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Farmer Cooperation as a Means for Creating Local Food Systems—Potentials and Challenges

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Abstract: Facing the continuous loss of family-run farms across Europe, farmers are seeking new pathways to sustainability. One such pathway is involvement in local food supply systems. Often, this requires new forms of cooperation among farmers and with consumers. Little is known, however, about how this cooperation works in practice and how it might be better fostered. This paper aims to illustrate various forms of cooperation in relation to small-scale farming and the establishment of local food supply. It sheds light on challenges farmers are facing and on the potential measures they can adopt to tackle these challenges. By means of an Austrian case study, researchers applied a participatory method (Social Multi-Criteria Evaluation) and conducted workshops with farmers. Research shows that local production, processing and distribution infrastructure becomes more affordable when farmers collaborate with each other and with consumers and institutions. Furthermore, sharing and collectively developing know-how helps to optimise local farming and food supply systems. However, farmers often lack the knowledge and time to establish new collaborations and to re-organise labour, logistics and communication processes. They would benefit from the availability of cooperative schemes that help facilitate such processes and innovations.

Keywords: farmer cooperation; local food supply; small-scale farming; sustainable food system

1. Introduction

The sense that the food system is in crisis [1] has brought the rules governing the current food industry to the forefront of discussion. ‘Sustainability transitions’ and the emergence of a more sustainable food system [2–4] have become central concerns for both academics and agricultural practitioners [5–8]. Both groups argue that a sustainable food system requires deep socio-economic change. New ways of organising food supply chains that promote small farms, which apply organic and agro-ecological farming methods, as well as small-scale, locally organised systems of food distribution are needed [9–13]. The shared objective is to establish and strengthen local, regional and national food networks that are able to provide healthy, affordable, ecologically sound and culturally diverse foods. These networks should allow for democratic participation, social equity, and cultural and natural diversity. They should also engender a more resilient and regenerative natural environment in which renewable energies are used. Such an approach adheres to the 2009 report of the International Assessment of Agricultural Knowledge, Science and Technology of Development [7]. This stressed the multifunctional role of agriculture and the centrality of small and medium-sized farms which apply agro-ecological farming methods to the reduction of environmental degradation, global warming, poverty and social inequality.

Such discourses concerning sustainability transitions mirror emerging trends in our food system and the agricultural industry. European agriculture, for example, continues to face a loss of small, family-run farms and there is no sign that this trend may halt in the near future [14]. For countries

traditionally characterised by a high number of diverse, small-scale family-run farms, such as Austria, this implies massive socio-ecological change. This is manifested in altered landscapes and the different pathways farmers feel pressured to embark upon [15]. In order to continue farming, many farmers are forced to restructure their farms [16,17]. A shrinking number of farmers manage to grow and/or intensify production. Many others cannot sustain themselves and have to farm part-time to allow them to gain additional non-agricultural income. Finally, niche-production, diversification, multi-functionality, para-agriculture (i.e., activities which are not directly related to agriculture, such as renting out rooms and hosting workshops and banquets) and local food supply are ways in which small-scale farmers might survive. All of these pathways benefit from cooperation, but it is particularly important for farmers endeavouring to set up local food supply systems. Cooperation is a practice historically well known to farmers. It occurs in a variety of situations, ranging from informal collaboration with relatives and neighbors at times of high workload (e.g., hay harvesting) to formal production, distribution and marketing cooperatives. As well as collaborating amongst themselves, farmers also cooperate with consumers and institutions [18–22].

Informal cooperation is of continual importance, especially for small-scale, family-run farms [23]. It involves farmers sharing machinery and agricultural know-how, and helping one another at times of high workload. Such cooperation is similar to the reciprocal aid that often occurs between relatives and neighbors [24]. It is based on trust and the continual nurturing of personal relationships. In countries with a high number of small-scale family-run farms, such cooperation is very common. One may also find informal farmer cooperatives that are often rudimentary arrangements where one farmer takes the products of other farmers to the market and sells them without a surcharge. The incentive for such cooperatives is that each farmer's products become more attractive through being marketed next to a wider range of other high quality products. Very often, the central criterion of cooperation is transport-logistics. Farmers have to decide who delivers to whom and at what time. How are transport costs and other expenses shared? Who pays for the labor related to transport? How are products delivered (what packaging is used)? Most often, transport arrangements are unstructured and informal with collaborations being based on trust rather than formal contracts. However, with the upscaling of local food supply systems farmers are facing the need to formalize their collaborations [1].

The so-called "modern" agricultural cooperatives present the most prominent example of formal cooperation [25]. Such cooperatives emerged in the nineteenth century and are most often associated with Wilhelm Raiffeisen who aimed to (financially) support small farmers in a way that would allow them to become self-sufficient. Agricultural cooperatives, like other cooperatives, may be defined as essentially user-owned and user-controlled businesses that distribute benefits equitably on the basis of use or patronage [26]. Such cooperatives are formalized and legally enshrined institutions based on membership. The so-called "Maschinenring" (machinery ring), which enables farmers to share machinery and labor-power, is a well-established farmers' cooperative.

What appears to be of emerging importance are other types of formal cooperation, which we call "vertical" cooperation (also called vertical integration, see, for example, [27] (p. 152)). This cooperation may be described as "vertical" in the sense that it arises out of increasing differentiation within production, processing-structures and food-supply chains. Very few farms, for example, produce and process and distribute the cereals they grow. Accordingly, few farms rear pigs, sell the meat directly and produce the required feed themselves. Thus, farmers might, for example, cooperate in producing feed for a neighboring farm, or in processing the cereals of another farm. In such cases, farmers do not formally join a common enterprise or cooperative. They do not necessarily share infrastructure, profits, risks or decision-making processes. Instead, each farmer runs his/her own business, bi-laterally interacting with other farmers according to his/her entrepreneurial needs.

Apart from agricultural differentiation in relation to production, processing and distribution, the so-called "pluriactivity" of farms [28] increasingly requires bi-lateral forms of cooperation. For instance, in order to gain income some farmers cooperate with social and educational institutions. They collaborate, for example, with schools in hosting classes in order to make pupils familiar with

farming and food production. More recently, European farmers have been subsidized to set up so-called “Green Care Projects” (<http://www.greencare.at/>), which aim to place social institutions on farms, e.g., for the purpose of integrating handicapped people in the labor-market. Another example of formal cooperation is the use of a shared trademark to make it easier for consumers to recognize local farmers and their quality standards. Those involved frequently share logistics and supply chains to reduce marketing costs. Furthermore, such cooperation can help to secure marketing rights for the farmers which would usually be owned by the retailers [27].

Finally, emerging local food networks require various forms of cooperation (see, for example, the special issue on “Cooperatives and alternative food system initiatives”, [18]) as seen in the following examples.

Farmers have increasingly started to join and shape so-called local, civic or alternative food networks [10,14,29]. Most often, these networks have been initiated by consumers, who want to establish a closer relationship between themselves and producers [30]. Some have taken the form of food coops or solidarity purchasing groups, collectively purchasing directly from the farmers themselves. Other initiatives, such as Community Supported Agriculture (CSA), are characterised by a strong and enduring economic partnership between consumers and farmers [31,32]. In Austria, for example, the first producer-consumer cooperative, BERSTA, was founded in 1980. Consumers and producers collectively organized the sale in Vienna of produce (initially mainly potatoes) grown in disadvantaged regions of Austria [21]. This “grass-roots” initiative developed into a small wholesale company that continues to collaborate (though not exclusively) with small-scale farmers from disadvantaged regions [33]. Civic local food networks, such as CSAs or solidarity purchasing groups, found their way into Austria many years after they had been established in the USA, Japan and in several European countries such as Italy, France and Germany. However, the number of these initiatives in Austria is growing, albeit at a slower rate than elsewhere [34].

Academic research is increasingly focused on alternative food networks (see, for example, [35]). It is recognized that cooperation and “networking” are essential to upscaling transition pathways [36]. However, very little is known about how and where cooperation works, nor concerning the specific challenges that farmers face when they cooperate [37]. Furthermore, more knowledge is needed to better foster effective farmer cooperation.

This paper sheds light on farmer cooperation in relation to the establishment of local food supply systems, and illustrates the specific forms of cooperation engaged in. The researchers used Social Multi Criteria Evaluation (SMCE) as a specific participatory methodology to help farmers reflect on the decisions and cooperative pathways they embarked upon. The paper begins by introducing an Austrian case study and describing the applied methodology. It then presents findings on the challenges facing farmer cooperation, particularly in relation to local food supply. Research shows that local production, processing and distribution infrastructure and work-intensive modes of production become more affordable through farmer cooperation. Furthermore, collectively developing and sharing knowledge can help to optimise local farming and food supply. Farmers would appreciate the availability of cooperative, participatory schemes that might facilitate knowledge sharing and the restructuring of labour, logistics and communication processes.

2. Materials and Methods

2.1. The Case Study Area and the Farms Involved

In our study, we brought together farmers from six Austrian farms. These farms were not representative of the “average” Austrian family-run farm but were selected because they were involved in local food networks and already collaborating formally and informally with consumers, institutions and other farmers. They represented the farmers typically involved in newly emerging Austrian local food networks and their activities demonstrated the different types of farmer cooperation being practiced [37]. This group of farmers regard organic, local food supply as a major means of creating

a healthy and sustainable food-supply system. They are convinced that local food supply will enable them to co-shape the food-supply-system in accordance with their own needs, and stop them being dictated to by “the market”, i.e., big businesses. They argue that local food supply enables them to carry out farming in organic ways and allows them to use innovative agricultural methods (as opposed to engaging in intensive mass-production). It also helps them achieve a good work-life balance, providing them with enough income and a healthy family life, which they consider crucial to their being able to carry on farming. The farmers involved in the case study repeatedly stressed that local food networks already allowed them, and would continue to enable them, to farm sustainably.

The case study took place in the Austrian municipalities of Herzogenburg, Asperhofen, Brand-Laaben and Maria Anzbach. The municipality of Maria Anzbach is entirely located on the Wienerwald Biosphere Reserve, while Asperhofen and Brand-Laaben are partly located within the borders of the Wienerwald Biosphere Reserve, on its North-Western side. The Wienerwald Biosphere Reserve extends across the provinces of Vienna and Lower Austria (Niederösterreich). It covers an area of more than 105,000 ha over 51 municipalities and seven districts of Vienna. Today, the Wienerwald is a popular recreation area, and also an attractive residential location [38]. The area of study covers hilly and partly forested as well as flat agricultural landscapes. It thereby represents a variety of geographical conditions, representative of the eastern part of Austria.

The farmers participating in the case study are involved in local food supply systems in various ways. Their farms differ in size and have different focal points of production. One farmer lives on his own, renting out most of his farm whilst retaining a small area to grow vegetables within a community farming project. This project involves 12 to 15 people who share the work and the produce they harvest. The farmer also runs a small restaurant at weekends.

Another farm comprises six family members: a couple who run the farm full-time, their three children, two of whom are already working on the farm, and their grandmother who is in need of care. They also host between two and five external workers. They grow cereals and their main source of income is from composting municipal organic waste. They also participate in the programme “Schule am Bauernhof”; that is, they host school classes visiting the farm and offer animal-assisted pedagogy (Tiergestützte Pädagogik), particularly for handicapped people. More recently, they have started a so-called “Green Care Project” in which they provide opportunities for the handicapped by renting out their bakery to an institution (“Jugend am Werk”). Finally, they also host an organic food cooperative.

The third farm comprises a farmer, his wife and his mother as well as five children. They mainly produce cereals, while, at the same time, renting out their farm to an association. On the one hand, this enables them to live and collaborate closely with other people and, on the other hand, it helps them to reduce their monthly expenses. The couple explicitly want to open up their farm to consumers and young people who are struggling to “adapt” to society. They are primarily interested in new and innovative ways of organic farming that allow for and are based on community-supported activities.

Another participant is a passionate part-time organic farmer, bee-keeper and lumberjack who educates people on sustainable farming methods. For instance, he assists a farming-project run by a Montessori School in Vienna. He manages his farm together with his wife and raises chicken, sheep, lambs and ducks. Both he and his wife are interested in conserving traditional plant varieties and animal breeds, and in experimenting with traditional as well as new organic farming methods. They use direct marketing for their produce as they want to expand ways of farming that allow them to maintain close contact with consumers.

One young farmer runs a community-supported farm together with his parents and brother. Community-supported farming relies on a very close collaboration between consumers and farmers in which a farm is pre-financed by consumers whom the farmers are then committed to “feed” throughout the entire year. This farmer also produces seedlings for the association “Arche Noah”, which is dedicated to the preservation of old and rare agricultural plant-varieties

Finally, one woman involved in the project can be defined as a part-time farmer, running an organic farm venture in which consumers harvest themselves the vegetables which she has cultivated. She also delivers produce locally to two small retailers.

2.2. Social Multi-Criteria Evaluation: A Participatory Approach

Decision-making processes addressing environmental concerns are highly complex. Social Multi-Criteria Evaluation (SMCE) is a tool developed for participatory decision frameworks that focus on stakeholders' expertise and preferences in decision-making processes [39]. The aim of SMCE and of all participatory multi-criteria methods is not to find a single best solution for all interest groups. Instead, it is to provide a basis for collective deliberation in order to facilitate compromise acceptable to all stakeholders [40]. In order to avoid conflict and to ensure the acceptance of results, transparent communication during the process is vital [41].

Public involvement is required to conduct participatory multi-criteria evaluations. However, to avoid under-representation of specific groups and the undue influence of powerful interests, stakeholder participation in SMCE is limited. Stakeholders provide information but do not get to make decisions [42]. It is therefore important that they do not feel instrumentalized by the facilitators or decision makers. Instead, knowledge transfer and stakeholder empowerment should be central to the process [43].

The researchers used the participatory core of SMCE to enable farmers to reflect on optional pathways and their decision-guiding criteria. A series of three workshops was held to collaboratively gather and share information on optional pathways, problem definition, criteria selection and values. The aim was to use the SMCE results to facilitate further dialogue between the farmers. This helped create a common understanding of optional pathways involving cooperation and was used to help decide the first steps the farmers took.

The information generated during the SMCE process can be managed using computer software. In this study, the chosen tool was Super Decisions (Creative Decisions Foundation, Pittsburgh, PA, USA), a decision-support software based on the implementation of the Analytic Hierarchy Process (AHP) and the Analytic Network Process (ANP). AHP and ANP are multi-criteria decision making methods that combine judgements and data in order to produce a ranking of priorities for the possible options. Both methods use pairwise comparisons to produce the final ranking. However, AHP uses a hierarchical structure for goal, criteria, and options [44], while ANP is a more general form of AHP that structures goal, criteria, and options into a network that provides continuous feedback [45]. In Super Decisions, the user is able to choose between AHP and ANP. The researchers decided to use AHP as this process is easier to communicate to workshop participants.

2.3. The Workshop-Trilogy

The transdisciplinary research was structured by three participatory workshops. The process involved close collaboration between researchers and stakeholders, i.e., farmers, and as well as aiding the decision making of the farmers created new scientific knowledge.

Discussions at the *first workshop* revealed that all participants were critical of the dominant agro-food system, and all sought different ways of farming. It became evident that their choices were strongly related to (a) personal preferences and experiences, (b) family structures, (c) the availability of labour power, and (d) each family-farm's economic conditions and needs.

These findings helped us draw-up an initial list of decision-guiding criteria that could be used to evaluate the different optional pathways available to farmers. The list structured and ranked potential courses of action according to each farmer's needs and preferences. The initial list of decision-guiding criteria is shown in Table 1.

Table 1. Decision-guiding criteria for the evaluation (ranking) of optional pathways.

Decision-Guiding Criteria	Description	Criteria Used with Super Decisions
Personal sense-making	Farming should enable a way of life which satisfies individual needs and requirements. According to the farmers, work-life balance is particularly important. That is to say, farmers feel the need to avoid stress and an over-burdening workload. Work structure and workload should allow spare time for family life and personal recreation.	Reduction of stress and workload. Sufficient personal time. Respectful interaction of family-members
Social sense-making	Actions which lead to a way of life that satisfies the requirements of the community and society. This involves creating a system of production and distribution in which social equity and social and economic relationships of mutual respect are inherent. Actions which lead to the exploitation of human beings and the concentration of power should be avoided.	Traditional agriculture. Education and employment
Ecological sense-making	Actions that promote the sustainability of the natural environment (e.g., the use of renewable and/or local resources; the growth of traditional plant varieties and the rearing of traditional breeds; the avoidance of GMO (genetically modified) seeds, chemical fertilisers and pesticides; preserving biodiversity).	Careful use of resources. Healthy agriculture
Economic sense-making	Investments should be lower than revenues. Actions should also contribute to a system of production and distribution that transcends a liberal market economy based on competition. Ideally the farmers want to create an economy for the common good (<i>Gemeinwohl-Ökonomie</i>).	Income security and public welfare. Economic independence. Transport and marketing
Enhancing the community	Actions which strengthen personal and professional networks (friendship and other relationships) at local and regional level.	Respectful interaction with colleagues. Cooperation with consumers

During the first workshop, farmers were also asked to look for optional pathways, which would allow them to start or continue farming in ways that make economic, social and ecologic sense for them and their families. The options formulated by the farmers were clustered into the following eight potential pathways for sustainable agriculture (see Table 2).

Table 2. List of potential pathways as proposed by the farmers.

Potential Pathways	Actions
Individual agriculture	Each farmer owns machinery and means of production. An agricultural model based on intensification and continuous use of fertilizers, and other chemical products.
An economy for the common good	Promoting values such as solidarity, human dignity and economic sustainability, rather than competition and personal profit.
Employment of workers	Hiring labor or participating as hosts in volunteer programmes; providing employees and volunteers with fair recompense.
Community Supported Agriculture (CSA)	Finding people who are willing to join and actively support a CSA Project based on organic farming. Organising in a transparent and respectful way that allows all members to economically survive while strengthening the relationships between farmers and consumers.
Education	Finding institutions and people who are willing and able to finance education.
Cooperation with others	Strengthening connections with producers, distributors and institutions. Establishing regular meetings to discuss matters arising.
Improving logistics	Sharing marketing strategies, establishing efficient communication systems, and collaborating on transportation.
Direct marketing	Focusing on local markets. Finding ways of establishing closer relationships with consumers.

The *second workshop* developed and complemented the lists of decision-guiding criteria and potential pathways by giving individual values to the items agreed upon. Again, the AHP methodology was followed, using the Super Decisions software. To find the most suitable cooperative system to ensure the sustainability of small-scale farming, the criteria provided by the participants were weighted and placed in pairs for comparison. The potential pathways were similarly weighted, paired and compared. Figure 1 shows how these sets of pairwise comparisons are generically presented in the Super Decisions software. The results of the pairwise comparisons are presented in the Results section of this paper.

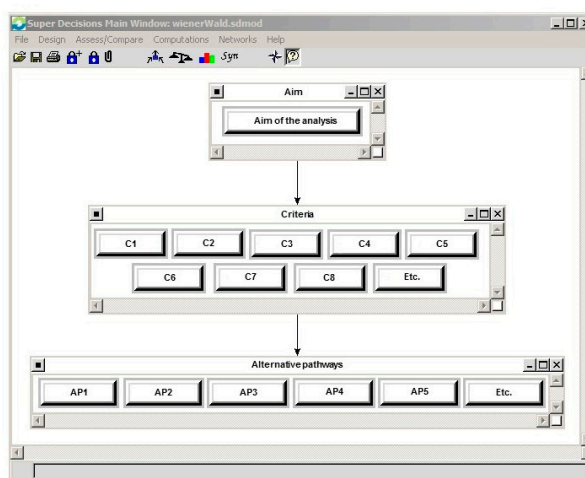


Figure 1. Generic arrangement of data in the Super Decisions software to perform pairwise comparisons following the AHP (Analytic Hierarchy Process) method.

The *third workshop* addressed the researchers' analysis of the interplay between decision-guiding criteria and the pathways farmers follow. This was done through discussion of (a) the results of the Social Multi Criteria Evaluation and (b) two posters, provided by the project "rethink" [46], which illustrated the interdependency of farm modernisation, rural development and resilience in different European countries. The posters showed the current difficult situation of (Austrian) farmers and provided examples of new pathways in which community-level cooperation played a key role.

The farmers discussed the outcomes of the Super Decisions calculation based on the values given by them individually, showing (1) shared logistics and marketing strategies, (2) an economy for the common good and (3) extra-familial labour-power as the pathways meeting most of their criteria. Farmers were not particularly interested in the methodology that we used to generate our results. However, they acknowledged that our final findings and analyses (as well as those presented on the posters) represented the potential pathways they wanted to embark upon. This motivated all participants to work on the second goal of the workshop, which was to establish shared transport-logistics in the regions of St. Pölten Land, Wienerwald and Vienna. One farmer presented his plan for a shared transport-logistics system and asked the other farmers how he could adapt it to meet their needs and interests.

3. Results—Who Cooperates: Why and in What Way?

3.1. Outcomes of the Analysis with the Super Decisions Software

The use of the Super Decisions software to arrange and analyse the data provided three sets of results. First, the pairwise comparisons of the criteria gave a ranking of the relative importance of the criteria (Table 3). Second, the pairwise comparisons of the alternative pathways with regards to each criteria gave specific values for how much each criteria influenced the final results (Table 4). Third, the combination of the two previous set of results provided a final ranking of priorities for the alternative pathways (Table 5).

Table 3. Ranking of the criteria obtained with Super Decisions according to the weights provided by the participants.

Criteria	Ranking Value
Careful use of resources	0.10
Traditional agriculture	0.04
Healthy agriculture	0.21
Reduction of stress and workload	0.06
Sufficient private time	0.06
Respectful interaction with family	0.22
Respectful interaction with colleagues	0.05
Cooperation with consumers	0.10
Education and employment	0.03
Income security and public welfare	0.04
Economic independence	0.05
Transport and marketing	0.04
Total	1.00

This table shows that the participants considered respectful interaction with family (0.22) and developing healthy agriculture (0.21) by far the most important criteria for creating cooperative systems which ensure the sustainability of small-scale farming. Careful use of resources (0.10) and cooperation with consumers (0.10) were also considered important, although significantly less than the two leading criteria. Participants thought that, although the remaining criteria acquired lower values of importance (all of them ranging from 0.03 to 0.06), they should nevertheless also be kept in mind.

The values in this table help us to understand the relationship between the criteria and each of the alternative pathways from the perspective of the participants. For example, we can see that the farmers considered the employment of more labor important for the reduction of stress and workload (0.36), and for having sufficient time to themselves (0.31). However, hiring labor, farmers think, contributes poorly to income security and public welfare (0.04), and to economic independence (0.03).

Table 5. Final ranking of priorities for the alternative pathways considered.

Alternative Pathway	Total
Improving logistics	1.91
Community Supported Agriculture (CSA)	1.90
Economy for the common good	1.85
Employment of workers	1.81
Cooperation with other institutions	1.50
Direct marketing	1.28
Education in various forms	1.06
Individual agriculture	0.69

This table shows the final results of the analysis performed with Super Decisions, it illustrates the ranking of the alternative pathways according to the values given by the farmers during the workshops. The most valued pathway was improvement of logistics (1.91), closely followed by the establishment of Community Supported Agriculture (CSA) (1.90). In addition, highly valued were an economy for the common good (1.85), the employment of more labor (1.81), and cooperation with other institutions (1.50). Finally, pathways involving individual agriculture (0.69), education (1.06) and direct marketing (1.28) were considered the least relevant to achieving cooperative systems which ensure the sustainability of small-scale farming.

3.2. *Motives for Cooperation: The Farmers' Visions of Agriculture and Food Supply*

Based on the findings of the three workshops and additional qualitative interviews, the researchers identified shared needs, activities and outlooks that could prompt farmer cooperation.

The farmers in our study unequivocally stressed their view that the core function of agriculture is to ensure a secure and rewarding life for everyone—for humans as well as non-humans. This, they argued, necessitates the application of organic farming methods and a system of equal resource ownership and use. In their words: “It is unfair that some people own or use a lot of land and some don’t”. They emphasised the necessity of equal and adequate farmer incomes, healthy working conditions and reduced working hours. They all agreed that farming, and especially organic farming, can have a therapeutic, recreational and educational function. In particular, young people who have difficulties integrating into broader society may be provided with recreational opportunities and new ways of participating in the community through their involvement in agriculture. Nearly all of the farmers mentioned that they had already welcomed people with emotional or social problems onto their farms. They stated that farming should be conducted in ways that engender close, inclusive and rewarding relationships. Moreover, they thought farming should facilitate “bringing people back to nature”. This would require the development of farm-schools and a conception of farmers as educators.

All participants agreed that their farming does not and should not be primarily geared towards profit-making. Instead, monetary income is viewed as a means to protect the livelihoods of the farmers, their families and the people they work and live with. As abstract concepts, “economic growth” and “competition” are not considered desirable and are rather associated with stress and discomfort.

Farmers agreed there are useful cooperative pathways to help them realize their vision of farming. These include sharing know-how (e.g., regarding organic farming methods) and logistics (e.g., infrastructure and marketing chains); promoting a seed bank with self-produced seeds (avoiding

the use of hybrid and genetically modified seeds); encouraging an on-farm schooling system; involving outsiders in production and distribution schemes; developing a regional food pool; and reducing fossil energy use in farming operations.

They all stated that cooperation with other farmers, as well as with consumers and institutions, is essential for following these pathways. To achieve their visions of farming, they are experimenting with diverse forms of cooperation that will be discussed in the following section.

3.3. *Forms of Cooperation and Their Challenges*

3.3.1. Cooperation with Other Farmers

For all of the farmers, *cooperation with other farmers* was of high importance. Cooperation was seen primarily as a means of reducing costs and working time, and of exchanging agricultural know-how. Most farmers shared technical and transport infrastructure with each other. It seems that the smaller the farm, the greater the need to share facilities and infrastructure. The farmers also expressed a need for mutual support at times of high workload. The mutual exchange of agricultural know-how appeared to be common and particularly important for organic farmers. Shared know-how, the farmers argued, strengthened their farming and enabled them to develop new techniques of food production and processing which they regard as crucial to sustainable organic farming.

All of the farmers defined their cooperation with other farmers as generally “easy-going” and informal. This “easy-goingness” stems from their all being situated in a common socio-economic context and thus able to understand one another’s circumstances. Nevertheless, farmers experienced the prospective formalization of their mutual cooperation as challenging. For example, in order to upscale and invest in a bigger van, one farmer tried to formalize the pre-existing, informally shared transport-system. Although all of the farmers were in need of this transport system, they were sceptical about formally sharing the investment. Their scepticism stemmed from a lack of faith in the functionality of a formalized system and the increased bureaucracy it might require. The farmers therefore decided against a formal and contractually-shared investment (purchasing a larger van) and instead chose to share the expenses for weekly deliveries. They also agreed on using compatible transport boxes to meet the need for a standardized system of packaging.

Such cooperative weekly deliveries helped the organizer of the transport-system as he was able to re-finance his investments. It also benefited the other farmers who saved time and avoided additional costs. This is vital as, for many farmers, a single delivery to a local food distributor (e.g., a food coop) does not pay off as usually only small amounts of produce are ordered.

The farmers also discussed making shared investments in production and processing infrastructure. They agreed that such investments usually required shared financial risks and (personal) dependencies which they were not willing to accept. The previously mentioned aversion to investment in a larger van illustrates this point of view. Instead, the farmers preferred to share pre-existing infrastructure. In practice, this might mean that one farmer would invest in a tractor and another in a harvester and the two would then share the machinery and the running costs. However, shared investments would foster the (re)establishment of missing machinery and infrastructure, such as local mills, necessary for the upscaling of local food supply. With this in mind, farmers agreed that professional process-support and start-up funding would help them to realize shared investments. As an example, they mentioned a subsidized local woodchip heating plant that is jointly owned and managed by farmers.

3.3.2. Cooperation with Consumers

All farmers in our study cooperated with consumers. The types of cooperation ranged from informal collaboration to more formal arrangements. The objective of cooperation with consumers was to afford better working conditions and standards of living for producers, as well as agricultural know-how and the local production and provision of fresh, organic foods, for consumers. Furthermore,

cooperation with consumers offered farmers a way of putting into service parts of their farms that would otherwise have remained idle.

Regarding cooperation aimed at food-provision and distribution, all farmers sold food directly to local communities. They did this by cooperating with local food coops and by producing food for, or in collaboration with, a certain group of consumers. The cooperation with food coops might be called semi-formal as there were no contracts stipulating how much food had to be delivered, at what time and to what quality. Instead, food was delivered according to a weekly order from consumers. Over the last few years, the delivery of produce to food coops and local markets has become a major source of income for farmers and has helped rebuild local food systems [27,47].

One farmer decided to produce food together with a group of consumers, without this arrangement receiving formal ratification from an association or cooperative. In this case, those involved acted as a community in which each member agreed to follow certain activity-driven rules. Each member was involved in production and harvesting and the harvest was shared according to the needs of members. This project, however, failed after three years. It was hard to achieve equality within the community when the farmer was the land owner and the expert on agriculture, and consequently felt entirely responsible for planning the production and harvesting processes. The community proved unable to effectively organise itself. It could not decide who was responsible for decision-making, who was obliged to carry out particular tasks and when; and what produce should be sold or kept for consumption.

The most formal system of cooperation between farmers and consumers in our study was the so-called “Community Supported Agriculture” (CSA) scheme. Within CSA, farmers and consumers signed a contract in which the farmer agreed to produce food for a group of consumers for a certain period of time (the contract usually lasts for one year) and the consumers pre-financed the production and distribution of this food [48]. The farmer running the CSA that we studied had difficulties finding sufficient customers to fully finance his farming. He decided to gain additional income by delivering food to coops and local markets, closely collaborating with other local farmers, especially in terms of transport. Through these networking-activities and by running local food transportation, he now plays a major role in the emerging local food supply system.

According to our study, each act of cooperation with consumers seemed to foster local food supply systems. Farmers valued consumers’ appreciation of their work and products. Farmers who conducted direct marketing and collaborated with food coops described the cooperation as especially rewarding. However, the structures and operations of food coops (e.g., the ordering-system) were, in some cases, experienced as “chaotic” and there was a high demand for more structured communication and interaction. Some farmers found cooperation with consumers both challenging and time-consuming. It seemed difficult for producers and consumers to gain a mutual understanding of each other’s needs, expectations and circumstances. Furthermore, it was difficult to develop a clear and formal relationship between farmers as land-owners and consumers as land-users.

3.3.3. Cooperation with Institutions

One farm in our survey cooperated with an institution such as a school or other public body. The aim of this type of cooperation was, first, to educate young people and, second, to re-employ existing farm-infrastructure. In this case, the infrastructure was a bakery that had not been used for a couple of years due to a lack of time and profitability. Like cooperation with consumers, cooperation with institutions was regarded as challenging by the farmers. They felt constrained by the slow and complex bureaucratic structures and decision-making processes of public institutions. Nevertheless, cooperating with a partly state-financed institution seemed the only way to make profitable use of the bakery and to reactivate idle infrastructure. The bakery helped to provide fresh organic bread for local people and the food coop situated on the farm. Furthermore, the institution’s networking activities helped the farm and the food coop establish new contacts and gain more (local) publicity, which helped them to upscale the local food supply network. Thus, the cooperation between the farm

and the institution turned out to be successful over time and the institution's activities on the farm were consequently widened.

4. Discussion: Cooperation as a Means for Building Local Food Supply Systems?

Our research-design was limited in the sense that the sample was rather small, representing only a specific group of farmers who were highly motivated to improve local food supply systems. At the same time, our research made possible methodologically structured and qualitatively profound discussions both with and amongst the farmers.

The research made clear that various forms of cooperation are vital for small farmers who are trying to establish and maintain local food supply systems. Cooperation fosters shared infrastructure (e.g., machinery, logistics, and transport), food production and processing methods as well as agricultural know-how. Infrastructure, transport and work-intensive modes of production become affordable for farmers through coordinated production and the sharing of costs and manpower required for these processes to be carried out. Sharing and collectively developing agricultural know-how helps optimize local farming and food supply systems according to farmers' needs. Farmers hope it may enable them to become less reliant on scientific research carried out on behalf of agro-industrial companies. Cooperation thereby has the potential to allow farmers to maintain control of and develop the various aspects of the local food supply chains of which they are an integral part.

In addition, cooperation with social institutions can boost local food supply. Existing infrastructure is often dormant as family-run farms do not have the capacity to utilize it profitably. Furthermore, small enterprises are averse to starting businesses that are economically barely feasible. Thus, more and more small-scale infrastructure has disappeared and cooperation with institutions and other actors might work to halt or even reverse this trend.

Finally, cooperation with consumers is crucial for establishing local food supply systems. Many farmers are willing to institute closer relationships with consumers as they appreciate the recognition of their work that they receive. They also appreciate the greater freedom to decide what to grow and sell, and at what price. This fosters variety in local food production, which is vital for local food supply.

Cooperation is thus, in principle, very much welcomed by farmers. Nevertheless, all farmers stated that establishing new collaborations is time-consuming. It can also be complicated organizing the labor-processes and communication involved in cooperative enterprises. In our study, joint investments were regarded with scepticism. Thus, to date, collaboration between farmers has related principally to transportation and specific farming practices such as the sharing of technical equipment. However, the farmers value the availability of participatory cooperative schemes, such as the food coops and CSAs. These schemes, they argue, help them to remain local and family-oriented while also making their farms more productive to meet local needs. Farmers would like enhanced networking opportunities and the availability of easily accessible training to greater facilitate local food supply. They do not want permanent subsidies or profit-related funding. Instead, they require start-up funding and the availability of cooperative schemes that are not overly bureaucratic. As a participatory scheme with a focus on engendering discussion, SMCE can be a useful tool for addressing these and other important issues that farmers may face in the future.

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