SHERPA
Rural Science-Society-Policy Interfaces

SHERPA Discussion Paper

# TOWARDS SUSTAINABLE & RESILIENT VALUE CHAINS

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Sustainable Hub to Engage into Rural Policies with Actors (SHERPA) is a four-year project (2019-2023) with 17 partners funded by the Horizon 2020 programme. It aims to gather knowledge that contributes to the formulation of recommendations for future policies relevant to EU ruralareas, by creating a science-society-policy interface which provides a hub for knowledge andpolicy. Find out more on our website:

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# Summary

The SHERPA process will support the gathering of evidence from across Europe, at multiple levels, regarding **sustainable and resilient value chains**, showing the directions in which it is most appropriate and feasible to address local needs. SHERPA Multi-Actor Platforms (MAPs) are invited to discuss the following key questions:

- What are the needs of the area covered by the MAP in relation to sustainable & resilient value chains?
- What are the policy interventions already in place, and what are examples of actions taken by local actors addressing these needs implemented in the area covered by the MAP?
- Which policy interventions (i.e. instruments, measures) are recommended by MAP members to be implemented at the local, regional, and/or national level? How can the EU support these interventions?
- What are the knowledge gaps, and what research projects are needed?

The exercise will follow the standard SHERPA process: (i) preparation of discussion material based on the SHERPA Discussion Paper as well as regional- and national-specific research (ii) consultation with MAP members, (iii) summary of the discussions in a MAP Position Paper, and (iv) synthesis of the regional and national MAP Position Papers for discussion at European Union level.

This SHERPA Discussion Paper provides a synthesis of EU policy aims and findings from research as identified in recent research projects. It sets out the main research findings in relation to sustainable value chains. It does not aim to cover all aspects related to sustainable value chains, but will focus on a set of sub-themes identified as relevant for rural areas.

# 1. Introduction

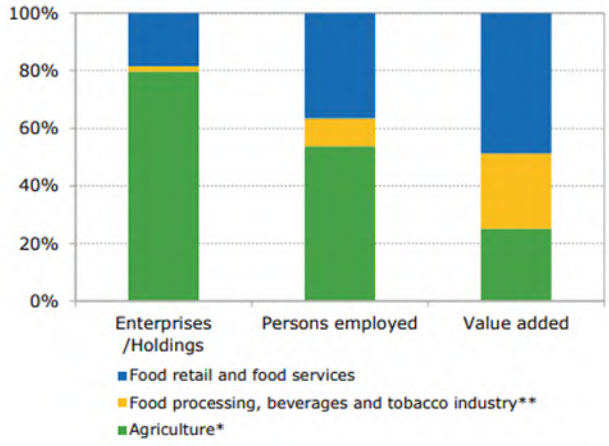
Many businesses in rural areas, particularly farms, are small businesses embedded in agri-food supply chains that are often large multinational companies up and downstream of primary production. Therefore, rural areas are disproportionately affected by the changing power dynamics in agri-food supply chains. The growth of global agri-food value chains has coincided with the process of merger and acquisitions in the European retail sector. This process has shaped perceptions that the structure of agri-food supply chains has become oligopolistic, with the retail sector increasing its influence over producers, whose bargaining power in supply chains has weakened in comparison. With a weakened bargaining position, it is assumed that redistribution of added value will negatively impact producers in rural areas who will receive a smaller proportion.

While the largest number of businesses and employees involved in agri-food supply chains is in the agricultural sector, the added value belonging to agriculture in the whole food chain is much smaller compared to the food processing and retail industries (see Figure 1). In addition, the amount of the agricultural sector's added value has neither decreased nor increased over time despite increasing added value for the retail sector (see Figure 2). Asymmetric value distribution within the European agri-food sector varies between sectors and/or over time, with some producers being more negatively impacted than others, or some producers more negatively impacted during different time periods (Swinnen et al., 2021). Perceptions among rural producers of asymmetric value distribution have led to relations between producers and other supply chain actors becoming characterised by mistrust and a lack of solidarity (H2020 SUFISA) (Busch & Spiller, 2016), leading to calls for policies that can re-balance the market power relations between supply chain actors (Copa Cogeca, 2016).

The Long Term Vision for Rural Areas up to 2040 highlights the 'active' role rural areas will play in transitions towards sustainable value chains and achieving the objectives of the EGD, Farm to Fork Strategy, and Circular Economy Action Plan. Under the LTVRA, the Commission emphasizes how the preservation of natural resources, the restoration of landscapes, including cultural ones, the greening of farming activities and shortening supply chains will make rural

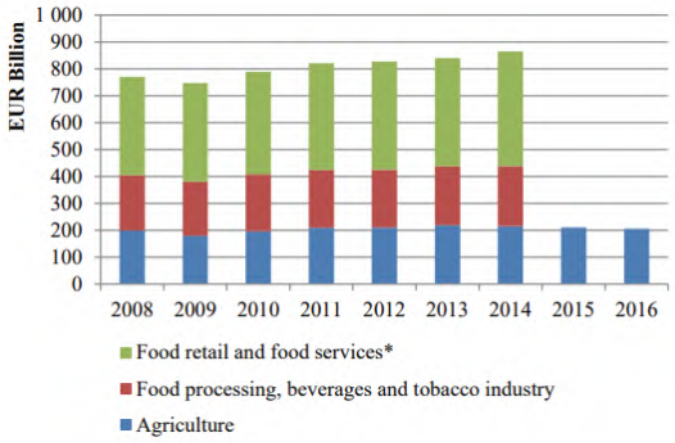
rural areas 'stronger' by focusing on empowering rural communities, improving access to services and facilitating social innovation. To ensure economic sustainability, actions will be aimed at making rural areas more 'prosperous' by diversifying economic activities and improving

Figure 1. Contribution of the different stages of the agri-food chain to the European Economy




Source: European Commission, 2015

Figure 2. Distribution of Gross Added Value per Food Supply Stage in the EU




Source: DG Agri (2018)

The global food system is among the highest contributors to climate change, releasing from 10.8 to 19.1 of GtCO2eq per year, equivalent to 21-37% of total net anthropogenic GHG emissions (IPCC, 2022). In the EU, ~10% of GHG emissions comes from the agricultural sector (Crippa et al., 2021). On top of this, intensive agricultural practices, are responsible for 32% of global terrestrial acidification, 78% of global eutrophication and 80% of global deforestation (Poore & Nemecek, 2018). Environmental impacts are also associated with the high resource intensity of food production systems: for instance, around 37% of the global land and two thirds of global freshwater resources are devoted to agriculture (ibid). What is more, the food production process is becoming increasingly energy intensive, with a third of food systems' emissions being associated with energy consumption (Crippa et al., 2021). It is therefore relevant to identify a set of feasible intervention measures to help facilitate improved farm management practices that can enable rural producers to continue to meet consumer demands as well as ensure environmentally beneficial outcomes.

While the agri-food sector is a significant contributor to climate change, it is simultaneously vulnerable to its negative impacts, such as droughts, floods, and forest fires (Thornton & Lipper, 2014). Environmentally sustainable practices therefore should not just be seen as a requirement to maintain the stability of the eco-system, but also a necessity to increase the resiliency and adaptability of the ecosystems that form the basis of social and economic development in rural areas (Beccali et al., 2009).

The COVID-19 crisis has demonstrated the shortcomings of global supply chains when unexpected exogenous shocks occur. Such shocks are a particularly acute problem in agri-food supply chains as disruptions can impact the quality or usability of products due to the short lifetime of food products (H2020 GOLF). This has led supply chain actors to reassess priorities – as opposed to efficiency and productivity, business continuity is starting to be prioritised over costs and supply chain resiliency and flexibility are becoming central objectives.

In this given context, sustainable value chains are recognised to mitigate the problems discussed above. Sustainable value chains differ from conventional value chains in terms of control, transparency, distribution of profit and in the concept of 'value' itself. While in conventional value chains, participation of actors is limited by the stages of the value chain, in sustainable value chains members participate in a different way: they contain partnerships between all players of the chain, where all participants benefit and have a say in the development of the chain (Ecker, 2010). Conventional value chains limit the concept of value to economic profitability, while sustainable value chains expand the idea of value to include economic, environmental, and social well-being. Sustainable value chains therefore add values and relationships to an otherwise purely price-driven equation.

By definition, sustainable value chains are those which are profitable throughout all of its stages (economic), provide broad benefits for society (social), and have a positive or neutral impact on the environment (environmental) (FAO, 2014). With the increasing importance of environmental and social factors in business, the understanding of the concept of added value has expanded, shifting from a focus on profit maximisation, to satisfying the needs of a variety of stakeholders within the value chain now and in the future. 'Sustainable value' thus implies the integration of environmental, social, and economic sustainability goals into business, together with multi-stakeholder needs and long-term planning (Sadovska et al., 2020).

In a just transition, those who will benefit from a transition must be incentivised to change, and those who will lose must be compensated. The overall approach to meeting challenges of climate change and environmental degradation must improve the social and economic conditions of rural populations. Supply chain stakeholders could mediate or obstruct an environmental sustainable transition and therefore will play a significant role in ensuring that it assists, and not inhibit, this transition. Strong support from private actors along the value chain is needed, not just from producers of primary goods, but also processors, retailers, and input suppliers.

Based on the problems outlined above, and the potential solutions provided by transitioning towards sustainable value chains, this discussion paper will focus on the following strategies:

- Strengthening the role of producers in supply chains by: increasing their market power through participation in alternative supply chain models; empowering them through education and training; and increasing their resilience and adaptability by fostering their responsive capacities.

- Building trust between supply chain stakeholders by: increasing horizontal coordination; facilitating vertical coordination; and increasing producer capacity through social networks and social capital.

- Verification and communication of sustainable practices and outcomes through: commitments to abide by agreed-upon standards within supply chains; and participating in certification and labelling schemes.

# 2. EU policy context

Many policy developments are changing the landscape for supply chains with the aim of facilitating a transition towards sustainable value chains. Most notably, in the environmental realm, under the Fit for 55 package, the European Union (EU) has committed to reduce greenhouse gas emissions (GHG) by 55% by 2030 and to climate neutrality by 2050. To support these GHG reduction commitments, the EU developed a set of policy initiatives aimed at various sectors known as the European Green Deal (EGD), which sets out a green growth strategy for the EU with climate and environment at its centre.

By the very fact that they cover approximately 80% of EU territory, rural regions will have an essential role in the transition to net-zero emissions economies and building resilience to climate change due to the associated natural resources, biodiversity and ecosystem services needed to sustain our lives. They produce food and energy, clean water and air, and sequester carbon. Simultaneously, there is an urgent need to transform emission-intensive activities in rural regions into environmentally friendly and net-zero alternatives. Because of its influence on the natural environment and its special role when it comes to climate action, the policy ambitions of the EGD will affect many aspects of rural economies.

Compared to urban areas, the primary sector (particularly agriculture and the agri-food system) remains vital to rural economies in the EU. Therefore, policies aimed at facilitating transitions towards sustainable value chains within these sectors will disproportionately affect rural areas. The Farm to Fork Strategy, with the objective of making the EU's food system 'a gold standard of sustainability' is the most important to the agricultural and agri-food sectors. It complements and supports the EGD efforts to move towards a more sustainable food system and contributes to the UN's Sustainable Development Goals. The Strategy is intended to facilitate an environmental sustainability transition in every step in the food supply chain from production to consumption. To achieve this, it sets out actions and objectives the Commission considers necessary, combining both regulatory and non-regulatory initiatives, as well as targets in a number of spheres for 2030, including:

- 25% target for organically farmed area
- 50% reduction in the use of chemical pesticides
- 20% reduction in the use of mineral fertilisers
- 50% reduction of antimicrobial use for farmed animals
- 50% reduction in food waste.

The Long Term Vision for Rural Areas up to 2040 highlights the 'active' role rural areas will play in transitions towards sustainable value chains and achieving the objectives of the EGD, Farm to Fork Strategy, and Circular Economy Action Plan. Under the LTVRA, the Commission emphasizes how the preservation of natural resources, the restoration of landscapes, including cultural ones, the greening of farming activities and shortening supply chains will make rural areas more resilient to climate change, natural hazards and economic crises: 'As providers of services that protect ecosystems and solutions for carbon neutrality, rural areas have an increasingly important role to play in climate change mitigation and the sustainable bio- and circular economy. Rural areas should build on sustainable farming, forestry, agri-food economic activities and a diversified range of greener economic activities promoting carbon-farming and local, community-based high-quality production'.

The Long-Term Vision for Rural Areas Action Plan does not solely focus on the environmental dimension of sustainable value chains, but it also focuses on social and economic sustainability. The Action Plan will engage actors at EU, national, regional and local levels, to support the shared goals, foster economic, social and territorial cohesion and respond to the aspirations of rural communities. To ensure social sustainability, actions will be aimed at making rural areas 'stronger' by focusing on empowering rural communities, improving access to services and facilitating social innovation. To ensure economic sustainability, actions will be aimed at making

rural areas more 'prosperous' by diversifying economic activities and improving the added-value of farming and agri-food activities and agri-tourism. The Commission's communication on the LTV includes proposals for a rural pact engaging actors at the EU, national, regional, and local levels to support the vision. A rural observatory will be established to improve the data collection and analysis on the situation of rural areas. In support of its proposals, the Commission will put in place a 'rural proofing' mechanism to assess the impact of major EU legislative initiatives on rural areas and a toolkit is planned for 2022 as a guide to the various funding opportunities available for rural areas.

To address the potential negative economic impact of the transition towards sustainable value chains, the EU has established the Just Transition Mechanism, a key tool to ensure that the transition towards a climate-neutral economy happens in a fair way, leaving no one behind. The mechanism provides targeted support to help mobilise around €55 billion over the period 2021-2027 in the most affected regions, to alleviate the socio-economic impact of the transition. It includes a €17.5 billion Just Transition Fund, along with €13.3 billion in grants and loans through other channels to support just transition programs and investments, in addition to co-financing and matching requirements for countries.

While Article 101(1) of the Treaty on the Functioning of the European Union prohibits agreements between companies that restrict competition, Article 42 states that competition rules apply to the sphere of agriculture only to the extent determined by the Parliament and Council. In the context of reforms to the CAP for the funding period 2023-2027, a new derogation from competition rules for agricultural products was adopted in 2021, which amends Regulation 1308/2013 establishing a common organisation of the markets in agricultural products. The Amended Common Market Organisation Regulation states that agreements aimed at achieving sustainability objectives by applying standards higher than what is mandatory under EU and/or national laws are allowed. Sustainability objectives included under the CMO Regulation include:

- Environmental objectives such as climate change mitigation and adaptation, sustainable use and production of landscapes, water and soil, circular economy, including the reduction of food waste, pollution prevention and control, and the protection and restoration of biodiversity and ecosystems.

- The production of agricultural products in ways that reduce the use of pesticides and manage risk resulting from such use, or that reduce the danger of antimicrobial resistance in agricultural production.

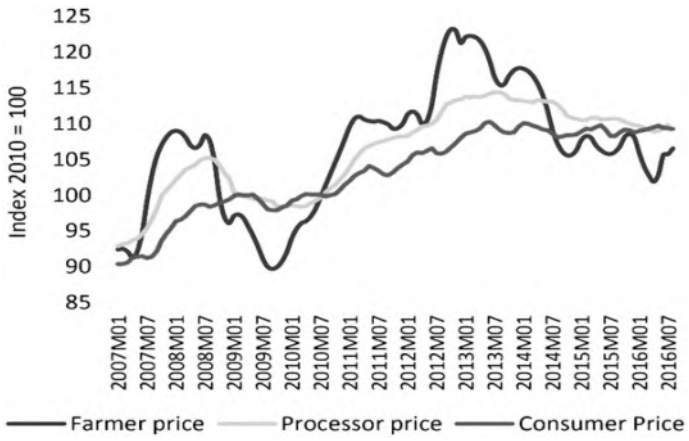
- Animal health and welfare.

Such sustainability objectives are expected to be carried out through cooperative, collective action agreements between actors in the agri-food supply chain, which the reformed CAP funding for 2023-2027 aims to reinforce. Collective actions can occur through horizontal agreements between primary producers or vertical agreements between primary producers and other actors within the supply chain. The overall aim of the amended CMO is to ensure that the application of competition law in agri-food value chains contribute more clearly to meeting environmental challenges.

# 3. Strengthening the role of producers

European producers have become more vulnerable to global market volatilities over time, with their share of added value becoming highly dependent on fluctuations in global commodity prices (Swinnen et al., 2021). Reforms to the EU's Common Agricultural Policy in the 1990s changed mechanisms of subsidies for agricultural producers, where commodity price regulations and import tariffs were replaced with direct income support. These reforms made farmers' income more reliant on global market prices (ibid). These reforms were followed by major volatilities in the global agri-food markets after 2006, with sharp spikes and declines and commodity price fluctuations more strongly felt at the farm level compared to the processing and retail sectors (see Figure 3). Therefore, exogenous events such as the COVID-19 pandemic, impact rural producers more acutely than they have in the past. In addition to such vulnerabilities, rural producers perceive themselves to have a weakened bargaining position within supply chains, perceiving that the impacts of downward price fluctuations are being pushed onto farmers by retailers and processors, while upward prices are only partially shared (Busch & Spiller, 2016; Swinnen et al., 2021). Therefore, practices that can strengthen the role of rural producers within supply chains and increase their resiliency should be explored.

Figure 3. Agri-food supply chain prices




Source: European Commission, 2016

## 3.1. Participation in alternative supply chains

Producer participation in alternative supply chains (e.g. short supply chains, local agri-food systems) are often understood as a reaction to the shortcomings of conventional supply chains (Bisoffi et al., 2021), in that they allow producers to capture a larger proportion of price margins otherwise absorbed by different intermediaries (Malak-Rawlikowska et al., 2019). For example, short supply chains (SSCs) are those which 'short-circuit' the long anonymous supply chain characteristics of conventional supply chains, and typically involve no more than one intermediary between producers and consumers. Examples of SSCs include farmers' markets, pick-your-own produce, community supported agriculture (CSA), farm shops, and online sales. Sales in short supply chains result in better prices achieved by producers, as the average values of indicators for 'price premium' and 'chain value added' indicate: the average price premium for SSCs is 72% compared to 16.7% in long supply chains (ibid; H2020 STRENGTH2FOOD). Price premiums in SSCs are usually highest in farmers' markets and pick-your-own fruit and vegetables, with prices almost twice as high compared with average farm gate prices (ibid).

Additionally, the effective execution of alternative supply chains during COVID lockdowns demonstrates how such alternative models can be utilised to make supply chains more resilient to exogenous shocks (Bakalis et al., 2020; Nemes et al., 2021; Prosser et al., 2021; Thilmany et al., 2021; Zollet et al., 2021). For example, an open-air market in Dunakeszi, Hungary was transformed into a drive-in market to reduce the risk of infection: offerings of producers were showcased on a website, where customers could select products remotely in advance and then book a time slot for drive-in service (H2020 SMARTCHAIN).

Short supply chains offer the opportunity to have more direct or proximate relations with consumers, however, there are potential barriers which limit the ability of producers in achieving increased margins by selling their products through SSCs. Proximity to urban areas affects the ability of producers to be able to sell their produce in farmers' markets or pick-your-own options. Proximity to urban areas also impact on-farm shops which are hard to reach for consumers and often have limited open hours due to limited time available for producers, and therefore makes it difficult to provide a consumer-friendly service (Hyland et al., 2019). While direct sales through online websites are a potential solution to such proximity barriers, small producers usually do not have the resources or skills needed to create and maintain an online shop for promotion. As part of the H2020 SMARTCHAIN project, the Hermeneus online marketplace in Spain allows producers to have a website hosted by a third party to sell products. Hermeneus promotes producers through an online catalogue of local food, charging a flat fee to producers and no commission for sales.

Although an online presence for producers presents an opportunity for direct sales, research from the H2020 SKIN project indicates that even though producers can reach a large audience through social media and selling their goods on websites, interactions with consumers online are limited. Therefore, social media and websites help to provide information to consumers, but producers mainly interact with them offline and achieve very little sales online (Drejerska et al., 2019). However, the project also observed potential innovative solutions that may provide opportunities to overcome such barriers. Examples include: unmanned kiosks using an honour system allowing consumers to purchase goods any time of the day, which worked surprisingly well in trials; or encasing products in transparent locked boxes that opened through automated payment systems, rendering simple vending machines as a means of selling fresh produce (Delicato et al 2019).

Research through the H2020 project STRENGTH2FOOD demonstrates that while consumers tend to associate local foods with higher quality, there is a lack of understanding as to why prices are higher. Consumers are also concerned as to whether they can trust the authenticity of local food, and express doubts about food safety and regulation (Brečić et al., 2021). Communication campaigns can help to inform consumers about the processes underlying production, control, and regulation and how these translate into higher costs for food but also provide greater social and environmental benefits (H2020 STRENGTH2FOOD). Under the STRENGTH2FOOD project, the Campagna Amica in Italy initiated a pilot action by Coldiretti with support from the University of Parma, which aimed to provide knowledge to consumers from economically-disadvantaged areas. Even though the pandemic led the campaign to occur mostly online, a smartphone app was a successful tool in increasing consumer knowledge about several agricultural themes: nutrition, sustainability, food origin and food quality. The app also enabled consumer learning about local and traditional recipes, fostering a sense of cultural identity and belonging to a territory. As a result, the bond between consumers and producers was strengthened and consumers felt closer to farmers with increased trust in their products. The app also fostered increased local consumption, by facilitating access to information on the nearest farmers' markets and local farmers as well as providing home delivery features.

Online tools are an effective means to communicate a rationale in paying more for local goods. Nevertheless, information campaigns must also take into consideration consumers' preferred outlets for purchasing food products (H2020 SMARTCHAIN). Consumers overwhelmingly purchase their food in supermarkets, local grocery stores, and discount supermarkets, and therefore efforts to engage consumers may be more effective in these settings. In many EU Member States, particularly in Eastern Europe, local produce linked with specific geographic origins lack cost competitiveness, and therefore retailers are reluctant to stock local goods because of insufficient demand. A pilot action by the University of Zagreb and Croatian grocery retailer KONZUM introduced in-store priming to promote local products (H2020 STRENGTH2FOOD). Results of the pilot action demonstrated the importance of point of sales primes to increase sales, as exposure to in-store marketing materials significantly affected the likelihood of purchasing local foods.

## 3.2. Empowering producers through education & training

Several EU-funded projects (e.g. LIFT, NEXTFOOD, NEWBIE, UNISECO) highlight the need for a strategic perspective to designing, planning and implementing approaches for transforming knowledge into skills and competences required for transitions to sustainable value chains in farming, forestry and other rural sectors. This necessitates greater engagement between teams responsible for policy development, businesses and organisations responsible for implementing policy (e.g. NGOs, civil society groups), and providers of training, education and continuing professional development, examples of which are emerging (e.g. Skills Action Plan for Rural Scotland) (Miller et al., n.d., submitted, UNISECO). Such a strategy would be consistent with the EU aim of mainstreaming ambitions of the UN SDGs into education, training and learning, including sustainable use of natural resources (Council of the European Union, 2018), and the European Education Area work on Education for Environmental Sustainability, Vocational education and training and the green transition.

Opportunities to learn, challenge and debate new evidence from different perspectives within a supply chain dialogue and actor alliances contributes to tackling barriers to the development of sustainable practices in farming and forestry systems (Barnes, 2022; Mann et al., 2021) (LIFT; InnoForESt). Evidence suggests that industry and farmers need work-based skills, apprenticeships, life-long learning and graduates, but face competition in the labour market. Reflexive management practices and continuous learning among actors in value chains, and the related coaching, are key success factors, in particular when value chains aim to maintain higher product and process qualities (Münchhausen et al., 2018) (H2020 SUFISA).

Over the long-term, a strategic approach is required to providing training, education and life-long learning for it to be taken up by relevant actors in the value chain and be attractive to prospective students and pupils. Lifelong learning strategies requires adequate organisational structures providing facilitation and reliability. Similarly, (Lieblein et al., 2019) (NEXTFOOD) suggest that the application of organisational learning theory is a way forward to support people challenging their assumptions and worldviews and develop new practices.

The inclusion of themes on transformations to sustainable farming and food systems in the curriculum of formal education programmes (secondary and tertiary education) could aid the creation of a new generation of farmers paying greater attention to sustainability (environmental, economic, social and health implications) of different farming methods and value chain approaches. Such education and training could also improve the levels of awareness of information and communication technology tools, which is key to the transformation of food systems in Europe. New entrants' business models – apart from the dominance of mainstream farming – contribute to different types of alternative value chains, e.g., niche products and markets including short chains, direct sale, Alternative Food Networks including Community Supported Agriculture, and on-farm diversification including pedagogical, social, recreational services (Helms et al., 2018) (NEWBIE).

## 3.3. Increasing the responsive capacities of producers

The COVID-19 pandemic has demonstrated that the adaptive capacities of farm systems must be addressed in order for farms to become more resilient, as exogenous events are expected to increase in the coming years, particularly negative impacts on production caused by increasing climate change. During the pandemic, farm systems demonstrated 'coping capacities' – the ability to withstand challenges and continue to function without making major changes to the farming system (H2020 SURE-FARM). However, to make farm systems resilient, resources need to be invested to increase 'anticipatory capacities' (the ability to detect trends and their potential impact on the functioning of farm systems) and 'responsive capacities' (the capacity to adapt to transform the farming system when it is no longer robust against exogenous impacts (Meuwissen et al., 2021) (H2020 SURE-FARM).

However, the most common policy responses to farm system adaptation have been to transfer streams of payments, such as direct income support, to mitigate symptoms rather than providing incentives to develop structural solutions to challenges (Paas et al., 2021). For example, in the French beef sector, responses to droughts have focused on reducing permanent grasslands and increasing cereal production, which may exacerbate the problem of droughts. Structural solutions would instead necessitate adapting beef farms to adapt their systems to become more drought tolerant through improved practices and technologies (H2020 SURE-FARM). Other coping mechanisms have focused on downplaying challenges rather than taking actions to address them and even redefining or reinterpreting problems to justify a lack of action (Meuwissen et al., 2021) (H2020 SURE-FARM). For example, the Belgian dairy industry's reaction to growing opposition to intensive livestock practices has focused on slowing down this trend through positive image campaigns (H2020 SURE-FARM). To address responsive capacities, the H2020 SURE-FARM project has developed guiding principles for supply chain stakeholders and policy makers to increase farm system resiliency.

### GUIDING PRINCIPLES TO INCREASE FARM SYSTEM RESILIENCE

Ressources should be shifted towards building anticipatory and responsive capacity to increase future coping capacity.

Provide assistance to farm systems in detecting, assessing, and addressing long-term trends that may challenge the resilience of farm systems including through adaptation or transformation.

Foster a diversity of responses rather than focusing on a limited set of actions.

Find a balance in allocating resources between immediate and future challenges.

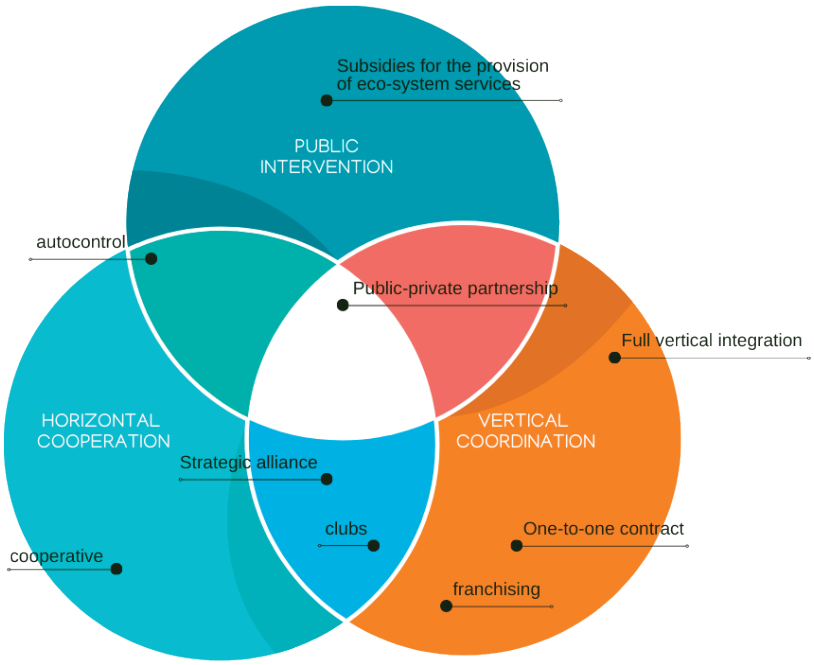
Conduct systemic in-depth analysis of root causes of challenges and drivers of farm system vulnerability to avoid problem redefinition and implementation of solutions that do not address a challenge.

Source: Wauters (2021) (H2020 SURE-FARM)

# 4. Building trust between supply chain stakeholders

It can be arduous to reduce dependence on powerful actors in the supply chain and foster new relationships with supply chain partners (Hyland et al., 2019). Collaboration is an effective method of overcoming many of these power imbalances in supply chains. Horizontal coordination is collaboration between producers to capture scale economies and build up countervailing power, while vertical coordination entails collaboration between producers and other supply chain actors down or upstream to share information and optimize chain-wide costs. Enhanced vertical and horizontal coordination allows producers, processors, and retailers to participate in coordinated distribution and marketing activities that maximizes product value through strategic responsiveness to buyer demand and consumer preferences. In light of the disruptions to global supply chains caused by the COVID pandemic, there is a recognition that supply chain resiliency is impossible unless all parties along the chain are willing to share information with each other and collaborate (World Economic Forum, 2022). This requires a shift from antagonistic to collaborative supply chain relationships. Therefore, addressing mistrust in supply chain relations is a key objective and will require concerted and directed efforts to design institutional arrangements to overcome this barrier and facilitate coordination (see Figure 4) (H2020 SUFISA).

Figure 4. Institutional arrangements to support supply chain collaboration




Source: (Bonjean & Mathijs, 2018) (H2020 SUFISA)

## 4.1. Increasing horizontal coordination

Horizontal cooperation helps to address economic disadvantages connected with missing economies of scale and scope. Examples of horizontal cooperation are co-operatives and producer organisations which provide a means for improving market power and income stability of individual producers in the face of corporate retailers (H2020 SUFISA; H2020 SKIN). Co-operatives usually deal in the sale, administration, product control and logistics, such as collection, storage, and transportation. Co-operatives also mediate bilateral contracts between producers and final buyers, and provide support for production, planning, marketing, wholesaling, including functions of downstream trading partners. Producer organisations negotiate framework contracts – collective contracts negotiated with trade partners on behalf of producers, which are aimed at counterbalancing the power of partners in supply chains.

Producer organizations and co-operatives have been an important form of horizontal coordination in many European countries (i.e. France, Belgium, and in certain sectors in Italy), and have provided individual producers a degree of security in transitioning away from protective agricultural policies towards more open markets on food commodity prices. For example, in the dairy industry production contracts are extremely important and producer organisations and co-op models have become a key instrument for farmers and processors to adopt to market conditions (H2020 SUFISA). Arla is a dairy co-operative that processes milk in the UK and Denmark, and offers producers evergreen contracts and money is pooled and redistributed through monthly milk price (ibid). While co-ops mainly buy milk, producer organisations provide a wider range of services beyond purchasing milk, acting as intermediaries with other buyers in negotiating prices and support the design of terms of contracts between farmers and buyers (ibid).

Producer organisations and co-ops are also becoming more important in sectors (i.e. Italy) and Member States (i.e. Poland) where they have not previously existed. For example, although some sectors in Italy have well-established producer organisations, the pear industry is highly fragmented and lacks organisation. The strategy of the O-pera project in Italy has been to aggregate existing groups and concentrate production, and therefore improve the quality of produce and negotiating power of pear producers (H020 SUFISA).

Establishing collaborative supply chains based on mutual trust can be enabled through co-operatives and producer organisations. However, based on experiences within the H2020 SUFISA project, this potential can depend on cultural contexts: in countries with a cultural tradition of cooperation in some sectors (e.g. dairy in Denmark or France) it is easier to achieve such collaborations compared to countries or sectors where this is not how supply chains are normally organised (i.e. wheat in Poland or poultry in Denmark (von Muenchausen, 2014) (H2020 SKIN).

However, even in countries and sectors with a tradition of horizontal cooperation, horizontal relationships based on trust are not guaranteed. Many fruit and vegetable sectors have been traditionally dominated by co-operatives in Belgium (e.g. 83% of pear farmers are part of a co-operative). Co-ops have been merging for years. Retail concentration is also high in Belgium and farmer trust in co-operatives is low. Focus groups held under the H2020 SUFISA project found that farmers perceive the performance of co-ops in markets to be quite poor, auctions are too large, and co-ops are not flexible or quick enough to adapt and act as brokers. The focus groups also found that farmers felt their voices were not being heard in the management of co-ops and that they have bypassed the common interest of farmers and are not doing enough to sell individual produce (ibid). However, the focus groups also found that farmers considered cooperatives to still be essential for the strength of the position of the farmer, and that farmers believe that improved solidarity is part of the solution (ibid).

## 4.2. Facilitating vertical coordination

The main type of vertical arrangements in supply chains are contractual relationships, which can be either formal (legally enforced) or informal. Contractual relationships can be organised through branch organisations, where acceptable business practices are agreed upon, or through individual options, where farmers sell their produce to retailers. Under individual contracts, the price a farmer receives should cover the cost of production and a premium. While contractualisation can help reduce asymmetrical market relations, in some cases risks can be transferred to producers, especially when they are informal and cannot be legally enforced, or when producers are not collectively organised (H2020 SUFISA).

A new form of vertical arrangements in supply chains is to establish value creating networks pursuing value-based strategies. In values-based supply chains, rather than emphasizing 'value' as profits, a shared set of values between supply chain actors is emphasized: what is valued is a commitment to one another and to collaborate in ways that enable supply chain flexibility. To achieve this, the H2020 RUBIZMO project has utilised the 'cluster' approach. Clusters are geographical concentrations of inter-connected firms and institutions in a certain field, acting as a means for regions to identify their competitive advantage. These clusters are intended to produce value through mechanisms of collaboration and shared values. An example under the RUBIZMO project is the Food Cluster of Brandenburg, which was established to enable collaboration between companies in a region where the food sector is key. The cluster included small enterprises as well as large national and international companies in fields that involve food production and processing as well as delivery to consumers. Members of the cluster pooled resources to cooperate in processing and marketing, based on the regionality trend, as the Brandenburg region is known for culinary traditions. The cluster also operated under strict ecological guidelines, as the region is perceived as Germany's leader in environmentally-based farming. The objective of the cluster was to complement each other's competencies and create increased value without making major sacrifices.

A common conclusion of several H2020 projects has been, that in order to enhance vertical and horizontal coordination, policies must be designed in a way that addresses vertical and horizontal coordination in a synergistic way (H2020 SUFISA; H2020 RUBIZMO; H2020 STRENGTH2FOOD). EU policy responses thus far have been to stimulate horizontal coordination through producer organisations and vertical coordination through branch organisations through CAP-funded programs. Questions remain as to whether this is sufficient to improve producers' position. The main recommendation in the H2020 SUFISA project is to create a legislative framework that will enable vertical coordination, horizontal cooperation, and public interventions to work in an efficient way. Governments should build and strengthen enabling frameworks for coordination to emerge, endure and be beneficial for all supply chain actors (ibid). This implies strengthening producers' skills and participation rate to help overcome the lack of trust and build producer capacity (ibid).

To facilitate synergistic strategies, the H2020 SUFISA project emphasizes that a better understanding of the contextual factors shaping existing institutional arrangements is needed. Institutional arrangements can differ across regions, industries, and products. Therefore, there is a need to better understand the factors influencing the development of supply chain institutional arrangements: the selling conditions embedded in institutions, rules and agreements governing exchange relationships, formal contracts and laws and informal relations (trust, reputation) and the influence of private and public elements (H2020 SUFISA). A better understanding of these factors enables stakeholders and policy makers to improve existing arrangements and design new ones (ibid).

## 4.3. Improving producer capacity through social networks

Transitioning to sustainable value chains require changes to institutional arrangements. Sustainable value chains depend on alternative forms of social organisation, which is influenced by group norms that are important pre-conditions for the sustainability of these alternative networks (Charatsari et al., 2018). It can be arduous to reduce dependence on powerful actors in the supply chain and foster new relationships with supply chain partners (Hyland et al., 2019). New forms of collaboration can provide effective methods of overcoming many of these power imbalances in supply chains (H2020 FOX; H2020 PEGASUS).

New forms of collaboration go beyond the conventional contractual model in one or more respects. The H2020 PEGASUS project explored collaborative approaches involving the whole supply chain in seeking solutions to increase the supply of ecosystem services/public goods related to rural land management. The project found that collaborative approaches involving various actors along the supply chain coming together to discuss issues and working together to achieve ecosystem services and public goods were successful in facilitating transitions towards sustainable land management practices. Most successful case studies in the project involved broad heterogenous stakeholders. Collaboration was organised around the management of a circumscribed resource system and the key driver of such arrangements was the convergence of mutual interests. While regulatory measures were an important ingredient for incentivising collective action, they were not sufficient in motivating collaboration. Rather, as the tomato supply chain in Northern Italy demonstrates, the combination of market and environmental pressures, EU and national regulations, and stakeholder interactions led to an alignment of interests enabling the introduction of farming methods that led to the improvement of water management and soil resources (H2020 PEGASUS).

Producers in rural areas often have narrow social networks which limits collaborative opportunities (McElwee, 2006). In addition, building sufficient trust between competing producers to form networks large enough to supply consistent volumes of differentiated food products for local consumers is challenging (Noe et al., 2015). To enlarge social networks for rural producers and build trust in these networks, policy makers should facilitate multi-stakeholder connections and public cooperative partnerships to enable closer connections between farmers, supply chain stakeholders, local governments, and other interested stakeholders such as NGOs, and academic researchers (H2020 STRENGTH2FOOD). Public-co-operative-partnerships are key tools to renegotiate supply chain governance through mutuality (ibid) (see Figure 4).

A potential example of a trust-building collaborative network is the Food Dialogues and Food Policy Councils under the H2020 FOX project. Project Smart Food Grid Graz in Austria provides local measures, deals with the formation of local food value chains serving various goals such as reducing emissions, promoting the local economy, and strengthening rural areas. Food Dialogues were introduced as a measure to link food actors from the target area with one another. The Dialogues were a participatory instrument, facilitating the exchange between different agri-food actors, such as local food producers, distributors, retailers, consumers, authorities. The Dialogues were supported by local Food Policy Councils, which were constituted of a group of representatives from different stakeholder groups, such as farmers, government officials, businesses, NGOs. The objective of the Food Policy Council is to be a democratic and participatory instrument to manage food issues at different scales and to debate actions that can be taken to meet various goals. Such participatory instruments can facilitate stronger relationships between rural producers and other stakeholders in social networks.

Reconciling tradition with territorial innovation is central for the resilience of the value chain and social capital is the resource that needs to be mobilised to cooperate and innovate. Farmers undertaking adaptation are characterised by bonding and bridging social capital obtained by formal and informal networks, are early adopters of innovation, and have high self-efficacy. Combinations of bridging and linking social capital from formal networks could foster farmers to learn new ideas, critically reflect on current farm business models and actively engage in sustainable value chains (Slijper et al., 2022) (SURE-FARM).

Mature social capital is critical for the institutional changes such as new knowledge networks. Low social capital requires higher levels of coordination, which emphasises important facilitating roles of trusted intermediaries. These intermediaries can be trusted farm and forestry advisors reaching out to farmers and bringing value chain actors together in interactive innovation processes. Intermediaries enable farmers and foresters to forge linkages that they would not easily be able to make, which enhance access to sources of knowledge, but also other resources such as funding and policy support that could be mobilized (Lybaert et al., 2022) (I2CONNECT). Many sustainable value chains strengthen local culture and identities by putting in value (traditional) local products, production and marketing methods and knowledge and consumption habits. Such chains provide space for community member interactions thus strengthening their social capital in terms of networks, inclusion, knowledge and social cohesion (Hooks et al., 2017) (SKIN).

# 5. Verifying and communicating sustainability

The challenge in ensuring environmentally and socially beneficial outcomes in sustainable value chains is ensuring that supply chain actors are implementing practices and abiding to agreed-upon standards. Particularly in agri-food chains, the imposition of standards is usually unidirectional: farmers have little means to induce processors or retailers to change their procedures in order to implement changes to land management practices as they have no motivation to do so if their business is unaffected (H2020 Diverfarming). The situation changes, however, if there is mutual dependency between land managers and other supply chain stakeholders, such as formal agreements to uphold standards within the supply chain or participation in a certification scheme.

Standards are often used by value chains to ensure that all actors supplying products through the chain are adhering to minimum threshold of quality, environmental sustainability, or some other attribute relating to the production process or the finished product. Certifications are systems by which producers, processors, and retailers are held accountable to a given set of standards. The combination of standards and certifications can produce valuable points of product differentiation. By mutual agreement, value chains may develop their own standards for product quality and for other values to which the chain is committed. They then must measure and evaluate performance on these standards using a range of tools and techniques to ensure adherence to such standards. This could include protocols that participants agree and adhere to. Internal standards are often supplemented with external validation through formal third-party certification or labelling schemes. Such labels usually have widespread name recognition in which an organisation can verify that a farm or business is following a set of standards.

## 5.1. Adoption of standards in supply chains

The adoption of voluntary internationally recognised standards is often synthesised under the broad concept of Corporate Social Responsibility. CSR is a form of self-regulation that reflects a business' accountability and commitment to contributing to socially and environmentally beneficial outcomes. CSR is increasingly recognised as a tool to achieve sustainability objectives through market mechanisms. CSR is often used as part of a product's 'brand perception' – by making claims of social and environmental responsibility, consumer perceptions of the quality of a good can be enhanced and therefore add value to a product. However, in delivering environmentally and socially beneficial outcomes associated with agriculture and forestry it is necessary to take into consideration the unique position of rural producers: due to the characteristics of these sectors (producer anonymity in conventional chains and the concentration of power in the processing and retailing sectors) it is very difficult for farmers and foresters to establish an appropriate position and reputation amongst final consumers through CSR standards (H2020 PEGASUS). Therefore, rural producers are usually less compensated through market-based voluntary standards such as CSR, increasing the economic risk of adopting sustainable practices (ibid).

However, advisory services in producer organisations and cooperatives can help to decrease rural land managers' perceived risks and help to make investments more feasible. Indeed, French POs in the pig sector have played an important role in reducing the risks associated with adopting sustainable practices by providing technical and economic assistance, training members, or providing input procurements (H2020 LIFT). Pig POs have incentivised members to adopt quality schemes, some of which have environmental requirements, by setting an industry target to increase the number of farms under quality labels from 5% to 10%.

Another challenge of CSR is the lack of an independent system to guarantee the reliability of producers' claims of environmental and social benefits (H2020 CIRC4LIFE). It can be difficult for consumers to decipher between genuine claims of sustainable practices and instances of greenwashing. It can also be difficult for consumers to understand the true impact of their purchases due to a lack of knowledge and understanding of the environmental and social impact of a product they are consuming, as the calculation of such impacts can be complex. For example, claims of a product being 'climate friendly' implies that the carbon footprint of a product is lower compared to its competitors and substantive efforts to reduce GHG emissions along the value chain have been made. To ensure emission reductions, proper measurement of a supply chain's emissions is essential to GHG reductions, as they are a tangible indicator that can be monitored and tracked. Life cycle analysis (LCA) involves gathering large amounts of data from external parties and working with complex models and estimates. For consumers to understand the meaning behind LCA data is quite difficult, and therefore it can be difficult to communicate the environmental benefits of a product (Vizzoto et al 2021).

However, strategies for communicating LCA information to consumers are being developed using simplified communication styles, particularly through integrating smartphone technologies. The H2020 project CIRC4LIFE developed an 'eco-points' smartphone app to communicate the environmental impact of a product to consumers. The app developed a numerical measure of the environmental impact of a product's environmental impact through the product's supply chain. Multiple mobile technologies were applied to develop novel functions of a mobile app, including QR encryption algorithm, embedded Google maps, and multi-language support. Consumers could accrue eco-points derived from credits and debits ('costs') calculated using LCA methods. Eco-points could be applied to eco-accounts for both consumers and manufacturers and incentivise them to improve their environmental impact by earning eco-credits, which could be used for in-store discounts. While mobile apps are an effective means of interacting and communicating with consumers regarding sustainable practices, there is a lack of standardisation in reporting such information to consumers (H2020 CIRC4LIFE). Therefore, in light of the proliferation of consumer-based smartphone apps to inform environmentally- and socially-conscious consumers, policy-makers should consider legislation to develop standards for reporting such information to consumers.

Another strategy to ensure that supply chains adhere promises of environmentally and socially beneficial outcomes may be the use of supply chain contracts (Mitkidis, 2017) (H2020 SMART). Supply chain contracts, which can be legally binding, can help develop partnerships between contractual parties working towards a common goal. For LCA these types of contracts can address the problem carbon leakage, which occurs when carbon heavy activities are moved from country with strict environmental regulations to a country with weak environmental regulations and therefore counteracting emission reductions (ibid). Flexible agri-environmental contracts are already in use across the EU. However, many initiatives are costly, have skewed distributional impacts, increase farmers' risks, or implementation has been too bureaucratic (H2020 EFFECT). Environmental and agricultural stakeholders need better guidance on when and where different contractual arrangements are likely to generate significant impacts (H2020 EFFECT).

## 5.2. Participation in certification and labelling schemes


Claims of environmentally and socially beneficial outcomes are utilised to enhance consumer perceptions regarding the quality of a product. However, quality is a subjective term, and many practices to ensure environmentally and socially beneficial outcomes cannot be quantitatively measured and/or communicated using assessment tools such as LCA. Therefore, it can be difficult to provide consumers with the confidence needed to incentivise their willingness to pay more for a product based on claims of higher quality. Improving claims of quality through recognised accreditation schemes is likely to facilitate added value when compared to similar products outside such schemes. Indeed, it is becoming increasingly common to support claims of provenance, production methods, or environmental sustainability using official accreditation schemes (Brečić et al., 2021).

Under EU Food Quality Schemes, the main accreditations for claims of provenance are PDO (Protected Designation of Origin), in which products are linked to the place they are made; PGI (Protected Geographical Indication), which emphasises the relationship between a specific geographic region and the name of the product; and TSG (Traditional Specialty Guaranteed), which highlights the traditional aspects of a product. For PDO, PGI and organic labelled food, prices are higher compared to reference products which do not have a quality label, regardless of the production level or the sector (Collison et al., 2019) (H2020 STRENGTH2FOOD). Higher farm incomes, due to higher price premiums, are expected to offer opportunities for endogenous development in rural areas if more added value remains at the farm level (Gangjee, 2017). Indeed, products in FQS exhibit a higher positive contribution to local economies compared to conventional supply chains: the local economic advantage is 7% higher for vegetal products, 24% higher for animal products, and 25% higher for PGI products, and wage levels are 32% higher (Donati et al 2019; H2020 STRENGTH2FOOD).

Besides EU quality schemes, there is a wide range of public and private voluntary schemes for agricultural products and foodstuffs. They operate either at the business-to-business level or at business-to-consumer level and range from compliance with compulsory baseline production standards laid down by government authorities to additional or higher requirements and they may cover products or processes or management systems. However, despite the existence of hundreds of labels across the EU covering various policy areas, there are a lack of labelling schemes where the provision of public goods and environmental protection is a primary objective (H2020 PEGASUS). Most quality labels are not specifically aimed at improving environmental impacts (H2020 LIFT).

Therefore, certification can be a challenge to translate environmentally sustainable practices into marketable attributes if they do not align with existing categories of certifications (H2020 LIFT). For example, although not explicitly, organic labels infer contribution to eco-system services such as biodiversity, carbon sequestration, and positive landscape features. However, only certified organic farms and the products they produce are accounted for under the organic label. Therefore, farms that adapt various ecological-friendly practices but are not classified as organic will be considered conventional by default and farmers will not receive premium prices for such practices. To address this problem, the H2020 project LIFT has developed a typology tool of ecological practices on farms for the purpose of adaptation in policy making (see Figure 5) – the intention of the typology is to widen the view of the conventional spectra of labelling schemes to include ecological land management practices that could incentivise farmers that are willing to adopt ecological practices.

Consumer surveys conducted under the H2020 STRENGTH2FOOD project found evidence of persistent confusion over labelling, certification, and assurance schemes. While there is high recognition of the EU organic label, there is lower recognition of other quality labels. Familiarity with EU certifications are lower compared to national and regional schemes. Levels of recognition vary significantly across Member States, with high levels of recognition in Italy and France, and low levels of recognition in Eastern Europe. This lack of recognition can lead to problems of falsification and fraud. Under the project, the Polish food authority GIJHARS implemented a pilot action aimed at formulating a market of FQS products in Poland. Consumer surveys found low levels of recognition of FQS labels and difficulties distinguishing between official labels and counterfeits. In addition, low numbers of certified producers and small-scale production constrains the use of effective marketing strategies. Therefore, Polish FQS are not able to create more profitable market niches, often selling certified products at regular marketing prices without a price premium (H2020 STRENGTH2FOOD). The project recommended several policy actions to support producers participating in FQS, including those aimed at providing support for training and establishing guidelines for producers. In addition, national systems for monitoring FQS distribution and reporting counterfeits, including a built-in mechanism for reporting fraud, should be established and inspectors should be re-trained to increase competence (ibid). To increase consumer knowledge, the project recommended the promotion of common branding for regional products, such as arranging common labels and packaging to increase recognition of specific qualitative characteristics of FQS products (ibid).

Figure 5. Example of Ecological Type of Farm Based on Assessment Using Typology Lift Tool


Source: Billaudet et al, 2021

# 6. Conclusions

Based on the findings from recent research projects, the following strategies to facilitate sustainable value chain transitions in rural areas should be considered:

- **To empower rural producers in transitioning towards sustainable practices and increasing their resiliency** to exogenous shocks, investments in the long-term development of skills and responsive capacities should be made. Such investments should facilitate work-based skills,apprenticeships, and lifelong learning for rural producers. Organisational structures that will promote lifelong learning in formal institutions should be developed. Educational programmes within such institutions should include themes on sustainable transitions. Investments in responsive capacities should be balanced towards increasing coping capacities to deal with exogenous shocks in the short-term, and anticipatory and adaptive capacities in the long-term to facilitate transitions.

- **To address mistrust and power imbalances in supply chains**, supply chain organisational structures should be reformed or replaced with new structures. In reforming current structures, if producer organisations are fragmented, then aggregation of existing groups should be considered. Public-cooperative-partnerships should be developed to renegotiate supply chain governance. To facilitate supply chain stakeholder interactions, collaborations should involve heterogeneous stakeholders and trusted intermediaries should be utilised in re-negotiating supply chain governance. Stakeholder connections should go beyond supply chain members,to involve other interested actors such as local governments, NGOs, and academics to facilitate cooperative partnerships. In developing new organisational structures, the cluster approach to collaboration based on shared values should be considered. Participatory instruments should be implemented to make new supply chain organisational structures more democratic to facilitate relationships based on mutual trust between supply chain stakeholders.

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