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AGRICULTURAL COOPERATIVES AND FARM SUSTAINABILITY



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Abstract: This article presents a literature review of the role played by agricultural cooperatives in influencing farm sustainability and investigates all three empiric dimensions of sustainability in developing and developed countries. In addition, the main goal is linking the empirical findings to the theoretical understanding of cooperatives, in particular members' heterogeneity.

Key words: Agricultural cooperatives; Cooperative behavior; Farm sustainability; Member Heterogeneity.

Annotatsiya: Ushbu maqolada qishloq xo'jaligi kooperativlarining fermer xo'jaliklarni barqarorligiga ta'sir etishdagi o'rni haqida ilmiy-nazariy asoslar va rivojlanayotgan va rivojlangan mamlakatlarda uch o'lchovlik empirik barqarorlikni tasiri ochib berilgan. Shuningdek, asosiy maqsad-empirik natijalar va kooperativlarning nazariy bilimlari, xususan ularning a'zolarining xilma-xilligi o'rtasida bog'liqlik o'rganish hisoblanadi.

Kalit so'zlar: Qishloq xo'jaligi kooperativlari; Kooperativ xatti-harakatlar; Fermerlar barqarorligi; A'zolar xilma-xilligi.

Introduction

Future government initiatives and increasing awareness among consumers are anticipated to drive an increase in the availability of more sustainably produced agricultural products (Saitone and Sexton, 2017). Farmers are expected to produce in this context in a way that balances the economic, environmental, and social aspects of sustainability. The empirical literature has a wealth of assessments of agricultural sustainability and its fundamental factors (Dessart et al., 2019). According to Rasmussen et al. (2017), and other researchers, these factors are related to the sociodemographic characteristics of farmers (such as age and education), the characteristics of their farms (such as organizational structure, size, debts, and main production), and external factors (such as the kind of supply chain, market prices, and government interventions).

In western nations' agri-food supply chains, agricultural cooperatives hold significant market shares (in the European Union (EU) in 2010, 40% of the agri-food sector). In the EU, Austria, Denmark, Finland, France, Ireland, the Netherlands, and Sweden have cooperatives with a market share of more than 50% for the entire

agricultural sector (Bijman and Iliopoulos, 2014). Furthermore, producers may be even more inclined to use cooperatives for vertical integration when it comes to extremely perishable crops (57% and 42%, respectively, in the EU's fruit and vegetable and dairy sectors). More than 75% of the milk produced in the USA was sold by dairy cooperatives in 2017 (Wadsworth, 2019). Furthermore, the market proportions of cooperatives vary greatly among industries and nations. In the olive oil industry in 2010, the market share held by Spanish cooperatives was 70%, compared to 5% in Italy.

Main objective is to review and discuss the literature on the role played by agricultural cooperatives in farm sustainability. Our contribution to a better understanding of agricultural cooperatives is twofold. First, we gather a diversified set of theoretical models to examine how the economic behavior of agricultural cooperatives differ from other organizations. As no unified modelling of the economic behavior of cooperatives exists, we discuss the different features of the cooperatives' behavior and we explain their main theoretical weaknesses. Second, we provide insights about how agricultural cooperatives may influence farm sustainability. The empirical literature is rich, however unbalanced between developing and developed countries. We specifically investigate the three dimensions of sustainability and we highlight the topics that are scarcely covered.

2. Economic Behavior of Agricultural Cooperatives

The theoretical literature about the economic behaviour of cooperatives has been built through several waves since the seminal work of Nourse in 1922 and followed by the work of Philipps (1953) and Hemberger and Hoos (1962) which present two contrasting strands: the cooperative as an extension of individual farms and the cooperative as a firm. This section presents the theoretical background on the behaviour of cooperatives from the most recent ones, the second and third waves, followed by an explanation of their main theoretical weaknesses as found in the agricultural economics literature. First, the well-known weaknesses are described, then we focus on the specific issue of farmer heterogeneity.

There have been several attempts in the literature on economics to characterize a cooperative as a distinct type of economic organization (Cook et al., 2004;). Regarding the economic concept of agricultural cooperatives, experts cannot agree on anything (Tortia et al., 2013). Based on economists use theoretical reasoning to create several models that evaluate the economic behavior of cooperatives.

Cooperative members offer more raw materials than other farmers who supply through investor-owned businesses in an environment of imperfect competition (Hemberger and Hoos, 1962; Albaek and Schultz, 1998; Pennerstorfer and Weiss, 2013). Input procurement is examined by Bontems and Fulton (2009) in two distinct scenarios: an investor-owned company that seeks to maximize profit, and a cooperative that aims to maximize member welfare. The cost structure reflects the variability of farmers. The authors show that a cooperative is more effective than an investor-owned business when the goals of the cooperative and its members coincide. Finally, agricultural cooperatives may also be defined as vertically integrated organizations which aim at maximizing members' welfare (Soboh *et al.*, 2012). Agricultural cooperatives, however, should be distinguished from traditional vertical integration since farmers can behave differently in

these two organizational schemes. Farmers who become vertically integrated with investor-owned firms become employees and thus have fewer incentives to improve product quality (Reimer, 2006). Incentives might be even lower with asymmetric information because of the principle-agent problem. In the case of vertical integration via cooperatives, however, farmers' economic incentives for innovations that improve quality can be preserved.

2.1 *Major Challenges Faced by Cooperatives*

Despite their above-mentioned economic advantages, cooperatives have long been criticized in the

- economic literature
- poor economic performance
- overproduction
- horizon problem

Except them there is another challenge is Farmers' heterogeneity that giving rise to governance issues in cooperatives, is a key underpinning issue of the above-mentioned weaknesses. Farms and farmers indeed have different characteristics, creating information asymmetry and discrepancies among members. Farmer heterogeneity in agricultural cooperatives is characterized differently in the literature (Höhler and Köhl, 2018). This heterogeneity may come from various factors such as farm size and cost structure, type of product or members' personal characteristics such as age, risk aversion, preferences. Membership heterogeneity also leads to governance issues. The general finding regarding this issue is that cooperatives' decisions with respect to product quality are dependent on the dominant farmers' group. The 'median voter' makes the quality decision in the cooperative level. If farmers who have a higher incentive to invest in high-quality product are in the majority, then the cooperative produces at a quality level which is even superior to the first best option. Another theoretical approach is based on quality decisions in a mixed duopoly case (cooperative versus investor-owned firm). The difference between the two types of organization is often shown in the form of different objective functions. In these models, the cooperative may provide a higher-quality level in the case of high innovation costs, depending on cost structure. Moreover, when the quality of products supplied by members to the cooperative is not observable, the free riding problem may emerge. Several factors can explain heterogeneity in quality at the farm level. There are numerous frameworks for agricultural cooperatives available in the theoretical literature, as this second part demonstrates. This section's primary goal was to provide light on the unique qualities of the cooperatives as well as their financial performance. By doing away with double marginalization, agricultural cooperatives refers to removing supply chain middlemen and, as a result, pricing beyond marginal cost at every point in the supply chain) and by trying to enhance member welfare, may be advantageous for farmers.

3. **Can Cooperatives Influence Farm Sustainability? Empirical Studies:**

On methodology, we searched for agricultural cooperatives, cooperative membership, farm practices, innovation, environmentally friendly, and sustainable farming between 2010 and 2020 using the terms in the EconLit and Google Scholar databases. This lookup made it possible for us to find studies that might be pertinent. We also looked through the most current research that has been used in developing nations,

but we only looked at papers that address social or environmental concerns and were published in the agricultural economics literature. For two reasons, we have included in our analysis empirical research that expressly look at quality issues in cooperatives as well as some papers that were cited in the literature that we chose from the databases. First, there is a lot of member heterogeneity in this literature, which clearly demonstrates the challenges of cooperative governance. Second, customers might place a particular value on fair trade or ecologically friendly products, and they might be willing to pay more for a product that has a social or environmental characteristic. As a result, the literature provides some useful information about how cooperatives could improve quality. Lastly, we incorporated research that the current paper's reviewers suggested.

3.1 *The Cooperatives' Economic Role*

Members of cooperatives may see changes in their financial performance. The majority of the discussion has been focused on developing nations. The effect of farmers' cooperative membership on farm productivity (Wossen et al., 2017; Ma et al., 2018a; Ortega et al., 2019; Manda et al., 2020) or incomes (Verhofstadt and Maertens, 2014; Ma and Abdulai, 2016; Mojo et al., 2017; Hoken and Su, 2018; Kumar et al., 2018; 2019; Ofori et al., 2019) has been the subject of numerous empirical studies in these nations. These studies highlight the benefits of cooperative membership for members' long-term financial stability. Depending on the size of the farm, cooperative membership may have different effects. According to research by Hoken and Su (2018) and Kumar et al. (2018), small-scale farms benefit more from cooperative participation in terms of proportionate influence on farm income. According to Wollni and Fischer (2015), small-scale farmers gain from belonging to a cooperative due to two factors: either their low opportunity cost or their lack of bargaining leverage. Additionally, they demonstrate how large-scale farmers benefit from cooperative. This effect is shown by Liu et al. (2019), who found that cooperatives have a greater positive impact on the income of larger farms. In developed nations, the literature shows broader economic effects of cooperatives, including impacts on non-members through yardstick effects, and mixed effects on quality due to higher global quality standards. The authors highlight that this competitive yardstick effect benefits even non-cooperative farmers, aligning with the positive spill-over effect of cooperatives. It can be expected that cooperatives pay farmers more than the marginal value of their product.

Cooperatives that prioritize quality distinction may see a reduction in the marginal cost of innovation, which would encourage other businesses in the market to follow suit. The effects of establishing an agricultural cooperative on Alaska's salmon seafood business are examined by Jardine et al. (2014). They draw the conclusion that the establishment of the cooperative raised the rates that local fishers. Furthermore, the cooperative's rival investor-owned businesses subsequently embraced the new fishing production system. Cooperatives can lower the cost of innovation for other farmers who are not members, which could help with quality improvements throughout the supply chain.

However, potential cooperative organizational issues may have a detrimental impact on the general quality of the result. Pennerstorfer and Weiss (2013) use the empirical portion of their study on the quality choice in the Austrian wine industry to demonstrate that cooperatives offer worse product quality compared to investor-owned enterprises.

They discover that, when comparing cooperatives to investor-owned businesses, the quality of wine is noticeably worse utilizing data pertaining to the Austrian wine market from 2004 to 2007.

3.2 *The Cooperatives' Role in Encouraging Environmentally Friendly Practices*

Overall, agricultural cooperatives may influence farmers to adopt environmentally friendly practices and agricultural innovation, thus increasing farm environmental sustainability (Gonzalez, 2018). Bareille *et al.* (2017) explore how the alignment of objectives between a multipurpose cooperative and its members influences member commitment. The authors show that the adoption of new agricultural practices has a small but significant effect. In other words, innovative projects could facilitate farmers' convergent economic goals and increase their motivation to join the cooperative. Empirical evidence suggests that farmers' usage of less pesticides may be aided by cooperative involvement. Chinese cooperatives enhance environmental quality by participating in the production stage through input purchases and quality standards. As a result, cooperative farmers in underdeveloped nations might be more motivated to raise the caliber of their output. Additional empirical research looks at the positive effects of technical help in encouraging farmers to practice environmentally friendly techniques. Services for technical support can have a significant impact on farmers' choices about the adoption of methods that have greater fixed costs.

According to Ji *et al.*'s (2019) analysis of the Chinese hog market, farmers who participate in cooperatives are considerably more motivated to use safe production techniques. Safe techniques include input sourcing that fulfills safety and quality standards, as well as strict adherence to prescribed production methods by pig farmers. Agricultural cooperatives can help farmers improve productivity and profits, reduce production costs and adapt to quality requirements. According to Grashuis and Su (2019), the majority of studies are conducted in underdeveloped nations. A study of the research indicates that membership in a cooperative leads to higher agricultural revenue due to improved access to inputs. On the other hand, the intensification of agriculture could have negative effects on the environment. Abebaw and Haile (2013) highlight this point in the context of Ethiopian cooperatives that assist farmers in using pesticides, fertilizers, and enhanced seeds to increase yield, but with the risk of having negative environmental effects.

3.3 *The Social Role of Cooperatives*

The decision of a farmer to join an agricultural cooperative may have non-financial motivations. Numerous researches look at the factors that influence membership commitment and the significance of trust. There are, however, few empirical studies that specifically examine the social function of cooperatives. According to Hernández-Espallardo *et al.* (2013), "non-price" elements offer cooperative members stronger incentives to stick with the organization than do pricing. If the cooperative can handle issues related to transaction costs, like gaining market access, informing farmers about cooperative management, and assisting farmers in meeting market demands and societal expectations, farmers might be more willing to accept lower prices. (2017) Bareille *et al.* discover a startling finding regarding the impact of a cooperative's territorial presence, which is quantified as the facilitation of market access for all farm commodities.

The literature covers a variety of topics related to the social role of cooperatives, including employment, the gender effect, and knowledge. According to Michalek et al. (2018), cooperative membership has a favorable impact on members' employment on farms. He evaluated the ways in which women smallholders can enhance their economic results through cooperative membership. They demonstrate how these women's market price and quantity in the honey sector are greatly increased by cooperative membership. This is in contrast to Ferguson and Kepe (2011) who show that in Uganda women extract non-monetary benefits from being part of cooperatives; namely, increased negotiating skills and ability to take decisions. Other studies deal with the provision of social capital. Also, cooperatives can help farmers to make better use of chemical inputs when associated with a high level of social capital (communication, trust and common goals). This allows the cooperative to help farmers to provide safe food. Lithuanian cooperatives create knowledge and capacity building for members. Portugal also considers not only cooperative members but the rural sector in general. The authors show that agricultural cooperatives have multiple impacts on their members through training or technical support and are able to promote local development, for example by the use of local resources. In line with this, for the case of cooperatives in Slovakia, that they provide social services to members and contribute to the local development. This is in contrast to Bulgarian cooperatives where such non-profit activities are still very much present and take the role of safety nets in poor rural areas. Cooperatives contribute to public infrastructure such as roads and street lighting, and provide services such as kindergartens, sports facilities and inexpensive canteens and food shops.

Conclusion.

With regard to the different past history of cooperatives and the technical characteristics of agricultural industries, one could contend that additional contextual works are required to bridge the gap between theoretical and empirical research, both at the sector and national levels. The fact that more empirical research has been done on developing nations is one explanation. In fact, recently established and focused on rural development. These nations' cooperatives offer largely encouraging proof of the high caliber of cooperatives.

These cooperatives are democratic only formally and in fact behave as investor-owned firms (Nilsson *et al.*, 2009). In that instance, they also lack environmental and social responsibility. Furthermore, laws in a number of nations, including China, France, and Italy, have made it possible for cooperative businesses to attract outside investors. The literature has suggested a number of private and public incentives or solutions to encourage farmers to embrace ecological practices. This study demonstrates that cooperatives are important for the adoption of environmentally friendly farming techniques and farm economic sustainability.

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