RESEARCH PAPER 2024-05

ASSESSING THE ROLE OF SOCIAL ENTERPRISES IN SHAPING ECO-SOCIAL AGRICULTURE

Evidence from Smallholder Organic Growers in West Bengal (India)

Arindam Laha, Nilojyoti Koner and Santanu Kumar Ghosh

UNRISD UNITED NATIONS RESEARCH INSTITUTE FOR SOCIAL DEVELOPMENT

Research for Social Change

UNRISD UNITED NATIONS RESEARCH INSTITUTE FOR SOCIAL DEVELOPMENT

The United Nations Research Institute for Social Development (UNRISD) is an autonomous research institute within the UN system that undertakes multidisciplinary research and policy analysis on the social dimensions of contemporary development issues. Through our work we aim to ensure that social equity, inclusion and justice are central to development thinking, policy and practice.

UNRISD, Palais des Nations
1211 Geneva 10, Switzerland
Tel: +41 (0)22 9173060
info.unrisd@un.org
www.unrisd.org

June 2024

This paper was prepared in response to a call for papers for the UNRISD Global Policy Seminar for a New Eco-Social Contract, Bonn, Germany, 29–30 August 2023.

UNRISD working papers are posted online to stimulate discussion and critical comment.

Suggested citation: Laha, Arindam, Nilojyoti Koner and Santanu Kumar Ghosh. (2024). *Assessing the Role of Social Enterprises in Shaping Eco-Social Agriculture: Evidence from Smallholder Organic Growers in West Bengal (India)*. Working paper 2024-05. Geneva: United Nations Research Institute for Social Development.

Abstract

The potential of Social and Solidarity Economy (SSE) in the agricultural sector lies in designing people-centric and planet-sensitive approaches that recognize the multifunctional nature of agriculture in producing not only commodities, but also non-commodity outputs such as environmental services, landscape amenities and cultural heritage, and social services. Applying SSE approaches in agriculture is considered a response to intensive farming, which deviates significantly from the traditional nature-based social contract. In this context, an intervention of social enterprises in shaping eco-social agriculture can enable smallholders to restore their earlier contracts with nature. This study contributes to the existing literature by addressing a lack of empirical research on social farming experiences in the global South and the role of social enterprises in facilitating eco-social agricultural initiatives. This study presents empirical research on the role of ONganic Foods—a social enterprise that has developed a strong relationship with smallholder organic producer groups in the Nadia district of West Bengal—in supporting eco-social agriculture. A progressive alliance between the local organic smallholder group, ONganic and the state supported the integration of local smallholders in eco-social transformation processes. The evidence presented in the paper shows that eco-social agriculture can contribute to fulfilling the Sustainable Development Goals (SDGs) at the local level.

Contents

List of tables

List of figures

Acronyms

DID	Difference-in-Differences Method
FAO	Food and Agriculture Organization
INR	Indian rupee
PGS	Participatory Guarantee System
PKVY	Paramparagat Krishi Vikash Yojana (Traditional Agriculture Development Programme)
SDG	Sustainable Development Goals
SSE	Social and Solidarity Economy

Acknowledgements

The authors acknowledge the contribution of the organic smallholders at Nadia for their responses. We would also like to acknowledge the contribution of Ekta Jaju, CEO of ONganic Foods, and her team members for providing relevant information about the organization, sharing the impact report, and disseminating other information for desk research. We extend a special thanks to Katja Hujo and Maggie Carter for their sincere effort in reviewing the entire manuscript.

1. Introduction

Twenty-first century development ideals are centred on social equity, inclusion and justice. Multiple global crises, including the environmental crisis, as well as the consequences of globalization, have prompted world leaders and researchers to search for alternative production and consumption patterns and ways of organizing enterprise activities. Social and solidarity economy (SSE), which is meant to satisfy human needs and help in the expansion of human capabilities by enhancing social relations through cooperation, association and solidarity, has been considered by many researchers as a potential alternative model. SSE prioritizes social and ecological considerations over private economic interest and pure profit orientation. SSE holds considerable promise in reorienting economies and societies toward achieving many of the Sustainable Development Goals (SDGs) (UNRISD 2016). In the ongoing process of eco-social transformation,[1] SSE represents a people-centred and planet-sensitive approach to address the economic, social and environmental objectives of sustainable development.[2] The Food and Agriculture Organization (FAO) has conceived SSE-based approaches to agroecology as a response to the shortcomings of industrial agriculture (Hitchman 2023). In fact, SSE is included as one of the "10 Elements of Agroecology" adopted by the FAO Council in December 2019.

What has been labelled the "Green Revolution," a move toward technology-intensive industrial agriculture, involved a process of marked deviations from the traditional nature-based procedures that prevailed in India before. Despite its success of improved yield and reducing the dependence on foodgrain imports, this input-intensive and agrochemical-based agriculture has created negative externalities by breaking earlier social contracts with nature (Pimentel and Pimentel 1990; Rahman 2015). Focused mainly on a "shortsighted" objective of enhancing yield, this modern agricultural technology "paid little or no attention" to its impacts on the environment (Baum and Pimentel 1987). The adverse consequences were reflected in increased use of pesticides (leading to subsequent negative impacts on the aquatic environment, reduction in natural enemies of pests, and the emergence of new pests), heavy reliance on fertilizers and fossil fuel-based energy, mismanagement of soil and water resources, and political and cultural costs (Shiva 1989).

Besides this technological reform, a shift toward market fundamentalist approaches (a product of the neoliberal turn) has led to the breakdown of developmental social contracts in the global South (UNRISD 2022). In the Indian agricultural context, a series of neoliberal economic reforms, namely, the reduction or withdrawal of input subsidies, privatization and marketization of economic activities, had a detrimental impact on smallholders (Patnaik 2006; Goswami et al. 2017). The present state of the country's farming system is characterized by high production costs, volatile market prices of crops, rising costs of fossil fuel-based inputs and privatization of seeds (Badwal et al. 2019). Therefore, to find more sustainable solutions to these pressing challenges, there is an urgent need for a new social contract that could improve broken agrarian relations while respecting the importance and integrity of nature.

1 By the term "eco-social transformation," we mean a "worldwide remodeling of economy and society towards sustainability" (WBGU 2011). See also UNRISD (2022).
2 UNTFSSE 2014; Utting 2015; Yi et al. 2023.

In the food and agricultural sector, SSE organizations (namely, cooperatives, mutual benefit societies, associations, foundations, farmer collectives and social enterprises) are engaged in producing goods, services and knowledge by means of fostering solidarity and building local economies (Dash 2016; Bhowmik 2022). The potential of SSE lies in designing an integrated approach in rural disadvantaged areas by combining agricultural multifunctionality with the innovation of social services (Elsen 2023). Multifunctionality recognizes the contribution of agriculture in producing not only commodities but also non-commodity output such as environmental services, landscape amenities and cultural heritage (Renting et al. 2009). Social farming is one approach within the broader concept of multifunctional agriculture (Nicli et al. 2020). Social farming adopts a multifunctional view of agriculture by combining farming activities with social services at the local level (EESC 2012). It not only establishes close contact with nature,[3] but also generates a "positive sense of well-being" for the local community through the provisioning of social services in many different areas (including healthcare, therapy, rehabilitation, life-long education, vocational training, employment support and women's empowerment) (Herman 2015; García-Llorente et al. 2016). Since the end of the twentieth century, different forms of social farming have been in practice across European countries. In fact, organic cultivation and biodynamic agriculture are two predominant modes of social farming (Nicli et al. 2020; Elsen 2023).[4] Such eco-social farming practices can foster eco-social transformation. Five broad components of eco-social farming are empowerment of disadvantaged people, sustainable agricultural practices, protection of natural resources, support to the community and education for sustainable development (Nicli et al. 2020).

Social farming practices contribute to the formation and growth of social capital (Knapik 2018), which can catalyse a structural change toward making societies more inclusive. The growth of social capital allows individuals to work together to achieve a common purpose through the social farming practice at a community level. It is generally held that such a community economy facilitates the eco-social transformation process (Elsen 2018). It provides an opportunity for smallholders to unleash the potential of collective action in this process of transformation. The community-based management approach of social farming can strengthen the solidarity principle and support poor and marginalized groups who have been excluded from previous social contracts (García-Llorente et al. 2016). For instance, the inclusion of disadvantaged farmers in a network built on the foundation of shared values (in the form of farmer collectives) can support their empowerment by facilitating a range of agricultural activities, such as creating new supply chains, exploring new product markets for their harvested crops, and engaging more stakeholders in farming activities. Agricultural cooperatives, farmer producer organizations and organic clusters[5] are examples of such large-scale collective efforts that play an instrumental role in re-embedding nature back into the economy and society (UNRISD 2022; Dik et al. 2022). A large-scale collective effort is considered a pre-condition for the effective adoption of organic cultivation (Reddy et al. 2022). Organic farming cannot be practiced in isolation as it requires

3 Traditional forms of health care services believe in contact with nature as a form of therapy (Sempik and Brag 2016).

4 Biodynamic agriculture is another mode of social farming. Like organic farming, this practice also excludes the use of synthetic fertilizers and pesticides and rather depends on manures and composts. Country-level experiences suggest that organic farming as a mode of social farming is widely practiced in Catalonia (Guirado et al. 2017), Italy (Fazzi 2011), Austria (Wiesinger et al. 2013) and Germany (Limbrunner and van Elsen 2013).

5 An organic cluster comprises 25–50 organic producer groups registered under the Paramparagat Krishi Vikash Yojana (PKVY). Each PKVY group should have a minimum of 20 farmers engaged in organic production, certification and marketing activities. See footnote 13 for a further explanation of PKVY.

converting a substantial amount of farmland from neighbouring areas into organic farming to limit their exposure to the detrimental effects of chemical cultivation.[6]

However, a robust support mechanism is needed to assist these solidarity groups in their sustainability transition journey (Reddy 2017). There has been a growing recognition of the role of bottom-up initiatives (such as social enterprises) in facilitating this social and ecological transition (UNRISD 2022). So, the design of an inclusive policy on agriculture calls for the promotion of corporatist social contracts, whereby the state, farmer collectives and social enterprises provide an ecosystem conducive for implementing the SDGs. The adoption of eco-social agriculture is considered to be an effective strategy in the localization of SDGs. With social enterprise support, the transition toward eco-social agriculture can be accelerated. Moreover, the components of eco-social agriculture are closely linked with three fundamental principles of eco-social contracts:[7] new forms of solidarity, a contract for nature, and progressive fiscal contracts.[8] Compliance with the principles of eco-social contracts can generate intended outcomes of social agriculture and thereby have a far-reaching impact on the attainment of global development goals. In fact, a global consensus has defined the key objectives—the SDGs—that a new eco-social contract needs to fulfill (UNRISD 2022). In other words, compliance with the principles of eco-social contracts fosters transformative actions that can lead to the attainment of global development goals. Figure 1 outlines the linkage between the principles of eco-social contracts and the components of social agriculture and its ultimate implications for achieving the SDGs.

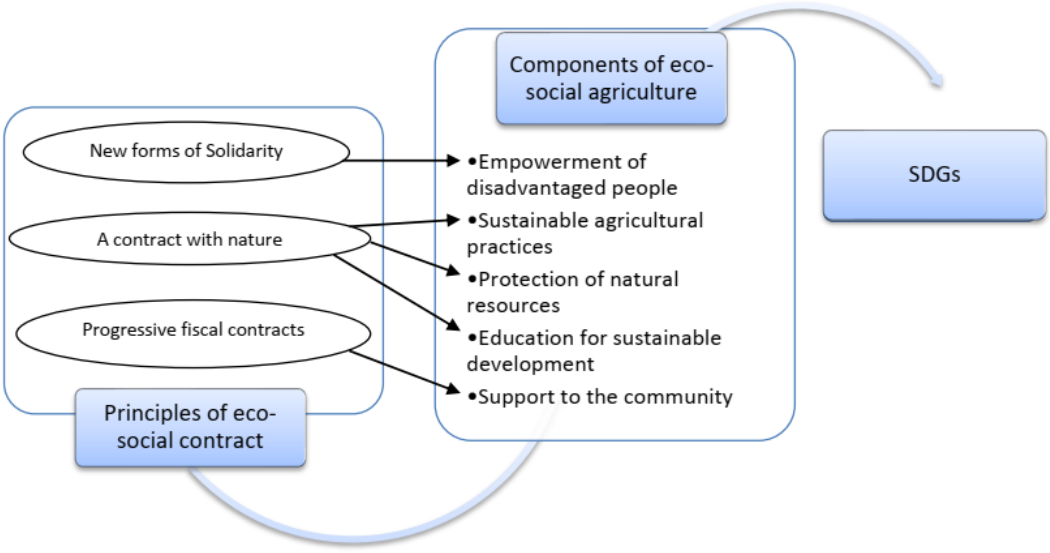

Figure 1. Implications of Eco-Social Contracts on SDGs via Eco-Social Agriculture
Source: Authors' composition based on UNRISD (2022) principles for an eco-social contract

6 Practicing organic cultivation in a small piece of land surrounded by non-organic land poses a threat of exposure from the non-organic practices from adjacent land. Therefore, for effective implementation, large tracts of contiguous land need to be brought together under organic cultivation so that the non-organic practices do not hamper organic operations.

7 UNRISD has designated seven principles for building a new eco-social contract: human rights for all, progressive fiscal contracts, transformed economies and societies, a contract for nature, historical injustices addressed, gender justice and solidarity (UNRISD 2022).

8 The components used here essentially follow the same shared vision principles (increase productivity, employment and value addition in food systems; protect and enhance natural resources; improve livelihoods and foster inclusive economic growth; enhance the resilience of people, communities and ecosystems; and adapt governance to new challenges) recommended in the FAO's approach that can ensure a balance between social, economic and environmental dimensions of sustainable agriculture (FAO 2018b).

In this backdrop of the conceptual framework, this study broadly examines the facilitating role of the social enterprise in realizing the potential of farmer collectives in the policy-driven journey toward eco-social transformation in agriculture. Some of the specific objectives of the study that are framed in light of the research gaps in the existing literature are mentioned as follows:

Firstly, the practice of social farming is well-conceived in the context of European countries (Di Iacovo 2020).[9] However, empirical evidence on this mode of sustainable or alternative agricultural practices from the global South (India in particular) is relatively scarce in the existing literature (Cofini 2014). In the Indian context, social farming initiatives include Swastha Centre from Karnataka (Petric 2014; Cofini 2014) and Nisarg Nirman from Maharashtra (Sohoni and Joshi 2015). However, there is still a lack of evidence-based research on social farming initiatives in the Indian context. Against this backdrop, this study presents a case of eco-social agriculture in the Nadia district of West Bengal (an Indian state characterized by a high smallholder population),[10] showcasing its potential in fostering a sustainable transformation to organic farming by combining social and ecological concerns. In recent times, eco-social agriculture practices have added a new dimension to social farming research (Nicli et al. 2020)[11] by addressing the problems of social viability (through innovative support mechanisms), economic efficiency and environmental protection.

Secondly, in the transition (Slimi et al. 2021) to sustainable or alternative agriculture, the role of different forms of farmer collectives—agricultural cooperatives (Luo et al. 2020; Nicli et al. 2020), farmer producer organizations (Meek and Anderson 2020; Malik et al. 2022) and organic clusters (Zollet and Maharjan 2021; Reddy et al. 2022)—has been assessed. An assessment of the role of social enterprises in the formation of such collectives and its measurable social, economic and environmental impacts can be considered a significant contribution to the existing literature.[12] Against this backdrop, this study examines the role of ONganic Foods along with its parent organization SwitchON Foundation in facilitating smallholder rice growers in the formation of an organic producer group in the Nadia district of West Bengal. An impact assessment of these interventions on the measurable outcome variables (cost of cultivation, crop yield, price realization and agricultural income) is made. Such outcomes have been further linked to the targets of the SDGs in a mapping exercise. In fact, the SDG targets are considered as a guideline to measure and monitor the progress achieved by the local initiative.

This study is organized as follows. The next section focuses on the conceptualization of the problem, the purpose of choosing this case initiative, the context of the study, desk research and primary survey methodology, and impact assessment methods used in this study. Empirical

9 Some of the specific country level studies on social farming are made in the context of Italy (García-Llorente et al. 2016; Gramm et al. 2020; Nicli et al. 2020), Czech Republic (Hudcova et al. 2018; Kučerova 2018), Austria (Gramm et al, 2020; Nicli et al. 2020), Spain (García-Llorente et al.2016; Nicli et al. 2020), Catalonia (Guirado et al. 2017), Germany (Gramm et al. 2020) and Switzerland (Gramm et al. 2020).

10 A high rate of household division in West Bengal over the period 1960–2004 resulted in a sharp decline in land per household (Bardhan et al. 2014). The average size of holdings in West Bengal is 0.76 hectares compared to the all-India average of 1.08 hectares (Agricultural Census 2015–16).

11 This new dimension of social farming can be considered as a research gap in the existing body of literature, as suggested by Jarábková et al. (2022), Sarkar et al. (2022) and Yu and Mu (2022).

12 This research gap has also been identified by Ferreira et al. (2016), Chaudhuri et al. (2020), Cardella et al. (2021), Tan (2022), Hota (2023) and Satar et al. (2023).

evidence from this case in light of the components of eco-social agriculture is presented in section 3, results and discussion. Conclusions and policy implications are outlined in the final section.

2. Data and Methodology

2.1 Case selection

This study focused on a single case of eco-social agricultural practices in the Nadia district of West Bengal. The community-based social farming initiative of an organic producer group (Hanskhali Onfarm Farmers Group) was facilitated by a social enterprise (ONganic Foods) under a public scheme for the promotion of organic farming (Paramparagat Krishi Vikash Yojana, or PKVY, scheme).[13] ONganic Foods (a subsidiary of SwitchON Foundation, a non-profit organization) is one of the leading suppliers of certified organic agro-products in India. It works closely with the smallholder farming communities in the eastern and northeastern parts of the country (especially in the states of West Bengal, Sikkim, Assam, Meghalaya and Manipur) to provide support in their organic conversion journey. Its primary objective is to build a sustainable agricultural value chain (with a specific focus on value-added production and marketing) that links smallholder organic growers to the domestic and global markets. Since the start of its operation in 2016, it has engaged in the production and marketing of certified organic agro-products and educating and training farmers about sustainable agricultural practices. It currently targets both domestic (direct sales to the customers through its own local retail outlets and e-commerce platforms) and international markets. ONganic Foods is a subsidiary of the SwitchON Foundation, a non-profit organization focusing on addressing environment challenges and promoting sustainable livelihoods through innovative business models and technologies.

2.2 Design of the study

In a framework of experimental research design, this study employed mixed methodologies to explore the role of ONganic in promoting eco-social agriculture.[14] For data collection, the study used both desk and field research. In the first stage, relevant information about the initiatives of ONganic was sourced from its official website. Based on the information obtained from this

[13] PKVY is an ongoing flagship programme of the government of India for promoting organic cultivation in India since 2015. A cluster-based approach (with an average farm size of 20 hectares per cluster) is followed in implementing this programme. Under this scheme, 13.9 million organic farmers in 29,859 certified organic clusters (each cluster comprising 25–50 organic producer groups) have formed across Indian states, covering about 0.59 million hectares of land (0.4 percent of croppedarea in India) as of 2021 (Reddy et al. 2022). Since the farmers registered under the PKVY groups follow the Participatory Guarantee System (PGS) of organic certification, these groups are also known as PGS groups. More than 69,000 (of which 340 are in the state of West Bengal) PGS groups have been formed across India as of May 2024 (PGSI 2024). Readers can visit the website of PGS India (https://pgsindia-ncof.gov.in/) to examine the outreach of this scheme across Indian states. However, few studies have assessed the performance of PKVY at the regional level (Chouhan et al. 2022, 2023; Shalini et al. 2023) and the national level (Reddy 2017; Reddy et al. 2022; Ghosh et al. 2023). Specifically, regional-level studies consider the knowledge of farmers about PKVY (Chouhan et al. 2022), the constraints of PKVY (Chouhan et al. 2023), and the impact of PKVY on livelihood (Shalini et al. 2023). Most of these studies have observed that success of the PKVY groups is hindered due to a lack of robust supporting mechanisms specially in the areas of capacity building, marketing, value addition and branding. Interventions of agri-social enterprises with their specialized expertise in these key areas can play an instrument role in ensuring viability of these groups (Reddy 2017). However, none of the studies (at the national or regional level) have explored the role of social enterprises (or other SSE actors) in achieving economic, social and environmental outcomes using appropriate impact assessment methodology.

[14] The mixed method design allows the integration of qualitative and quantitative data within a single study which can help gain insights into the research problem (Teddlie and Tashakkori 2003).

process, a semi-structured questionnaire was designed and subsequently sent to the representatives of ONganic via mail. The questionnaire was designed to capture data relating to organizational details (for example, starting year of operation, area of operation, number of farmers currently associated with this enterprise) and the details about the activities of social agriculture (for example, social, education, capacity building assistances, enabling market participation and other livelihood services). Official responses through a series of mail conversations were also recorded to validate our preliminary observations gathered through the online search and to develop a deeper understanding about the multi-functional agricultural practices of ONganic.

2.3 Primary survey methodology

To triangulate the findings and to gain further insights into the role of ONganic from the farmers' perspective, field visits were made. During these visits, household-level interviews were conducted with 58 organic rice growers associated with this enterprise. Similarly, 52 neighbouring conventional (or non-organic) rice farmers not associated with ONganic were also interviewed. A semi-structured questionnaire was used to collect qualitative and quantitative information concerning the demographic characteristics of the sample farmer households, their agricultural practices (e.g., cultivation methods, crops, livestock), and details of farming operations (crop yield, prices, cost of cultivation and agricultural income). The farmer interviews took place from November 2017–February 2018, mostly at their homes or farms. Data relating to input usage, yield, cost, price and income were collected, covering both pre- and post-joining periods. The farmers joined the organic producer group facilitated by ONganic at the start of the agricultural season of 2016, and the survey was designed to capture any change in farming outcomes (cost of cultivation, yield, price and income) over the pre- (2015) to post- (2016 and 2017) joining period. In the absence of recorded data, most of the farming details were collected based on the farmers' recall memory. In addition, open discussions were held with the contracted organic farmers to learn more about their motivation, challenges and specific experiences with ONganic. Background information on the social enterprise and farmer interview details are shown in table 1.

Table 1. Farmer Interview Details

Surveyed villages	Gopalpur, Muchi Fulbari and Fulbari
Surveyed block	Hanskhali block
Surveyed district	Nadia district (West Bengal)
Number of farmers engaged in this region	133
Nature of engagement	Explicit contract agreement
Number of contracted farmers interviewed	58
Number of non-contracted farmers interviewed	52
Total sample size of farmer households	110
Sampling method applied in the selection of farmer households	Convenience sampling

Source: Field survey, 2018

2.4 Method

The collected data were analyzed both quantitatively and qualitatively. The study used the "difference-in-differences" (DID) method, a quantitative tool of data analysis, to assess the impact of the farmers' association with ONganic on outcome variables (such as cost of cultivation, crop yield, price and agricultural income). More specifically, the DID method was applied to assess whether their engagement with ONganic had a positive effect on the desired outcomes (e.g., reducing the cost of cultivation, enhancing yield, realizing higher prices and increasing income) for the farmers who joined ONganic as compared to the farmers not associated with ONganic (control group) in the study region. The assessment was done with the help of DID estimates which measure the impact by capturing the change in outcome variables between the treatment and control groups due to the intervention (i.e., treatment effect) after discounting their initial differences in the base period (Gertler et al. 2011; Reddy et al. 2022). Alternatively, we can compare the average change over time in the outcome variables (i.e., cost, yield, income, etc.) for the treatment group (farmers associated with ONganic, or the organic farmers), compared to the average change over time of the control group (farmers not associated with ONganic, or the conventional farmers). For instance, assume that after the conversion, the average farmgate price received by the organic farmers has increased by x percent. However, after discounting a y percent price rise experienced by the conventional farmers in that same period, the impact of organic conversion comes down to a (x-y) percent relative increase in price (as the converted farmers experienced x percent of exact increase and missed out on a y percent price rise by not continuing conventional cultivation practices).

3. Measuring the Impact of Eco-Social Agriculture: Implications for the SDGs

The progressive alliance between local communities, social enterprise and the state developed under the framework of the PKVY scheme supported the local smallholders in their sustainability transition. The operating mechanism of the scheme showed a reflection of a solidarity principle that encouraged the building of a network where public bodies, local SSE actors (e.g., community-based organizations, such as organic producers' groups, social enterprises, etc.) and communities work together toward the common goal of making agriculture sustainable. Primary survey observation showed that the state and social enterprises (ONganic and SwitchON) supported the solidarity group of local smallholders by creating a corporatist social contract[15]. The engagement/interaction, agreement and consent among the three players (Hanskhali Onfarm farmers group, ONganic/SwitchON and the state) in a tripartite agreement are shown in figure 2. It also shaped a progressive fiscal contract (through different welfare provisions[16] under the PKVY scheme) and the fair distribution of benefits (remunerative prices

[15] Usually a corporatist social contract (or social pact) refers to tripartite bargaining between unions, employers and the state. It relates to the concept of "corporatism," a system where organized interest groups negotiate with the state on key agreements. In the context of agriculture in the global South (India, Senegal, Ghana), Sheingate (2008) showed how social pacts link producer organizations, politicians and bureaucrats for policy formulations. Based on the broad interpretation of corporatism, a new form of interest representation in agriculture (called "neo-corporatism") has emerged recently where negotiation between producers and agribusiness is constituted within the organizations that bring these two segments together (Ortega 2019).

[16] It included different forms of technical and financial assistance provided by the government aimed at building capacities for newly converted organic farmers. The government of India is currently providing financial assistance totaling INR 31,000 per

highlighted in the explicit contract agreement) among the local smallholders. From the societal perspective, participation in organic farming activities through this network allowed the smallholders to rebuild their contract with nature. Further, the facilitating role played by the "stronger"[17] actors (ONganic/SwichON in particular) in the network ensured a new form of solidarity with the smallholders in the local economy. ONganic enabled the smallholders to promote locally grown aromatic organic rice, which in turn raised agricultural income and supported the local economy through their participation in the global value chains. The engagement of SwitchON empowered the smallholders in addressing environmental challenges (through solar-based irrigation systems) and promoting sustainable livelihood (through skill education).

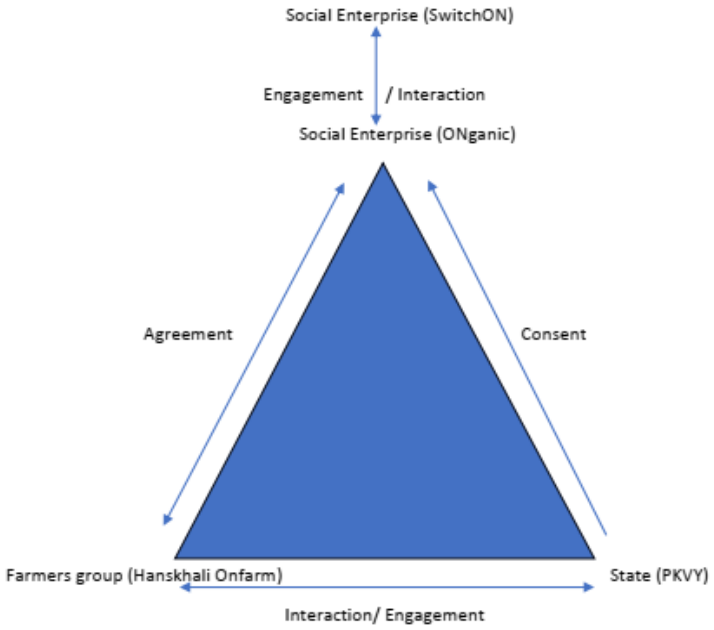

Figure 2: Actors in Corporatist Social Contract and their Relationships
Source: Authors' composition

In the following section, the initiatives of ONganic are evaluated in light of the five distinct roles of eco-social agriculture and how they contribute to SDG achievement, namely, empowerment of disadvantaged people, sustainable agricultural practices, protection of natural resources, support to the community and education for sustainable development.

3.1 Empowerment of disadvantaged people

The embedding process of community-based eco-social agriculture essentially deals with a new form of solidarity among disadvantaged people, especially those living in rural regions (García-Llorente et al. 2016). In the context of India (West Bengal in particular), a major portion of disadvantaged people include smallholders who are becoming increasingly vulnerable to the negative externalities of commercial agriculture (Roth et al. 2024). There is a growing recognition

hectare (subject to a maximum ceiling of one hectare) for the initial three years of conversion toward organic inputs (including support for on-farm input infrastructure) to the organic farmers registered under the PKVY scheme.

17 By "stronger" we refer to those actors in the network who have better access to monetary resources.

among researchers of the potential of social enterprises engaged in the field of agriculture in counteracting these trends.

Survey evidence showed that the farmers associated with ONganic in Nadia were either small or marginal farmers who lacked access to information, opportunities and resources. The majority of them (82 percent) also came from the *dalit* community, i.e., a "backward" caste category in India.[18] Social enterprise played a facilitating role to the smallholders' community in the formation of solidarity groups and networks. In fact, ONganic played a crucial role in the mobilization of the smallholders to form an organic producer group (known as Hanskhali Onfarm Farmers Group) registered under the PKVY scheme of the Government of India. The participation of smallholders in the solidarity group not only ensured social and economic inclusion but also played a key role in supporting their empowerment (SDG 10.2, 10.3). Participation in the PKVY also allowed them to join the existing network of organic farmers under this scheme spread across the districts of West Bengal and use this network as a platform to interact with each other and share their knowledge. This platform was instrumental in building a partnership between local organic farmers, the government and ONganic. It played a key role in fostering identity, solidarity and support for the local economy (SDG 17.17).

Through an explicit contract agreement (centred on the "seed to shelf" model in practice[19]), ONganic not only provided the smallholders access to costly organic inputs (such as quality seeds, bio-fertilizers, bio-pesticides, etc.) at affordable rates (SDG 1.4) but also enabled them to exploit the opportunities offered by the growing organic market (SDG 2.3). ONganic played a key role in connecting small-scale organic producers to the domestic and global supply chain. The market linkage made a significant impact on the economic empowerment of smallholders who were struggling with declining profitability due to rising input costs and stagnant output prices. The practice of organic farming enabled them to reduce the cost of cultivation and also to receive attractive prices for their crops. Specifically, after converting to organic farming with the support of ONganic, the organic farmers in Nadia experienced a 4 percent reduction in the cost of cultivation per hectare,[20] whereas the conventional farmers (the control group working with intensive cultivation) experienced a 6 percent increase in the cost of cultivation[21] (table 2). Overall, the relative costs of farming were reduced by 10 percent after transitioning to organic (as shown by the DID estimate on cost). On the other hand, immediately after the conversion, the organic farmers observed a substantial decline in yield (41 percent). Ultimately, organic farmers experienced a considerable increase in the cost per unit of output. However, the average farmgate price[22,23] received by the organic farmers (as stipulated in the contract agreement with

18 Considering the importance of small farmers in the promotion of organic farming, the PKVY scheme of the government of India introduced a provision specifying that small and marginal farmers should account for at least 65 percent of the total farmers of a cluster formed under this scheme.

19 The "seed to shelf" model is a practice followed by agri-social enterprises that emphasizes their direct interventions throughout the supply chain stages, from the sourcing of the seeds, to farming, inspecting, harvesting, processing, testing and packaging of the product that makes it way to the store shelves and consumers' tables.

20 In a separate study in West Bengal, Das et al. (2021) observed significantly lower production costs of organic rice as compared to conventional rice.

21 The increase in the cost of cultivation for conventional farmers was due to the fluctuations in the market rates of some key farming inputs, such as labour, fertilizers, pesticides, etc.

22 It refers to the value of agricultural produce sold directly from the field. Hence, it does not cover any market transportation cost, warehousing cost, processing cost or any other selling charges.

23 Several studies found significantly higher prices for organic products as compared to non-organic products (Lyngbaek et al. 2001; Amarnath and Sridhar 2012; Pawlewicz 2020).

ONganic) increased by 127 (table 2). On the other hand, conventional farmers witnessed only a 4 percent price rise in that same period. Therefore, the relative price for the organic farmers was increased by 123 percent (table 2). The substantial price premium received by the organic farmers compensated for the decline in yield and generated higher revenue. As a result, the relative income of the organic farmers increased by 177 percent[24] (SDG 2.1, 2.3).

Table 2. Impact of Engagement on Yield, Price, Cost, Revenue and Income

Criteria		Farmers not associated with ONganic	Farmers engaged with ONganic	Impact of engagement (DID estimate)
Yield (q/ha)	Before[25]	44.41	43.92	
	After	45.62	26.01	
	% Change	2.72	-40.78	-43.50
Price (INR/q)	Before	1425	1387	
	After	1483	3154	
	% Change	4.07	127.40	123.33
Cost (INR/ha)	Before	50103	48579	
	After	53234	46641	
	% Change	6.25	-3.99	-10.24
Cost per unit of output (Cost ÷ Yield) (INR/q)	Before	1128.19	1106.08	
	After	1166.90	1793.19	
	% Change	3.43	62.12	58.69
Gross Income (Yield × Price) (INR/ha)	Before	63284	60917	
	After	67654	82036	
	% Change	6.91	34.67	27.76
Net Income (Gross Income – Cost) (INR/ha)	Before	13181	12338	
	After	14420	35395	
	% Change	9.40	186.88	177.48

Source: Field survey, 2017–18

Notes: 1. q = quintal[26], ha = hectare[27], INR = Indian rupee
2. As an impact assessment method, DID here examines to what extent an intervention of social enterprise can contribute to the change in the measurable outcomes (cost of cultivation, crop yield, price realization and agricultural income). DID compare the changes in outcomes over time between a farmer group engaged with ONganic (the treatment group) and a farmer group that is not associated with this social enterprise (the control group). It compares two differences: the first is the difference in the before-and-after changes in outcomes for the treatment group and the second difference is the before-and-after changes in outcomes for a control group that was exposed to the same set of environmental conditions (but did not receive the treatment). As the name suggests, the DID estimator (or impact estimate) is the difference between the difference in outcome for the treatment group and the difference for the control group. It thus eliminates the role of other time-varying factors that may affect the outcome of interest (Gertler et al. 2011). For a better understanding of the table, please refer to the impact assessment methodology in section 2.2.

[24] Qiao et al. (2018) found evidence of higher incomes for the smallholders practicing organic farming vis-à-vis conventional farming. The authors also observed that organic farmers who were members of cooperatives performed better economically than non-members. This highlights the importance of cooperatives in improving the livelihood of organic farmers by increasing their income.

[25] Before the conversion to organic farming, all of the surveyed farmers were engaged in conventional farming practices. However, there are small differences in the reported starting figures (i.e., mean values reported in the pre-conversion period) between these two categories of farmers. It is important to note that the majority of the organic farmers (i.e., treatment group) in the study region came from the backward caste category with smaller farm sizes and lesser access to monetary resources. This explains a lower value in the outcome variables (i.e., lower costs due to lesser use of external inputs, lower yield, lower price and lower income) of the farmers in the treatment group vis-à-vis farmers in the control group.

[26] Quintal is a unit of measurement equal to 1000 kilogram or about 220 pounds.

[27] Hectare is a unit of area equal to 10,000 square metres.

3.2 Sustainable agricultural practices

"A contract for nature" is one of the core principles governing an eco-social contract (UNRISD 2021, 2022). By complying with a contract for nature, social farming can foster a symbiosis between agriculture, humans and nature (Nicli et al. 2020).

Survey evidence portrayed the role of ONganic in re-establishing the human–nature relationship embedded in the local agrarian setting through the promotion of sustainable agricultural practices. The eco-centric behaviour of ONganic was reflected in the cultivation practices of organic farmers which played a key role in preserving the health of people, animals, plants and ecosystems. In transitioning to organic farming, the farmers in Nadia switched from using synthetic chemical inputs to non-toxic bio-fertilizers and bio-pesticides. Such practices helped them to reduce the occurrence of illness caused by the use of hazardous chemicals (SDG 3.9).[28] This along with the adoption of a range of other organic practices (such as applying the techniques of minimum tillage and crop rotation and other soil management treatments such as alternate wetting and drying) helped to mitigate the impacts of climate change (SDG 2.4, 13.2).[29] Organic management practices such as soil fertility treatment (use of compost, manure and bio-fertilizers), seed treatment (application of Cowpathy technique suggested in Indian Ayurveda[30]), and pest management techniques (use of biological pest control and bio-pesticides) followed by the organic farmers in Nadia were mostly based on the inputs available within the local agrarian setting (rather than using externally purchased inputs). The use of regenerative production methods created a synergy between social and ecological objectives in the local context. Table 3 exhibits that after their conversion to organic farming, the use of external (or purchased) fertilizers and pesticides of the contracted farmers was reduced by 54 percent and 51 percent respectively (whereas for the non-contracted conventional farmers, the usage of these inputs increased in the same period).[31]

Table 3. Impact of Organic Conversion on the Use of External Inputs

Criteria		Farmers not associated with ONganic	Farmers engaged with ONganic	Impact of conversion (DID estimate)
Fertilizers (q/ha)	Before	4.1	3.9	
	After	4.4	1.8	
	% Change	6.82	-53.85	-60.67
Pesticides (l/ha)	Before	4.68	4.32	
	After	4.98	2.10	
	% Change	6.41	-50.93	-57.34

Source: Field survey, 2017–18. Notes: l = litre

28 In some instances, the use of synthetic chemical inputs results in human pesticide poisoning and far-reaching implications on public health at large (Rani et al. 2021). Due to a lack of sufficient knowledge on the proper use of pesticides, farmers often harm themselves through improper handling of chemical inputs. Chemical-free organic cultivation practices provide a safer option to prevent health complications associated with agrochemical exposure (Setboonsarng and Gregorio 2017).

29 A study in the context of India identified three cost-saving farming practices (efficient use of fertilizers, zero tillage, and better water management in rice farming) that could reduce greenhouse gas emissions by nearly 18 percent (Sapkota et al. 2019). Alternate wetting and drying are known as an effective soil management treatment adopted by ONganic to reduces methane emissions. Other sustainable farm practices by ONganic enable the smallholders to avoid negative impacts on climate, soil microorganisms, nutrient content and future yield, as well as the health of the farmers, their communities and the consumers (Women on Wings 2014).

30 This technique (also known as "Panchagavya treatment") is based on the application of five ingredients obtained from cow, specifically, cow dung, cow urine, cow milk, curd and cow butter oil, in organic cultivation practices (Bajaj et al. 2022).

31 In a study in Karnataka, India, Lukas and Cahn (2008) observed that there was a significant reduction in the use of costly external inputs for the organic farmers after their conversion to organic farming. This also played a key role in reducing their cost of cultivation.

Reducing the dependence on external inputs was possible through reusing and recycling locally available resources. This process not only increased their resource-use efficiency (SDG 2.4) but also promoted sustainable use of natural resources and preservation of ecosystem services (SDG 12.2, 12.5, 15.1).

3.3 Protection of natural resources

By restoring a contract with nature, eco-social farming practices adopted by organic farmers can play a key role in the protection of natural resources (soil and water in particular) and the preservation of biodiversity in the local context. For instance, the application of sustainable soil management practices prevented land degradation and improved soil health. Earlier farming methods (such as extensive tilling and overuse of synthetic chemical fertilizers and pesticides) of the farmers resulted in the depletion of soil nutrients which led to loss of soil fertility and degradation. However, the adoption of organic soil management practices (such as the use of minimum tillage, retention of permanent soil cover, crop rotation, compost and manure by the organic farmers) prevented the depletion of soil nutrients by enhancing the carbon-storing and water-holding capacity of the soil and developed "soil organic matter" through increased microbial activity (SDG 15.3).[32]

Empirical evidence (table 4) also showed that a transition from conventional to organic cultivation reduced the water usage per hectare of the contracted farmers by 11 percent.[33] On the other hand, the water usage of non-contracted farmers had slightly risen (approx. 4 percent) in the same period. Overall, the relative water usage per hectare was reduced by 15 percent (as shown by the DID estimate) for the farmers who converted to organic farming. It indicated the increased water use efficiency of the contracted organic farmers (SDG 6.4).

Table 4. Impact of Organic Conversion on Water Usage

Criteria		Farmers not associated with ONganic	Farmers engaged with ONganic	Impact of conversion (DID estimate)
Water (hrs/ha)	Before	108	102	
	After	112	91	
	% Change	3.73	-10.78	-14.51

Source: Field survey, 2017–18

Notes: hrs = hours. Here, hours per hectare denote how many hours of water are required to flood one hectare of the paddy field by well pumps. In our study region, irrigation charges are paid on the basis of hours of water use.

In addition, a prohibition of the use of synthetic chemical fertilizers and pesticides and the adoption of integrated pest management and biological pest control techniques by organic farmers prevented water pollution (SDG 6.3, 12.4) and biodiversity loss (SDG 15.5). Similarly,

[32] This can be defined as the organic materials (produced originally from living organisms, i.e., plant or animal) found in soil. It plays a major role in enhancing soil physical fertility, increasing water retention capacity of the soil and reducing soil erosion (Chenu et al. 2024).

[33] While comparing the water usage of organic and conventional farms, Wheeler et al. (2015) found that organic irrigation farms use less absolute water than conventional farms.

the organic management practice of maintaining parts of land around the organic fields as buffer regions created suitable habitats for wild species. The initiatives of ONganic also focused on the conservation and restoration of natural landscapes. For instance, the reintroduction of a few endangered traditional local rice varieties (known for their rich nutritional content and a higher level of resistance to disease and climate shocks) by ONganic improved biodiversity (SDG 2.5). However, the adoption of organic practices adversely affected the agricultural productivity of smallholders in Nadia. This indicated a trade-off between economic and ecological objectives in the local context. Empirical evidence (table 2) showed that after their conversion to organic farming, the contracted farmers in Nadia experienced a substantial 41 percent reduction in yield for their cultivated crops, whereas the conventional farmers realized a 3 percent increase in per hectare yield. Overall, the relative yield was reduced by 44 percent (as shown by the DID estimate on yield) for the organic farmers. Such evidence of massive yield reduction suggested that an unplanned large-scale conversion of smallholders into organic farming can potentially create a shortage of food in the region and thereby adversely affect food security through reduced availability of foods and increasing food prices (SDG 2.1, 2.3). However, it is important to note that there are regional variations in the yield behaviour of organic farms: the yield decline is relatively lower in the rainfed, hilly and tribal regions where the farmers use fewer external inputs (Reddy et al. 2022). Therefore, to ensure the up-scaling of organic conversion, the government needs to adopt a mixture of strategic location selection (choosing rainfed, hilly and tribal areas) and the prioritization of farmers who use fewer external inputs (Reddy et al. 2022).[34]

A just transition approach to sustainable and equitable farming that can "build resilient, adaptable, and food security while protecting nature and future climate change" is essential[35] (WBCSD 2023; UNRISD 2018). Financing a just transition requires strong fiscal support (in the form of cash assistance) in the transition period to ensure that the newly converted organic farmers can withstand the initial decline in yield.[36,37] For instance, cash assistance can be provided to newly transitioned organic farmers to compensate them for any reduction in yield experienced in the transition period (usually lasting up to 3 years). Subsidies can also be provided to local consumers to purchase organic foods. This has the potential to ensure that organic foods remain affordable to local consumers and also boost domestic demand. Besides, as a risk mitigation strategy, the adoption of crop diversification practices (such as shifting from mono-cropping to multiple crops) as well as integrated crop-livestock production can be encouraged among organic farmers. A diversified production system cannot only provide the farmers with additional income sources but also it can protect them from crop or market failures (FAO 2018b).

34 The variation in yield during the conversion period largely depends upon the agricultural practices followed before conversion. It has been seen that conversion from a traditional low external input system of cultivation rarely results in lower yields. However, when switching from external input-intensive forms of agriculture, the yield may decline significantly (Das 2007). Considering this, farmers historically using fewer external inputs could be prioritized in the promotion of organic farming.

35 This is the joint statement prepared by the Just Rural Transition and the World Farmers' Organization at an event at COP27.

36 Financial support was also provided to farmers converting to organic cultivation in a number of western European countries (Austria, Denmark, Finland, Norway, Germany, Sweden and some cantons in Switzerland). Within the European Union, these conversion aid scheme-related policies are implemented under the common legal framework of Regulation 2078/92, known as the agri-environment programme (Lampkin and Padel 1994; Lampkin and Weinschenck 1996).

37 The lower yield of organic crops is generally observed in the initial years of conversion. However, it improves substantially after the end of the transition period (Das 2007).

3.4 Support to the community

A corporatist social contract usually formulates a support mechanism for protecting key stakeholders who are part of the bargaining process. In the study region, public financial assistance to the smallholders, a kind of progressive fiscal contract, raised sufficient resources in enhancing their resilience and developing capability at the regional level. In fact, the conversion to organic farming was very challenging for the smallholders in Nadia due to their lack of knowledge and sufficient resources to meet such challenges. To smoothen this transition process, the state and the social enterprise (ONganic) provided support in every aspect of their organic operation (from the sowing of the seeds to the marketing of the organic produce). The state provided fiscal support in the capacity-building process. Under the PKVY scheme, it provided financial assistance to the smallholders for developing on-farm organic input infrastructure. In the study region, partial public assistance received by the smallholders was utilized in the building of vermicompost units. This allowed the smallholders to produce the required organic fertilizers locally (instead of purchasing from outside), thereby playing a crucial role in reducing their costs.

As a part of its contractual agreement, ONganic arranged several training programmes for the contracted farmers which were instrumental in developing their understanding of organic farming and different agroecosystem techniques (SDG 2.a). ONganic encouraged the preservation of traditional agricultural practices and knowledge (SDG 11.4) by promoting local aromatic rice varieties and sharing knowledge about low-cost Indigenous farming techniques. In addition, it provided an array of services to build the capacities of smallholders and ensured their participation in the global value chain. For instance, the crop advisory and certification assistance provided by ONganic helped contracted organic farmers take advantage of emerging marketing opportunities. In fact, the marketing of organic products depends on certification which often acts as a barrier for smallholders (due to its high costs) entering into attractive markets (Jouzi et al. 2017). As a solution to the problem, ONganic assisted the smallholders in Nadia to get their product certified under the costly "third party certification system" and bore the entire certification cost so that they could reap the benefits of price premium in the export market (SDG 2.a).[38]

Furthermore, ONganic made substantial investments in promoting value-addition activities, which paved the way for new marketing opportunities (SDG 2.3, 8.2). Survey observation showed that investment in value-added production (through the setting up of a local processing unit) and marketing helped the organic farmers to get adequate prices for their crops and generated employment opportunities for the locals (SDG 2.a, 8.3). The embedding of production and marketing in local economic circuits contributed to building resilience at the community level. More specifically, the improved access to information, resources, technical knowledge and a larger market enhanced the resilience of the smallholders in Nadia. In addition, such alternative farming practices (moving away from intensive farming to more climate-resilient agricultural practices) encouraged the contracted organic farmers to diversify their sources of income (SDG

[38] Due to the lower acceptability of peer-monitoring-based PGS organic certification (usually followed by the organic farmers registered under the PKVY scheme) in the international market, ONganic got its organic products certified by independent accreditation agencies (hence the term "third party certification").

8.2) through the cultivation of multiple crops (growing other organic crops such as millets, pulses, vegetables and oil seeds in the off-season) and maintaining livestock (such as cows, goats and ducks). Such diversification also played a key role in building the resilience of the food production system (SDG 1.5, 2.4, 13.1).

Survey observation also highlighted the role of SwitchON Foundation in offering support to the community through the provision of innovative technologies for the smallholders and skill education for local youth. Evidence showed that it made substantial investments to promote domestic renewable energy resources by setting up solar-based irrigation systems (SDG 7.b). It played a major part in not only expanding access to affordable clean energy (SDG 7.1) but also promoting the transition to sustainable, low-carbon energy systems, thereby reducing the energy footprint of food production and consumption (SDG 12.a). Apart from promoting the application of innovative technologies in agriculture, the initiatives of SwitchON Foundation also focused on generating employment opportunities for local youths through developing technical skills. In 2016, it set up a technical education centre in the Hanskhali block of Nadia district to provide local youth with technical training related to solar energy and information technology (SDG 4.3, 4.4). Data relating to the period 2017–18 showed that a substantial number of students (73 out of 99 total enrolled students) managed to gain employment from this institution (SDG 8.5).

3.5 Education for sustainable development

In bringing transformative change in agriculture, eco-social agriculture initiatives focus on promoting values that foster stewardship of nature (Nicli et al. 2020). ONganic undertook several initiatives to create awareness about sustainability among the stakeholders in an effort to establish a contract for nature. For instance, it arranged several awareness campaigns to educate farmers about the harmful effects of chemical farming and the benefits of organic farming (SDG 4.7, 12.8). In addition, the technical training provided by ONganic and SwitchON Foundation made the farmers and local youths aware of a range of environmental and climate issues and adaptation strategies covering ecology, biodiversity, use of natural resources and renewable energy (SDG 13.3). Besides, it promoted awareness among consumers (through participating in trade fairs and other events) about the adverse health effects of consuming foods grown using synthetic-input-based farming as opposed to the potential health benefits of consuming organic foods. Moreover, nutrition education and awareness initiatives promoting the consumption of nutritious and safe organic foods played a major part in promoting a sustainable lifestyle (SDG 4.7) and encouraging consumers to be an integral part of an ethical and sustainable food production system (SDG 12.8, 13.3).

Overall, the evidence showed that the components of eco-social agriculture have paved the way toward fulfilling the SDGs at the local level. This mapping exercise identifies the major (having direct influence) and contributing (having indirect influence) impact of the eco-social agricultural initiatives on reaching the targets of the SDGs (table 5).

Table 5. SDG Mappings of the Case Initiatives

Components	Empowerment of disadvantaged people	Environment sustainable agricultural practices	Protection of natural resources	Support to the community	Education for sustainable development
SDG 1 No poverty	Contributing (↑1.4)			Contributing (↑1.5)	
SDG 2 Zero hunger	Major (↑2.1, ↑2.3)	Major (↑2.4)	Major (↓2.1, ↓2.3, ↑2.5)	Major (↑2.3, ↑2.4, ↑2.a)	
SDG 3 Good health and well-being		Major (↑3.9)			
SDG 4 Quality education				Major (↑4.3, ↑4.4)	Major (↑4.7)
SDG 6 Clean water and sanitation			Major (↑6.3, ↑6.4)		
SDG 7 Affordable clean Energy				Major (↑7.1, ↑7.b)	
SDG 8 Decent work and economic growth				Major (↑8.2, ↑8.3, ↑8.5)	
SDG 10 Reduced inequalities	Major (↑10.2, ↑10.3)				
SDG 11 Sustainable cities and communities				Major (↑11.4)	
SDG 12 Sustainable consumption and production		Major (↑12.2, ↑12.5)	Major (↑12.4)	Contributing (↑12.a)	Major (↑12.8)
SDG 13 Climate action		Contributing (↑13.2)		Contributing (↑13.1)	Major (↑13.3)
SDG 15 Life on land		Major (↑15.1)	Major (↑15.3, ↑15.5)		
SDG 17 Partnership for the goals	Contributing (↑17.17)				

Source: Authors' composition based on survey evidence

Notes: While identifying the interlinkage between the eco-social agriculture initiatives and SDG targets, the mapping process highlights the synergistic or trade-off effects at the target level. Synergistic effects (denoted with a ↑ sign) show how an eco-social agriculture initiative can contribute to achieving one or multiple SDG targets. On the other hand, the trade-off effect (denoted with a ↓ sign) shows how an eco-social agriculture initiative may successfully achieve one or various SDG targets but at the expense of other SDG targets.

4. Conclusions and Policy Implications

This study assesses the role of a social enterprise (ONganic Foods) in promoting eco-social agriculture in the Nadia district of West Bengal. Results showed that the multifunctional agricultural practices supported by ONganic and social service initiatives of SwitchON Foundation played a key role in the eco-social transformation in Nadia. In a facilitating capacity, ONganic mobilized the local smallholder community to form an organic producer group registered under the PKVY scheme of the government of India. Participation in this scheme fostered a progressive alliance between the local organic smallholders' group, ONganic, and the state which supported the social integration of local smallholders. Moreover, the support provided by ONganic throughout the stages of the supply chain (from facilitating access to agricultural inputs, to providing training to develop producers' knowledge about climate-resilient agro-farming techniques, offering crop advisory and certification assistance, investing in value addition activities, and connecting smallholders to attractive markets) supported the economic transformation of smallholders in Nadia. Further, initiatives such as building community-level resilience through diversification of crops and income sources, and access to non-renewable energy sources, supported the local smallholder community. In addition, social services offered by SwitchON through the provision of technical education generated employment for local youth. Finally, from the environmental perspective, the adoption of sustainable practices in the form of imposing a ban on the use of harmful synthetic chemical inputs and switching to sustainable organic practices and renewable energy sources has led to the protection of natural resources and the preservation of biodiversity.

The results of this study highlight how the components of eco-social agriculture initiatives can result in the successful localization of multiple global development goals. However, to unleash the transformative potential of eco-social agriculture initiatives on a larger scale, public policies can be designed as follows:

First, the local case initiative highlighted a key challenge that can impede the eco-social transformation process. Survey observations showed that after the conversion to organic farming, the local smallholders experienced a massive decline in yield, causing a considerable increase in cost per unit of output. The evidence of a substantial yield reduction raises serious doubts about the sustainability of this alternative mode of farming. Therefore, the findings of the study indicate that a nationwide large-scale conversion (under the PKVY scheme) can reduce the yield of the crops and potentially affect the country's food security. To deal with this challenge, the government needs to adopt a well-calibrated approach, instead of an unplanned blanket adoption of organic farming. The agro-climatic factors and their implication on the yield of organic crops need to be considered before promoting it on a larger scale. More importantly, the evidence highlights the need for a just transition approach to strike a balance in between food security and ecological sustainability. In this process of just transition, there is a need to provide the required fiscal support (through more progressive public welfare provisions) to ensure the sustainability of organic farming.

Secondly, in making social contracts more successful, there is a need for a proactive and long-term development vision of the state in scaling the outreach of the programme at the national

level. A successful implementation of the PKVY programme at the national level is conditioned upon uninterrupted public support measures, especially in the initial three years of conversion. A discontinuation of the financial assistance from the government along with the non-realization of a price premium (to compensate the decline in yield) are seen as the major constraints to the PKVY programme implementation. Non-realization of the price premium by the farmers is mainly due to the lack of awareness about the Participatory Guarantee System' (PGS) certification among consumers, retailers, and wholesalers (Reddy 2017).[39] However, PGS certification is used in the domestic market and has a limited appeal in the international market. In addressing this problem of certification, ONganic Foods maintained the "third party certification" (recognized by the European Union) and became one of the major exporters of organic rice products (aromatic black rice, red rice, basmati rice, diabetic rice, blended rice) to Europe (Times of India 2023). Thus, ONganic played a crucial role in establishing market linkages, which enabled the local organic farmers to fetch a substantial price premium. This was essential in not only withstanding the negative yield effect but also generating sufficient revenue to ensure the economic viability of local organic smallholders. Therefore, in addition to state intervention, the roles of SSE actors working in the PKVY ecosystem are crucial in ensuring the sustainability of the organic farming model.

[39] PGS certification is a widely popular form of certification used by organic producers across several countries around the world (especially in the global South). In India, 109,317 farmers are involved in PGS certification (Reddy 2017).

References

Amarnath, J. S. and and V. Sridhar. 2012. "An economic analysis of organic farming in Tamil Nadu, India." *Bangladesh Journal of Agricultural Economics*, *35*(1-2):33–51.

Badwal, Davinder Pal Singh, Mandeep Kumar, Harjinder Singh and Kaur K. Simran. 2019. "Zero budget natural farming in Indiaa review." *International Journal of Current Microbiology and Applied Science,* 8(12):869–873.

Bajaj, Komal K., Vishal Chavhan, Nishikant A. Raut and Shailendra Gurav. 2022."Panchgavya: A precious gift to humankind." *Journal of Ayurveda and Integrative Medicine,* 13(2):1–9.

Bardhan, Pranab, Michael Luca, Dilip Mookherjee and Francisco Pino. 2014. "Evolution of land distribution in West Bengal 1967–2004: Role of land reform and demographic changes." *Journal of Development Economics,* 110:171–190.

Baum, Warren C. and David Pimentel. 1987. "Partners against hunger." *Environment: Science and Policy for Sustainable Development,* 29(7):25–27.

Bhowmik, Manas Ranjan. 2022. "Interrogating Social and Solidarity Economies Following Marxian Class Focused Approach: Evidence from India." *Arthaniti: Journal of Economic Theory and Practice,* 21(2):194–214.

Cardella, Giuseppina Maria, Brizeida Raquel Hernández-Sánchez, Alcides Almeida Monteiro, and José Carlos Sánchez-García. 2021. "Social entrepreneurship research: Intellectual structures and future perspectives." *Sustainability,* 13(14):1–21.

Chaudhuri, Ranjan, Demetris Vrontis, Gitesh Chavan and SM Riad Shams. 2020. "Social business enterprises as a research domain: a bibliometric analysis and research direction." *Journal of Social Entrepreneurship*, 14(2):186–200.

Chauhan, Laksheeta, Manmeet Kaur, Subhash Chandra and Surya Rathore. 2022. "Nexus between Knowledge of farmers related to Paramparagat Krishi Vikas Yojana and socio-personal variables." *Indian Journal of Extension Education*, 58(1):59–65.

Chauhan, Laksheeta, Manmeet Kaur, Subhash Chandra and Rishi Dev Jaryal. 2023. "Evaluating Constraints-Faced by Farmers in the Adoption of Paramparagat Krishi Vikas Yojana in Rajasthan State of India." *Asian Journal of Agricultural Extension, Economics & Sociology*, 41(10):804–813.

Chenu, Claire, Cornelia Rumpel, Charlotte Védère and Pierre Barré. 2024. "Methods for studying soil organic matter: nature, dynamics, spatial accessibility, and interactions with minerals." In *Soil microbiology, ecology and biochemistry*, edited by Eldor A. Paul and Serita D. Frey, 369–406. USA: Elsevier.

Cofini, Francesca. 2014. *Social Farming Practices in Developing Countries: Gender and Other Implications.* Masters' thesis. Ghent University. Mimeo.

Das, Kasturi. 2007. "Towards a smoother transition to organic farming." *Economic and Political Weekly,* 42(24):2243–2245.

Das, Sreemoyee, Subhasis Mandal and Suchitra Mohanty. 2021. "Agribusiness Opportunities of Organic Agriculture in West Bengal–An Empirical Analysis." *Indian Journal of Agricultural Economics* ,76(3):514–532.

Dash, Anup. 2016. "An epistemological reflection on social and solidarity economy." *Forum for social economics*, 45(1):61–87.

Dik, L., H. A. C. Runhaar and C. J. A. M. Termeer. 2022. "Farmer collectives for more effective agri-environmental schemes? An assessment framework based on the concept of 'professionalization'." *International Journal of Agricultural Sustainability,* 20(4):543–557.

Di Iacovo, Francesco. 2020. "Social farming evolutionary web: from public intervention to value co-production." *Sustainability,* 12(13):1–27.

EESC (European Economic and Social Committee). 2012. "What is Social Farming?". Brussels: EESC. https://sofaredu.eu/what-is-social-

farming/#:~:text=The%20EESC%20defines%20Social%20Farming,with%20social%20and%20solidarity%20principles.
Elsen, Susanne. 2018. "Community Based Solidarity Economy and Eco-Social Transformation." *Postmodernism problems,* 8(1):50–68.
Elsen, Susanne. 2023. *Social Services and the Social and Solidarity Economy*. Working paper. Geneva: United Nations Inter-Agency Task Force on Social Solidarity Economy.
FAO (Food and Agriculture Organization). 2018a. *The 10 Elements of Agroecology: Guiding the Transition to Sustainable Food and Agricultural Systems*. Rome: FAO.
FAO (Food and Agriculture Organization). 2018b. *Transforming Food and Agriculture to Achieve the SDGs*. Rome: FAO.
Fazzi, Luca. 2011. "Social cooperatives and social farming in Italy." *Sociologiaruralis,* 51(2):119–136.
Ferreira, João J., Cristina I. Fernandes, Marta Peres-Ortiz and Helena Alves. 2016. "Conceptualizing social entrepreneurship: perspectives from the literature." *International review on public and nonprofit marketing,* 14:73–93.
García-Llorente, Marina, Cristiano M. Rossignoli, Francesco Di Iacovo and Roberta Moruzzo. 2016. "Social farming in the promotion of social-ecological sustainability in rural and periurban areas." *Sustainability,* 8(12):1–15.
Gertler, Paul J., Sebastian Martinez, Patrick Premand, Laura B. Rawlings and Christel MJ Vermeersch. 2011. *Impact Evaluation in Practice*. Washington, DC: World Bank Publications.
Ghosh, K. Ranjan, Ankit Saha and Akansha Agarwal. 2023. *Progress and Uptake of Sustainable Agricultural Practices under Paramparagat Krishi Vikash Yojana, including Bharatiya Prakritik Krishi Padhhati.* Ahmedabad: Centre for Management in Agriculture, Indian Institute of Management.
Goswami, Binoy, Madhurjya Prasad Bezbaruah and Raju Mandal. 2017. *Indian agriculture after the green revolution: Changes and Challenges*. United Kigdom: Routledge.
Gramm, Verena, Cristina Dalla Torre and Andrea Membretti. 2020. "Farms in Progress-Providing Childcare Services as a Means of Empowering Women Farmers in South Tyrol, Italy." *Sustainability,* 12(2):1–18.
Guirado, Carles, Natàlia Valldeperas, Antoni F. Tulla, Laia Sendra, Anna Badia, Camille Evard, Àngel Cebollada, Josep Espluga, Imma Pallarès and Ana Vera. 2017. "Social farming in Catalonia: Rural local development, employment opportunities and empowerment for people at risk of social exclusion." *Journal of Rural Studies,* 56:180–197.
Herman, Agatha. 2015. "Enchanting resilience: Relations of care and people–place connections in agriculture." *Journal of Rural Studies,* 42:102–111.
Hitchman, Judith. 2023. "Food and agriculture sector." In *Encyclopedia of the Social and Solidarity Economy*, edited by Ilcheong Yi, 224–230. United Kingdom: Edward Elgar Publishing.
Hota, Pradeep Kumar. 2023. "Tracing the intellectual evolution of social entrepreneurship research: Past advances, current trends, and future directions." *Journal of Business Ethics,* 182(3):637–659.
Hudcova, Eliška, Tomáš Chovanec and Jan Moudr. 2018. "Social entrepreneurship in agriculture, a sustainable practice for social and economic cohesion in rural areas: The case of the Czech Republic." *European Countryside,* 10(3):377–397.
Jarábková, Jana, Marcela Chreneková and Lukáš Varecha. 2022. "Social Farming: A Systematic Literature Review of the Definition and Context." *European Countryside,* 14(3):540–568.
Jouzi, Zeynab, Hossein Azadi, Fatemeh Taheri, Kiumars Zarafshani, Kindeya Gebrehiwot, Steven Van Passel and Philippe Lebailly. 2017. "Organic farming and small-scale farmers: Main opportunities and challenges." *Ecological economics,* 132:144–154
Knapik, Wioletta. 2018. "The innovative model of Community-based Social Farming (CSF)." *Journal of Rural Studies,* 60:93–104.

Kučerová, Eva. 2018. "Social inclusion in the context of Czech rural development policy." *Agricultural Economics,* 64(9):412–422.

Lampkin, Nicolas and Sussane Padel. 1994. *The Economics of Organic Farming--An International Perspective*. UK: CAB International.

Lampkin, Nicolas and Günther Weinschenck. 1996. "Organic farming and agricultural policy in Western Europe." In *Fundamentals of Organic Agriculture: Proceedings of the 11th IFOAM International Scientific Conference,* edited by Troels V. Østergaard, 11–15. Copenhagen: International Federation of Organic Agriculture Movements.

Limbrunner, Alfons and Thomas van Elsen. 2013. *Boden unter den Füßen: GrüneSozialarbeit-SozialeLandwirtschaft-Social Farming*. Weinhiem: Beltz Juventa.

Lukas, Martin and M. Cahn. 2008. "Organic agriculture and rural livelihoods in Karnataka, India." Paper presented at the 16th IFOAM Organic World Congress, Modena, Italy, 16–20 June.

Luo, Jianli, Huiying Han, Fu Jia and Hao Dong. 2020. "Agricultural Co-operatives in the western world: A bibliometric analysis." *Journal of Cleaner Production,* 273:1–30.

Lyngbaek, Anja E., Reinhold G. Muschler and Fergus L. Sinclair. 2001. "Productivity and profitability of multistrata organic versus conventional coffee farms in Costa Rica." *Agroforestry systems,* 53:205–213.

Malik, Sushant, Dharmesh K. Mishra, Dipen Paul and Joel Noronha. 2022. "Farmer producer organisations for sustainable development of tribal communities." *World Review of Entrepreneurship, Management and Sustainable Development,* 18(1–2):119–136.

Meek, David and Colin R. Anderson. 2020. "Scale and the politics of the organic transition in Sikkim, India." *Agroecology and Sustainable Food Systems,* 44(5):653–672.

Nicli, Sara, Susanne Ursula Elsen and Armin Bernhard. 2020. "Eco-social agriculture for social transformation and environmental sustainability: A case study of the UPAS-project." *Sustainability,* 12(14):1–15.

Ortega, Antonio Cesar. 2019. "Corporatism and New Forms for Representing Agriculture Interests: A Theoretical Approach." *Revista de Economia e Sociologia Rural,* 36(4):141–168.

Patnaik, Utsa. 2006. "Unleashing the market: global capitalism, deflation and agrarian crisis in developing countries." In *Contested transformations: Changing economies and identities in contemporary India,* edited by Mary E. John, Praveen Kumar Jha and Surinder S. Jodhka, 53–83. New Delhi: Tulika Publishers.

Pawlewicz, Adam. 2020. "Change of price premiums trend for organic food products: The example of the polish egg market." *Agriculture,* 10(2):1–22.

Petric, Hajnalka. 2014. "Social farming (also called care farming): an innovative approach for promoting women's economic empowerment, decent rural employment and social inclusion. What works in developing countries." Global Forum on Food Security and Nutrition (blog), 15 April. https://www.fao.org/fsnforum/consultation/social-farming-also-called-care-farming-innovative-approach-promoting-womens-economic.

PGSI (Participatory Guarantee System for India). 2024. "Dataset on Local Group." New Delhi: Government of India. Accessed 31 May 2024. pgsindia-ncof.gov.in.

Pimentel, David and Marcia Pimentel. 1990. "Comment: Adverse environmental consequences of the Green Revolution." *Population and Development Review,* 16:329–332.

Qiao, Yuhui, Friederike Martin, Seth Cook, Xueqing He, Niels Halberg, Steffanie Scott and Xihe Pan. 2018. "Certified organic agriculture as an alternative livelihood strategy for small-scale farmers in China: A case study in Wanzai County, Jiangxi Province." *Ecological Economics,* 145:301–307.

Rahman, Saidur. 2015. "Green revolution in India: environmental degradation and impact on livestock." *Asian Journal of Water, Environment and Pollution,* 12(1):75–80.

Rani, Lata, Komal Thapa, Neha Kanojia, Neelam Sharma, Sukhbir Singh, Ajmer Singh Grewal, Arun Lal Srivastav and Jyotsna Kaushal. 2021. "An extensive review on the

consequences of chemical pesticides on human health and environment." *Journal of Cleaner Production,* 283:1–98.

Reddy, Anugu Amarender. 2017. *Impact Study of Paramparagat Krishi Vikas Yojana.* Hyderabad: National Institute of Agricultural Extension Management. https://www.manage.gov.in/publications/reports/pkvy.pdf.

Reddy, Anugu Amarender, Indrek Melts, Geetha Mohan, Ch Radhika Rani, Vaishnavi Pawar, Vikas Singh, Manesh Choubey, Trupti Vashishtha, A. Suresh and Madhusudan Bhattarai. 2022. "Economic impact of organic agriculture: evidence from a Pan-India survey." *Sustainability,* 14(22):1–22.

Renting, Henk, Walter AH Rossing, Jeroen CJ Groot, Jan Douwe Van der Ploeg, Catherine Laurent, Daniel Perraud, Derk Jan Stobbelaar, and Martin K. Van Ittersum. 2009. "Exploring multifunctional agriculture. A review of conceptual approaches and prospects for an integrative transitional framework." *Journal of environmental management,* 90:112–123.

Roth, Christian H., Michaela Cosijn, Lucy Carter, Arnab Chakraborty, Mahanambrota Das, Serena H. Hamilton and Alak Kumar Jana. 2024. "Overcoming barriers to social inclusion in agricultural intensification: reflections on a transdisciplinary community development project from India and Bangladesh." *Community Development Journal*, 59(1):87–107.

Sapkota, Tek B., Sylvia H. Vetter, Mangi Lal Jat, Smita Sirohi, Paresh B. Shirsath, Rajbir Singh, Hanuman S. Jat, Pete Smith, Jon Hillier and Clare M. Stirling. 2020."Cost-effective opportunities for climate change mitigation in Indian agriculture." *Science of the Total Environment*, 655:1342–1354.

Sarkar, Apurbo, Hongyu Wang, Airin Rahman, Waqar Hussain Memon and Lu Qian. 2022. "A bibliometric analysis of sustainable agriculture: based on the Web of Science (WOS) platform." *Environmental Science and Pollution Research,* 29(26):38928–38949.

Satar, Mir Shahid, Deepanshi Aggarwal, Rohit Bansal and Ghadah Alarifi. 2023. "Mapping the Knowledge Structure and Unveiling the Research Trends in Social Entrepreneurship and Inclusive Development: A Bibliometric Analysis." *Sustainability,* 15(7):1–28.

Sempik, Joe and Rachel Brag. 2016. "Green Care: Nature-based interventions for vulnerable people." In *Green Exercise: Linking Nature, Health and Well-being,* edited by Jo Barton, Rachel Bragg, Carly Wood and Jules Pretty, 100–113. London and New York: Routledge.

Setboonsarng, Sununtar and Elsbeth E. Gregorio. 2017. *Achieving sustainable development goals through organic agriculture: Empowering poor women to build the future.* ADB Southeast Asia Working Paper Series, Working Paper No. 15. Philippines: Asian Development Bank.

Shalini, J. R., G. Selvarani, T. Dhamodaran, S. Senthilnathan and K. Prabakaran. 2023. "Impact of Paramparagath Krishi Vikas Yojana Scheme on the Livelihood of Beneficiaries." *Asian Journal of Agricultural Extension, Economics & Sociology*, 41(10):26–31.

Sheingate, Adam. 2008. "*Agrarian social pacts and poverty reduction*." In *Development Pathways to Poverty Reduction*, edited by Yusuf Bangura, 149–171. Basingstoke: Palgrave Macmillan and United Nations Research Institute for Social Development.

Shiva, Vandana. 1989. *The violence of the green revolution: third world agriculture, ecology and politics.* United Kingdom: Bloomsbury Academic.

Slimi, Celina, Magali Prost, Marianne Cerf and Lorène Prost. 2021. "Exchanges among farmers' collectives in support of sustainable agriculture: From review to reconceptualization." *Journal of Rural Studies,* 83:268–278.

Sohoni, Vandana and Anjali Joshi. 2015. "Nisarg Nirman: The social farming venture from India." *Emerald Emerging Markets Case Studies,* 5(8):1–15.

Tan, Phan Luc. 2022. "Bibliometrics of social entrepreneurship research: Cocitation and bibliographic coupling analyses." *Cogent Business & Management,* 9(1):1–11.

Teddlie, Charles and Abbas Tashakkori. 2003. "Major issues and controversies in the use of mixed methods in the social and behavioral sciences." *Handbook of mixed methods in social and behavioral research,* 46:3–50.

UNTFSSE (United Nations Inter-Agency Task Force on Social Solidarity Economy). 2014. *Social and Solidarity Economy and the Challenges of Sustainable Development*. Position paper. Geneva: UNTFSSE.

Times of India. 2023. "ONganic Foods to raise funds." 27 July. https://m.timesofindia.com/city/kolkata/onganic-foods-to-raise-funds/articleshow/102154495.cms#:~:text=Kolkata%3A%20ONganic%20Foods%2C%20a%20social,and%20Rs%201%20crore%20grants.

UNRISD (United Nations Research Institute for Social Development). 2016. *Policy Innovations for Transformative Change*. 2016 Flagship Report. Geneva: UNRISD.

UNRISD (United Nations Research Institute for Social Development). 2018. *Mapping Just Transition to a Low Carbon World*. Geneva: UNRISD.

UNRISD (United Nations Research Institute for Social Development). 2021. *A New Eco-Social Contract*. Issue brief 11. Geneva: UNRISD.

UNRISD (United Nations Research Institute for Social Development). 2022. *Crises of Inequality: Shifting Power for a New Eco-Social Contract*. 2022 Flagship Report. Geneva: UNRISD.

Utting, Peter (ed.). 2015. *Social and Solidarity Economy: Beyond the Fringe*. London: Zed Books and United Nations Research Institute for Social Development.

WBGU (German Advisory Council on Global Change). 2011. *World in transition-a social contract for sustainability*. Germany: WBGU.

Wheeler, Sarah Ann, Alec Zuo and Adam Loch. 2015. "Watering the farm: Comparing organic and conventional irrigation water use in the Murray–Darling Basin, Australia." *Ecological Economics,* 112:78–85.

Wiesinger, Georg, Erika Quendler and Christian Hoffmann. 2013. *Soziale Landwirtschaft: Situation und Potenzialeeiner Form der Diversifizierung land-und forstwirtschaftlicherBetriebe in Österreich, Südtirol und Trentino*. Research Report No. 66. Vienna: Federal institute for mountain farming issues.

Women on Wings. 2024. "Advancing farmer's soil, health and incomes: Interview with Ekta Jaju." Women on Wings blog, 8 March. https://www.womenonwings.com/2024/03/farmer-incomes-soil-health-social-enterprise-interview/.

WBCSB (World Business Council for Sustainable Business) 2024. "A farmer driven approach to furthering a just transition: Bringing farmers into the climate policy-making process." Geneva: WBCSB.

Yi, Ilcheong, Jacques Defourny, Caroline Hossein, Denison Jayasooria, Jean- Louis Laville, Cecilia Navarra, Rocio Nogales-Muriel, Barbara Sak, Peter Utting and Fernanda Wanderley (eds.). 2023. *Encyclopedia of the Social and Solidarity Economy*. Cheltenham: Edward Elgar.

Yu, Shu and Yongtong Mu. 2022. "Sustainable agricultural development assessment: a comprehensive review and bibliometric analysis." *Sustainability,* 14(19):1–18.

Zollet, Simona and Keshav Lall Maharjan. 2021. "Overcoming the barriers to entry of newcomer sustainable farmers: Insights from the emergence of organic clusters in Japan." *Sustainability,* 13(2):1–24.