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Comparing the Collaboration of Smallholder Farmers through Participatory Guarantee System Practices in Northeastern Thailand

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Abstract: Organic agriculture based on the participatory guarantee system (PGS) is frequently touted as a tool for improving ecosystem sustainability and self-reliance and for alleviating the poverty of smallholder farmers in Thailand. However, specific criteria must be fulfilled for products to be certified organic. In this paper, we investigate the similarities and differences between three cases of organic agricultural production (based on the participatory guarantee system) in four provinces in northeastern Thailand: Nong Bua Lam Phu, Nakhon Phanom, Ubon Ratchathani, and Nakhon Ratchasima. A total of 135 smallholder farmers were selected to act as informants, and semi-structured interviews were held. The participatory guarantee system was utilized, considering the farmers' diverse agricultural backgrounds and socio-economic conditions. For agriculture to be adapted with the ultimate aim of sustainability, policy support will be necessary in the form of financial measures and capacity building.

Keywords: participatory guarantee system; organic agriculture; smallholder farmers; Thailand

Citation: Phromthep, P.; Torut, B. Comparing the Collaboration of Smallholder Farmers through Participatory Guarantee System Practices in Northeastern Thailand. *Sustainability* **2024**, *16*, 4186. https://doi.org/10.3390/su16104186

Academic Editors: Hossein Azadi and Michael S. Carolan

Received: 5 February 2024
Revised: 21 April 2024
Accepted: 10 May 2024
Published: 16 May 2024

1. Introduction

Thailand is often referred to as the "Rice Bowl of Asia"; its agriculture sector is considered fertile ground for development [1,2]. More than half of the country's population makes their living in the agricultural sector [3]. It has, thus far, been the main source of the nation's income; therefore, government policies have promoted the use of chemical fertilizers, pesticides, and optimized seeds in order to enable food self-sufficiency and ensure that surplus agricultural products are produced for export. The so-called "green revolution" began in Thailand in 1970 [4–7]. This involved the adoption of new mechanical equipment, heavy machinery, hybrid seeds, and chemical fertilizers to be used in monoculture practices to meet both national and international demands [2,7]. However, this development has had wide-reaching and varied impacts; for example, some farmers have faced illness due to side effects from using herbicides and insecticides. Farmers' incomes have also been affected, and some have become trapped in a vicious cycle of poverty due to the fact that monoculture practices encourage farmers to buy seeds and use chemical fertilizers, herbicides, insecticides, and cultivation equipment. As a result, levels of poverty have increased due to debts incurred in this process [8]. Additionally, the environment has gradually been degraded and become highly contaminated, and this has affected aquatic animals and groundwater resources. Moreover, the substantial amounts of greenhouse gases (GHGs) emitted during agricultural production processes have contributed substantially to global warming and climate change [1,9,10].

Due to the severe impacts of conventional agriculture, the perception of "sustainable agriculture" in Thailand was first created and has been promoted since the advent of the Eighth National Social and Economic Development Plan (1997–2001) in order to overcome

the negative impacts of conventional agricultural processes; such impacts may be detrimental to the economy, arriving in the form of environmental degradation and chemical pollution [2,6,11–13]. Since alternative agricultural methods have been implemented in Thailand, the government has foreseen the negative effects that unfair and unsustainable practices may have on smallholder farmers [14]; thereafter, a shift toward chemical-free farming has been enacted in order to promote well-being for both farmers and consumers. The core concept of organic agriculture was formulated by the International Federation of Organic Agriculture Movements (IFOAM), reflecting concerns regarding health, ecology, fairness, and care. Organic agricultural production must take into account environmental, economic, and social aspects. Initially, the government promoted organic agriculture for the purpose of exports, so third-party certification systems played a pivotal role in trade. However, export business is limited for smallholder farmers due to the high costs associated with complex logistics, documentation, lengthy certification procedures, and local markets [14–19]; therefore, smallholder farmers are implicitly excluded.

In order to make development more sustainable, agricultural development policies have since paid greater attention to smallholder farmers by promoting organic agriculture based on the participatory guarantee system (PGS), which was developed by the International Federation of Organic Agriculture Movements (IFOAM) in 2014 as an alternative farming practice. It encourages smallholder farmers to engage because it positions farming as a combination of indigenous knowledge, technology, and science; moreover, it incentivizes farmers to participate in planning, decision-making, and the assessment of farms [20,21]. The PGS manifests as a community-based organization that encourages the exchange of knowledge and empowers smallholders [22,23]. Thus, collaborative participation within the PGS creates institutionalized groups. Agricultural production based on the PGS has five facets: (1) natural resource management; (2) participation in both the planning and actioning of activities throughout production; (3) the horizontal relationships within the group [24]; (4) the assurance system; and (5) the available network for exchanging information and knowledge. These facets build the capacity of local farmers in PGS groups to scheme, apply, and assess their groups' PGS standards within their production practices.

The government launched the National Organic Agriculture Development Strategy Issue 1 from 2008 to 2011. It mainly focused on managing knowledge and innovation, building networks, and improving commercial organic agriculture and collaboration among related sectors. This first issue of the National Organic Agriculture Development Strategy confronted several problems: packaging, organic zoning, and the promotion of both an international control system (ICS) and a participatory guarantee system (PGS). [25]. In assessing organic zoning, the government has historically paid more attention to the northeastern region for several reasons. Firstly, it is the largest region of the country, situated on the Khorat Plateau and shallow basin and bordered by the Mekong River [26]. The northeastern region also has a higher proportion of people living in poverty than other regions [27]. The farmers in this region have an average annual income of only THB 62,751, which is considerably lower than that of farmers in the central and southern regions, who earn an average of THB 329,579 and THB 210,397 per capita per year, respectively [28]. Therefore, the farmers in this region have been encouraged to engage in organic farming based on the PGS in order to increase their income, ensure food security, and restore biodiversity. As in other areas of the country, agriculture is practiced as a means of generating income. Although the Thai economy has experienced remarkable growth in recent decades, poverty and inequality persist in this part of the country.

Previous research studies have focused on various aspects of the PGS, such as the educational [29] benefits, opportunities, challenges, and constraints of the PGS [15,30,31]. Implementation of the PGS [11] has not yet been compared with Third-Party Certificate (TPC) in terms of farmers' empowerment and the strengthening of community [18]. To narrow this research gap, this paper aims to compare the production processes of smallholder farmers in three case studies (based on PGS practices) in northeastern Thailand. Our aims can be summarized in the following research question: how are recent production

processes employed by participatory farmer groups in organic agriculture different and similar, based on the participatory guarantee system (PGS)?

The remainder of this paper is organized as follows: Section 2 presents the literature review. Section 3 explains the methodology of this research. In Section 4, we present our results and outcomes. Section 5 discusses our results. Finally, Section 6 presents conclusions and suggestions for future research.

2. Literature Review

This alternative agriculture is known as an organic agriculture stream that has come into Thailand since 1989, and organic agriculture was set up as the national agenda in 2001 [13]. This alternative is the combination of local wisdom, agriculture technology, and science, especially encouraging farmers to participate in planning, expressing opinions, making decisions, and evaluating performance while sharing benefits, both positive and negative [20,32–34]. Mancur Olsen defined participation in collaborative participation as individuals with the same interests, being important to the group, leading a new concept of socio-management, focusing on groups and social processes, and affecting the structure system [35]. Therefore, collaborative participation creates an institutionalized group.

PGS requires the cooperation of farmers in various ways. A principal measure is used to identify the collaboration as suggested by IFOAM [36]. Regarding the organic farming process, PGS practices greatly focus on the production process—organic seeds and fertilizers, natural resources and diversity management, and productivity and collection management. To synthesize the production process, several key factors (relationship-building, mutual learning, trust, context specificity, and collective action) can create collaboration participation [23]. Exchanging points of view within groups through the establishment of standards plays a crucial role in guidelines about seeds and organic fertilizers, preventing chemical contamination and natural resource management. Contributing opinions is another vital aspect because the farmers can express their plans and decisions in any activities and establish group rules and regulations. The horizontal relationship among producers uniquely emphasizes making decisions, farm visiting, and supporting each other together with the academics, entrepreneurs, and officers to continuously develop organic farming [37].

Transparency is particularly established as the assurance system. Even though this standard does not require a large number of documents, it presents clear regulatory standards, productions, internal audit systems, and penalties for non-compliance [14], so it builds trust among producers and consumers.

Lastly, networking represents the learning process; visiting friends allows the verification of the understanding of standard and farm practices, providing advice and recommendations, and the exchange of knowledge coupled with unpredictable plant diseases and insects and climate change effects [38,39]. Thus, a successful PGS for collaborative organic production among smallholder farmers requires careful consideration of several key factors.

3. Materials and Methods

3.1. Study Site

We adopted a case study method because this approach allows for the description of our real-world context, evaluation of research findings, exploration of diverse scenarios, and explication of the intricacies involved in the chosen research strategies, whether surveys or experiments. This study was conducted in four northeast provinces of Thailand: Nong Bua LamPhu, Nakhon Phanom, Ubon Ratchathani, and Nakhon Ratchasima. These provinces are located in both the upper and lower parts of the region (Figure 1). They are commonly recognized as pilot provinces for promoting organic agriculture based on the PGS as a tool for food security, self-sustenance, and sustainable practices for the following reasons: first, they receive a plentiful water supply from the Mekong River. Second, these provinces also

face agroecological limitations, such as poor-quality soil, long dry seasons, and irregular distribution of rainfall due to climate change [26,40,41].

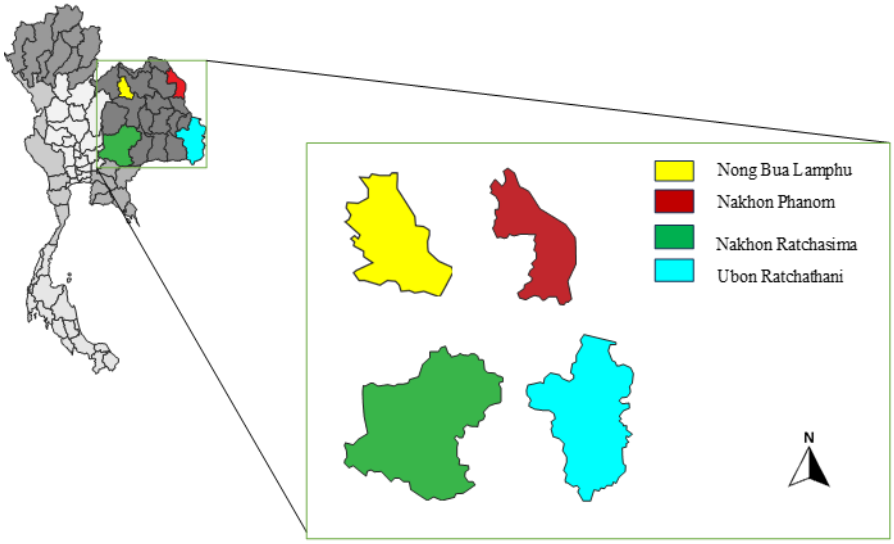

Figure 1. Map of Thailand, including the study areas that are situated in the northeastern of Thailand. Yellow: Nong Bua Lam Phu; red: Nakhon Phanom; green: Nakhon Ratchasima; blue: Ubon Ratchathani (source: own creation, Adobe Illustrator cc 2019, Microsoft Office 365).

3.2. Sampling Procedure

Considering the limitations faced by organic farmers in northeastern Thailand, a purposive sampling method was employed. The empirical data were provided by each province, which resulted in a total of 135 organic farmers acting as informants in this study. Since the study employed a qualitative research approach, the researcher categorized the informants with these criteria, as shown in Table 1.

Table 1. Categorization of samples into three case studies based on the following criteria.

Case Study	Criteria	No. of Samplings
Case study 1	- Farmers who are in in the process of shifting from chemical agriculture to organic agriculture based on the PGS - Farmers who grow vegetables with attention to organic farming - Having an area of cultivation not more than 10 rai - Having an annual income not more than THB 100,000 - Farmers who are engaged in organic agriculture based on the PGS and are waiting to be certified	104
Case study 2	- Farmers who grow vegetables with attention to organic farming - Having an area of cultivation not more than 10 rai - Having an annual income not more than THB 100,000 - Awaiting inspection for participatory guarantee system	15
Case study 3	- Farmers who are engaged in organic agriculture based on the PGS and are certified - Having an area of cultivation not more than 10 rai - Having an annual income more than THB 100,000 - Certified participatory guarantee system	16

According to the criteria, 135 informants were grouped into the following three case studies. This study encountered a significant variation in the number of participants across the case studies. Three primary factors appear to have influenced this disparity:

- Organic product certification status: the majority of informants lacked certified organic products.
- Income level: the study found that a minority of informants had an annual income exceeding THB 100,000. Lower-income farmers might face greater resource constraints, limiting their ability to invest the time required for PGS development.
- Time investment: the process of developing PGS can be time-consuming. This time commitment might pose a significant barrier for some farmers, particularly those with smaller operations or limited labor availability [42].

3.3. Data Collection and Data Analysis

This study was carried out from 2019 to 2022. Data collection was divided into three stages. Firstly, the informants were educated on the concept of the PGS within social–ecological systems in order to transform abstract ideas into more concrete understanding.

Secondly, semi-structured interviews were held. Every informant was asked about his or her agricultural background and other relevant data, such as socio-economic conditions, farming practices, and agricultural history (Table 2).

Table 2. Indicators of PGS production process based on the following criteria.

Criteria	Indicators
(1) Agricultural background	Types of crops grown by farmers
	How long have you used chemical fertilizer?
	When did you stop using chemical fertilizer?
(2) Economic criteria	Income
	Debt
	Loan
	Labor
	Farm size
	Land tenure
	Agricultural machinery
(3) Social indicators	Age
	Education
	Occupation
	Number of family members
	Owning/renting farmland
	Whether the utilized agriculture area is located outside the municipality of the holding location
(4) Production process	Natural resource management, which takes into account use of on-farm resources and indigenous knowledge to clearly understand their farm management
	Participation in both the planning and execution of activities throughout the production process
	Horizontal relationship of the group
	Assurance system
	Network for exchanging information and knowledge

Thirdly, field research was supplemented by farm visits or meetings with farmers to confirm the given information.

The interviews and observations were recorded, and notes were taken. These data were transcribed into descriptive and reflective data. The following approach was considered suitable for converting interview data into useful quantifiable units using three qualitative data analysis processes: (1) data reduction; (2) data display; and (3) drawing conclusions [43]. Moreover, a descriptive analysis was employed to calculate percentages by using Excel (Microsoft Office package, 2010).

4. Results

4.1. Main Characteristics of the Three Case Studies

The majority of informants were female (70%), and the minority were male (30%). The most common ages were 51, 50, and 60. A total of 39 farmers had a farm ranging in size from 0.16 to 0.8 ha, 23 farmers had farms ranging from 0.96 to 1.6 ha, and 17 farmers had a farm of over 1.6 ha. Controversially, 56 farmers used rented land for their agricultural practices. They cultivated various kinds of crops, which were then categorized into six types of organic farming, as follows:

- Leafy vegetables: morning glory, cabbage, white cabbage, kale, coriander, basil, spring onion, bok choy, lettuce, basil, celery, and licorice;
- Vegetables: peppers, eggplants, brinjal, pumpkin, lentils, lemons, jujube, tomatoes, zucchini, santol, and star fruit;
- Edible or root vegetables: bamboo shoots, ginger, galangal, lemongrass, sweet zucchini, cassava, and yam;
- Edible vegetables: cayenne flowers, cauliflower, butterfly pea, okra, and horseradish;
- Herbs: aloe vera, turmeric, kaffir lime, and galingale;
- Others: rice, deep-leaf, mango, bitter bush flower, lychee, mushroom, and Chiang Da vegetables.

The following are the fundamental PGS practices that each case study considered. The five criteria—(1) natural resource management; (2) participation in both the planning and execution of activities throughout the production process; (3) the horizontal relationship of the group; (4) the assurance system; and (5) networks for exchanging information and knowledge—were used to compare and contrast the sustainable production processes of these three case studies (Figure 2).

4.2. Case Study 1

The interviewees in this case study were at the point of shifting from chemical agriculture to organic agriculture; as a result, we spoke with a broad range of interviewees who were interested in organic agriculture based on PGS practices.

4.2.1. Natural Resource Management

This property is associated with the qualities of an individual, which are proven by their use of on-farm resources and indigenous knowledge alongside modern education. This group was in a period of transition, so they were greatly concerned about their soil quality because soil is vital for organic agricultural practices. They had been engaged in extensive monoculture. The method for rehabilitating their soil quality was tilling, planting hemp seeds, plowing rice stubble, and drying soil (including sowing dolomite). Moreover, these smallholder farmers showed cooperation within groups by not burning soil, straw, or hay and not using any chemicals at all to grow plants. This is because they were of the opinion that farmers engaged in organic agriculture should be aware of chemical contamination throughout the production process [18]. However, the initial stages of group formation can be marked by difficulty in collaborating effectively. Furthermore, methods of managing water resources within this group could be divided into two types. The first was performed by 10 interviewees who resided in the city concerned with protecting the community by not throwing garbage into the river or canal (i.e., using trash bins); the

waste was to be kept sanitary because water from sewage may flow into the river, causing contamination. The second kind, i.e., water management in agricultural plots, involved building defense lines or ditches to prevent water from outside the farm from flowing in.

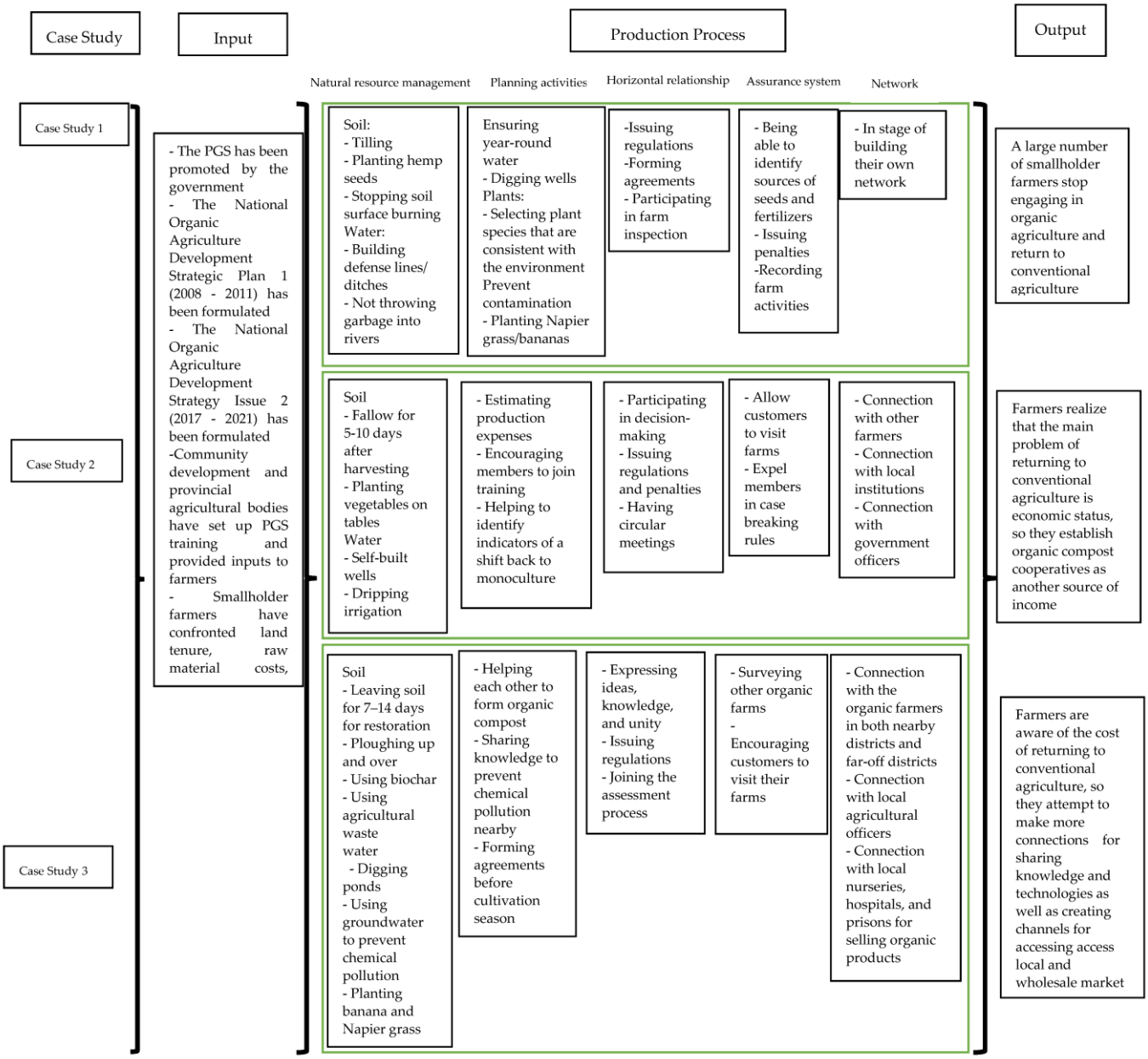

Figure 2. Comparing organic agriculture based on the PGS across the three case studies.

4.2.2. Assurance System

4.2.3. Planning and Conducting Activities throughout the Production Process

The interviewees participated in both water and soil management. Regarding water management, the interviewees planned to protect capacity for year-round water use; this is because there was insufficient water during the dry season due to climate change. In total, 80 interviewees used groundwater mining and digging wells to store water, while others modified plant species like rice to make them more consistent with the environment. Regarding plans for soil rehabilitation, all the interviewees were highly engaged, from problem identification to solution implementation. In terms of planning and resource management, for example, when confronting pests, the farmers suggested planting odorous crops. To prevent water contamination, the farmers suggested building a

dike between neighboring farms and sowing Napier grass and banana plants to prevent chemical pollution.

4.2.4. Horizontal Relationship

This vital property concerns the structure of the farmers' relationships, which may be both formal and informal. Based on our findings, each individual had their own role and rights in their groups in terms of issuing regulations and forming agreements. That said, the head of the group and all inspectors, agricultural officers, and members had to participate in farm inspection. This is because the acts of producing, harvesting, and packaging on organic farms require a wealth of different types of knowledge as well as understanding. For instance, the farm inspection process did not indicate correct or incorrect management; it instead focused on the exchange of knowledge and experience in adapting different farms [44].

This property focuses on standardization in production. It is essential that the sources of seeds and fertilizers are known. The farmers recognized that both their seeds and organic fertilizers had been obtained from government organizations and provided for the PGS training. Moreover, when farmers faced the reality of running out of inputs (seeds and organic fertilizers), they were able to buy from previously agreed-upon shops or stores, and this helped to guarantee and clearly reveal input sources. To maintain higher collective standards, farmers issued their own penalties. For instance, the farmers were obliged to record their farm's activities on a continuous basis.

4.2.5. Networking

This group was at the shifting stage; therefore, their networks were mostly made up of farmers who joined the same organic training group or district agricultural institution and acted as consultants for organic agriculture based on PGS practices. They were in the stage of building their own network not only for sharing knowledge but also for accessing organic markets.

4.3. Case Study 2

The interviewees in this case study had been engaged in organic agriculture based on the PGS for more than 3 years and were waiting to be certified. The number of farmers involved at this stage was significantly smaller because of various factors, such as low productivity, socio-economic differences, and the time taken for soil rehabilitation.

4.3.1. Natural Resource Management

This property focuses on integrating indigenous knowledge and modern education for optimal management of resources. As northeastern Thailand is a well-known dry region [45], its farmers are highly dependent on rainfall and irrigation; the interviewees planned to endure the dry season using self-built wells, nearby canals, and groundwater. They also applied drip irrigation systems on their farms, which reduced water usage, labor, and grass. In addition, most organic farmers use their farms to produce organic fertilizers. This case study involved both traditional and modern means of managing soil resources. The soil was left fallow for 5–10 days after harvesting. By contrast, the interviewees also planted their vegetables on tables to reduce pestilence and the time taken for soil remineralization. These modern means could reduce the risk of plant disease. The farmers also established an organic compost cooperative, which provided them with an alternative income creation opportunity. This creates opportunities for farmers to improve their livelihood [18].

4.3.2. Planning and Conducting Activities throughout the Production Process

This vital property focuses on participation in both the planning and execution of farming activities. Most organic farmers estimated their expenses amassed by agricultural inputs (seeds and organic fertilizers) before cultivating; if they joined government

training or local institutional training, they would receive organic seeds, compost, hay, or bio-extracts. Thus, they strongly encouraged members to join so that they could buy these inputs from stores or shops that had been accepted by members. Furthermore, the number of organic farmers proved crucial for both production volume and bargaining. They helped each other to identify key factors that had caused other farmers to return to chemical agriculture. For instance, there were 40 members at the beginning, but this number gradually reduced because organic agricultural practices required significant perseverance and took time to bring a return on investment. Active involvement is key for members to build trust and credibility [44].

4.3.3. Horizontal Relationship

This horizontal relationship focuses on parallel relationships, which primarily exist between decisions made, adaptation to regulations in the local context, and assessment of farms [18]. According to our findings, distance was the main limiting factor in monthly meetings, so they took the form of socializing and circular meetings. It implied that observing participation on the farm can reveal the process of building trust between farmers [44]. As a consequence, each individual member could feel included because the member involvement increases transparency, fostering trust and creating a platform for knowledge sharing. Moreover, regulations and penalties were issued by every farmer; thus, rules and stipulations applied equally to each member.

4.3.4. Assurance System

Monitoring played an essential role in building trust and transparency to thereby ensure standardization. The most severe penalty was expulsion from the group. However, before being expelled, farmers could be warned both formally and informally, and compromise was attempted. No one was expelled from the group, but some did leave the group to continue engaging in chemical agriculture. Moreover, this case study allowed the customers to visit their organic farm to show their production process.

4.3.5. Networking

This pivotal property of networking focuses on connection with local groups, institutions, and organizations of organic farmers. According to our findings, there were three notable connections in this case study. The first was a connection with local organic farmers who had become involved in organic agriculture based on the PGS. Communication with them allowed for the sharing of problems and the proposition of solutions. Secondly, local institutions can establish training programs and launch projects with the aim of enhancing organic products; this encourages organic farmers to apply their indigenous knowledge alongside technology to prevent pests, develop organic compost, and produce organic seeds. Lastly, government organizations, which are the most influential promoters and supporters of farmers, can provide organic inputs, train farmers to engage in organic agriculture, and act as consultants when organic farmers move from simply producing to properly accessing organic markets.

4.4. Case Study 3

4.4.1. Natural Resource Management

The organic farmers in this case study totally understood organic agriculture based on PGS criteria because they were certified. They were aware of what constituted effective farm management and environmentally friendly actions. For instance, they left their soil for 7–14 days after harvesting to allow time for restoration before plowing up and over. Moreover, five farmers from this case study used "biochar", which is a kind of organic matter that can be added to soil for the purpose of improving soil quality and mitigating climate change using the carbon contained in soil [46]. This method was recommended by agricultural officers and can result in reduced production costs. That said, farmers at this stage were still highly aware of the issue of agricultural waste. They were concerned about

insufficient water resources resulting from climate change and water contamination. The farmers held a meeting before cultivation to discuss water scarcity and ways they might solve this problem (or at least mitigate its severity). For instance, they proposed digging a pond, using groundwater, and beginning irrigation. Moreover, they planted banana and Napier grass on dikes in order to prevent chemical pollution from nearby farms; however, they could not sell these bananas or bamboo shoots as organic products.

4.4.2. Planning and Conducting Activities throughout the Production Process

The interviewees participated in selecting seeds, sourcing seeds from the government, and producing organic compost. They were encouraged by their groups to help each other produce organic compost, which could then be shared. Moreover, they discussed how they might prevent chemical pollution from nearby farms and formed an agreement before the beginning of the cultivation season. Nevertheless, the interviewees in this case study seriously considered shifting back to chemical agricultural methods because such methods are a prerequisite for producing volumes large enough to sell wholesale to firms such as Lotus or Makro. They acknowledged that the main incentive for shifting back to chemical agriculture is economic conditions.

4.4.3. Horizontal Relationship

This vital property focuses on equality of membership, which means each individual involved can express their ideas, knowledge, and history. As in the other two case studies, every interviewee shared their ideas for rules and regulations to be issued and became involved in exchanging ideas for bettering the assessment process.

4.4.4. Assurance System

The interviewees had two ways of guaranteeing standardization. Firstly, they surveyed the other organic farmers, making sure they adhered to rules and regulations. If they broke the rules, they would be cautioned twice before expulsion (however, nobody had cause to be expelled from the organic groups). Secondly, they encouraged customers to visit their farms to build trust and provide education.

4.4.5. Networking

Networking is essential for organic agricultural practices so that producers collaborate and interact with others [18]. In this case, there were three important connections, among which the connection with local agricultural officers was the most important. These officers acted as facilitators to help this group begin their organic agriculture practices based on the PGS, guiding the farmers to certification and accessing the organic market. The next most important connection was that with organic farmers in both nearby districts and far-off districts. They generously shared their technologies and access to the market, and while their organic products were insufficient, they actively sought out connections. Lastly, government organizations such as nurseries, hospitals, and prisons bought their organic products.

5. Discussion

Land tenure is highly problematic for smallholder farmers in Thailand. According to a study [47], there are 4,070,228 farming households in Thailand, and 1,724,091 (42.36%) households do not have land tenure; this implies that they face huge economic burdens in the form of raw material costs, labor costs, and overhead costs [48]. Moreover, smallholder farmers have less power for negotiations; therefore, collaboration is what allows them to persuade the local government or institutions to support them [24]. This is because they cannot depend solely on the centralized government due to limitations on budgets, time, and resources; thus, organic farmers help each other, maximizing their potential and making full use of their horizontal relationships. These farmers have similar purposes and objectives, so it follows that their activities may be collaborative.

Organic agriculture based on the PGS is an alternative form of agriculture that requires holistic management of natural resources and the environment, as well as on-farm management that combines indigenous knowledge and technology. It encourages farmers to plant a variety of plants on their farms. Moreover, within this participatory approach, farmers are capable of expressing their thoughts and issuing regulations in line with their local context [49]; thus, PGS practices create democratic participation [50].

Even if organic farming based on the PGS is an appropriate solution for ensuring a sustainable environment and safeguarding ecosystems, it takes a long time to recover soil fertility, which means the yields and incomes of farmers may dramatically decline [1] as soil is vital for organic production; the volume of products depends on the quality and quantity of the soil being used. Consequently, this factor directly impacts the shifting stage. In fact, smallholder farmers may see gradual decreases of around 40% [51–53] due to depleted soil nutrition, which will then significantly impact their income. Thus, the government should take measures to aid smallholder farmers during this shifting stage, such as through financial measures like subsidies or low-interest loans [20,54]. According to the study in [55], organic farming policies in the European Union result in more sustainable production by using financial assistance to incentivize farmers to shift from their conventional agricultural methods to more sustainable ones. Policies such as these could mitigate the potential shift back to the chemical agricultural practices mentioned above.

In addition, collaboration between the smallholder farmers and local institutions or between smallholders and agricultural officers—through enhancing organic composts and fertilizers and establishing organic fertilizer cooperatives within the community—may create another source of income [56–60]. Furthermore, participation in organic fertilizer cooperatives was shown to affect farmers' behavior and interests [61].

The unique model of the PGS gave smallholders the power to carry out activities such as planning, decision-making, establishing standards, issuing penalties, and holding visits, which then gave farmers the opportunity to encourage the active participation of various stakeholders (producers, consumers, officers, and educational institutions). Moreover, the purpose of participation in the assessment was an expression of farmers' equality and empowerment, in line with the study of [18], which also pointed out that farmers' participation was empowering. Furthermore, farm visits allowed members to gauge basic information about farms' operations because they facilitated the identification of problems and solutions. Both studies by [12,21] have reinforced this, stating that participation in group activities is fundamental to the PGS practice.

Securing producers is a central challenge of engaging in this practice because personal differences and problems may be encountered. Thus, both farmers and government agencies should work together to find solutions and methods of preventing said problems. This investigation, in agreement with authors such as [62,63], showed that government agencies have foreseen the impact of decreasing yields and incomes on farmers, and there is a chance of recurrence. However, few studies on preventing farmers from returning to chemical agriculture have been carried out.

6. Conclusions

Organic agriculture practices based on the PGS act as a tool for mitigating poverty, restoring ecosystems, and collaborating with various stakeholders. The large number of smallholder farmers assessed in this study preferred practicing organic farming at first, as in case study 1, but they were inclined to cease these organic agricultural practices due to decreases in their yields (even though they sought out and built their own connections with other farming institutions). In case study 2, the farmers attempted to alleviate this problem by establishing a cooperative compost initiative as another source of income. They also applied various water management technologies to ensure a safe and adequate water supply year-round. In case study 3, the farmers used biochar-based soil management techniques to encourage fertility and sought stronger connections with close and far-off district institutions to ameliorate the issue of farmers leaving their groups. We conclude

that every related sector should supply aid to farmers who are completing the difficult transition away from chemical agriculture to organic agriculture. Long-term sustainability in agriculture hinges on policy support that combines financial aid with initiatives to empower farmers.

Author Contributions: P.P. contributed to the majority of this manuscript, and B.T. acted as an advisor. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Mahidol University and approved by the Office of The Committee for Research Ethics (Social Sciences) (MUSSIRB2019/280 B1).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request. The data are not publicly available for privacy reasons.

Conflicts of Interest: The authors declare no conflicts of interest.

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