBUTES TO PRINCIPLE 2: THE ENABLING ENVIRONMENT HELPS BUILDING RESPONSIVE CAPACITY AND INCREASES FUTURE COPING CAPACITY OF THE FARMING SYSTEM. EXPERIENCE FROM FORMER EXTREME WEATHER EVENTS PROVIDES KNOWLEDGE BOTH TO FARMING SYSTEM AND TO THE ENABLING ENVIRONMENT ON RESILIENT CROP VARIETIES. SO, SUCCESS REQUIRES JOINT ACTIONS OF FARMING SYSTEM AND THE ENABLING ENVIRONMENT.

RESPONSE DIVERSITY BY INCREASED DIVERSIFICATION OF FARMS' PRODUCTION STRUCTURE INCREASES ALSO DIVERSITY OF RISK MANAGEMENT.



- 10 Providing specific compensation depending on produce types and extreme weather events types / Government

State compensation due to extreme weather events needs to be adjusted to particular characteristics of farms, as currently they are paid at flat rate. Government needs to change the regulations so that they grasp a wider scope of risk events and more case specific compensations by type of productions.

WORKSHOP

FIXES THAT FAIL – EXTREME WEATHER EVENTS.

PROVIDING MORE TARGETED FINANCIAL AID WHICH TRIGGERS PROPER INCENTIVES FOR FARMERS TO PROTECT THEMSELVES AGAINST THE WEATHER DAMAGE

CONTRIBUTES TO PRINCIPLE 3 – THE GOVERNMENT PROPERLY EVALUATES AND ANTICIPATES THE POSSIBLE DAMAGE DUE TO WEATHER CONDITIONS AND PROVIDES COMPENSATION ACCORDING TO CLEAR AND STRICT RULES.

DIVERSE POLICIES BY STIMULATING FARMERS' RESILIENCE CAPACITIES. ON ONE HAND, THE FARMING SYSTEM CAN RELY ON SOME FINANCIAL RESOURCES IN CASE OF DAMAGE (WHICH ENHANCES THEIR ROBUSTNESS), ON THE OTHER HAND, THE LESS RISKY CROPS CAN BE PROMOTED, WHICH HOWEVER REQUIRES MORE ADAPTABILITY FROM THE FARMING SYSTEM.

11	<p>Intensification of farmers' cooperation through digital educational platform / AKIS, Government, Societal</p> <p><i>Digital educational and raining platform would help farming system's actors communicate, obtain knowledge regarding various farming issues.</i></p>	WORKSHOP	<p>SUCCESS TO THE SUCCESSFUL - DIRECTING SUPPORT TO ONLY ONE FORM OF COOPERATION.</p> <p>A DIGITAL EDUCATIONAL PLATFORM WITH VALUABLE ECONOMIC, AGRONOMIC, FINANCIAL, ORGANISATIONAL AND OTHER INFORMATION BENEFICIAL FOR FARMERS AND OTHER FARMING SYSTEM'S ACTORS. CREATION AND CONSISTENT LONG-TERM FUNCTIONING OF SUCH PLATFORM COULD IMPROVE FARMERS' QUALIFICATIONS, CONFIDENCE AND NETWORKING.</p> <p>CONTRIBUTES TO PRINCIPLE 3 BY PREPARING THE FARMING SYSTEM'S FUTURE RESILIENCE CAPACITIES THROUGH BUILDING OF KNOWLEDGE AND NETWORKING.</p> <p>CONTRIBUTES TO PRINCIPLE 4 BY BUILDING A POTENTIAL DIVERSITY OF RESPONSES THROUGH</p>	<p>APPROPRIATELY CONNECTED WITH ACTORS OUTSIDE THE FARMING SYSTEM BY FACILITATION OF PERMANENT NETWORKING BETWEEN THE FARMERS AND ACTORS IN THE ENABLING ENVIRONMENT.</p>
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D6.4 Implementation roadmaps for the implementation of the enabling environment principles



			IMPROVEMENT OF FARMERS' KNOWLEDGE AND COOPERATION POTENTIAL.	
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12	<p>Training that would increase farmers' mutual trust and confidence / AKIS</p> <p><i>Currently there are trust issues among the rural residents, which influence the intensity and efficiency of cooperation in various forms.</i></p>	WORKSHOP	<p>SUCCESS TO THE SUCCESSFUL - DIRECTING SUPPORT TO ONLY ONE FORM OF COOPERATION.</p> <p>PROPER TRAININGS AIMED TO EXPLAIN THE WAYS FARMERS CAN COOPERATE AND UNDERSTAND THE BENEFITS OF COOPERATION COULD BUILD TRUST AND CONFIDENCE AMONG FARMERS. LOCAL TRAININGS COULD BRING THE NEIGHBOURING FARMERS TOGETHER, WHO COULD INTERACT AMONG THEMSELVES AND REVEAL THEIR STRENGTHS AND WEAKNESSES, THUS UNDERSTANDING EACH OTHER IN A BETTER WAY.</p> <p>CONTRIBUTES TO PRINCIPLE 2 BY WORKING TOWARDS COOPERATION TO IMPROVE ANTICIPATORY CAPACITY.</p> <p>CONTRIBUTES TO PRINCIPLE 4 BY BUILDING A POTENTIAL DIVERSITY OF RESPONSES THROUGH IMPROVEMENT OF FARMERS' KNOWLEDGE, TRUST AND COOPERATION POTENTIAL.</p>	<p>SOCIALLY SELF-ORGANIZED BY IMPROVING TRUST ISSUES AND CONFIDENCE IN BENEFITS ARISING FROM COOPERATION AMONG THE FARMING SYSTEM'S ACTORS.</p>
13	<p>Involvement of trusted and respected specialists to perform trainings for farmers / AKIS, Societal</p> <p><i>Knowledge level about the cooperation possibilities is considered low, specialists with extensive knowledge are needed to perform trainings and show how to cooperate, increase trust level and achieve better economic results.</i></p>	WORKSHOP	<p>SUCCESS TO THE SUCCESSFUL - DIRECTING SUPPORT TO ONLY ONE FORM OF COOPERATION.</p> <p>INVOLVING RESPECTED INDIVIDUALS WHO ARE PROFESSIONALS IN ECONOMIC RELATIONS AND AGRICULTURAL DEVELOPMENT WOULD IMPROVE THE FARMERS' PERCEPTION OF INFORMATION AND COULD MAKE THEM MORE OPEN TO NEW IDEAS, INCLUDING THE NEED OF COOPERATION.</p> <p>PRINCIPLE 3 BY ASSISTING THE FARMING SYSTEM TO ADDRESS THE KEY CHALLENGES THAT ARE POSSIBLE TO BE COPED WITH BY INCREASING THE COOPERATION.</p>	<p>APPROPRIATELY CONNECTED WITH ACTORS OUTSIDE THE FARMING SYSTEM BY IMPROVING RELATIONS BETWEEN THE FARMING SYSTEM'S ACTORS AND ACTORS IN THE ENABLING ENVIRONMENT, MAKING THEM FEEL AS WORKING TOWARD ONE MUTUAL GOAL.</p>



14	<p>Promotion of healthy consumption habits / Enterprise, Government, Societal</p> <p><i>Such promotion aids existing producer groups involved in production of healthy food products, such as fruits and vegetables.</i></p>	WORKSHOP	<p>SUCCESS TO THE SUCCESSFUL - DIRECTING SUPPORT TO ONLY ONE FORM OF COOPERATION.</p> <p>TRANSFORMING THE DEMAND TOWARDS INCREASING OF CONSUMPTION OF HEALTHY AGRICULTURAL PRODUCTS WOULD BENEFIT THE HORTICULTURE FARMING SYSTEM IN THE LONG-TERM PERSPECTIVE.</p> <p>CONTRIBUTES TO PRINCIPLE 6, BUT GOES BEYOND THE FARMING SYSTEM'S CHALLENGES, RATHER ADDRESSING CHALLENGES OF NATIONAL LEVEL (SWITCHING TO HEALTHY CONSUMPTION HABITS) SIMULTANEOUSLY HELPING THE HORTICULTURE FARMING SYSTEM.</p>	<p>LEGISLATION COUPLED WITH LOCAL AND NATURAL CAPITAL BY IMPLEMENTING HEALTHY CONSUMPTION HABITS FOR THE POPULATION.</p>
15	<p>Intensifying the state farm advisors' activities toward intensification of farmers' cooperation / Government, AKIS</p> <p><i>Currently the state farm advisors are involved in numerous bureaucratic activities, controlling functions over farms, which take their attention from advisory services as such.</i></p>	WORKSHOP	<p>SUCCESS TO THE SUCCESSFUL - DIRECTING SUPPORT TO ONLY ONE FORM OF COOPERATION</p> <p>FARM ADVISORS' ATTENTION SHOULD BE DIRECTED TO PROVIDE FARMERS WITH OPTIMAL SOLUTIONS, COOPERATION BEING AMONG SUCH. RELIEVING THE FARM ADVISORS OF THE CONTROLLING AND BUREAUCRATIC STATE FUNCTIONS SHOULD HELP IMPROVE THEIR ADVISORY CAPACITIES AND PROVIDE MORE SPECIFIC AID TO THE FARMING SYSTEM.</p> <p>CONTRIBUTES TO PRINCIPLE 3 BY ASSISTING THE FARMING SYSTEM TO ADDRESS THE LONG-TERM CHALLENGES AND IMPLEMENT ADAPTATION MEASURES.</p>	<p>DIVERSE POLICIES BY SUPPORTING ALL TYPES OF FARMER COOPERATION, THUS ENFORCING THE FARMING SYSTEM'S RESILIENCE CAPACITIES.</p> <p>RESPONSE DIVERSITY BY PROVIDING THE FARMERS WITH MORE DIVERSIFIED OPTIONS TO COPE WITH THE CHALLENGES.</p>



16	More resources devoted to consultancy activities / Government, AKIS	WORKSHOP	<p>SUCCESS TO THE SUCCESSFUL - DIRECTING SUPPORT TO ONLY ONE FORM OF COOPERATION.</p> <p>AS THE STATE AGRICULTURAL ADVISORY SERVICE IN POLAND IS THE ULTIMATE CONSULTING ENTITY AVAILABLE TO THE FARMERS, THE COMPETENCE LEVEL OF THE ADVISORS IS IMPORTANT TO HELP FARMERS' ADDRESS THEIR EXISTING AND FUTURE ISSUES. IMPROVED UNDERSTANDING OF PROS AND CONS OF AVAILABLE FORMS OF FARMERS' COOPERATION CAN POTENTIALLY IMPROVE AND INTENSIFY THE WAYS FARMERS INTERACT AND JOIN FORCES TO COPE WITH THE CHALLENGES.</p> <p>CONTRIBUTES TO PRINCIPLE 4 BY FOSTERING A POTENTIAL DIVERSITY OF RESPONSES.</p>	<p>RESPONSE DIVERSITY BY BROADENING THE VARIETY OF AVAILABLE MEASURES TO COPE WITH THE CHALLENGES.</p> <p>INFRASTRUCTURE FOR INNOVATION BY IMPROVING THE AVAILABILITY OF KNOWLEDGE TO THE FARMING SYSTEM'S ACTORS.</p>
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More attention is needed to the advisors' qualifications and knowledge.

17	<p>Strengthened support of existing leaders / Government, Societal</p> <p><i>Local leaders need to be further supported to lead the farmer cooperation intensification.</i></p>	WORKSHOP	<p>SUCCESS TO THE SUCCESSFUL - DIRECTING SUPPORT TO ONLY ONE FORM OF COOPERATION.</p> <p>THE FARMING SYSTEM IN TERMS OF TERRITORIAL DIMENSION IS SCATTERED, THERE ARE NUMEROUS SMALL FARMERS IN DIFFERENT REGIONS OF POLAND. FARMERS NEED TO SEE LOCAL LEADERS WHO ARE ACTIVE IN BUILDING UP THE FARMING SYSTEMS CAPACITIES.</p> <p>CONTRIBUTES TO PRINCIPLE 3 BY BUILDING LONG-TERM RESILIENCE CAPACITIES THROUGH ACTIVITIES OF EXPERIENCED AND STRONG LOCAL LEADERS.</p>	<p>RESPONSE DIVERSITY BY IMPROVING THE POTENTIAL OF LOCAL LEADERS TO WORK AMONG THE LOCAL FARMERS AND INCREASING THE DIVERSITY OF POSSIBLE ACTIONS WITHIN THE FARMING SYSTEM.</p>
18	<p>Joining forces to achieve economies of scale / Enterprise, Societal</p> <p><i>Small farms should join in large groups to diminish fixed production costs.</i></p>	WORKSHOP	<p>SUCCESS TO THE SUCCESSFUL - DIRECTING SUPPORT TO ONLY ONE FORM OF COOPERATION.</p> <p>JOINING THE EFFORTS TO COPE WITH THE CHALLENGES WOULD HELP ACHIEVE THE ECONOMIES OF SCALE EFFECT IN EVERY WAY: PRODUCTION, FINANCIAL, ORGANISATIONAL. HORIZONTAL COOPERATION IN THE HORTICULTURE SECTOR COULD ALLOW TO BUILD THE NEEDED INFRASTRUCTURE (E.G., STORAGE).</p> <p>CONTRIBUTES TO PRINCIPLE 5 BY BUILDING UP THE CAPACITY OF JOINT ECONOMIC STRENGTH, THUS ALLOWING TO PREDICT AND AVOID NEGATIVE EFFECTS OF FUTURE CHALLENGES.</p>	<p>FUNCTIONAL DIVERSITY BY DIVERSIFYING THE OPTIONS FOR POST-PRODUCTION PROCESSES: STORAGE, MARKETING, REACHING NEW MARKETS.</p> <p>INFRASTRUCTURE FOR INNOVATION BY REACHING HIGHER INVESTMENT POTENTIAL AND BEING ABLE TO BENEFIT FROM MODERN TECHNOLOGIES.</p>



Discussion

Which actors play a major role in explaining or prevalence of the system archetypes in the case study? Are these the same actors who should/could play a role in addressing the system archetypes in the future?

The stakeholders participating in the workshop represented government institutions (6 people), local self-government (2 people), research (2 people), farmer association (1 person) and an NGO (1 person). Several of the participants had secondary involvements, such as scientific research activities or farming. This turned out to be the proper reflection of the actors involved in the archetypes in the researched farming system.

In participants' opinion the actors who should and could play a role in addressing the system archetypes in the future are primarily the government, AKIS and societal entities. These three make a logical triad, as the government is perceived as responsible for the existing archetypes (their policies and their implementation are the reasons for the continuous faulty loops), it is also the government institutions that are seen as the ones able to influence the situation and work at the solutions of the core of the discussed problems. The AKIS, which is to a large extent represented by the state advisory service is perceived to have a key role in targeting the cause of the problems and helping intensify the measures aimed at solving the problems. This is to be done by increased knowledge and qualifications of agricultural advisors, conducted trainings for the farmers in terms of insurance policies and options, cooperation possibilities and other economic and organizational opportunities. The role of societal group (entities and individuals) is perceived as bottom-up policy consultations, sharing the knowledge and intensifying the networking.

How do the actions presented in part 4 and 5 contribute to the principles of a resilience enabling environment (see deliverable 6.2 or annex). Which principles are most urgently in need of action in your case study?

The actions proposed by stakeholders contribute primarily to principle 3 (actions 8 out of 18), then to principles 2 and 4 (actions 3 out of 18) then to 5 and 6 (actions 2 out of 18) and only one action to principle 1.

The primary contribution of the proposed actions is to principle 3 which means that the actors belonging to enabling environment should assist the farming system to detect, assess and address long term trend in order to increase future resilience capacities. In case of solving the problem of extreme weather events it would require from enabling environment the following: 1) from government, AKIS and Societal - to increase awareness of farming system on the future climate change trends and the benefits of insurance against their effects, 2) from government - changing regulations to provide farming system with more specific compensations in line with anticipated future damage, 3) from intermediary and societal - launching more public-private partnerships for expansion of mutual insurance funds, and 4) from enterprise, government and societal - mobilizing financial and human resources for investments in innovative technologies increasing



farming system's information on and protection against the climate change (through digital information platforms, help desks, etc.). In case of solving the problem of low cooperation, the actions within principle 3 would require from enabling environment the following: 1) from government and advisors – reorganising farmers' advisory towards more practical advice on farmers' cooperation, while is less burdened with controlling activities and bureaucracy, 2) from AKIS and Societal – to provide through trainings the knowledge and incentives for farming system to open for cooperation and to increase the trust among FS members, 3) from government and Societal – to select and support the existing leaders who would pave the way for cooperation within the farming system and 4) from AKIS, government and Societal – to invest in digital educational platform which would ease the trustworthy cooperation.

The most urgent in view of the stakeholders are principles 3 and 5 in case of actions related to solving extreme weather events and principles 3, 4 and 2 in actions related to low cooperation problem.

How do the actions described in part 4 and 5 contribute to the resilience attributes?

Actions defined by the participants aiming to address the system archetypes contribute primarily to the "Legislation coupled with local and natural capital" (4 actions), "Diverse policies" (4 actions), and "Response diversity" (4 actions). Adaptation of the norms, legislation and regulatory frameworks would be better adapted to address not only the horticulture farming system's needs, but also agriculture as a whole. These actions combined with the "Diverse policies" would enhance the environment in which the farming system operates and would have a beneficial influence upon its resilience capacities, among which it seems the adaptability would benefit the most, but also the robustness towards particular challenges. A "Response diversity" would also be improved, especially in case of the "Success to the successful" archetype, in which support of various types of farmer horizontal cooperation was discussed. Cooperation would help farmers join forces and invest in such needed improvements as storage facilities and especially cold-storage facilities.

Slightly less targeted but still significantly influenced resilience attributes would be the "Infrastructure for innovation" (3 actions), "Appropriately connected with actors outside the farming system" (2 actions), and "Exposed to disturbance" (2 actions). Cooperation is perceived as the possibility to implement innovative solutions for farmers, as the Polish horticulture producers are small-scaled and unable to invest and obtain most of technologies by themselves. Part of possible impact of defined actions upon the resilience attributes is the improvement of connectedness with other actors in the farming system and the enabling environment, which could be achieved through improved cooperation. Several actions can aid in further strengthening of robustness of the farming system by improving its ability to withstand minor challenges.



Several resilience attributes that are targeted in the least manner (but still targeted, unlike many other from the list) are the “Functional diversity”, “Production coupled with local and natural capital”, “Socially self-organized”, and “Reasonably profitable”. Each was associated with one of the proposed actions through having a positive impact upon the attribute’s conditions.

How do the actions presented in part 4 and 5 contribute to the resilience capacities (robustness, adaptation, and transformation)?

In total, most of the actions contribute to Adaptation (8 out of 18), and the other actions equally contribute to Robustness and to Transformation (5 out of 18 each) – see Table 5-1. However, the picture is more diversified depending on the problem and archetype that the actions address. In case of problem with extreme weather events (archetype “Fixes that fail”) the same number of actions contribute to Robustness and to Adaptation (4 in each case), while only 2 contribute to Transformation. In case of problem with low cooperation (archetype “Success to the successful”), the highest number of actions contribute to Adaptation (4) and Transformation (3), while to Robustness contributes only 1 action.

As for Robustness - the actions addressing “Fixes that fails” archetype contribute to this capacity through providing buffer resources (through the level and targeted damage compensation), through short-term focus (in reducing time between the weather event and actual payment) as well as risk-management (through enforcement of insurance law). For Robustness in “Success to the successful” the only contribution was through buffer resources (through diminishing fixed costs).

As for Adaptation – the actions addressing “Fixes that fails” archetype contribute primarily through variety (which relates to more resilient crops and to more insurance institutions) but also social learning (training about benefits of insurance) and flexibility (assuring a proper code of conduct if insurers). In case of “Success to the successful” Adaptation increases primarily through social learning by means of existing leaders, respected specialists and promotion of healthy eating habits.

As for Transformation - the actions addressing “Fixes that fail” archetype contribute through in-depth learning (on climate resistant crop varieties) and niche innovation (on information platforms and anti-damage protection systems). In case of “Success to the successful” the actions contribute to this capacity through: long-term focus and dismantling status-quo (transforming advisory system from advising on hard investments towards advising on soft skills building trust and increasing cooperation); through in-depth learning (teaching farmers the trust to each other) and niche innovations (through digital educational platforms).



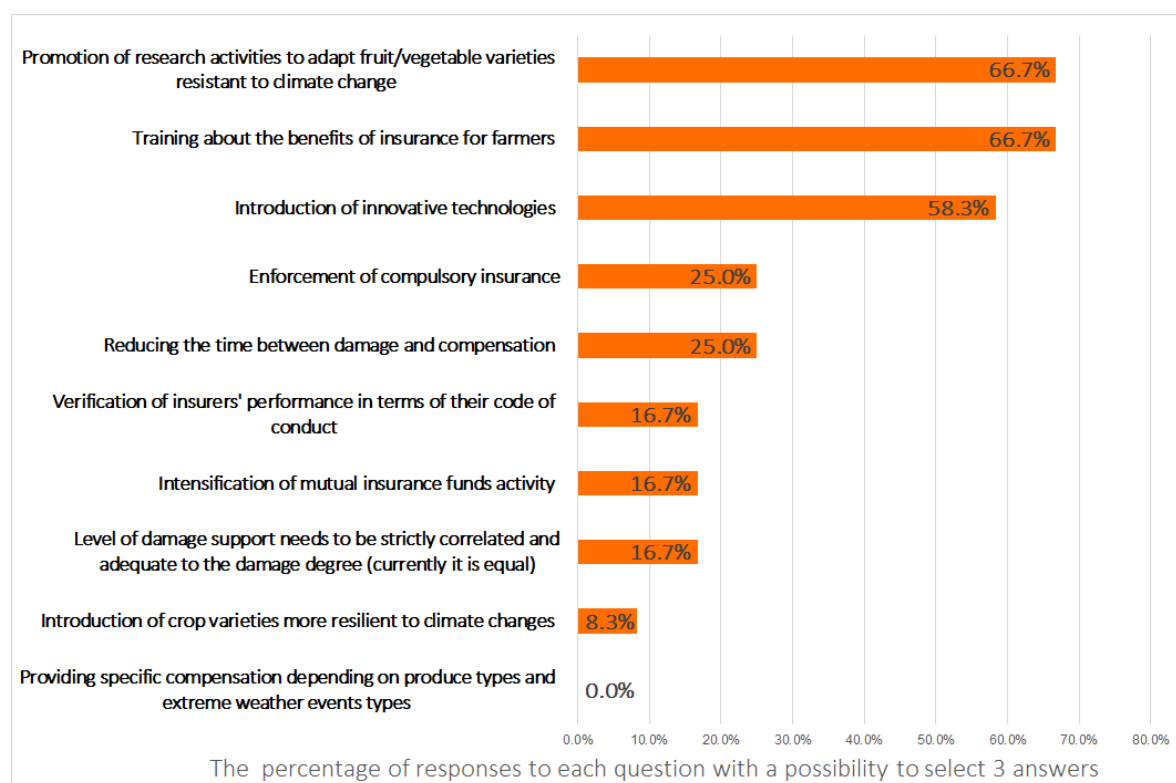


Figure 13.5. Voting results for the archetype “Fixes that fail” - Extreme weather events

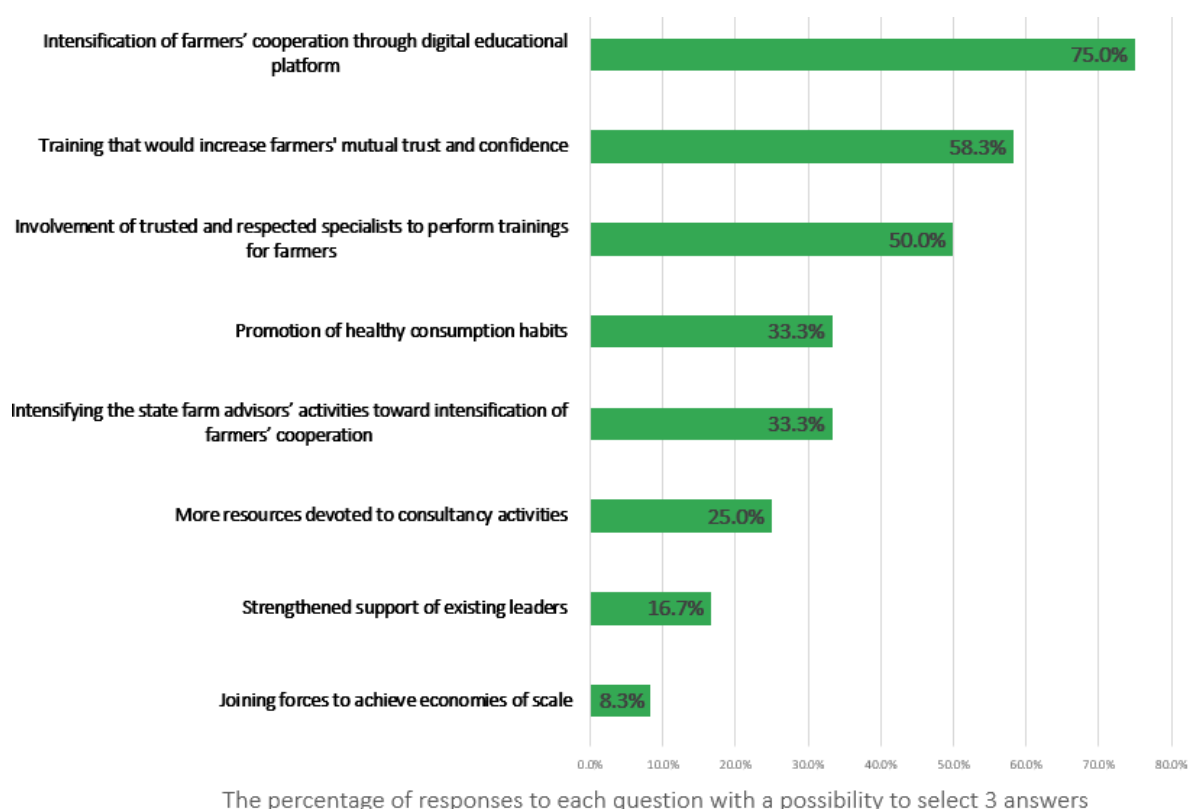


Figure 13.6. Voting results for the archetype “Success to the successful” - Directing support to only one form of cooperation

Table 13-5 Actions by resilience capacities, attributes, and principles

No.	Action/ACTOR	RESILIENCE CAPACITIES			RESILIENCE	
	Actions related to problem of extreme weather events/ "Fixes that fail"	Robustness	Adaptation	Transformation	EE Principles	FS Attributes
1	Promotion of research activities to adapt fruit/vegetable varieties resistant to climate change / AKIS, Societal			in-depth learning	5	production coupled with local and natural capital
2	Training about the benefits of insurance for farmers / Government, AKIS, Societal		social learning		3	diverse policies & reasonably profitable
3	Introduction of innovative technologies / Enterprise, Government, Societal			niche innovations	3	infrastructure for innovation
4	Enforcement of compulsory insurance / Government	risk management			4	legislation coupled with local and natural capital
5	Reducing the time between damage and compensation / Government, Intermediary	short-term focus			2	exposed to disturbance & legislation coupled with local and natural capital
6	Verification of insurers' performance in terms of their code of conduct / Government		flexibility		6	legislation couple with local and natural capital
7	Intensification of mutual insurance funds activity / Intermediary, Societal		variety		3	exposed to disturbance
8	Level of damage support needs to be strictly correlated and adequate to the damage degree (currently it is equal) / Government	buffer resources			1	diverse policies
9	Introduction of crop varieties more resilient to climate changes / AKIS		variety		2	response diversity
10	Providing specific compensation depending on produce types and extreme weather events types / Government	buffer resources			3	diverse policies



	Actions related to problem of low cooperation of farmers / "Success to the successful"	Robustness	Adaptation	Transformation	EE Principles	FS Attributes
11	Intensification of farmers' cooperation through digital educational platform / AKIS, Government, Societal			niche innovations	3&4	legislation coupled with local and natural capital
12	Training that would increase farmers' mutual trust and confidence / AKIS			in-depth learning	2&4	socially self-organised
13	Involvement of trusted and respected specialists to perform trainings for farmers / AKIS, Societal		social learning		3	appropriately connected with actors outside the FS
14	Promotion of healthy consumption habits / Enterprise, Government, Societal		social learning		6	response diversity
15	Intensifying the state farm advisors' activities toward intensification of farmers' cooperation / Government, AKIS			long-term focus & dismantling status-quo	3	response diversity
16	More resources devoted to consultancy activities / Government, AKIS		middle-term focus		4	response diversity & infrastructure for innovation
17	Strengthened support of existing leaders / Government, Societal		social learning & middle-term focus		3	infrastructure for innovation
18	Joining forces to achieve economies of scale / Enterprise, Societal	buffer resources			5	functional diversity
TOTAL		5	8	5		

Source: Own proposition based on workshop and ResAT tool classification of resilience capacities



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Conclusions

Two archetypes discussed during the workshop - “Fixes that fail” in relation to extreme weather events and “success to the successful” in relation to problem of low cooperation – triggered 18 actions that the stakeholders proposed to effectively solve the problems. Solutions to the archetype “Fixes that fail” contributed primarily to enabling environment's principle 3 and equally to resilience capacities Robustness and Adaptability, through enhancement of mainly such attributes as diverse policies and legislation coupled with local and natural capital. The solutions are in line with those suggested by literature. That is while quickly fixing (mitigating) the problem of damage through damage compensations (also improving their level and targeting so not to waste the resources on temporary fix) the main effort (regulations and resources) should be shifted towards, creating incentives for farming system to insuring themselves, apply more climate resistance crops, transfer knowledge and timely information on the climate change and on the other side, developing and improving the institutions at the insurance market (mutual funds, public-private partnership, regulations, good code of conduct, etc.). So the real problem is addressed (need for more comprehensive anti-damage system) not the symptoms (damage itself).

Solutions to the archetype “Success to the successful” contributed primarily to enabling environment's principle 3, but mostly to resilience capacity Adaptation and Transformation, through enhancement of mainly such attributes as response diversity and infrastructure for innovation. The solutions for this archetype are also in line with those suggested by literature. Mainly they suggested to support the system which is above the individual forms of cooperation. That is by improvement of advisory systems which should focus on development of skills needed for cooperation and building trust in cooperation, trainings and digital platforms of cooperation, supporting the existing leaders – so investments in key elements of successful cooperation - IT and human resources - rather than in concrete groups of cooperating actors.

It is important to stress a vital role of the enabling environment in enhancement of resilience as the proposed actions address main drawback in resilience attributes and capacities recognised so far – see Annex 3 Factsheet. Particularly, the proposed actions address the problem of relatively low capacity to transform and medium so far capacity for adaptability. At the same time, they address so far, the most underperforming resilience attributes such as response diversity and low openness for cooperation among farmers (indicated with red labels in the Factsheet) while on the other side building on the strong ones, such as innovation-driven machine capacity (system



reserves) as well as transfer of knowledge and use of internet (openness) (indicated with green labels in the Factsheet – see Annex 3).

Feedback from workshop organisation

Analysis of archetypes is difficult if many of them are discussed simultaneously. The best way is to either present problems and see which archetypes are most appropriate to understand them, or to view one archetype and try to understand which current problems fit. A difficulty in discussion of archetypes with the stakeholders is that the discussion often goes in various directions, as the participants don't stay inline of the analysed archetype, but contribute with various other issues, ideas and solutions. Therefore, the analysis of the workshop's output is somewhat difficult and needs to be cleared off the imprecise thoughts, while also keeping them for broader understanding of problems.



14 Implementation roadmap for the implementation of enabling environment principles in Sweden (egg and broiler production)

Introduction

The aim of this report is to develop a case study-specific roadmap for a resilience enabling environment (EE), applying the guiding principles established in T6.1. This report uses a desk study approach, based on the system archetypes framework (Kim, 2000) to diagnose system challenges. In addition, the study identifies interventions to address the recognized challenges. A workshop design was considered to integrate the opinion of the shareholders. However, due to difficulties in recruitment and online meeting fatigue, we decided for the desk study method. The alternative approach was chosen for its analytical advantage, allowing us to dive more deeply into defined challenges to contribute to a holistic perspective of the resilience in the farming system. In the report, we have used an external examiner, increasing the quality control to better understand and apply the system archetypes to the case study (CS). Moreover, the examiner have consulted literature beyond the scope of the project to validate the findings of the study, adding substance and critical perspectives to the results. The method provided insights into pivotal strategic areas, incorporating and building in the EE and the resilience capacity of the farming system (FS).

What is the enabling environment?

The Swedish egg and broiler FS identifies egg and poultry meat associations, advisors, retailers, consumers, governing bodies and research units are among the actors enabling the environment for the resilience of the FS. These actors influence the FS, while they are not substantially influenced by the system. Factors such as “openness”, “modularity” and “response diversification” are among the main attributes that explain the EE of the FS in the Swedish CS. This report will focus on the actors within the FS as well as the actors enabling the environment.

Connection between task 6.1 and task 6.2

T6.1 integrated previous results to define the EE. The CS report resulted in six principles for a resilient EE to deliver generic system failures (see Mathijs et. al., 2021). In report T6.2, we integrate findings from the SURE-Farm work package (WP) 5 and 6 to develop appropriate archetypes for each of the sectors’ challenges to help overcome long-term problems and create opportunities to form the correct interventions. The aim is to translate the principles to the



Swedish CS of high-value egg and broiler production to reach concrete recommendations and points of specific actions.

T6.1 identified four main challenges over the past 10 years for the Swedish CS and the possible impact on its resilience capacity (see Mathijs et. al., 2021). The first challenge identified were high standards and strict regulations. Ensuring high quality products and high animal welfare is perceived positively, but strict regulation is also perceived as an administrative burden. The solution to overcome the administrative workload is to invest in cognitive resources outside of the existing labour force, such as advisors, administrative staff and in capacity building activities.

The second challenge was the erratic change in consumer preferences, marked by unpredictable drops and increases in demand, aggravated by social media, NGO's and/or animal welfare activists. The challenge is to meet the requirements while providing a sufficient farm income, as adapting the production to the consumers' demand which requires costly investments in technology. The solution for the farmers is to stay responsive to market changes and invest in resources enabling the delivery of system functions that are expected to survive changes to consumer demands.

The third challenge was constant technology adoption. Technology is essential for production to deliver high quality food products and ensure working conditions for the employees. Technological improvements are also partly driven by new regulations. Without the adoption of new technology, farms risks to fall behind in productivity or to not being able to expand their business which can reduce the viable income of the farm. However, adaptation to regulatory demands and new technologies are costly in terms of investment, knowledge, and administrative tasks. The solution is to learn from others and to be pragmatic when applying new technology.

The fourth challenge identified was generational renewal, which creates knowledge capacity gaps in rural areas. Networks, skills, and labour availability are at risk of being lost when a farm faces an intergenerational shift. The solution is to plan for the next generation to take over, including management and business, as well as strengthening values and addressing heavy workloads. At a structural level making rural areas more attractive to a younger generation is needed.

Farming system and enabling environment

Table 14.1 displays the identified actors and institutions by five domains within the FS and its EE. In this report, the financial resources and non-financial resources contributing to EE are included, which primarily can be found in the government domain.



Table 14.1. Actors and its enabling environment (institutions and resources) in the Swedish high-valued egg and broiler dairy farming system and its enabling environment

Actors	Formal institutions	Informal institutions	Financial resources	Non-financial resources
Enterprise domain: <ul style="list-style-type: none"> • Farmers • Slaughter houses • Input suppliers (feed, technology, fertilizer, pharmaceuticals) • Farm organisations (Federation of Swedish farmers (LRF), Lantmännen-cooperative) • Retailers 	<ul style="list-style-type: none"> • Farming regulation 	<ul style="list-style-type: none"> • Attitudes and norms concerning sustainable farming (including animal welfare) • Attitudes towards collaboration 		
Government domain: <ul style="list-style-type: none"> • European Union • Ministry of innovation and entrepreneurship • Swedish Board of Agriculture • County Administrative Boards • Swedish Food Agency • Swedish Environmental Protection Agency (EPA) • Swedish Veterinary Institute • The National Food Administration 	<ul style="list-style-type: none"> • CAP • Regulation as issued by the Swedish Governmental Agencies focusing on quality control, business development, innovation, rural areas, food and regional growth 	<ul style="list-style-type: none"> • Accountability • Attitudes towards sustainable farming • Trust in authorities • Farmer participation in networks • Societal participation in networks 	<ul style="list-style-type: none"> • Land security support • Direct payments • Organic production/adaption to organic production • Investment support for modernisation and restructuring to sustainable technologies • National support • Support to young farmers (within Pillar 1 and Pillar 2) • Knowledge transfer and information measures; • Support for pilot projects and innovations • Compensation support (partly EU/partly Swedish government) • Income losses Corona-support 	<ul style="list-style-type: none"> • Providing data • Activities knowledge exchange
Intermediary domain: <ul style="list-style-type: none"> • Eggs & broiler meat associations; • Advisors • Banks 	<ul style="list-style-type: none"> • Regulations and standards 	<ul style="list-style-type: none"> • Collaboration culture/attitudes among value chain actors • Ideal farmer type 	<ul style="list-style-type: none"> • Insurances (salmonella) 	

AKIS domain: <ul style="list-style-type: none"> • Networking –eggs & broiler meat associations • Networking – advisors 	<ul style="list-style-type: none"> • Vocational training, advisory service 	<ul style="list-style-type: none"> • Technical vision on farming 		<ul style="list-style-type: none"> • Knowledge/capacity building • Research support
Societal domain: <ul style="list-style-type: none"> • Swedish Consumers' Association • NGOs (Djurens rätt, Djurskyddet Sverige, WWF) 	<ul style="list-style-type: none"> • Campaigns, animal welfare movements, Vego movements 	<ul style="list-style-type: none"> • Societal vision on farming 		<ul style="list-style-type: none"> • Knowledge exchange • Evaluations • Research (e.g. KSLA)

The financial resources mostly consist of different kind of disaster compensations, funded at regional (County Administrative Boards) and national (Swedish Board of Agriculture) levels. The CAP has an indirect effect on the farm income and thereby the robustness of the sector, via direct payments provided per hectare land. As the Swedish egg and broiler systems have low dependency on self-produced fodder, support from the CAP to land and fodder production is perceived as less relevant for this CS compared to other (livestock) production systems. In terms of adaptability and transformability, the CAP is relevant for fulfilling environmental objectives, e.g., organic farm support, investment support, support for innovations and knowledge disseminations. The non-financial resources are recognized as capacity-building activities and support to research and evaluations, mainly from egg- and broiler meat associations and NGOs. The D2.1 Report on farmers' perceptions of risk and resilience capacities (Spiegel et al., 2019) show that Swedish farmers perceive shocks to the production, such as extreme weather events and limited availability of skilled farm workers, as the main future challenges to their farm. The financial supports in hand (governmental disaster compensations) and the non-financial support (capacity building and knowledge exchange) are aligned with the perceived future needs of the FS. Farmers in Sweden have a positive outlook on non-financial support (networking and assistance from professional experts) in comparison to other EU farmers, which is positive for future efforts of the EE. Below follows a summary of the EEs within the five domains.

The enterprise domain includes the importance of hiring skilled labour in all areas of the production. For the farm to stay robust, the production should not be dependent on a single person. The processors (slaughterhouses and packing companies) recruit farmers to develop their production, but can in the same time operate at international markets and by-pass local farms. Farm organizations (e.g., the Swedish Farmers' Association LRF) help farmers with capacity-building activities and knowledge exchange to develop farming solutions and strengthen the power to impact policy-makers and governing bodies. The retail sector enables affects production

as a mediator between producers and consumers and by setting standards, including expectations regarding animal welfare.

The government domain affects the EE through imposing roles, policies and regulations. The domain's function can be considered as a tool to initiate technological change, but often also is perceived as increasing administrative burdens. The intermediary domain functions as a vertical integration of the FS enabling connections between several stakeholders. Egg- and broiler meat associations work as advisors and take responsibility to provide new knowledge. These associations are also invested in lobby activities and advocate the sector's needs to policy-makers. The AKIS domain consists of networks of enabling representatives from the egg- and broiler meat associations and advisory services to provide information regarding needed skills and (newly emerging) technology. Finally, the societal domain includes consumers, animal welfare activists, consumers' organizations, and media. Demand is to a great extent also driven by these actors, affecting long-term trends and short-term shocks.

System Archetypes

Stakeholders in the high-value Swedish egg and broiler production have identified major challenges, opportunities and essential functions to the FS, as well as the resilience capacities and attributes. In light of the system thinking tools, many of these challenges and opportunities can be recognized with a system archetype method. The archetype "templates" can be applied to highlight patterns of behavior in the FS based on the CS preformed to reach a system-structured solution. By identifying when and why problem arise in single events, and whether or not they are driven by long-term challenges or due to system dynamics, the FS may find a common solution to organizational structures that creates these challenges.

System Archetypes identified in T6.1

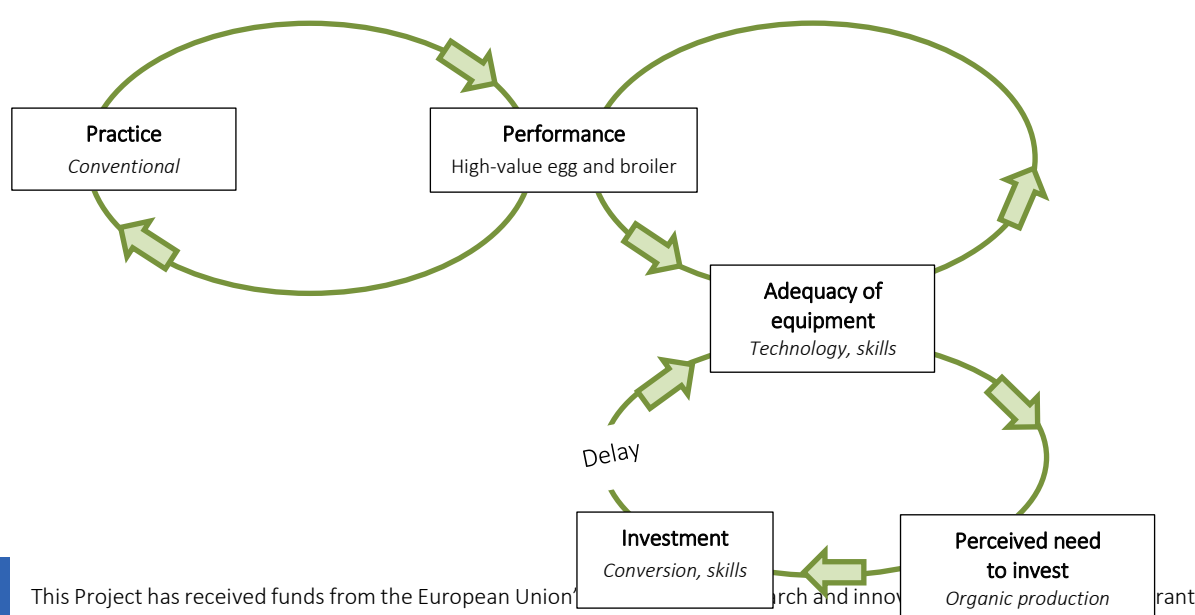
In the "Drifting goals" scenario, the discrepancy from the main goal and the reality rests in a trade-off between producing high quality products in a sustainable manner, while keeping up with technology and animal welfare which requires adjustments in operations. This is a challenge across the value chain, as well as for institutions when actors within the FS are pushed towards a new production reality which disables them to reach their goals. The system faces challenges to adjustments in practices, technology, food quality and animal welfare. Following Kim (2000), solutions identified in T6.1 imply: taking corrective actions (B1) via new legislation and standards or societal pressure and policy support, and lowering the goal (B2) by implementing the changes



within a larger time-span in a harmonized manner across the EU. For the challenge “generation renewal”, the gap was instead demonstrated by the lack of young people’s interest in farming, making the goal of farm survival hard to achieve. The corrective action (B1) was identified to involve the younger generation in farming activities early or lowering the goal (B2) by allowing employees to take over the farm or to sell it. The archetype relates to Principle 3 for a resilience EE, i.e., the need of detect and asses long-term trends to avoid eroding goals patterns.

System Archetypes identified in T6.2

The first system archetype identified in the desk study is “Growth and underinvestment”, as illustrated in Figure 1. In this archetype, the growth reaches a limit which can be eliminated or turned into a future if capacity investments are made (Kim, 2000). In the last decade, the Swedish Board of Agriculture has measured a long-term growing trend towards a higher consumer demand for ecological and organic production (Jordbruksverket, 2020). The stakeholders also acknowledged this opportunity in the FoPIA-SureFarm workshop, as they recognize the pressure to convert to organic production as the major need for technology adoption. In the D2.1 Report on farmers’ perceptions of risk and resilience capacities roughly one fifth of the farms in the Swedish CS answered that they today have an organic farm, which is a notably higher rate than the average across the EU farmers (Spiegel et al., 2019). This manifest the previously identified high adaptability of the sector. However, no Swedish farmers answered that they are currently converting to organic production, which is contrasted by the more dynamic developments in Denmark, France, or Italy. Technological change and adaptation are key factor when it comes to facing future challenges in the FS.

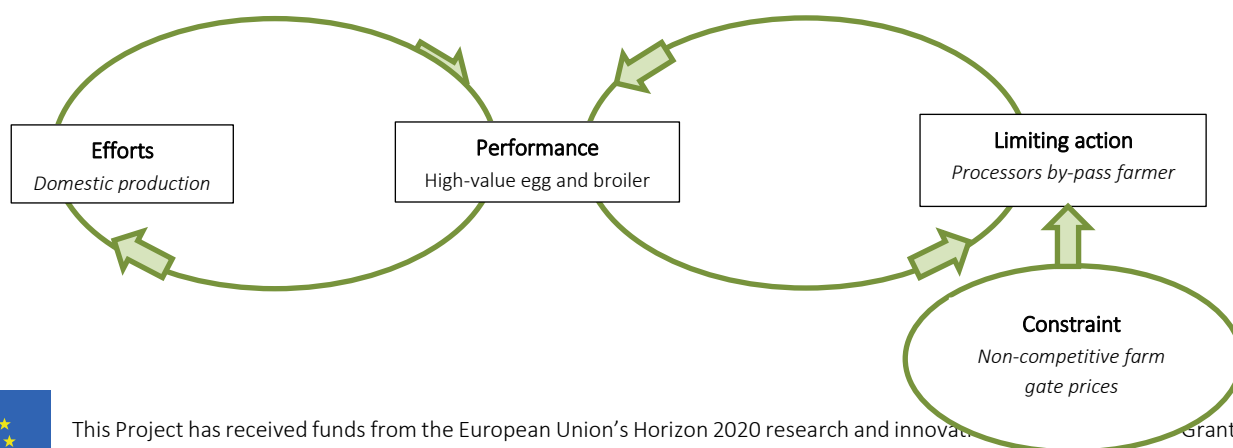


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Figure 14.1. “Growth and underinvestment” system archetype in the Swedish egg and broiler farming system

In the FS, growth efforts are made to improve performance, but the performance is also limited by technological change and skills. Investment in the “right” capacity will enable the egg and broiler farmers to keep up with changes in consumer demand. The conversion to organic production involves a delay to performance as it requires technical and knowledge improvements. Change to organic production also involves a major shift and longer time horizons which may leave the system more vulnerable to mid-term drops in demand. However, without investment in capacity, the performance may suffer. In our case, if the farmers do not meet the demand, processors and retailers can solve the consumer request by importing organic products from other countries, a challenge that is interrelated with the next identified archetype.

The second system archetype translated into the CS are imbalances in market power. The pattern can be detected by the “Limits of success” principle and mostly concerns the broiler meat producer relations with slaughterhouses. In this scenario, efforts leading to performance encounters a limit, imposed by a constraint, which causes farmers’ performance to slow down. The imbalance occur as farmers depend on single processors, while the processors do not depend on the producers to reach efficient market shares. Figure 2 shows the disparity of the market power.



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Figure 14.2. “Limits to success” system archetype in the Swedish egg and broiler farming system

The constraint limiting the success emerges from non-competitive farm gate prices. As many farmers own land, the resulting lack of profitability does often not immediately threaten the existence of the business (if levels of equity are high). Even if efforts continue to rise among farmers, the processor’s constraint will suppress the performance preventing leverage for the producers. The archetype also emphasizes the importance of cumulative effects of not dealing with future problems, and the “if it ain’t broke, don’t fix it” attitude. One goal of the Swedish Food Strategy¹ is to increase the self-sufficiency to create a competitive production, reaching environmental objectives, and at the same time to create domestic growth and employment opportunities (Jordbruksverket, 2020). Processors by-passing farmers may therefore juxtapose these goals in the long run.

Last, “Success to the successful” is demonstrated by the discrepancy in regulations across the EU market. Competitors in the EU market are not subject to the same regulations, monitoring, and enforcement imposed on Swedish farmers, potentially leading to higher production costs. Note that this issue is somewhat contested, as strict animal welfare regulations could also go hand in hand with a greater profitability. The Swedish FS also benefits from strict sanitary requirements for imports regarding salmonella which limits international competition from central Europe. Egg and broiler producers will perform at capacity according to the national regulations in hand, which creates fluctuations in imports. However, the Swedish FS is mainly challenged at the domestic market by Denmark, Finland and Norway in variations to production costs, as the Nordic neighbors are excluded from the salmonella certification for import. Lower regulations may not only mistreat conditions for hens and chickens, but can also potentially harm the whole FS from scandals and disease spreading which damage the production for other producers (however mainly nationally).

¹ The Swedish Food Strategy [*En livsmedelsstrategi för Sverige – fler jobb och hållbar tillväxt i hela landet.* Näringsdepartementet, Regeringen 2017.](#)

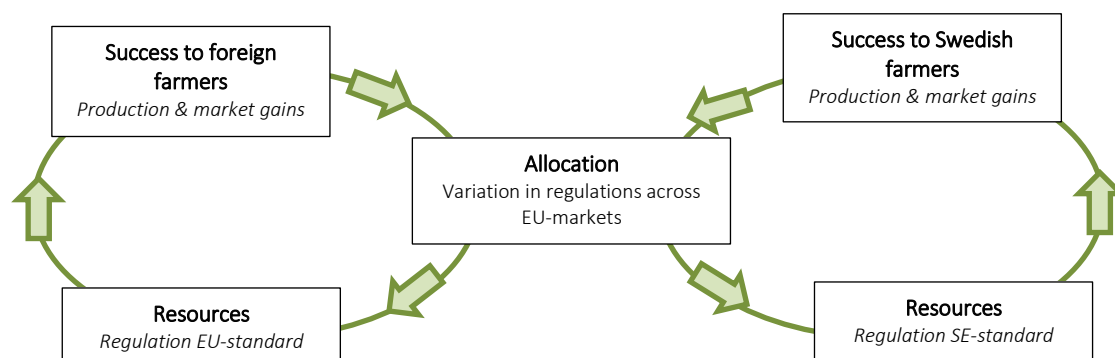


Figure 14.3. “Success to the successful” system archetype in the Swedish egg and broiler farming system

The archetype in Figure 3 suggests that the success depends on other factors than talent, when one group is given more resources (lower regulations) than other groups, which increases the likelihood of succeeding. The long-term collective loss might however be larger than adjusting a stricter international standard characterized with sustainability of the resources (animals). Producers not complying with the same strict ruling as Swedish farmers will be given more resources, as they can compete with lower prices, and may build on this success to create an even larger international market share, into self-fulfilling prophecies. Note, however, that these dynamics interact with import barriers regarding salmonella certification e.g. for egg import.

Validation and recognition in additional literature

The archetype “Drifting goals” was classified as the common challenge in the CS report in T6.1, applied to “high standards and regulation”, “changing consumer preferences”, “technology adoption” and “generational renewal”. Both producers and egg- and broiler meat associations validate the goal of producing high-value, healthy and secure products. The external examiner recognized the system archetype “Drifting goals” from T6.1, as the archetype is based on common challenges to the FS. Especially, actors within the FS are detected to be open to possible corrective actions (B1), such as changing management practices, diversification and knowledge adjustments to overcome the behavioral lock-ins. Requirements to lowering the goal (B2) are recognized as a harder gap to defeat, as the producers feel locked in by standards and regulations from Swedish authorities. The “Drifting goal” scenario is a structure that leads to poor performance, while lowering expectations. At the moment, movements away from the goal are usually unnoticed, which can make it hard to detect.



In 2017, the Swedish government introduced the Swedish Food Strategy with two targets to fulfill by 2030: (1) 30% of Swedish agricultural land should consist of certified organic agricultural land, and (2) 60% of public procurement consumption should consist of certified organic products (The Swedish Food Strategy, 2017). The demand for organic food products has increased for the last 10 years and will continue to rise in Sweden. According to the market report of the organic food market, Ekoweb forecast the organic sales in Sweden to increase by 13% in total, over the next 10 year period (Ekologisk livsmedelsmarknad, 2020). Policy documents, forecasts and Principle 3 in EE validate the “Growth and underinvestment” archetype, recognizing a demand and growth potential from conversion and investment to technology and skills enabling organic production. Note that increasing organic production as a strategy is highly contested in the academic debate, as for instance indirect land use change (more area is needed to produce the same amount of food) may outweigh the benefits from less intensive farming practices.

Investigating statistics and reports from the egg and broiler FS, the case does not seem to be as clear-cut. For broiler meat, the demand of organic production is the lowest for all animal food production, and barely 1% of the total production is organic. This is motivated by the major challenges in regulation resulting in substantially higher prices for organic broiler meat. The inflated production costs are mainly associated with occupancy rate and access to outdoor living, which increases the risks of infections and disease spreading (Jordbruksverket, 2019). Unfortunately, the organic broiler demand in Sweden has not kept up with its capacity. Farm organizations have observed difficulties to secure a market, and neither grocery stores nor public kitchens have ordered as much organic production as expected. It seems like the “Growth and underinvestment” archetype is not identified for the Swedish high-value broiler production as investment to new technology conversion for an organic product is not profitable (LRF, 2018).

For egg production the demand for organic eggs mainly increased in the first half of the last decade, and has stagnated or even decreased since 2018. At the same time, prices (especially on organic eggs) are stable over time. The Swedish farmers’ association (LRF) predict a future long- and short-term demand for organic eggs, with the security in long-term contracts for the FS. **The Swedish egg market is self-sufficient to a degree of 97.5% (Jordbruksverket, 2020b), and therefore does not react strongly to fluctuations in international market prices.** It remains to be seen how processed food containing eggs will relate to these developments, because as of now this trend concerns mostly fresh eggs.

Insecurity among farming system actors emerges from egg price uncertainty rather than from a fear of a lack of access to fodder. LRF also noticed that at times there is a shortage of organic eggs

in Sweden, with a market space to fill for Swedish farmers. One middle-way brought to attention by stakeholders in Denmark is an investment in technology and skills enabling organic production, but the possibility to keep conventional systems for times when the organic demand is low, or when fodder prices are high. This hybrid model allows farmers to stay adaptive to changes and shocks to the system beyond control (Henningsson, 2019). Over time, the prices of conventional eggs have been weakly decreasing while the prices for organic eggs instead have been weakly increasing in Sweden.

In line with our analysis, the consulted literature also recognizes a delay to the “Growth and underinvestment” archetype. In 2014 the market experienced a shift in demand for eggs by hens in cages to organic eggs, which made the FS stagnate. Due to this change in consumer demand, farmers rebuilt their stables. The Swedish market saw a drop in total production during this time, but picked up again in 2015, in connection with the stables being re-opened after the renovation (Jordbruksverket, 2020).

The second identified archetype in 3.2 is “Limits of success”, created from imbalances in market power. This was validated by our CS as local farmers witnessed of being by-passed by processors in favor for imports of e.g. organic eggs from Finland. Recent public debates in the FS have regarded a non-working dialog between the actors. The packing companies’ market knowledge on the one hand contributes to market balance, but the fact that there are few processors also limits the producer’s room for maneuver. Swedish broiler farmers have recognized a “culture of silence” with a sensitive position to lay out critique to the processors and packers. The farmers are worried that their bargaining position will deteriorate in times of contract renewals (Fréden 2019). Swedish egg producers instead recognized a non-existing dialogue between producers and processors, which makes agreements within the FS hard to reach (Henningsson, 2018). This validates the “Limits of success” system archetype, as producers experience a constraint to their potential performance due to the market imbalance. Moreover, extension of the archetype consulting further literature discovers imbalances of market power between other actors within the FS. Mainly, between retailers and producers. Voices from organic egg production in Northern Sweden experience a “bad” imbalance as local grocery stores are uninterested in their supply. At the same time, consumers are travelling far in distance to buy organic and locally produced eggs directly at the farms (Olsson, 2018). Retailers in this respect are “Limits of success” creating obstacles between the producer and consumer. On the other hand, a more level playing field exists since 2011, as retailers banned eggs from cages which is in line with stricter domestic regulation and overall trends. Pressure from retailers based on consumer demand pushed



producers to decrease the usage of cages in the whole production system (Jordbruksverket, 2020).

The “Success to the successful” archetype forecasts a better position at the international market for EU farmers not coping with same high restrictions and regulations as Swedish farmers. To validate this archetype, we can start by comparing prices across the EU market for our CS. Statistics from the Swedish government show that the Swedish price level for broiler production is notably higher and more volatile compared to the EU average. From 2017 to 2020, the Swedish broiler price was on average 35% above the EU market average. The Swedish price is roughly the same as the Danish market price, whereas Germany has the highest (and most stable) price level. Investigating the egg market, Swedish eggs are usually above the price level compared to other EU countries. However, since imports need to be salmonella controlled for non-Nordic countries, price levels in Denmark, Norway and Finland are more relevant (and transportation costs add to this relevance as well). Both Finland and Denmark had higher egg prices than the EU average. Yet, they were not as high as prices in Sweden (Jordbruksverket, 2019; Jordbruksverket, 2020). Comparing only the Nordic countries, Finland has the lowest price which validates earlier findings that Finland was perceived as a major competitor for eggs on the Swedish market. Incorporating imports and exports to the equation can give more hints whether foreign producers have an advantage that might arise from lower animal welfare standards.

The import of broiler meat has constantly increased over the last 10 years, and the Swedish self-sufficiency rate in 2019 was around 70%. The export of Swedish broiler amounts to 1/4 of the import. More than 50% of the imported broiler meat comes from Denmark, second are the Netherlands followed by Germany. In the last years, Sweden has had a declining trend in imports for all meat products, besides from broiler meat (Jordbruksverket, 2020). This statistic may serve as a validation of our “Success to the successful” system archetype for the broiler FS, since Swedish producers may have a harder time competing on the international market which could also be related to variation in regulation across the EU market. In contrast, Swedish egg production is self-sufficient to a large extent where almost the whole market consist of domestically produced eggs. This is partly due to high salmonella regulation in combination with high consumer awareness and low usage of antibiotics. Over the past 10 years, the imports has decreased by 2% while exports have increased with 81%, implying limited problems with competing at an international market. At the same time, import competition shouldn’t be underestimated as even if the imports are decreasing and the exports are rising, the membership to the European Union has caused food prices to drop in Sweden at the expense of domestic producers and to the benefit of domestic consumers. At times, poor animal welfare standards



abroad impact domestic prices. For instance, the Dutch scandal from 2017/2018 (pesticides were found in the fodder for laying hens) led to a price drop across the EU as a whole.

The trend in Swedish egg self-sufficiency differs from other Swedish food production systems, which normally do not have the capacity to compete with import prices (Jordbruksverket, 2020). In the case of the Swedish egg FS, we cannot validate the “Success to the successful” system archetype, as it Swedish egg farmers can compete at the international market fairly well, regardless of its high regulations and standards. Swedish eggs may even add a higher value at an international market, because of the high animal welfare (regulation), notwithstanding potential cost advantages farmers may even experience.

From consulting additional sources analyzing resilience attributes of the high-value Swedish egg and broiler production, other recent and important issues entered the discussion of this desk study. Today, the ongoing birth flu has affected the Swedish egg production massively. In January, the largest farm in Sweden was found infected and had to kill the entire stock of birds, eliminating 1/4 of the Swedish egg production from free-range hens. The debate has circled around self-sufficiency questioning the resilience of domestic egg production. According to the epizooti law, all egg producers who are affected by the bird flu are entitled to financial compensation from the government, covering the costs of the damage (Haraldsson, Liedberg and Martinsson, 2021). Even if the government can compensate farms, the system appears to be highly dependent on a few farms which allow the bird flu to affect the Swedish total supply. In D2.1 of Work Package 2, Swedish actors perceived future challenges to the farm of “Pest, weed, or **disease outbreaks**” to 4.62 (SE 1.64) on a scale of 1-7. Swedish farmers rated both “Persistent extreme weather events” and “Limited availability of skilled farm workers” as larger risks to the FS resilience capacity (Spiegel, 2017), highlighting a blind spot in the awareness and risk perception of tail risks/low probability events. This could be identified in the “Shifting the burden” archetype, which relates to Principle 1 for a resilient EE, as the quickly implemented solution (B1) to the problem symptom is killing all infected birds and the rest of the farm in order to inhibit the outbreak, leading to a low total supply at the domestic egg market. The fundamental system failure might, however, be traced to market dependency on large-size farms which makes the whole FS sensitive to shocks. Large size farms with many animals (hens) are also more exposed to disease spreading as the probability to get affected increases.

The decrease in organic demand for egg products, and the slow growth in demand for organic broiler meat can probably to some extent be explained by an overall Swedish consumer demand for vegetarian and local actors through the value chain. Egg has for a long time been used as an



environmentally friendly protein source, while broiler production has a disadvantage in Vego-movements. Generally, Swedish consumers have a lower trust in broiler production than in egg production which might have emerged from animal rights campaigns and previous scandals in the FS (Andersson, 2018).

Validation of system archetypes

Section 3 underlines specific patterns of behavior in the CS over time which gives the FS a chance to respond proactively. The challenges identified in the system archetypes in T6.1 and T6.2 originate from the same system failures, while we have identified different system archetypes at our level of understanding. These challenges are dynamic in its nature, showing multiple and complex causes to the problems, but also multiple solutions. The recognition of the system archetypes also depends on how the farmers phrase and perceive targets and goals. In T6.1, the goals identified were to a larger extent directly targeting social and environmental impacts of the FS, as sustainable production and high quality food with indirect impact on economic values as farmer's viable income. The goals identified in T6.2 focus more directly on reducing gaps to production, international competition and constraints directly associated with economic values of the FS. Moreover, the archetypes and the validation conducted in T6.2 distinguish between the conditions prevailing in the egg and the broiler production.

While some parts of the identified system archetypes in T6.1 and T6.2 are recognized outside of the CS, support to others have been absent or even demonstrated as the opposite. The purpose and structure of the system archetypes provide a tool to find patterns of behavior within an organization or to a business issue. Different actors in the FS experience different challenges when it comes to ensuring the resilience of Swedish egg and broiler production, and therefore also need diverse system thinking tools. Applying the archetypes to a whole FS enables us to evaluate the structure, but might get too abstract when searching for a generic solution. Often, the system archetypes can be validated by parts of the FS (broiler/egg producers, small-size/large-size farms, conventional/organic production) but do not bring clarity across the actors within the whole FS. Identifying the system archetypes and make them accessible to the system gains applicability, but loses to the evaluation process below the surface. The structure of the FS is complex, and while some system failures can be traced throughout the system, future planning for finding solutions need to be customized for particular parts of the FS. The example of the bird flu has also revealed weaknesses looking forward when tail risks are at play.



Actions for an enabling environment

Until now, the level of understanding has allowed us to find patterns to grasp the commonly mentioned challenges the high-value egg and broiler production in Sweden faces. In this section, we have created a list of strategies and actions based on the results from the desk study. The system archetypes define actors, and how they relate to resilience attributes, to best contribute to an EE for the FS.

Table 14.2 Strategies by actors of the farming system to solve on system archetypes contributing to principles for resilience enabling environment and resilience attributes

Action/actor	Source	Contribution to resilience enabling principles/archetype	Contribution to resilience attributes
Formulate action and which actor might be responsible	SURE-Farm deliverable	Indicate archetype this action will solve/prevent and how, and to which principle this action might contribute and how	Indicate to which resilience attribute(s) this action might contribute and how
Farmers, NGOs (animal welfare campaigns, campaigns), national government/local government (public procurement)	Desk study T6.2: economic and environmental challenge	“Growth and underinvestment” Key factors to prevent the system archetype is to foreseen trends to consumer behaviour, climate and sustainability competitiveness.	Robustness/adaptability
Farmers, Processors (slaughter houses, packers), national Government (market power)	Desk study T6.2: economic challenge	“Limits of success” Foster a balanced relationship between the actors, encouraging a local production with mutual dependence.	Adaptability
EU/national regulation, Ministry of Innovation and Entrepreneurship	Desk study T6.2: economic and social challenge	“Success to the successful” International regulation should encourage a healthy competition and sustainability standards.	Transformability/robustness

National governments (regulation), societal (vision on farming), advisors, institutions	CS report T6.1: social, economic and environmental challenge	“Drifting goals” Solutions to trade-off between producing high quality products in a sustainable manner.	Adaptability/ transformability
Farmers, National governments, EU (regulation, disease prevention)	Desk study T6.2: economic, social	“Shifting the burden” Market dependency on few actors makes the system vulnerable	Robustness

As one part of the Swedish Food Strategy, the government aims to increase the share of organic food production. A financial support of 50 million Swedish Crowns (2018-2020) was distributed to enable Swedish farmers to convert from conventional farming to organic. The Federation of Swedish farmers also provides non-financial support in form of knowledge exchange and education to farmers who want to transform their farms to organic production. These examples can be read as evidence in favor of the FS enabling environment support in line with the “Growth and underinvestment” archetype, hence contributing to the transformability of the FS. The Swedish government also has set the goal to increase organic food exports. To reach this goal, they have invested in non-financial support as education regarding international markets, campaigns for foreign expansion, and providing advice to farmers. It is possible, however, that the support mainly benefits the broiler farmers, which according to this study, experience more fierce foreign competition (see “Success to the successful” system archetype).

Roadmap

The instructions can be visualized through a roadmap, incorporating domains, challenges and resilience attributes, and its dynamic relationship based on previous findings (see figure 14.4). One pivotal insight from this desk study is the spill-over effects from one system failure to another. The roadmap gives concrete recommendations where the identified system archetypes spans through multiple dimensions of challenges to the FS and relate to the generic EE’s.

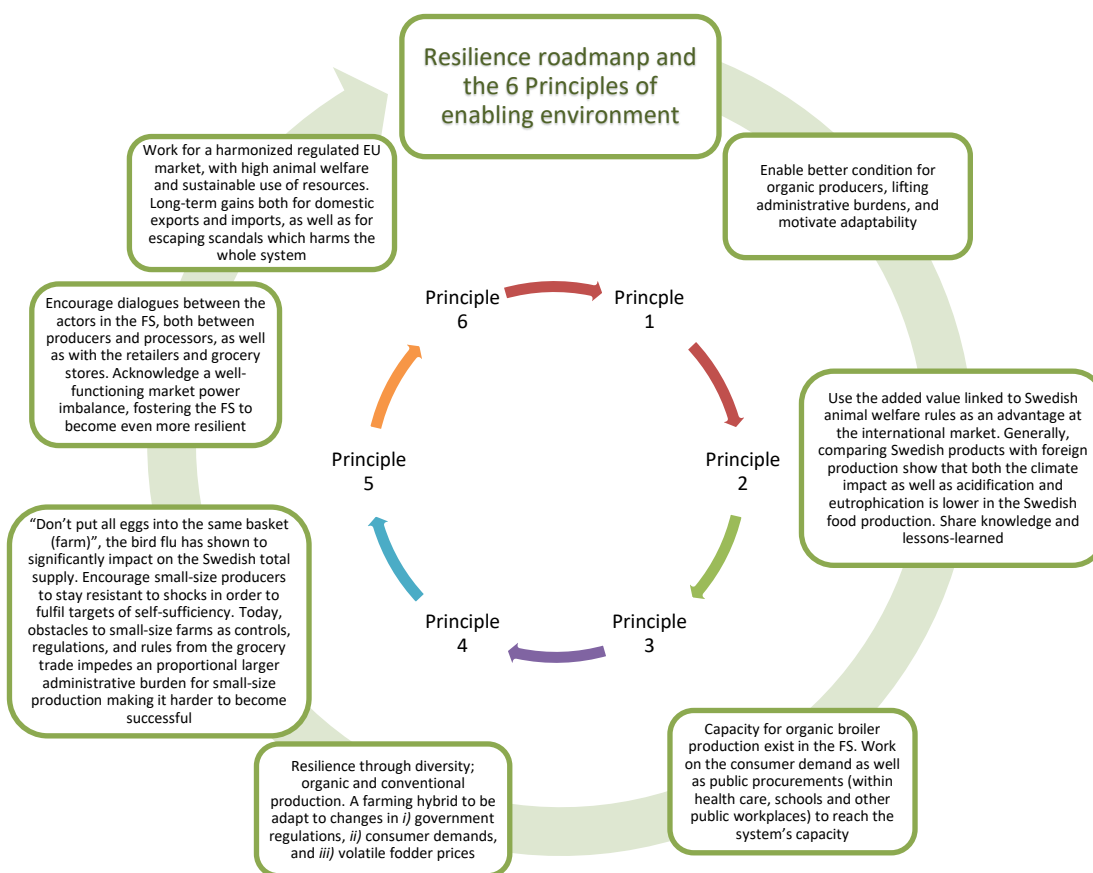


Figure 14.4. Resilience roadmap and six principles of enabling environment.

Discussion

Factors such as “openness”, “modularity” and “response diversification” are among the main attributes that explain the EE of the FS in the Swedish CS. The Swedish FS has demonstrated great resilience in many aspects and factors as an entrepreneurial mind-set, constant technology adoption, proactive and pragmatic actors, seeking advice for updating knowledge and information are only some attributes that characterize the system.

Governmental actors, farmers’ organization, processors, influencers on social media, and animal rights movements play major roles in the system archetypes identified for the FS. Below follows an assessment of their future roles as important actors building on previous identified patterns and behaviour.

In future strategies, the government is identified to continue to play a key role in the EE for the FS. Both, imposing corrective regulation at the domestic market, as well as pushing for balanced standards at the EU level, will be essential for the development of the Swedish high-value egg and broiler market. Efforts in creating forward looking strategies in cooperation with farmers, accompanied by financial and non-financial support to reach the goals of the Swedish Food Strategy and to achieve robustness of the FS should continue. Making it easier for organic and/or small-size farms to operate by limiting the administrative burden should also be a focus area in order to secure the sector's self-sufficiency as a strength. The government has an important role to future resilience in robustness and transformation and to integrate at some level to all the desk-study identified system archetypes.

Egg and broiler meat associations play an intermediate function in the system. As we have identified discrepancy in the dialog between actors in the system, these associations will have an important future role in dealing with imbalances and to increase the bargaining power of farmers. When a constraint limiting the success emerges from non-competitive farm gate prices, the shock to the farmer's performance has already occurred. In line with Principle 2 for a resilient EE, anticipatory capacity can be built by dealing with farm gate prices and imbalances before the market power play out its role. Finding a path for harmonization today within the FS should be prioritized, contributing to resilience facing the "Limits to success" archetype in the future. This may also require sector-specific capacity development in competition authorities.

Swedish consumers' awareness for high quality products is high. The focus on the price that has been the driver of the demand for food products for a long time is now combined with forces of consumer demand contributing to a more sustainable production and consumption of food. "Growth and underinvestment" guidelines pinpoint the importance to anticipate future demands, as stated in Principle 3 for a resilient EE. As discussed by several actors within the FS, the expected requests from both consumers, policy-makers and governmental bodies will continue to be directed towards organic and local production. Therefore, capacity investments in technology enabling organic production allows farmers to keep up with future demand, regulations and competitiveness. It is important to be forward-looking and take actions to solve the scenario, eliminating factors while the farmers still has the resources. The leverage point lies in boosting the domestic farm production, which additionally may solve some of the unbalanced relations with processors and slaughters that by-passes local farmers in favour for organic products. Therefore, focusing on strategies meeting a sustainable use of resources and high quality products will enable farms to stay robust to future consumer demands. This may not only involve a shift



towards more organic consumption. Adopting a food system perspective to these challenges may be needed to achieve better outcomes for everyone.

Conclusions

Under the umbrella framework of System Archetypes by Kim (2000), we have identified additional patterns of behaviors in a desk study of the Swedish egg and broiler production FS. Technological capacity and organic production have been identified as the major “engines of growth” in the CS. It is also within this capacity that the FS finds its largest system failures (“Growth and underinvestment”, “Limits to success”, “Drifting goals”). The roadmap for T6.2 pinpoints the need of synergy in regulation, flexibility to consumer demand, and a healthy competition as the major needs for future strategies (accompanied by continued technology adoption). Different actors within the FS are exposed to different failures, with demand for sustainability in food consumption as the most severe for the producers, healthy and competitive regulations for the government bodies, and strengthening the bargaining power and relationship across the FS for the egg- and broiler meat associations. Identifying financial and non-financial resources enabling the environment for the FS display a source to defeat patterns of system failures when they are used as a tool mastering future strategies to achieve resilience in the Swedish FS. Additional actions for a resilient EE could have been identified by a workshop or in-depth interviews with particular stakeholders.



References

- Andersson, J. 2018. "Svenska kycklingar är friska och välmående" Land Lantbruk (LRF), published April 14, 2018 [accessed 20210414 <https://www.landlantbruk.se/debatt/svenska-kycklingar-ar-friska-och-valmaende/>]
- Cabell, J.F., Oelofse, M., 2012. An Indicator Framework for Assessing Agroecosystem Resilience. Ecol. Soc. 17, 18. <https://doi.org/10.5751/ES-04666-17011>
- Ekologisk livsmedelsmarknad, rapport om den ekologiska branchen sammanställd av Ekoweb.nu. Ekoweb, 30 Januari 2020 [accessed 20210414 <http://www.ekoweb.nu/?p=11247>]
- Fredén, J. 2019. "Kronfågel kritiserar för tystnadskultur", Land Lantbruk (LRF), published September 27, 2019 accessed 20210412 <https://www.landlantbruk.se/lantbruk/kronfagel-kritiserar-for-tystnadskultur/>
- Haraldsson, L., M. Liedberg and E. Martinsson. 2021. "Jättelika hönsfarmer bäddar för äggbrist" Svenska Dagbladet, Debatt. 2021- 03-26. [accessed 20210413 [Äggproducenter: Jättelika hönsfarmer bäddar för sjukdom | SvD](https://www.svd.se/aggproducenter-jattelika-honsfarmer-baddar-for-sjukdom)]
- Henningsson, M. 2018. "Äggproducenter går på knäna efter ökade foderpriser", Land Lantbruk (LRF), published September 4, 2018 [accessed 20210412 <https://www.landlantbruk.se/lantbruk/aggproducenter-gar-pa-knana-efter-okade-foderpriser/>]
- Henningsson, M. 2019. "Överskott på ekologiska ägg i Danmark" Land Lantbruk (LRF), published August 5, 2019 [accessed 20210412 <https://www.landlantbruk.se/lantbruk/overskott-pa-ekologiska-agg-i-danmark/>]
- Jordbruksverket, 2019. Lannhard Öberg, Å. Marknadsrapport Matfågel - utveckling till och med 2019. Livsmedelskedjan och Exportenheten. Jönköping, May 2019
- Jordbruksverket, 2020. Lannhard Öberg, Å. Marknadsrapport – Ägg – utveckling till och med 2019. Livsmedelskedjan och Exportenheten. Jönköping, June 2020
- Jordbruksverket. 2020b. 'Marknaden för ägg. Jordbruksverket, Sverige.
- Kim, D.H. 2000. *Systems archetypes I. Diagnosing Systemic Issues and Designing High-Leverage Interventions.*: Pegasus Communications.
- Mathijs, E., Bijttebier, j., Accatino, F., Feindt, P., Gavrilescu, C., Manevska-Tasevska, G., Meuwissen, M., Ollendorf, F., Peneva, M., San Martín, C., Severini, S., Spiegel, A., Vigani, M., Zawalińska, K., Wauters, E., (2021). D6. 2 Report on combinations of conditions for successful and unsuccessful fostering of resilience in agricultural sectors. Sustainable and Resilient EU Farming Systems (SURE-Farm) Project Report, EU Horizon 2020 Grant Agreement No. 727520.
- Paas, W., Accatino, F., Bijttebier, J., Black, J.E., Gavrilescu, C., Krupin, V., Manevska-Tasevska, G., Ollendorf, F., Peneva, M., San Martin, C., Zinnanti, C., Appel, F., Courtney, P., Severini, S., Soriano, B., Vigani, M., Zawalinska, K., van Ittersum, M.K., Meuwissen, M.P.M, Reidsma, P., 2021. Participatory assessment of critical thresholds for resilient and sustainable European farming systems. Submitted to Journal of Rural Studies.

- Olsson, E. 2018. "Säljer äggen i äggbod – annars ingen efterfrågan" Affärsliv, published March 19, 2018 [accessed 20210412 <https://www.vk.se/2018-03-19/saljer-aggen-i-aggbod-annars-ingen-efterfragan>]
- Spiegel, A., T Slijper, Y. De May, M. Poortvliet, J. Rommel, H. Hansson, M. Vigani, B. Soriano, E. Wauters, F. Appel, F. Antonioli, H. Harizanova, C. Gavrilescu, P. Gradziuk, D. Neumeister, and M. Meuwissen. 2017. "D2.1 Report on farmers' perceptions of risk and resilience capacities comparison across EU farmers. Sustainable and Resilient EU Farming Systems (SURE-Farm) Project Report, EU Horizon 2020 Grant Agreement No. 727520
- The Swedish Food Strategy, (2017) "En livsmedelsstrategi för Sverige – fler jobb och hållbar tillväxt i hela landet" Näringsdepartementet/Ministry of Enterprise, Regeringen/Swedish Government Office, 2017 [accessed 20210406 [handlingsplan_lms_1702072.pdf \(regeringen.se\)](#)]



15 Implementation roadmap for the implementation of enabling environment principles in France (extensive beef production in Bourbonnais)

Introduction

Table 15-1. Workshop introductory data

Date	March 26 th , 2021 and April 6 th , 2021
Venue	On-line
SURE-Farm team involved (names)	INRAE

Table 15-2. Participants to workshop 1

Discipline	Gender
Aude - Agronomy	F
YD - Agronomy	M
PM - Agronomy	M
Mourad – Management Sciences	M
JMM – Agronomy & Conception sciences	M
MLB – Agronomy & Conception sciences	F
PL – Animal sciences	M
AH – Animal sciences	M
SP – Animal Sciences	F
LP - Ergonomy	F
MC – Agronomy and modelling	M
VS - Modelling	F

Table 15-3. Participants to workshop 2

Institution	Gender
Coop de France	M
Network Inosys BV	M
IDELE	F

Deviations from guidelines:

- *Two workshops organized*

The difficulty to have 10 stakeholders at the same time in the period was the main cause of deviation from the guidelines. Three stakeholders could be involved for a participatory workshop.



In order to gain more insights, the following solution was adopted. A first participatory workshop was run on march 26th involving INRAE member. The team where the author of this report works is interdisciplinary with researchers in zootechnical, agronomic, and also social sciences. The purpose of this first workshop was to consolidate the archetypes depicted for deliverable D6.2 and to generate a first set of ideas. A second workshop was organized on April 6th involving 3 stakeholders/experts of the Bourbonnais region and in general of the Massif Central (which is very homogeneous and similar to the Bourbonnais region). The first workshop turned out to be a very good basis for generating the discussion for the second. In case of contradictions between the first and the second seminar, the priority was given to the second workshop as the participants had a more concrete experience with the case study region. In the first workshop we had the time to discuss two archetypes (related to droughts and to social distrusts of agricultural practices), in the second workshop all the archetypes were discussed (droughts, social distrust, difficulty to find successors, low beef prices).

- *Usage of MURAL*

The first workshop was done with the help of the platform MURAL (the final voting was replaced by a general debate). The second workshop was done without MURAL and was more a discussion. One facilitator explained the challenges and the archetypes related to it, triggering the discussion also with inputs from the first workshop, and in the meanwhile another facilitator filled tables on a shared screen indicating the strategies and the actor involved for contrasting each challenge. For each challenge, the archetype was presented (except for one challenge, see below) and participants were asked to react, then ideas for strategies were generated, and finally the facilitator asked to indicate the most important strategy to put in place in the study region.

- *One challenge without archetype*

We decided to present also the challenge related to the demography, consisting of the difficulty of finding farmer successors in the study region. In D6.2 the challenge was not associated to any of the archetypes, because at the moment it has not reached the climax (nevertheless it was described). We decided to submit this challenge to workshop participants, and it turned out to be one of the most important issues for taking action.



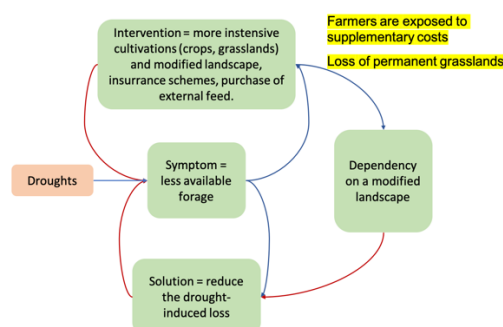
Farming system and enabling environment

Table 15.3. Actors and its enabling environment (institutions and resources) in the Bourbonnais

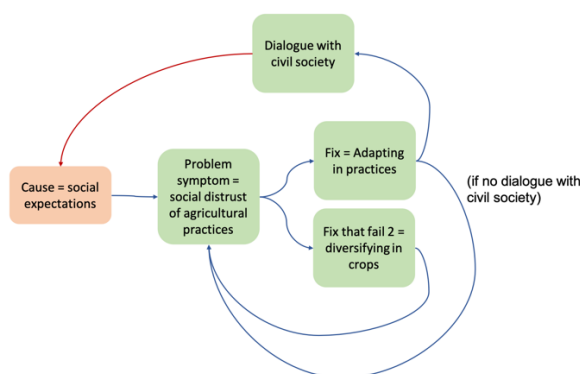
Actors	Formal institutions	Informal institutions	Financial resources	Non-financial resources
Enterprise domain: Slaughterhouses, retailers, banks, insurance companies, veterinaries	Confederation des Paysans, Conservation associations (e.g., Mission Haies Bocage), cooperatives	Attitude to cooperation Attitude to retail	Insurance schemes, loans	Dialogue in the value chain
Government domain: European Union, French Ministry of Agriculture, French Ministry of Economy, Chamber of Agriculture of Allier, Department of Allier, Municipalities.	CAP, INAO (for label production)	Accountability Farmer participation Societal participation	Aids for farmers, funding	Promote dialogue in the value chain, communication
Intermediary domain: Value chain actors for French non-local market, value chain actors for export market.	Interbev (inter-professional organization), FNB (Fédération nationale Bovine), trade unions organizations			Promote dialogue in the value chain, communication
AKIS domain: IDELE, INRAE, VetAgro Sup, Advisors				Advise
Societal domain:		Local consumers, Italian consumers, French non-local consumers, vegan movement		Willingness to pay

Validation of system archetypes

The archetypes submitted to workshop participants (reported here as figures) received partial confirmation.



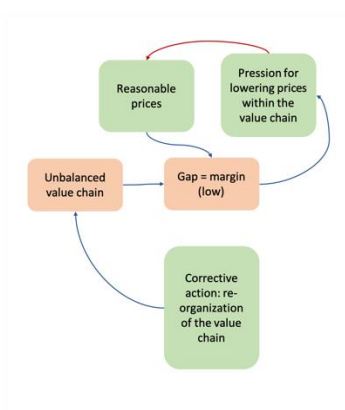
The archetype (fixes that fail/shifting the burden) related to the challenge “droughts” was overall accepted in Workshop 1, however, in Workshop 2 it received some comments. The main comment was that it is not very correct to present “intensive cultivations” as something that destroy the landscape: **the landscape remains grassland-dominated even if a small fraction of it is cultivated with crops or grassland**. Furthermore, it would be more correct to speak about “sustained” or “optimized” cultivation as it would not require a very high nitrogen input; indeed, keeping a part of the landscape for “sustained” cultivation was suggested in Workshop 2 as a resilience-enabling strategy. In particular, the participants to workshop 2 confirmed the role of agroforestry in protecting the landscape from droughts (explaining that in the regions agroforestry was already applied in some cases with good results)



The archetype “fix that fail” related to the challenge “social distrust” was criticized mostly in workshop 1 especially for the **lack of precision in some terms**: what is exactly “civil society”? What



is exactly criticized among the practices? How to define “dialogue with the civil society”? In the region of Bourbonnais, are problems only related to cattle farming? Are all the forms of cattle farming criticized? In workshop 2 the main critic made was that **this problem is not something specific to the Bourbonnais region**, but something related to the animal production sector and to agriculture in general. In workshop 2 it was remarked that this is something for the enabling environment, as farmers alone cannot compete against some forms of communication against livestock farming.



The archetype “eroding goals” (boiling frog) related to “low prices” was discussed only in workshop 2. It was overall accepted in its form, however the corrective actions suggested were **not only related to re-organization of the value chain but also on the communication and valorization of product quality**.

The challenge “difficulty to find successors” was not related to any archetype in D6.2 because still it is something not happening. However, this challenge was discussed and remarked as something to be anticipated, as more than 50% of the farmers in the region are more than 50 years old. The challenge was therefore discussed and some strategies were suggested.

Overall, the challenges considered most relevant for immediate actions for the Bourbonnais region were “droughts”, “difficulty to find successors”, and “low prices”, being “social distrust” something not strictly specific to the study region.

Actions for an enabling environment

Ideas are exposed starting from the strategies considered most urgent for the farming systems (droughts, low prices, and difficulty to find successors) while ideas related to the social distrust are put at the end. In workshop 1, at the end of the discussion dedicated to each challenge, we asked to participants to indicate the most important strategies for contrasting the challenge and for promoting the good resolution of the archetype. These ideas are highlighted in green.

Table 15-4. Actions/strategies by actors of the enabling environment/farming system to act/solve on system archetypes contributing to principles for resilience enabling environment and resilience attributes

	ACTION/ACTOR	SOURCE	Contribution to resilience enabling principles/archetype	Contribution to resilience attributes
	FORMULATE ACTION AND WHICH ACTOR MIGHT BE RESPONSIBLE	SOURCE (WORKSHOP; SUREFARM DELIVERABLE; OTHER LITERATURE)	INDICATE ARCHETYPE THIS ACTION WILL SOLVE/PREVENT AND HOW, AND TO WHICH PRINCIPLE THIS ACTION MIGHT CONTRIBUTE AND HOW	INDICATE TO WHICH RESILIENCE ATTRIBUTE(S) THIS ACTION MIGHT CONTRIBUTE AND HOW
Droughts	More sustained management of surfaces	WORKSHOP 2	P3, BECAUSE IT CHANGES THE SYSTEM SO TO MAKE IT MORE ROBUST TO FUTURE DROUGHTS	IN TRADE-OFF WITH “PRODUCTION COUPLED WITH LOCAL AND NATURAL CAPITAL” BECAUSE IT INCREASES MINERAL NITROGEN INPUT AND DECREASES GRASSLANDS, HOWEVER, IT IS RELATED TO A GENERAL STRATEGY OF DIVERSIFICATION, AND THEREFORE ENHANCES “FUNCTIONAL DIVERSITY”, “RESPONSE DIVERSITY”, “SPATIAL AND TEMPORAL HETEROGENEITY OF FARM TYPES”
	Agroforestry	WORKSHOP 1 AND 2	P3, BECAUSE IT CHANGES THE SYSTEM SO TO MAKE IT MORE ROBUST TO FUTURE DROUGHTS	A NATURE-BASED SOLUTION, THEREFORE IN LINE WITH “PRODUCTION COUPLED WITH LOCAL AND



		AND P4 BECAUSE IT IS A FORM OF DIVERSIFICATION	NATURAL CAPITAL" AND A DIVERSIFICATION STRATEGY, THEREFORE ENHANCING "FUNCTIONAL DIVERSITY", "RESPONSE DIVERSITY", "SPATIAL AND TEMPORAL HETEROGENEITY OF FARM TYPES"
Optimization of herd management	WORKSHOP 2	P3, BECAUSE IT CHANGES THE SYSTEM SO TO MAKE IT MORE ROBUST TO FUTURE DROUGHTS	THE OPTIMIZATION OF THE HERD WOULD BE AN ADAPTATION TO THE CLIMATE CHANGE, THEREFORE "PRODUCTION COUPLED WITH LOCAL AND NATURAL CAPITAL"
Pluriannual contracts for different crops	WORKSHOP 2	P3, BECAUSE IT CHANGES THE SYSTEM SO TO MAKE IT MORE ROBUST TO FUTURE DROUGHTS AND P4 BECAUSE IT IS A FORM OF DIVERSIFICATION	THIS STRATEGY IS MONETARY IN ITS FORM ("REASONABLY PROFITABLE") AND WOULD PROMOTE DIVERSIFICATION ("FUNCTIONAL DIVERSITY", "RESPONSE DIVERSITY", "SPATIAL AND TEMPORAL HETEROGENEITY OF FARMS"). OVERALL IT IS AIMED AT SUSTAINING RURAL LIFE (SUPPORTS RURAL LIFE")
(Slightly) change the production	WORKSHOP 1 AND 2	P3, BECAUSE IT CHANGES THE SYSTEM SO TO MAKE IT MORE ROBUST TO FUTURE DROUGHTS AND P4 BECAUSE IT IS A FORM OF DIVERSIFICATION	DIVERSIFICATION: "FUNCTIONAL DIVERSITY", "RESPONSE DIVERSITY"
Building water reserves	WORKSHOP 1 BUT PUT IN LOWER PRIORITY IN WORKSHOP 2	NOT RELEVANT BECAUSE FINALLY THIS STRATEGY WAS DISCARDED	NOT RELEVANT BECAUSE FINALLY THIS STRATEGY WAS DISCARDED
Valuing the extensive character of the region, already producing quality - labelling	WORKSHOP 2	P4, QUALITY IS A FORM OF DIVERSIFICATION OVER QUANTITY	THIS WOULD STRENGTHEN THE LINKAGE TO THE NATURAL CAPITAL ("PRODUCTION COUPLED WITH LOCAL AND NATURAL CAPITAL") AND WOULD ADAPT RULES AND LAWS TO THIS ("LEGISLATION COUPLED WITH LOCAL AND NATURAL CAPITAL")
Valuing the extensive character of the region, already producing	WORKSHOP 2	P4, A FORM OF DIVERSIFICATION OVER QUANTITY	A FORM OF DIVERSIFICATION: "FUNCTIONAL DIVERSITY"

quality – characteristics of the animals				
Contractualization	WORKSHOP2	P5, CONTRACTUALIZATION IS A FORM OF REVENUE SECURIZATION THAT ALLOWS FARMERS TO THINK IN THE LONG TERM	MONETARY STRATEGY: “SUPPORT RURAL LIFE” “REASONABLY PROFITABLE”	
In-depth understanding of the functioning of the value chain	DELIVERABLE D6.2	P6, BECAUSE IT IS ABOUT UNDERSTANDING THE MECHANISMS AND THE VULNERABILITY OF THE SYSTEM	PROMOTES SOCIAL DIALOGUE “SOCIALLY SELF-ORGANIZED”	
Promotion of dialogue and transparency within the value chain – value chain plan	DELIVERABLE D6.2	P5: IT IS A FORM OF LONG-TERM INVESTMENT	PROMOTES SOCIAL DIALOGUE “SOCIALLY SELF-ORGANIZED”	
Keep the production potential (= do not remove e.g. slaughterhouses)	WORKSHOP2	P5, THIS ACTION RELATES TO NOT REMOVING BIG STRUCTURES THAT WOULD HARDLY BE PUT BACK. THE CHOICE OF KEEPING THEM IS A BALANCE BETWEEN PRESENT AND FUTURE	THIS STRATEGY CONCERNS THE SUSTAINMENT OF THE PRODUCTION POTENTIAL IN THE REGION, THEREFORE “SUPPORTS RURAL LIFE”. THIS INVOLVES ALSO MAINTAINING THE LINKAGES WITH THE APPROPRIATE ACTORS (“APPROPRIATELY CONNECTED WITH ACTORS OUTSIDE THE FARMING SYSTEMS”)	
Do not put value chains in competition (e.g., milk vs beef)	WORKSHOP2	P6: THIS REQUIRES AN UNDERSTANDING OF THE FUNCTIONING OF THE VALUE CHAINS	THIS IS ABOUT SUSTAINING BEEF PRODUCTION (“SUPPORTS RURAL LIFE”) AND ADAPTING POLICIES OF DIFFERENT AGRICULTURAL SECTORS (‘DIVERSE POLICIES’)	
Better land prices	WORKSHOP2	P3, THIS IS A CHANGE IN ORDER TO REDUCE DEBTS IN THE FUTURE FOR FARMERS	MONETARY STRATEGY: “REASONABLY PROFITABLE”, ‘SUPPORTS RURAL LIFE’	
Communicating on the positive aspects of livestock farming	WORKSHOP2	-	AIMED AT BUILDING CONNECTIONS: “APPROPRIATELY CONNECTED WITH ACTORS OUTSIDE THE FARMING SYSTEMS” AND A POLICY INITIATIVE AIMED AT VALORIZING THE QUALITY OF	

			THE TERRITORY: "LEGISLATION COUPLED WITH LOCAL AND NATURAL CAPITAL"
Encouraging new installations (economic prizes)	WORKSHOP2	P1, BECAUSE THIS ECONOMIC RESOURCES ALLOWS BEGINNERS TO START THEIR ACTIVITY OVERCOMING THE INITIAL DEBTS	MONETARY STRATEGY: "REASONABLY PROFITABLE", "SUPPORTS RURAL LIFE"
Securing the revenue of beginners	WORKSHOP2	P5, THIS ACTION RELATES TO MAKING THE FARMERS ABLE TO THINK IN THE LONG TERM	MONETARY STRATEGY: "REASONABLY PROFITABLE", "SUPPORTS RURAL LIFE"
Diversifying production	WORKSHOP2	P4, ABOUT THE DIVERSIFICATION OF PRODUCTION	A FORM OF DIVERSIFICATION: "FUNCTIONAL DIVERSITY", "RESPONSE DIVERSITY", "SPATIAL AND TEMPORAL HETEROGENEITY OF FARMS"
Create new professions (e.g., administrative aspects of farming)	WORKSHOP2	P4, THE CREATION OF NEW PROFESSIONS LEADS TO DIVERSIFICATION FOR ATTRACTING MORE PEOPLE IN THE REGION	A FORM OF DIVERSIFICATION IN THE PROFESSIONS ("FUNCTIONAL DIVERSITY", "SPATIAL AND TEMPORAL HETEROGENEITY OF FARMS") BUT ALSO BUILDING NEW SOCIAL LINKS, COMPETENCES AND INNOVATIONS ("SOCIALLY SELF-ORGANIZED", "INFRASTRUCTURE FOR INNOVATIONS", "BUILDS HUMAN CAPITAL")
Short value chains	WORKSHOP 1 AND 2	P4, EVEN IF MAINTAINING SHORT VALUE CHAIN OVER TIME CAN BE CHALLENGING, THEY REPRESENT A FORM OF DIVERSIFICATION	FORM OF DIVERSIFICATION ("FUNCTIONAL DIVERSITY", "SPATIAL AND TEMPORAL HETEROGENEITY OF FARM TYPES"), BUT ALSO A MATTER OF FINDING CONTACTS AND NETWORKING ("SOCIALLY SELF-ORGANIZED", "APPROPRIATELY CONNECTED WITH ACTORS OUTSIDE THE FARMING SYSTEM")
Developing tourism	WORKSHOP 1 AND 2 – ALSO PREVIOUS DELIVERABLES AND DESK STUDIES	P4, TOURISM IS A FORM OF DIVERSIFICATION THAT CAN BE PUT ALONGSIDE AGRICULTURE IN THE REGION	PROMOTES RURAL VITALITY ("SUPPORTS RURAL LIFE"), BUILDS NEW SOCIAL LINKS ("SOCIALLY SELF-ORGANIZED"), GIVES THE OPPORTUNITY FOR INNOVATING ("INFRASTRUCTURE FOR INNOVATIONS"), PROMOTES INTER-SECTORIAL POLICIES ("DIVERSE POLICIES") OVERALL AIMED AT PROMOTING THE NATURAL CAPITAL

D6.4. Implementation roadmaps for the implementation of enabling environment principles



School canteen open to local products	WORKSHOP 1	P4, FORM OF DIVERSIFICATION	(“LEGISLATION COUPLED WITH LOCAL AND NATURAL CAPITAL”) CREATES SOCIAL LINKS (“SOCIALLY SELF-ORGANIZED”) AND PROMOTES NEW POLICIES FOR VALORISING LOCAL PRODUCTS (“DIVERSE POLICIES”, “LEGISLATION COUPLED WITH LOCAL AND NATURAL CAPITAL”)
Give the basis of agriculture in generic schools (education)	WORKSHOP 1	-	ABOUT INSTRUCTION AND KNOWLEDGE SPREADING (“BUILDS HUMAN CAPITAL”)
Promoting good practices	WORKSHOP 1	P6, THIS IS ABOUT GETTING TO KNOW THE SYSTEM AND PROMOTING ITS CHARACTERISTICS IN HARMONY WITH SOCIETY’S EXPECTATIONS	VALORISATION OF THE PRACTICES IN THE REGION (“LEGISLATION COUPLED WITH LOCAL AND NATURAL CAPITAL”)



Some explanations are given for understanding the table.

Droughts – archetype: addiction.

Concerning droughts, participants to workshop 2 considered that the most relevant strategy was a **“more sustained management of surfaces”**. The participants remarked that it is better to speak about “sustained” and not “intensive” because the overall landscape will remain grassland-dominated and dedicated to extensive beef production. This strategy will introduce maybe some mineral nitrogen, but it would mainly consist of a “smarter” and optimized management. Some examples are the following: producing more in spring rather than in summer (where water is mostly absent), introducing a small quantity of nitrogen fertilizer, including a part of cultivated grass to secure the feed stock. All of this, done moderately, should not impact the landscape, according to the participants of workshop 2. **Agroforestry** was mentioned in both workshops and was also an output of previous SURE-Farm activities: droughts are not only about lack of water, but also about burning sun. The presence of trees would alleviate this problem, improving the fertility of surrounding grass, keeping humidity, and giving possibility of diversification. **Optimization of the herd management** is actually aimed at its reduction. Participants of workshop 1 suggested that some aids should be given to compensate the loss of revenue for a reduced herd. Instead, participants of workshop 2 insisted on the need of optimization, finding way to produce more or less the same quantity, with less, for example, limiting the number of unproductive cows, optimizing the workload in relation to the number of cows. **Pluriannual contracts for different crops** include the possibility to include e.g., alfalfa and to promote the complementarity between livestock farmers and cereal farmers. The idea **“(slightly) change the production”** refers to small adjustment of the practices and of configurations, for example, breeding the Charolais cows (the main breed present in the farming system) with cows that become productive at younger ages. It is important that in workshop 1 participants mentioned the idea of **building water reserves**. Participants of workshop 2 indicated that such a strategy has a lower priority, because building a water reserve in the Bourbonnais constitutes a political choice. An infrastructure should be built for a big quantity of water and it is difficult and costly to make concrete: it was more recommended by participants to work on the adaptation of the system (strategies put in the table for this challenge).

Low prices – archetype: boiling frog

This challenge was discussed only in workshop 2. While in previous SURE-Farm deliverables (including D6.2), the attention was more posed on the unbalanced value chain, the participants to the workshop posed the attention mostly on the need of valuing the quality of the production.



Therefore, in Table 3-1, the strategies proposed in workshop 1 are highlighted in green while the information coming from D6.2 are still reported, as they are based on some media news and deserve some attention in relation to this challenge. **“Valuing the extensive character of the region, already producing quality – labelling”** and **“Valuing the extensive character of the region, already producing quality – characteristics of the animals”** would correspond to take the most advantage of the nature of the region based on extensive cattle farming and strongly based on quality. Labelling would give to the consumers an explanation of the increased price of beef and it is necessary to work on the valorisation of all the carcass. Characteristics of the animals refers to the necessity to produce smaller animals (of better quality), however this would provoke a trade-off because of the necessity to sell more expensive carcasses. It is important to mention that a difficulty arises from the fact that an important part of the production is exported to Italy. The Italian system is based on feedlots with cereal-based fattening. The Italian part of the value chain is not characterized by the same level of quality: it becomes therefore challenging to justify the higher price due to quality in the Italian market. This aspect needs further investigations. **Contractualization** is something already being made in the region and makes it possible for the farmer to have a longer-term vision of future costs and revenues. In France there are already some contractualization programs in line with the CAP: they should be made more operational for beef cattle. From D6.2 two more strategies are considered relevant and are therefore reported even if not discussed in the workshops. The **in-depth understanding of the functioning of the value chain** consists of a diagnosis (made by interprofessional organizations) about the mechanisms of the value chain, in order to understand how to fix elements and dynamics that lower prices paid to farmers. The **promotion of dialogue and transparency within the value chain (value chain plan)** corresponds to setting rules within the value chain for making it fairer for the farmers.

Difficulty to find successors – unidentified archetype

The participants of workshop 2 identified this challenge as very important to anticipate, because the system is going towards a demographic turnover in the next decades. If current farmers will not be replaced, there will be a collapse in the functioning of the farming system. One of the main suggested ideas was to **keep the production potential of the region**, even if the farmer population would show some decline. This means maintaining the capital necessary to sustain a food production. For example, removing a slaughterhouse (in the Bourbonnais there is a certified organic slaughterhouse, SICABA) would reduce possibilities and would be something hardly reversible. Related to the maintenance of the production potential, the participants also highlighted the importance of **not putting different value chains in competition**, especially the dairy and the beef value chains for minced meat and hamburger production. The initial investment is

usually something that discourage the starting of a new farming activity. In order to facilitate the setting up of beginners, it would be important to set **better land prices**, to **encourage new installations**, for example giving monetary incentives to young new farmers, and to find ways of **securing the revenue for new beginners** at least for the first years (verifying and sustaining the conditions of the existence of a market in the area, zero-rate loans). In order to maintain a good level of population in the region it is also important to **diversify the production** (not only beef but e.g., agroforestry or other activities) and to **create new professions**, for example the administration activity in the farm can be handled by new professionals.

Social distrust – fixes that fail

The challenge of social distrust was considered in the two workshops. The participants of the second workshop remarked that this challenge regards agriculture and livestock farming in general, and not specifically the Bourbonnais. Therefore, all the ideas proposed by participants of workshop 1 could be considered (participants were not specifically experts about the Bourbonnais region and, in this case, their general ideas applied). These ideas were not put in priority for the case study; however, this does not exclude their importance for agriculture. The most important remark from workshop 1 was about the clarity of terms “civil society”, “practices” (specifically, which practices are contested?), etc. In order to generate more targeted ideas, it would be beneficial to better define terms and to define segments of the society (e.g., vegans, consumers caring about the landscape). The most important consideration from workshop 2 was that for solving these archetypes the enabling environment is essential, as farmers alone cannot cope with societal preferences (“*David vs Goliath*”). Among the ideas, **developing short value chains** was suggested as a strategy that can improve the situation, even though there is a limit to that: not all the production can be delivered via short value chains and not all farmers developed these skills of finding and maintaining contacts in short value chains. This strategy also includes (suggested in workshop 1) selling on-line. The **development of tourism** can surely help bringing people in the area in order to improve their knowledge of the region and of the countryside. A strategy of this type would increase the cooperation between agriculture and other sectors. Local policy making can strengthen the synergies among agriculture and other potential of the region: tracks for hiking, cycling, horse riding, thermal spots. However, this strategy would address only a part of society sensitive to countryside environments. Making **school canteens open to local products** would allow farmers to have a certain market outputs and would educate to local products. More general strategies were proposed to improve the knowledge of the agriculture by all the population in general, by **giving the basis of agriculture in generic schools**; and to improve the knowledge and adoption of good practices (**promoting good practices**).



Discussion

Actors

Concerning the archetype “addiction” related to droughts, the main road suggested was to promote practices for adapting the landscape to droughts, with some optimization of the surface cultivation and of the herd, introducing - where needed - a small quantity of land cultivated in a more “sustained” manner. It was remarked that farmers are the most important actors to do so, therefore *every action in this sense should be made concrete by farmers*. The role of the enabling environment in the future should come in the form of advice (**cooperatives, advisors**) or from policy-making promoting form of contractualization in favor of diversification in the region (**policy-making at different levels – mostly at the regional level**). The actors whose role should be reduced are economic actors like insurance companies and banks, because the main strategy would be to help farmers optimizing and changing their practices and not relying on insurance schemes or aids.

Concerning the archetype “boiling frog”, related to low prices, if in the current situation much is put on farmers’ shoulders, more should be done in the future by policy-makers, interprofessional and professional organizations to better value the quality produced in the territory and make consumers to be willing to pay the fair price for it. Even though it was not mentioned in the workshops, it is relevant to remark some conclusions from the D6.2: the enabling environment should more and more act to have an in-depth understanding of the mechanisms of the value chain and act as a referee, in order to fix the mechanisms that make the value chain unbalanced. The strategies to cope with low prices would require a *coordinated action* of many actors (**policy-making - French and department level - interprofessional organizations, cooperatives, professional organizations**) in order to get to a well-balanced value chain that would value quality and remunerate farmers in a fair way. At moment, while some action is being taken (especially during the COVID-19 crisis, as described in D6.2), more should be done for having the actions coordinated. In addition, it is relevant to mention that the value chain should also be considered at the trans-national level (French-Italian): for this, it will be important to organize workshop with stakeholders having a vision of all the value chain and not only on the Bourbonnais region.

Concerning the difficulty to find successors, two points are relevant: this is a challenge for which nothing particular is being done at moment (therefore the participants of the workshop remarked on the importance of anticipation) and it is a challenge for which economic resources are mentioned necessary. Economic resources are necessary for allowing the installation of new



farmers, to overcome the initial indebtedness. The relevant actors are **policy-makers, in cooperation with banks and insurance companies** (for guaranteeing a revenue in the first years of the activity). Non-monetary actions would still require the intervention of public policy in the form of communication and in keeping the potential of production in the region.

Concerning the social distrust, a communication campaign is already in progress for some years about the sustainable practices in cattle farming (**interprofessional and professional organization**). However, participants of workshop 1 remarked that the form of communication should be always put in discussion and improved. Finally, it is important to remark the important role of consumers (relevant for the challenge “social distrust” and the challenge “low prices”): consumers have a key role in the enabling environment, and their behavior affects farmers’ revenue and quality of life.

Resilience principles

Based on the responses of the participants, it is possible to affirm that the most important principles to address are **P3, P4, and P5**. Principle P3 (addressing long-term trends and increasing future robustness) is in line with the strategies proposed to cope with droughts. The proposed way forward consists of making the system more adapted to future droughts through optimization of surfaces and herd management. Such management optimization is obtained mainly through diversification (diversified crops, diversified forms of production, etc.), therefore involving principle P4 (promoting a diversity of strategies). Diversification strategies in line with P4 are also the promotion of quality (over quantity) for improving prices, and creating new forms of professions and promoting tourism. Principle P5 (balancing short-term and long-term investments) is particularly important for assuring farmer successors. Short-term interventions are needed for helping new farmers starting their activity and assuring an income for them in the first years. Long-term investments are related to the maintenance of the production potential of the region. Strategies proposed are also in line with **P6** (in-depth understanding of the root of challenges and vulnerabilities), especially regarding fixes to improve the structure of the value chain and to understand the best forms of communication with civil society.

Resilience attributes

The most enhanced resilience attributes are those that relate to diversity: **“functional diversity”, “response diversity”, “spatial and temporal heterogeneity”**. These attributes are enhanced by the ideas for contrasting droughts, but also for contrasting low prices (promoting quality and not only quantity – in this case the most pertinent attribute will be **“diverse policies”**) and the other challenges (e.g., creating new professions, promoting tourism). Concerning the adaptation of



landscape to droughts, it is important to mention that some forms of diversification might be in trade-off with “**production coupled with the local and natural capital**” (participant suggested to cultivate a small part of the surfaces in a more sustained way). However, it is important to remark that the region will still be coupled with the natural capital and the form of diversification will not harm this important identity element of the region; on the contrary, it would sustain it. The participants of workshop 2 highlighted the need of valuing quality, and this is in line with “**legislation coupled with the local and natural capital**”, as well as other ideas like the development of tourism and allowing the access of farm production to school canteens. Finally, the main strategies aimed at sustaining the farmers population are in line with “**supports rural life**” as the purpose would be maintaining rural vitality. This would correspond to the application of principle **P5** balancing short-term strategies, mostly monetary (“**Reasonably profitable**”) and long-term strategies mostly aimed at creating social connections also outside the agriculture sector (“**Appropriately connected with actors outside the farming system**” and “**socially self-organized**”)

Resilience capacities

Participants of workshop 2 highlighted more than one time that for coping with the challenges, *a radical transformation will not be necessary*. Importantly, the region is expected to maintain its historical identity based on extensive, grassland-based beef cattle system. However, **adaptation will be necessary** in order to improve the conditions of farmers and to make the landscape more drought-tolerant. A more drought-tolerant landscape will also be more robust to individual drought events.

Conclusions

To make a nutshell summary, the main conclusion out of these two workshops for the Bourbonnais regions is:

A transformation is not needed for the Bourbonnais. The enabling environment should protect and value the identity trait of the landscape (grassland-based beef production coupled with the natural capital) by (i) advising farmers to promote practices for optimizing the management of surfaces and herds (even by introducing some “sustained” forms of cultivation), (ii) anticipating the demographic problems expected to be in the area by facilitating the installation of new farmers, with monetary aids in the short term and by promoting rural vitality and interactions with other sectors in the long term, (iii) making the value chain more balanced and more able to fairly remunerate quality.



The implemented methodology based on one workshop with researchers and one workshop with stakeholders/experts of the Bourbonnais region turned out to be very favourable. Some of the ideas proposed in workshop 1 turned out to be not well fitted for the specific region of the Bourbonnais (e.g., the creation of water reserves for mitigating droughts), but were fundamental in order to trigger the discussions in workshop 2. In addition to that, the suggestions of workshop 1 related to the social distrust of farming practices, were totally pertinent as the challenge was not in itself related to the Bourbonnais. The weak point of workshop 2 was the poor participation (three persons). Maybe a higher number would have brought other points of view in the discussion. Last but not least, for future activities related to the Bourbonnais, it might be very relevant to involve actors with a complete view on the French-Italian value chain.



16 Implementation roadmap for the implementation of enabling environment principles in Bulgaria (large scale arable farming)

Introduction

Table 16-1. Workshop introductory data

Date	05-09 April 2021
Venue	UNWE, Sofia, phone and skype calls
SURE-Farm team involved (names)	UNWE team, Mariya Peneva & Stela Valchovska

Table 16-2. Workshop participants

Institution	Gender
University of National and World Economy	2 females
Ministry of Agriculture, Food and Forestry (MAFF)	1 male & 1 female
Regional Directorate of MAFF	2 males
National Agricultural Advisory Services (NAAS)	1 male
Regional office of NAAS	1 female
Farmers	2 males
Trade company (machinery supply)	1 male

Deviations from guidelines:

The UNWE team modified the initial workshop taking into consideration the stakeholders preferences and considerations. The main reason is the complicated political situation and the crucial time of planning the next programming period. Therefore, the stakeholders preferred to give their opinion and discuss their position in smaller groups instead of a workshop. Thus, the team developed materials which have been send to those who agreed to participate and after that we had several interviews and discussions with them to collect the information.

It was easier for participants to comment on the challenges and system failures, instead on concrete actions needed. To be precise farmers, researchers and the representative of trade



company did show more concerns what should be done but in general terms, e.g. they insist that changes into CAP 1st pillar are needed but they did not formulate what (concrete) changes would be feasible.

In the report participants' ideas about the possible actions by actors that will enable the environment/FS to overcome the challenges causing different system archetypes are complemented by desk study, mainly of the project reports for the CS as part of the deliverables under different WPs and tasks. We have also added one view point which has been expressed during the workshop organized by the Department of Natural Resources Economics (DNRE), UNWE and where the team presented findings and policy recommendations from the project.



Farming system and enabling environment

During the discussions stakeholders agreed about the different actors, institutions and resources defined as part of the crop farming system environment.

Table 16.3. Actors and its enabling environment (institutions and resources) in the CS of Northeast Bulgaria: large scale crop production farming system

Actors	Formal institutions	Informal institutions	Financial resources	Non-financial resources
<i>Enterprise domain:</i> Farms Cooperatives Machineries/Input suppliers Traders	Legislative principles and requirements for: Corporate companies Cooperatives Trade companies	Economic relations Low level of cooperation Decreased trust in cooperatives as production entity	Fixed and financial assets Revenues Investments (including borrowed capital)	Companies' reputation Brand image Intellectual property
<i>Government domain:</i> European Institutions Ministry of Agriculture, Food and Forestry (MAFF) and its regional and local offices Ministry of Environment and Water and its regional offices Local governments LAGs	CAP (greening) EU regulations and directives GAP implementation National laws in agriculture, food and environment Taxation	Accountability Decision making Farmers' representation Societal participation	SAPS; RDP funds Resources for EIP National programs (e.g. credits with low interest rate for farmers; aid for gasoil excise used in primary production) State support for scientific institutions Regional/local development programs	Access to production resources: land relationships, labour
<i>Intermediary domain:</i> National Agricultural Advisory Services (NAAS) Producers' unions and associations Private consultants Banks/Insurance companies	Public institutions Private organizations Individual companies Specific credits and insurances	Informal cooperation and negotiations between farmers Farmers negotiating power increases within the supply chain Credit risk acceptance Long-term relationships increase trust and access to financial resources	Credits Loans Insurances	Educational materials Trainings Information exchange and provision Technology transfer Know-how Reputation



AKIS domain: Educational and research institutions NAAS Pioneering farmers Technical consultants and representatives of global companies Specialized agricultural press	Schools Universities Research Institutes Private companies Associations Media	Innovations and technology perceptions and acceptance Farmers knowledge exchange Increased awareness about natural resources preservation Acceptance of climate changes and need for common actions Weak relationship with educational and research institutions	Financial resources from projects stimulating cooperation between farmers, science and advisory services Coordination and support actions	Educational materials Open days Trainings Information exchange and provision Technology transfer Know-how
Societal domain: Farm household Land owners Other farmers Local communities (Social media) Consumers Internet magazines	NGOs LAGs Citizens	Society perception on farmers' activities and farming Land possession and economic realization of ownership Environmental concerns Consumers preferences	Household budget Income from non-farming activities and/or occupation	Family support and understanding Local leaders Personal stories and relations Local knowledge and networking Societal perceptions Image of the farm business



Validation of system archetypes

The stakeholders recognize and agreed to the presented archetypes with the respective examples from the North-eastern Bulgaria CS as follows:

1. Archetype “Fixes that fail/shifting the burden” – examples from the CS include: extreme weather (droughts, hail and floods) and constantly changing policies and regulations, especially the land ownership and their regulations. The challenges represent the case of system robustness and its failure to adapt/transform due to the lack of adequate incentives for change. The actions undertaken by the actors (institutions) limit the negative consequences but do not enable new solutions, e.g. restoration and maintenance of irrigation system and/or changes of the production practices/technologies; strategic planning to address long-term interest of the farming community and country instead of short-term changes which support unbalanced development of the different agricultural subsectors and/or ownership taxes, clear assignment of the responsibilities for the soil quality preservation etc.

2. Archetype “Success to the successful” – the team presented example related to the labour force, namely that the lack of labour challenge forced mechanization and innovation implementation processes (even it influences the farm specialisation since farmers prefer to cultivate crops where the processes are easier and affordable as investments, to be mechanized and many of them stopped animal breeding). The limited number of educated young workers effects the farms’ profitability negatively due to the increased levels of labour payments and the need of additional investments (higher competition between farmers to attract young well educated professionals). We questioned our initial consideration that the need of better education/training of the workers, especially the managerial staff in economy/marketing/trade as response to the price volatility challenge presents this archetype as well? During the discussions with the stakeholders it has been revealed that the additional trainings offered better professional opportunities, even the farmers prefer them for their future successors. But the well-educated young people have more and better opportunities outside rural areas. Thus, some of the workers/children choose to change their working places looking for better carrier but also for better living conditions related to the infrastructure and access to services. So, in both cases the initial challenges are still in place. Unfortunately, the strategies to overcome these trends are undertaken mainly by the farmers and the rest of the actors are less active which also backfire the success of the solution. Again the need is of long-term holistic approach of planning coordinated actions of every stakeholder group.

3. Archetype “Eroding goals” – we identified that the pressure from the consumers and society’s expectations for production of safety and healthy food without damaging the



nature is a challenge which creates a gap between the goal and current status. The participants in the discussions agreed that still the environmental goals are more on paper, than as part of the concrete results in the CS region. The preservation of the status quo in studied farming system is still better supported by the current policies instead to stimulate adaptations/transformations. Robustness is identified as current system resilience capacity within which the damaging monoculture production in the region is still in place, respectively the declared environmental goals are better stated than achieved.

4. Archetype “Limits to growth” – one of the major challenges identified and agreed by the stakeholders is from the institutional domain: “the constantly changing policies and regulations”. Any strategy related to the adaptations/transformations of the system requires stable and long-term oriented programs/measures/legislation. Thus, many of the actions undertaken by the farmers are compromised if there is no consistency and logical continuity of the above-mentioned factors. A very good example has been given by a participant from the NAAS. He explained that the changes into programming and planning of the measure “Organic farming” (comparing previous and current planning period) led to difficulties for farmers who started the process of certification at the end of previous programming period. Budget limitations and changes into the regulations hinder the full certification completion in this programming period.

The participants did not mention any other example different from the once that we identified during our study in the CS region and which are entirely discussed in the CS report for T6.1.

Each one of the archetypes needed urgent actions since, according to the participants, the crop farming in Northeast Bulgaria is in the conservation phase and adaptations/transformations are a must. But all of them agreed that the resilience of farming systems would be increased undoubtedly if concrete and urgent strategies are undertaken to the “Eroding goals” archetype which deals with the nature as an absolute precondition for farming.



Actions for an enabling environment

Table 16-4. Actions/strategies by actors of the enabling environment/farming system to act/solve on system archetypes contributing to principles for resilience enabling environment and resilience attributes

ACTION/ACTOR	SOURCE	Contribution to resilience enabling principles ² /archetype	Contribution to resilience attributes
CAP 1 st pillar changes which to prevent strong crop specialisation (in Bulgaria SAPS is implemented and definitely it is in favour of the crop farmers)	STAKEHOLDERS' OPINION	<p>ARCHETYPE "ERODING GOALS" – CHANGING THE AREA BASED PAYMENTS WOULD DISMANTLE INCENTIVES TO MAINTAIN THE STATUS QUO, RESPECTIVELY THE DOMINATED SYSTEM OF MONOCULTURE FARMING</p> <p>ARCHETYPE "LIMITS TO GROWTH" – LONG-TERM ORIENTATION OF THE POLICY WOULD STIMULATE LONG-TERM INVESTMENTS IN PRODUCTIONS WHICH LIFECYCLE IS LONGER (E.G. STARTING ORGANIC APLES PRODUCTION NEEDS 3-5 YEARS INVESTMENTS UNTIL BECOMING PROFITABLE)</p>	<p>PRODUCTION COUPLED WITH LOCAL AND NATURAL CAPITAL – MAINSTREAMING DIVERSITY (OPPOSITE TO CURRENT MONOCULTURE FS) WILL PRESERVE/INCREASE SOIL FERTILITY AND GROUND WATER QUALITY</p> <p>FUNCTIONAL DIVERSITY – CHANGES SHOULD LEAD TO SUPPORT OF FARMERS' INCOME AND INCREASE THEIR FREEDOM TO DECIDE ON PRODUCTION STRUCTURE OF THE FARM</p>
EU institutions / MAFF		<p>PRINCIPLE 3 – THROUGH THE CAP THE INSTITUTIONAL ACTORS CREATE OR LIMIT ADAPTIVE/TRANSFORMATIVE CAPACITIES OF THE FS</p> <p>(UP TO THE MOMENT THE POLICY GOALS EXCEED THE INSTRUMENTS EFFECTS. WE MEAN THAT THE DECLARED GOALS ARE HIGHER THAN THE OUTCOMES OF IMPLEMENTED INSTRUMENTS).</p>	<p>EXPOSED TO DISTURBANCE – RESTRUCTURING THE MONOCULTURE IN THE CS REGION DECREASES EXHAUSTION OF NATURAL RESOURCES AND LOWER THE DISTURBANCES</p> <p>SPATIAL AND TEMPORAL HETEROGENEITY OF FARM TYPES – MEASURES WILL STOP THE PROCESS OF ENLARGEMENT&SPECIALISATION</p>

² The contribution is assessed according to our best expectations because at the end it would depend on the way in which the action is implemented and the responsibilities undertaken by the different actors.



THUS, BREAKING THE STATUS-QUO IS URGENT AND THE CAP SUPPORT WILL ENSURE RESOURCES AND SHOULD TARGET INVESTMENTS IN ADAPTATION/TRANSFORMATION OF THE MONOCULTURE CROP PRODUCTION IN THE REGION.

WHICH AT THIS MOMENT IS CONSIDERED AT ITS LIMIT

OPTIMALLY REDUNDANT FARMS – THE ACCESS TO MAIN PRODUCTION FACTORS – LAND AND LABOUR – IS FAIR AND ALLOWS FS ENTRANCE/EXIT WITHOUT DISTURBANCES

SOCIALLY SELF-ORGANIZED – CHANGES IN SUBSIDY MECHANISM WILL CHANGE THE INTERRELATIONS BETWEEN FARMERS. CURRENTLY IT IS MORE COMPETITIVENESS BETWEEN FARMERS FOR LAND (LEVEL OF SUBSIDIES IS PROPORTIONAL TO THE LAND QUANTITY) INSTEAD OF LOOKING FOR COMMON DECISIONS

LEGISLATION COUPLED WITH LOCAL AND NATURAL CAPITAL

DIVERSE POLICIES

Stimulus for environmental friendly technologies (e.g. no-till) and no-use of pesticides and herbicides

STAKEHOLDERS' OPINION

ARCHETYPE “ERODING GOALS” – THE MENTIONED ACTION WILL STIMULATE REAL CHANGE INTO THE PRODUCTION PROCESS AND ITS EFFECTS ON THE NATURAL RESOURCES (IN THE CS AREA MAINLY ON LAND QUALITY AND PRODUCTIVITY). FARMERS WOULD CHANGE NOT ONLY THEIR BEHAVIOUR IN REGARD TO THE REGULATIONS BUT THEY WILL CHANGE THEIR BELIEFS IN

PRODUCTION COUPLED WITH LOCAL AND NATURAL CAPITAL – THE PROPOSED ACTIONS REQUIRED PRODUCTION OPERATIONS TO BE CONSISTENT WITH LOCAL CONDITIONS AND THUS PREVENT NATURE DESTRUCTION

FUNCTIONAL DIVERSITY – STIMULUS WILL INCREASE ALSO THE



MAFF / farmers /
environmental
NGOs

CONSISTENCY WITH THE SOCIETY
AND CONSUMERS' EXPECTATIONS

ECOLOGICAL SERVICES WHICH FS
ACTORS MAINTAIN AND DELIVER

PRINCIPLE 3 – FS ACTORS NEED
SUPPORT TO ACCUMULATE
RESOURCES (FINANCIAL,
KNOWLEDGE, INFORMATION ETC.)
WHICH ARE ESSENTIAL TO
ADAPT/TRANSFORM THE CURRENT
FS. FARMERS NEED SUPPORT
WHICH WILL COMPENSATE THEM
FOR ADDITIONAL EFFORTS BUT
ALSO TO REPAY THEIR
CONTRIBUTION TO THE SOCIETAL
GOALS AND NEEDS.

SOCIALLY SELF-ORGANIZED – THE
ACTION WILL STIMULATE
COOPERATION BETWEEN FARMERS
SINCE THE LACK OF PHYSICAL
BORDERS WHEN WORKING WITH
BIOLOGICAL ORGANISMS TO
PRODUCE, EXPOSES THE GRAIN
FARMERS TO THE RISKS OF ACTIONS
UNDERTAKEN BY THE
NEIGHBOURING FARMERS (E.G. USE
OF CONTROVERSIAL SEEDS AND
INPUTS, SPREAD OF DISEASES, PESTS
ETC.)

LEGISLATION COUPLED WITH LOCAL
AND NATURAL CAPITAL

Development of
clear
(understandable
and easy to apply)
indicators for
biodiversity
control at farm
level

DNRE SEMINAR:
“CAP AFTER
2020: NEW
GREEN
ARCHITECTURE,
ECO-SCHEMES
AND
BIODIVERSITY.
HOW CAN
SCIENTISTS AND
SCIENCE
CONTRIBUTE TO
THEIR
IMPROVEMENT?”

ARCHETYPE “ERODING GOALS” –
EDUCATING FARMERS HOW TO
CONTROL AND TRACK OUT THEIR
PROGRESS WOULD CHANGE THEIR
UNDERSTANDING OF THE
ECOLOGICAL PROCESSES AND OF
THE INTERRELATIONS IN NATURE
AND HABITATS

PRODUCTION COUPLED WITH
LOCAL AND NATURAL CAPITAL –
IMPLEMENTATION OF THESE
INDICATORS WILL FORCE FARMERS
TO BE MORE CONSCIOUS TO THE
CURRENT CONDITIONS AND LOCAL
SPECIFICITIES TO FULFIL REQUIRED
LEVELS OF INDICATORS
(THRESHOLDS)

MAFF / research
institutes /
environmental
NGOs

ARCHETYPE “LIMITS TO GROWTH” –
THE MENTIONED INDICATORS NEED
TO BE MONITORED FOR LONGER
PERIOD BECAUSE THE NATURAL
PROCESS HAS THEIR SPEED OF
DEVELOPMENT. THE
ADAPTATION/TRANSFORMATION
OF THE POLICY MAKING PROCESS
WOULD REFLECT THESE
NECESSITIES

FUNCTIONAL DIVERSITY – THE
ACTIONS STRESS ON THE PUBLIC
GOODS PROVISION AND
ENCOURAGE FARMERS TO
DIVERSIFY THEIR ACTIVITIES

LEGISLATION COUPLED WITH LOCAL
AND NATURAL CAPITAL



<p>PRINCIPLE 3 – THE ENABLING ENVIRONMENT WILL PROVIDE MAINLY NON-FINANCIAL RESOURCES TO THE FS ACTORS WHICH RISE AWARENESS AND CREATE PATHWAYS FOR PROPER IMPLEMENTATION OF THE OTHER ACTIONS, E.G. NEW TECHNOLOGIES, MORE ADAPTIVE VARIETIES ETC.</p>			
<p>Better interaction with research institutes for more sustainable crop varieties development</p> <p>National government / research institutes / farmers / NGOs</p>	<p>SUREFARM CS REPORTS WP 2 AND 3</p>	<p>ARCHETYPE “ERODING GOALS” – DEVELOPMENT OF THE SUCCESSFUL ADAPTIVE/TRANSFORMATIVE VARIETIES/BREEDS AND PRODUCTION TECHNOLOGIES IS ONE OF THE SOLUTIONS WHICH BENEFIT THE NATURAL RESOURCES UTILISATION. THE COLLABORATION BETWEEN ALL THE STAKEHOLDERS FACILITATE THE SCIENTIFIC BASE OF THE CHANGES AS WELL AS THE PRACTICAL USEFULNESS OF SCIENTIFIC EXPERIMENTS</p>	<p>REASONABLY PROFITABLE - CHANGES INTO PRODUCTION PROCESS EITHER THE MORE SUSTAINABLE CROPS AND NEW TECHNOLOGIES MAY INCREASE FARMS’ INCOME</p>
		<p>PRINCIPLE 3&4 – THE SCIENTIFIC APPROACH TO DETECT, ASSESS AND ADDRESS LONG-TERM CHALLENGES IS IMPORTANT FOR THE FUTURE RESILIENCE OF THE FS BECAUSE RESEARCHES MAY TRANSMIT THEIR FINDINGS AS WELL TO THE POLICY MAKERS AND GOVERNMENT. THE INTERMEDIARY POSITION OF SCIENCE (IN COOPERATION WITH ADVISORY SERVICES AND NGOS) IS ALSO CRUCIAL IN SUPPORTING DIVERSITY OF SOLUTIONS WHICH TO BE IMPLEMENTED IN ACCORDANCE TO THE LOCAL</p>	<p>PRODUCTION COUPLED WITH LOCAL AND NATURAL CAPITAL – MORE SUSTAINABLE (EVEN IN ECONOMIC SENSE IN LONG-TERM PERIOD) ARE CROPS WHICH ARE BETTER ADAPTED TO THE LOCAL/NATURAL CONDITIONS. THUS, THE USE OF ADDITIONAL INPUTS WILL DECREASE.</p> <p>RESPONSE DIVERSITY – THE INTERACTION MAY LEAD TO NOVEL RISK MANAGEMENT STRATEGIES</p> <p>APPROPRIATELY CONNECTED WITH ACTORS OUTSIDE THE FARMING SYSTEM</p>



SPECIFICITIES OF EACH ACTOR IN THE FS.			
Land quality inventory and update of the cadaster	SUREFARM CS REPORTS WP 2 AND 3	<p>ARCHETYPE “ERODING GOALS” – THE LAST INVENTORY IS DONE MORE THAN 25 YEARS AGO AND STAKEHOLDERS PROVE THAT THE CURRENT INFORMATION IN THE CADASTER IS NOT THE ACTUAL ONE. THE POPULAR BELIEF THAT THE SOILS ARE FERTILE IN SOME CASES WILL BE QUESTIONED. THUS THERE WILL BE A CLEAR BASIS WHY AND WHAT ACTIONS ARE NEEDED AND IN WHICH PLOTS.</p> <p>PRINCIPLE 5 – THE GOVERNMENT SHOULD INVEST IN PROPER INVENTORY AS BASIS OF ANY FUTURE REGULATIONS AND REQUIREMENTS FOR THE FARMERS’ ACTIVITIES AS WELL AS TO CORRECTLY IMPLEMENT ANY INDICATORS TO MEASURE FS EFFECTS/ACHIEVEMENTS IN ENVIRONMENTAL PRESERVATION AND MAINTENANCE. THE UPDATED CADASTER IS ALSO IMPORTANT FOR THE LAND MARKET DEVELOPMENTS AND ACHIEVING BALANCED AND FAIR PROCESS OF PRICE-FORMATION FOR LAND RENT/LEASE AND SALES.</p>	<p>REASONABLY PROFITABLE – FAIR PRICES FOR LAND RENT/LEASE WILL REDUCE PRODUCTION COSTS IN FS</p> <p>PRODUCTION COUPLED WITH LOCAL AND NATURAL CAPITAL – PART OF THE INVENTORY IS ASSESSMENT OF THE SUITABILITY OF THE LAND TYPES TO CONCRETE VARIETIES/TECHNOLOGIES. IT WOULD BE A VERY GOOD REFERENCE POINT TO START NEW/ADAPT/TRANSFORM PRODUCTION</p> <p>LEGISLATION COUPLED WITH LOCAL AND NATURAL CAPITAL</p>
MAFF			
Land legislation stimulating land consolidation and long-term rent/lease	STAKEHOLDERS’ OPINION	<p>ARCHETYPE “FIXES THAT FAIL/SHIFTING THE BURDEN” – POSITIVE EFFECTS MAY BE EXPECTED ON THE LAND MARKET (CURRENTLY THE LEVEL OF RENT/LEASE ARE VERY HIGH COMPARED TO THE OVERALL PRODUCTION COSTS). THE LEGAL MEASURES WHICH STIMULATE LONG-TERM CONTRACTS AND</p>	<p>REASONABLY PROFITABLE – FAIR PRICES FOR LAND RENT/LEASE REDUCES PRODUCTION COSTS IN FS</p> <p>FUNCTIONAL DIVERSITY – LONG-TERM CONTRACTS ENABLE FS ACTORS TO ENDEAVOUR VARIETY OF OUTPUTS</p>



MAFF and
national
parliament

LAND CONSOLIDATION WOULD
GIVE MORE FREEDOM FOR
FARMERS TO INVEST IN
PRODUCTION/TECHNOLOGY
ADAPTATION/TRANSFORMATION

PRINCIPLE 6 – THE NEED TO ASSESS
AND UNDERSTAND THE DEEPER
PROBLEM BEHIND LAND
FRAGMENTATION AS RESULT OF
THE CONTRADICTION PROCESSES
OF LAND NATIONALISATION
DURING THE COMMUNIST TIME
AND OWNERSHIP RESTORATION IN
THE BEGINNING OF 90TIES OF XX
CENTURY. THERE IS MORE THAN
ECONOMIC STIMULUS WHICH MAY
COMPEL 1.8 MILLION HOLDERS
(MAFF, 2020) TO BE ACTIVE
PARTICIPANTS IN LAND MARKET
AND LAND CONSOLIDATION FOR
MORE EFFECTIVE PRODUCTION.

SPATIAL AND TEMPORAL
HETEROGENEITY OF FARM TYPES –
BETTER ACCESS TO MAIN
PRODUCTION FACTOR – LAND –
WILL CREATE MORE AND BETTER
OPPORTUNITIES FOR
DEVELOPMENT OF THE FARMS
WITH DIFFERENT SIZE,
SPECIALISATION AND
INTENSIFICATION

OPTIMALLY REDUNDANT FARMS –
THE ACCESS TO MAIN PRODUCTION
FACTORS – LAND AND LABOUR –
WILL BE FAIR AND WILL ALLOW FS
ENTRANCE/EXIT WITHOUT
DISTURBANCES

Maintaining
irrigation system

STAKEHOLDERS'
OPINION

ARCHETYPE “FIXES THAT
FAIL/SHIFTING THE BURDEN” –
IRRIGATION IS CONSIDERED THE
MAJOR ACTION TO OVERCOME
NEGATIVE CONSEQUENCES OF
DROUGHT RESPECTIVELY TO
PREVENT CROP FARMERS
BANKRUPTCY IN YEARS LIKE THE
YEAR OF 2020.

REASONABLY PROFITABLE –
IRRIGATION WILL DECREASE
PRODUCTION LOSS DUE TO
DROUGHT

MAFF / farmers /
suppliers /
regional
authorities

PRINCIPLE 1 – IT IS IMPORTANT THE
GOVERNMENTAL INTERVENTION
SINCE DEVELOPMENT AND
MAINTENANCE OF THE IRRIGATION
SYSTEM REQUIRES FINANCIAL

FUNCTIONAL DIVERSITY – FS
ACTORS HAVE MORE
OPPORTUNITIES TO CHOOSE
DIFFERENT CROPS, VARIETIES,
ACTIVITIES, RESPECTIVELY TO MAKE
VARIOUS SOURCES OF INCOME

RESPONSE DIVERSITY – THE ACTION
IS RESPONSE TO THE SEVERE



		<p>RESOURCES WHICH ARE NOT AVAILABLE (AND AFFORDABLE AS INVESTMENTS) TO THE SINGLE FARMER AND EVEN THE FS AS A WHOLE IN THE REGION. WHEN THE IRRIGATION SYSTEM IS AVAILABLE THE FS ACTORS WILL BE ABLE TO STABILISE THEIR INCOME AND TO ACCUMULATE SOURCES FOR ADAPTATIONS/TRANSFORMATIONS.</p> <p>THUS THE ENABLING ENVIRONMENT WILL PROVIDE FARMERS TIME TO WORK ON NEW (MORE RESILIENT) VARIETIES, TECHNOLOGIES ETC.</p>	<p>WEATHER CONDITIONS AND IS PART OF THE RISK MANAGEMENT STRATEGIES APPLIED IN THE FS</p> <p>EXPOSED TO DISTURBANCE – WEAKEN DISTURBANCES FROM DROUGHT</p> <p>SOCIALLY SELF-ORGANIZED – MEASURE SUPPORTS COOPERATION OF FARMERS TO USE THE IRRIGATION SYSTEM, TO MAINTAIN IT AND TO SHARE THE MAINTENANCE COSTS AS WELL AS TO BETTER COORDINATE WATER USE (IN SOME PART OF THE REGION EVEN THERE IS WATER SCARCITY AND IT IS QUESTION NOT ONLY ABOUT IRRIGATION SYSTEM BUT ALSO TO WATER MANAGEMENT)</p> <p>LEGISLATION COUPLED WITH LOCAL AND NATURAL CAPITAL</p>
Insurance schemes suitable for crop farmers specificities	SUREFARM CS REPORTS WP 2 AND 3	<p>ARCHETYPE “FIXES THAT FAIL/SHIFTING THE BURDEN” – ONE OF THE INSTRUMENTS WHICH COMPENSATE FRAMERS IN CASE OF EXTREME WEATHER EVENTS AND WHICH SUPPORT FARMERS’ INCOME IN YEARS WITH NEGATIVE PRODUCTION AND MARKET DEVELOPMENTS</p> <p>PRINCIPLE 2 – IMPLEMENTATION OF DIFFERENT INSURANCE INSTRUMENTS PLAUSIBLE FOR FARMERS REQUIRES INTERACTIONS BETWEEN INSURANCE COMPANIES</p>	<p>REASONABLY PROFITABLE – COMPENSATIONS FOR EXTREME WEATHER OR ANY OTHER DISASTROUS EVENTS DECREASE FARM LOSSES</p> <p>RESPONSE DIVERSITY – INCREASE FS’ FLEXIBILITY TO RESPONSE ON DIFFERENT EXTREME EVENTS</p> <p>EXPOSED TO DISTURBANCE – THE ACTION DECREASE UNFAVOURABLE CLIMATE CHANGE</p>
MAFF / insurance companies			



		<p>AND FARMERS. THE PROCESS WILL INCREASE THE KNOWLEDGE AND MUTUAL UNDERSTANDING OF BOTH ACTORS. ESPECIALLY FOR FARMERS WHICH MAY BENEFIT FROM THE INFORMATION AND STRATEGIES APPLIED BY THE INSURANCE SECTOR TO PREVENT/PREDICT NEGATIVE EVENTS. BOTH INCREASE THE BUILT ANTICIPATORY AND RESPONSIVE CAPACITIES AND THE INSURANCE COMPENSATION INCREASE THE COPING CAPACITY OF THE FS</p>	<p>APPROPRIATELY CONNECTED WITH ACTORS OUTSIDE THE FARMING SYSTEM</p>
Marketing instruments implementation	SUREFARM CS REPORTS WP 2 AND 3	<p>ARCHETYPE “SUCCESS TO THE SUCCESSFUL” – FARMERS COULD IMPROVE THE FINANCIAL STABILITY OF THE BUSINESS USING SUCH INSTRUMENTS AND COLLABORATING WITH THE SUPPLY CHAIN ACTORS</p>	<p>REASONABLY PROFITABLE – BETTER MARKETING OF FS OUTPUTS DEFINITELY INCREASE FARMERS’ INCOME</p>
Farmers / trade companies		<p>PRINCIPLE 2 – LEARNING AND ADOPTING MARKETING STRATEGIES BASED ON DIFFERENT INSTRUMENTS IS PART OF THE BUILT ANTICIPATORY AND RESPONSIVE CAPACITIES. MOREOVER, INEVITABLY MARKETING STRATEGIES ARE BECOMING PART OF THE COPING CAPACITY OF THE FS AND WILL BE PRESENT IN THE FUTURE AS WELL. SUCCESSFUL MARKETING INCREASE FARMERS’ INCOME AND THEIR SELF-RELIANCE TO INVEST/ADAPT/TRANSFORM.</p>	<p>FUNCTIONAL DIVERSITY – INCREASE THE VARIETY OF MARKETING ACTIVITIES (BOTH TO ENSURE INPUTS AND TO SELL THE OUTPUT OF THE FS)</p> <p>RESPONSE DIVERSITY – DEFINITELY NEW/DIVERSE MARKETING INSTRUMENTS ARE PRESENT IN RISK MANAGEMENT STRATEGIES OF ANY FARMER, INCLUDING CROP PRODUCERS</p> <p>APPROPRIATELY CONNECTED WITH ACTORS OUTSIDE THE FARMING SYSTEM – IT IS RELEVANT TO THE RELATIONS WITH INPUT PROVIDERS AND TRADE COMPANIES</p>



Strict labour legislation ensuring better working conditions	STAKEHOLDERS' OPINION	<p>ARCHETYPE "SUCCESS TO THE SUCCESSFUL" – IMPROVEMENTS IN WORKING CONDITIONS (ROBOTISATION, AIR-CONDITIONING, SANITARY SYSTEMS ETC.) INEVITABLY CHANGE THE PERCEPTION AND THE IMAGE OF THE FARMING AS PROFESSIONAL ACHIEVEMENT.</p>	<p>EXPOSED TO DISTURBANCE – THE PREVENTIVE ACTIONS FOR LABOUR SAFETY DECREASE ANY DISTURBANCES (E.G. ECONOMIC IF WORKER IS INJURED; SOCIAL WHEN GOOD IMAGE INCREASE WILLINGNESS TO WORK IN THE FARM ETC.)</p>
Ministries and national parliament / social organizations / farmers		<p>PRINCIPLE 6 – A VERY IMPORTANT AND IN-DEPTH ANALYSIS IS NEEDED TO EXAMINE MOTIVATION FACTORS/DRIVERS WHICH WILL INCREASE THE ATTRACTIVENESS OF THE FARMING PROFESSION AND HOW (IF IT IS POSSIBLE) THESE MAY BE PART OF THE SOLUTIONS TO THE CHALLENGE OF LABOUR FORCE SCARCITY.</p>	<p>OPTIMALLY REDUNDANT FARMS – THE ACCESS TO MAIN PRODUCTION FACTORS – LAND AND LABOUR – IS FAIR AND ALLOWS FS ENTRANCE/EXIT WITHOUT DISTURBANCES</p> <p>SUPPORTS RURAL LIFE – THE ACTION STOPS/PREVENTS EXIT FROM THE FS</p> <p>DIVERSE POLICIES</p>
Infrastructure and services improvements in rural areas	STAKEHOLDERS' OPINION	<p>ARCHETYPE "SUCCESS TO THE SUCCESSFUL" – AT LEAST THE PROCESS OF DEPOPULATION (KEEPING POPULATION AT WORKING AGE) COULD BE STOPPED WHEN LIVING CONDITIONS IN RURAL AREAS ARE COMPARABLE WITH THOSE IN URBAN AREAS. AND THE YEAR OF PANDEMIC REVEALED THAT IT IS POSSIBLE SINCE MANY YOUNG PEOPLE MOVED TO RURAL AREAS WHICH OFFER (ALLOW) THEM CONDITIONS TO WORK REMOTELY.</p>	<p>FUNCTIONAL DIVERSITY – IMPROVED INFRASTRUCTURE IMPROVES THE ACCESS TO RURAL AREAS AND DIVERSIFY THE DECISIONS ABOUT INCOME SOURCES AND MARKETING CHANNELS</p> <p>SUPPORTS RURAL LIFE – THE ACTIONS STOP/PREVENT DEPOPULATION AND AGEING OF RURAL AREAS</p>
MAFF / national and regional government institutions		<p>PRINCIPLE 1 – THE ROLE OF GOVERNANCE AS PART OF THE</p>	<p>INFRASTRUCTURE FOR INNOVATION – THE PROCESS OF DIGITALISATION</p>



		ENABLING ENVIRONMENT IS TO SET UP AND TO GUARANTEE THE RESOURCES FOR PUBLIC INFRASTRUCTURE. IN LONG-TERM SUCH ACTIONS WILL ENSURE AVAILABLE LABOUR FORCE TO THE FS.	DEPENDS ON THE LEVEL OF ICT AND THE ACCESS (AS WELL THE SPEED) OF INTERNET DIVERSE POLICIES
Investments in educational and research infrastructure	SUREFARM CS REPORTS WP 5	ARCHETYPE “SUCCESS TO THE SUCCESSFUL” – THE CONCENTRATION OF THE EDUCATIONAL AND RESEARCH INSTITUTIONS IN THE BIGGEST CITIES IN THE COUNTRY STIMULATE EMIGRATION. VERY FEW OF YOUNG PEOPLE RETURN TO THE RURAL AREAS AFTER THEIR UNIVERSITY STUDIES.	REASONABLY PROFITABLE – SCIENCE OFFERS MANY (INCLUDING INNOVATIVE) SOLUTIONS WHICH TARGET ALSO BETTER ECONOMIC PERFORMANCE OF THE FS. THE ACTION WILL IMPROVE MANAGEMENT SKILLS AT FARM AND FS LEVEL AND IT IS PART OF THE DEVELOPMENT OF NEW, MORE SUSTAINABLE AND RESILIENT, BUSINESS MODELS
National parliament and Council of ministries		PRINCIPLE 5 – INVESTING IN EDUCATION AND RESEARCH ENABLES SOLUTIONS FOR CURRENT AND FUTURE CHALLENGES FOR THE STUDIED FS NOT GIVING PRIORITY TO THE SHORT-TERM ONCE. MOREOVER, IDENTIFYING AND PREDICTING THE POSSIBLE NEGATIVE EFFECTS OF THE CURRENT SOLUTION WILL PREVENT THE FS FROM FUTURE FAILURES. BETTER EDUCATION AND NEW SCIENTIFIC FINDINGS WILL BRING NEW SOLUTIONS TO THE FUTURE CHALLENGES EVEN IF THEY ARE THE SAME AS CURRENT, HAVING IN MIND THE DIFFERENCES IN THE ENVIRONMENT.	FUNCTIONAL DIVERSITY – INCREASED KNOWLEDGE AND SCIENTIFIC ACHIEVEMENTS INCREASE THE VARIETY OF INPUTS USED IN FS, OUTPUTS AND THEIR MARKET REALISATION EXPOSED TO DISTURBANCE – INCREASED KNOWLEDGE AND TRAINING ENABLE FS ACTORS TO MITIGATE AND TO CHANGE ADAPT THEIR ACTIVITIES TO DECREASE NEGATIVE EFFECTS FROM DIFFERENT DISTURBANCES INFRASTRUCTURE FOR INNOVATION DIVERSE POLICIES





Discussion

In the four system archetypes major roles play actors from the enterprise and government domains and always the general concerns raised by the societal domain actors are considered as well. The governmental actors are crucial to set up the rules and instruments of an enabling environment but also to ensure resources and to establish the appropriate structures and institutions needed to achieve the common goals. The actions/strategies of the enterprise actors (farmers are the core group) are essential in operationalisation and practical success in reaching goals. Namely, filling the gap between the actions of these actors could address the system archetypes in the future to foster resilience of the studied crop farming system. But the process requires to reinforce the role of the AKIS and intermediary actors which may mobilise financial but also key non-financial resources. The latter includes learning which would change all actors' perceptions which is needed if we want to deeply change the system configuration and relations in the future overcoming the challenges and maintaining production and provision of private and public goods equally (in balanced way).

During the discussions with stakeholders and desk study (combination of) different actions/strategies are identified as needed in the future to solve the archetypes that currently exist in the crop farming system in Northeast Bulgaria. They contribute to all of the six key principles for a resilience enabling environment but the more urgent (in regard to the ranged actions according to their importance as well as the frequency with which each principle occurs) is the 3rd one (principle to detect long term trends and their potential impact on the FS). It is in conformity with the above statement that the governmental domain actors through the CAP (setting up the formal institutions) limit the adaptive/transformative capacities of the FS due to the lack of coordinated long-term development vision consistently supported by the policies not only in agricultural and food areas, but also by other policies like environmental, health, consumers', tax etc. Thus, the governmental actors will support FS actors to accumulate resources (financial) to increase their anticipatory and responsive capacities when it is no longer possible to be robust against challenges, as it is the case of large-scale crop production in the studied region and the challenges from the environmental and socio-demographic areas. Therefore, actions which require active participation of the AKIS and intermediary domains actors are very relevant, namely to equip farmers with non-financial resources in response to the long-term trends. The next group of actions which may considered as well urgent because the above mentioned could be successful in combination with these and if the holistic approach is applied to contribute to the other principles (ranged according urgency of actions ranged by the stakeholders and



researchers): 5th (to develop a sufficient degree of ambidexterity) and 6th (to do in-depth analysis of root causes of challenges and the FS's vulnerability to them).

The proposed actions contribute to all of the resilience attributes as some of the actions could have effects in several attributes. The attribute which most of the actions will strengthen is "Functional diversity" because it suggests achieving more freedom for FS actors to increase delivering/maintaining public goods and to decide on the various production input/output, respectively to diversify the marketing channels and sources of income. A very important one is that most of the actions will support also the attribute of "Reasonably profitable" as the economic viability is a precondition for the successful new business models which will be resilient in the future. The balance between economic, social and environmental functions of crop farming system will be achieved through proposed actions which improve both attributes: "Legislation coupled with local and natural capital" and "Production coupled with local and natural capital". Both of the attributes have been identified as preconditions to reach more sustainable and resilient future systems (D5.7) and from the proposed actions relevant are: to preserve/increase soil fertility, to use crops which are better adapted to the local/natural conditions etc. Future resilience of crop farming in Northeast Bulgaria is very much influenced by its exposure to disturbances (attribute "Exposed to disturbance"). It is possible to be addressed by several of the actions which weaken the disturbances from climate change and restructure the damaging monoculture production structures. Few of the actions contribute to the attributes like: "Socially self-organized" and "Appropriately connected with actors outside the farming system" which currently are considered as weaknesses as many adaptations/transformations require common and coordinated strategies from actors from the FS but also those which influence FS actors, e.g. supply chain actors. Last but not least, two of the actions improve "Infrastructure for innovation" and "Supports rural life" attributes which importance increases with acceleration of the need to support generational renewal (overcoming labour scarcity) and innovation strategies implementation (intensifying the process of digitalisation).

It is clear that proposed actions address current challenges as far as it is possible to project their influence in the future. All of them target establishment of an enabling environment for the crop FS which will improve its responsive capacity even in the uncertainty of unfavourable conditions occurs. But some of these challenges/conditions should be considered in a positive way as possibilities for the system which is close to collapse. In response to them, the proposed actions suggest new solutions for system advancements even if radical changes are needed and facilitated by the enabling environment to keep it resilient. In this sense the actions which target future system resilience enforce adaptive and transformative capacities of the large-scale crop



production in Northeast Bulgaria, e.g. adaptation of technologies (environmental friendly practices; irrigation) and varieties, diversification of crops and activities, transformation to organic farming, incremental change of innovations development and implementation with strong interaction between farmers and actors from AKIS domain, evolution of the supply chains and marketing methods used by FS actors, embracement of insurance instruments as part of risk management strategies etc.

Conclusions

The discussions and desk study were very informative and insightful in understanding and taking into consideration the interrelations between challenges, actions by actors and available (as well as affordable) resources and institutions per action/actor. Using the four archetypes to present these interactions revealed (at least for our team) the complexity of the studied FS and the reality that not always good (excellent) solutions lead to increased resilience within the concrete enabling environment. In that sense the assessment of actions' contribution to each of the six principles is practical when resources are programmed/planned as it is the time now.

Therefore, we consider the identification of potential actions is key element but very comprehensive and it was difficult to list all of them in partial the discussions and desk study we performed. If there is a political will, organizing similar workshop (at different levels) will benefit the future policy decision making process.



17 Implementation roadmap for the implementation of enabling environment principles in Romania (small mixed farms in Nord-Est region)

Introduction

The workshop on participatory development of roadmap for a resilience enabling environment of the of small mixed farming system in Nord-Est region of Romania was organized on-line late April 2021 with 12 local participants (policy makers, consultants, farmers, processor representative and researchers).

Table 17-1. Workshop introductory data

Date	28 April 2021
Venue	On-line
SURE-Farm team involved (names)	Camelia Gavrilescu Monica Mihaela-Tudor Anca-Marina Izvoranu Elisabeta Rosu

Table 17-2. Workshop participants

Institution	Gender
Farmer, Local Action Group representative	male
Processor	female
Farmer, Rural Development Association representative	male
Director, County (1) Directorate for Agriculture and Rural Development (local branch of the Ministry of Agriculture and Rural Development)	male
Executive Director, County (2) Directorate for Agriculture and Rural Development	male
Public consultant, County (3) Directorate for Agriculture and Rural Development	female
Researcher, "Gh. Zane" Social and Economic Institute, Iasi Branch of the Romanian Academy	male
Researcher, SURE-Farm team member	male
Researcher, SURE-Farm team member	female
Researcher, SURE-Farm team member	male
Researcher, SURE-Farm team member	female
Researcher, SURE-Farm team member	male

Deviations from guidelines:

No major deviations from the established guidelines occurred; the workshop was held online in the indicated format. No online whiteboard was used during the workshop, instead we used interactive Powerpoint presentation (tables filled in in real time) so all participants saw them and discussed them directly. The specified time indications were too short; discussions on actions and solutions were vivid and interesting, which led to prolonging the workshop by 75 minutes



Farming system and enabling environment

The table below shows the actors, institutions and resources contributing to the enabling environment of the Romanian case study: small mixed farms. In the deliverable 6.2 (Mathijs et al., 2021), in the Annex on the Romanian case study, the analysis showed the response of main actors and institutions, and some of the resources used to face the identified challenges to the farming system. The list of actors and institutions was completed, together with financial and non-financial resources involved. The result is presented in table 17.3.

Table 17-3. Actors and its enabling environment (institutions and resources) in small mixed farms in Nord-Est region of Romania

Actors	Formal institutions	Informal institutions	Financial resources	Non-financial resources
ENTERPRISE DOMAIN: <ul style="list-style-type: none"> - Individual farmers - Farmers' cooperatives / associations / producer's groups - Input suppliers (technology, fertilizers, pharmaceutical) - Traders - Processing industry - Retailers - Banks - Insurance companies - Real estate agencies 	<ul style="list-style-type: none"> - Individual companies - Associations/cooperatives - Good and service providers - Market integrators 	<ul style="list-style-type: none"> - Attitude towards cooperatives / association - Negotiating power - Attitude towards service providers and intermediaries - Attitude towards bank loans and insurances - Short food supply chains / direct sales 	Farmers: <ul style="list-style-type: none"> - Own resources - Keeping (saving) financial resources for use in time of need - Funding from non-banking financial enterprises (ex. credit cooperatives) - Extra logistics/transportation costs (when reorientation to short chains or direct sales) 	<ul style="list-style-type: none"> - Knowledge stock - Long term forecasts - Partnerships / cooperation - Openness to change - Promotion - Opening of new markets - Regulations - Collective action / cooperation - Interest representation
GOVERNMENT DOMAIN: <ul style="list-style-type: none"> - EU - Central administration - Local administration - County agricultural authority (branch of the Ministry of 	<ul style="list-style-type: none"> - CAP - Regulations (Nitrates Directive, Water Directive, neonicotinoids regulations, etc.) - Regulations for accessing funds from NRDP (National 	<ul style="list-style-type: none"> - Decision making - Awareness and acceptance from farmers - Accountability - Farmer's participation 	Government: <ul style="list-style-type: none"> - Support funds (exceptional aids) NRDP: <ul style="list-style-type: none"> - Technology modernization 	<ul style="list-style-type: none"> - Legal framework - Information regarding labour market - Regulations regarding labour market

Actors	Formal institutions	Informal institutions	Financial resources	Non-financial resources
Agriculture and Rural Development) - APIA (Agency for Payments and Intervention in Agriculture) - AFIR (Agency for Funding the Rural Investments) - ANSVSA - DSV (National / county Sanitary Veterinary and Food Safety Authority) - Organic certification bodies	Rural Development Program) - Sanitary-veterinary regulations - Food safety regulations - Economic and financial regulations - Fiscal (taxation) regulations - Payment agencies		- Support for purchasing agricultural equipment - Training programs for adults - Investments in new animal shelters and purchase of new livestock - Investments in agricultural equipment - Investments in equipment able to replace manual labour	
INTERMEDIARY DOMAIN: - Producers' organizations (PO) - Advisors / consultants - LAG (Local Action Group)	- Public advisors - Private consultancy	- Attitude towards POs - Food chain management - Governance - Expert groups - Advisor groups	Government: - Legislation / regulations NRDP: - Support for associative forms	- Cooperation and vertical integration - Consultancy - Information on market niches - Counselling on changing the productive paradigm
AKIS DOMAIN: - Research organizations - Input developers - Vocational schools - Specialized radio/TV broadcasts - Social media / Internet	- Knowledge and innovation developers - Training institutions - Technology advisors - Media (TV, radio, internet)	- Attitudes towards technologies - Attitudes towards education / training - Good farming practices	NRDP: - Adult training programs	- Education - Knowledge / innovations - Training
SOCIETAL DOMAIN: - People on the farm / family members - Other farmers - Customers - Civil society (World Vision)	- Farmers' communities - Consumers' organizations - Citizens - Media companies	- Societal vision on farming - Environmental attitudes - Consumer preferences - Attitude towards social support	Facilitating communication among stakeholders: - Monitoring committees - Workshop organization - Debates, forums	- Consultancy - Collective action / cooperation - Interest representation



Validation of system archetypes

The archetypes recognized in the small mixed farming system, and the corresponding challenges are shown in table 17.4.

Table 17-4. Archetypes identified and proposed for discussion in the small mixed agricultural system

Archetype	Challenge
1 – Fixes that fail	<ul style="list-style-type: none"> • Extreme weather conditions
2 – Eroding goals	Not identified in our case study
3 – Limits to growth	<ul style="list-style-type: none"> • Change of agricultural policies and regulations
4 – Success to successful	<ul style="list-style-type: none"> • Business development, diversification, and integration
5 – Growth and underdevelopment	<ul style="list-style-type: none"> • Poor integration of small farms in agri-food chains

The participants recognized the proposed system archetypes and discussed also additional examples.

Archetype 1 - “Fixes that fail”

The participants recognized it as the most frequently encountered in the farming system. In the last decades, severe droughts occurred with increased frequency (every 4-5 years). The drought in 2020 has been extremely severe, affecting mostly the eastern and southern part of Romania. The Government promised relief funds for farmers which incurred severe losses for winter crops (wheat, barley, rapeseed) to be paid in two funding sessions, but in the end money was enough for one session only. Farmers were extremely dissatisfied, but on the other hand, there were available funds (largely unused) for measure 17.1 from the National Rural development Program (NRDP), which allows the farmers to be reimbursed by 70% of the insurance premium. The real problem is that farmers are expecting relief funds from the Government, instead of taking actions that would fix the problem: using insurances (and the available European funds for that), and, in the long term, investing in irrigation facilities.

Archetype 3 - “Limits to growth”

The participants recognized as well this system archetype. Frequent changes in regulations, especially those regarding the applications for NRDP support programs were seen as quite inconvenient if not harmful for the farmers, together with excessive bureaucracy and complicated procedures.

An example was the “de minimis” support for tomatoes in glasshouses or under plastic tunnels. Farmers invested considerable amounts of money in that type of activity and relied on the support, which was reflected in their business plans. In 2021, the support was abruptly discontinued, diminishing the profitability and the capability of repayment bank loans for their investments.

Another example was the measure 21 (support for new/young farmers), which had limited success, since the support is seen as insufficient to start a farm. The related expenditures to land consolidation and property/leasing transfer are very high.

Also, there is some reluctance from the civil servants assessing the projects. Their activity is evaluated through the cumulated value of the projects analyzed and approved for funding. The amount of work and time for assessing a project for NRDP funding is the same whether the value of the project is EUR 50,000 or 1 million.

The participants agreed that all archetypes need urgent actions, but mostly A1 – “Fixes that fail”, and A3 – “Limits to growth”, and these are the most problematic for the resilience of the small mixed farming system.

Archetype 4 - “Success to the successful”

The participants validated it and discussed several examples. It is quite difficult for small farms to be able to access NRDP funding programs. They must meet several conditions and criteria and, in general, must be assisted by consultants in preparing proposals. But once they get funding and start to develop, it's much easier for them to access later programs once they've been able to demonstrate previous success. Yet, there are many young farmers with many new ideas and innovation proposals that are worth funding, despite lacking experience in implementing support funding. On the other hand, many of those who fail are generally not inclined to try again.

Archetype 5 - “Growth and underdevelopment”

It was intensely discussed. In general, small farms strive to increase their performance and production, but processors and retailers (supermarkets) are not interested in buying their products (either because of high transaction costs or because of lower prices of imported products). So, farms are forced to sell to intermediaries or occasionally at low prices. Lower revenues do not allow investment in the capacity needed for business development, so that farm products meet the quality and quantity requirements imposed by processors and / or retailers.

The discussion pointed out that sometimes roles can be reversed, but with the same negative outcome. Two large retailers (Kaufland and Carrefour) initiated programs for small farmers, to allow them to sell their products. But farmers were rather reluctant, because they were supposed to issue invoices and receipts, thus being obliged to pay the corresponding taxes. This is something they are not used to, because they sell their products mainly through alternative channels (direct sales to customers, west markets, etc.). Also, groups of small farmers were reluctant to organize themselves in associations/cooperatives, despite better conditions offered them by a supermarket for selling their products, as compared to conditions offered them as individuals. There is a significant lack of habit and knowledge of working together to be able to get better deals with processors and retailers.



3. Actions for an enabling environment

The participants discussed vividly many possible actions that can be implemented in order to avoid the system failures. The proposed actions, together with the actors and institutions that need to be involved, as well as the financial and non-financial resources to be committed are shown in tables 4-1 to 4-4.

Table 4-1. Actors of the enabling environment/farming system to act/solve on system Archetype 1 - “Fixes that fail” (addressing the immediate effects and not the real causes or risk factors)

Actions	Actors / Institutions	Resources (F – financial; NF – non-financial)
<ul style="list-style-type: none"> - Increase awareness of insurance importance - Compulsory insurance for farmers as condition for future access to relief funds or insurance support measures 	<ul style="list-style-type: none"> - Farmers - MARD (Ministry of Agriculture and Rural Development) and county branches - Payment agency 	<ul style="list-style-type: none"> F – Financial resources for emergency support NF – Attitude to insurance NF – Conditions for access to financial support
Increase stability and clarity of regulating framework	MARD	NF – Non-changing rules for financial allocations from NRDP
<ul style="list-style-type: none"> - National irrigation system: <ul style="list-style-type: none"> o rehabilitation o new resilient and soil friendly systems - Forest protection „curtains” 	<ul style="list-style-type: none"> - Associations of water users - MARD - Payment Agency 	<ul style="list-style-type: none"> F – Financial resources NF – Farmers’ organizing in associations for water use NF – Regulations that should not exclude land under protection curtains from subsidies (DP)

Actions	Actors / Institutions	Resources (F – financial; NF – non-financial)
Consultancy / extension to increase information on available support measures from NRDP	<ul style="list-style-type: none"> - County Directorates (local branch of MARD) - NGO-s - Media 	NF – Human capital NF – Interest representation of small farmers
<ul style="list-style-type: none"> - Education and training of farmers and consultants <ul style="list-style-type: none"> o Changing educational programs o Promoting good practice models 	<ul style="list-style-type: none"> - Ministry of Education - MARD - NGO-s 	NF – Human capital

Table 4-2. Actors of the enabling environment/farming system to act/solve on system Archetype 3 - “Limits to growth” (growth slowed by the actions of the farming system environment)

Actions	Actors / Institutions	Resources (F – financial; NF – non-financial)
Increase stability and clarity of regulating framework	MARD	NF – Non-changing rules for financial allocations from NRDP
Compulsory registration in representing bodies (agricultural chambers), payment of membership fee	<ul style="list-style-type: none"> - Government - Agricultural chambers acting as representative bodies and path for access to funding 	NF – Norms / rules for access to funding

Actions	Actors / Institutions	Resources (F – financial; NF – non-financial)
Organizing representative groups for small farmers	<ul style="list-style-type: none"> - NGO-s - Consumers 	F – Financial resources of NGO-s NF - Lobby for small farmers NF – Human capital
Increasing farmers' information and availability of advisory services	<ul style="list-style-type: none"> - (Re)setting up of Agricultural Chambers) - County Directorates – improving extension services - LAG 	F – Financial resources for extension public services NF – Information NF – Human resources in public bodies NF – Digital transformation
Education and training for consultants	<ul style="list-style-type: none"> - Ministry of education - MARD 	NF – Human capital

Table 4-3. Actors of the enabling environment/farming system to act/solve on system Archetype 4 – “Success to the successful” (directing resources to performers only disincentives alternatives)

Actions	Actors / Institutions	Resources (F – financial; NF – non-financial)
Knowledge transfer	<ul style="list-style-type: none"> - Research units - MARD 	F – Funding targeting needs of small farmers NF – Orientation of research topics to the needs of small farmers
Counselling for knowledge transfer from research to farmers	Functional AKIS (County Directorates + farmers + research)	NF – Human capital

Actions	Actors / Institutions	Resources (F – financial; NF – non-financial)
Improved actions for young / small farmers	MARD	F – Increasing funding NF – Rules non-differentiated territorially
Increase stability and clarity of regulating framework	MARD	NF – Non-changing rules for financial allocations from NRDP
<ul style="list-style-type: none"> - Education and training of farmers and consultants <ul style="list-style-type: none"> o Changing educational programs o Promoting good practice models 	<ul style="list-style-type: none"> - Ministry of education - MARD - NGO's 	NF – Human capital

Table 4-4. Actors of the enabling environment/farming system to act/solve on system Archetype 5 – “Growth and underdevelopment” (delaying / denying decision to invest)

Actions	Actors / Institutions	Resources (F – financial; NF – non-financial)
Supporting cooperation	<ul style="list-style-type: none"> - Farmers - NGO-s - Consultancy (agricultural chambers) - MARD - Integrators / processors 	<ul style="list-style-type: none"> F – Funds for support NF – Attitude / openness to cooperation F/NF – Digital transformation NF – Human resources NF – Networking (info / exchange knowledge on good practices)

Actions	Actors / Institutions	Resources (F – financial; NF – non-financial)
Developing short chains Promoting local selling platforms	<ul style="list-style-type: none"> - Farmers - NGO-s - Consultancy (agricultural chambers) - MARD 	F – Funding NF – Information
Informing on cooperation principles and benefits	<ul style="list-style-type: none"> - Farmers - Integrators / processors - NGO-s - Clusters 	NF – Transfer of examples of good practices
Development of farmers' associations for processing / selling products	<ul style="list-style-type: none"> - Farmers - Integrators / processors 	F – Financial support NF – Cooperation farmer – processor NF – Trust NF – Mentality NF – Examples of good practices
Promotion of local products	<ul style="list-style-type: none"> - Government - NGO-s - Companies 	F – Financial resources
Awareness of importance of small farms in food security	<ul style="list-style-type: none"> - All institutions - Media campaigns 	F – Financial resources NF – Education
<ul style="list-style-type: none"> - Education and training of farmers and consultants <ul style="list-style-type: none"> o Changing educational programs o Promoting good practice models 	<ul style="list-style-type: none"> - Ministry of education - MARD - NGO's 	NF – Human capital

Table 4-5 lists all the ideas that the participants have suggested during the in-depth discussion on system archetypes and indicates how each of these actions contribute to the principles for a resilience enabling environment and resilience attributes.

Table 4-5. Actions/strategies by contributing to principles for resilience enabling environment and resilience attributes

ACTION/ACTOR(S)	SOURCE	CONTRIBUTION TO RESILIENCE ENABLING PRINCIPLES/ARCHETYPE	CONTRIBUTION TO RESILIENCE ATTRIBUTES
ACTION (WHICH ACTOR MIGHT BE RESPONSIBLE)	SOURCE (WORKSHOP; SUREFARM DELIVERABLE; OTHER LITERATURE)	INDICATE ARCHETYPE (A) THIS ACTION WILL SOLVE/PREVENT AND HOW, AND TO WHICH PRINCIPLE (P) THIS ACTION MIGHT CONTRIBUTE AND HOW	INDICATE TO WHICH RESILIENCE ATTRIBUTE(S) THIS ACTION MIGHT CONTRIBUTE
Increase awareness of insurance importance (farmers, MARD, payment agency)	WORKSHOP	A1 – farmers will be expected to start using available insurance instruments	RESPONSE DIVERSITY
	D2.6	P1 – reducing dependence on emergency relief funds in case of extreme weather events (drought, floods)	
Increase stability and clarity of regulating framework (MARD)	WORKSHOP	A1, A3, A4, A5 – will improve the predictability of the EE and provide equal opportunities for all farmers in accessing support	LEGISLATION COUPLED WITH LOCAL AND NATURAL CAPITAL
	D6.2	P3 – provides farmers and FS possibility to assess and address long-term trends challenging resilience	
Investment in the national irrigation system and forest protection curtains	WORKSHOP	A1 – contributes to mitigate the adverse effects of extreme weather events	FUNCTIONAL DIVERSITY
		P2 – resources are directed to building anticipatory and responsive capacities to mitigate the adverse effects of extreme weather events	
		P5 – puts resources in responding to future challenges	

ACTION/ACTOR(S)	SOURCE	CONTRIBUTION TO RESILIENCE ENABLING PRINCIPLES/ARCHETYPE	CONTRIBUTION TO RESILIENCE ATTRIBUTES
ACTION (WHICH ACTOR MIGHT BE RESPONSIBLE)	SOURCE (WORKSHOP; SUREFARM DELIVERABLE; OTHER LITERATURE)	INDICATE ARCHETYPE (A) THIS ACTION WILL SOLVE/PREVENT AND HOW, AND TO WHICH PRINCIPLE (P) THIS ACTION MIGHT CONTRIBUTE AND HOW	INDICATE TO WHICH RESILIENCE ATTRIBUTE(S) THIS ACTION MIGHT CONTRIBUTE
Consultancy / extension to increase information on available support measures from NRDP (MARD local branches, NGO's, media)	WORKSHOP	<p>A1 – provides farmers with knowledge to better respond to environmental challenges</p> <p>A3 – farmers are able to properly apply for support from NRDP</p> <p>A4 – increases new applicants' success chances to obtain funding</p>	SOCIALLY SELF ORGANIZED
Increasing farmers' information and availability of advisory services (Agricultural chambers, MRD local branches, LAGs)	WORKSHOP	<p>A5 – provides new ideas and knowledge for farm activity diversification and fosters cooperation for better insertion in agri-food chains</p> <p>P2, P3, P4, P5 – farmers and FS are better prepared to assess future long-term trends, build anticipatory and response capacity, and properly direct their investments to increase profitability and/or diversify activities</p>	

ACTION/ACTOR(S)	SOURCE	CONTRIBUTION TO RESILIENCE ENABLING PRINCIPLES/ARCHETYPE	CONTRIBUTION TO RESILIENCE ATTRIBUTES
ACTION (WHICH ACTOR MIGHT BE RESPONSIBLE)	SOURCE (WORKSHOP; SUREFARM DELIVERABLE; OTHER LITERATURE)	INDICATE ARCHETYPE (A) THIS ACTION WILL SOLVE/PREVENT AND HOW, AND TO WHICH PRINCIPLE (P) THIS ACTION MIGHT CONTRIBUTE AND HOW	INDICATE TO WHICH RESILIENCE ATTRIBUTE(S) THIS ACTION MIGHT CONTRIBUTE
Education and training of farmers and consultants (Ministry of education, MARD)	WORKSHOP	<p>A1, A3, A4, A5 – provide farmers and consultants with proper education, training, and knowledge to deal with challenges and shortcomings of the EE, as well as to increase while observing all the requirements imposed by the new policies</p> <p>P2, P3, P4, P5 – enables small farmers to detect, assess and address long-term trends and challenges in ways oriented to their needs</p> <p>P6 – better adaptation of educational programs to the current needs of modern farming</p>	RESPONSE DIVERSITY
Organizing representative groups for small farmers (NGO's, consumers)	WORKSHOP	<p>A3 – provides small farmers a voice in dealing with policy makers; they are currently non-represented, as opposed to large farmers</p> <p>P3 – enables small farmers to detect, assess and address long-term trends and challenges in ways oriented to their needs</p>	SOCIALLY SELF-ORGANIZED
Knowledge transfer (research units, MARD)	WORKSHOP	A4 – increases new applicants' success chances to obtain funding by preparing projects based on new and innovative ideas	<p>SOCIALLY SELF-ORGANIZED</p> <p>INFRASTRUCTURE FOR INNOVATION</p>

ACTION/ACTOR(S)	SOURCE	CONTRIBUTION TO RESILIENCE ENABLING PRINCIPLES/ARCHETYPE	CONTRIBUTION TO RESILIENCE ATTRIBUTES
ACTION (WHICH ACTOR MIGHT BE RESPONSIBLE)	SOURCE (WORKSHOP; SUREFARM DELIVERABLE; OTHER LITERATURE)	INDICATE ARCHETYPE (A) THIS ACTION WILL SOLVE/PREVENT AND HOW, AND TO WHICH PRINCIPLE (P) THIS ACTION MIGHT CONTRIBUTE AND HOW	INDICATE TO WHICH RESILIENCE ATTRIBUTE(S) THIS ACTION MIGHT CONTRIBUTE
Counselling for knowledge transfer from research to farmers	WORKSHOP	P2, P3, P4, P5 – farmers and FS are better prepared to assess future long-term trends, build anticipatory and response capacity, and properly direct their investments to increase profitability and/or diversify activities P6 – research topics are better oriented to the needs of small farmers	
Improved actions for young / small farmers	WORKSHOP	A4 – increases new/young farmers applicants' success chances to obtain funding for starting activities P2 – enables new/young farmers to start new activities well prepared to face future challenges	RESPONSE DIVERSITY
Supporting cooperation (farmers, NGO-s, consultancy, MARD, integrators, processors)	WORKSHOP D2.6 D6.2	A5 – provides better opportunities for integrating small farms in agri-food chains and increases negotiating power with upstream and downstream actors; allows transfer of examples of good practices	SOCIALLY SELF-ORGANIZED
Informing on cooperation principles and benefits (farmers, integrators, processors, NGO's, clusters)	WORKSHOP D2.6 D6.2	P2, P4, P5 – allows farmers to build together anticipatory and responsive capacities, consider diversity of responses and balance resources between actual and future challenges	SPATIAL AND TEMPORAL HETEROGENEITY

D6.4. Implementation roadmaps for the implementation of enabling environment principles



ACTION/ACTOR(S)	SOURCE	CONTRIBUTION TO RESILIENCE ENABLING PRINCIPLES/ARCHETYPE	CONTRIBUTION TO RESILIENCE ATTRIBUTES
ACTION (WHICH ACTOR MIGHT BE RESPONSIBLE)	SOURCE (WORKSHOP; SUREFARM DELIVERABLE; OTHER LITERATURE)	INDICATE ARCHETYPE (A) THIS ACTION WILL SOLVE/PREVENT AND HOW, AND TO WHICH PRINCIPLE (P) THIS ACTION MIGHT CONTRIBUTE AND HOW	INDICATE TO WHICH RESILIENCE ATTRIBUTE(S) THIS ACTION MIGHT CONTRIBUTE
Development of farmers' associations for processing / selling products (farmers, integrators, processors)	WORKSHOP D2.6 D6.2		
Promotion of local products (Government, NGO's, companies)	WORKSHOP		FUNCTIONAL DIVERSITY
STRATEGIES DISCUSSED TO INCLUDE THE ABOVE ACTIONS			
New crops /varieties/technologies to improve diversity and cope with climate change (drought)	WORKSHOP D2.6 D5.5	A1 P2	FUNCTIONAL DIVERSITY

ACTION/ACTOR(S)	SOURCE	CONTRIBUTION TO RESILIENCE ENABLING PRINCIPLES/ARCHETYPE	CONTRIBUTION TO RESILIENCE ATTRIBUTES
ACTION (WHICH ACTOR MIGHT BE RESPONSIBLE)	SOURCE (WORKSHOP; SUREFARM DELIVERABLE; OTHER LITERATURE)	INDICATE ARCHETYPE (A) THIS ACTION WILL SOLVE/PREVENT AND HOW, AND TO WHICH PRINCIPLE (P) THIS ACTION MIGHT CONTRIBUTE AND HOW	INDICATE TO WHICH RESILIENCE ATTRIBUTE(S) THIS ACTION MIGHT CONTRIBUTE
Insurance instruments adapted to needs of small farms	WORKSHOP	A1	RESPONSE DIVERSITY
	D2.6	P1, P2, P3	
More stable and clear policies and regulations	WORKSHOP	A3	LEGISLATION COUPLED WITH LOCAL AND NATURAL CAPITAL
	D6.2	P3, P4, P6	
Improved consultancy system	WORKSHOP	A1, A3	SOCIALLY SELF ORGANIZED
		P3	
New technologies and machinery adapted for the needs to small farms	WORKSHOP	A4	FUNCTIONAL DIVERSITY INFRASTRUCTURE FOR INNOVATION
	D2.6	P2, P3, P5	
	D5.5		
Land consolidation / improved regulations for land market	WORKSHOP	A3 LIMITS	LEGISLATION COUPLED WITH LOCAL AND NATURAL CAPITAL
		P5, P6	

ACTION/ACTOR(S)	SOURCE	CONTRIBUTION TO RESILIENCE ENABLING PRINCIPLES/ARCHETYPE	CONTRIBUTION TO RESILIENCE ATTRIBUTES
ACTION (WHICH ACTOR MIGHT BE RESPONSIBLE)	SOURCE (WORKSHOP; SUREFARM DELIVERABLE; OTHER LITERATURE)	INDICATE ARCHETYPE (A) THIS ACTION WILL SOLVE/PREVENT AND HOW, AND TO WHICH PRINCIPLE (P) THIS ACTION MIGHT CONTRIBUTE AND HOW	INDICATE TO WHICH RESILIENCE ATTRIBUTE(S) THIS ACTION MIGHT CONTRIBUTE
Funding/credit instruments adapted to needs of small farms	WORKSHOP D2.6	A3 LIMITS P1, P2, P3, P6	RESPONSE DIVERSITY
Diversification of farm activities (processing)	WORKSHOP D5.5	A3 LIMITS P5, P6	FUNCTIONAL DIVERSITY
Expansion of organic farming	WORKSHOP D5.5	A3 LIM P4, P5	SPATIAL AND TEMPORAL HETROGENEITY OF FARM TYPES
Foster cooperation (facilities and incentives)	WORKSHOP D5.5	A5 P5	SOCIALLY SELF-ORGANIZED
Better adaptation of education programmes to current demand/needs of agricultural sector	WORKSHOP	A1, A3, A4, A5 P2, P3, P4, P5, P6	RESPONSE DIVERSITY

Notes:

A1=archetype 1 (fixes that fail); A3=archetype 3 (Limits to growth); A4= archetype 4 (Success for the successful); A5=archetype 5 (Growth and underinvestment)

D6.4. Implementation roadmaps for the implementation of enabling environment principles



P1...P6= principle 1...6 (see details in table 5.1)

EE= enabling environment; FS=farming system



Discussion

There are several actors who play a major role in explaining the prevalence of the system archetypes in the Romanian case study.

Farmers are a major player, since they are all in center of the farming system. Small farmers are reluctant to work with insurance companies (unless they are obliged to buy an insurance as a condition for obtaining funding for investments from the NRDP), due to past negative experiences, when they were not reimbursed for the losses they incurred (under various unrealistic reasons). They prefer to cope with this challenge in alternative ways (by applying changes in technologies such as using new plant varieties and local animal races – more resistant to drought and better adapted to local conditions, or by maintaining financial resources to be used during harsh times.

Also, they are very reluctant to cooperation, which is the major cause of poor integration of small farms in the agri-food chains.

Yet, they have an important role to play in addressing the system archetypes in the future, through:

- better education and training that would teach them to:
 - o make use of insurance instruments and of support measures from NRDP (addressing archetype 1 - fixed that fail);
 - o learn to cooperate.

The **Ministry of Agriculture and Rural Development (MARD)** as policy maker is another major player. It has an essential role in explaining the prevalence of the system archetypes in the small farming system. In the discussions, as well as in previous deliverables, its contribution was highlighted in several ways. The frequent changes, together with increasing bureaucracy are contributing to archetype 3 (Limits to growth) and archetype 4 (Success to the successful). So, corrective actions that need to be taken are:

- First and foremost, it needs to provide a stable legislative framework for agricultural and rural development policies, accompanied by coherent and simple regulations for implementation.
- The local branches need to apply identical criteria for funding similar projects from NRDP (procedures and assessment criteria are still somewhat subjective/slightly different in various counties).
- Improving the quality of human resources in the public system is needed.

The **advisory / consultancy system** is another major actor. In time, the public advisory system has been reduced, old consultants that had a vast knowledge and experience retired, many new consultants currently need complex training to be able to guide farmers to new technologies, new principles of management and marketing, the intricate and continuously changing legislative

“forest”, in brief, to make use of all the new knowledge and regulations to comply with, and trying to achieve efficiency and sustainability.

Actions needed for it include a complete reorganization of the public advisory system (as functional Agricultural Chambers) which should be able to meet the needs of information of small farms (which are prevalent in the Romanian agricultural sector).

In the above analysis (section 4), the advisory system appears to have a potential important contribution in fixing the system failures in all archetypes.

Another important actor is the **education and training system**. In the last three decades, its quality decreased continuously. The vocational schools specialized in agriculture, horticulture, animal husbandry, veterinary and all related activities have been closed, only very few remained, and they are not able to cover the need for skilled workers (specialized technicians). The remaining schools generally lost their adjoining farms used for students’ practical training, and the current curricula is more theoretical than applied. It is also old, not able to match the newest trends and innovations in latest years agriculture.

The education system appears to have a potential important contribution in fixing the system failures in *all archetypes* if certain important actions will be taken:

- The formal education system needs to update the curricula according to the current knowledge and information in new technologies;
- It needs to allow students to graduate with different levels of education (unskilled workers, skilled workers – technicians, university graduates – engineers), in order to cover the whole range of specializations demanded on the labour market.
- Continuous training should be available for farmers lacking formal agricultural education.
- Specialized education and training should be available for consultants / advisors.

The ways the actions presented in section 4 and 5 contribute to the principles of a resilience enabling environment are summarized in table 5-1.

The principles that are most urgently in need of action in our case study are:

- **Principle 2:** When shocks occur, resources (from actors in FS and EE) should be shifted towards building anticipatory capacity as well as responsive capacity, to prevent addiction to external solutions and to increase future coping capacity of the FS;
- **Principle 5:** FS and EE should develop a sufficient degree of ambidexterity, that is, find a balance in putting resources in immediate versus future challenges;



- **Principle 4:** the enabling environment foster a potential diversity of responses, rather than focusing too much on a limited set of actions strengthening resilience.

The discussed actions and strategies in section 4 and 5 contribute essentially to the following resilience attributes:

- Socially self-organized (most of discussed actions – 7, included in 2 strategies)
- Response diversity (3 actions included in 3 strategies)
- Functional diversity (2 actions included in 3 strategies)
- Legislation coupled with local and natural capital (1 action included in 2 strategies)
- Infrastructure for innovation (1 action included in 1 strategy)
- Spatial and temporal heterogeneity (1 action included in 1 strategy).

The actions presented above for the small mixed farming system in Romania are contributing in different ways to the resilience capacities.

Most of actions resonate with the need for strengthening the anticipatory and responsive capacities by shifting resources to increase future coping capacities of the farming system (principle 2), which deals with *adaptation*.

The actions resonating with principles 4 and 5 refer to fostering a potential diversity of responses and ambidexterity, by finding a right balance between resources needed for facing the current challenges and future challenges (calling for adaptation and/or transformation).

No actions are resonating with principle 1, most of them are pointing to avoiding providing temporary resources to cope with the adverse consequences of shocks, and rather finding alternative solutions to the dependence on emergency solutions/aids; therefore no discussed actions are contributing to robustness.



Table 5-1. Contribution of discussed actions and strategies to the principles of a resilience enabling environment

Actions / strategies	Principle 1	Principle 2	Principle 3	Principle 4	Principle 5	Principle 6
	When a FS cannot cope with a challenge to avoid severe income losses, the EE (particularly government) should provide temporary resources to cope with the adverse consequences of the shock, but only to buy time while working on the real remedy	When shocks occur, resources (from actors in FS and EE) should be shifted towards building anticipatory capacity as well as responsive capacity , to prevent addition to external solutions and to increase future coping capacity of the FS.	EE should assist the FS to detect, assess and address long-term trends that challenge the future resilience of the FS in the long run.	EE foster a potential diversity of responses , rather than focusing too much on a limited set of actions strengthening resilience	FS and EE should develop a sufficient degree of ambidexterity, that is, find a balance in putting resources in immediate versus future challenges	systemic in-depth analysis of the root causes of challenges and of the drivers of FS vulnerability to these challenges to avoid a redefinition of the problem and implementation of solutions that don't fix the real problem.
ACTIONS						
Increase awareness of insurance importance	✓					
Increase stability and clarity of regulating framework			✓			
Investment in the national irrigation system and forest protection curtains		✓			✓	

D6.4. Implementation roadmaps for the implementation of enabling environment principles

Consultancy / extension to increase					
information on available support measures from NRDP	✓	✓	✓	✓	
Increasing farmers' information and availability of advisory services	✓	✓	✓	✓	
Education and training of farmers and consultants	✓	✓	✓	✓	
Organizing representative groups for small farmers		✓			
Knowledge transfer	✓	✓	✓	✓	✓
Counselling for knowledge transfer from research to farmers	✓	✓	✓	✓	✓
Improved actions for young / small farmers	✓				
Supporting cooperation	✓		✓	✓	
Informing on cooperation principles and benefits	✓		✓	✓	
Development of farmers' associations for processing / selling products	✓		✓	✓	
Promotion of local products	✓		✓	✓	

STRATEGIES

New crops /varieties/technologies to improve diversity and cope with climate change (drought)		✓	✓		✓
Insurance instruments adapted to needs of small farms	✓	✓	✓		
More stable and clear policies and regulations			✓	✓	✓
Improved consultancy system			✓		
New technologies and machinery adapted for the needs to small farms		✓	✓		✓
Land consolidation / improved regulations for land market					✓
Funding/credit instruments adapted to needs of small farms	✓	✓	✓		✓
Diversification of farm activities (processing)		✓		✓	✓
Expansion of organic farming				✓	✓
Better adaptation of education programmes to current demand/needs of agricultural sector			✓		✓



Conclusions

Summarizing the broad discussions and the important diversity of actions proposed by the workshop participants in order to deal with the identified system failures, some conclusions may be highlighted.

For all archetypes, multiple actors and institutions need to be involved, and some institutions require rehabilitation (such as the public advisory system) or significant improvements in functioning and quality of human resources. This is true at the level of policy making and implementation – local branches of the Ministry of Agriculture and Rural Development, Agency for Funding the Rural Investments and Agency for Payments and Intervention in Agriculture. It is also true for the education and training system which needs a significant modernization and synchronization with the current advances and requirements of modern agriculture, as well as a better adaptation to the demand of current markets and consumers.

Although farms and farming systems need financial resources for development, actions and strategies for enabling their resilience need also important non-financial resources, aimed at aligning formal and informal “institutions” (regulations, laws, policies enforced by the official authorities) and social norms modelling the thinking and behavior of the main actors involved (such as attitudes/openness to cooperation, to insurance instruments, to digital transformation, to networking).

Two important strategies (and linked actions) were highlighted as working to fix most of the system failures: modernizing the education and training system, making functional the advisory/consultancy system, and increasing awareness and openness to cooperation.

Having taken into consideration all the actions and strategies analyzed in the workshop and resulting report, one may conclude that the enabling environment of the small mixed farming system in the Nord-Est region of Romania is orienting its future development mostly through adaptation and transformation and to a much lesser extent through robustness as resilience capacities.

References

Gavrilescu, C., Tudor, M., Voicilas, D-M. 'Annex to D6.2 – Romania. In: Mathijs, E., Bijttebier, J., Accatino, F., Feindt, P., Gavrilescu, C., Manevska-Tasevska, G., Meuwissen, M., Ollendorf, F., Peneva, M., San Martín, C., Severini, S., Spiegel, A., Vigani, M., Zawalińska, K., Wauters, E. (2021) D6.2 Report on combinations of conditions for successful and unsuccessful fostering of resilience in agricultural sectors. Sustainable and resilient EU farming systems (SURE-Farm) project report.

Gavrilescu, C., Tudor, M., Voicilas, D.M., Luca, L. 'FoPIA-SURE-Farm 2 Case Study Report Romania'. In: Accatino, F., Paas, W., Herrera, H., Appel, F., Pinsard, C., Shi, Y., Schütz, L., Kopainsky, B., Bańkowska, K., Bijttebier, J., Black, J., Gavrilescu, C., Krupin, V., Manevska-Tasevska, G., Ollendorf, F., Peneva, M., Rommel, J., San Martín, C., Severini, S., Soriano, B., Valchovska, S., Vigani, M., Wauters, E., Zawalińska, K., Zinnanti, C., Meuwissen, M., Reidsma, P. (2020). D5.5 Impacts of future scenarios on the resilience of farming systems across the EU assessed with quantitative and qualitative methods. Sustainable and resilient EU farming systems (SURE-Farm) project report, EU Horizon 2020 Grant Agreement No. 727520.

Gavrilescu, C. (2019). T2.6. Report on Focus Group on Risk Management Strategies – Romania. Sustainable and resilient EU farming systems (SURE-Farm) project report, EU Horizon 2020 Grant Agreement No. 727520.

Kim, D.H. (2000). Systems Archetypes I: Diagnosing Systemic Issues and Designing High-Leverage Interventions. Pegasus, Waltham (MA).

Reidsma, R., Paas, W., Accatino, F., Appel, F., Black, J., Bijttebier, J., Gavrilescu, C., Kopainsky, B., Krupin, V., Manevska Tasevska, G., Meuwissen, M., Ollendorf, F., Peneva, M., Senni, S., Severini, S., Soriano, B., Urquhart, J., Vigani, M., Zawalinska, K., Zinnanti, C., Herrera, H. (2020). D5.6 Impacts of improved strategies and policy options on the resilience of farming systems across the EU. Sustainable and resilient EU farming systems (SURE-Farm) project report, EU Horizon 2020 Grant Agreement No. 727520.

Voicilas, D.-M., Luca, L. (2018). Assessing how policies enable or constrain the resilience of a small and medium-sized mixed farming system in North-Eastern Romania. An application of the Resilience Assessment Tool (ResAT), available at <https://surefarmproject.eu/>.



18 ANNEXES

18.1 ANNEX 1: Roadmaps for a resilience enabling environment: workshop guidelines

The workshop in Task 6.2 has two main objectives:

- The first objective is to validate the archetypes identified in Task 6.1 with the stakeholders. *Do the stakeholders recognise the system archetypes? Do they agree on the prevalence of the system archetypes in the case study? Which ones are really problematic according to the participants? Can they provide any additional examples?*
- The second objective is to have a brainstorm with the participants on how the enabling environment can avoid or act on these system archetypes in the future. The enabling environment mainly has an impact on the functions and attributes of the farming system through providing resources (financial and non-financial) and institutions (formal and informal). *Stakeholders are asked to think about how resources can be better distributed, based on the causes of system failures, and/or how institutions must change in order to deal with these system archetypes.*

Finally, stakeholders are asked to prioritise their ideas in this brainstorming exercise, to develop case-specific roadmaps for a resilience enabling environment.

Preparation of the workshop

Participants: Participants for this workshop should be representatives of important stakeholder groups in the enabling environment and in the farming system. Case study partners should use their knowledge of the case study stakeholder landscape to ensure the most appropriate participants are invited. Representatives of a **variety of stakeholder** groups is recommended. However, presence of policy makers is key. The number of participants is flexible, although we would suggest a minimum of 10.

Online workshop using online whiteboard: Under current conditions, we provide guidelines for an online workshop. We strongly recommend to use an online whiteboard such as **Mural or Miro** to facilitate a structured discussion with participants. Such an online whiteboard allows you to capture ideas from all participants and is used as an important output of the workshop.

Introductory presentation: The main preparation for this workshop has been the work done in Task 6.1. However, as an introduction to the workshop, **a presentation** should be prepared in advance to:

- 1) Introduce the objectives of the workshop
- 2) Introduce the concept of enabling environment.
- 3) An overview of the 4 archetypes described in deliverable 6.2. Show how they are particularly valid or derived from results of the pattern analysis in your case study by giving a specific example.
- 4) The outline of the workshop

Outline of the workshop

This section provides details for the content of the workshop. Guide times are given for each section, but please alter these if you anticipate more or less time is required for your intended group of participants. The workshop will require about **3 hours**. We recommend:

- to have at least **2 breaks of 5 min** as it is hard to concentrate during on line discussions
- that the workshop is **audio recorded** (with permission of the participants through informed consent) in order that case study partners can refer back to the recording when preparing their summary report of the workshop.

Outline and format of the workshop

- **00h00- 00h10:** Welcome – participants introduce themselves (10 min)
- **00h10-00h30:** Introductory presentation (see preparation)
- **00h30-00h55:** Have a discussion with the participants:
 - Clarifying questions regarding the system archetypes?
 - Validation of the system archetypes within your case study:
 - *“Do you agree/disagree with our diagnosis in the form of system archetypes?”*
 - *“Besides examples given during the presentation, do you have other case-study specific illustrating examples that apply to the presented system archetypes?”*

5 min break



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- **01h00-02h30:** In depth discussion on system archetypes. We advise to have about 7 participants for these in depth discussion. So, if you indeed have 10-15 participants, we recommend to do this part in 2 break-out sessions. However, if you do not have much more than 7 participants, break-out sessions are probably not necessary, and you might continue as plenary.
 - **01h00-01h45:** Break out session (or plenary if the number of participants is not much higher than 7) on first 2 archetypes (fixes that fail/shifting the burden and limits to growth). Provide the updated table (see preparation) of actors, institutions and resources (enabling environment) on the online whiteboard to inspire the participants. Ask them to think of actions (and to write them down on the online whiteboard) or combinations of actions that need to be taken by these actors for acting on or avoiding these particular archetypes and/or to solve the archetypes that currently exist in the case study. To allow participants to think of actions on the short or rather long term or actions linked to particular future opportunities (eg new CAP, local elections, etc), we recommend you to structure the input of participants around a timeline within the online whiteboard. The actors should not be addressed one by one, but when a participant writes down an idea, ask him/her to clearly indicate which actor or actors should contribute to that action. This individual task should take about 10 min, followed by a discussion around the collected ideas (30 min). As a moderator, while participants are writing their ideas on post-it notes, try already to re-arrange them, by combining the same ideas into one, by grouping similar ones etc. Then organize your discussion around the groups of actions, by asking participants to further explain their proposals and others to react on it. At the end, set up a voting session (5 votes per participants) to vote for the most urgent ideas with highest priority according to the participants (5 min).
 - **01h45-02h30:** Have a second break-out session on the following 2 archetypes (eroding goals, success to the successful). Follow the same steps as for the first session.

10 min break



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- **02h40-02h55:** Go back to plenary. Moderator of each break out session presents 3 ideas with highest votes for each of the archetypes in plenary. If you have no break out sessions, this part is not relevant. You can either decide to use this time to extend the discussion on the archetypes or to have a somewhat shorter workshop.
- **02h55-03h00:** Thank the participants for taking part in the workshop. If possible, provide a summary back to the participants to check if it reflects their understanding of the key points that were discussed and the resulting recommendations



18.2 ANNEX 2: Resilience attributes

Table 18.1: Resilience attribute definitions and implications. Source: Paas et al. (submitted)³ adapted from Cabell & Oelofse et al. (2012)⁴.

³ Paas, W., Accatino, F., Bijttebier, J., Black, J.E., Gavrilescu, C., Krupin, V., Manevska-Tasevska, G., Ollendorf, F., Peneva, M., San Martin, C., Zinnanti, C., Appel, F., Courtney, P., Severini, S., Soriano, B., Vigani, M., Zawalinska, K., van Ittersum, M.K., Meuwissen, M.P.M, Reidsma, P., 2021. Participatory assessment of critical thresholds for resilient and sustainable European farming systems. Submitted

⁴ Cabell, J.F., Oelofse, M., 2012. An Indicator Framework for Assessing Agroecosystem Resilience. Ecol. Soc. 17, 18. <https://doi.org/10.5751/ES-04666-17011>

Resilience attribute	Definition	Implications	Explanation statement	Link with resilience principle
Reasonably profitable	Persons and organizations in the farming system are able to make a livelihood and save money without relying on subsidies or secondary employment	Being reasonably profitable allows participants in the system to invest in the future; this adds buffering capacity, flexibility, and builds wealth that can be tapped into following release	Farmers and farm workers earn a livable wage while not depending heavily on subsidies	Systems reserves (economic capital)
Production coupled with local and natural capital	The system functions as much as possible within the means of the bio-regionally available natural resource base and ecosystem services	Responsible use of local resources encourages a system to live within its means; this creates an agroecosystem that recycles waste, relies on healthy soil, and conserves water	Soil fertility, water resources and existing nature are maintained well	Systems reserves (natural capital), tightness of feedbacks
Functional diversity	Functional diversity is the variety of (ecosystem) services that components provide to the system	Diversity buffers against perturbations (insurance) and provides seeds of renewal following disturbance	There is a high variety of inputs, outputs, income sources and markets	Diversity
Response diversity	Response diversity is the range of responses of these components to environmental change	Diversity buffers against perturbations (insurance) and provides seeds of renewal following disturbance	There is a high diversity of risk management strategies, e.g. different pest controls, weather insurance, flexible payment arrangements	Diversity
Exposed to disturbance	The system is exposed to discrete, low-level events that cause disruptions without pushing the system beyond a critical threshold	Such frequent, small-scale disturbances can increase system resilience and adaptability in the long term by promoting natural selection and novel configurations during the phase of renewal; described as “creative destruction”	The amount of year to year economic, environmental, social or institutional disturbance is small (well dosed) in order to timely adapt to a changing environment	Openness
Spatial and temporal heterogeneity of farm types	Patchiness across the landscape and changes through time	Like diversity, spatial heterogeneity provides seeds of renewal following disturbance	There is a high diversity of farm types with regard to economic size, intensity, orientation and degree of specialization	Modularity, diversity
Optimally redundant farms	Critical components and relationships within the system are duplicated in case of failure	Redundancy may decrease a system’s efficiency, but it gives the system multiple back-ups, increases buffering capacity, and provides seeds of renewal following disturbance	Farmers can stop without endangering continuation of the farming system and new farmers can enter the farming system easily	Modularity

D6.4. Implementation roadmaps for the implementation of enabling environment principles



Supports rural life	The activities in the farming system attract and maintain a healthy and adequate workforce, including young, intermediate and older people.	A healthy workforce that includes multiple generations will ensure continuation of activities and facilities in the area, and the timely transfer of knowledge.	Rural life is supported by the presence of people from all generations, and also supported by enough facilities in the nearby area (e.g. supermarkets, hospital, shops)	Systems reserves (social capital)
Socially self-organized	The social components of the agroecosystem are able to form their own configuration based on their needs and desires	Systems that exhibit greater level of self-organization need fewer feedbacks introduced by managers and have greater intrinsic adaptive capacity	Farmers are able to organize themselves into networks and institutions such as co-ops, community associations, advisory networks and clusters with the processing industry	Tightness of feedbacks, system reserves (social capital)
Appropriately connected with actors outside the farming system	The social components of the agroecosystem are able to form ties with actors outside their farming system	In case self-organization fails, signals can be sent to actors that indirectly influence the farming system	Farmers and other actors in the farming system are able to reach out to policy makers, suppliers and markets that operate at the national and EU level	Tightness of feedbacks
Legislation coupled with local and natural capital	Regulations are developed to let the system function as much as possible within the means of the bio-regionally available natural resource base and ecosystem services	Responsible use of local resources encourages a system to live within its means; this creates an agroecosystem that recycles waste, relies on healthy soil, and conserves water	Norms, legislation and regulatory frameworks are well adapted to the local conditions	Systems reserves (social capital)
Infrastructure for innovation	Existing infrastructure facilitates diffusion of knowledge and adoption of cutting-edge technologies (e.g. digital)	Through timely adoption of new knowledge and technologies, a farming system can better navigate in a changing environment	Existing infrastructure facilitates knowledge and adoption of cutting-edge technologies (e.g. digital)	Openness, system reserves
Diverse policies	Various policy instruments stimulate different mechanisms that improve different resilience capacities.	Policies addressing all three resilience capacities avoid situations in which farming systems are permanently locked in a robust but unsustainable situation. Or situations in which adapting and transforming systems are increasingly vulnerable	Policies stimulate all three capacities of resilience, i.e. robustness, adaptability, transformability	Diversity



