FOODLEVERS

Deliverable 2.3:
Report on Value Chain Assessment

Leverage points for organic and sustainable food systems

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1. Objective of the report

This report analyses the different value chain linkages of FOODLEVERS' case studies of innovative organic and sustainable food systems from farm-to-fork. Drawing from frameworks of Global Value Chains (GVC) and Global Production Networks (GPN), it examines complexities of production networks and innovation activities, relationships of actors in the chains as well as the embeddedness of the food systems to identify specific regional mechanisms. In this way, the report highlights the interventions along the value chain that address the realms of "deep" leverage. Moreover, social value added is revealed by an attempt to define the social return on investment for each food system.

The report is divided into six parts. Section 2 outlines the conceptual background, extending the conceptualization of "deep" leverage points through the analytical frameworks of GVC and GPN. The methodological approach and the data structure underlying this study is presented in Section 3. While Section 4 introduces each case study, Section 5 provides in-depth analyses of their agri-food value chains, including the sustainability levers addressed therein. This allows to understand how, why and where in food systems opportunities for change are or can be created. Section 6 summarizes the results obtained from the case-centered analyses in a cross-case study manner to highlight the potential for leverage along innovative food value chains. The report ends with Section 7. It provides insights into the attempt to determine the social performance of innovative organic and sustainable food systems, i.e. their Social Return on Investment (SROI).

2. Conceptual frameworks

Author: Valerie Holzner

Looking at value chains allows to better understand what is physically flowing through the systems and where system actors have reconfigured flows or changed operational structures (Birney 2021). For this reason, this study analyses the value chains underlying innovative agri-food systems. To this end, the conceptual frameworks of global value chains (GVC) and global production networks (GPN) (Henderson et al. 2002; Gereffi et al. 2005) are applied in combination with that of "deep" leverage for system change (Abson et al. 2017), since they provide useful tools for the in-depth analysis of value chains. In this way, insights can be gained into the transformative potential that arises from supplier-buyer relationships, chain governance, and the way how value is generated and distributed between the actors in the chain.

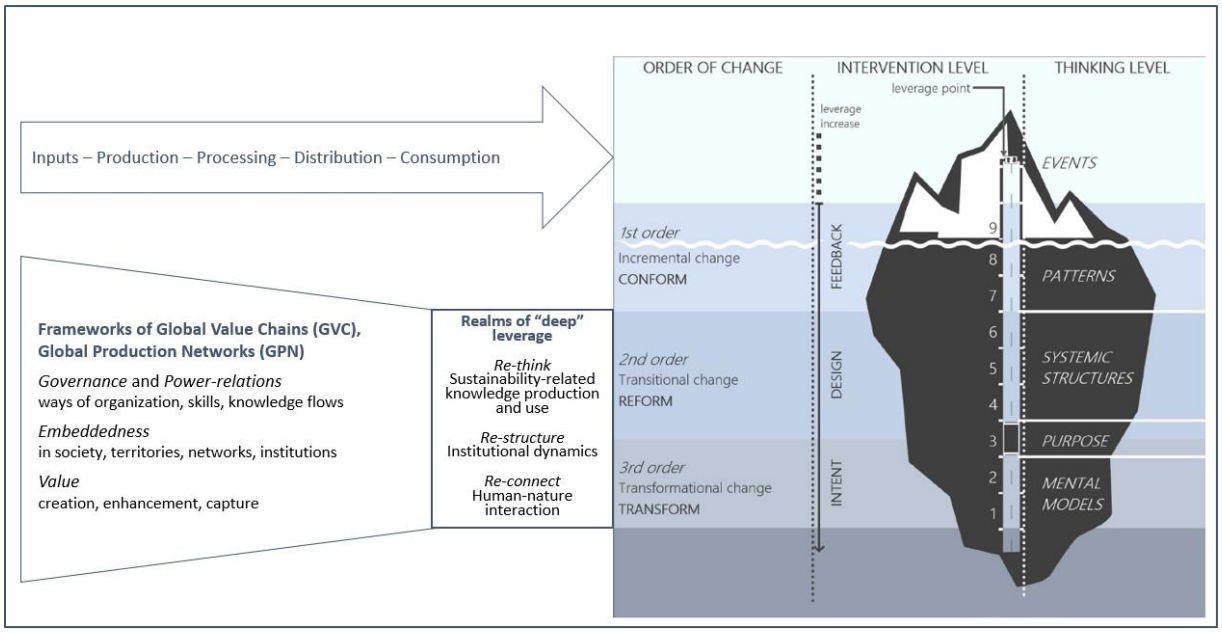

Figure 1. Interpretation of linkages between the conceptual frameworks underlying the analysis (Own illustration based on Davelaar 2021, p. 731; Abson et al. 2017; Gereffi et al. 2005; Henderson et al. 2002).

For a better understanding of how leverage points can be deducted from a value chain analysis, this paragraph explains the link between the two conceptual frameworks (see Figure 1) that essentially underlie the results of this report. Figure 2 illustrates the leverage points perspective through the ice-berg model (Davelaar 2021). The visible, very obvious part of the ice-berg refers to interventions of shallow leverage for systemic change. The lower one gets underneath the surface, the more powerful the leverage potential (referring to "deeper" leverage points). At a superficial glance, a value chain appears to be a very static, straight-forward sequence of material flows from input to output, incrementing value at each stage. However, the frameworks of GVC and GPN help to look underneath the surface of the ice-berg. They allow to uncover underlying and in-tangible (co-)processes, such as the governance

of value chains (incl. ways of organisation, skills and knowledge flows), power relations, the embeddedness of value chains in networks, societal and territorial contexts (incl. socio-econmic and institutional context) as well as aspects of value creation, enhancement and capture. Consequently, there are clear linkages to the realms of "deep" leverage (Abson et al. 2017) concerning knowledge production and use (*re-think*) and the interaction of food system actors with the natural environment (*re-connect*) as well as the institutional dynamics (*re-structure*) they are embedded in.

3. Data and method

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Methodologically, this task is grounded on a qualitative research design in order to investigate the input-output structures along the agri-food value chains. As food production systems as well as innovations comprise also various intangible (co-)processes such as the (re-)configuration of social practices or relationships between the actors involved, this research design is particularly suitable to explore these phenomena. Qualitative in-depth case studies provide detailed insights into the structures and functioning underlying the object of study by looking at an individual case (Baxter 2010). It does not only allow to reveal the context-specific conditions in which the respective food system is embedded and within which actors in the chain (inter)act, but also to highlight the subjective perceptions and opinions of the interviewees (Mattissek et al. 2013).

To address the research objective of this study, a three-stage process was implemented, including (1) the development of a common interview protocol; (2) the data collection in each project country; and (3) the analysis of the data generated.

In the first stage, common interview guidelines were elaborated (see Annex I) applicable to the diversity of food value chains regardless of their farming system, geographic or institutional context. Being a useful tool for unexplored phenomena (Kvale & Brinkmann 2009), a guideline for semi-structured interviews has been developed. Since the interaction between the interviewer and interviewee is an essential part of the qualitative research process, semi-structured guidelines allow to flexibly adapt the sequence of questions and specific question formulation. In this way, they leave space for thematic deviations to arise during the interview which can contain valuable information. However, the guidelines also contained obligatory questions to be dealt with to ensure a certain comparability and consistency in the data. Depending on the type of stakeholder addressed, there were different interview protocols for production farms, stakeholders involved in other parts of the value chain (e.g. processing, supply, distribution and sale, waste management etc.) and other stakeholders (e.g. from policy, umbrella organizations, experts etc.).

Theoretically, the interview questions are linked to the analytical dimensions of the conceptual frameworks of GPN and GVC that underly this study (see Section 2). The interview protocol also takes the conceptual background of FOODLEVERS into account by integrating

questions that might uncover the three realms of "deep" leverage for sustainability transitions along the case studies' value chains. The thematic topics and concepts covered in the interview guidelines are illustrated in Figure 2.

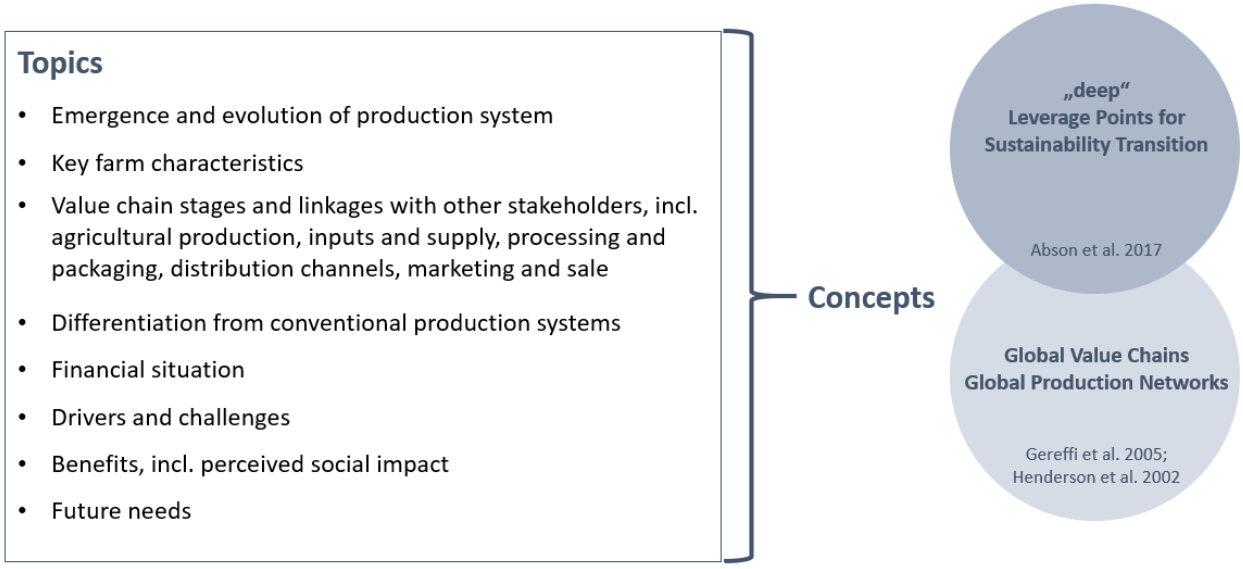


Figure 2. Thematic and conceptual topics covered in the interview guidelines.

The sampling strategy applied was two-folded, consisting of pre-sampling as well as snowball-sampling. The starting point for identifying interview partners has been set out within the first stages of the project (Task 1.1) whereby the FOODLEVERS Innovative Case studies have been carefully selected through an outranking process considering the coverage of the four OECD-areas of innovation[1]: (1) Products; (2) Production techniques; (3) Marketing; and (4) Organization and governance. Following this pre-sampling, the technique of snowball-sampling was applied as a strategy to identify suitable stakeholders to interview within each national case study. This sampling strategy allowed to better grasp the specific nature as well as the value chain configuration of each food system.

Table 1. Overview of data per Case study.

N°	Country	Farming system	Context	Main food products	N° interviews
1	Finland	Agroforestry, Horticulture, Organic	Forest farming, Circularity	Mushrooms	7
2	Italy	Agroforestry, Organic	Circularity	Eggs, educational and social services	4
3	Germany	Horticulture, Organic	Community Supported Agriculture, Urban, Producer network	Vegetables, fruits, eggs, meat, honey, juice, bread, noodles	7
4	Poland	Livestock farming, Organic	Producer network, Standard setting	Beef, vegetables, fruits	16

[1] see https://www.oecd.org/site/innovationstrategy/defininginnovation.htm

5	Romania	Livestock farming, Mixed farming, Biodynamic	Mixed farming	Vegetables, fruits, dairy, medicinal plants, jams, pickles	6
6	Belgium	Horticulture, Organic	Community Supported Agriculture	Vegetables, herbs, potatoes, fruits	2
7	United Kingdom	Mixed farming, Biodynamic	Community Supported Agriculture	Vegetables, beef, pork, poultry meat, eggs, dairy	2

The empirical findings presented in this report are based on a total of 44 semi-structured interviews conducted between 2021 and 2023. They concern seven case studies of sustainable and organic food systems in Europe with varying farming systems, food products and contextual characteristics (see Table 1). The sampling allowed a diverse range of stakeholders to be recruited and interviewed as visualized in Figure 2, including farmers (20), retailers (7), consultants (5), contractors (3), consumer groups (2), researchers and experts (2), environmental protection organizations (1), local community groups (1) and others (3). The interviews took place in diverse formats such as face-to-face, telephone or video call and lasted between 0.5 and 1.5 hours.

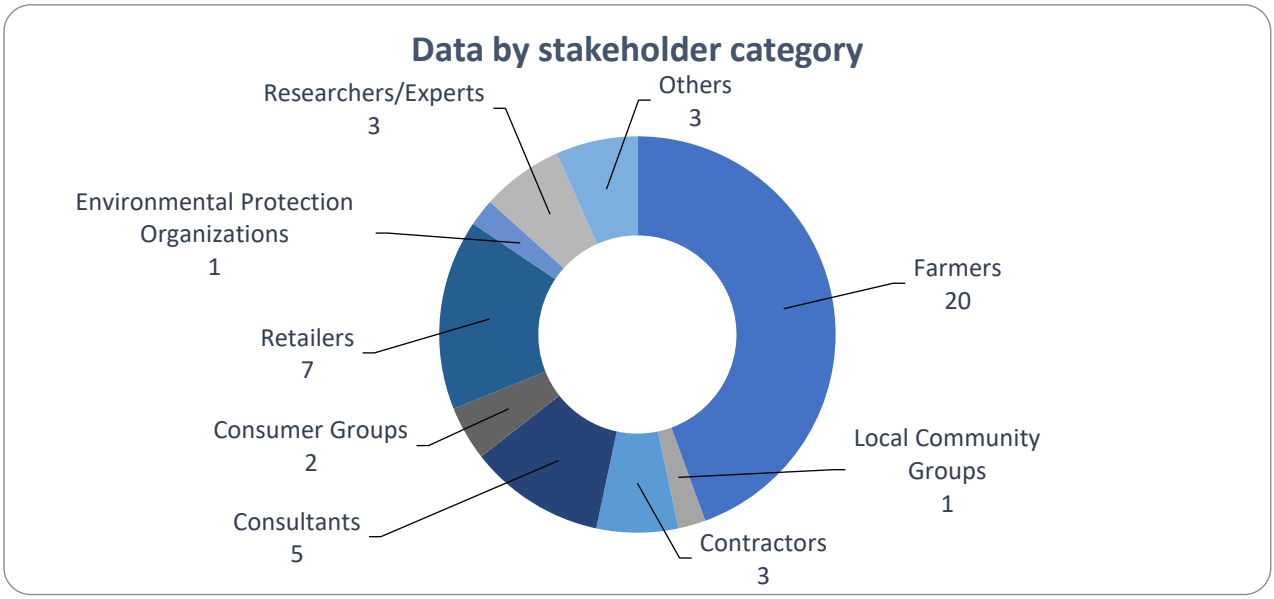


Figure 3. Data by stakeholder categories.

While the interviews have been carried out in the respective national languages, the transcripts have been translated into English for data analysis. The data processing and transfer was carried out in pseudo-anonymized form. For data analysis, qualitative content analysis according to Mayring (1993) was employed, taking into account the theoretical concepts and the objective of the study.

4. Overview of FOODLEVERS Case studies

Author: Valerie Holzner

Through an outranking process, seven national case studies representing innovative sustainable and organic food systems were carefully selected. To provide an overview before the in-depth analysis, the case studies are summarized in Table 2.

Description of European case studies	
	**Finland** Forest farming in Finland includes a shiitake mushroom farm cultivating organic edible mushrooms in forests. The case study covers the more efficient use of forestry side products, such as small diameter trees, to grow food.
	**Italy** Fattoria Cupidi is an organic farm (UAA 15 ha) managing silvopastoral systems where walnut plantations and olive orchards are grazed by laying hens. The farm is included in an agreement on the sustainable management of local resources, based on organic principles and practices, aiming at the fulfilment of the economic and sociocultural resources of the territory. The farm promotes educational programmes addressed to people interested in live rural farms, students, organised groups and disadvantaged people. The farm has strong and constructive relationships with different organisations and public institutions, and it has stable partnerships and networks with local services, consumers, young people and other stakeholders.
	**Germany** *Die Kooperative* is a community supported agriculture that is led as a cooperative. By cooperating with a large network of organic producers, it connects urban consumers with regional food production. Additionally, it manages a city farm in Frankfurt am Main which, in addition to production, serves as a space for community action and consumers' contact with growing food.
	**Poland** The Polish case study represents a network of 28 local farms built to penetrate the market and get a "grass-fed" standard for beef. Furthermore, the initiative aims to improve short value chains and create joint shops for community farmers. Besides beef, the community produces fruits, vegetables and wood.
	**Romania** *Ferma Ecologica Topa* is a biodynamic farm cooperating with a large network of regional organic farms. It is characterized by consumer-driven decision making, innovative method of distribution, volunteer program, on site learning for local school children.
	**Belgium** Het Polderveld Community-Shared-Agriculture is providing organic meals for a local hospital. The agroforestry plot within the farm also serves as a 'healing garden' for patients. The production technique is organic. CSA Principle: At the beginning of the season, the cultivation plan is made in consultation with the hospital. The hospital kitchen prepares about 1200 meals a day. With a number of vegetables such as pumpkin, celeriac and courgette, Het Polderveld can meet almost the entire annual requirement. The CSA principle is used both for private customers (self-harvesting) and for the local hospital.

	**United Kingdom** The Stroud CSA is a biodynamic mixed farm and a community supported agriculture with over 350 members produces vegetables, beef, pork, poultry meat, eggs and dairy products. With its CSA structure it provides an innovative governance structure for restructuring local distribution channels.

Table 2. Selected European case studies of innovative organic and sustainable food systems.

5. Deep Leverage points in innovative agri-food value chains

a. Finland

Author: Valerie Holzner

Case Study Name: ***Iso-orvokkiniity farm***

Location: ***Karjalohja, Finland***

OVERVIEW

The food system is comprised of a short value chain for fresh shiitake mushrooms that is centered around four stages: inputs, production, distribution and sales and the domestic market. Taking over the stages of production and distribution, the main actor within the chain is a permaculture farm located in Karjalohja, in southern Finland. The produce is grown outdoor on wooden logs and sold directly from the producer primarily to consumers. However, part of the distribution is also channeled through another local mushroom producer who resells the farm's shiitake to regional restaurants. Besides this horizontal relationship, there exist vertical linkages with a second fungiculture-based company nearby, at the beginning as well as at the end of the chain. It supplies the inoculation material for cultivation and, in case of overproduction, purchases fresh shiitake to refine their bioactive compounds into an extract for the global nutraceutical market. To some extent, therefore, the farm's produce also enters a global value chain for medicinal mushrooms in refined form. Nevertheless, the central purpose of the value chain is to provide fresh shiitake for food consumption at local scale. The raw materials for production, apart from the inoculant, come from the farm's own forest and beekeeping and are purchased from a local company. By using raw material from the forest as input for shiitake cultivation, an additional value chain is integrated into forestry.

The cultivation of shiitake mushrooms is an integral subsystem of a three-pillar permaculture farm. In addition to growing shiitake outdoors on wooden logs, the farm's main activities comprise beekeeping and forest gardening of perennial and annual vegetables. The farm plot

was acquired in 2014 by a couple with professional backgrounds in the organic food industry and organic agriculture. It covers a total of 12 hectares including building plots, of which 6 hectares are arable land and 6 hectares are forest. Following the principles of permaculture and aiming at self-sufficiency, the farm was built-up from scratch, including a residential building made of natural materials (straw bales, clay) and autonomous infrastructure for energy and water resource management (e.g. wood heating, solar panels, solar collectors, windmill). Although this is more of a personal project, the owner's overall goal is to create an ecological and sustainable way of life on a farm that will serve as a best practice example for others by testing and developing permaculture practices for northern conditions.

In 2015, the farm started with shiitake cultivation as one of the pioneers in Finland by establishing a low-tech mushroom cultivation system. It is based on the traditional Japanese technique where the mushrooms are grown outdoors on wooden logs inoculated with the fungus. The harvest from the first inoculated logs went on sale in 2018. Since its beginning, the farm has developed into a fairly large-scale production system, averaging around 1,400 to 1,600 logs in production (in 2021). By doing so, they provide high-value food, both economically and nutritionally. Shiitake is not only considered an edible mushroom, but also a medicinal mushroom that, among other things, supports the human immune system. It is a highly nutritious with regard to protein, beta-glucan, amino acids and has a low-fat content.

It is important to point out that mushroom cultivation is only a side business and not the main source of income, neither for the farm, nor for its owners who have full-time jobs. The primary goal is to try the business of mushroom cultivation as a matter of interest. Particularly, the fact that it feeds on hardwood, which is readily available in local forests and can even be partly supplied from their own forest, convinced the farmers to engage in shiitake cultivation. Another reason for looking into the fungal species was that it cannot spread as a foreign organism in the forest ecosystem, as it is not a perfect genetic match for the Finnish tree species, although it can grow on them.

In order to understand shiitake in the context of production, it is crucial to have a basic understanding of its inherent nature. Shiitake belongs to the group of saprophytic fungi. Unlike the most commonly cultivated saprophytes (e.g. champignons) that – as secondary decomposers – feed on organic matter that has already broken down by some primary microorganisms (e.g. manure, compost), shiitake is a primary decomposer. As such, it is able to break down dead organic material by transforming the lignin of wood into edible compounds. While shiitake naturally grows in Japan on dead wood from a tree species called shii, it also accepts other deciduous tree species such as oak, alder or birch as a growing medium.

Based on the characteristics of shiitake, it is understandable that the type of mushroom might not solely determine the production stage, but also affects the entire value chain. Thus, different types of mushrooms require different inputs, different distribution channels, different markets and consequently different business models to set up.

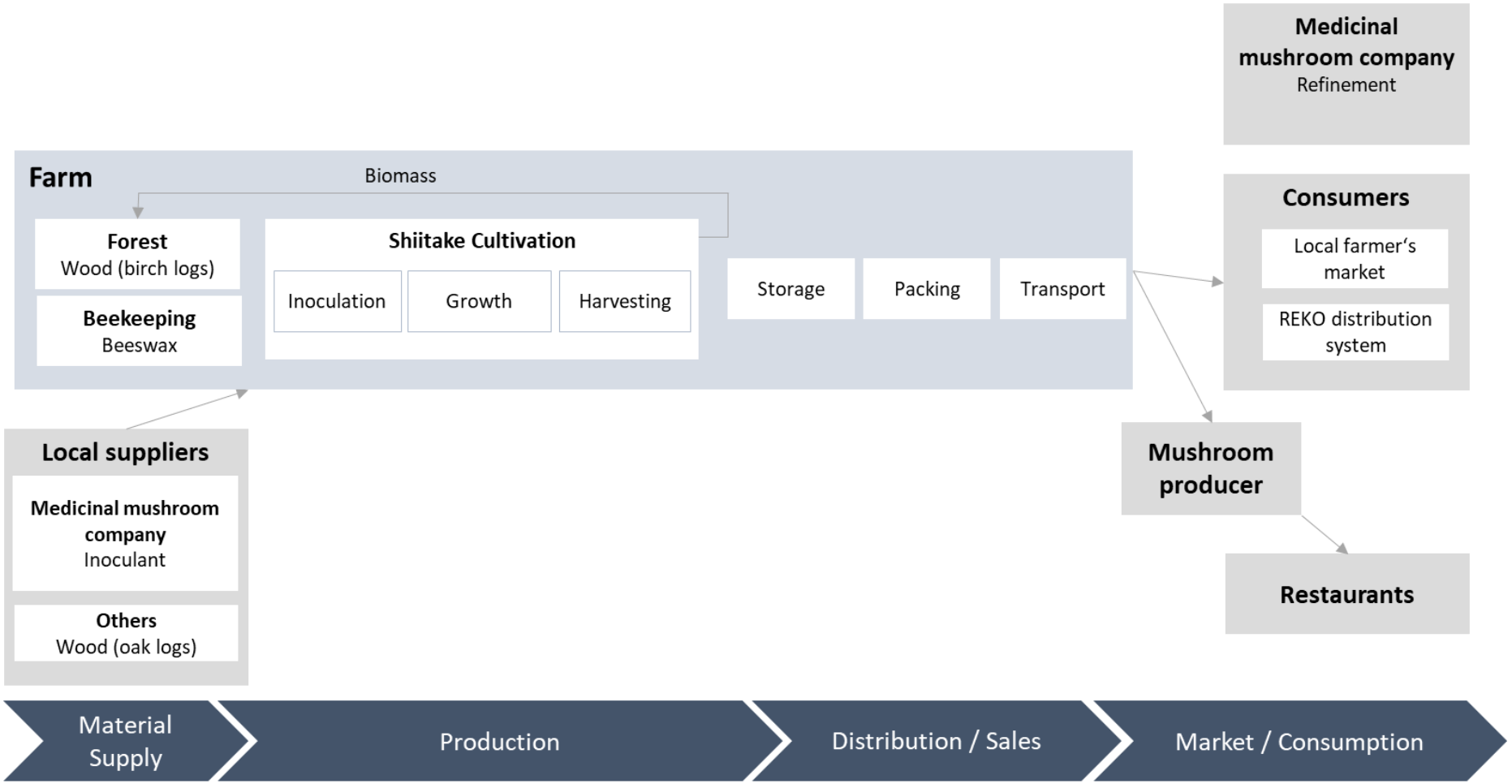


Figure 4: Value chain of the Finnish case study.

INPUTS

Unlike industrial indoor production of specialty mushrooms for which high-tech facilities are needed, the upfront costs for the farm's outdoor cultivation system for shiitake are low. They are mainly annually recurring costs and concern the growing medium (wooden logs) and the material and equipment for inoculation (drill, beeswax, sawdust spawn). Due to the farm's specific set-up of interacting subsystems where mushroom cultivation is integrated in forestry and beekeeping, some inputs can be, and as a matter of self-sufficiency are sought to be, provided by the farm itself, while it is dependent on external suppliers for other inputs.

The raw material used for shiitake cultivation is wood from birch and oak trees. The latter is purchased from a local company where the logs are a by-product of thinning its oak forests that would otherwise be used as firewood. Oak is considered a conducive growing medium for shiitake. Being a slow-rotting wood, it allows for the production period (5-6 years) and additionally leads to solid productivity. Nevertheless, the shiitake mushrooms are mainly grown on birch logs from the farm's own forest, not least because self-supply is more profitable than procurement and the material flow can be integrated into the farm's forest management. Since small-diameter trees (10-15 centimeter) are needed for log-cultivation, felling of the trees can be carried out in combination with the production of firewood. In quantitative terms, the annual demand for wood amounts to 150 to 400 logs with a length of 1 meter each, which corresponds to about 4 to 10 cubic meters.

Apart from basic tools such as a drill, the materials used to inoculate the logs is beeswax and sawdust spawn containing mycelium. In general, any type of wax can be applied that is of food quality. With the endeavor that the farm's subsystems complement each other, beeswax from the farm's own production is used here. If not produced on-farm, the wax can incur significant additional costs, especially if an organic certified wax is sought. For inoculating the mycelium into the logs there basically exist two ways: either with wooden dowels or with sawdust spawn, both contaminated by the fungus. The latter method is considered to be more economical and more efficient in the long term than the dowel method. Therefore, the shiitake producer works with purchased sawdust spawn, which is his biggest annual cost. In the beginning, the farmer grew his own sawdust spawn with mycelium bought from foreign suppliers to understand the process of shiitake cultivation holistically and to maintain a certain independency of ordering large amounts from abroad that are costly and involve high shipping costs. Since producers of fungal mycelium and inoculants have emerged on the Finnish market in the meantime, the ready-grown sawdust spawn is now obtained from a local supplier. Contrary to the common dilemma in mushroom production, where inputs such as substrates are not always fully available in organic quality, the inoculation material from this supplier is certified organic. Despite the fact that external sourcing contradicts the farm's principle of self-sufficiency, the farmer is willing to support the local supplier by buying sawdust spawn, not least because of his personal relationship with the founders of the company. Especially in the early days of the company, the farmer shared his knowledge and experience in

fungiculture with the founders and provided his mushroom farm to them for organized visits and workshops.

PRODUCTION

The production system in place is based on traditional methods from Japan and Korea, where the cultivation of shiitake mushrooms on wooden logs originates. It consists of a four-step cultivation process: the preparatory work, the inoculation, the force fruiting and the harvest.

The preparatory work starts in winter with felling the trees and cutting them into 1-meter long logs. In this step, the freshness as well as the protection of the logs from dryness and mould are critical points to consider. Therefore, the farmer makes sure that the time of felling the trees is as close as possible to the time of inoculation. Additionally, to ensure air circulation and avoid contaminations, the logs are loosely cross-stacked the Japanese way under the shelter of a spruce forest to wait for inoculation.

The inoculation is a seasonal work that is carried out every year in spring. It involves drilling holes along the log (about 50 per log), filing the holes with sawdust spawn containing the fungus and covering them with beeswax to prevent drying out and contamination. In order to keep track and monitor the production, the logs are labelled with some data such as tree species, month the tree was felled, mushroom strain and date of inoculation. Inoculating the logs is a work-intensive process. While the labour required for this process would cause substantial costs, this is circumvented by offering paid inoculation workshops. Hence, instead of costs, a source of income is created, albeit not a significant one. Every spring, the farmer organises a one-day workshop for 10 to 15 people where forces are joined to inoculate and stack the logs. The workshops attract a lot of interest, particularly among people from the peri-urban and urban surroundings who are grateful for the opportunity to spend time on a farm and are willing to pay for it. Shortly after the inoculation, the logs are placed in a shady location in the forest where they are protected from wind and sun. Such a location is crucial for log cultivation, since the moisture level inside the logs must be kept sufficiently high (at least 30 percent).

Growing shiitake outdoors involves a technique called ”force fruiting” where the logs are regularly soaked in cold water overnight. The technique allows for better control and improvement of the production in terms of achieving a consistent production rhythm and a steady and high production volume, both essential aspects in commercial cultivation. For this purpose, the farmer set up two basins in his forest. This step of is carried out by the farmer himself on daily basis.

Inoculation of birch logs with sawdust spawn. Photos: Erkki Pöytäniemi.

Shiitake birch stacks (left). Japanese cultivation method (right). Photo: Michael den Herder.

During the harvesting season from May/June to late autumn, the ready grown shiitake mushrooms are harvested daily by the farmer. The first harvest can be obtained as early as two years after inoculation, but it is not until the third year that the logs are actually in production. From then on, the logs will continue to produce crops for several years, approximately 2 to 3 more years. Depending on how fast the wood rots, a cultivation cycle from inoculation until the end of production takes about 5 to 6 years in total.

Shiitake logs in production. Photo: Michael den Herder.

The farm is operating a fairly large-scale production system with an average of around 1,400 to 1,600 logs in production (in 2021). This production scale results from the aim to create an annual turnover of 10,000 EUR, which corresponds to about 400 kilograms of fresh shiitake. The numbers are based on calculations from U.S. studies on the economics of log-based shiitake cultivation and can be achieved if 300 to 400 logs are inoculated each year. Inoculating a certain amount of logs every year is important to balance the time lag between inoculation and production and ultimately to reach a sufficient number of logs of different ages in production. This enables to obtain an even and steady production quantity.

So far, however, the mushroom farm has not been able to achieve the production figures indicated by the literature. It produces on average 100 to 200 kilograms of fresh shiitake per year. Deviations from the target number of logs to be inoculated per year (between 150 and 400 logs per year) and/or insufficient force fruiting as well as the climate and light conditions in Finland could be possible reasons for lower yields.

The “waste product” of shiitake cultivation is the growing medium, the rotten logs. At the end of the cultivation cycle they are either used for bordering raised beds in the garden, for providing habitat for a declined bird species that breeds in rotten wood or for creating healthier forests. In the latter case, the rotten wood is left in or taken to the forest as deadwood to increase biodiversity and improve the soil. The lack of deadwood is one of the major issues in Finnish forests due to intensive forestry practices.

Growing shiitake on logs is linked to some challenges related to work- and resource-intensive processes and production outcomes.

The work- and labor-intensity of inoculation and force fruiting is one of the challenges the mushroom farm is facing. Although the work force needed for inoculation is absorbed by offering workshops, in recent years there have been fluctuations in the number of logs that could be inoculated due to external shocks, affecting the overall production capacity. During

the pandemic, two inoculation workshops had to be cancelled, resulting in only 150 logs being inoculated two years in a row instead of 400 logs. The process of force fruiting is a fairly intensive one where 1,500 logs need to be soaked in the water basins in an eight-week cycle, meaning 30 logs per day. Since this step must be carried out daily, it cannot be outsourced, so the farmer takes on the full workload. Furthermore, the high water needs for force fruiting makes it difficult to carry out the process efficiently. An optimal water temperature would require the water in the basins to be changed every other day. Instead, however, it is only changed every week to save water, since the farm is supplied exclusively by a single well. Consequently, the water is not cold enough, which does not boost production in the same way as shocking them in cold water.

In terms of production outputs, the major challenges concern the limited control over production, moderate productivity and profitability. Though production can be regulated to some extent through force fruiting, when and in what quantities the harvest will occur cannot be fully controlled. This, in turn, limits the predictability of production and impedes to obtain and maintain a steady and even supply of fresh mushrooms. Being an extensive production method, the productivity of shiitake cultivation on logs is lower than that of intensive indoor cultivation. In outdoor mushroom farming, yields are realized much more slowly, about 1 to 2 years after inoculation, whereas in indoor conditions it takes a maximum of 24 weeks, including substrate growth (15-22 weeks) and fruiting body formation (2 weeks). In addition to the long time-lag until shiitake-logs are producing, achieving a sufficient production scale is also an issue. So far, the mushroom farm has obtained only half – or even less – of the target quantity of 400 kilograms stated in U.S. studies. The farmer suspects it is due to differences in climate and light conditions between Finland and North America. Compared to other crops, mushrooms are very delicate organisms with a water content of over 90 percent and no cuticle to protect them from evaporation. Hence, the optimal climate for growing mushrooms is of enormous importance. Another reason might be that the process of force fruiting is not fully carried out according to the requirements. As a result of low(er) productivity in terms of time and quantity and a limited control over production, log-cultivation is not very profitable when operated as a full-scale mushroom business, unless premium prices can be charged. This was also confirmed by an experienced expert in specialty mushroom cultivation.

These circumstances represent a barrier to entry into commercial outdoor cultivation for many and are the reason why most shiitake on the market is produced semi-industrially on wood substrate under controlled indoor conditions. In Finland and even in the whole of Europe (e.g. in the Netherlands or in Germany) there are only a few examples of professional producers growing mushrooms on logs. Those Finnish companies that have tried it on a commercial scale have switched to indoor cultivation because of the large fluctuations in harvest volumes, the long growth period, low profits, and the high labor needs involved in log-cultivation.

STORAGE

After harvesting, the fresh shiitake mushrooms are stored in a refrigerator until sale, for a maximum of one week. To ensure the freshness of the mushrooms, harvesting is done as close as possible to the day of delivery, preferably the same day.

PROCESSING

Since the value chain is designed for fresh mushrooms, it does not include the step of processing. Nevertheless, the farmer experimented with possible solutions when large harvest quantities occurred, such as shiitake pâté or sun-dried shiitake. However, this was not continued. Therefore, processing can be neglected in this analysis.

DISTRIBUTION AND SALES

The fresh shiitake mushrooms are distributed through two main channels of direct sales: via a local farmer's market and a distribution system called REKO. There exists also an indirect sales channel to restaurants in Helsinki via an oyster mushroom producer. In addition, there are other, but rather occasional distribution channels, mainly used in the event of overproduction. Distribution then takes place in the neighbourhood either through farm-gate sales to private individuals or through sales to a local refiner of medicinal mushroom extract, the same company from which the inputs for inoculation is sourced. Spatially, distribution through all channels takes place close to production, at local to maximum regional level. The transport is mainly carried out by the farmer himself.

Direct sales take place weekly on specific days, for both local farmer's market and REKO sales. REKO is a fairly simple system for direct sales developed by a Finnish farmer. It is organized into location-based groups of consumers, each with a designated collection point, day, and time where they meet with local producers to exchange food products for money. Prior to the weekly delivery day, producers announce on Facebook which products they will sell, in which package sizes and at what price, and consumers can order according to their needs. The mushroom farm supplies fresh shiitake mainly to three nearby REKO groups, but extends its delivery radius to other REKO groups in the Helsinki region when the weekly production volume is larger.

According to the farmer's experience, both direct sales channels have proven to work quite well for his produce. In particular, through REKO, the farmer is able to sell solid quantities, and the fact that consumers can place pre-orders makes the sales volume more predictable compared to farmer's market sales. The customer relationship is characterized by personal contact with the shiitake producer, an important selling point and relevant aspect for long-term customer loyalty.

Prices for the shiitake mushrooms vary depending on the distance to the market and on the buyer. The producer charges lower prices on the local market (around 30 EUR/kg) and higher prices on the regional market (around 40 EUR/kg). Although the prices obtained from direct sales are satisfying, the mushroom business is currently not very profitable. This is mainly due to the fact that the business is not yet operated on a scale where it should generate a (side) income for living. As long as the farmer is still fully employed, it is rather run for passion than for profit. When selling his overproduction as a medicinal ingredient to the mushroom extract refiner, the farmer makes a trade-off in price. The prices paid by the company are lower than for direct sales. However, since shiitake production is not done for income generation, it is an easy solution when there is unpredictable overproduction, often associated with log-cultivation.

Distribution of the farm's shiitake is challenged by market barriers related to competition with edible mushrooms from conventional systems in Finland and market entry, as well as by the time intensity of direct sales.

Shiitake produced in this innovative food system has to compete with mushrooms from other production systems, more precisely with mushrooms from wild collection and shiitake from industrial indoor cultivation. However, the fact that it is a non-local species, its characteristics as well as its cultivation method could serve as unique selling points if well marketed, allowing to overcome these market barriers in the long term. Wild mushrooms are an essential part of Finnish culture. Not only are they highly valued as an ingredient in Finnish cuisine, but also collecting them in the forest is considered a popular leisure activity. This profound connection and the free access to wild mushrooms somewhat lowers the willingness to buy and pay for (other) mushrooms. With shiitake, however, the supply of wild mushrooms can be complemented as it differs by texture from the mushrooms that can be found in Finnish forests. Contrary to some other mushroom species that are similar in texture (e.g. oyster mushrooms and chanterelles), shiitake has no native counterparts. As such, the shiitake is even interesting to buy during the mushroom picking season (summer, autumn), rather than only in winter. While shiitake log cultivation was claimed to perform better than commercial indoor cultivation in terms of the product quality, it performs worse in terms of product availability. The downside of log cultivation is that there is no steady production throughout the year, especially not in winter.

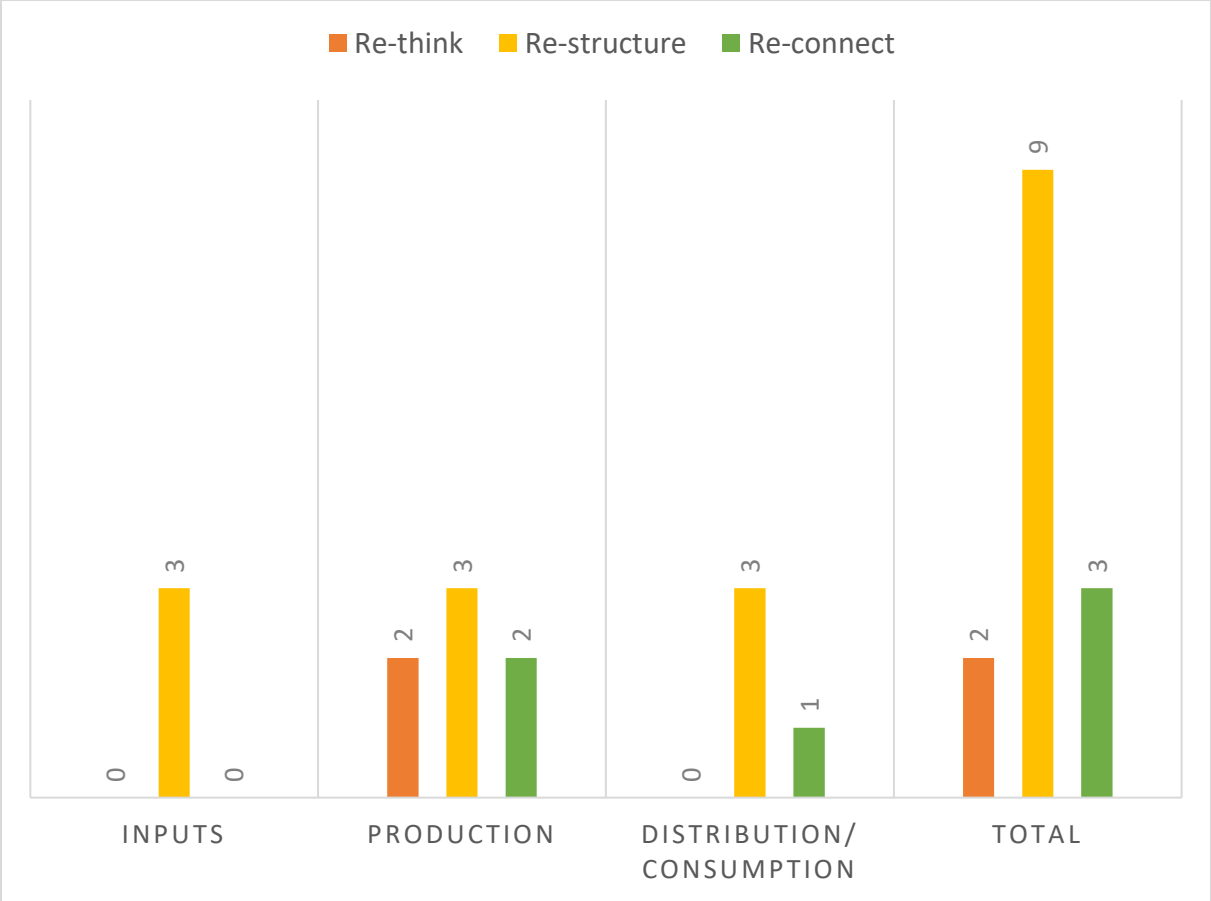
Moreover, the initial goal of entering the market segment of high-end restaurants could not be achieved. Many sales efforts were made including personal conversations with chefs but it did not reach the point where the restaurants put shiitake on the menu or bought it regularly, though the story behind the mushrooms and the samples were greatly appreciated. On the other hand, even if it had been possible to attract high-end restaurants as customers, there were concerns about supply bottlenecks resulting from the cultivation method, where it is difficult to ensure consistent production volumes.

While he appreciates the interaction with people from his area, the farmer had to pause selling at the local farmer's market because it was too time-consuming on top of his full-time job. But selling via REKO can also be time-consuming. As soon as larger quantities have to be sold, several REKO stations have to be approached, which means that delivery can take a total of half a day per week.

LEVERAGE POINTS

Along the food system's value chain, there are leverage points in all three realms of deep leverage, most of them in the realm of *re-structure*. The majority concerns the stage of production. Knowledge is particularly important in production (*re-think*), as is the people-nature nexus in production as well as in distribution and sales (*re-connect*). The configuration of system structures and flows is tackled along the entire value chain (*re-structure*). Overall, interventions were most often targeted at the production stage.

Figure 5: Deep leverage points in the value chain of the Finnish case study by frequency.



In order to implement the outdoor production system for shiitake, a high level of knowledge input and generation was required. This was achieved through learning from others, learning

by doing and gathering information. On the other hand, the operation of the production system also generated valuable knowledge and sustainable practices as output that is openly shared with others to encourage imitation. The value chain shows points of intervention that address system structures related to material flows, relationships and the organisation of work and associated capital flows within the innovative food system, but also (to some extent) beyond. These include the creation and utilization of synergies between (sub-)systems to increase self-sufficiency as well as ecological and economic efficiency of material flows, the cultivation of relationships based on collaboration and personal contact, the outsourcing of work- and labour-intensive processes and the conversion of associated costs in revenues by offering paid workshops as well as by the complementation of the mushroom supply from conventional production systems in the region. The food system links humans and their economic activities to nature through semi-natural production processes, temporary product availability and opportunities for participation.

Table 3: Deep leverage points in the value chain of the Finnish case study (Numbers indicate the frequency of interventions).

Deep leverage points	Intervention points in the value chain			
	Inputs	Production	Distribution / Market	Total
Σ:	**3**	**7**	**4**	**14**
Re-think	**-**	**2**	**-**	**2**
Acquiring knowledge and experience in fungiculture through learning from others, learning by doing and gathering information		x		
Culture of sharing and disseminating generated knowledge and sustainable practices to encourage imitation		x		
Re-structure	**3**	**3**	**3**	**9**
Creating and making use of synergies between (sub-)systems to increase self-sufficiency, eco-efficiency and economic efficiency of material flows				
Converting by-product of forestry into raw material input for food production	x			
Using the output of one subsystem of production as an input for the other	x			
Co-producing wood and high-value food from forest		x		
Creating circular material flows with waste products from the production process		x		
Cultivating relationships based on collaboration and personal contact				
Vertical and horizontal cooperation with other mushroom producers instead of competition (B2B-relationships)	x		x	
Operating a short value chain with direct and personal contact to customers (B2C-relationships)			x	
Outsourcing work- and labour-intensive processes and converting associated costs in revenues by offering paid workshops		x		

Complementing, instead of competing with, regional product supply from conventional mushroom production systems			x	
Re-connect	**-**	**2**	**1**	**3**
Synchronizing production processes with natural rhythms, including trade-offs		x		
Using the temporary availability of products as a means to (re-)educate consumers about seasonal consumption			x	
Involving private individuals in production process by organizing participative workshops for inoculation		x		

Re-think

Each type of fungus requires its very individual, often very demanding, cultivation system. Growing mushrooms therefore needs a great deal of practical experience and requires highly context-specific knowledge of the species in question, how and under what climatic and light conditions it grows, and how it reproduces. For this reason, different ways of learning are essential for cultivating mushrooms. In this case study, there was no prior knowledge of mushroom cultivation. The necessary knowledge for shiitake production was acquired through a combination of learning from others' experiences, learning by doing, and gathering information. Before starting, the farmer visited an established company in North America that produces mushrooms on logs to get a first understanding of how the processes and operations behind this particular production system are designed. From there, the farmer began to learn from scratch by reading books, browsing the internet and exchanging with mycology enthusiasts and home-growers on social media. However, the greatest learning effect was achieved through trial and error. The farmer experimented with different mushroom types, different mushroom strains from different suppliers, different degrees of freshness of the logs to see how it affects the inoculation success and with growing his own sawdust spawn for inoculation. This way of knowledge generation was crucial not only to ultimately identify the best performing mushroom species, namely shiitake, but also because Finland has very exceptional climate and light conditions that limit the transferability of experiences in outdoor cultivation from other parts of the world.

Besides using the accumulated knowledge in fungiculture to optimize the farm's own production, it is also willingly and openly shared and disseminated to benefit others. For reasons of competitive advantage, disclosure of knowledge and production processes is not a common practice in the conventional mushroom industry. In contrast, the case study farmer sees knowledge sharing and exchange as a natural component. More importantly, it is in his interest to interact with others who have similar goals and interest to encourage the replication and dissemination of sustainable practices tested and developed on his farm. For example, knowledge gained and lessons learned, including failures, are made publicly available in an online blog. Additionally, there is a lively exchange with people interested in the mushroom cultivation system, including farm visits. In this sense, the mushroom farm serves as a catalyst for imitation, both at commercial and hobby level. Inspired by the

exchange of experience and ideas with the pioneer in the region, a local resident co-founded a fungi-based business in the neighbourhood. Today, the biotech company is one of the leading medicinal mushroom producers in Europe. Instead of perceiving the company as a competitor, the farmer maintains a relationship with it that is based on cooperation. Apart from vertical linkages in the value chain, he also provides his farm to the company as a best practice example and as a place to learn. He assists the company in conducting workshops on his farm to promote log cultivation of mushrooms in Finland. Following these workshops, some participants have started with outdoor mushroom production, although not on a commercial level.

Re-structure

An outstanding feature of this food system is that it creates and making use of synergies between the (sub-)systems forestry, mushroom farming and beekeeping to increase the self-sufficiency, eco-efficiency and economic efficiency of material flows. This includes the conversion and as such valorisation of a by-product of forestry into a source of raw material for food production. Instead of using small-diameter trees exclusively for bioenergy (e.g. firewood), the by-product of thinning is also used as an input for mushroom cultivation, eventually transforming the wood into food with the help of a saprophytic fungus. Depending on the tree species, parts of the logs can be supplied by the farm's own forest (birch), parts are purchased from external sources (oak). For reasons of self-sufficiency and profitability, the farmer compromises on the higher and longer productivity of oak and uses mainly self-produced birch is used as growing medium. Also, beeswax from own production is used as an input for shiitake cultivation which would otherwise represent a significant cost factor. This illustrates the interaction between the farm's subsystems: the output of the subsystem beekeeping is used as an input for the subsystem mushroom farming. The use of inter-system synergies is also reflected in the output of production. By introducing a novel fungal species into forestry, the forest produces both wood and non-wood products. Through shiitake cultivation, it additionally provides high-value food, both in economic as well as in nutritional terms. In this way, this newly designed co-production system increases the eco-efficiency of forest land. The forest provides raw material input for the mushroom production and vice versa, creating circular material flows by closing the loop with waste products from the production process. At the end of the cultivation cycle, the decayed logs are (partly) returned to the forest as organic material, contributing to a healthier forest ecosystem (e.g. soil, habitat, biodiversity) by compensating for the current lack of deadwood in Finnish forests caused by excessive wood harvesting.

The way relationships are designed and cultivated can be interpreted as another lever in the realm of *re-structure*. Instead of seeing them as competitors, the mushroom farm builds on vertical and horizontal collaboration with other mushroom producers in the region at different stages in the value chain. It allows cultivation inputs to be procured locally, overproduction to

be sold, and regional restaurants to be reached. Trade-offs regarding the farm's principle of self-sufficiency as well as regarding prices are willingly made for cooperation, not least because of the personal relationships with the business owners. The case study operates a short value chain with predominantly direct sales on local, or at most regional, level. Personal contact with customers plays an essential role in the success of these distribution and sales channels.

Outsourcing work- and labour-intensive processes and converting the associated costs in income by offering paid workshops is another measure that addresses the organisational structures of and the cash flows within the food system. The annual process of inoculation is organized in workshops offered to the general public for money, which generates revenue rather than costs.

Furthermore, shiitake mushrooms from outdoor production serve a regional market niche. The case study's product does not necessarily compete, but rather complements the supply of mushrooms from conventional production systems in Finland, i.e. wild collection and industrial indoor production, especially in terms of texture and quality.

Re-connect

The leverage point of *re-connect* is reflected in the production process which is synchronized with natural rhythms. While in indoor cultivation the growth of shiitake has been optimized to a maximum of 24 weeks, in outdoor cultivation yields and thus revenues can only be obtained about 1 to 2 years after inoculation, contradicting the prevailing economic logic of quick returns on investment. In this semi-natural production system, the work processes are carried out in line with the seasons: the trees for cultivation are felled in winter, the logs are inoculated in spring and the mushrooms are harvested in summer and autumn. To produce with nature, several trade-offs are made, including limited control over production quantities and timing, moderate productivity and profitability, a long growth period, and high labour needs. While the farmer's goal is to produce as naturally as possible anyway, his statement "*ultimately, mushrooms come when they come*" illustrates that he has a strong connection to and trust in nature and its cycles.

Shiitake grown outside on logs are seasonal products. Although this could be a disadvantage compared to industrial indoor production, the farmer perceives the temporary product availability as a means to raise awareness and (re-)educate consumers about the diversity of edible fungi and their respective availability according to their natural season, though being aware that changing consumption habits takes time. A few years of direct sales experience have already confirmed to the farmer that his efforts can mobilize people to learn and adopt new consumption patterns, as many of his customers return to buy from him. However, it should be mentioned that Finns are among the nations that can be considered to have a profound connection with mushrooms and their season, as mushroom picking in the forests is very popular.

The case study also provides possibilities to people to get in touch with nature on their farm. It involves private individuals in their production process by organizing participative workshops for inoculation each spring. The fact that the workshop has been very popular so far, particularly among people from (peri-)urban areas, might be an indication that people have a desire to *re-connect* with the production of natural food.

b. Italy

Author: Valerie Holzner

Case Study Name: Fattoria Cupidi

Location: Gallese, Italy

OVERVIEW

The Italian example of an innovative organic and sustainable food system is represented by an organic farm called *Fattoria Cupidi*. It is located in in Gallese, in the province of Viterbo (Latium Region, Central Italy). The farm's main activity is the production of organic eggs from the breeding of laying hens around which the value chain is centred and designed, including land management and social activities. Despite this specialization, the farm can be described as multifunctional. Besides the main product, organic chicken eggs, the farm also produces cereals and protein crops as fodder for the livestock as well as small quantities of olive oil and wine. In addition to their primary function of agricultural produce, the farm provides educational and social farm services. It carries out didactic programmes and farm visits for school children and cooperates with social associations and health facilities to provide social activities for children with disabilities. For reasons of a more self-sufficient and environmentally friendly energy supply, part of the electricity and heating for the production facilities is produced on-farm by operating a photovoltaic system and using pruning residues from vine and olive oil production as wood chips. Also, the pomace from olive milling is valorised, being used for the boiler plant after processing by a third party. In terms of production volume, eggs account for 85 percent. The remaining 15 percent come from the production of animal feed, oil and wine, teaching and electricity generation.

The value chain is rather producer-centered with predominantly short and regional linkages at both ends of the chain. The farm operates in all value chain stages, ranging from material inputs to distribution and sales. Self-sufficiency is not only emphasized in terms of energy but also in terms of production inputs as animal feed and fertilizers are mostly self-supplied. To benefit from ecological synergies between subsystems, egg production is an integral part of the farm's walnut plantation where the laying hens are grazing. Since the value chain does not contain any steps of product transformation, the eggs are freshly packaged and labelled on farm and sold directly to the farm's customers. While the farm initially sold exclusively to wholesalers, its distribution and sales channels are now much more diverse, including direct sales to consumers, supermarkets, organic stores, market traders and the food service industry. Though it is a regional value chain, the eggs also enter a supra-regional value chain through vertical linkage to an intermediary distributor that connects the farm with urban households in Rome. *Fattoria Cupidi* is closely connected with stakeholders in the region,

whether with social and educational facilities through farm services or with institutionalized networks of value-driven producers and sustainability-driven actors through mutual support and knowledge exchange.

Now in the fifth generation, the farm is run as a family business. It is owned and managed by two siblings with the support of their parents and grandmother. The labor force is augmented by seasonal workers, usually three, and trainees. In 1999, an organic production system was adopted and poultry farming was changed from intensive to extensive practices with laying hens for the production of organic eggs. In order to produce its own chicken feed, the farm's agricultural area has grown considerably to 33 hectares in the last decade. However, it also includes a small vineyard of half a hectare, olive groves and a walnut plantation.

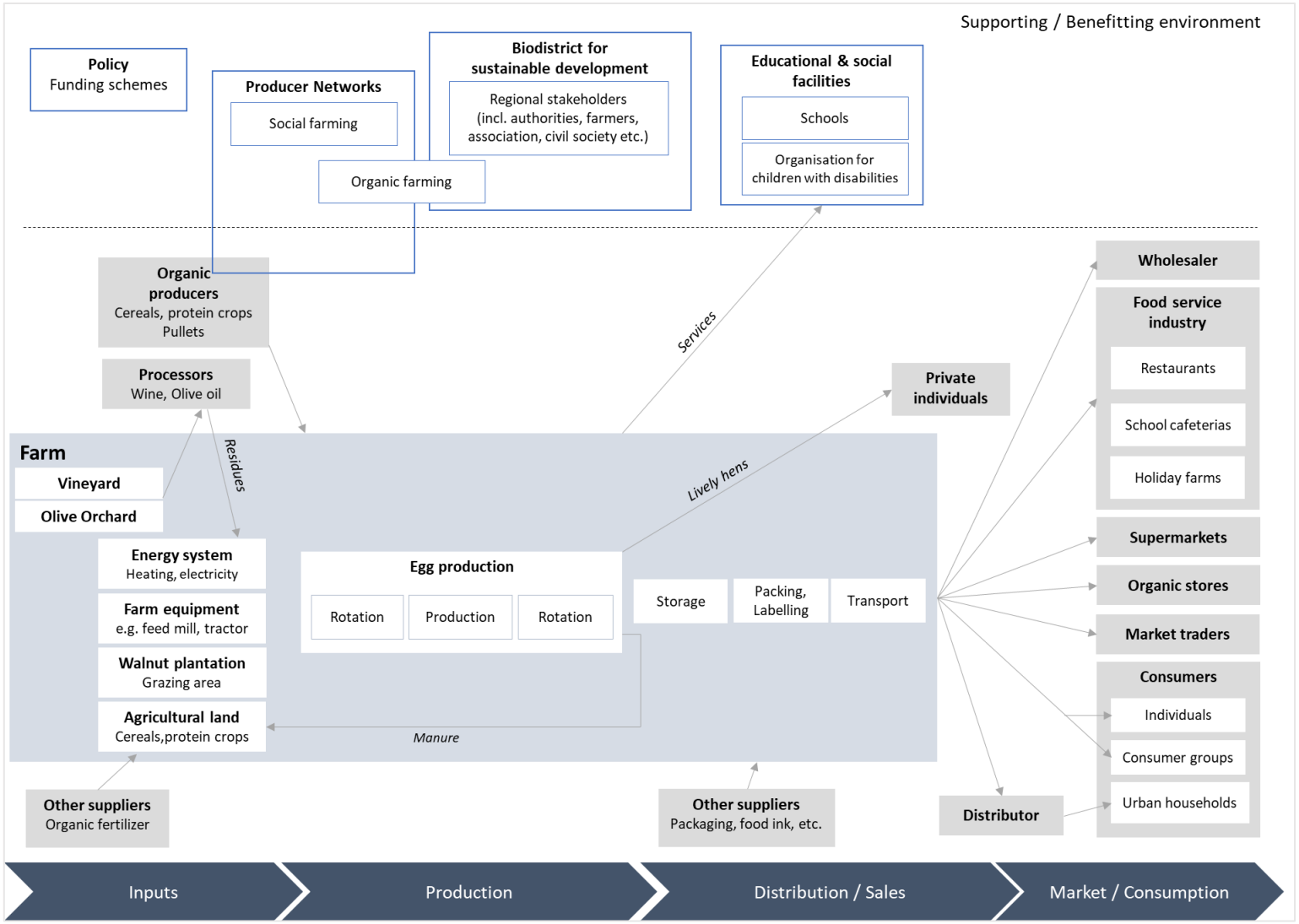


Figure 6: Value chain of the Italian case study.

INPUTS

Material inputs for egg production comprise animal feed, organic fertilizers, pullets as well as farm equipment.

While fodder for the chickens, including cereals (e.g. wheat, barley) and protein crops, is produced by the farm itself, it is not yet enough for self-sufficiency and is therefore supplemented by purchases. This mainly results from the obligation of crop rotations according to organic standards. In order to reduce supply chain dependencies by producing its own feed, investments have been made in recent years to expand land tenure. With the exception of one leased acre, the total area of 33 hectares belongs to and is managed by the farm. The farm's poultry manure, the waste product from egg production, is used entirely to fertilize the fields. However, since the stables are emptied only twice a year, its availability is limited, which requires organic fertilizers to be purchased occasionally.

To supplement the fodder needs that can't be provided by own production, grain is purchased from several, primarily local, suppliers, e.g., the agricultural consortium or individual farms, many of whom are part of the organic producer network of which the farm is a member. Over time, the farm has been able to identify suitable grain suppliers for itself through a careful selection process based on several parameters, such as price or quality. Particularly, sourcing from farmers in the producer network is highly valued, not least because of the transparency regarding the production method and the reduction of transport costs and emissions. To complement each other and to ensure that the whole range of organic cereal crops are available locally, the producer network even jointly plans the annual cultivation according to the members' individual crop rotations. Apart from feed, the farm's affiliation with a producer network has generally proven to be advantageous in procurement from both an economic and an ecological point of view. For example, joint orders are placed to save on transport costs and kilometers or to obtain quantity discounts.

The production and procurement of organic cereals and protein crops for fodder is also linked to challenges related to high costs and limited availability of inputs. The prices for both grain and fertilizers have risen sharply, often by double, e.g. from 44 to 84 euros per quintal of soybeans (in 2021). To increase resilience to such external shocks, the farm is constantly elaborating and testing alternative solutions, e.g. by using digestate from biogas production as fertilizer or experimenting in the cultivation of soybeans. The limited market availability of organic products, such as corn, is another issue, often exacerbated by contractual supply obligations to large buyers. On the other hand, there are difficulties with the availability of affordable land, which prevents the farm from becoming independent of market developments and improving their product. The hazelnut monocultures in the region have caused land prices to skyrocket, distorting the entire market. In particular, the pandemic year of 2021, with its extreme price fluctuations, has exposed the volatility of the market and thus the need for independence.

When rotating the hens, pullets are purchased at intervals of one to one and a half years from organic farms in Calabria (Italy) to restart the production cycle of eggs.

Other production inputs include farm equipment, such as a feed mill to transform the grains into fodder, machinery for tilling the soil, and other materials for maintenance (e.g. nests, mats, grids etc.).

PRODUCTION

The production process for eggs is of an iterative, cyclical nature. After a laying hen's productive life, which varies between one and one and a half years, the livestock is sold alive to private individuals. The sale lasts about a month (30 to 40 days) and is followed by the cleaning of the facilities and a period of sanitary vacuum. Two to three months later, new pullets are introduced. During their time on the farm, the chickens can graze freely in the walnut plantation every day.

To ensure continuous production, the farm operates with a production system that is based on two herds of different ages. Simultaneously, the process of hen rotation is carried out in line with seasonal demand: When the demand for eggs decreases (after Easter), the procedures are initiated. This system of egg production was adopted because as the hens get older (after approximately one year), the number of eggs that are defective or unsuitable for further processing or sale (e.g. fragile or rippled shells, deviations in size) increases.

Stable for the livestock. Photo: *Fattoria Cupidi*.

A major risk for the production systems is the bird flu that has recently spread in northern Italy and could mean the loss of the total livestock. As a consequence of low diversification, the revenues generated from the other activities would not be sufficient to sustain the farm's income. To compensate for this low economic resilience to diseases, the farm invested in a mill that can not only be used for feed production, but also provides the possibility of producing flour or offering its use as a service to other farms. In addition, once the walnut

plantation is old enough for production, it is intended to expand the range of products and thus the sources of income.

Hens grazing in the walnut plantation. Photo: *Fattoria Cupidi*.

STORAGE, PACKING AND PROCESSING

The eggs are stored for a maximum of one to two days. They are labelled with the farms' own brand "Bioangelino", the organic logo of the European Union and the CE mark and packaged in cardboard pulp packaging directly on the farm.

In addition to the material inputs for the actual production of eggs, supplies are purchased for packaging and labelling of the produce.

Packaged eggs. Photo: *Fattoria Cupidi*.

The packaging material involves cardboard pulp packaging for the eggs and carboard boxes for the egg cartons, supplied by an Italian retailer, but not manufactured in Italy. The food ink is a rather costly product that needs to be ordered well in advance. It is purchased together

with a diluent to be used in the inkjet printer for egg labeling. There is additional cost for maintenance of the printer.

The farm does not carry out any steps of product transformation but has recently entered arrangements with an external processor to integrate its eggs into pasta manufacturing.

DISTRIBUTION AND SALES

While the farm initially sold exclusively to wholesalers, its distribution and sales channels are now set up much more diverse. They encompass direct sales to private individuals, some of whom form groups for joint orders, the supply of several organic stores and supermarkets, market traders and the food service industry. The latter includes restaurants, holiday farms as well as school cafeterias. Although distribution takes place on regional scale, witihin Viterbo region, there is also a link to customers in Rome through a company that trades and distributes organic produce to households. Leftover eggs are sold in bulk to a wholesaler who resells them unbranded. The prices charged for the eggs are the same, regardless of the buyer.

Eggs are a seasonal product that is particularly in demand in winter and spring, especially during Christmas and Easter holidays. As soon as the temperatures rise, the demand for the farm's produce decreases. The largest volumes of eggs (over 50 percent), are sold to organic shops and supermarkets, making these channels essential for distribution. The possibilities to enter supermarkets that belong to large chains are limited because they impose requirements that are neither economically nor quantitatively feasible for small-scale producers. For this reason, *Fattoria Cupidi* farm mainly supplies smaller supermarkets that are privately owned and offer local products.

The company in Rome plays a valuable intermediary role by providing the egg producer with a distribution channel to reach urban consumers. It operates a distribution system in which organic produce from the regions surrounding Rome is bought, compiled into a basket of products and sold and delivered to households in the capital. To do so, the distributor cooperates with about 100 small- and medium-sized farms, including *Fattoria Cupidi*. There are different sets of baskets that can be chosen according to the household's eating habits and size. They contain mainly fresh products, such as fruits and vegetables, meat, eggs and cheese, some of which can vary depending on the seasonal availability. To carry out the weekly home deliveries, the company has an innovative logistic system in place. Using a fleet of special cargo bikes that cover the so-called "last mile", allows for a reliable and very efficient logistics in an urban area such as Rome. For delivery, the bikes follow refrigerated vans that act as thermal hubs and move around. In its bridging function, the company establishes and maintains relationships with both producers and consumers. On the producer side, cooperation farms are analytically selected on the basis of a set of criteria concerning cultivation techniques, economic clarity, economic, social and environmental responsibility. Instead of contractual agreements, great emphasis is placed on relationships that are based

on mutual trust, fairness, strong sense of collaboration, knowledge and information exchange, and shared values. The purchase prices are set by the farms, often, however, with support of the trader, as not all of them are aware of their production costs. As a result, the producers can obtain fair prices for their produce that exceed those for standard products. The other part of the intermediary's role is dedicated to the marketing and communication to customers. Relationships to customers are built exclusively following a face-to-face meeting to strengthen their personal ties to the food system, its producers and products and to make them understand that they are entering a system that is made by human beings, that is not standardized and thus allows for mistakes. This is also achieved through farm visits, as also happened in the case of *Fattoria Cupidi*. There is full transparency with regard to the product origin. The producer is either known personally or indicated on the product. As a consequence, there is no need for using organic certification as a selling point, even though it exists for all products.

> *"[W]e try to make the end user […] understand what they are part of, and […] that the act of buying is in fact the end point of a virtuous process that supports virtuous production processes and commercial, economic, and ultimately human relationships based on trust: in our opinion all this has a social, political value in itself."* (Manager of distribution company in Rome, Italy)

This integrative approach, combined with communication measures, contributes to a better understanding and acceptance of changes in the food system among consumers, such as what happened in the case of a price increase caused by higher production costs. While the distributor expects the consumer to trust the food system, the consumer is also trusted in return with regard to payment. Consumers pay after they have received their deliveries, not beforehand.

While a food courier is used for more distant deliveries (e.g. to Rome), the farm covers the transport within the regional market by its own vehicle, not least because great importance is attached to maintaining direct contact with customers. Fragments of the transport are also carried out with the vehicle shared by the producers of the *SOLCARE* network.

Word of mouth has proven to be an effective mean for *Fattoria Cupidi* to increase its customer base. Once customers are familiar with the way the farm works, the quality of its product and reliability of its deliveries, they recommend it to others, gradually attracting new buyers. Nevertheless, several marketing and sales strategies are applied. The farm invests time and efforts in promoting the loyalty of new customers. For this purpose, guided farm tours, markets and educational workshops are organized, to make people understand and appreciate the differences between the farm's organic product and its conventional counterpart. Social media in particular, but also the farm's website, are helpful in maintaining customer relationships and encouraging them to participate in events and activities. Furthermore, being part of the social farming producer network (*SOLCARE*), does not only serve as a means for joint sales by assembling and delivering packages of the network's products to families, but also for the exchange of customer contacts. The farm markets its

eggs by creating and/or promoting an identity around its product as well as its geographical origin. The eggs are branded with the farm's own logo for recognition and, in stores, information boards are placed. For geographical marketing, the logo of the *Biodistrict (Biodistretto della Via Amerina e delle Forre)* is used to associate its meaning with the eggs. It identifies a territory that is known for its sustainable practices. Other certifications and brands include the national organic certification (*Associazione Italiana Aziende Biologiche*) and the *Tuscia Viterbese* brand, but no brand indicating social sustainability. The farm also joined the INPS (National Institute for Social Welfare) Quality Agricultural Network, however without advertising it. For reasons of price competition with the global egg market, the farm adopted strategies to lower costs. They take advantage of price discounts by buying larger quantities of packaging material, experiment with growing new protein crops to become less dependent on the high market price fluctuations for animal feed, and share transport costs for both material inputs and delivery with the producer networks. The *SOLCARE* producer network has therefore even jointly invested in a shared vehicle.

Distribution and sales have experienced effects of external shocks. As a result of supply shortages during the pandemic, the exponential increase in sales gave rise to hopes that consumer behavior would shift more towards local products. Instead, consumers soon opted for products based on low prices again and sales returned to normal levels. Apart from the distribution through supermarkets, the pandemic situation has caused a one-third drop in sales to the food service industry, forcing the farm to sell its eggs unbranded and putting it under pressure to find new customers.

LEVERAGE POINTS

While interventions in the food system's value chain span the triad of deep leverage points, the majority concerns the realm of *re-structure*. Measures targeting system structures are evenly distributed across the entire value chain (*re-structure*). Knowledge creation and exchange is primarily relevant to production, but also plays a role in both material inputs and distribution and sales (*re-think*). Connections between people and nature are fostered in the stage of production as well as of distribution and sales (*re-connect*). Overall, the most frequent intervention is in the production stage, followed by distribution and sales.

The value chain of the food system is characterized by various structural interventions and adaptations related to the institutionalization of networks, input material flows, producer-buyer relations, logistics, funds and the production process. Organizing into institutionalized networks that are based on sectoral and territorial aggregation and created and informed by bottom-up and multi-stakeholder processes, empowers small-scale organic producers, like the case study, and promotes their regional value chains. By shifting towards new forms of organisation and collaboration, the food system has contributed to restructure the institutional landscape of the food sector and even beyond, at least at the reginal level.

Further value chain interventions that address system structures relate to enforcing the self-sufficiency for material inputs to reduce external dependencies and increase the ecology of the production system, and establishing and maintaining producer-buyer relationships, both business-to-consumers (B2C) and business-to-business (B2B) relations, that are based on direct human interaction, mutual trust, values and collaboration. Moreover, an innovative and environmentally friendly logistic system for urban delivery is used and funding programs at different policy scales allow to develop a multifunctional, resilient and diversified production system. Production process is restructured with regard to creating and making use of synergies between the farm's subsystems and synchronizing production cycles with seasonal demand. The case study contributes to a (re-)connection of people to the food system in two ways: to get different societal groups in touch with organic food production through educational and social services and fostering value-based, territorialized, personified and mindful relations to consumers through product labelling and intermediaries. Knowledge for improved production is tested and validated through research and development cooperation with scientific institutions and universities. Additionally, knowledge is co-created exchanged on both an intra-sectoral and inter-stakeholder basis to strengthen the sustainability of regional agri-food systems.

Figure 7: Deep leverage points in the value chain of the Italian case study by frequency.

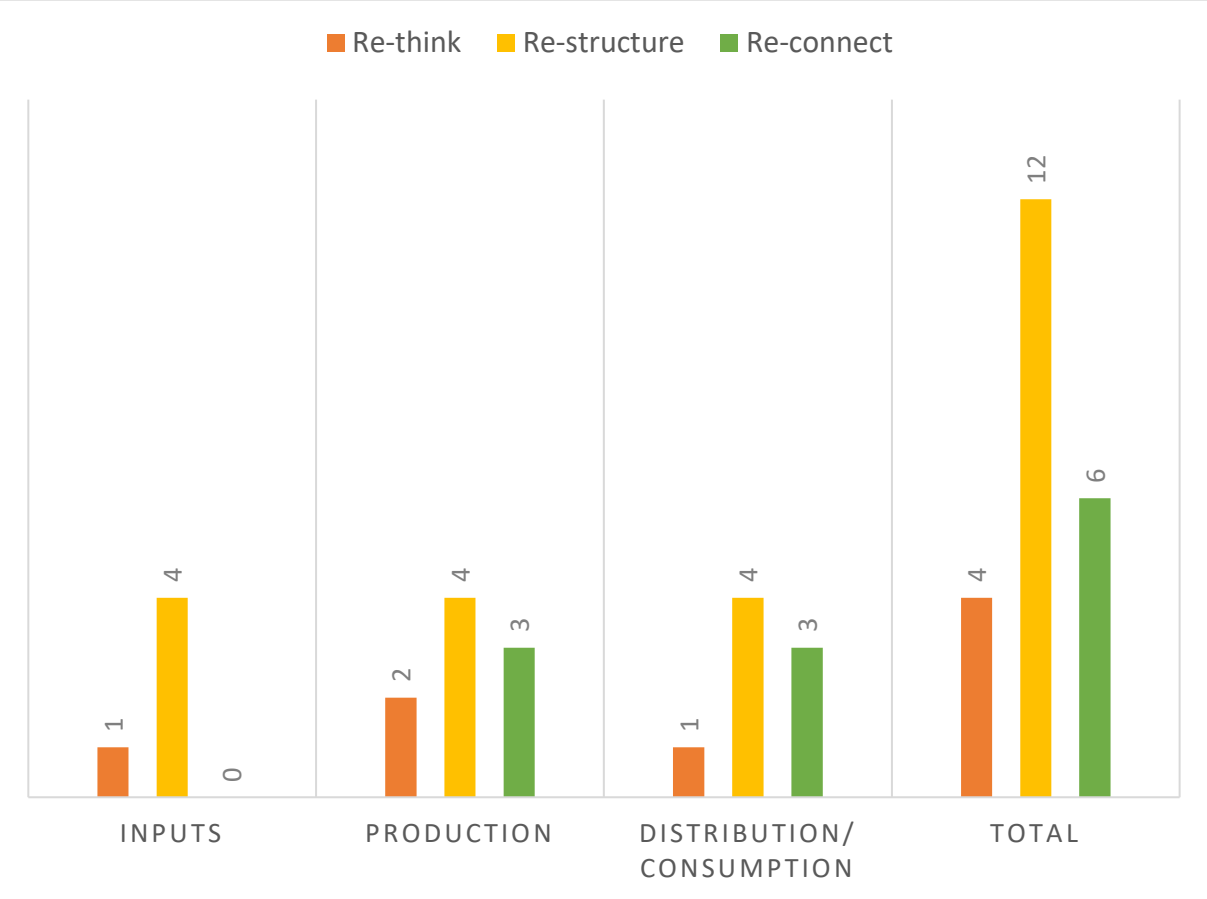


Table 4: Deep leverage points in the value chain of the Italian case study (Numbers indicate the frequency of interventions).

Deep leverage points	Intervention points in the value chain			
	Inputs	Production	Distribution / Market	Total
Σ:	**5**	**9**	**8**	**22**
Re-think	**1**	**2**	**1**	**4**
Engaging in research and development projects with research institutions and universities to improve production (i.e. regarding animal welfare and product quality)		x		
Co-creating and exchanging intra- and inter-sectoral knowledge within institutionalized networks to develop solutions for regional agri-food systems	x	x	x	
Re-structure	**4**	**4**	**4**	**12**
Organization in sectoral and territorial institutions created and informed by bottom-up and multi-stakeholder processes to empower small-scale organic production and promote regional food value chains	x	x	x	
Enforcing self-sufficiency for material inputs to reduce external dependencies and increase ecology of production system				
Expanding agricultural land tenure to increase own fodder production while shortening transport distances	x			
Creating circular material flows with waste products from production processes	x			
Testing and elaborating alternative solutions for fodder and fertilizer self-sufficiency	x			
Building and maintaining producer-buyer relationships (B2C and B2B) based on direct human interaction, mutual trust, values and collaboration instead of prices or contracts				
Delivering predominantly without intermediaries and participative activities to cultivate personal contact with consumers (B2C-relationship)			x	
Emphasizing value-orientation, trust, knowledge and information exchange and collaboration (B2B-relationship)			x	
Using an innovative and environmentally friendly logistic system adapted to space-specific requirements of urban delivery			x	
Using funding programs at different policy scales to develop a multifunctional, resilient and diversified production system		x		
Creating and making use of synergies between subsystems to increase eco-efficiency of land use		x		
Synchronizing production cycles with seasonal demand		x		
Re-connect	**-**	**3**	**3**	**6**
Providing participatory farm services to connect different societal groups to organic food production				
Offering educational services for school children		x	x	
Offering social services for the inclusion of disadvantaged people		x		
Using organic and local food labelling for consumers to identify with the product based on production method and origin			x	

Establishing personified and mindful ties between urban consumers and small-scale producers by bridging spatial and cognitive distance through intermediaries		x	x	

Re-think

For reasons of improving production, particularly with regard to animal welfare and product qualities, the farm is engaged in research and development projects with research institutions and universities, such as the *CURSA* (*Consorzio Universitario per la Ricerca Socioeconomica e per l'Ambiente*) and the *Zooprophylactic Institute of Viterbo*. While one project focuses on the intercropping walnut plantation with thyme, rosemary, clover, vetch and oats to test the effects on the animal welfare, on the nutritional and organoleptic qualities of the eggs, the other introduces insect meal in the diet of the laying hens.

Furthermore, the production system participates in and benefits from intra- and inter-sectoral networks that co-create and exchange ideas and knowledge related to sustainable solutions in organic agri-food systems (among others). Within the sector, *Fattoria Cupidi* farm exchanges not only within producer networks for organic or social farming (*AgroEcoAmerina, SOLCARE*), but also with a regional association specialized on agroecology (*Schola Campesina*). The association pursues an approach where both scientific and practical knowledge on agroecological systems and their management is developed and shared. As part of the *Biodistrict*, the farm co-creates and exchanges ideas and knowledge with the multi-stakeholder consortium to improve the region's sustainability, including food systems. The knowledge is informed by a broad range of expertise and perspectives from local and regional politics, civil society, trade unions and sustainability-oriented associations. As outlined under the subsection of *re-structure*, organizing in institutionalized networks has shown to positively affects all stages of the food system's value chain.

Re-structure

An outstanding lever in this food system is the organization in institutionalized networks to enhance the efficiency and power of small-scale organic producers and promote food value chains that serve the region and are supported by the region. The strength of these networks lies in the aggregation of actors, whether at sectoral or territorial level, in their bottom-up design, and in the high level of multi-stakeholder participation which has led to changes in the institutional landscape of the regional organic food sector, but also of the region as a whole. Being initiated and founded by ecologically or socially driven farmers, among them *Fattoria Cupidi*, they are grassroot innovations. They encompass producer associations dedicated to social farming (*SOLCARE*) and organic farming (*AgroEcoAmerina*), the latter of which in turn served as a catalyst for an association for sustainable territorial development and transition (*Biodistretto della Via Amerian e delle Forre*), of which it continues to play a functional role

today. Belonging to value-oriented producer networks has positive effects for the small-scale producers involved, such as for costs (scaling effects through joint orders, quantity discounts and shared transport in procurement and/or distribution), for the environment (reduced kilometers and emissions through shared transport), for customer contact (favors establishment and maintenance), for procurement of animal feed (local and transparent) and for information and knowledge (better access and vital exchange). Through this cohesion and cooperation, small-scale farmers of the organic sector have more power not only at the socioeconomic but also at the sociopolitical system level, at least on regional scale. The *Biodistrict* unites a diverse set of regional stakeholders, including 13 municipalities, local authorities, trade associations and unions, sustainability-oriented associations, civil society as well as the organic producers' association. Organized into committees and involving multiple perspectives and expertise, solutions are co-created to foster the economic, ecological and sociocultural potential of the territory for the benefit of the community. By representing about 600 organic farms that manage about 40 percent of the agricultural land used, the organic producer network has the ability to represent its interest, influence decision-making processes of regional policy from the bottom up and stimulate change according to agricultural realities. *Fattoria Cupidi* takes on a proactive role in these processes by representing the concerns of the organic farmers' association in the *Biodistrict* as a board member and by participating in both the scientific and advisory committees of the *Biodistrict*. These joint efforts have led to changes in the institutional fabric of the region. It allowed for the development of territorial food value chains, in and between which various linkages exist between food system actors, also favoring the value chain activities of the case study. While marking its starting point, the *Biodistrict* now goes beyond the organic agri-food sector and is concerned with the overall sustainability of the territory, including topics such as energy, sustainable tourism, waste management and land protection. Institutional changes are manifested in the fact that the *Biodistretto della Via Amerian e delle Forre* was recently formally recognized by the regional law as a governing body for sustainable development in the Lazio Region.

Another lever in the realm of *re-structure* is the enforcement of self-sufficient material flows of production inputs in order to reduce external dependencies and increase the ecology of the production system. Measures were taken to increase the farm's own fodder production by investing in the expansion of agricultural land. As the land around the farm is within a radius of 2 km, this has the additional ecological effect that the transport distances for the animal feed are short. Moreover, waste streams from egg production as well as olive and wine production are fed back into the production system as material inputs, either as fertilizers or as environmentally friendly energy. To further decrease the production system's vulnerability to high price fluctuations for inputs (organic cereals and/or protein crops, organic fertilizers), alternative solutions for fodder and fertilizer self-sufficiency are constantly elaborated and tested. Notwithstanding these efforts, the production system has not yet been able to reach the point where it is self-sufficient in terms of material inputs, constrained in particular by the limited availability of affordable land.

Building and maintaining relationships at the producer-buyer nexus is based on direct human interaction, value-orientation, mutual trust and/or collaboration, instead of mere price mechanisms or contracts. For B2C-relationships, the producer invests considerable time and efforts in personal contact to both existing and new customers. To foster consumers' loyalty to the production system and its products, deliveries are deliberately carried out without intermediaries (except for deliveries to urban consumers), participatory activities (farm tours, workshops, events) are organized and social media are actively used for communication. Even though these strategies promote consumers' understanding and appreciation of the product and the production process behind it, price still seems to play a role. In order to remain somewhat competitive to eggs from conventional production, measures are taken to reduce production costs. In B2B-relationships, great emphasis is placed on shared values related to sustainability, mutual trust, fairness, knowledge and information exchange and strong sense of collaboration, even in pricing. Instead of dictating prices to the producer, there are business partners who encourage and help the producer to set the price himself and at a level that allows for a reasonable profit margin, and who, in case of a price increase, take over the communication of the underlying reasons to the consumers.

An innovative logistic system is used to deliver to urban consumers. It has been adapted to the requirements that an urban area like Rome places on the transport and distribution of food. By covering the "last mile" with cargo bikes, it enables an environmentally friendly, efficient and reliable delivery.

Funding programs at different policy scales are used to develop a multifunctional farm and strengthen business resilience through the diversification of production. In order to make the investments to become an accredited educational farm, the farm successfully participated in the calls of the national Rural Development Programs that are co-financed by the European Union. While the farm is characterized by multifunctionality, it does not have a diversified system in terms of agricultural products, making it vulnerable to external shocks such as animal diseases. To compensate for this low economic resilience, funding from the Local Action Group and the region helped to diversify, e.g. to establish a walnut plantation and to build a farm mill. Nevertheless, it was criticized that EU agricultural policy, and in particular subsidies, were tailored in favor of large farms, while small-scale producers were often neglected. Besides the disproportionate distribution of funds, it was pointed out that the preservation and transmission of cultural heritage and local knowledge in agriculture is completely disregarded in EU policy, although it is a highly valuable asset. This neglect highlights the need to shift agri-food policies to the regional level, with institutions capable to create spaces and conditions that facilitate the dissemination of such context-specific knowledge and heritage. With the creation of the *Biodistrict*, these gaps in supranational policy are somewhat closed by a regional institution that allows political decisions to be influenced from the bottom-up, ultimately creating a regional food system that is based on local knowledge and agricultural realities and increasingly oriented towards sustainability.

Further levers concern the synergetic and synchronous processes inherent in production. Firstly, the eggs are produced in an agroforestry context combining the farm's sub-systems of egg production and walnut production: the walnut plantations are grazed by laying hens increasing the eco-efficiency of land use. Secondly, the production cycles are synchronized with the seasonal demand for eggs. When demand is low in spring or summer, the time frame is used to carry out the process of livestock rotation.

Re-connect

Fattoria Cupidi farm provides both educational and social services to introduce and involve different target groups in organic food production. As an educational farm, it offers didactic farm visits for school children, hence sensitizes the next generation to where food comes from and how it is produced from nature. To do so, efforts and investments have been made to transform the activity from a rather voluntary and unpaid basis into a formalized business activity that also allows for income. This process was financed with funds from the Rural Development Program and included to fix the access roads to the farm and create premises suitable and up to standard for the accommodation of school children. Additionally, *Fattoria Cupidi* is engaged in social agriculture. It is part of a network of producers called *SOLCARE* which aims to enable disadvantaged people to carry out activities in contact with nature. By cooperating with a social organization called *Il Pungiglione*, the farm offers opportunities for children with disabilities to experience and be included in organic food production.

Organic as well as local food labelling of the eggs allows to re-connect consumers' choices to the inherent attributes of the product. While the organic logo of the European Union and of the Italian certification body (*Associazione Italiana Aziende Biologiche*) allows an association with the production method according to the European as well as national standards for organic farming, the logo of the *Biodistrict* creates a place-based connection to the product. The latter indicates not only the origin from a local source, but also from a territory where sustainable development, including ecological farming practices, is emphasized.

By bridging the spatial and cognitive distance through personified and mindful ties between the two ends of the value chain, the distributor in Rome connects urban consumers to a small-scale producer. This is achieved by applying an integrative approach that is based on face-to-face interactions, including farm visits, mutual trust and communication efforts in both directions. In this way, the intermediary strengthens consumers' personal attachment to the food system, its producer and the product, and fosters their understanding and acceptance of potential changes, such as price increases.

Educational and social farm services provided by *Fattoria Cupidi*. Photos: *Fattoria Cupidi.*

c. Germany

Author: Valerie Holzner

Case Study Name: Die KOOPERATIVE

Location: Frankfurt am Main, Germany

OVERVIEW

The food system is comprised of a regional value chain that is coordinated by a community-supported agriculture (CSA), called *Die Kooperative*. It is located in the city of Frankfurt am Main, in the state of Hesse, Germany. By managing short linkages at both ends of the chain, the CSA connects regional producers with urban consumers. Its core value chain activities encompass cooperating with organic producers in the region and channeling their produce directly to the consumer through a centralized process of packaging and distribution. The latter step is largely outsourced to logistics service providers who carry out the deliveries within the city using cargo bikes. In addition to chain coordination, the CSA itself is involved in food production to complement the produce of its regional suppliers. Therefore, it operates a city farm that includes both organic horticulture as well as poultry farming. The product range is further diversified by purchasing from an organic wholesaler. The value chain is primarily designed for fresh produce (fruits, vegetables, meat), but also includes processed products such as bread, pasta, honey or juice. Being organized as a cooperative allows for the involvement of urban households in a regional food value chain not only as consumers but also as shareholders. Other activities of the CSA comprise running a members' shop with integrated Bistro and offering farm tours, workshops and community activities. Die *Kooperative* is well embedded in an ecosystem of institutions and networks including actors advocating for systemic change at sectoral and/or regional level (e.g. German CSA community, civic society organizations) and local policy and authorities.

The *Kooperative* has been in existence since 2018 and was co-founded by two horticultural specialists with professional experience in agriculture, but also in the organic food industry in general. The CSA was founded with the aim of making consumption independent of the conventional food trade by creating an organic supply system for regional households that is close to the city. Since then, its membership has grown to 720 members or 630 crop shares, making it one of the largest CSAs in Germany. The city farm consists of a total of 6.3 hectares including greenhouses, arable land and grassland for the chicken mobiles. For the management of the farm, the staff has considerably grown to 24 people, of which 16 are permanent employees, 5 are temporary staff and 3 are trainees. With regard to human resources, the CSA emphasis the inclusion of different societal groups, including refugees and people with disabilities.

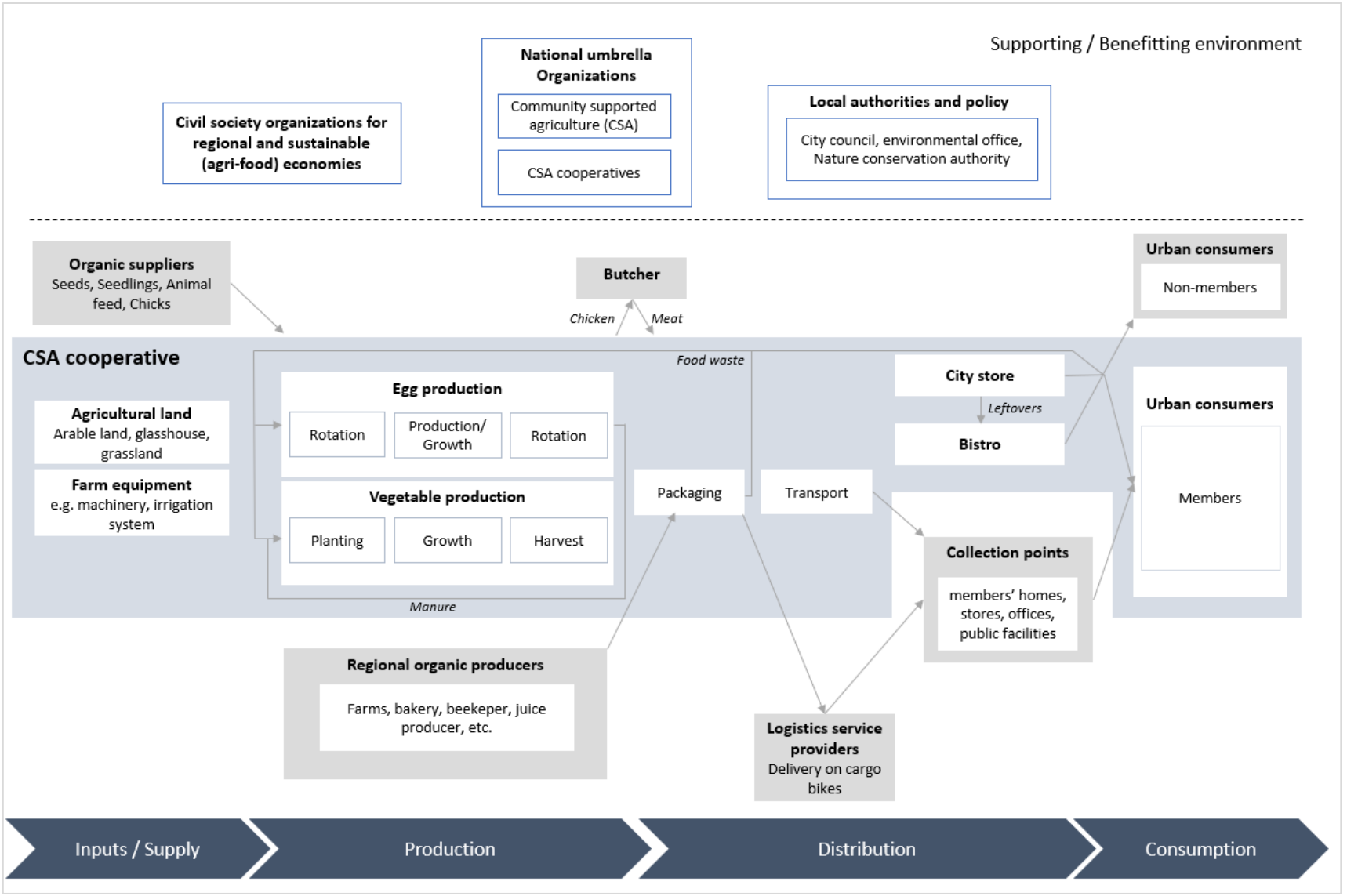


Figure 8: Value chain of the German case study.

FOOD SUPPLY

The supply of organic food is mainly based on the cooperation with regional producers, but partly supplemented by purchases from an organic wholesaler. Despite the desire to be independent of the conventional food trade, the CSA is supplied by a regional organic wholesaler in order to expand the product range. Even though this represents a trade-off, collaborating with this wholesaler is also accompanied by some benefits compared to larger, often cheaper wholesalers in Germany. Firstly, the company emphasizes to source from regional production in Hesse and work with small-scale producers wherever possible. Secondly, the spatial proximity to the wholesaler enables fast delivery and keeps the food miles relatively low. Thirdly, by purchasing from the wholesaler, the *Kooperative* promotes regional value creation and supports a middle-sized enterprise that employs about 70 people. With regard to business relationships, the wholesaler attaches importance to personal contacts, transparency and fairness, both towards the CSA and towards any other partner, whether producer or buyer. To guarantee organic producers secure purchase quantities and to safeguard stocks, careful planning is essential for the wholesaler. Effective collaboration therefore requires joint planning which products are needed by the purchasing party, in what quantities and intervals. The cooperative has been working with the company since its foundation and their business relationship developed in an uncomplicated way, according to the wholesaler. However, the wholesaler reported to face some structural difficulties. While the state of Hesse is very well covered with organic fruit and vegetable producers, there seems to be a shortage of organic processors. Moreover, finding qualified workers is a problem. To counteract this development, the wholesaler trained refugees, who are not only of great value to the company in economic terms, but above all in socio-cultural terms.

PRODUCTION INPUTS

Apart from farm equipment (e.g. irrigation system, tractors etc.), the material inputs for the production on the CSA's own farm include seeds and seedlings, animal feed and fertilizers.

Seeds and seedlings for horticulture are obtained from a regional seed producer who is certified organic. Fruit and vegetables that are neither suitable for the members' harvest shares nor for further processing in the bistro kitchen, as well as agricultural waste and residues, are either used as feed for the chickens and roosters or composted for fertilizer. However, it is not enough for self-sufficiency. Thus, the feed is supplemented by purchases from an organic supplier. The farm's poultry manure, the waste product from egg production, is used entirely for fertilization. The high nitrogen concentration in the manure makes additional application of nitrogen fertilizer unnecessary.

PRODUCTION

Production of cooperation network

Regardless of suppliers for production inputs, those who provide food to the *Kooperative* are central to the functioning of the value chain. The *Kooperative* has 14 cooperation partners located in the region around Frankfurt, among them primary producers (organic farms) and secondary producers (e.g. bakery, beekeeper, juice producer). Building on cooperation enables to provide the members with a balanced and diverse range of food products. Producers are offered long-term partnerships and guaranteed purchases at stable prices, providing a regular source of income for producers and planning security for both parties. To maintain a stable supply chain, regular communication and consultation is essential. This even includes that the annual cultivation planning is done in consultation with the cooperating farms, on the basis of which the product portfolio of the CSA's cultivation is aligned. The partnerships also allow for a certain flexibility for mutual support. For example, the *Kooperative* makes spontaneous purchases when a partner loses a buyer or there is overproduction, and links it to community activities such as making jam. This allows the producer to make profits instead of losses, while the cooperative can offer its members additional food and more participation. All these aspects have helped to create linkages that are characterized by stability, mutual trust and appreciation, which is of enormous importance for the CSA as it highly depends on its cooperation partners for a reliable food supply. The cooperation partners have been identified through a strategic and careful selection process including visits, test purchases, evaluation and testing of the goods. Through regular and consistent purchase volumes, the initial skepticism of some producers towards the CSA and its value chain turned into trust and credibility. The fact that both founders had established many contacts with farms during their previous work as organic inspectors made it easier to select and establish relationships with suitable suppliers.

Production of the CSA

The procurement of food from external sources is supplemented by the CSA's own production of vegetables, eggs and chicken meat, which are produced on an urban farm. The production area consists of arable land owned by the CSA and a plot leased with greenhouses and grassland (including an office building). The latter is owned by the city of Frankfurt am Main and is currently leased under a five-year contract, but negotiations are underway to convert it to a long-term contract (about 60 years) to minimize the risk of land loss and allow for long-term land use planning. Simultaneously, the land could be used in more diverse ways, such as for agroforestry or planting hedgerows, ultimately strengthening the provision of ecosystem services.

The annual cultivation plan is determined by the CSA's management according to demand and season and in consultation with the cooperating producers to complement their products. Particular attention is given to an optimal mix of varieties, the selection of which is primarily made by the gardeners. For example, tomato cultivation consists of a combination of seed-stable tomatoes and hybrid tomatoes. Seed-stable tomatoes are higher in quality with regard to taste,

while hybrid tomatoes achieve higher yields. Varieties with high yields are particularly important to ensure constant crop shares. The cultivation success of the vegetable varieties fluctuates annually due to environmental influences, and some varieties, such as peppers, have not yet been successfully grown. Therefore, the cooperative is constantly adapting its cultivation methods by testing new plants and cultivation methods. While small-scale cultivation is much more time and labor intensive than in conventional large-scale agriculture anyway, there are more labor-intensive crops, such as bush beans, for which the *Kooperative* has so far lacked the human resources.

For reasons of pasture rotation and the associated soil fertilization, mobile sheds are used for the chickens. Poultry farming also includes the rearing of brother cocks, which are later passed on to the consumers as meat.

Chicken mobile (left) and greenhouse at the CSA's city farm (right). Photo: *Die Kooperative*; Valerie Holzner).

The farm is managed organically according to *Demeter* standards. This is because both the arable land and the greenhouse were already certified organic or Demeter under the previous tenants or owners. Since many of the cooperation partners are *Demeter* farms, a common standard facilitates cooperation, e.g. in order to be able to supply each other without the end product losing its certification. Although producing under organic standards is considered important, the *Kooperative* does not actively market its certification. Rather, the aim is to create transparency by enabling members to come to the farm and see the conditions under which the crops are grown and the livestock is kept.

> *"What we want is an agriculture that is transparent. Members should come out here to the field and see what we are doing. The chickens are right in front of the skyline of Frankfurt, where members can come by and get an impression: how are the chickens actually doing? Do they have fresh grazing? Are there any injured animals? Are they doing a good job in cultivation? And of course, the organic status is important, but it's not something we define ourselves by."* (Co-founder and Manager of the *Kooperative*, Frankfurt am Main, Germany)

PROCESSING

Processed goods are mainly sourced from those cooperation partners who operate in the secondary sector, e.g. from a bakery. They therefore arrive at the *Kooperative*'s distribution center already processed.

The CSA's own products are almost exclusively fresh produce, with no additional processing stages, except for meat or overproduction. In both cases the fresh products are transformed by external parties. For meat, the hens and roosters are slaughtered by a butcher directly on site in a slaughter mobile so that they are exposed to as little stress as possible. If there is an overproduction of eggs, for example, they are processed into pasta by a cooperation partner.

DISTRIBUTION AND CONSUMPTION

Coordinating the process of packaging and distribution of the weekly food shares is the core function of the *Kooperative*.

For the step of packing, there is a centralized process in place that is carried out in-house, at the CSA's premises. The cooperative harvests and gathers the produce for the food boxes throughout the week. Products such as lettuce, where freshness is especially important, are harvested just-in-time. Due to precise planning in terms of quantities, food surpluses rarely occur, but when they do, they are distributed as an add-on to all boxes. Each box is individually packed and labelled by hand, making packing quite labor- and time-intensive. Therefore, the implementation of packing and distribution is precisely planned and closely timed to ensure a reliable and smooth delivery. For resource-saving reasons, the step of cleaning and washing the products is skipped, since the members do this at home anyway. Additionally, as little food as possible is sorted out, as standards that apply in conventional food trade regarding shape or appearance are deliberately not taken into account.

The *Kooperative* has a circular system with plastic boxes in place to avoid any additional packaging, wherever possible. However, packaging cannot be completely avoided. In some cases, products are already delivered wrapped in plastic. At the same time, eliminating packaging or switching to more sustainable alternatives can mean sacrifices in product freshness or quality by the time they reach the consumer. Similarly, opinions among members diverge. There are those who radically reject packaging and those who demand packaging so that the products reach them undamaged and in good quality. To explain the reasons for the packaging trade-offs to consumers and to encourage their acceptance, a lot of communication efforts are required.

The produce of the cooperation partners ready for packaging the harvest shares (left) and for delivery on cargo bikes (right). Photo: Valerie Holzner; Klaus Grund.

For the delivery of the harvest shares a distribution structure has been set up, consisting of around 40 collection hubs spread throughout the city of Frankfurt am Main and its surroundings. The collection hubs, where members pick up their food boxes, are located at members' homes, stores, offices and public facilities. Compared to the initial home delivery, the current distribution structure with collection points is a much more cost-effective solution. The cooperation between the CSA and the shops that provide a collection point is a win-win situation for both sides. While the *Kooperative* obtains space for its distribution points for free, some of which are already reaching its capacity limits, for the shops it increases the number of potential customers and thus possibly their weekly turnover. According to an owner who operates a packaging-free shop, working with the CSA brings 40 potential customers a week into the shop. In addition to economic potentials, the same partner values the integration in a network of actors with shared-values, transformative ideas and sustainable learning. The collaboration with stores is based on personal contact, oral agreements and short communication channels. As a token of appreciation, partnering shops receive a box of food from the *Kooperative* every week.

Part of the distribution structure is the *Kooperative*'s own city store with an attached bistro. It is located in downtown Frankfurt am Main, in a neighborhood with high member density. The store serves as a collection point for members, but is also open to other clientele who can buy products from the CSA and its cooperation partners or consume them in the bistro. This particular design has two main functions. Firstly, combining the store with a bistro allows to use the food that could not be sold in the store and/or was sorted out during packaging. Hence, food waste is minimized in a profitable and obviously successful way, as the rent for both stores can be covered by the income from the bistro. Secondly, the shop and bistro offer the possibility of direct contact with both members and non-members, which would not be possible at the other collection points.

City store (left) and bistro (right) of the CSA. Photo: Die Kooperative.

The delivery of the food shares is carried out on a weekly basis. Whereas the transport within the city is mainly outsourced to two logistics service providers who deliver the goods on cargo bikes, the remaining 30 percent is taken over by the CSA itself with a van. The *Kooperative* has been working with one of the two logistics service providers since the beginning. Although there is a written agreement for the delivery routes, it is not a binding contract. Rather, their cooperation is based on trust and personal discussions. During their collaboration, the CSA reduced its own logistics capacity, making its ability to deliver highly dependent on the service provider. This makes the supply chain vulnerable to incalculable risks, which was particularly evident in the absence of delivery staff due to illness during the pandemic. Staff shortage and fluctuation are a general problem that the logistics company tries to counteract with improved working conditions, e.g. through part-time employment. To reduce the risk of limited delivery capacity, the CSA is now working with a second bicycle logistics company.

The chain ends with the members of the CSA at household level. The store and bistro concept allows to also reach urban consumers beyond the CSA's institutional boundaries, albeit to a relatively small extent. With membership, consumers simultaneously become shareholders in the cooperative and are thus entitled to a harvest share. Usually, one person per household becomes a member of the CSA. The opportunity to become a member exists four times a year and requires a one-time fee of 50 euros. This fee corresponds to the capital share in the cooperative. Before becoming a member, there is the possibility to test the concept for three months.

One harvest share equals one box of food per week. For the harvest shares, the *Kooperative* has developed a modular system where the members can individually compile their food boxes according to their needs. They can determine the types of products and the respective quantity using the categories small, medium and large. Depending on the individual composition, the costs per harvest share vary between a minimum of 200 euros and a maximum of 310 euros per month. In contrast to the free market, where food is subject to constant price fluctuations, the *Kooperative*'s prices have remained stable in the 5 years of its existence. Since then, prices have only been increased once in the course of the increase in the statutory minimum wage in Germany. The composition of the harvest shares as well as the collection point are bindingly fixed for half a year, during which neither changes nor cancellations can be made. This provides more planning

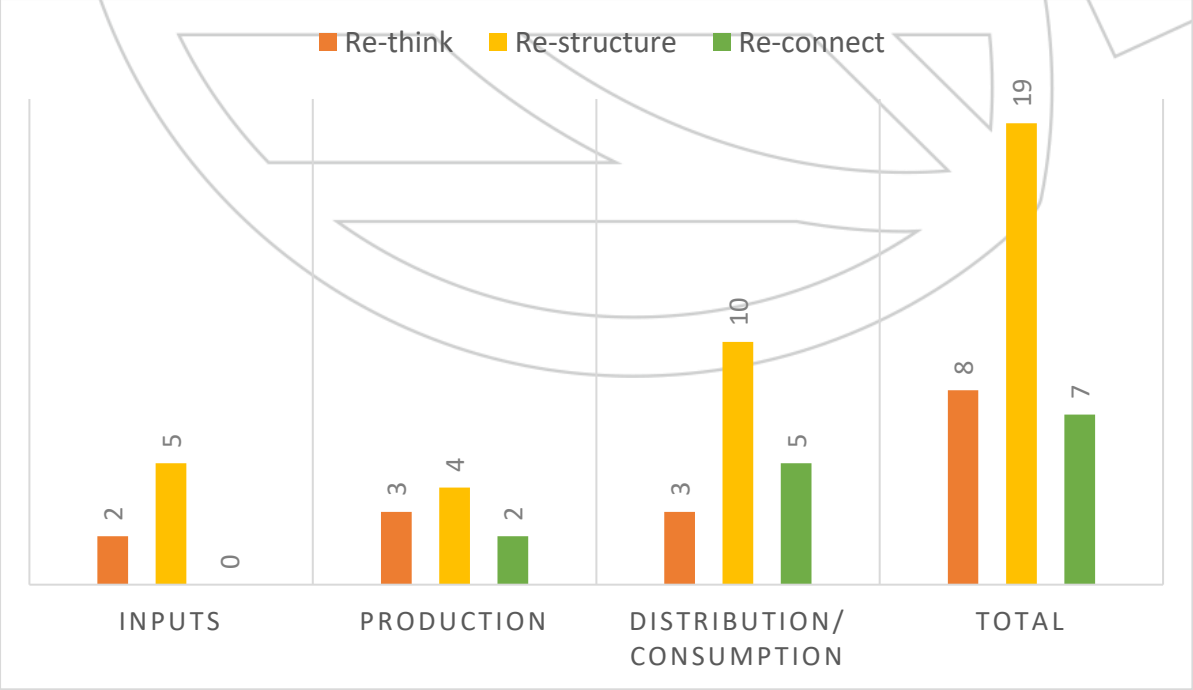
security, both in terms of the agricultural harvest and food procurement and in terms of the CSA's finances. Nevertheless, members are given the option of pausing the delivery four times a year with notice. The exact composition of fruit and vegetables depends on the season and may change from one week to another, but is announced before delivery via a weekly harvest email. In addition to the modular system, the *Kooperative* applies a unique approach with regard to the egg share. While they are usually decoupled from each other, the egg share is linked to a compulsory meat share consisting of at least one hen or cock per year. The higher the egg share, the higher the amount of meat.

The membership structure indicates a tendency towards the German middle class, which is probably due to the fact that the costs for the smallest harvest share already presuppose a certain income level. For or this reason, the cooperative offers a solidarity payment option to compensate for lower-income households. Members can decide whether they want to pay 10 percent more or 10 percent less. So far, however, no equalization could be achieved, as currently more members would pay a lower amount than a higher one.

LEVERAGE POINTS

The food system's value chain shows interventions in all realms of deep leverage. By far the most concern the realm of *re-structure*, where measures are predominantly aimed at the structures of distribution and consumption. The way how knowledge is produced, used and shared is relevant for the entire value chain, but tends to be somewhat less important for production inputs than for the downstream stages (*re-think*). Mindful connections between people and nature are promoted in production as well as distribution and sales, but not in the upstream stage (*re-connect*).

Figure 9: Deep leverage points in the value chain of the German case study by frequency.



Leverage points for organic and sustainable food systems

Along the value chain, numerous interventions were made to adapt and change system structures. These cover a broad range of aspects with regard to consumers' role, distribution patterns including logistics, production, material flows, growth and pricing logic, diversification and relations to stakeholders in- and outside the value chain. Organizing the CSA as a cooperative has allowed to shift the role from passive consumers to investors, co-owners and customers of a regional food system. Simultaneously, consumers are not only bilaterally connected to one producer, but multilaterally to several through the CSA which provides a central link between the two ends of the chain. Common logics in agriculture as well as CSA are redesigned in terms of growth orientation, pricing mechanisms and production to create the system's economic resilience and provide a broad range of products. Downstream of production, value chain activities are outsourced to environmentally friendly service providers (e.g. for logistics), while others are vertically integrated to diversify the CSA's distribution channels. By collaboration and interacting with a diverse set of sustainability-driven actors inside as well as outside the value chain, the case study contributes to systemic change, at least on a regional and sectoral level. Vertical chain linkages to businesses are based on paradigms other than price. In addition to shared values, personal communication, oral agreements and joint decision-making between the actors in the chain are emphasized, among other things while for extra-chain stakeholders, mutual support applies instead of competition. Networking with value-driven institutions has allowed to obtain seed capital and counselling services, but is also used to jointly develop transformative projects. In turn, dialogue with local authorities and politicians has helped to locate the CSA in close proximity to urban consumers. For the establishment and operation of a food system that is based on resilient organizational and value chain structures, the input and generation of knowledge was and is essential. In this respect, the practice of open knowledge sharing in the German CSA community as well as the high qualification of the founders in the agri-food sector were conducive. Additionally, to improve the CSA's production and its ecological impact, horticultural practices are constantly adapted through experimentation and testing. People are (re-)connected to organic food production in two ways. Firstly, food consumption is linked to natural production patterns and cycles by providing seasonal food, moving away from commercial standards regarding the visual characteristics of food products and coupling the consumption of animal products to the consumption of their by-product, meat. Secondly, urban consumers are enabled to experience, understand and identify with food production through multiple forms of participation at the operative, socio-ecological and socio-cultural level and through spatial proximity.

Table 5: Deep leverage points in the value chain of the German case study (Numbers indicate the frequency of interventions).

Deep leverage points	Intervention points in the value chain			
	Inputs	Production	Distribution / Consumption	Total
Σ:	**7**	**9**	**18**	**34**
Re-think	2	3	3	**8**
Practice of open knowledge sharing in German CSA community, particularly relevant to develop resilient organisational and value chain structures	x	x	x	
Building a food system based on the knowledge and experience of founders highly qualified in the agri-food sector	x	x	x	
Continuous adaptation of horticultural practices through experimentation and testing to improve production and its ecological impact		x		
Providing consumers with spaces for experimental learning and interpersonal exchange through participatory offers			x	
Re-structure	5	4	10	**19**
Organizational form of cooperative turns passive consumers into investors, co-owners and customers of a food system			x	
Establishing new distribution patterns by centrally channeling the produce of several producers to an associated group of consumers instead of a bilateral connection between the two ends of the chain			x	
Own production as a means of supplementing the production of cooperation partners		x		
Creating circular material flows for delivery, waste from food production and from distribution in the value chain and/or between subsystems	x		x	
Limiting organizational growth to an optimum member size at which economic resilience is reached			x	
Making ideological trade-offs in pricing mechanism to reach economic stability			x	
Outsourcing food delivery to third-parties operating environmentally friendly logistic systems adapted to space-specific requirements of cities			x	
Diversifying value chain activities downstream of production through vertical business integration (e.g. retail, catering)			x	
Collaborating and interacting with stakeholders inside and outside the value chain who advocate for systems change				
Vertical cooperation with value-driven businesses is based on paradigms other than price (e.g. personal communication, oral agreements, joint decision-making, trust etc.)	x	x	x	
Mutual support between CSAs instead of competitive behavior	x	x		
Networking with value-driven institutions on sectoral and regional level for consulting, funding and joint project developments	x	x	x	
Engaging in dialogue with local authorities and politicians to obtain a farm location close to urban consumers	x		x	
Re-connect	-	2	5	**7**
Linking food consumption to natural production patterns and cycles				
Providing seasonal food to (re-)educate consumers about seasonal consumption			x	
Moving away from commercial standards regarding the visual characteristics of food products (a low-sorting strategy is applied)			x	

Coupling the consumption of animal products to the consumption of their by-product, meat			x	
Enabling urban consumers to experience, understand and identify with organic food production through participation and spatial proximity				
Enabling multiple forms of participation at operative, socio-ecological and socio-cultural level		x	x	
Locating the CSA farm close to urban consumers		x	x	

Re-think

The *Kooperative* benefits from, but also contributes to, the practice of openly sharing knowledge that is prevalent in the German CSA community. Learning from others experiences was particularly important to develop and design the organizational structures and thus also the value chain in such a way that allowed to successfully overcome the challenges associated with the establishment and growth of a CSA cooperative. For reasons of shared values, knowledge is readily shared in the CSA movement rather than protected as a competitive advantage. Being an ecosystem in itself, founding and designing a CSA is considered to be highly complex and subject to lengthy social and economic stabilization processes. One of the biggest challenges is internal conflicts arising from the way decisions are made, which often leads to the failure of CSA projects. In this vein, defining and establishing the decision-making and organizational structures at an early stage is crucial to ensure stability and long-term viability of a CSA. This requires expert advice for founders. The concept underlying the *Kooperative* was elaborated in assistance of the founder of the *Kartoffelkombinat*, the pioneer among cooperatively organized CSAs in Germany. Serving as a best-practice example, the *Kooperative* has adopted the idea of the initial financing mechanism from the pioneering cooperative where the principle of solidarity is suspended until economic resilience is achieved through fixed prices for the harvest shares. However, knowledge also flows in the opposite direction. The *Kooperative* shares its experience with the CSA community, facilitated by the umbrella organizations, and contributes to develop the CSA and cooperative concept further.

While many CSA founders are career changers and therefore lack the necessary knowledge and skilled, the fact that the co-founders are professionals in both agriculture and the organic food sector was a key factor in the successful establishment of the *Kooperative*. Both have a degree in agriculture with a focus on horticulture as well as professional experience in organic trade, certification and farm management. Their educational and professional backgrounds were conducive to selecting a suitable location close to consumers, to the CSA's own production and to building relationships with supplying producers.

In order to improve production as well as its ecological impact, practices in horticulture are continuously adapted through learning by doing. New cultures, cultivation methods and measures for soil improvement are constantly experimented with and tested.

Apart from knowledge that is relevant for the intra-organizational development, the CSA provides consumers with spaces for experimental learning and interpersonal exchange. By offering various opportunities for participation, such as community gardening or workshops on jam-making (among others), consumers can experience and learn how to grow, but also how to preserve food.

People can also rent plots to cultivate vegetables on their own, but under guidance from the CSA's gardeners. In this way, the *Kooperative* provides occasions for exchanges of ideas and knowledge between people with diverse backgrounds, but shared values.

Re-structure

The food system distinguishes itself from those of other CSAs by its organizational form. Being a cooperative turns consumers into investors, co-owners and customers of the CSA. Hence, passive consumers become prosumers. At the operational level, the members have a right of co-determination in accordance with the cooperative principles. However, member participation in corporate decision-making processes is still somewhat limited, but is sought to increase once the organizational structures are consolidated. In order to develop into an economically stable cooperative with efficient processes and structures in place, the CSA is currently rather governed by the managing directors and the board. The managing directors and the board of directors act as a body of experts providing the know-how required for professional operation. One of the decisions in which the members are not yet involved, but is presented to them at the general meeting, is the annual cultivation plan. Nevertheless, members are involved in various decision-making through surveys or at the annual general meeting. This applies, for example, to pricing, the product range or regulations regarding the pausing of harvest shares. So far, there have been no major conflicts regarding the decision-making culture in the cooperative, and if there are concerns, there is always the possibility of personal discussions with the management.

Instead of the common bilateral CSA-approach where one farms feeds an associated group of people, the *Kooperative* creates multi-layered connection between organic production and consumption. By centrally channeling the produce of several cooperating producers to consumers through the CSA, new distribution patterns are established.

Another lever in the realm of *re-structure* is the fact that the CSA's own production serves as a means of supplementing the product range supplied by its cooperation network. Therefore, the annual cultivation is planned in consultation with the cooperating producers.

Along the value chain and/or between subsystems, circular material flows are created for waste from food distribution. Damaged products or food waste are utilized in many ways. If food is not suitable for fresh consumption or could not be sold in the member store, it is processed into dishes in the CSA's bistro kitchen. Both food that is not (any longer) suitable for human consumption and food waste are returned to the production system either as animal feed or as composted fertilizer. Moreover, the "waste product" from egg and meat production, chicken manure, is used as fertilizer for vegetable cultivation. In this way, synergetic links between the subsystems of the *Kooperative* are created and utilized. Additionally, in order to avoid packaging waste, a circular system of reusable boxes was set up for the delivery of the harvest shares.

The system structures are designed differently with regard to the underlying growth logic. Contrary to organic business growth, the *Kooperative* limits its member size to an optimum at which economic resilience is achieved to cover operational costs, make reinvestments and pay above-

average wages. It is estimated that that the optimal size is between 600 and 700 members. Once this state is reached, the goal is horizontal growth, where the CSA is multiplied rather than growing in depth. Horizontal upscaling would make it possible to create a network of CSAs in and around Frankfurt am Main that are independent of each other but complement each other's production and share production factors such as machinery or labor. This approach rethinks and redesigns the economics of CSAs. Since it does not aim for profit maximization, the common growth logic of achieving economies of scale in the sense of more efficient and cost-effective production with increasing farm size is irrelevant for the *Kooperative*. Nevertheless, expansion is secondary at the moment, as optimizing the current site has priority. Once the optimal size is reached, the goal is to pay solid wages, increase the number of employees to ensure smooth operations, and reinvest in the cooperative. Potential reinvestments concern the remodeling of building, for example, to create better conditions for the packaging process as well as for community building at the city farm.

Similar to the growth strategy, the priority to achieve a certain economic resilience is also reflected in the financing mechanism. Unlike the common mechanism of bidding rounds, the CSA started with fixed prices for the crop shares. This was mainly because the *Kooperative* started without any assets such as land, farm or machinery, but also to avoid financial risks during the initial growth phase. While this approach represented a trade-off between ideology and economic viability, now that the financial situation becomes stable, the pricing mechanism is being ideologically fine-tuned with the involvement of the members.

While for the majority of CSAs the transport of the harvest shares is integrated in their value chain operations, the *Kooperative* is considered a pioneer among the CSAs in Germany in outsourcing logistics to external parties. About 70 percent is handled by two service providers who use cargo bikes to make the deliveries within the city of Frankfurt am Main. In addition to reducing the carbon footprint, transport on cargo bikes in urban areas is usually faster than with conventional vehicles and causes less traffic and noise. Despite these advantages, the use of e-bikes also means sacrifices in environmental sustainability, as Frankfurt am Main currently still lacks charging stations with green electricity.

Vertical business integration does not only mean expansion at the corporate level, but possibly also at the conceptual level. The *Kooperative* has diversified its value chain activities downstream of production by buying a fruit and vegetable store including a bistro. This vertical integration has created an additional distribution channel which, in contrast to the collection points, allows to establish and maintain contact with both members and non-members, also outside the city farm. In addition, there are considerations to acquire one or even both of the bicycle logistics companies with which the *Kooperative* collaborates. By integrating retail, food service and possibly logistics, the concept underlying CSA is transmitted to other, mainly tertiary sectors that go beyond mere agri-food production. This could eventually lead to spillover effects in other industries which is known as “community supported everything else” (CSX).

An effective intervention with regard to institutional structures is that the *Kooperative* interacts and collaborates with multiple actors within and outside the value chain who are committed to systemic change. Within the value chain, there are vertical links to value-driven businesses.

Cooperation with them is based on paradigms other than price, both upstream and downstream. When selecting business partners, great importance is attached to sustainability orientation, which is underlined by the fact that ecological and/or social added value is preferred over more cost-effective solutions, as was the case with logistics, for example. Whether with upstream or downstream cooperation partners, the CSA cultivates relationships that are characterized by personal and regular communication, oral agreements and joint decision-making. Of course, fair prices play an important role in addition to mutual trust and appreciation. Furthermore, partners are supported. For example, the *Kooperative* offered to share its office and parking spaces to one of the bicycle logistics, whose business was still in its start-up phase. This way of collaborating along the value chain does strengthens all business actors involved in the food system not only in economic terms, but also in socio-political terms. It creates a network of value-driven, mainly small-scale businesses that allows to join forces to develop and implement transformative ideas, which has already been achieved by jointly operating a sustainable food system at regional regime level. Furthermore, since the value chain only connects economic actors from one region, their cooperation also has a positive effect on the environment due to the short transport distances.

Regardless of linkages within the core value chain, the *Kooperative* also cultivates valuable relationships with extra-value chain stakeholders. One of them is a CSA which is located in the immediate neighborhood. Instead of competitive behavior they mutually support each other, e.g. in the procurement of seedlings or training of their gardeners. Moreover, the *Kooperative* is embedded in an ecosystem for the sustainable transformation of the agri-food sector and/or the region of Frankfurt am Main. It consists of umbrella organizations and civil society organizations that provide consulting, information, political advocacy and funding, but also facilitate knowledge exchange and joint project development. On a sectoral level, the umbrella organization for German CSAs (*Netzwerk Solidarische Landwirtschaft*) and its suborganization for CSA cooperatives (*Arbeitsgemeinschaft Solawi-Genossenschaften*) are core institutions for the *Kooperative*. The latter provides consultation in founding and operating cooperatives, including their value chain, and increases the visibility of CSA cooperatives in Germany. On a regional level, the *Bürger AG*, a citizen-led stock company for regional and sustainable development, was of particular relevance in the founding of the *Kooperative*. It provided seed capital, e.g. for acquiring agricultural land, by granting a low-interest loan. Since cooperatives are not profit-oriented, it is often difficult to find investors to finance their foundation. In this vein, institutions like the *Bürger AG*, which are designed to provide funding for such transformative projects, are essential. Since its foundation, the cooperative has also been in close contact with a civic society association for Regional Agriculture and Nutrition (*BIONALES - Bürger für regionale Landwirtschaft und Ernährung e.V.*), with which it initiates and implements projects to promote change towards sustainability in the agri-food sector.

Engaging in dialogue with local authorities and politicians was crucial in obtaining a site for the CSA's farm that is close to urban consumers. Before deciding on the location in Frankfurt, the founders met with representatives of the city council, the environmental office and the nature conservation authority, among others. This procedure was key to obtaining the site, which belongs to the city.

Re-connect

The *Kooperative* promotes food consumption in line with natural production patterns and cycles in three different ways. The weekly composition of fruits and vegetables changes according to seasonal availability, but is announced in a weekly harvest mail. The mail often contains cooking recipes to inspire and assist consumers in dealing with seasonal or lesser-known varieties. Unlike conventional food retailing, where trading standards dictate how food should look, the CSA promotes consumer awareness that fresh produce does not have to be perfect and uniform to be consumed. They can have different sizes, shapes and appearance. Therefore, a low-sorting strategy is applied when packaging the crop shares, meaning that the majority of the agricultural produce is passed on to the consumers, regardless of its visual properties. Nevertheless, the cooperative receives complaints, between 10 to 15 per week, mainly related to the appearance or insect infestation of the product. In such cases, attempts are made to address the members' complaints in an argumentative and constructive manner. Although quality assurance could be improved, e.g. through higher standards in sorting or through on-farm washing, this would be at the expense of the monthly costs of the harvest shares and environmental sustainability. Moreover, the occasional insect infestation is the result of not using pesticides and thus the trade-off for healthy and environmentally friendly produced food. A unique feature of the *Kooperative* is that the egg share is linked to a compulsory meat share. By consuming not only eggs, but also the by-product from its production, members are made aware of the causal chain underlying their consumption of animal products. Unlike in industrial egg production, the male chicks are also raised on the CSA's farm. Together with chickens that no longer lay eggs, their meat is passed on to members for consumption in dependence of their egg share. This motivation led the *Kooperative* to choose a hybrid breed of chicken, which produces proportionately fewer eggs but more and high-quality meat.

By creating opportunities for participation and spatial proximity, urban consumers are enabled to experience, understand and identify with organic food production. Through the cooperative design of the CSA, members can participate on two levels, the operational and the socio-ecological and -cultural one. Being shareholders of the *Kooperative* empowers consumers to be involved in decision-making related to the business development, albeit to a limited extent so far (see also subsection "*re-structure*"). On a socio-ecological level, offering workshops (e.g. on beekeeping, juicing), farm tours and at least two community activities per months (e.g. gardening, planting or clean-up activities) allows consumers to explore agricultural spaces and realities. The recently established rental plots, where members, but also non-members, can grow vegetables and herbs themselves, are also a good vehicle for urban consumers to experiment and learn how to grow food. There is a lot of interest in volunteer support, particularly in horticulture. However, to maintain professional structures, the *Kooperative* needs reliable people, know-how and a team that knows each other. In the meantime, a core of volunteers has emerged who regularly help out and are able to adapt to this professional environment. The CSA does not only connect people to agriculture, but also people to people, further strengthening the identification with the food system through personified relationships. By providing a space for human interaction and

exchange, it also involves a socio-cultural component of participation. In doing so, members themselves can shape the organizational culture by organizing a summer party, for example. Nevertheless, it was stated that member participation and community building can still be expanded. This was particularly hampered by the fact that the CSA was still quite young when the pandemic required a social lockdown. Even though member participation is highly desired, it would not be feasible on a large scale. On the one hand, because the capacities for it are lacking, on the other hand, because it would disrupt daily operations.

Another aspect that facilitates to create a personal link between urban consumers and the food system is the location. Since both founders had certain requirements, they spent a long time looking for a suitable site. The most important criterion was the proximity to the consumers to create an agri-food system that is transparent and participatory. Hence, a system where people can see how their food is grown and where it comes from. The vision was clear: to successfully make the production site accessible to members, there needs to be a certain level of convenience without having to travel long distances. The site found was a former nursery in the city of Frankfurt am Main that was managed according to organic standards and was about to close. With the establishment of the city farm, the *Kooperative* has converted abandoned urban land into a center for community and food production.

d. Poland

Author: Nicklas Riekötter

Case Study Name: OIKOS Farm

Location: Low Beskids mountains, Poland

PRODUCTION

Farm Operations:
The farms in the Polish case study engage in organic and sustainable farming practices, primarily focusing on meat production. They maintain a mission to generate profits from agricultural production while having a positive impact on the surrounding environment and supporting local communities. The farms' key activities include raising livestock (cattle, goats), selling meat products (beef, lamb, pork), and organizing training programs for farmers on agronomy and environmental aspects of agriculture.

Collaboration within the producer network:
The farms collaborate in a producer network since 2012, aiming to meet the high demand for high-quality products that couldn't be fulfilled solely by their own farms. The collaboration involves building infrastructure, employing additional workers, and organizing training to ensure the maintenance of product quality. The collaboration is trust-based, with the farm managers being responsible for planning and decision-making. Financial arrangements ensure fair prices, higher than market prices, to compensate associated farmers for their cattle.

Differentiation from Conventional Cooperators:
Compared to conventional cooperators, the collaboration with the network emphasizes quality over quantity. The farms place a strong focus on organic and sustainable practices, resulting in higher prices and better market performance for their products. The collaboration requires more time, knowledge, and resources compared to singular production, due to the extensive nature of the production system. The products from the producer network are regarded as superior, attracting consumers that are seeking high-quality organic and sustainable food options.

Social and Environmental Impact:
The collaboration with the producer network has brought positive social and environmental benefits. The farms support local development and smallholders, contributing to the social fabric of the community engaged with the network. By practicing sustainable grazing and optimizing transport, the collaboration reduces environmental impacts, such as fuel consumption and shortened value chains to consumers. The commitment to organic and sustainable production methods enhances the natural environment, promoting biodiversity and ecosystem services further fostering the positive reputation of the network.

Future Plans and Needs:

Leverage points for organic and sustainable food systems

To overcome challenges and continue to thrive, the farms and the producer network need to focus on developing their outlets and increasing consumer awareness on environmental and health considerations. They plan to build a stronger local community, establish a joint logo, and implement an internal quality standard for grass-fed beef. These initiatives aim to enhance the reputation of their products and foster long-term sustainability.

Summarizing, the Polish case study demonstrates the success and benefits of collaboration between the farms and the producer network. By prioritizing organic and sustainable practices, the farm differentiates itself in the value chain, delivering high-quality products that attract consumers seeking superior organic and sustainable food options. The collaboration fosters social and environmental impacts by supporting local development, reducing environmental footprints, and enhancing the natural environment. Future plans involve further strengthening the collaboration, expanding the market reach, and ensuring the long-term sustainability of the production system.

PROCESSING

The Polish case study also operates in the processing and distribution segment of the value chain. The following outlines analyse the key activities, stakeholders, and factors that contribute to the success of their operations:

Key Activities:
The processing stage of the polish case study include animal slaughter, transport, and distribution. One of the actors also provides road cleaning services, which involve collecting fallen animals and garbage and mowing roadsides in collaboration with approximately 60 communes. Additionally, they have a venison buying point.

Firm Size and Resources:
The processing is classified as a small-scale operation. The processor employs 13 individuals and operates with a fleet of 15 cars, 6 tractors, and other machinery. They have dedicated farm buildings, including a slaughterhouse and meat cutting and boning machines.

Organic and Sustainable Practices:
While the processing is not explicitly described as organic, they mention that around 20-25% of their meat is organic. They follow environmental standards and manage all wastes in a sustainable manner.

Main Markets and Collaborations:
The processing primarily serves local and regional markets. They have established a trust-based collaboration with OIKOS since 2014, focusing on slaughter and transport activities. The collaboration requires producers to adhere to organic standards. Another stakeholder involved is "Angela" firm, which provides meat partitioning services.

Collaboration Responsibilities:

Leverage points for organic and sustainable food systems

The collaboration between the farms and OIKOS is characterized by trust, with the collaborating farms responsible for slaughter and transport, and OIKOS ensuring meat quarters' partitioning. Funding for the collaboration comes from the networks own sources.

Financial Arrangements:
Prices in the collaboration are determined through mutual agreement, with a 4% margin rate. The network considers the arrangements fair and satisfactory.

Differentiation from Conventional Value Chain Co-operators:
The collaboration with OIKOS differentiates from conventional co-operators by focusing on organic products and adhering to organic standards. The specific products involved include cut meat quarters, and the collaboration requires knowledge of organic certification standards.

Knowledge, Time, and Resource Intensity:
The collaboration requires knowledge of organic certification standards, indicating a higher knowledge intensity compared to conventional collaborations. While the exact resource and time intensity is not explicitly mentioned, it can be inferred that the collaboration requires appropriate resources and time to meet organic standards.

Effects and Social Benefits of Collaboration:
The collaboration with OIKOS has positively impacted the networks operations. It has ensured on-time delivery, reduced waste, and contributed to social impact by supporting local development and workers. The exact monetary value of these impacts is challenging to estimate.

In conclusion, the Polish case study's collaboration with OIKOS in the processing and distribution segment of the value chain demonstrates a focus on organic standards and sustainable practices. The collaboration enables the firm to provide high-quality organic meat to local and regional markets. The trust-based relationship, adherence to organic standards, and collaboration with meat partitioning services contribute to the success of their operations.

DISTRIBUTION

The Polish case study involves two businesses, referred to as Actor 1 and Actor 2, both collaborating with a network of producers for their sales and distribution processes. Analysing their value chain in terms of sales and distribution provides insights into their operations and strategies.

Key Activities and Products:
Actor 1: The key activities of Actor 1 include food services, accommodation services, and organizing culinary workshops. They offer a variety of food dishes, with a focus on meat sourced from the network. Their products are sold directly to customers dining at their establishment.
Actor 2: This small-scale business specializes in selling organic food and promoting healthy eating. They offer a range of organic products, including meat sourced from the network. Their sales primarily occur through their shop, and they also offer delivery services.

Network Collaboration:

Both businesses collaborate with the network of producers to source their meat products. The network, referred to as XY, supplies them with organic meat from a specific producer.
The collaboration is based on trust and is characterized as direct sales with steady exchanges. There are no long-term agreements, and prices are determined by the producer.

Responsibilities and Arrangements:
Actor 1: The owners of Actor 1, including the mother and daughter, are responsible for planning and making important decisions regarding the collaboration. They are in charge of collecting the meat from the network, and the network ensures a steady supply. The arrangements are considered fair and satisfactory.
Actor 2: The owner of Actor 2 takes on the responsibility of planning and making important decisions related to the collaboration. The network provides a regular delivery of meat products to the shop. The arrangements are also considered fair, although there are occasional challenges when the network cannot meet the demand, leading to purchases from alternative suppliers.

Differentiation from Conventional Co-operators:
Both businesses highlight the superior quality of the products sourced from the network compared to conventional suppliers. The organic and sustainable production practices of the network contribute to the differentiation.
The price aspect is mentioned, with the network offering fair prices for their products. In contrast, other suppliers, particularly one mentioned by Actor 2, have higher prices without equivalent quality.

Effects and Social Benefits:
The collaboration with the network has had positive effects on both businesses. They have experienced an improved image and customer relations due to their association with organic and sustainable products.
The social benefits include contributing to an improved local environment, increased awareness of food quality and health, and enhanced working conditions for employees.

Future Plans and Needs:
Both businesses express the need for motivated producers to continue producing high-quality products and the importance of greater collaboration among supply chain actors.
They also mention the importance of regional government support and the establishment of platforms that facilitate collaboration.
Future plans include expanding their offerings and investing in the promotion of specific products to meet evolving consumer trends.

In summary, the value chain analysis of sales and distribution in the Polish case study reveals the importance of collaboration with the network for sourcing high-quality organic meat products. Both businesses have benefitted from the collaboration, experiencing positive impacts on their image and customer relations. However, challenges such as limited supply, high prices, and the need for better collaboration among producers remain. To overcome these challenges and sustain the collaboration, future plans focus on diversification, increased producer motivation, and support from regional authorities.

LEVERAGE POINTS

Based on the information provided in the case study, here are some leverage points for increasing sustainability in the Farm Operations, Processing, and Distribution segments of the value chain:

Farm Operations:
a. Regenerative Agriculture Practices: Encourage the adoption of regenerative agriculture practices on the farms. This involves techniques such as rotational grazing, cover cropping, and agroforestry, which can enhance soil health, sequester carbon, and promote biodiversity.

b. Expansion of Sustainable Meat Production: Invest in research and development to expand the range of sustainable meat products offered by the farms. This could include exploring options for producing poultry or other sustainable protein sources to diversify the product offerings.

c. Knowledge-Sharing Programs: Strengthen the training programs for farmers on agronomy and environmental aspects of agriculture. Provide access to resources, experts, and best practices to support continuous improvement in sustainable farming methods.

d. Community Engagement: Foster stronger ties with the local community by involving them in the farms' activities, such as volunteer programs, educational events, or farm tours. This can build trust and support for sustainable farming practices.

Processing:
a. Increase Organic Meat Percentage: Encourage the processing facility to increase the percentage of organic meat in their operations. This could involve incentivizing producers to adopt organic practices or sourcing from additional organic farms.

b. Waste Reduction and Recycling: Implement waste reduction and recycling practices at the processing facility. This includes proper management of by-products and waste materials to minimize the environmental impact.

c. Energy Efficiency Measures: Invest in energy-efficient technologies and practices to reduce the processing facility's carbon footprint. This may involve using renewable energy sources, optimizing transportation routes, and upgrading equipment.

d. Sustainable Packaging: Explore the use of sustainable and eco-friendly packaging materials to minimize the environmental impact of product distribution.

Distribution:
a. Consumer Education and Awareness: Increase consumer awareness about the environmental and health benefits of choosing organic and sustainable products. This can be achieved through marketing campaigns, labelling initiatives, and partnerships with educational institutions.

b. Certification and Standards: Work with relevant certification bodies to ensure that the network's products meet organic and sustainable standards. Obtain recognized certifications to build consumer trust and differentiate from conventional products.

c. Supply Chain Collaboration: Strengthen collaboration among all stakeholders in the supply chain, including producers, processing facilities, and distribution businesses. This can improve communication, efficiency, and product traceability.

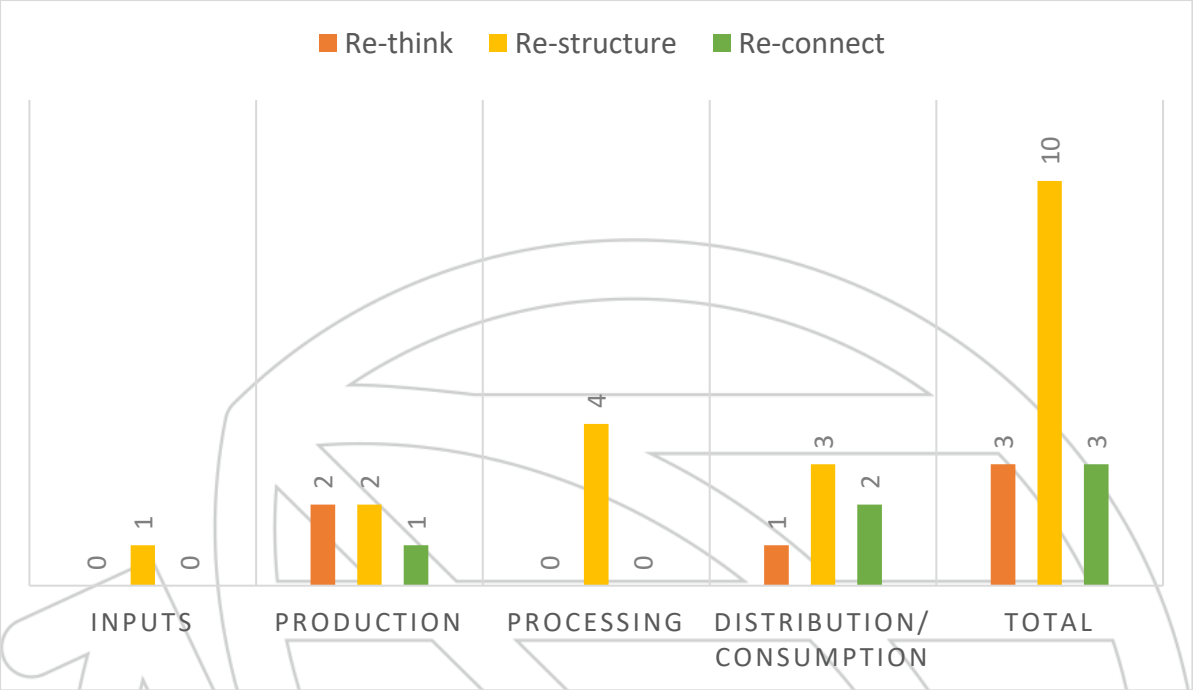
d. Local and Regional Market Expansion: Collaborate with local restaurants, retailers, and institutions to expand the availability of organic and sustainable products in the region. Building a strong local market can support the network's growth and long-term sustainability.

By leveraging these points, the Polish case study can further enhance its sustainability efforts and contribute positively to the environment, community, and the organic and sustainable food industry.

Table 6: Deep leverage points in the value chain of the Polish case study (Numbers indicate the frequency of interventions).

Deep leverage points	**Intervention points in the value chain**				
	Inputs	Production	Processing	Distribution / Consumption	Total
Σ:	**1**	**5**	**4**	**6**	**16**
Re-think	-	2	-	1	**3**
Invest in research and development to diversify the range of sustainable meat products offered by the farms		x			
Knowledge-Sharing Programs for farmers		x			
Consumer Education and Awareness				x	
Re-structure	1	2	4	3	**10**
Regenerative agricultural practices		x			
Increase Organic Meat Percentage in processing			x		
Waste Reduction and Recycling			x		
Energy Efficiency Measures			x		
Sustainable Packaging				x	
Supply Chain Collaboration	x	x	x	x	
Local and Regional Market Expansion				x	
Re-connect	-	1	-	2	**3**
Community Engagement		x		x	
Certification and Standards for consumer awareness				x	

Figure 10: Deep leverage points in the value chain of the Polish case study by frequency.



e. Romania

Author: Nicklas Riekötter

Case Study Name: Ferma Ecologică Țopa

Location: Sighişoara, Transylvania, Romania

PRODUCTION

The organic farming value chain in the Romanian case study starts with the production phase, where sustainable agricultural practices are implemented to cultivate organic crops and products by Topa Ecological Farm. The farm is located in Topa, Mures Country, serves as a prime example of this phase. Committed to organic and sustainable farming, the farm prioritizes diverse crop rotations, soil health maintenance, and the preservation of biodiversity. This approach not only yields high-quality organic produce but also supports the long-term health of the land and ecosystems.

Topa Ecological Farm's collaboration with the "Agroecological Center for Research, Innovation and Technology Transfer of INCDA Fundulea" further exemplifies the interconnectedness of the production phase. The Center provides certified organic seeds to the farm, ensuring that the crop production process begins with quality inputs. This collaboration underscores the importance of reliable partnerships and knowledge-sharing in achieving successful organic farming practices.

PROCESSING

Transitioning from production to processing, the value chain encompasses stakeholders that add value to the raw organic materials from agricultural production. The "Local Action Group 'Târnavelor Hills'" operates as a pivotal player, providing support and funding to local producers, including Topa Ecological Farm. By promoting organic farming practices and offering financial assistance, this group contributes to the development of the organic sector.

BioCoop Sibiu, an organic farmer-owned cooperative, represents another key aspect of the processing phase. Their role in aggregating and processing organic products from multiple small organic households showcases how collaborative efforts can amplify the impact of individual farmers. BioCoop Sibiu's diverse product range includes honey, wine, dairy products, bakery items, and more. This processing stage not only enhances the value of the products but also expands the range of choices available to consumers seeking organic options.

DISTRIBUTION

Efficient distribution is essential for ensuring that organic products reach consumers in a timely and accessible manner. In this regard, BioCoop Sibiu emerges as an intermediary between organic producers and consumers. Their direct sales model establishes a short supply chain, connecting

consumers directly with locally produced organic goods. By doing so, BioCoop Sibiu addresses consumer demands for transparency, traceability, and sustainable sourcing. This approach also supports local economies by keeping profits within the community.

Additionally, the Agroecological Center's contribution to distribution is evident through their collaboration with Topa Ecological Farm. By supplying organic seeds, the Center enables Topa Ecological Farm's production, indirectly influencing the distribution of organic products. This demonstrates the far-reaching impacts of stakeholders within the value chain, each contributing to the seamless flow of organic goods from farm to consumer.

LEVERAGE POINTS

Within this organic farming and distribution value chain, several leverage points exist that hold the potential to drive positive change and growth:

a. Sustainable Practices: Topa Ecological Farm's commitment to sustainable practices not only produces high-quality organic products but also sets an example for other farmers, promoting the adoption of eco-friendly methods.

b. Knowledge Sharing: The Agroecological Center plays a critical role in disseminating knowledge about organic farming practices. This knowledge-sharing empowers farmers to make informed decisions and implement best practices, leading to improved productivity and environmental conservation.

c. Direct Consumer Connection: BioCoop Sibiu's approach of connecting consumers directly with local organic products fosters consumer trust and engagement. This strategy aligns with increasing consumer demands for ethical and sustainable consumption.

d. Community Development: The Local Action Group's support for local producers contributes to the socio-economic development of the region. By strengthening local economies and promoting sustainable land use, this collaboration has the potential to uplift communities.

e. Market Expansion: Collaboration among stakeholders opens avenues for market expansion for organic products. By catering to consumer preferences for organic and locally produced goods, these initiatives stimulate demand and encourage further growth in the organic sector.

CONCLUSION

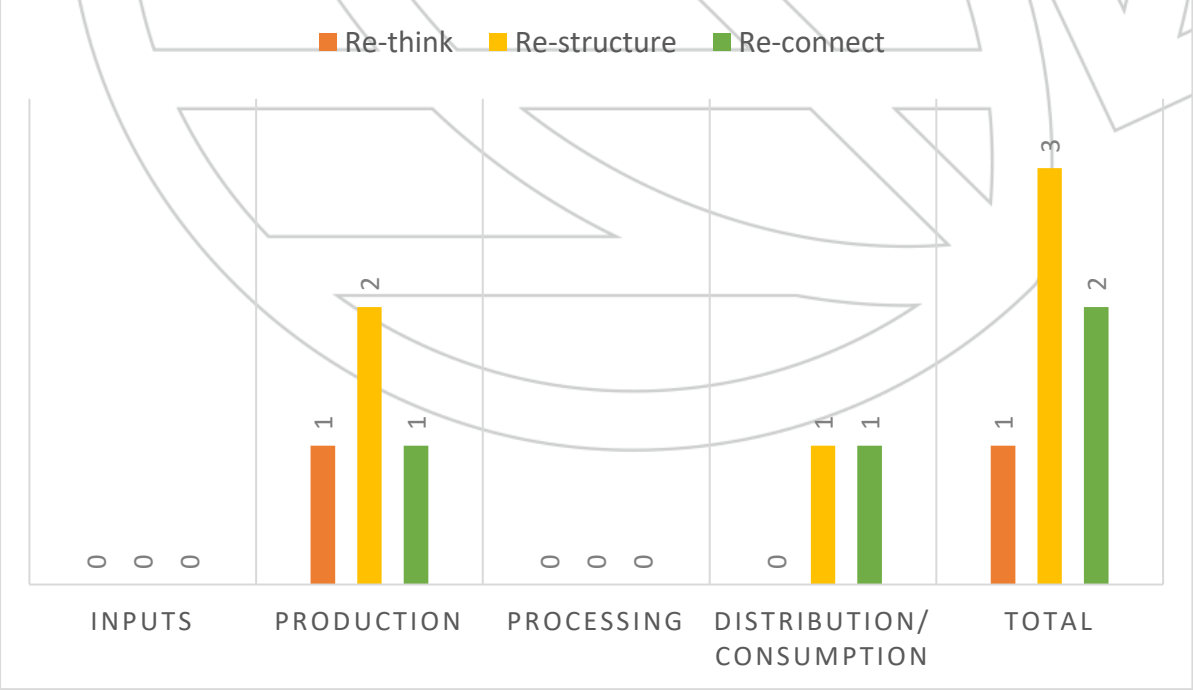
In conclusion, the organic farming and distribution value chain in Romania demonstrates the power of collaboration and synergy among diverse stakeholders. Through the cultivation of organic crops, processing into value-added products, and efficient distribution to consumers, this value chain embodies sustainability, community development, and consumer satisfaction. The interplay of organic farmers, research centers, cooperatives, and community groups creates a holistic ecosystem that promotes responsible agricultural practices, supports local economies, and meets the demands of environmentally conscious consumers. As these stakeholders continue to

work together, the organic sector in Romania is poised for growth, resilience, and a positive impact on the environment and society at large.

Table 7: Deep leverage points in the value chain of the Romanian case study (Numbers indicate the frequency of interventions).

Deep leverage points	Intervention points in the value chain				
	Inputs	Production	Processing	Distribution / Consumption	Total
Σ:	**0**	**4**	**0**	**2**	**6**
Re-think	-	1	-	-	**1**
Knowledge-Sharing Center for farmers		x			
Re-structure	-	2	-	1	**3**
Sustainable agricultural practices		x			
Support for local producers through Action Group		x			
Market Expansion				x	
Re-connect	-	1	-	1	**2**
Direct Consumer Connection		x		x	

Figure 11: Deep leverage points in the value chain of the Romanian case study by frequency.



f. Belgium

Author: Hoi Ki Stefan Chen

Case Study Name: Het Polderveld

Location: Westkapelle, Belgium

OVERVIEW

Het Polderveld is a farm located in West Flanders, Belgium. Situated in a mild maritime climate on clay soil, the farm specializes in horticulture since 2016. Apart from being organized as a Community Shared Agriculture (CSA), the particularity of the food system's value chain is that it consists of two consumer groups: local member households and institutional clients. Within the latter group, a nearby hospital kitchen is a major cooperation partner of Het Polderveld, sourcing a substantial portion of its fresh produce.

The farm was started in 2016 and is fully committed to the approach and principles of a CSA and is officially certified organic. They grow many different kinds of vegetables, herbs and flowers. Additionally, they got sheep and chickens. In a few years they also expect their first harvest of fruits. The total size of the farm accounts for 15 ha, including arable land and pasture. The CSA is centered around 140 households, which is a 271 adult equivalents.

PRODUCTION INPUT

The farm consists of two parts - the main section on the family-owned land and an extension on a small plot located 1.5 kilometres away near the AZ Zeno hospital. The 15-hectare farm is situated on light clay soil and has access to arable land and pasture, which are used for vegetable cultivation. 3 ha are near the AZ Zeno hospital, where their sheep graze. Around the farmstead there are 5 ha of pasture, 2.4 ha for self-harvesting, 2 ha of arable farmed vegetables, 1 ha of which 5000 m² is cultivated area and for the hospital 1 ha.

The certified organic vegetables are cultivated without any fertilizers and pesticides. To ensure quality, the farm's owners use high-quality inputs, such as organic granular fertilizer and farmyard manure, which store carbon and feed the soil with nutrients.

PRODUCTION

The farm produces seasonal vegetables such as carrots and potatoes year-round. For most crops, a 4-year crop rotation plan are used.

Little to no tillage is used to not disturb the soil's fungi, bacteria and earthworms. Plants and dead organic matter are used for soil cover and baby vegetables are not harvested from the soil. These

measures also prevent soil erosion. Despite clay soil's poor drainage, the farm has experienced less severe flooding compared to others due to a drainage system built nearby. To increase the soil's carbon content, the farm's soil is covered with wood chip mulch and compost. There are no cold storage facilities; fresh vegetables and crates of winter vegetables preserved using the traditional methods are stored indoors instead.

Fruits such as apples, pears and plums are grown with minimal pruning, weeding and spraying. To promote biodiversity, trees are planted near fruit trees as protection and grass and flowers allow beneficial insects to flourish. The insects' larvae feed the farm's free-range chickens, which produce poultry meat and eggs. Over a hundred eggs are hatched annually in order to ensure new generations of chickens, while the remainder are sold to the CSA participants. The farm also has sheep, from which lamb and mutton are produced and sold to CSA participants. Mutton is processed into ground meat, sausages and patties. Wool from the sheep is sold to produce insulation material and unsold wool is donated - nothing is wasted. A ram is used to sire lambs to produce new generations of sheep.

The farmer’s production plan is based on personal insights and feedback from its institutional clients and CSA participants. Many different crops are planted each season to mitigate the risk of crop failures. Each year, the farmers adjust production for the upcoming season based on popularity among its customers and their own experience. The farm's ability to produce each vegetable at the right quantities to meet demand builds consumer trust, but requires foresight and ability from the farmers to make the right decisions before each season.

Innovative and non-destructive ways are used to prevent pests from damaging crops. Specific countermeasures are used to deal with each type of pest. For example, organic slug pellets are added to the soil to keep slugs away, and chickens, which prey on snails, serve as snail repellents. To prevent extreme damage to crops caused by caterpillars, protection blankets are used to attract birds, which target the caterpillars. These methods, according to the farm's owner, is more effective than pesticides. Vegetables are simply washed to remove aphids. Total elimination of these pests before sale is unnecessary as the CSA participants and institutional clients tolerate pests found in produce. Non-toxic bacterial preparations are used to keep caterpillars and snails away.

PROCESSING

The processing phase is minimal in this food production system. The CSA farm prioritizes the delivery of fresh, unprocessed vegetables directly to the hospital and CSA members. The farm does not engage in extensive processing activities, aiming to provide consumers with produce that retains its nutritional value and freshness. However, there is a level of processing involved at the hospital's kitchen, where the vegetables are prepared and incorporated into meals for patients and staff.

DISTRIBUTION

There are two consumer groups linked to this food system: the CSA-members and institutional clients. Roughly half of the produce are reserved for the CSA participants. The remainder are sold

to large buyers, namely the nearby general hospital AZ Zeno, a major sports club and a restaurant. The distribution system depends on the consumer group. While private CSA-members collect their produce on the farm by self-harvesting, institutional consumers are delivered by the farmer.

In 2021, the farm has generated about €200,000 in turnover - enough to sustain the livelihoods of the farmer. Half of which comes from the sale of the CSA harvest shares, €75,000 from the cooperation with the hospital, €20,000 from flower sales, €5000 from the sale of extra vegetables and €1000 from a government subsidy.

Unsold products, often with minor cosmetic defects, are either sold to the hospital or fed to the farm's livestock - if the farmers have time to harvest them. Otherwise, they are left on the field or are disposed of. The farm does not have a compost container, since the owner believes leaving crop residues on the soil for the earthworms to consume is better for soil health. The unsold produce is shredded and then incorporated into the soil, while vegetable waste that have been removed from the field are used to feed livestock.

CSA-members

Het Polderveld distributes its produce using the CSA model since 2016. CSA members participate in self-harvesting, allowing them to collect their share of vegetables directly from the farm. This direct distribution approach strengthens the connection between consumers and the farm, fostering a sense of community and trust. All products are seasonal and sold unpackaged, so participants must bring boxes to take the produce home. This eliminates the need for greenhouses, cooling, packaging supplies and reduces its need for storage space.

Though self-harvesting by participants frees ups the farmers' time, it sometimes damages the quality of the vegetables, as self-harvesting meant crops are left on the field longer, increasing the number of spoiled vegetables that can no longer be sold. Some leave the vegetables uncovered after self-harvesting, rendering crops more vulnerable to insects. The farmers also uncover the crops to make it more convenient for participants.

The farm refers to its CSA model as community "shared" agriculture, because instead of agriculture being 'supported' by the community unidirectionally from the consumer to the farmer, the farm's CSA model puts emphasis on the sharing of the costs, food and decision-making process bidirectionally between consumers and farmers. Participants share the risk of crop failures by lowering their consumption of crops that experienced a bad harvest.

For transparency, the farm's account books and costs are shared with the participants. Before each season, the farmers and the participants meet and plan production for the upcoming season; participants have a say in the farm's operations, such as the price of the harvest share. The farmers proactively seek the input of the participants over key decisions and also communicate the farm's limitation in cases where the participants' suggestions are impossible to implement. This way, the participants can better understand the situation from the farmers' perspective.

This model requires commitment and trust from both sides. Participants demonstrate commitment by providing the farmers with pre-financing, active involvement on the farm for one

year and trust in the farmer's ability uphold their responsibility to provide food for the community. The prepayment gives the farm's owners the financial security they need to focus on cultivation. Commitment from the farmers is shown through their dedication to live up to the expectations of the participants by producing enough vegetables all their clients, especially the hospital.

Participants decide to join Het Polderveld's CSA for different reasons. Some are attracted to the healthy aspects of organic food, some joined because they thought CSAs are "hip". Overtime, participants became more involved in the farm's activities as they acquire a greater appreciation for the taste of the farm's produce, such as helping the farmers transport irrigation pipes to the farm. Nevertheless, participants who joined thinking it was cool were especially prone to quitting, others left after a few years when self-harvesting, the additional cleaning procedures and the need to cook creatively according to seasonal availability of vegetables became impractical for them.

Institutional clients (e.g. hospital)

Produce destined for institutional clients, mainly the hospital, are harvested, cleaned and then delivered by the farmer's van.

The hospital is the farm's main client since September 2017, when staff from the hospital's kitchen inquired the farm about the supplying enough seasonal and healthy produce for its 1000 hospital meals daily. From the start, the hospital was very motivated, which helped the cooperation to progress smoothly. In addition, the kitchen's staff and catering manager from the hospital have the right mindset and already understood what their responsibilities are in this cooperation; they were ready to put in the effort to make it work.

Processing the farm's produce to prepare healthy meals is more time consuming and costly. For example, whole chickens, for instance, needs to be cut up into different parts by the kitchen staff. Organic vegetables need to be washed to remove slugs and aphids. Nevertheless, the kitchen staff are very flexible and process the vegetables creatively. The farmers' consults with the kitchen staff when planning for the following year's cultivation. Based on client feedback, the farmers and kitchen staff jointly develop a cultivation plan tailored to both partners. Over the course of the year, the hospital kitchen can request particular produce at short notice.

This cooperation is financially beneficial for the farm and the hospital appreciates the quality of the products they receive from the farm and the positive press coverage and response from the local community they and the farm received for their collaboration. As a result of the good public attention on the hospital, the owners of the farm believe this will discourage the hospital from terminating the current arrangement. Furthermore, the arrangement is supported by all levels of the hospital - including its director and the kitchen staff, rather than by just a particular individual.

LEVERAGE POINTS

The Hospital and CSA food production system in Belgium exemplifies a sustainable and community-oriented approach to food production. Through direct collaboration, organic farming practices, and active consumer involvement, the system creates value for both the farmers and consumers. The value chain analysis highlights the strengths, challenges, and opportunities within the system, underscoring the importance of trust, shared responsibility, and local community engagement. This case study serves as an example of how a collaborative and socially responsible food production system can contribute to sustainable agriculture and promote healthier food choices.
The sustainable food system centered around Het Polderveld shows a number of leverage points, which offer opportunities for food system transformation.

Re-think

Knowledge building and exchange: Het Polderveld enables knowledge exchange between different stakeholders in the system, provide opportunities for knowledge building and show alternatives to the existing food production system. It is the regular meetings where participants and CSA interested peoples are introduced to organic farming and the structure, and exchange information about cultivation methods and processing. The cooperation with AZ Zeno makes it possible to communicate and show the advantages and quality of regional, organic food to a wide public.

Farmer's Knowledge: Firstly, by improving one's farming ability and know-how, the farmers can plan their production and harvest more effectively. Additionally, this improves their ability to educate their consumers, such as through workshops aimed at challenging existing beliefs about food production and consumption. The farm's owner argues most consumers do not fully understand the meaning behind organic products - values that cannot be conveyed through a product label. To promote consumer understanding and to encourage consumers to buy local and organic, the farmer prefers to work locally, where they can explain directly the reasons behind why they produce their vegetables in a particular way. This "deep" lever targets two system characteristics. First it alters the structure of how information flows among actors in the food system (design). Second, it targets the shared beliefs among the mindset of the (food) system's actors.

Re-think

Soil Quality: Though Belgium's agricultural sector is severely impacted by soil degradation, the farm's efforts to improve soil quality are counteracting this trend. This is achieved by measures such as minimizing soil disturbance, use of high-quality inputs and organic soil cover.

Cooperation with institutional clients: The hospital plays a crucial role as a customer, sourcing a substantial quantity of fresh produce from the CSA farm and thus strengthens the economic resilience of the entire production system. The collaboration with the hospital is essential for planning the annual production and for reliable purchase volume. Moreover, it serves to diversify the financial risk compared to a CSA that only works with private consumers.

Livestock Size: Increasing the stock of chicken and sheep boosts overall production to drive all the positive feedback loops linked to increased production. Gaining additional farmland and improving biodiversity are two factors that contribute to increasing the stocks of these two variables.

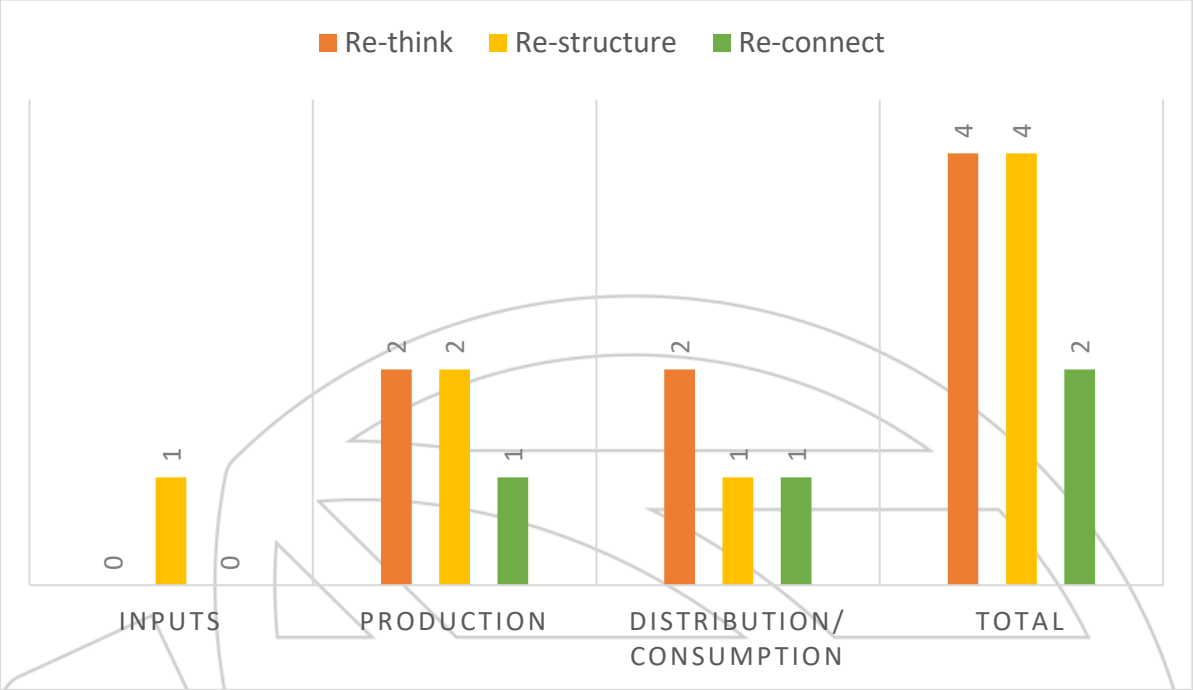
Re-connect

CSA Participant Involvement: CSAs are a way to re-connect consumers with the origin of their food and that's what Het Polderveld does, whether they are direct CSA-members or indirect beneficiaries through the collaboration with the hospital kitchen (e.g. patients, employees, guests). Increasing CSA participants involvement on the farm, such as through self-harvesting, open field days and workshops would: (i) increase their level of understanding about food, (ii) increase their ability to adjust their dietary patterns flexibly according to the seasonal availability of the produce at the farm and most importantly, (iii) free up the farmers' time to focus on other farm-related activities besides harvesting. CSA participants build a bond with the farmers. Through self-harvesting for one year at the farm, CSA participants realize that the vegetables they harvested on the field are products with a backstory and involves people that they know personally, unlike the food from supermarkets produced by relatively anonymous producers. The field serves as a setting for local community building. It enables locals to socialize, relax and form a personal connection with the farmers and the field. Participants learn firsthand how their food is produced and get ideas for new recipes. By being an active participant in food production rather than as passive consumers, CSA participants came to view food in a new way and have greater appreciation for organic foods. Through regular participation on the farm, participants became more involved in sustainability and began to prefer organic products when shopping at other food retailers.

Table 8: Deep leverage points in the value chain of the Belgian case study (Numbers indicate the frequency of interventions).

Deep leverage points	**Intervention points in the value chain**			
	Inputs	Production	Distribution / Consumption	Total
Σ:	**1**	**5**	**4**	**10**
Re-think	-	2	2	**4**
Knowledge building and exchange		x	x	
Farmer's knowledge		x	x	
Re-structure	1	2	1	**4**
Soil Quality	x			
Cooperation with institutional clients		x	x	
Livestock size		x		
Re-connect	-	1	1	**2**
Involvement of CSA-participants		x	x	

Figure 12: Deep leverage points in the value chain of the Belgian case study by frequency.



Challenges & barriers to systemic transformation

In order for this sustainable food system to exert a lasting impact on society, environment and local economy, it needs to find adequate solutions to address the following key challenges that affect its resilience and that may prevent it from realizing its transformational potential.

Manual labour: The first of which is related to the high degree of manual labour on the farm. As the size of its clientele expands, so does the farmers' workload. As a result, the farmer has less time to educate consumers to improve their understanding of food production. Another direct cause that contributes to this problem is consumers having less free time to self-harvest and process farm produce, which forces farmers to spend more time harvesting and processing the produce for the consumers. To address this, the farmers have reduced the amount of manual labour-intensive tasks on the farm by acquiring a seeding machine for sowing green manure. Mechanization of other farm processes may reduce the farmers' workload further, freeing up time for them to perform other activities, such as hosting education workshops for its CSA participants. By adding new physical structures in the system, this lever targets Meadows' leverage point of improving the system's resilience by adding, altering and organizing the system structure.

Land Affordability: Rising land prices makes the access to agricultural farmland difficult. This hinders the farm from acquiring more farmland to scale up its operations and increase its production. In 2021, the average cost of farmland in Flanders is €63,000 per hectare, making the acquisition of farmland in this region highly difficult, particularly for young farmers unless they come from an agricultural family that owned farmland.

Availability of labour: The second barrier deals with the availability of farm labour. A lack of available labour reduces the farm's ability to continuously increase food production and expand its operations. The direct cause of this problem is the increase in additional customers and institutional clients. Though the additional sales from new customers increase the farmers' income, they also increase the farm's need to hire more workers to cope with the rising consumer demand. However, the increased demand for labour may drive up the cost of hiring new farm labourers, thereby reducing the farmers' income and farm's ability to hire the labour required to achieve production levels that can meet the increased demand. In addition, the labour-intensive nature of the work on the farm and its remote location further compound this problem.Moreover, finding the right candidates to work on the farm is a challenge. Although the farm is hiring, it cannot fill its vacancies due to its remote location and the labour-intensive nature of its operations. The farmers believe the farm has to remain small to remain manageable, because even if they raise prices and if more CSA participants contribute financially, it is difficult to generate enough income to hire an extra farmer in order to increase production to meet increased demand. Therefore, the farmers currently do not wish to scale up the farm's operations exponentially.

g. United Kingdom

Author: Ruth Cullen, Nicklas Riekötter

Case Study Name: Stroud CSA

Location: Gloucestershire, United Kingdom

PRODUCTION

The farm started 20 years ago as a CSA and has grown over time. It currently operates on 21 hectares of land, practicing organic mixed farming. The farm has a diverse range of enterprises, including vegetables, fodder crops, and various livestock such as cattle, sheep, and chickens. Crop rotation follows a traditional organic model, with one-third of the rotation dedicated to fertility-building ley. The farm's livestock is raised on approximately 20 hectares of grassland, supplemented by small areas of woodland and an orchard. The farm has a team consisting of a farm manager, full-time workers, part-time workers, apprentices, and volunteers who contribute to the day-to-day operations.

PROCESSING

The farm's processing activities are minimal. Produce is harvested by the farm team and organized in a packing shed. Packaging mainly consists of paper and compostable plastic, with guidelines provided to members on quantities they can take. The farm does not engage in significant processing or value-addition of the products before reaching consumers. Instead, the focus remains on delivering fresh and organic produce directly from the farm.

DISTRIBUTION

The farm operates as a CSA, where members purchase a membership to support the farm and gain access to its produce. Members visit the farm to pick up their shares of produce, which are organized in wooden boxes within the packing shed. Consumers are trusted to weigh the correct amounts of their share using the available scale. The farm provides paper packaging and compostable plastic for convenience. Distribution relies on the direct interaction between the farm and its members, with the packing shed serving as the primary distribution point.

The farm emphasizes word-of-mouth marketing and maintains an active presence on social media platforms such as Instagram and Facebook. The farm manager actively shares information about the farm, its activities, and produce. The farm also organizes events to engage the community, including educational visits, dances, walks, and barbecues. These activities contribute to community building and foster a sense of belonging among members.

In summary, the farm's value chain starts with organic production practices, ensuring a diverse range of crops and livestock. Processing activities are minimal, focusing on the organization and packaging of the produce. Distribution primarily occurs through the CSA model, with members directly visiting the farm to collect their shares. The farm's marketing efforts emphasize word-of-mouth and social media engagement, while community events strengthen the social aspect of sustainability and create a vibrant and engaged community of members.

LEVERAGE POINTS
Author: Ruth Cullen

Re-structure

Strong sense of community based on trust and financial risk sharing: Throughout the interview, there were clear indications of a strong focus being shifted towards the social aspects of a CSA system, stating:

'Ten or fifteen years ago it was more focused on production elements and the environmental aspects, but the social has come in a lot more.'

A solidifying factor for community strength is also economic reliance. While discussing the payment schemes and relations between consumers and farmers, the interviewee confirmed that there was a certain level of trust built between the two groups of actors. This personal connection makes organic certification unnecessary:

'It's not certified as biodynamic so [the farmers] follow a regenerative approach and there's an understanding between the customers and farmers that they know how the farmer is managing the land; and how the quality of their product results so it's more on a trust basis.'

There was a level of economic reliance as CSA systems do seek to create a safety net with regards to financial risk, using 'a pre-payment scheme for the consumers and then you can pay a lump sum or you can pay a monthly rate'. This pre-payment removes some financial pressures and constraints from farmers as it gives them a set income for the coming season. Another layer is the level of transparency for the community; their financial contributions and where they are being spent are shown to them, in conjunction with what seems to be a contract of trust in so far as there are mutual gains and mutual reliance between the farmers and consumers. This creates the feeling of 'a social space as well as a productive one'. The members of the CSA farm show this mutual benefit as stated in the interview:

'Occasionally there's a special need for a particular piece of infrastructure and so they'll go to the community.'

While this is a passing reference to how the CSA system works, there is a clear social contract between all the members in which financial support will reap beneficial outcomes for all actors involved. With examples of fundraisers for the CSA, and one recent event raising over £10,000 for necessary upgrades, there is clear motivation to maintain this project from the members. Thus, there is a clear indication of a strong level of trust between all the community members and a large network of support for the CSA farm.

Socio-ecological values drive the CSA, meaning trade-offs for the economy of the production system: The integrity of the farm has been maintained, with growing membership and values, even without economic motivations. This furthers the complexity of the value chain as, although it may not be the most economically viable pathway, the values of the actors go beyond this – proving a clear sign of intent. During the interview, it was discussed that the farmers earn below or the equivalent to minimum wage; a problem that may not be as prominent if they should choose to move to a more 'conventional' methodology of agricultural practice.

Increased interest for the CSA's local food system through external shocks such as COVID-19 : A separate note to this but another potentially confounding variable that arose during the interview was the increase in interest due to the Covid pandemic in which lockdowns created a bigger demand due to, according to the interviewee 'people being a bit more connect to their food'. Where people have time and yearn for more social interaction, there are signs that they may turn to local projects such as this CSA farm. There is a clear creation of a community that has been created in this project in particular and the multitude of like-minded people has allowed there to be an interplay of socio-economic factors to create the opportunity for community involvement while creating the mindset for more sustainable living. Where there is the chance for people to be involved, there are indications that they are indeed willing, which could hugely alter public perception to easiness and accessibility for more environmentally friendly and sustainable choices.

Re-connect

Connecting consumers to organic food production through proximity rather than certification: The CSA framework aims to reconnect people with the natural environment and from the offset, there were clear indicators that this was the primary motivation behind the creation of this CSA farm. The importance of reconnecting consumers to the natural world and also creating a balanced environment in which those from diverse socio-economic backgrounds can involve themselves benefits the CSA farm greatly. The strong connections between farmers and consumers at a basic level through social interactions are already a clear indicator of a strong community feeling. Moreover, the method of collection and involvement of community members in social gatherings is a further piece of evidence in showing the strong sense of community. During the interview, when asked about the method of transaction, the way it works is that ' it's not a box scheme as such; the customers drive to the collection point(s).' This, although a small detail, shows that even during the collection of the products, consumers are interacting with those working on the production side of the farm; rather than simply having a collection of the products delivered to their door. The farming structure is based on 'regenerative agriculture and the benefits that provides'according to the interviewee, creating a network within this structure of, as discussed *'an inner circle of about four or five hundred people who are connected to the farm in various ways'.*

Re-think

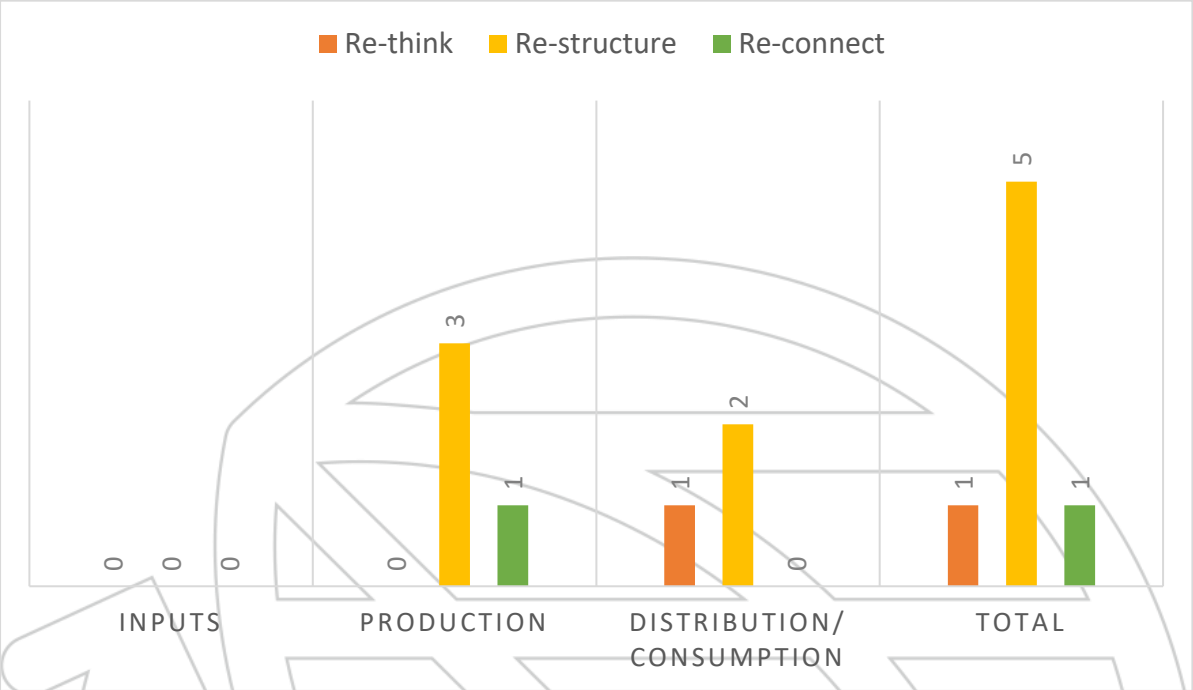
With design being focused on the transformation and distribution of knowledge, there is a need for strong community bonds and transparency. This is clearly shown with the level of trust between the actors involved; however, where the transaction of knowledge takes place is important. Firstly, with regards to publicity, the interview established there was a 'growing awareness in terms of the impacts of our food, but also the events that have been held on-farm and the coverage in terms

of the local and national press in terms of the media'. These methods of outreach show a keen interest in educating the community and establishing a baseline of information that can be made available. The accessibility for information is not only through this level of outreach, but also with town hall meetings and regular interactions with consumers. For community members involved in the farm, there is 'an annual meeting with the members to show how their money is being spent and so on'. This level of transparency further allows for there to be a constant level of communication between the different levels of actors involved in the farm. In establishing a basis for knowledge through the aforementioned communication networks between the different actors and high levels of involvement amongst the community, there is a significant strength shown through the creation of these local, community-based projects such as the CSA farm in question. The flow of information is clear with aspects of the 'really mixed enterprise' being completely open to educating community members. The excitement for consumers to involve themselves in a sustainability-based project shows the intent is there, and the design has been fundamental in educating people to the point they want to get involved.

Table 9: Deep leverage points in the value chain of the English case study (Numbers indicate the frequency of interventions).

Deep leverage points	**Intervention points in the value chain**			
	Inputs	Production	Distribution / Consumption	Total
Σ:	**0**	**4**	**3**	**7**
Re-think	-	-	1	**1**
Community education and/or participation activities			x	
Re-structure	-	3	2	**5**
Strong personal and trustful relationship between producer and consumers CSA-members		x	x	
Pre-payment scheme to reduce financial risk and to provide set income for coming season		x		
Socio-ecological value orientation means trade-offs for the economy of the production system (farmers earn below or the equivalent to minimum wage)		x		
Increased interest for the CSA's local food system through external shocks (e.g. COVID-19)			x	
Re-connect	-	1	-	**1**
Connecting consumers to organic food production through proximity rather than certification		x		

Figure 13: Deep leverage points in the value chain of the English case study by frequency.



6. Cross-Case Conclusion

Author: Valerie Holzner

On the basis of the preceding case-centered analyses, four key cross-case conclusions can be drawn with regard to "deep" leverage points in innovative agri-food value chains:

(1) OVERALL: Value chains show interventions in all realms of deep leverage. By far the **most concern** the realm of ***re-structure***, while the connection between people and nature is just as important as the generation and dissemination of knowledge.

(2) RE-THINK: The way how knowledge is produced, used and shared tends to be particularly relevant for the **production stage** of food.

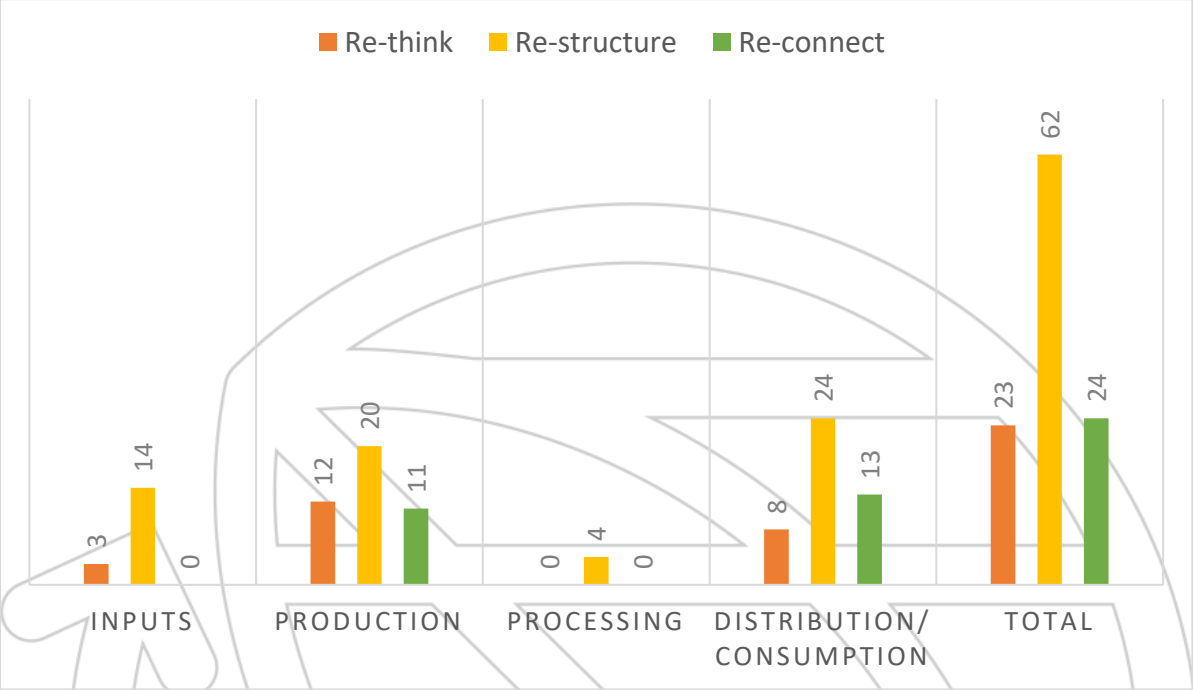
(3) RE-STRUCTURE: Most interventions to adapt and change system structures are made downstream, targeting **distribution** and **consumption patterns.** However, several structural interventions also target the way of how food is **produced.**

(4) RE-CONNECT: Mindful connections between people and natural processes are promoted **in production** as well as **distribution and consumption**, but tend to be less important in the upstream value chain (production inputs). This is mainly because all innovative food systems focus on short supply chains with the aim to reinitiate a direct and personal tie between consumption and organic production. Within the value chains consumers are enabled to experience, understand and identify with how organic food is produced – mostly achieved through participation as well as spatial and social proximity – and food consumption is strongly linked to natural production patterns and cycles.

(5) UPSTREAM VALUE CHAIN: In the upstream value chain, **several structural changes** are made with regard to production input, while knowledge plays a lesser role and the **human-nature nexus plays no role** at all.

(6) PROCESSING: The **fewest leverage points** were found in the stage of processing. This is due to the fact that most of the case studies sell fresh, unprocessed goods. The four interventions concern the Polish case study, which deals with the marketing of organic, grass-fed beef and therefore the processing step of slaughtering plays a key role in the value chain.

Figure 14: Deep leverage points in innovative agri-food value chains by frequency (results based on value chain analysis of seven innovative case studies in Europe).



7. Social Return on Investment in FOODLEVERS Case studies

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Within this task attempts were made to define the Social Return on Investment (SROI) for each food system. The SROI is a way to measure change relevant to the people or organizations that experience or contribute to it by using monetary values to represent the social, environmental and economic outcomes of an initiative (Nicholls et al. 2012). By doing so, the aim was to highlight better/worse social, environmental and economic performance within innovative farming systems.

The determination of these cost-benefit ratios is based on qualitative data on the benefits experienced by people involved in the respective production systems as well as quantitative data related to investments. To do so, the stated preference method (Fujiwara & Campbell 2011) was applied. In this vein, the interviewees were directly asked to assign values to the individually experienced impacts of the respective food system they are involved in. This was done by applying the concept of "willingness to pay" for an outcome to happen or to avoid. Choosing this open-ended format is the "most direct approach" (Fujiwara & Campbell 2011). It allows for more honest and meaningful answers, as respondents answer spontaneously instead of solely reacting to predefined indicators that may not even be considered relevant. Additionally, it better aligns with the qualitative method as well as the theoretical framework of this task which is to uncover the analytical aspects of value creation, enhancement and capture of the food systems in question. The social return of initiatives is calculated as a ratio, obtained by comparing the present value of outcomes with the value of initial inputs. As a result, the ratio indicates the social return in Euros for every Euro invested. For reasons of calculation, data on the initial investment was therefore also collected (according to European Commission 2014, p. 44).

Following the concept of "willingness to pay", food system actors were asked to name the three most important social benefits they experience and how much money they would be willing to pay per month in order not to lose these benefits. While positive outcomes have been easily described, relating them to monetary values was somewhat difficult which was the case for all respondents, except for those from the Polish and Romanian case studies. The observed phenomenon might indicate that for people working in or being part of a sustainable and organic food system, the creation of social added value is prioritized over economic added value:

> *"[T]he CSA is for people and not for capital [...] The togetherness, the trust, the transparency [...] here people are simply worth something."* (Farm manager, German case study)

> *"The main benefit is that we do a job in which we earn very little, but which we enjoy. Those who work with us […] do work that has social value and that is very important to us. When we can, we try to make the end user, the people who buy, understand what they are part of, and therefore that the act of buying is in fact the end point of a virtuous process that supports virtuous production processes and commercial, economic, and ultimately human, relationships based on trust: in our opinion all this has a social, political value in itself. […] [F]or us it's intrinsic, in the sense that what we do must not have negative repercussions, in other words, let's say that I start from a classical economic background, we must not have negative externalities, we must only generate positive*

> *externalities, so you cannot exchange money for externalities, i.e. environmental externalities cannot be monetised. Our reality also stems from this, not everything is money, although money is used to do many things, so it is certainly the currency of exchange."* (Distributor Italian Case study)

Nonetheless, valuable results could be obtained regarding positive externalities of innovative food systems for different stakeholder groups as summarized in Table 6. Overall, the main beneficiaries are farmers and consumers, but also other value chain actors, including employees. Social benefits were also related to different societal groups such as disadvantaged people or school children, but also to the local community, economy and environment. However, it was not always the subjectively perceived benefit for themselves that was mentioned. The respondents' statements also referred to the social added value created for other target groups. Where social benefits have been assigned a monetary value, they cover a wide range. People would be willing to pay between 0 and 2,000 Euros per month in order not to lose certain social benefits. For others they are "invaluable" or "priceless". The wide range of monetary values underlines the fact that comparability is somewhat difficult due to the highly subjective nature of the assessment. In addition, purchasing power differs both between individuals and between countries.

> *„I feel very rewarded because I believe I am doing something useful. Finally, I feel lucky because I am connected to the natural world, one of the best places to work in the world. This type of work allows me to maintain many relationships including family relationships, we have the privilege of eating together every day."* (Farmer Italian Case study)

> *"The potential is huge; the idea is big and we are part of the solution for the future. That gives me the feeling every morning that I am directly involved in shaping change. All this together with people who are very motivated, constructive, open and sympathetic."* (Farmer German Case study)

Table 10: Social benefits from sustainable and organic food systems per Case study (numbers in parentheses indicate number of interviewees, if more than 1).

Social benefit	Role of…		Monetary value (€/month)
	Beneficiary	Interviewee	
GER			
Creating transparency of and connection to food production and supply	Consumers	Farm manager, Farmer	n/a
Providing high-quality, organic and sustainable food	Consumers	Farm manager	n/a
Working for something meaningful	Farm manager	Farm manager	n/a
Being involved in shaping change towards sustainability	Farmer	Farmer	n/a
Being part of a community of value-driven and like-minded people	Farmer	Farmer	n/a
Community and trust building between people	Food system actors	Administrator	n/a
BE			
Transparent food supply	Consumers	Farmer	n/a
Involving people in food production	Consumers	Farmer	n/a
changing their understanding of food	Consumers	Farmer	n/a
IT			
Doing something useful	Farmer	Farmer	100-400

Learning by exchanging knowledge with other organic producers	Farmer	Farmer	
Being connected to nature	Farmer	Farmer	
Good compatibility with family	Farmer	Farmer	
Eating self-produced food	Farmer	Farmer	
Enjoying work	Distributor	Distributor	n/a
Enabling people to become part of a virtuous food system	Consumers	Distributor	n/a
RO			
Eating food that is the result of your own work	Farmer	Farmer	1,350
Societal integration and livelihood through work	Disadvantaged people	Farmer	
Teaching school children about organic agriculture	School children	Farmer	
Gaining knowledge and skills in organic agriculture	School children	School teacher	33
Strengthened environmental awareness	School children, Customer	School teacher, Local action group, Customer	5-83
Distinguish useful and poisonous medicinal plants	School children	School teacher	33
Supplying customers with environmentally friendly products	Retailer	Retailer	50
Provision of safe and high-quality products	Customer	Customer	5
Pleasant interaction with farmer	Customer	Customer	5
Creating jobs	Local economy	Local action group	83
Good practice example for short food chains	Local economy	Local action group	83
PL			
Providing high-quality food products	Consumers	Farmer (3)	20-90; invaluable
Increased environmental and health awareness	Consumers	Retail, Restaurant	n/a; 200
Increased awareness on food quality	Consumers	Retail, Restaurant	Priceless; 200
Job creation for socially disadvantaged	Disadvantaged people	Umbrella organization	200
Providing training	Employees	Farmer	n/a
Improved working conditions	Employees	Retail	650
Improved working skills	Employees	Retail	450
Reduction of food waste	Environment	Restaurant	100
Doing something useful	Farmer	Farmer (3)	200-300; invaluable
Job satisfaction in relation to the diversity of activities	Farmer	Farmer	invaluable
Working in a restorative natural environment	Farmer	Farmer (8)	40-400
Adopted a healthier lifestyle/diet	Farmer	Farmer (7)	100-450; invaluable
Improved physical health	Farmer	Farmer (3)	70-200
Being part of a social network	Farmer	Farmer (2)	55-450
Learning new skills	Farmer	Farmer (3)	11-400
Good relations with consumers	Farmer	Farmer	“A lot!”
Feeling more confident	Farmer	Farmer	200
Spread idea that networks of producer can serve the local community	Farmer, local community	Umbrella organization	200
Strengthening local community	Local community	Farmer (2)	200
Collaboration with collectors, involvement in market activities	Local community	Farmer	300
Increase place’s attractiveness for tourists	Local economy	Farmer (2)	20-100
Supporting local development and workers	Local economy/ community	Processor	n/a

Improving local environment (e.g. soil, society)	Local environment	Farmer (7), Restaurant, Umbrella organization	40-2,000; 80% of farm expenses; invaluable; "A lot!"
Local esthetics improvement (e.g. grassland maintenance)	Local environment	Farmer (4)	0-1,000; 40% of farm income; equal to production costs
Building market for healthy products	Market	Farmer	20
FI			
Sharing generated knowledge on sustainable farm practices to benefit others	Other farmers	Farmer	n/a
UK			
Providing a space for community activities and learning	Local community	Researcher	n/a
Creating transparency in food production	Consumers	Researcher	n/a

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9. Annex

Interview Guidelines for farmers

Questions	(potential) theoretical links
1. Emergence & key farm characteristics	
When and how were the farm's operations started? / Since when is your farm cooperating with the CSA/part of the producer network and how did you get engaged with it? What were the main motivations for it? • years active; origin of idea/knowledge; mission & objectives; conversion to sustainable/organic practices; support of other stakeholders in start-up process • *Only to ask, if farm is part of a producer network or cooperating with other farms:* Could you describe **your role** within the production network/cooperation as well as the **relationship** and **the arrangements** with the main farm/CSA/producer network farms? How and by whom is the production network managed? ○ Governance structure of network; Farm's role; **number** of actors involved	System's design/intent; Re-structure/re-connect/re-think GVC: Governance
Coming to some key farm characteristics, could you describe your farm in terms of size, farming practices and organizational structure? Could you also outline why you have chosen this particular farm design? • Farm size (ha); farming practices; reasons; how farmer obtained **knowledge** about it • Organizational structure (legal status; ownership of farm and land; responsibilities for management & risks; labour force etc.); *for CSAs:* number of CSA members/shares; ideal number of shares; price per share; **Why** CSA as organizational form?	GPN: firm architecture & ownership; GVC: governance; system's design
2. Value chain	
Agricultural production	
What are the products/services of your farm? How do you produce them and why? • Product/service types (crops, livestock etc.); purpose; production scale; particularities of cultivation; main products in terms of **quantity** and **economic importance**? Why? • How are you **dealing with co- or waste-products**? (e.g. reuse, sale, external disposal) • Do you offer any **supplementary products or services**? (non-agricultural activities carried out, e.g. workshops) If yes, why and what is it about? • *Only for network producers or cooperation farms of a CSA:* Which of your products & services are **devoted to the CSA/production network**? Can you estimate the share of your land and of your whole production capacity/quantity devoted to this purpose?	GPN: value creation Re-structure
How do you plan your annual production and what are important factors for the planning? • Decision making strategies; involvement of other stakeholders? (e.g. consumers)	GVC: governance
What aspirations do you have to your products and production process and how do you achieve them? Do you follow any environmental or social production standards or schemes? Why or why not? • internal self-commitments (e.g. traceability, environmental compatibility, regionality, seasonality etc.); official standards (e.g. organic); **viability** of implementation?	System's intent/GPN: value creation & enhancement
Inputs & supply	
What kind of supplies do you have to buy for your production and where from? Can you describe how you select suppliers and what relationship you have to them as well? • Type & source of purchased supplies (e.g. seeds, fuel, feed, fertilizer); largest quantities & expenses (shares); selection criteria; length & nature (formal/informal) of	GVC: governance; GPN: embeddedness/ power; system's design/intent

relationship; **number & spatial range** of suppliers; arrangements with suppliers; difficulties (e.g. dependency) • Are there **any supplies that you can provide yourself** or without buying it?	
<u>Could you outline how farm land, labour as well as facilities and machineries are used and organised? What are the reasons for the way you organize each?</u> • Land use, spatial distribution and acquisition; reasons • Number & type of workers (e.g. full-time/seasonal, family, volunteers); (relevance of) professional background of workers; training offered; division of labour; reasons • farm facilities (buildings, storage, other infrastructure etc.); type of machines owned/rented/shared & used; repairs, maintenance; reasons	GPN: firm's architecture; system's design (re-structure)
Processing & Packaging	
<u>How and by whom are your products processed and packaged? Why?</u> • In-house or outsourced processing/packaging; in which form are products processed/packaged; material/machineries used; innovative packaging; challenges	GVC: governance; GPN: value enhancement; re-structure
Distribution channels, marketing & sale	
<u>Could you describe the distribution of your products? Please track the flow of the products until they reach the consumer. Could you also estimate the revenues, quantities and labour for each of the distribution channels?</u> • Design, diversification and **length** of distribution (spatial range, number & type of actors involved); **Why** selling through these channels? ; To whom are you (mainly) selling?; How do you manage the **logistics** (transport, infrastructure; storage etc.)?; What **difficulties** occur regarding selling your produce (for the different channels) • Quantities: **How much** of the produce is sold through each of the channels? • Revenues: **Most rewarding** channel &product group (financially, personally)? Why? • Labour: Which channel/produce involves **most labour**?	GPN: value capture, embeddedness; GVC: governance / re-connect/re-structure
<u>How does the marketing of your products look like? What particular steps have you taken to add value to your products and how successful would you say it is?</u> • Marketing strategy; added-value activities (e.g. unique costumer experience; story telling; role of ICT/social media; **labelling/certification;** communication of farming philosophy/system & its benefits; **difficulties** in finding costumers?	GPN: value enhancement / re-connect/re-structure
<u>How are prices determined in your sale channels? To what extent do you consider the prices being fair/satisfying (for you but also for consumers)?</u> • Determination of prices; **true costs/benefits reflected in prices** • Are there any **differences in prices** to be made depending on the type of costumer/sale channel/product and if yes, why?; In which of your products is the **most value added** for you as a producer and why?	GPN: value capture, power
<u>How would you characterize the market for your products and your consumers?</u> • How **competitive** is the market? How does this show? ; What are recent **market developments** for your products offered? What influences it? • Characteristics of consumers; Why are they buying your products (**selling points**)?	GPN: power, value, embeddedness; re-connect/re-structure
3. Differentiation from conventional systems	
<u>How does your food production system differ from conventional ones and how does this impact the overall market opportunities of your farm?</u> • Particularities of production system/products (e.g. prices, quantity, quality, costumer relation; values; knowledge sharing; labour-, time-, resource-, knowledge-intensity**)** • To what extent are these particularities **reflected in your prices & marketing**?; How is this **appreciated by your costumers** (e.g. willingness-to-pay, trust)?; To what extent does this impact the **competitiveness** of your products?	Re-structure/re-think/re-connect
4. Benefits & social impact	

What are the main benefits of your production system / *for network producing farms:* of this collaboration (in social, ecological & economic terms)? • Social, ecological & economic benefits; provision of **additional services** (e.g. ecosystem services; knowledge; awareness) compared to conventional ones?	GPN: (added-)value creation/capture
Focusing more on intangible/non-monetary outcomes of your farming system: what are the three most important social benefits that **you as an individual** experience since you are working in this farming system/producer network? If you would have to give up the benefits described, how much would you be willing to pay a month (in €) for each to get them back? • Individual social impact experienced expressed in monetary terms (e.g. became part of a social network, adopted a healthier lifestyle/diet, improved physical health, doing something useful, job satisfaction, learnt new skills, being in a restorative natural environment, became more relaxed, felt happier/more confident etc.) • *Maybe give interviewee an example: "For getting back the feeling of less stress I would be willing to pay a maximum of 100 € of my monthly salary."*	Social Return on Investment
Could you also name three essential outcomes of your farm that are socially benefitting for other stakeholder groups? Pretending that these stakeholders would lose the benefits described, what would be the maximum monthly amount of money that your farm would be willing to compensate them for that loss? • Intangible impact (e.g. improved perception of the local area, less waste etc.) on other stakeholders served (e.g. staff, volunteers, CSA-members, environment, consumers, suppliers, sponsors, public sector, local community etc.) expressed in monetary terms	Social Return on Investment
5. Evolution & financial situation of farm	
If you compare the farm's position today to its initial phase, how did it change since then and why? • **internal** changes (mission & values, ownership, legal status, suppliers, costumers, production quantity/efficiency, labour force, diversification, cultivation technique etc.) • changes in/triggered by the **external environment** (e.g. regulations, subsidies, partnerships, market entrance, changes in demand/competition etc.)	GPN: firm architecture; re-structure/re-think
Could you also describe the evolution of your financial situation? How do you (re-)finance your farm now and how was it in the start-up phase? • Profitability; timing of **exceeding break-even; main expenses & income sources**, why?; **financial support** (where from?); capital investment; access a fund/grant/**subsidies**/trust; farming as main occupation; *for CSA:* development of shares • How quickly is your farm able to bounce back from **external shocks/variable costs**?	Re-structure / GPN: power; value capture
6. Drivers & challenges	
Which factors would you say most enabled you to establish and maintain your production system and limit risks? • Drivers (e.g. regional support mechanisms; politics, skills, assets, social capital; partnerships & networks; trainings; learning from others; research projects, media etc.) • Do you **feel supported** in the way you farm by politics, regulations, society etc.?	Past levers; GPN: embeddedness
If not already mentioned as "driver": How important are linkages to other actors for your farm and/or an enabling environment? What is their role exactly? • Type of actors (e.g. political/financial institutions; local economy/community; other farmers; interest groups etc.); actors' role (value chain, advice, information, supporting, knowledge etc.) • **Value chain linkages:** How difficult is it, to coordinate and **find suitable (sub-)suppliers and (sub-)purchasers**? ; How do you **strike the balance** between the farm's autonomy and the need to collaborate with other stakeholders?	GPN: Embeddedness; power; re-structure

What were/are the main challenges that you were/are facing? • E.g. financial/political uncertainties; availability of local/regional infrastructure for key operations; (qualified) labour availability; access to & sufficiency of land; trade-offs between long-term benefits & short-term challenges etc. • How did you manage **to overcome** these challenges?	future levers needed
7. Future needs	
What would you need or what would need changing to further develop and scale-up your production system?	Future levers needed

Interview guidelines for other value chain stakeholders

Questions	(potential) theoretical links
1. Basic information	
Could you describe the key operations of your business? What are your products and services? • Key activities, products & services of firm • Firm size (small-/medium-/large-scale); machinery & facilities labour force • To what extend would you describe your **business operations as organic &/or sustainable**? Do you follow any social and/or environmental standards? Why/why not? • Who are you mainly working with? ; What and where are your main markets?	GPN: firm architecture; GVC: governance (capabilities; complexity, codification of transactions)
2. Value chain linkages to organic/sustainable production system	
Since when and how did your firm start to work with the farm/CSA/producer network XY? What were the reasons for it? • Emergence & length of relationship (long-term/short-term); reasons/motives for collaboration • Was it **difficult** to establish the relationship? (e.g. due to competitors; strict selection criteria of the farm/CSA; production capacity of the farm/CSA etc.)	GVC: governance; GPN embeddedness; system's design/intent
Could you outline which of your products and services are of concern for your cooperation with XY? Please also describe all activities and inputs (e.g. supplies, assets, knowledge etc.) devoted to this collaboration. • Type of products/transactions between value chain stakeholders; **(value-added) activities & inputs** devoted to collaboration (e.g. **financing in particular infrastructure/equipment**, labor force, **specific skills/knowledge** needed etc.) • Are there **any other stakeholders involved** in your activities devoted to the collaboration with farm/CSA/producer network XY? If yes, how and why?	GPN: value creation & enhancement
Could you describe how you are working together with farm/CSA/producer network XY? For example, what are the responsibilities of each partner and what arrangements have you taken with each other? • Nature of collaboration (e.g. formal/informal, trust-based); conditions of collaboration (e.g. risk/cost sharing; clear definition of responsibilities; steady exchange etc.) • Who is responsible for **planning or taking important decisions**? • How **fair/satisfying** would you consider the arrangements taken?	GPN: power; GVC: governance
How about financial arrangements taken? Who is determining the prices and to what extent do you consider them as being fair (for you but also for the farm/CSA)? • Determination of prices; **cost-benefit sharing** between the two parties; **true costs/benefits reflected in prices**?	GPN: power; GVC: governance
3. Differentiation from conventional value chain cooperators	
Could you describe how the cooperation with farm/CSA/producer network differs to your conventional/usual cooperators/suppliers/costumers etc. *(please adopt depending on the value chain position of stakeholder)*? • Characteristics of conventional cooperation partners vs. characteristics of case study partner; differences/particularities in prices, **cost-benefit ratio**, quality, values, commitments or standards, type of products etc.	Re-structure/re-think/re-connect

• How **knowledge-, time- and resource-intense** would you describe this cooperation compared to the conventional/usual ones? • *For wholesalers/retailers:* How do the **products** of farm/CSA/producer network XY **perform** compared to conventional ones?	
4. Effects & social benefits of cooperation	
<u>How did the collaboration with farm/CSA/producer network affect your business operations?</u> • Positive/negative effects on stakeholder's business (in economic, social & environmental terms)	GPN: (added) value creation/capture
<u>Focusing more on intangible/non-monetary outcomes of this collaboration, what are the **three most important social benefits** that your business experiences as a result of the collaboration with case study XY? What is the maximum amount of money (in €) your firm would be willing to invest a month **to not lose** each of the impacts described?</u> • Intangible impact of cooperation expressed in monetary terms (e.g. more social/environmental commitment, contributing to improved local environment, new skills, awareness on environmental issues, less waste production etc.) • *Maybe give interviewee an example: "To not lose the effect of contributing to an improved local environment my firm would be willing to invest a maximum of 500 € a month."*	Social Return on Investment
5. Drivers & Barriers	
<u>Which factors would you say most enabled you to establish and maintain a successful collaboration with the farm/CSA/producer network XY?</u> • Internal & external drivers (e.g. similar values; skills; social capital; personal relationship; regional support mechanisms; politics, subsidies, changes in demand/competition, market entrance etc.)	Past levers; GPN: embeddedness
<u>Were/are there any **specific difficulties or challenges that arose**/arise related to your collaboration with farm/CSA/producer network XY? If so, which kind of difficulties and why?</u> • E.g. dependency, delivery bottlenecks, selling opportunities, lack of awareness/appreciation of other value chain stakeholders; financial/political uncertainties; availability of local/regional infrastructure for key operations; (qualified) labour availability; trade-offs between long-term benefits & short-term challenges etc. • How did you manage **to overcome** these challenges?	future levers needed
6. **Future plans & needs**	
<u>What would you need or what would need changing to overcome the challenges mentioned?</u> <u>How do you see the future of your collaboration with farm/CSA/producer network XY?</u> • Future plans within collaboration; future challenges/market developments etc.	Future levers needed

Questions	(potential) theoretical links
1. Basic information	
Could you describe the main aim and target group as well as the key activities of your organisation/department? • Objectives & target group; key activities • On **which level(s)** do you operate? (local/regional/national) • *If stakeholder is a supporting network/interest group:* Could you describe your **member structure** in terms of numbers and stakeholder groups? What are **their motivations** to become a member?	GPN: firm architecture; GVC: governance (capabilities; complexity, codification of transactions)
2. General trends & developments *(only to ask if suitable for stakeholder's field of expertise)*	
What does local/regional/national politics do for sustainable and/or organic food production systems? Please also relate to the specific case of CSA/producer networks/organic farms *(adopt depending on your case study).* • Trends in political action for sector development (e.g. subsidies, special taxes or programmes in place, incentives, regulations etc.); **why/why not?** ; *if no particular actions related to the specific case of case study:* Are there **any plans to foster** that? • How are these politics **perceived and actively used** by the producers in question? • **How successful** would you consider these political measures? • Where do you see **gaps** or **difficulties**? • Which would you see as the **main burden** for farmers to get access to the supporting policy mechanisms in place?	GPN: embeddedness
Could you describe some general characteristics of a typical CSA/organic farm/producer network *(adopt depending on your case study)*? Please refer particularly to the internal organisation as well as to the design of the value chain. • Internal organisation (e.g. legal status; ownership of farm and land; standards applied; responsibilities for management & risks; labour force etc.) • Length of value chain (e.g. actors involved); farming practices; processing; distribution channels; relationship between actors; pricing etc. • What are typical **challenges and benefits**? • What are the main **factors of success**?	Reference system
3. Linkages to case study	
What are your linkages to case study XY? Could you also outline how and why these linkages have emerged? • Links to case study; emergence; reasons • How do you work together/support them? Why is that important? • What arrangements have you taken with each other?	GPN: embeddedness; GVC: governance
What changes could have been achieved through your support of/work with the case study XY? What enabled you to achieve these changes? • Achievements over time; drivers • **Why** were these changes **important**?	GPN: value creation
4. Social Benefits	
Focusing on intangible/non-monetary outcomes of this collaboration, what are the **three most important social benefits** from your organisation's point of view that	GPN: (added) value creation/capture

result from the collaboration. Could you also outline how these impacts relate to the purpose of your organisation? • Intangible impact of cooperation (e.g. spread the idea of the umbrella organisation of more farms serving a local community ; more social/environmental commitment, contributing to improved local environment/development, job creation for socially disadvantaged, environmental awareness etc.)	
What is the maximum amount of money (in €) your organisation would be willing to invest a month to not lose each of the social benefits described? • Intangible impact of cooperation expressed in monetary terms • *Maybe give interviewee an example: "To not lose the effect of access to local food supply for the rural community, my organisation would be willing to pay a maximum of 500 € a month."* •	Social return on Investment
5. Drivers & Barriers	
Which factors would you say most enabled you to establish and maintain a successful collaboration with the farm/CSA/producer network XY? • Internal & external drivers (e.g. similar values; skills; social capital; personal relationship; regional support mechanisms; politics, subsidies, changes in demand/competition, market entrance etc.)	Past levers; GPN: embeddedness
Were/are there any specific difficulties or challenges that arose/arise related to your collaboration with farm/CSA/producer network XY? If so, which kind of difficulties and why? • Internal and external challenges/difficulties • How did you manage **to overcome** these challenges?	future levers needed
6. Future plans & needs	
What would you need or what would need changing to overcome the challenges mentioned?	Future levers needed
Where do you see potential points for further action/intervention in order to further develop and scale-up the production system of case study XY? • Future plans within collaboration; future challenges/market developments etc.	