# Agricultural cooperatives and the transition to environmentally sustainable food systems

Handbook of Research on Cooperatives and Mutuals

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https://doi.org/10.4337/9781802202618.00031

# 20. Agricultural cooperatives and the transition to environmentally sustainable food systems

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## INTRODUCTION

Agriculture is faced with unprecedented challenges related to climate change, loss of biodiversity, food security and the need to reduce the use of water and fossil energy. Addressing these challenges requires making agriculture more environmentally sustainable. In addition, farmers are seeking improvements in both economic and social sustainability. Without a decent income farms will not survive, while safe working conditions and equal opportunities have been acknowledged as bottom-line conditions for socially sustainable farming.

Agricultural cooperatives are important actors in the agrifood industry. Traditionally they supply farm inputs and process and sell farm products. Cooperatives generate benefits through economies of scale, bargaining power, risk sharing and product and market development. However, with the transition towards more sustainability agriculture, the role of the cooperative is changing. Members expect additional services that allow them to adopt more sustainable farming practices. In addition, cooperatives are intermediaries between farmers and the rest of society, seeking to align the spatial, temporal and organisational conditions of farming with the societal demand for more sustainable food production.

In this chapter we focus on the environmental dimension of sustainability. While we acknowledge that social and economic sustainability is also important for farmers and their cooperatives, the largest sustainability challenge lies with the environment. For instance, agriculture and forestry contribute 13–21 percent of global greenhouse gas emissions (IPCC, 2022). Not only do farmers themselves experience the negative impact of unsustainable practices, in the form of droughts and excessive rainfall, they also encounter increasing pressure from consumers, governments and civil society organisations to reduce their environmental footprint.

This chapter presents a narrative review of the literature on the role(s) agricultural cooperatives could or should play in the transition towards more environmentally sustainable agriculture. More specifically, we explore how cooperatives support their members in the adoption of more environmentally sustainable farming practices. Following Dessart et al. (2019), we define environmentally sustainable practices as farming practices whose main expected benefit – relative to conventional practices – is the provision of positive externalities on biodiversity, water, soil, landscapes and climate change.

In addition to discussing the scant literature on what cooperatives are doing in practice, our paper presents what cooperatives could do (more). These recommendations are partly based on the theory of transitions and partly on several case studies of cooperatives that placed more emphasis on sustainability outcome. Our discussion will also deal with the limitations that cooperatives experience in fulfilling the demands of internal and external stakeholders.

While this chapter deals with agricultural cooperatives in general, we acknowledge that there is great variety in organisational characteristics and functions (Bijman and Hanisch, 2020). For instance, size matters for the scale and scope of the contribution a cooperative can make to the sustainability transition. A small community cooperative can change quickly and implement more radical innovation, while a large producer cooperative with thousands of members will need more time to decide on the sustainability goals.

While agricultural cooperatives are predominantly farmer-owned, there is a growing number of multi-stakeholder cooperatives in which farmers are one group of members (Leviten-Reid and Fairbairn, 2011). Empirical literature on the contribution of cooperatives to sustainability transition often focuses on these new forms of cooperatives, which include food cooperatives with both consumers and farmers as members (Ajates Gonzalez, 2017) and regional development cooperatives in which farmers, other land owners, citizens and sometimes even governmental agencies collaborate (Fonte and Cucco, 2017). The focus of this chapter will be on the traditional agricultural producer cooperatives.

The chapter is structured as follows. We discuss what sustainability in agriculture means, and we present the shift in research and policy making from farming to food chains and to food systems. We then present our theoretical framework – transition theory – and discuss what a sustainability transition implies for agriculture. We go on to present what cooperatives do and could do to further the transition towards sustainable food systems. Following this, we discuss what issues have been left out of the literature and what future research could contribute to a better understanding of the role of cooperatives, and then conclude.

## FROM FARMING TO FOOD CHAIN AND FOOD SYSTEM

Defining and delineating sustainability is a challenging task. The concept of sustainable development goes back to the famous 1987 report 'Our Common Future', published by the World Commission on Environment and Development. Known as the *Brundtland Report* (named after the Norwegian prime minister Gro Harlem Brundtland, chair of the Commission), it defines sustainable development as development which meets the needs of current generations without compromising the ability of future generations to meet their own needs. In this early definition, sustainable development clearly focused on the environmental impact of human behaviour.

As early as the 1960s, serious concerns were expressed about the negative environmental impact of farming. In particular, the unrestrained use of chemical pest control (such as herbicides and insecticides) posed a threat to biodiversity, soil health and even the health of farmers and farm workers (Carson et al., 1962). New regulations and better research lead to the abolishment of the most dangerous substances. A further step in the reduction of the negative environmental impact of pesticides came with the rise of integrated pest management, organic agriculture and biological pest control from the 1970s onwards (Council on Environmental Quality, 1972). Particularly in intensive crop farming, the amount of pesticides used per unit of product was substantially reduced by using better application tools and through improved formulations and increased farmer knowledge on how best to apply these chemicals (Dent, 1995).

As a major user of land, water and other natural resources, agricultural production has a large impact on the natural environment. This impact is not only felt on the farm and in the direct vicinity of the farm, but also far away because of the greenhouse gas emissions. Also,

*Table 20.1 Themes and subthemes of environmental sustainability in agriculture*

| Theme | Subthemes |
|---|---|
| Atmosphere | Greenhouse gases |
| | Air quality |
| Water | Water withdrawal |
| | Water quality |
| Land | Soil quality |
| | Land degradation |
| Biodiversity | Ecosystem diversity |
| | Species diversity |
| | Genetic diversity |
| Materials and energy | Material use |
| | Energy use |
| | Waste reduction & disposal |
| Animal welfare* | Animal health |
| | Freedom from stress |

*Note:* * Although animal welfare is strictly speaking not an environmental issue, it is often included in assessments of environmental sustainability.
*Source:* Adapted from FAO, 2014.

the long supply chains of farming inputs imply consequences on other parts of the world. An example is the use of soybeans grown in the Americas used for animal feed in Europe. When using a Life Cycle Assessment approach in measuring the environmental impact of meat and dairy production in Europe, the negative impact of soybean production on deforestation in South America is one of the major environmental impacts (Green et al., 2019). Table 20.1 shows that the impact of agriculture and food production on the environment has several dimensions.

While earlier efforts to improve sustainability in agriculture were mainly about reducing negative environmental impact, such as reducing the use of pesticides and the leaching of minerals from manure applications, the concept has become more encompassing over the years. Since the turn of the millennium it has become common to distinguish environmental (planet), social (people) and economic (prosperity) dimensions of sustainability, the so-called Triple Bottom Line (Elkington, 1998). A next step in defining and operationalising sustainability is the Sustainable Development Goals (SDGs). In its 2015 General Assembly, the United Nations decided its Agenda 2030, which included 17 Sustainable Development Goals. Directly related to agriculture are Zero Hunger (SDG-2), Good Health and Well-Being (SDG-3), Responsible Production and Consumption (SDG-12) and Climate Action (SDG-13).

The debate and research agenda on sustainable agriculture has also broadened in another direction. While the discussion on sustainable agriculture has long targeted on-farm production processes, in recent decades the attention has broadened towards the whole food chain (Fritz and Schiefer, 2008).[1] Traditional supply chain management literature already emphasised the need for collaboration among core chain partners, in order to improve logistic efficiency, innovativeness, customer-responsiveness and transparency (Fawcett et al., 2012). More recent literature on sustainable food supply chains has emphasised the importance of balancing environmental and social dimensions of sustainability and has indicated that institutions and governance arrangements also determine the scope for improvements in environmental sustainability (Beske et al., 2014; Dania et al., 2018; Nematollahi and Tajbakhsh,

2020). In addition, more attention is paid to legitimisation processes and the involvement of non-traditional stakeholders.

The most recent development in conceptualising sustainability in food production, distribution and consumption is the food system perspective (Ericksen, 2008). A food system is composed of all the processes and actors associated with food production, food transformation and food utilisation (Berkum et al., 2018). The food system includes production of inputs; growing of agricultural products; harvesting, packaging and processing of farm products; transportation; wholesale and retail trade; consumption of final food products; and disposal of food remains. While the core of the food system consists of the food chain, that is, the sequential activities of producing, transforming, distributing and consuming food products, the food system approach takes a wider perspective by including specific outcomes and enabling conditions. Three types of outcomes are distinguished: socio-economic (such as income and employment), food security (including safety and nutrition) and environmental (such as effects on biodiversity, climate, soil and water). Socio-economic enablers (or institutions) allow and guide the actions of businesses and consumers, while sustainability enablers are the biophysical conditions (including natural resources and climate) that facilitate or constrain those human actions.

Food system thinking acknowledges the interaction among elements of the system, as well as feedback mechanisms. Compared to more conventional approaches, like farming systems, market modelling or sector or chain analysis, in which interventions are often designed to optimise the deployment of means of production (natural resources, labour, capital), food system thinking takes a holistic approach by explicitly paying attention to interactions, synergies, complementarities, interdependencies and trade-offs among all system elements (Berkum et al., 2018).

In recent years many scholars and practitioners have expressed doubts whether sustainable food chains will be achieved without more fundamental change processes. These authors have claimed that a sustainability transition in the food system is needed (Poppe et al., 2009; Sutherland et al., 2015; Meynard et al., 2017). Achieving a sustainable food system requires a transition because it not only involves farming with low environmental impact, but also entails a new vision of agriculture as a protector of natural resources, as a repository of $CO_2$, as a producer of healthy food, as a contributor to viable rural communities, and as a steward for attractive landscapes (Poppe et al., 2009). In the next section we define what transition means and discuss the requirements and implications of a sustainability transition in the food system.

## A TRANSITION PERSPECTIVE

A transition is a fundamental change that incorporates processes of ecological, economic, cultural, technological and institutional co-evolution (Geels, 2005; 2019). A transition combines interdependent changes at several scales and involves multiple public and private societal actors. The classical example is the energy transition, changing from fossil to renewable energy sources. For a transition to be successful, technological advances combined with organisational and institutional changes are needed, while actors at different geographical and institutional levels need to combine their efforts to co-create new practices, social organisations and guiding principles. The term transition is often used to refer to large-scale transformations deemed necessary to solve 'grand societal challenges' (Loorbach et al., 2017).

In understanding transitions, it is common practice to apply the multi-level perspective (MLP) as developed by Geels (2005). The MLP conceptualises a transition to emerge through a dynamic process among three analytical levels. The first level is the regime, which represents dominant logic, vested interests and path-dependencies. Regimes are able to adjust, but only incrementally and slowly. The second level is the niche, where entrepreneurs work on radical innovations that deviate from the established norms and practices. The third level is the landscape, which is the combination of exogenous variables, including climate change, war, new technologies, economic crises and depletion of natural resources, which put pressure on the regime but also generate opportunities for niche innovations. Recent research on MLP has emphasised the possibilities for interaction between different regimes, such as agriculture and energy (Sutherland et al., 2015), or interaction between niche and regime, where regime actors may reorient to or even incorporate niche innovations (Geels, 2019; Runhaar et al., 2020).

Loorbach et al. (2017) discern three distinctive research approaches in the study of transitions, each with its own respective disciplinary and methodological background and objectives: socio-technical, socio-institutional and socio-ecological. In the socio-technical approach, the emphasis is often on (technological) innovations and how these disrupt the existing regime. The socio-institutional approach gives explicit attention to the analysis of (power) networks and governance structures. In this approach the emphasis is on political and institutional change. In the socio-ecological approach, the focus lies on ecology and biology. Scholars using this approach study the vulnerability and resilience of natural resource systems and the role of human behaviour in affecting that resilience.

These three approaches have several characteristics in common (Loorbach et al., 2017), as follows:

- Multi-actor dynamics: transitions involve multiple actors from various institutional backgrounds (including business, government, civil society).
- Reframing the problem: transitions require a minimum level of societal consensus on the problems at stake.
- Importance of visioning: transitions require actors to have ideas supporting a better future.
- Importance of experimenting: transitions will not materialize without experimenting with new methods, tools, processes, coalitions and governance forms.
- Importance of learning and evaluating: transitions require social learning, which implies not just dissemination of knowledge but, more importantly, changes in human behaviour and mental frameworks.

Applying these insights to the sustainability transition in the agrifood industry has generated specific recommendations for farmers and their food chain partners. Sutherland et al. (2015) and Lamine et al. (2019) have argued that food chain actors need to: (a) acknowledge that farming is a regionally specific and multifunctional activity; (b) collaborate with unfamiliar stakeholders; (c) seek institutional change; and (d) engage in experimentation. We will briefly elaborate on each of these four arguments.

Farming is regionally specific and multifunctional. Farming is heavily shaped by the local biophysical conditions, topography and climate, but also by the traditions, norms and socio-economic structures that have evolved in this natural environment. The large diversity in farming structures and practices is an important asset, as it is not only appreciated by the inhabitants of the region and visitors coming from other regions, but also a source of resilience. Farming is multifunctional because it has many functions other than producing food;

farming also contributes to maintaining biodiversity, keeping an attractive landscape, producing sustainable energy and providing meaningful labour opportunities. More recently, carbon sequestration has been added as a new function of farming (Morgan et al., 2010).

Collaboration with unfamiliar stakeholders implies that farmers and their food chain partners engage with societal organisations that look at agriculture from a different, often more critical, perspective. Environmental, animal welfare and nature conservation organisations, among others, can support the transition by providing new ideas, building legitimacy for change, exploring new collaborative ventures and jointly lobbying for favourable institutional conditions.

Analysis of the supporting or constraining influence of current institutions is needed. Such institutions can be laws and regulations, but also customs and traditions. Institutional change requires dialogue and partnerships among multiple stakeholders, including those unfamiliar stakeholders mentioned above. As Rudd (2000) has argued, the sustainability transition requires the development of new norms of behaviour and the institutionalisation of rules and norms. This requires the participation of multiple stakeholders at different levels of institutionalisation.

Finally, the sustainability transition requires experimentation. Since a transition brings risks and uncertainties and many farmers are risk averse, developing and implementing sustainable farming practices requires experiment and trial. In addition, there will not be one single transition pathway. In line with the diversity of farming systems (or farming styles), transition pathways will vary on the basis of local agro-ecological conditions, farm-specific resources, knowledge and skills of the farmer and regional market conditions. Experiments are needed to find out what works, under what conditions, and for who.

The characteristics of transition processes as presented by Loorbach et al. (2017) and the application of these characteristics to sustainability transitions in agriculture by Sutherland et al. (2015) and Lamine et al. (2019) can be used to explore how cooperatives can contribute to those transitions. In the next section we will discuss the traditional and new role(s) of cooperatives in the sustainability transition.

## ROLES OF COOPERATIVES IN THE SUSTAINABILITY TRANSITION

Most agricultural cooperatives support their farmer-members with multiple services (Höhler and Kühl, 2014; Bijman et al., 2016). Key services are providing agricultural inputs (often combined with technical assistance) and selling farm products (often after some handling activity such as storage, sorting and grading or even processing). In addition, cooperatives may provide credit and other financial services. In an extensive review of the literature on cooperatives and producer organisations in developing countries, Bizikova et al. (2020) found the same main functions.

These classical functions are a good starting point for exploring the role(s) of agricultural cooperatives in the transition towards more environmentally sustainable food systems. While members continue to demand the classical services, new activities and services are needed that focus on the sustainability transition and respond to the societal pressure for change. In this section we explore conventional and new roles of cooperatives in supporting the transition towards environmentally more sustainable food systems.

**Inputs, Experiments, and Technical Assistance**

Agricultural cooperatives have a long tradition of providing their members with the seeds, fertilisers, crop protection, machinery, animal feed and related services needed for agricultural production. The sustainability transition, however, requires different types of inputs, for instance biological instead of chemical crop protection. Also, the relationship between members and cooperative is likely to change. While traditionally cooperatives respond to the needs of their members in purchasing and producing inputs, in the sustainability transition they are more likely to initiate the development and purchase of other types of inputs and then convince members to apply these new inputs. Given the need for experimenting with new sustainable farming practices, but also for intermediating between farmers and other societal stakeholders, the initiative is more likely to lie with the cooperative instead of the individual members. This approach requires the cooperative to have a thorough understanding of the adoption behaviour of the members.

Adopting new farming practices is not an easy step for farmers. They need to acquire and apply new knowledge, step away from routines, accept risks and uncertainties, and often engage with new food chain partners. Cooperatives can facilitate members and make adoption easier by demonstrating that the new sustainable farming practices work, shifting individual risks to collective risks, and linking members to outside networks that support the transition. The role of cooperatives in supporting farmers to adopt new inputs has been studied extensively, particularly in developing countries (Grashuis and Su, 2019; Candemir et al., 2021). Most of these studies, however, measured the impact of cooperative membership on the uptake of new crop varieties, fertilisers and crop protection agents without explicitly paying attention to sustainability.

More recent research has focused explicitly on the adoption of sustainable farming practices. Many of these studies have been carried out in China, where after 2007 cooperatives were promoted by the government as a model to link smallholder farmers to modern food markets (Su and Cook, 2020). Reducing the environmental impact of farming was a key condition to improve market access, because urban consumers, with rising incomes, became increasingly critical of the unsustainable practices in traditional small-scale farming.

Deng et al. (2021) show that agricultural cooperatives in China have led to an improvement in overall environmental performance of farmers. The authors claim, more generally, that cooperatives play an important role in improving agricultural sustainability in China by helping farmers 'to adopt eco-friendly technologies and access environmentally friendly inputs with lower prices, promoting organic agricultural production and enhancing sustainable use of material inputs and natural resources' (Deng et al., 2021: 13). These findings and arguments are supported by other studies that show that cooperative membership has a positive effect on the application of safe production practices in the Chinese pork sector (Ji et al., 2019); the adoption of organic soil amendments in the Chinese apple sector (Ma et al., 2018); the adoption of integrated pest management in the Chinese apple sector (Ma and Abdulai, 2019); the adoption of green control techniques in the Chinese vegetables sector (Yu et al., 2021); the reduction of chemical inputs in the Chinese fruits and vegetables sector (Zhou et al., 2019); and the shift of Chinese farmers from using conventional inputs to organic inputs (Wang et al., 2018).

Groot Kormelinck et al. (2022) found, in a study of the fresh produce sector of Uruguay, that cooperatives experiment with sustainable farming practices and provide the knowledge that

farmers need to substitute conventional inputs for sustainable inputs. In addition, cooperatives promote the exchange of knowledge among the members themselves. Some cooperatives even engage in the production of organic inputs (seedlings, crop protection) which are subsequently sold to both organic and conventional farmers.

While these studies are rich in empirical analysis, they do not provide much theoretical guidance on how cooperatives (could) support the adoption of sustainable farming practices. Most of these studies compare farmers that are members of a cooperative with farmers that are not members, which does not tell us under what conditions members are willing to apply more sustainable techniques and to what extent the cooperative can influence those conditions.

Organisational mechanisms at the level of the cooperative can enhance members' willingness to reduce pesticide use. In a study on Chinese fruit and vegetable cooperatives, Zhou et al. (2019) showed process control, in the form of uniform production standards and the supply of specific inputs, does affect member behaviour towards sustainability. Building on this work, Mwambi et al. (2020), in a study on dairy cooperatives in Kenya, developed and tested a framework consisting of three types of control measures that the cooperatives apply to influence member behaviour: social control (social mechanisms that promote trust building and reduce free riding), process control (quality standards, farm inspection, inputs and training) and output control (quality tests and quality-based incentives). All three types of control measures proved to be relevant. While both of these studies were mainly focused on food safety issues, we expect that these organisation mechanisms are also relevant for cooperatives in supporting member adoption of sustainable farming practices.

For a better understanding of how cooperatives can support and encourage their members to adopt sustainable farming practices we need to consult studies that explore the behavioural determinants of adoption. Linking those determinants to cooperative membership provides insights into how and to what extent cooperatives can induce adoption. In an extensive review of the literature on the determinants of farmer adoption of sustainable farming practices, Dessart et al. (2019) found three groups of factors that affect farmer behaviour: dispositional, social and cognitive factors. Dispositional factors refer to farmers' internal propensity to behave in certain ways. One could think of risk attitude, moral concern, lifestyle, personality and farming styles. Social factors concern farmers' interpersonal relationships, such as relationships with family, friends and other members of the community in which they live. Cognitive factors relate to learning and reasoning about specific sustainable practices. Knowledge, experiences and competences are all relevant, and so are perceptions about risks, costs, and difficulties. While we argue that three groups of factors affecting adoption behaviour could be used to explore how cooperatives can influence member behaviour towards the adoption of sustainable farming practices, such empirical study still has to be done.

A transition towards more sustainable farming implies risks for individual farmers, both related to the production process and to marketing farm products. Studies on the conversion from conventional to organic agriculture have shown that the transition process involves higher risks (Berentsen et al., 2012). This raises the question of what cooperatives can do for their members to reduce the risks. Borgen (2004) has argued that collectively owned equity capital in agricultural cooperatives serves as an alleviation and absorber of external shocks, or unexpected and potentially damaging contingencies that cannot easily be dealt with by members individually and separately. Thus, the commonly owned equity has an 'insurance function', as it may ameliorate the need for individual insurance arrangements. Whether coop-

eratives are willing to use this insurance function to cover the risks inherent in the transition to sustainable farming is still in question.

To summarize, cooperatives can support members in the transition to more sustainable agriculture by providing new inputs, experimenting with new farming practices, providing training and technical assistance and bearing some of the cost and risk involved. Experiments are important for demonstrating the technical and economic feasibility of sustainable farming practices. While providing inputs is important, in the end there should also be market appreciation of the more sustainable farm products.

**Market Access**

Marketing farm products is one of the classical functions of an agricultural cooperative. This task includes collecting market information and informing members about trends in consumer markets. In the past, this marketing role of the cooperative has been reactive, by selling whatever members produce, benefiting from bargaining power and institutionalised markets. Over the years many agricultural cooperatives have become more proactive, by investing in product development and targeted marketing strategies (Cook and Plunkett, 2006).

The sustainability transition also requires a proactive role of the cooperative. For instance, large European dairy cooperatives such as Arla Foods and FrieslandCampina explicitly present themselves as suppliers of sustainable dairy products.[2] Being producers of major consumer brands, their sustainability strategies are part of the competition with other dairy companies but also with large retailers that seek to attract consumers with sustainability claims on their private label products. For farmers, large-sized cooperatives are important for countervailing power in a highly consolidated food retail market. Also, in negotiating with regard to the sustainability requirements of supermarkets, cooperatives need bargaining power to prevent the setting of unrealistic targets.

In contrast, small cooperatives have more options to develop products for those consumers that have high sustainability demands. Some of these cooperatives develop new value chains by setting up their own stores. Selling at (organic) food markets has long been a strategy of organic farmers to differentiate themselves from conventional food chains and to communicate directly with conscious consumers (Anderson et al., 2019). While these short food supply chains score high on social sustainability, they do not necessarily score better on environmental sustainability compared to conventional food chains (Malak-Rawlikowska et al., 2019).

An important strategic instrument for food companies to convince consumers to buy more sustainable food products (and to pay a higher price for these products) is the Corporate Social Responsibility (CSR) reputation of the cooperative (Maloni and Brown, 2006). While the wording of the term suggests a focus on social issues, CSR is often equivalent to corporate sustainability and its focus has traditionally been on environmental sustainability. A common definition of CSR is 'the responsibility of an organization for the impacts of its decisions and activities on society and the environment' (ISO 26000).

While studies on CSR proliferated after the turn of the century, Hartmann (2011) was the first to provide a comprehensive overview of CSR in the food industry. In her presidential address to the European Association of Agricultural Economics, Hartmann (2011) emphasised the need to include the supply chain into the analysis of CSR by food companies. The combined activities of suppliers, processors and retailers determine the sustainability of a food product. Therefore, the CSR strategy of any company in the food chain includes how suppliers

(and suppliers of suppliers) perform on sustainability. For agricultural cooperatives this poses advantages and disadvantages. By being member-owned, cooperatives can claim that their CSR strategies encompass at least two stages of the food chain, which may support the CSR reputation of the cooperative. On the other, the cooperative can only enhance sustainability to the extent that members are willing to apply more sustainable farming practices.

As Baden et al. (2009) and Hartmann (2011) have argued, powerful companies in the food chain have the ability to enforce CSR measures on their suppliers. These arguments are in line with the claim by Gereffi and others that in buyer-driven global value chains the buyers, including retail and food processing companies, often determine the level of compliance with food quality and environmental standards (Gereffi et al., 2005; Lee et al., 2012). Unequal power relations in food chains are increasingly recognized as presenting a lack of social and economic sustainability and will influence the way stakeholders assess the CSR of large companies. In this respect, agricultural cooperatives have a competitive advantage as they represent the interests of the farmers, which are often the least powerful actors in the food chain. Whether cooperatives have been able to exploit this competitive advantage is still a question.

A CSR strategy comes with the obligation to report on sustainability performance. Sustainability reporting is the practice of measuring and demonstrating accountability for organisational performance towards the goal of sustainable development. While most large companies (particularly those in the B2C market) publish a CSR report, in the food industry only a minority of all companies does so. Rottwilm and Theuvsen (2016) found that only 30 percent of German dairy companies (including cooperatives and investor-owned firms) reported their sustainability performance. The authors conjecture that the large number of SMEs in the food industry explains the low percentage.

Westerholz and Höhler (2021) studied the CSR reports of 13 German dairy companies and found that cooperatives report with a higher quality, and more extensively, about their CSR strategies and activities compared to investor-owned dairies. These authors also provide a number of propositions on the relationship between the cooperative ownership structure and the type of CSR reporting. First, cooperatives are farmer-owned and include reporting on the sustainability achievement of their members. Second, CSR reports are not only meant for outside stakeholders; members also want to know what their cooperative is doing. Therefore, CSR reports of cooperatives can be expected to provide more detailed information than reports of investor-owned firms.

Unambiguous CSR reporting requires standards and guidelines. Examples of sustainability standards are those of the Global Reporting Initiative (GRI) and the International Standards Organization (ISO). GRI is a nongovernmental organisation established in 1997 to produce guidelines and standards for sustainability reporting. ISO 26000, agreed upon in 2010, provides guidelines on social responsibility. Specifically for the food industry, ISO has developed the guidelines ISO/TS 26030:2019 on social responsibility and sustainable development in the food chain. GRI and ISO standards and guidelines aim to support any organisation in the food chain in contributing to sustainable development while considering all local laws, regulations and stakeholder expectations.

ISO 26030 has been strongly promoted by the French food industry and the French government. According to Filippi (2020), ISO 26030 is increasingly adopted by French agricultural cooperatives, and is expected to strengthen their CSR reputation. 'Even though the norm is voluntary, this label influences the perception of clients and distributors' (Filippi, 2020: 500).

Also, the International Cooperative Alliance (ICA, 2016) has published a guidebook on sustainability reporting. Just like any other (business) organisation, a cooperative needs to be accountable for its impact on society, more particularly for its performance towards the Sustainable Development Goals. Cooperative Principle #7 – Concern for Community – gives cooperatives the obligation to work towards the sustainable development of their communities. While the guidebook takes a broad perspective on sustainable development, environmental sustainability is the main part of it.

All of these initiatives and standards do not disguise that there is still a lot of discussion on what proper sustainability reporting is. A uniform and globally accepted set of standards does not exist, partly because setting sustainability standards has become a business in itself (and thus leads to competition among standards) and partly because the field is still in development. There is debate on which dimensions of (environmental) sustainability should have priority and which indicators should be used (Olde et al., 2017; Chopin et al., 2021). The FAO (2014) makes a distinction between target indicators, practice indicators and performance indicators. Target indicators show which targets a company seeks to reach, both in terms of focus area and in terms of the level of reduction of negative impact. Reporting on practice indicators shows what companies are doing, while performance indicators present the actual level of achievement on a specific sustainability theme. Over the years, CSR reports of food companies, including cooperatives, have become less dependent on target indicators and disclose more on performance indicators (Stranieri et al., 2019).

**Dialogue, Networking and Lobbying**

One of the requirements of a transition process, according to Loorbach et al. (2017), is for the stakeholders to develop a vision on a sustainable future. This also applies to the members of an agricultural cooperative. Developing a common vision is perhaps the most difficult task, as members differ in their personal values as to specific sustainability goals and farms differ in their capabilities to improve on specific sustainability indicators. Both farm resources and biophysical conditions influence the ability to invest in sustainable farming practices.

To develop a common vision on strategy and a plan of action, an extensive dialogue in the membership is needed (Battaglia et al., 2015). The uncertainties around governmental policies and sustainability accounting requirements also justify an elaborate dialogue among members about the goals, the paths, the concrete activities, the indicators and the level of financial incentives for more sustainable behaviour. According to Rudd (2000: 141), any community seeking a transition must 'discuss alternative resolutions, consider adverse impacts and amelioration, engage in the production and provision of solutions, and provide for sanctions, monitoring, conflict resolution and evaluation of outcomes'.

Case studies have shown that agricultural cooperatives have been organising more and more extensive dialogues among their members on the opportunities and challenges of sustainability (Bijman, 2022). Such discussions among the membership serve at least two purposes. First, they are the foundation underlying the decisions that cooperatives have taken on their role in the sustainability transition. Second, they are a source of knowledge exchange among members, thus facilitating learning processes for sustainable farming practices.

In addition to facilitating dialogue within the membership, agricultural cooperatives have engaged in dialogue and networking with external stakeholders. These external engagements are an important source of better understanding of societal demands, but also an opportunity

to share and discuss the technical and economic challenges that farmers face in the transition. Outside stakeholders have different perspectives on what needs to be done and what is feasible. Discussing objectives but also practical constraints not only creates better mutual understanding but also generates support for farmers engaging in the transition.

Discussing and networking with outside stakeholders can also be important for obtaining external (policy) support. Bardsley and Bardsley (2014) showed that the Gran Alpin cooperative acted as a bridging organisation to find external support and legitimacy for the changes that members and cooperative initiated. Also, Groot Kormelinck et al. (2022) found that cooperatives act as intermediaries between farmers and other parties in the food system, including commercial service providers, institutional support agencies and civil society organisations.

The intermediary role of cooperatives has also been found in studies on innovation in China (Yang et al., 2014) and Burkina Faso (Iyabano et al., 2021). Both studies showed that cooperatives play the role of intermediary between farmers on the one hand and governmental, research and commercial partners on the other hand. While not explicitly dealing with sustainability innovations, these studies are in line with the findings of Groot Kormelinck et al. (2022), showing that cooperatives have the potential to act as supporting intermediaries in linking agriculture and other segments of the food system.

The extent to which cooperatives can make a major contribution to sustainability also depends on the geographical location and regional specificities. Several authors have argued that sustainability is very much a regional challenge rather than a challenge for individual farmers. While acknowledging global sustainability challenges such as climate change, Sutherland et al. (2015) argue that (European) policy makers should shift away from an agricultural policy focused on individual farms to a policy that deals with the sustainability transition of agriculture at the regional level. 'The notion that sustainability is achieved at regional level not only takes into account that there will be regional differences in the forms and capabilities of agriculture, but also includes the tenet that interactions between individual farm models and farming systems at regional level are a key aspect of sustainability' (Sutherland et al., 2015: 7).

Since most cooperatives are strongly embedded in the regional economy, we assume that cooperatives will focus on improving sustainability at the regional level. Examples of cooperatives that work on maintaining and reinforcing regional biodiversity are nature conservation cooperatives (Polman and Slangen, 2002; Westerink et al., 2017). However, beyond the nature conservation cooperatives, which were explicitly established to achieve sustainability goals, the evidence on agricultural producer cooperatives working on regional sustainability objectives mainly comes from case studies.

Obtaining external support, such as subsidies and legitimacy, is not necessarily a new task of the agricultural cooperative. Cooperatives often lobby for favourable agricultural policies, including market protection and subsidies. Such lobbying is done at local, regional or national level, depending on the jurisdiction of the supporting authorities. One example of local embeddedness is the cooperatives that participate in the short food supply chain (Laforge et al., 2017).

However, the sustainability transition requires a broader lobbying strategy, as the financial support may come not only from governmental agencies but also from banks (for example, impact loans) and other actors in the food system, including nature conservation organisations. Cooperatives can also participate in political lobbying for social and environmental agendas,

for instance as part of a sustainability and food sovereignty movement (Fonte and Cucco, 2017; Ajates Gonzalez, 2017).

In sum, cooperatives can influence farmer behaviour towards sustainable practices by using social mechanisms such as dialogues, information exchange among members, trust building and developing common goals and by influencing the knowledge of the members through training, education and consultancy.

## DISCUSSION AND FURTHER RESEARCH

While the literature shows that agriculture cooperatives can play important roles in the sustainability transition, there is little empirical research on how cooperatives do this. Still, two streams of empirical studies provide some indication of future action. There are traditional impact studies – mostly in developing countries – that show that cooperative membership supports farmers in the uptake of new technology, including more sustainable farming practices. In addition, there are case studies of (small) cooperatives that have been established by farmers who have already made the shift towards more sustainable agriculture, such as those applying organic and agro-ecological farming. The importance of sustainability in agriculture would justify more empirical research on how (large) cooperatives support their members in applying more sustainable farming practices.

The literature presents many case studies of small, community-based cooperatives that perform well on a limited number of sustainability criteria. Most of these community-based cooperatives have been set up explicitly to promote alternative food systems, such as short food supply chains (Vittersø et al., 2019), organic agriculture (De Los Ríos et al., 2016) or community-supported agriculture (Miralles et al., 2017). One of the innovative characteristics of these small community-based cooperatives is the involvement of non-farming stakeholders, such as consumers. Such a multi-stakeholder partnership within one cooperative seems to be in line with the recommendation of transition theory to collaborate with unfamiliar businesses and civil society organisations. However, having multiple interests within one cooperative is known to affect efficient decision-making. How (small) cooperatives have dealt with these governance challenges is often not disclosed, also because most case study research only reports on success stories. Another lesson from community-based cooperatives is that social capital is important in jointly setting and pursuing sustainability objectives.

Another question for further research is whether the sustainable practices of those small community-based cooperatives can be scaled up towards large agricultural cooperatives. Given their vested (business) interests, it is still a question whether large agricultural cooperatives can and will copy the strategies and practices of small cooperatives, for instance because the small ones sell in niche markets and the large ones in commodity markets. However, large cooperatives have size-based benefits. First, they have the resources to initiate and support changes on a large scale. From a sustainable development perspective, large cooperatives generate a larger impact. Second, large cooperatives have the bargaining power to intermediate between the sometimes unrealistic requirements of large retailers and civil society organisations on the one hand and the risk-averse strategies of individual farmers on the other hand. The key challenge for the large cooperative lies in the combination of convincing its members to make the necessary transition and convincing customers and consumers to pay a higher price for sustainably produced food.

Agricultural cooperatives are member-based organisations, applying democratic decision-making processes. This organisational structure guarantees that the cooperative is primarily working in the interests of its members. However, the traditional focus on member interests is compromised by two developments among agricultural cooperatives: the growing size of the cooperative enterprise (Nilsson et al., 2012) and the growing heterogeneity of the membership (Höhler and Kühl, 2014). These developments have made it more difficult for the (large) agricultural cooperative to convince individual members to follow a more sustainable trajectory.

Another important finding of our review of the literature is that there has been very little attention given to the internal and external conditions that facilitate or hinder agricultural cooperatives in the sustainability transition. From earlier research on product quality improvement in agricultural cooperatives, it is known that the internal governance structure characteristics of member control and democratic decision-making may restrain the speed and scope of changes needed. It takes time to find a majority of members to support the changes. Literature on whether cooperatives are able to produce high quality products has shown that cooperatives and their members lack the resources and capabilities to invest in high quality production (Hendrikse and Bijman, 2002; Pennerstorfer and Weiss, 2013). However, the literature is inconclusive, as in some countries cooperatives are known for high quality products (Frick, 2017). Several authors have emphasised that cooperatives can invoke social mechanisms in support of higher quality production (Cechin et al., 2013).

Some authors have claimed that agricultural cooperatives are by nature sustainable organisations. While this may be true for social sustainability, as cooperatives are participative and democratic organisations, evidence that cooperatives also score better on environmental sustainability has not yet been presented. Future research will show whether the organisational characteristics, such as farmer-ownership and democratic decision-making, are a burden or a benefit. Arguments against the cooperative would emphasise the heterogeneity of the membership leading to slow and conservative decisions and too much focus on member interests compared to societal interests. Arguments in favour would emphasise the close relationship between farmers and cooperative and the central (intermediary) role of the cooperative in the food system.

An important lesson from the literature on product quality improvements in agricultural cooperatives is the importance of unambiguous incentives for producing higher quality products as well as the social mechanisms that prevent opportunistic behaviour. The same instruments can be used in influencing member behaviour towards adoption of sustainable agricultural practices. However, the comparison is only partially valid, as cooperatives are faced with at least three difficulties in influencing member sustainability behaviour. First, sustainable products often do not generate a higher price in the market, because powerful retailers often set the sustainability requirements unilaterally. Thus, the cooperative is faced with the dilemma of paying a higher price to members for more sustainable products, without obtaining a higher price in the market. A higher price for one farmer will then imply a lower price for another farmer. Such cross-subsidisation within the cooperative may encounter serious opposition in the decision-making bodies. Second, sustainability is not a uniform concept and not as easily measured as product quality. Thus, the cooperative has to decide on how to compare (and compensate) farmer performance on different sustainability indicators. Third, as many elements of sustainability are locally or regionally determined, because of biophysical differences, farmers differ in their interest in particular sustainability indicators. These

different interests need to be aligned with the democratic decision-making structures of the cooperative. More research is needed on how cooperatives deal with these three challenges of convincing and facilitating members to adopt more sustainable farming practices. Agricultural cooperatives in Northwest Europe are developing and implementing menu strategies, where members can decide to focus on (and get reimbursed for) different sustainability targets that best fit their farming objectives.

As indicated earlier, adoption of sustainable farming practices is influenced by dispositional, social and cognitive factors (Dessart et al., 2019). This framework can be used to develop hypotheses on how cooperatives can support the adoption of sustainable farming practices. We expect that the influence of cooperatives will be mostly on cognitive factors, but also to a certain extent on social factors. Given a fixed economic incentive, we hypothesise that cooperatives will influence the adoption of sustainable farming practices by providing information (through training as well as individual consultancy), supporting experiments and reducing individual risks. Future research should focus on the prevalence and impact of these support mechanisms.

## CONCLUSION

The goal of this chapter was to explore the roles that agricultural cooperatives (can) play in the sustainability transition. Literature on these (new) roles is rather scant. Case studies on small community-based cooperatives provide useful ideas on how other cooperatives can act within sustainable food systems; however, the question whether these ideas can be scaled towards large producer cooperatives is still to be answered.

In the sustainability transition, the classical functions of the cooperative, such as providing inputs and marketing farm products, continue to be important. Providing proper inputs will allow farmers to apply more sustainable farming practices. Marketing sustainable farm products and obtaining a proper price for these products will allow the members to make the long-term investments in sustainable production methods. In addition to these classical functions, agricultural cooperatives will have to engage in new functions, for which they may need to develop new capabilities.

Which are these new functions for sustainable food systems? Transition theory has shown which new tasks are needed. The first task is to set up an extensive dialogue among the members. Setting sustainability goals for the cooperative as a whole and for subgroups of the membership requires good discussions and inclusive decision-making. Dialogue is needed not only to develop a common vision, but also to get a better understanding of differences in the abilities and willingness of individual members to apply (particular) sustainable farming practices. The second task is to engage in discussions and networking with multiple outside stakeholders, in order to find new coalitions and gain societal support, but also to discuss with those stakeholders the (economic) challenges farmers face in the sustainability transition. The third task is supporting members in experimenting with sustainable farming practices – not only by providing new inputs and technical assistance, but also by sharing the economic risk of these experiments.

In addition to these specific new functions, agricultural cooperatives may have to acknowledge more explicitly that they are an intermediary between farmers and other societal stakeholders, not just between farmers and buyers. Another part of this intermediary role is

the facilitation of learning processes. Successful application of sustainable farming practices requires farmers to learn from experts and other farmers. More so than in the past, where the emphasis was on efficient handling of farm products, agricultural cooperatives have to engage in supporting and facilitating the change and learning processes of their members.

## NOTES

1. Some of the literature uses the term 'supply chain' while other literature prefers 'value chain'; we do not make this distinction and only use food chain.
2. https://www.arla.com/sustainability/; https://www.frieslandcampina.com/sustainability/

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