

## SPECIAL ISSUE

# Farmers' organizations and sustainable development: An introduction

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## Abstract

This special issue features 14 new research papers investigating the role of farmers' organizations (e.g., collective action, self-help groups, producer companies/organizations, and cooperatives) in supporting sustainable development. The key findings include: (1) farmer groups and cooperatives promote farmers' adoption of good farm management practices, new agricultural technologies and sustainable farming practices, although not substantially improving farm yield; (2) outsourcing services provided by agricultural cooperatives help to increase the technical efficiency of crop production; (3) cooperative membership enhances members' bargaining power and enables them to sell their products at higher prices; (4) cooperatives motivate rural laborers to work in off-farm sectors, while self-help groups empower rural women in decision-making; (5) internet use improves agricultural cooperatives' economic, social, and innovative performances; (6) direct administrative intervention supporting cooperative development may lead to the emergence of shell cooperatives; (7) participation in forest farmer organizations enables wood value chain upgrading; (8) increasing

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the cooperative size in terms of income, equity, and assets increases the profitability of savings and credit cooperatives; and (9) creating cross-border cooperation between cooperatives generates benefits for all parties involved. These findings can inspire the design of policies aimed to support farmers' organizations in achieving sustainable development goals.

**KEYWORDS**

decision-making, farmers' organizations, governance and efficiency, production and marketing performance, sustainable development, technology adoption

**JEL CLASSIFICATION**

Q13, Q16, J54

## 1 | INTRODUCTION

Farmers' organizations, such as cooperatives, associations, self-help groups, producer organizations, farmer-based organizations, farmer groups, and collective actions, are playing an increasingly significant role in supporting the sustainable development of the agricultural sector as well as improving the living standards of rural households. These organizations allow smallholders and resource-poor agricultural producers to work together, thus granting several benefits to rural farming households.

A growing number of studies have estimated the effects of farmers' organizations, highlighting how these organizations play multiple roles in supporting sustainable development. It is found that membership in different types of farmers' organizations helps to increase farm productivity and food security (Demont, 2022; Lin et al., 2022), strengthen member farmers' bargaining power (Di Marcantonio et al., 2022; Mwambi et al., 2021), improve farm management skills (Addai et al., 2022; Zhang et al., 2023), raise household welfare and livelihoods (Bachke, 2019; Seneerattanaprayul & Gan, 2021), enhance product quality and value chain integration (Bernard & Spielman, 2009; Cai et al., 2016; Francesconi & Wouterse, 2015; Tray et al., 2021), boost rural income growth (Ito et al., 2012; Zou & Wang, 2022), as well as reduce poverty and cropland abandonment (Gava et al., 2021; Ma & Zhu, 2020; Verhofstadt & Maertens, 2015). For example, producer organizations in Mozambique were found to increase the marketed surplus, the value of agricultural production, and total income (Bachke, 2019). In their investigation of Bosnia and Herzegovina, Gava et al. (2021) found that agricultural cooperatives contributed to rural poverty alleviation. Moreover, there is evidence that membership in producer organizations decreased the likelihood of farmers reporting unfair trading practices in France, Germany, Spain, and Poland (Di Marcantonio et al., 2022).

Despite the existence of rich literature that explores the roles of farmers' organizations in supporting sustainable development, substantial research gaps persist. For example, the existing studies have revealed that farmers' organizations such as cooperatives play a significant role in facilitating the adoption of technologies such as chemical fertilizers, chemical pesticides, and

improved seeds (Abebaw & Haile, 2013; Addai et al., 2022; Li et al., 2021; Manda et al., 2020) and determining technology adoption intensity (Zhang et al., 2020; Zhou et al., 2023). However, little is known about how membership in farmers' organizations affects members' adoption of good farm management practices, new technologies, and sustainable farming practices. Previous studies investigated how farmers' organizations influence the yield and technical efficiency of crop production (Abdul-Rahaman & Abdulai, 2018; Ahado et al., 2021; Gong et al., 2019; Neupane et al., 2022; Olagunju et al., 2021). For example, Abdul-Rahaman & Abdulai (2018) found that participation in farmer groups was associated with increased yield and technical efficiency relative to farmers who produce and market rice individually. However, no studies have empirically synthesized the yield effects of farmers' organizations. Little is known about whether there is a link between outsourcing services provided by farmers' organizations and production efficiency. Furthermore, cooperatives have been prompted to empower rural farmers by improving production efficiency or using outsourcing services (Gêmo & Babu, 2019; Ma et al., 2018; Zhang et al., 2017), saving labor time used for farming activities. Then, rural households may allocate exceeding laborers from farm work to off-farm work. However, there is limited evidence regarding the effects of membership in cooperatives on intra-household decision-making, such as allocating laborers to off-farm activities.

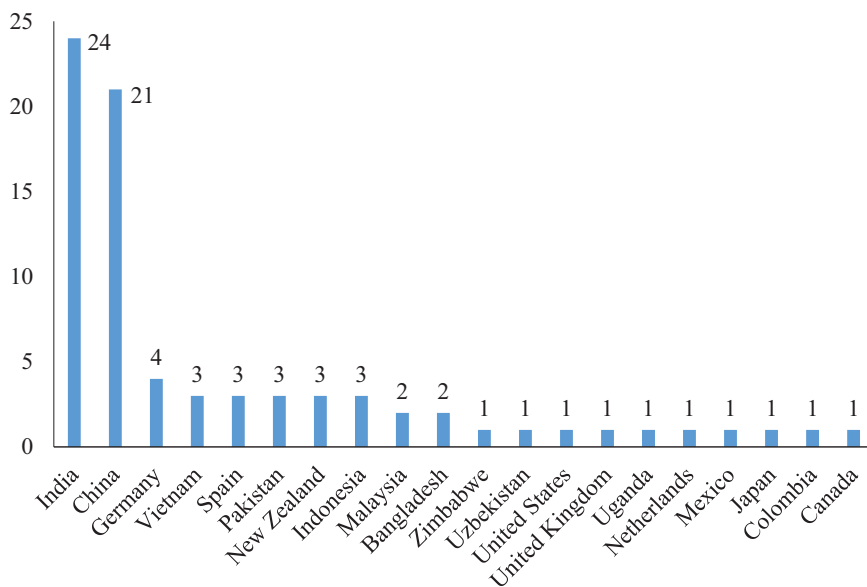
In this special issue, we aim to extend the findings of previous studies and provide significant insights into how farmers' organizations can support sustainable development from different dimensions. To achieve this goal, we made an open call themed on "Farmers' Organizations and Sustainable Development" to collect high-quality quantitative and qualitative papers that study the impacts, outcomes, and implications of farmers' organizations. We also invited papers investigating organizational performance, governance, and efficiency.

Finally, 14 papers were selected after a rigorous peer-review process and then published in this special issue. These papers examine how farmers' organizations influence technology adoption, farm performance, and intra-household decision-making, explore the nexus between external interventions and cooperative membership, as well as investigate the organizational governance and efficiency of farmers' organizations as business entities. The obtained findings provide policymakers with solid evidence and some new insights on how to design appropriate policy instruments to facilitate the sustainable development of farmers' organizations by enhancing their contributions to the achievement of sustainable development goals.

The structure of this paper is as follows: Section 2 summarizes the papers received in this special issue. Section 3 introduces the international conference purportedly organized for the special issue. Section 4 summarizes the key findings of the final papers published in the special issue, followed by a summary of their policy implications, presented in Section 5. The final section provides a brief conclusion.

## 2 | SUMMARY OF RECEIVED SUBMISSIONS

In total, 78 manuscripts were submitted for the special issue. The corresponding (submitting) authors come from 20 different countries (see Figure 1), signalling the broad diversification of submissions and the worldwide attention received. More than half (58%) of the submissions were from authors working in India and China. The authors from Germany, Vietnam, Spain, Pakistan, New Zealand, Indonesia, Malaysia, and Bangladesh contributed to 30% of the total



**FIGURE 1** Distributions of 78 received submissions by corresponding authors' countries. [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/doi/10.1111/apce.12449)]

submissions. The remaining 12% of submissions were made by authors from Zimbabwe, Uzbekistan, the United States, the United Kingdom, Uganda, the Netherlands, Mexico, Japan, Colombia, and Canada.

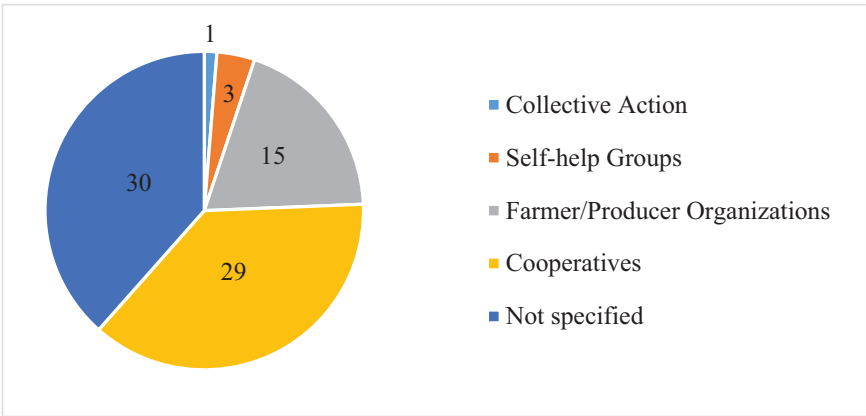
Among those 78 received submissions, 30 of them were neither aligned with the general aims and scope of the *Annals of Public and Cooperative Economics* journal nor with the special issue themes and they were, thus, desk-rejected by the guest editors. The rest of the 48 papers were selected as special issue candidate papers. They discussed different types of farmers' organizations. Specifically, 29 papers were concerned with agricultural cooperatives, followed by 15 papers focused on farmer/producer organizations (Figure 2). We received three papers discussing self-help groups and only one discussing collective action.

### 3 | ADBI VIRTUAL INTERNATIONAL CONFERENCE

#### 3.1 | Selected presentations

The guest editors organized a virtual international conference on the topics of the special issue. The conference was organized on 7–9 September 2022 and was financially supported and physically held by the Asian Development Bank Institute (ADBI), Tokyo, Japan.<sup>1</sup> The guest editors invited 48 corresponding authors, whose papers fitted the journal and special issue topics, to present at the conference. However, seven authors could not accept the invitations due to other commitments and the conference finally comprised 41 presentations. Figure 3 illustrates the

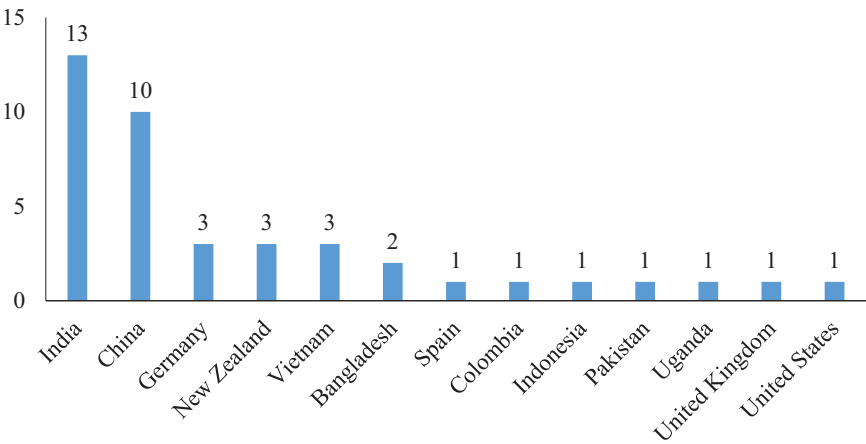
<sup>1</sup>The conference agenda and slides of speakers are available at the ADBI website: <https://www.adb.org/news/events/farmers-organizations-and-sustainable-development>.



**FIGURE 2** Distributions of submitted manuscripts by the types of farmers' organizations. [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

native countries of the presenters, showing that the presenters were from 13 different countries. Consistent with the initial submissions, most of the presenters (56%) were from India and China.

Each presentation was allocated 30 minutes. A speaker gave a 15-minute presentation to introduce his/her manuscript. After the presentation, an invited professional discussant commented on the manuscript and the presentation and interacted with the presenter for 10 minutes. Subsequently, the session chair initiated an interactive discussion between the speaker and other conference participants for 5 minutes. The well-structured presentations and discussions generated benefits for presenters, discussants, and all other participants for mutually fruitful exchanges. Importantly, the presenters could further improve the quality of their manuscripts based on the helpful feedback collected at the conference.



**FIGURE 3** Distributions of selected presentations by countries. [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

## 3.2 | Keynote speakers and speeches

### 3.2.1 | Keynote speakers

The guest editors invited three keynote speakers to present at the three-day conference. They were Prof. Keijiro Otsuka from Kobe University, Japan, Prof. Qiao Liang from Zhejiang University, China, and Prof. Richard Sexton from the University of California, Davis, USA.

Prof. Otsuka is a professor of Development Economics. He was Chairman of the Board of Trustees of the International Rice Research Institute (2004–07), President of the International Association of Agricultural Economists (2009–12), and President of the Japanese Association for Development Economics (since 2019). He is a co-author or co-editor of 27 books and 146 articles in internationally renowned journals. He is a fellow of the International, American, and African Association of Agricultural Economists. He received a Purple Ribbon Medal from the Japanese government in 2010, was selected as a member of the Japan Academy in 2018, and received the Orders of the Sacred Treasure, Gold, and Silver Star in 2021.

Prof. Liang is a professor of Agricultural Economics and Management, and the associate director of the Center for China Farmer Cooperatives (CCFC) at Zhejiang University. She obtained her double PhD degrees from Zhejiang University (China) in March 2011 and Erasmus University (the Netherlands) in March 2013, respectively. Her main research interests span from farmer organizations, agricultural supply chains to food safety. She has published more than 50 articles in renowned international journals and 5 monographs.

Prof. Sexton is a distinguished professor in the Agricultural & Resource Economics (ARE) Department at UC Davis. He is also the Past President of the Agricultural and Applied Economics Association (AAEA). Sexton served as chair of the ARE Department at Davis (1994–98; 2011–16) and as Director of the University of California Giannini Foundation of Agricultural Economics (2000–03). He served as co-editor of the American Journal of Agricultural Economics (AJAE) (1998–2000). His recent research focuses on the rapidly changing landscape of agricultural markets, with their increased emphasis on multifaceted dimensions of product quality, attempts by sellers at all market stages to differentiate their products, and close vertical coordination within the supply chain. He outlined his thinking on these topics for his colleagues in his 2012 AAEA Presidential Address, “Market power, misconceptions, and modern agricultural markets”, published in the January 2013 issue of the AJAE, and continues to study these topics to this day.

### 3.2.2 | Keynote speeches

Prof. Otsuka gave a speech, “Farmers’ organizations and sustainable food security, livelihood, and environment”, on 7 September 2022. He pointed out that Asian agriculture is currently facing three main “sustainability” issues in its development. According to his view, these are: (a) increasing inefficiency of small-scale farming jeopardizes sustainable food security; (b) there is an enhanced need for shifting from traditional grain production to high-value agricultural products (e.g., fresh fruit and vegetables, dairy products, and flowers), aimed at contributing to sustainable livelihood of farm households and (c) there is a need to adopt environment-friendly farming practices and management of natural resources for environmental sustainability. He suggested that farmers’ organizations can help to advance traditional agriculture production towards sustainability from different aspects. First, farmers’ organizations should support the promotion of large-scale

mechanized farming by promoting land transactions, consolidations, and the adoption of land-saving technologies, particularly mechanization, and information technology-based technologies. Second, farmers' organizations in Asia should consider promoting new labor-saving technologies and large-scale farming among rural households. Third, farmers' organizations such as cooperatives are expected to provide farmers with training in appropriate production practices and regulate production methods to reduce negative externalities.

Prof. Liang gave her speech, "Performance of farmer cooperatives in China and their roles in sustainable development", on 8 September 2022. She pointed out how the traditional smallholder agricultural production system in China is facing challenges (e.g., small-scale and fragmentation of farms), and farmer cooperatives could play a special role in linking smallholder farmers with modern agriculture. With financial and policy support, the number of cooperatives and cooperative members continuously increased. However, the issues such as the existence of large quantities of zombie cooperatives and small average membership size challenged the sustainable development of cooperatives.<sup>2</sup> Then, she provided empirical evidence, showing how the existence of zombie cooperatives on the one hand, and the size of their membership on the other, had an impact on their performance. The results showed that the presence of zombie cooperatives negatively affects the economic performance of standard cooperatives; moreover, the impact of membership size on per-member profit displays an inverted "U" pattern, where the optimal membership size is 17 members. In the end, Prof. Liang emphasized how farmer cooperatives should promote farmers' adoption of low-carbon technologies and agro-product quality certification to support sustainable rural and agricultural development.

Prof. Sexton made a speech, "Smallholder vs. large-scale farming systems in low- and middle-income economies", on 9 September 2022. He first introduced the renewed challenges to feed a growing and wealthier world population in the 21st Century. These challenges include, for example, increasing food production in response to rising incomes, growing populations, inadequate (food insecure) diets, the slowdown in agricultural productivity growth, pest resistance to traditional treatments, yield-reducing impacts of climate change, and the advent of biofuels and the need to provide increasing portions of the fuel supply. He then explained how smallholder farming could achieve higher land productivity by avoiding moral hazard problems associated with hired farm labor relative to household labor and having more intensive labor input. These efforts can finally help to alleviate rural poverty. He concluded that endogenous conversion to commercial-sized farms through market processes wherein smallholders sell land and labor inputs to commercial farms would generate benefits such as increasing farm output and rising urban consumer welfare.

## 4 | SUMMARY OF PUBLISHED ARTICLES

As a result of a rigorous double-blind reviewing process, the special issue accepted 14 articles for publication. Of these, some focus on the ways farmers' organizations (farmer groups, cooperatives, and self-help groups) influence technology adoption, on farms' performance and intra-household decision makings, on the relationship between external interventions and cooperative performance as well as on their organizational governance and efficiency. Below, we summarize the key findings of the contributions on the basis of their research themes.

<sup>2</sup> Zombie cooperatives are also called shell cooperatives in some places (Liang et al., 2023). They refer to those cooperatives who got registered but do not have actual business activities or ceased operations due to poor management/performance.



## 4.1 | Impacts on technology adoption

Farmers are usually facing barriers in accessing and adopting agricultural technologies because of information asymmetry and lack of the required knowledge and skills. This can harm farm production. Farmer organizations can influence the behavior of farmers' technology adoption by serving farmers with various market and technology-related information and guiding them to efficiently apply the technologies. This special issue collected three papers that enrich our understanding of the nexus between farmers' organizations and the adoption of innovative agricultural technologies and practices.

Yang and Wang's paper, "Impact of farmer group participation on the adoption of sustainable farming practices—spatial analysis of New Zealand Dairy farmers", analyzes the impact of participation in farmer groups on dairy farmers' adoption of good management practices (GMPs) (nutrient management, winter off cows, soil test, and riparian plantation) in New Zealand. Adopting a spatial propensity score matching method to account for spatial dependence and social connections, they find that participation in farmer groups increases the probability of dairy farmers' adoption of GMPs. In particular, their analysis reveals how spatial dependence exists in farmers' participation in farmer groups, which further motivates their adoption of GMPs. Also, farmers' decision-making on GMP adoption is shown to depend on the characteristics of their neighbours

Wu, Guo, and Guo's paper, "Cooperative membership and new technology adoption of family farms: Evidence from China", investigates whether and how cooperatives facilitate family farms to adopt new agricultural technologies in China. The family farm is a type of new agricultural business entity developed in China and its average operation scale is larger than that of smallholder farms. This is the first study that links family farms' cooperative membership with their technology adoption behavior. In this study, farmers are assumed to take a dichotomous choice and, hence, the new technology adoption variable takes the value of one if a farmer has, in turn, adopted new technologies, new varieties, new machinery, new fertilizers, new pesticides, new pest control techniques, new production methods, and new management methods, and zero otherwise. Employing the propensity score matching approach and the endogenous switching probit model to address the selection-bias issues, the authors find that cooperative membership increases farmers' probability of adopting new agricultural technologies by 7.5–9.1 percentage points. They also find that family farms with lower operating incomes and smaller farm sizes are more likely to adopt new technology when joining cooperatives than their counterparts with higher operating incomes and larger farm sizes.

Liang, Ma, and Liu's paper, "The role of farmer cooperatives in promoting environmentally sustainable agricultural development in China: A review", provides an overview of the literature concerning the role of farmer cooperatives in promoting environmentally sustainable agricultural development. They state that farmer cooperatives use different measures to facilitate farmers' adoption of sustainable farming practices, such as supplying farmers with inputs, providing them with technology training and information services and value-added market services, as well as providing them with regular supervision and incentives based on pricing and punishment. They find that smallholder farmers face market failure in the application of environmentally sustainable farming practices and have a relatively weak awareness of environmental sustainability thus paying extra costs for some of these practices. They conclude that farmer cooperatives promote farmers' adoption of sustainable farming practices by offering them various services (e.g., input purchases, education, information provision, value added by branding and packing, and product



marketing) and supervising them to reduce opportunistic behaviors in the application of such sustainable practices.

## 4.2 | Impacts on farm production and marketing performance

Improving farm production and marketing performance is essential to ensuring food security and increasing rural household income. Three papers included in this special issue provide significant insights into this matter. Specifically, two of these explore how cooperative membership and outsourcing services provided by cooperatives influence agricultural production, with a particular focus on farm yield and technical efficiency. The third paper looks at the impact of cooperative membership on farmers' marketing performance, with special attention to marketing channel choice and received prices.

Ma, Hong, Reed, Duan, and Luu's paper, "Yield effects of agricultural cooperative membership in developing countries: A meta-analysis", employs a meta-analysis to study the effects of cooperative membership on the yield of crops and livestock by collecting 158 estimated yield effects from 42 studies. These studies cover 19 developing countries. They find a positive publication bias, which indicates a preference among researchers and journals to publish articles with positive and significant results. However, after accounting for publication bias, cooperative membership is found to have a small and statistically insignificant effect on yield. The authors also show how the variations in the estimated yield effects across studies are determined by factors such as whether the effects are estimated by full sample or subsample, membership ratio, the econometric models used (IV-based parametric approach, non-parametric approach, or ordinary least square), type of effects (average treatment effects on the treated (ATT), average treatment effect (ATE), and coefficient), type of agro-products (grain or others) as well as climate zones (tropical or non-tropical).

Lin, Jin, and Guo's paper, "Do outsourcing services provided by agricultural cooperatives affect technical efficiency? Insights from Tobacco Farmers in China", tries to assess how outsourcing services provided by agricultural cooperatives affect the technical efficiency of tobacco production using survey data from 449 households collected from the Guizhou province, China. They use the one-step translog stochastic frontier model to estimate the production function and instrumental variable approach to address the selection biases associated with outsourcing service adoption. They find that farmers' decisions to outsource agricultural services provided by cooperatives significantly increase the technical efficiency of tobacco production. The effects of outsourcing on technical efficiency are highly heterogeneous across the six production stages: outsourcing nursery services, mechanized tillage services, planting protection services, harvesting services, flue-curing services, and grading services. Among them, outsourcing nursery services, mechanized tillage services, and planting protection services appear to have positive and significant impacts on the technical efficiency of tobacco production.

Neupane, Paudel, and He's paper, "Impact of cooperative membership on market performance of Nepali goat farmers", investigates the impact of cooperative membership on market channel selection (cooperatives, local market, and collector) and pricing outcomes, in Nepal. They apply an endogenous switching probit model to analyze the data collected from a survey of 661 Nepali goat farmers. Their results reveal that goat farmers with cooperative membership are more likely to choose cooperatives as their market channel, and farmers who sold their goats through cooperatives received significantly higher prices than those who sold through local markets or to goat

collectors. They also find how farmers who had access to price information can obtain better prices for their goats.

### 4.3 | Impacts on intra-household decision-making

Membership in farmers' organizations may influence intra-household decision-making regarding the division of household labor and production resource allocations. Our special issue contains two papers investigating how agricultural cooperatives in China and self-help groups in India determine intra-household decision-making in off-farm work participation and agricultural production, respectively.

Zheng, Vatsa, Ma, and Rahat's paper, "Does agricultural cooperative membership influence off-farm work decisions of farm couples?", investigates how membership in agricultural cooperatives affects the decisions of farming couples to engage in off-farm work, by using the data collected from 595 banana-producing households in rural China. They adopt a sample of 595 banana farmers in China and use a recursive bivariate probit and endogenous-treatment Poisson regression model to address the self-selection bias. They find that cooperative membership increases the likelihood of husbands and wives participating in off-farm work by 38% and 31%, respectively. In addition, cooperative membership is associated with a 73.1% reduction in the predicted probability of neither the husband nor the wife working off-farm but a 62% increase in that of both working off-farm.

Padmaja, Trivedi, and Srinivas's paper, "Women self-help groups and intra-household decision-making in agriculture", investigates the effect of women-centric agricultural self-help groups (SHGs) on intra-household decision-making in agriculture in India, using propensity score matching and inverse probability-weighted adjusted regression models. They analyze the data collected from 815 households through Focus Group Discussions and in-depth interviews. Intra-household decision-making was captured by two dummy variables that indicate whether the female is the primary decision-maker regarding agriculture in a household (yes = 1) and whether there is a difference in the perceived decision-making role within a household (yes = 1). They find that women's participation in SHGs increases their role in decision-making in agriculture by 8–13%. However, the effects vary according to the type of intervention and the decision, and there exist fewer discords in intra-household decision-making in seed SHGs than in micro-finance SHGs.

### 4.4 | External interventions and cooperative performance

The development and performances of cooperatives can be influenced by external interventions such as cooperatives' adoption of information and communication technologies and government policies. However, this field receives little attention in the literature. This special issue includes two papers (one from Vietnam and another from China) that enrich our understanding of the nexus between external interventions and cooperative performance.

Nguyen, Do, Rahut, Nguyen, and Chhay's paper, "Female leadership, internet use, and performance of agricultural cooperatives in Vietnam", examines the factors affecting the use of the Internet in agricultural cooperatives, the effects of Internet use on cooperatives' performance, and the distributions of these effects on economic performances. A dataset of 3,512 agricultural

cooperatives in Vietnam is analyzed using a Probit, a heteroskedasticity-based approach, and an unconditional quantile regression model. The authors find that (a) female leadership is a driver of Internet use in agricultural cooperatives; (b) Internet use in agricultural cooperatives significantly improves their economic performance (returns on assets, returns on equity, and labor productivity), social performance (the payment per laborer and contribution to labor union funds and insurance per laborer), and innovative performance (innovation in products); and (c) Internet use of agricultural cooperatives increases income inequality, and agricultural cooperatives with larger revenue benefit more from Internet use.

Chen, Xu, and Luo's paper, "False prosperity: Rethinking government support for farmers' cooperatives in China", examines the relationship between direct administrative intervention and the development of farmer cooperatives in China, using the survey data collected from 504 cooperatives in Jiangsu, Jilin and Sichuan Provinces. They state that government interventions such as enacting the Farmers' Specialized Cooperatives Law in 2007 and providing farmers with fund support when establishing cooperatives contributed to the rapid growth of rural China's cooperative population and membership size. However, this also leads to the non-standard phenomena of Chinese cooperatives, such as the emergence of shell cooperatives (i.e., the registered cooperatives do not play real functions) and fake participation. Their data collected in 2014 reveal that approximately 37% of the 504 surveyed farmers' cooperatives are shell cooperatives, and direct administrative intervention is the main cause of shell cooperatives and the "fake participation" phenomenon. By empirically analyzing the data of 241 marketing cooperatives with a generalized linear model, they find that task-oriented policy support increases the membership size of cooperatives but does not have a significant influence on cooperatives' function.

## 4.5 | Organizational governance and efficiency

In addition to exploring how farmers' organizations influence technology adoption and farm production and marketing performance, it is vital to enhance the sustainable development of such organizations. Four papers collected in this special issue discussed organizational governance and efficiency.

Hintz and Pretzsch's paper, "Co-creation of business models for smallholder forest farmers' organizations: Lessons learned from rural Ethiopia and Tanzania", develops forest farmers' organization (FFO) business models to evaluate their effectiveness within the regulatory framework and value chain upgrading theory. They combine the Input-Output scheme and the Business Model Canvas to create an analytical framework. They conduct participatory workshops with two farmers' organizations in Ethiopia and Tanzania, complemented by focus group discussions and key informant interviews. The co-created business models demonstrate the entrepreneurial potential of smallholders in envisioning FFOs. They identify areas requiring external support, such as accessing microfinance, silvicultural practices, and entrepreneurship know-how. They argue that the transformation from a farmers' organization to an FFO enables wood value chain upgrading and diversifying wood with non-wood products is key for FFOs.

Segovia-Vargas, Miranda-García, and Oquendo-Torres's paper, "Sustainable Finance: The role of savings and credit cooperatives in Ecuador", tests whether savings and credit cooperatives are sustainable over time from an economic and social perspective. They analyze the whole

population of savings and credit cooperatives in Ecuador, focusing on the overall profitability of the company (i.e. return on equality, which is necessary for the viability of the business) and the profitability of the microcredit portfolio (necessary to contribute to sustainability and the creation of social values). They adopt several methods, including a decision tree (classification and regression tree), random forest, and gradient-boosting machine learning, to predict the profitability of saving and credit cooperatives. They find that saving and credit cooperatives in Ecuador are profitable, and the cooperative size (measured by equity, assets, and interest income) is the most relevant variable to predict the return on equity, whilst the prediction of the profitability of the microcredit portfolio is conditioned by the credit variables (the implicit lending rate and credit spread).

Meliá-Martí, Meira, Martínez, and Bertuzzi's paper, "Cross-border cooperation: A response to the challenges facing agri-food cooperatives in southern European countries", examines the cooperative regulations in Spain and Portugal and the Statute for a European Cooperative Society to understand the process and potential conflicts involved in cross-border cooperation. They examine the regulatory framework, including current legislation in both countries, together with European legislation, such as the Statute for a European Cooperative Society, to ascertain the legal options for setting up cross-border cooperatives and their potential constraints. They carry out the identification of cases by contacting the organizations representing cooperatives in both countries to study and characterize cross-border cooperation experiences between agri-food cooperatives and other social economy organizations in Spain and Portugal and to highlight the reasons that have pushed them to cooperate, as well as the problems and drawbacks that have arisen in this relationship. They find that the Statute for a European Cooperative Society has not had the expected success at the European Union level, due to its complexity. However, in general, the lack of expected cross-border cooperative experiences was not due to legal, language, or management issues but to other reasons. Firstly, cooperatives think that they can achieve the same objectives through inter-cooperative agreements. Secondly, government policies protect the regional nature of their cooperatives rather than encouraging them to expand their business and, therefore, their capacity to respond to current challenges

Singh's paper, "(Farmer) producer companies in India as new generation cooperatives: Case studies of performance and impact from West Bengal, India", investigates how producer companies (PCs) affect the livelihoods of member farmers, using the member and non-member farmer interview survey conducted in the Indian state of West Bengal. They find that although PCs include small farmers as their members, the PC interface with members for farm inputs is not very strong. In addition, the output linkage between PCs and members is poor: only 25% of member farmers have sold vegetables to the PCs, and 3% each sold paddy and fruits. However, the presence of the Sufal Bangla public supermarket franchise operated by some PCs improves the PC performance and benefits their member farmers. The limited membership size in the most case study PCs creates challenges in terms of equity size, leading to constraints in working capital and market interaction.

## 5 | POLICY IMPLICATIONS

The findings of all published papers in this special issue highlight the importance of farmers' organizations in supporting sustainable development. The policy implications derived from the published papers' key findings can be summarised as follows.

## 5.1 | Implications for promoting technology adoption

The positive relationship between membership in farmer groups and the adoption of good management practices suggests that the central and regional governments should integrate their support for extension service programs on good management practices into farmer group activities, where farmers can make use of the fund to work together, share and discuss their experiences of good management practices. In addition, policymakers should consider ways of facilitating social interactions amongst farmers in the same community because, due to peer effects, farmers may stimulate their neighbours to participate in farmer groups and further affect their uptake of good management practices. Farmers identified as good environmental performers (e.g., through the young farmer leader program) can be introduced as leaders to local farmer groups. These leaders can help to lead activities and discussions about the adoption of good management practices.

The finding that cooperative membership facilitates family farms to adopt new agricultural technologies provides supportive evidence to promote the new agricultural business mode of “family farms plus cooperatives”. Cooperatives would provide family farms with an important channel to acquire information about new agricultural technologies and improve their capability to adopt them. Farmer cooperatives face challenges in effectively facilitating the adoption of environmentally sustainable farming practices due to collective action dilemmas, member heterogeneity, as well as constraints in membership size and human resources of cooperatives. Three suggestions would help to enhance cooperatives' roles in facilitating sustainable agricultural development: (a) improving farmers' understanding of cooperatives in terms of member ownership can help alleviate the collective action dilemma and reduce opportunistic behavior; (b) enlarging the organization size of cooperatives can help achieve the scale economy and cost-effectiveness for technical innovations and applications in sustainable production; and (c) providing farmers with more financial and human resource support from the government side can help address market failure and strengthen the capability of farmer cooperatives to organize farmers to adopt and apply sustainable farming practices.

## 5.2 | Implications for improving farm production and marketing performance

Although the meta-analysis reveals that membership in agricultural cooperatives does not significantly improve farm yield, this does not necessarily imply that policymakers in developing countries should reject cooperative organizations as a tool for economic development. If they do not yield benefits, cooperatives must be generating other benefits for farmers; otherwise, they would not be so prevalent. Thus, policymakers should focus on making cooperatives work better, especially by improving their provision of yield-improving services, rather than on how many cooperatives they should build. In practice, cooperatives should train their members on how to use farm inputs (e.g., fertilizers, pesticides, and improved seeds) efficiently and manage cropland appropriately to boost farm productivity and income.

The finding of the positive relationship between outsourcing services provided by agricultural cooperatives and the technical efficiency of crop production suggests that policymakers should facilitate the development of agricultural outsourcing services and agricultural

cooperatives with policy instruments and subsidies, promote the upgrading of the organizational skills, and outreach services served for farmers. In particular, cooperatives and other service providers should be tailored to provide different services with professional agricultural service teams and facilities, to meet the specific technical and power requirements of different growing and harvesting tasks in agricultural production. Cooperative membership also increased farm marketing performance by enhancing farmers' bargaining power at the sales markets and allowing them to sell their products at higher prices. These findings suggest that encouraging farmers to join cooperatives can help to reduce price uncertainties while providing training on production practices and ways to receive price information from local markets could be a valuable resource. To promote cooperative membership, policy measures such as clear legal frameworks and provisions for tax reductions and other promotional propositions should be implemented.

### 5.3 | Implications for empowering rural laborers

The findings that membership in agricultural cooperatives motivates rural laborers to participate in off-farm work highlighted the benefits of advising rural households to join agricultural cooperatives. Increasing fiscal outlays such as subsidies and providing tax incentives to cooperatives may pay rich dividends in improving the quality of life in rural China. Given the regional differences in the effectiveness of cooperative membership in helping households secure off-farm work, a one-size-fits-all policy framework is unsuitable. Policies ought to be designed with these differences in mind. The findings show that women's participation in self-help groups increases their role in decision-making in agriculture. Thus, institutions could first identify a key family requirement that the self-help group could fulfill to empower women in agriculture. In the case of micro-finance self-help groups, credit is an important need for households, and membership in self-help groups is an enabler. The ability of women to fulfill such needs earns them decision-making power within the family.

### 5.4 | Implications for boosting cooperative performance

The finding that female-presided cooperatives and cooperatives with a higher share of female laborers are more likely to use the Internet suggests that female leadership should be promoted to improve Internet use in agricultural cooperatives. Internet use improves agricultural cooperatives' economic, social, and innovative performance. Thus, there is a great need to promote Internet use among agricultural cooperatives in developing countries. Nevertheless, female leadership is less pronounced in contributing to the improvements of the economic, social, and innovative performance of cooperatives and this calls for a policy response to improve women's knowledge and experience in business operations. The finding that having a vocational training degree or higher in management board members improves cooperative performance underlines the importance of taking in board members with better education.

The false propensity of cooperatives caused by improper incentives would cause resource waste. For the future healthy development of cooperatives, proper government incentives are crucial. From the perspective of policymakers, indirect financial support such as tax cuts should have priority over direct administrative intervention. If direct administrative intervention is applied as a supplement, more weight should be given to indicators reflecting quality rather than quantity.



Additionally, people with government backgrounds should be strictly forbidden from receiving cooperative positions. Through the lens of cooperatives, policy support may help cooperatives to survive in the fierce market competition with other organizations at the early stage. However, cooperatives should rely more on themselves after getting on the right track. Of course, fraud of any kind should be discouraged.

## 5.5 | Implications for enhancing organizational governance and efficiency

Forest farmers' organizations (FFOs) play a crucial role in upgrading wood value chains, which necessitates concerted efforts by actors along the value chains. Thus, decision-makers or practitioners interested in advancing forest-related national goals through FFOs can consider two recommendations: (a) where explicit institutional support for FFOs is in place, the ability of the organization to strike a balance between realizing its grassroots ideas and being guided by institutional support actors is essential; (b) where support is not in place, the technical know-how regarding silvicultural practices and rural entrepreneurship could be integrated by existing agricultural extension programs.

Savings and credit cooperatives are found to play an important role in providing sustainable finance. Thus, the national, regional, and local governments should invest in and financially support the development of savings and credit cooperatives. Policymakers should provide appropriate support and a legal environment that facilitates the social impact of financial institutions by placing people (and the environment) at the centre of their financial operations. All cooperatives share common interests, irrespective of their geographical borders. Thus, creating cross-border cooperatives can generate benefits (e.g., the acquisition of cheaper goods or simply a way to internationalize) for all the parties involved. It is important to encourage members to contribute more equity and to reward their output linkage to improve the producer operation efficiency of the company.

## 6 | CONCLUDING REMARKS

This special issue contributes to understanding the relationship between farmers' organizations and sustainable development. It provides in-depth insights into how farmers' organizations influence technology adoption, farm performance, and intra-household decision-making, explores how external interventions affect cooperative development, as well as investigates the organizational governance and efficiency of farmers' organizations as business entities. These findings highlight the importance of the effective implementation of supportive policies to develop farmers' organizations globally and in developing countries in particular. Furthermore, the research presented in this special issue offers practical recommendations for promoting farmers' participation in farmers' organizations. These recommendations can be precious for developing countries and rural households, where the empowerment of farmers through collective action is crucial for their socio-economic progress. By adopting the insights and practical approaches shared in this special issue, policymakers, development agencies, and stakeholders can take concrete steps to foster the growth and sustainability of farmers' organizations. This, in turn, will contribute to achieving multiple sustainable development goals, such as poverty reduction, food security, and inclusive rural development.



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