

**PARTICIPATORY GUARANTEE SYSTEMS FOR ORGANIC  
VEGETABLES IN THAILAND: A STUDY ON FARMER  
PARTICIPATION AND GOVERNMENT SUPPORT**

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## **ABSTRACT**

This study investigates the determinants affecting farmer involvement in Participatory Guarantee Systems (PGS) for organic vegetables in Thailand, namely in the Kamphaeng Phet and Nakhon Pathom provinces of the central region. It examines farmers at various PGS stages (Initial, Intermediate, Advanced) and evaluates the impact of government support on the continuity and sustainability of PGS.

The study used a mixed-methods approach, integrating comprehensive interviews with PGS producers and a survey questionnaire. Qualitative data analysis will apply theme analysis, whereas quantitative data analysis will utilize descriptive and inferential statistics. The study seeks to ascertain the determinants influencing farmers' choices to participate in and persist with PGS, along with the impact of governmental support systems on the continuity of these organizations. The findings will help develop engagement methods for organic vegetable farmers in Thailand, fostering a more sustainable and equitable organic agriculture industry while harmonizing with governmental programs to more effectively serve farmers' needs and incentives.

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## **LIST OF ABBREVIATIONS**

BCG	Bioeconomy, Circular, Green economy
FAO	Food and Agriculture Organization
GPP	Gross Provincial Product
IFOAM	International Federation of Organic Agriculture Movements
LDD	Land Development Department
OA	Organic agriculture
OF	Organic farming
PGS	Participatory guarantee systems
SDGs	Sustainable Development Goals
TOAF	Thai Organic Agriculture Foundation
TPC	Third-party certification

# CHAPTER 1

## INTRODUCTION

### 1.1 Background of the Study

Sustainable agriculture, defined by the FAO as practices that sustainably meet human needs for present and future generations (Liu, 2023), is crucial for addressing global challenges. Organic agriculture, a prominent form of sustainable agriculture, prioritizes natural substances and processes, offering significant potential to mitigate environmental and social issues while contributing to the Sustainable Development Goals (SDGs) (Sacchi et al., 2024). With millions of producers worldwide, organic agriculture has seen substantial growth, reflected in the global organic food market, which reached nearly 125 billion euros in 2021 (Willer et al., 2023).

The growing demand for organic food is fueled by environmental concerns and the need for quality assurance, which has increased the necessity for robust systems to ensure the authenticity and integrity of these products. Quality assurance is crucial for maintaining consumer trust and confidence in organic goods. However, the choice of a guarantee system depends on several factors, including the scale of production, market access, and the specific needs and preferences of both producers and consumers.

These systems range from informal direct relationships between farmers and consumers to formal third-party certifications. (Zanasi et al., 2019). However, guaranteeing the authenticity of organic products presents challenges. TThird-party certification (TPC), the most common method, faces criticisms for being inaccessible and costly, especially for small-scale producers in developing countries (Banjara, 2015; Hruschka et al., 2022; Sacchi et al., 2024). These barriers have spurred the development of alternative quality assurance systems, notably Participatory guarantee systems (PGS)

PGS, defined by IFOAM - Organics International (2008) as "locally focused quality assurance systems based on active participation of stakeholders and built on trust, social networks, and knowledge exchange," offer a more accessible and inclusive approach. Key elements of PGS include shared vision, participation, transparency, trust, horizontality, and continuous learning (IFOAM - Organics International, 2019, pp. 15-20). While predominantly used in developing countries, PGS has also found application



in some western nations, with over 1,000 producers certified in seven countries, including India, Brazil, Thailand, Tanzania, Kyrgyzstan, Kenya, France (Willer et al., 2023).

Farmers' active participation is crucial for the long-term sustainability and effectiveness of PGS initiatives, as it drives social, economic, and environmental benefits. The success of PGS hinges on the active engagement of various stakeholders, particularly farmers, in all stages of the certification process, including planning, decision-making, and farm assessments (Torquati et al., 2021). However, challenges to effective participation in PGS exist, such as time constraints, lack of expertise, short membership durations, lack of awareness and motivation, logistical challenges due to long distances, and conflicts or conflicts of interest within the PGS (Hruschka et al., 2022; Kaufmann et al., 2020).

Government support has been crucial in promoting PGS through a variety of mechanisms, including institutional support, market institutionalization, demand creation, and financial assistance (Bellamy et al., 2023). In Thailand, government backing is particularly vital for smallholder farmers, providing necessary financial aid, capacity building, and market development to facilitate their participation in PGS (Phromthep & Torut, 2024).

Agriculture is a significant sector in Thailand, with a substantial portion of the population engaged in smallholder farming. In 2020, approximately 55 percent of the rural population was employed in agriculture. The majority of these farm households are smallholders. In 2019, about 80 percent of households holding farmland were from rural areas, with over 70 percent classified as smallholders, 23 percent as medium holders, and 6 percent as large holders. (World Bank Group, 2022, pp. 13, 22). The Thai government has shown support for organic farming through various policies and initiatives.

One such initiative is the Action Plan for Organic Agriculture 2017-2022, developed by the National Organic Agriculture Development Committee under the Ministry of Agriculture and Cooperatives, outlines ambitious goals for the growth of organic agriculture in Thailand. By 2022, the plan aims to increase organic agricultural land to at least 1.3 million rai and the number of organic farmers to no less than 80,000.

Additionally, the plan targets an average annual growth rate of 3 percent for the value of organic agricultural products. (Committee for Organic Agriculture Development of Thailand, 2022, p. 31) Crucially, the action plan prioritizes PGS as an important strategy. However, the results of the project "Development of Farmer Groups towards Organic Certification with Participatory guarantee systems (PGS)" from 2016 to 2023 showed a limited expansion of the PGS network.

Despite these efforts, there is a gap in comprehensive studies examining the factors influencing farmer participation in PGS, and the role of government and support mechanisms in this context, particularly in Thailand. This study aims to fill these gaps by analyzing the key factors influencing farmers' participation in PGS for organic vegetables, assessing the impact of factors on the continuity of PGS processes, and identifying the role of government and support mechanisms in shaping the sustainability of PGS in Thailand.

## **1.2 Statement of the Problem**

PGS offers a promising alternative to traditional third-party certification for organic agriculture, promoting inclusivity and empowerment of producers. However, several challenges hinder their widespread adoption and scaling. Firstly, operational challenges such as farmer readiness, scale of operation. There is skepticism about farmers' readiness to adopt PGS, which demands active participation and a shift from conventional practices. Additionally, scaling PGS to larger production systems risks losing their core participatory nature. As PGS becomes more institutionalized, the increased bureaucracy could hinder the flexibility and local adaptability that are fundamental to the PGS approach (Sacchi et al., 2024).

While Anselmi & Vignola (2022) indicated that the process of obtaining PGS certification involves complex and lengthy administrative procedures that are burdensome for small-scale farmers. The high costs associated with participation, including time spent on meetings, farm visits, and paperwork, deter farmers from engaging in PGS. Similarly, Chaparro-Africano & Páramo (2022) also highlighted that challenges facing PGS include time commitment from members, particularly consumers and producers. Diverse groups can experience conflicts, making it difficult to achieve short-term goals. Additionally, participants' capacity for engagement varies due to factors like training, experience, and competing priorities.

In Chile, the primary motivation for farmers to join PGS is to obtain organic certification and the associated economic benefits, such as price premiums (Hruschka et al., 2022). In contrast, PGS initiatives in Brazil offer benefits beyond just certification, including empowerment, social inclusion, and mutual support among farmers. These additional benefits serve as strong motivators for participation (Torquati et al., 2021). Both economic and non-economic factors influence farmers' decisions to join PGS. Therefore, a comprehensive study of social, economic, and environmental factors will provide clearer insights into the drivers within the PGS system, aiding in the promotion of its future expansion.

Active farmer participation is crucial for the success and sustainability of (PGS). As PGS are built on principles of collaboration, knowledge exchange, and shared responsibility, the active engagement of farmers and other stakeholders is fundamental to their effective operation (Phromthep & Torut, 2024; Kaufmann et al., 2020). However, achieving robust participation can be challenging. studies have shown that factors such as time constraints, perceived lack of expertise, and short membership duration can limit active involvement in PGS activities (Hruschka et al., 2022). Such limited participation can hinder the trust-building and knowledge exchange that are vital for PGS to function effectively (Kaufmann & Vogl, 2018). Furthermore, an over-reliance on a few key individuals, as observed in some Chilean PGS initiatives, can create vulnerabilities and undermine the participatory nature of the system (Hruschka et al., 2022). To fully realize the potential of PGS, it is essential to address these barriers and foster an environment that encourages and supports active and meaningful participation from all stakeholders.

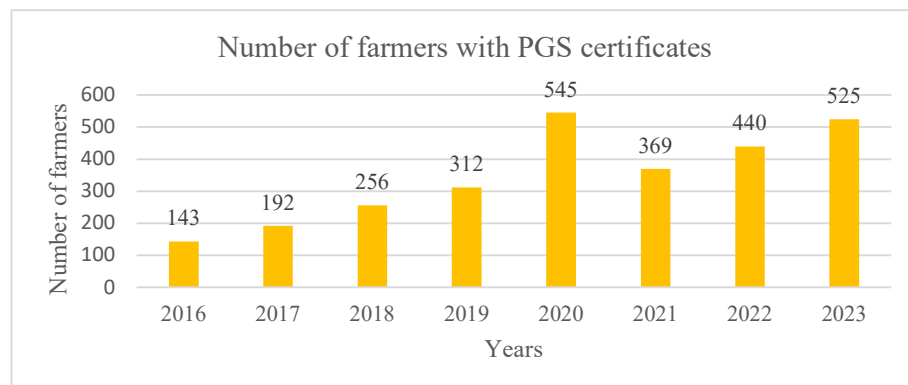
The role of government is pivotal in the success of PGS, as government programs and policies directly influence access to resources, market opportunities, and legal frameworks essential for PGS operations (Kaufmann et al., 2020). In Brazil, government interventions have been instrumental in promoting PGS by enhancing participation, transparency, and accountability within the food system (Bellamy et al., 2023). The relationship between government support and participation in PGS is closely intertwined. Effective government initiatives, such as financial incentives, technical assistance, and market development, can create an enabling environment that encourages farmer participation and bolsters the sustainability of PGS initiatives

(Phromthep & Torut, 2024; Bellamy et al., 2023). At the same time, active and meaningful participation from farmers and other stakeholders is essential for PGS to achieve their goals of promoting sustainable agriculture, empowering local communities, and ensuring the integrity of organic products (Phromthep & Torut, 2024; Kaufmann et al., 2020; Hruschka et al., 2022; Kaufmann & Vogl, 2018).

A pilot project in Thailand, led by the Thai Organic Agriculture Foundation (TOAF) and government agencies, demonstrated promising results. The pilot PGS project in five Thai provinces exceeded its target, involving 456 households and 60 hectares, with 152 members certified. Women played a significant role, comprising over 50% of active participants. Continued support from TOAF, the Ministry of Agriculture and Cooperatives, and provincial administrations suggests potential for growth in organic agriculture through PGS (Pongsrihadulchai, 2020). While the pilot PGS project in Thailand showed initial success, with high participation and certification rates (Pongsrihadulchai, 2020), the overall expansion of PGS certificates in the country has been slow, as demonstrated in Table 1.1, which reports data specifically for PGS certification (Land Development Department, 2023).

**Table 1.1**

*Number of farmers with PGS certificates under the Land Development Department (2016-2023)*



Existing studies have primarily focused on the concept and implementation of PGS and their operational challenges, such as the complexity of the certification process.

However, the multifaceted nature of farmer participation and its impact on the continuity of PGS remains underexplored. While economic motivations, like price premiums, are well-documented, the influence of non-economic factors, such as social inclusion and environmental aspect, is less understood, particularly in developing countries. Additionally, there is a lack of comprehensive research on how government support mechanisms affect farmers continued participation dynamics and the scalability of PGS without compromising their core participatory nature. Addressing these knowledge gaps is essential for developing strategies that enhance the effectiveness, sustainability, and expansion of PGS, ensuring they are better tailored to the needs and motivations of farmers and leading to more resilient PGS initiatives.

### **1.3 Research Rationale**

The increasing global demand for organic products has led to the development of alternative quality assurance systems like PGS. These systems are particularly appealing to smallholder farmers who face the high costs and bureaucratic complexities associated with TPC (Iannucci & Sacchi, 2022). With their localized and participatory approach, PGS aligns well with the collaborative nature of agri-food supply chains, emphasizing active participation and transparency to build trust in organic products (Gajdić et al., 2023; Ninnin & Lemeilleur, 2024).

While PGS offers benefits such as fostering knowledge exchange and community building, they also face significant challenges, including the time commitment required for participation and the complexities of administrative procedures (Hruschka et al., 2022). A major barrier to effective PGS participation is the lack of collaboration among diverse stakeholders, including regulatory bodies, which is crucial for successful integration and market viability (Sacchi et al., 2024). Additionally, distrust among participants can hinder engagement and knowledge exchange, undermining the effectiveness of PGS (Home et al., 2017).

In Thailand, the alignment of PGS with the National Strategy (2018-2037) highlights its potential to contribute significantly to sustainable agriculture and long-term development. However, broader adoption has been hindered by operational challenges and participation barriers, including farmer readiness, the complexity of certification processes, and difficulties in scaling up, such as maintaining stakeholder involvement and ensuring consistent quality standards across production systems.

According to SDG Move's studies on support systems for achieving the Sustainable Development Goals (SDGs), SDG 2.4 in Thailand is currently at a critical status, with performance below 50% of the target value (red status). The goal is to achieve 10 million rai of sustainable agriculture land by 2030 (SDG Move, 2024). One of the findings indicates that sustainable agriculture is not yet widely adopted in Thailand due to the complexity and difficulty of its procedures and practices, which demotivates farmers from transitioning to organic or sustainable methods.

This highlights the need for a comprehensive approach to overcoming these barriers. Mettpranee (2017) concluded that PGS has a significant positive impact on Thai agriculture, with farmers experiencing a substantial reduction in production costs and a remarkable increase in income after implementing PGS. These findings underscore the potential of PGS to enhance the economic viability and sustainability of Thai agriculture, further aligning with the National Strategy's goals of economic growth, social equality, and environmental sustainability.

This study investigates factors influencing farmers' participation in Organic Farming Groups (PGGs) for organic vegetables in Thailand, focusing on social, economic, and environmental motivations and barriers. Additionally, the research will examine the factors that influence farmers' continued participation in PGS groups which impact the continuity of PGS processes. Finally, the study will evaluate the role of government support the continuity of PGS for organic vegetables in Thailand, offering insights on optimizing interventions to enhance farmer engagement and ensure the long-term viability of PGS initiatives. This research aims to develop effective strategies for Thai organic vegetable farmers, enhancing resilience, promoting sustainable agriculture, and aligning with government initiatives to meet farmers' needs and incentives.

#### **1.4 Research Questions**

What are the key factors influencing farmers' decisions to join and continue participating in the PGS for organic vegetables in Thailand, and how do government support mechanisms affect the continuity of these groups?

1. What are the key factors influencing farmers' decisions to join PGS at different stages, such as initial groups (stage 1), intermediate groups (stage 2: years 2-4), and advanced groups (stage 3: certified groups)?

2. What factors influence farmers' continued participation in PGS groups, and how do these factors contribute to the continuity of PGS groups for organic vegetables in Thailand?
3. How do government support mechanisms influence the continuity of PGS groups for organic vegetables in Thailand? and how should these mechanisms be improved to promote the long-term success of PGS?

### **1.5 Objectives of the Study**

The overall objective of this study is to investigate the factors influencing farmers' participation and continued involvement in PGS groups, as well as to identify the role of government support mechanisms in ensuring the continuity of PGS systems for organic vegetable groups in Thailand.

The study aims to:

1. To explore key factors that influence farmers' decisions to join PGS at different stages, such as initial groups (stage 1), intermediate groups (stage 2: years 2-4), and advanced groups (stage 3: certified groups) of PGS for organic vegetables in Thailand.
2. To examine the factors that influence farmers' continued participation in PGS groups and how these factors contribute to the continuity of PGS groups for organic vegetables in Thailand.
3. To analyze the government support mechanisms that influence the continuity of PGS groups for organic vegetables in Thailand.

### **1.6 Scope and Limitations**

This study investigates the factors influencing farmer participation in the PGS for organic vegetables in Thailand. Specifically, it explores key motivations, farmer-specific factors such as individual characteristics, and external influences that drive or deter farmers' engagement in PGS. The research also identifies the factors that influence farmers' continued participation and how these factors impact the continuity of PGS. This includes analyzing individual factors such as perceptions of types of participation in PGS, perceived benefits from the system, time and resource constraints, and sense of ownership. Additionally, the study examines the government support mechanisms that influence farmers' decisions to join and engage in the PGS system, focusing on the forms of support implemented within the PGS system in Thailand.

The study will be limited to the context of the central region of Thailand and may not be generalizable to other countries or regions with different regulatory frameworks for PGS. It will primarily focus on smallholder farmers involved in organic vegetable production, as registered by the Land Development Department, and will exclude PGS systems managed by other agencies. While this focus allows for a detailed analysis within a specific context, it may not fully capture the experiences and perspectives of other types of farmers or those involved in different farming practices and crop types. The perspectives of other relevant actors, such as input suppliers or traders, are also not included. Despite these limitations, this study provides valuable insights into understanding PGS in Thailand and offers guidance to stakeholders working towards sustainable organic agriculture.

### **1.7 Conceptual Framework**

This study builds on previous research to develop a conceptual framework for investigating the factors that contribute to the sustainability PGS in Thailand. The research focuses on key components that shape farmers' decisions to participate in PGS, including motivations, barriers, and contextual influences. Motivations for participation include access to resources, economic incentives, and perceived benefits of organic agriculture (Phromthep & Torut, 2024). Barriers to participation encompass time constraints, perceived lack of expertise, and logistical challenges (Hruschka et al., 2022; Kaufmann et al., 2020). Contextual influences, such as social, economic, and environmental factors, also play a significant role in farmers' engagement with PGS (Torquati et al., 2021; Kaufmann et al., 2020).

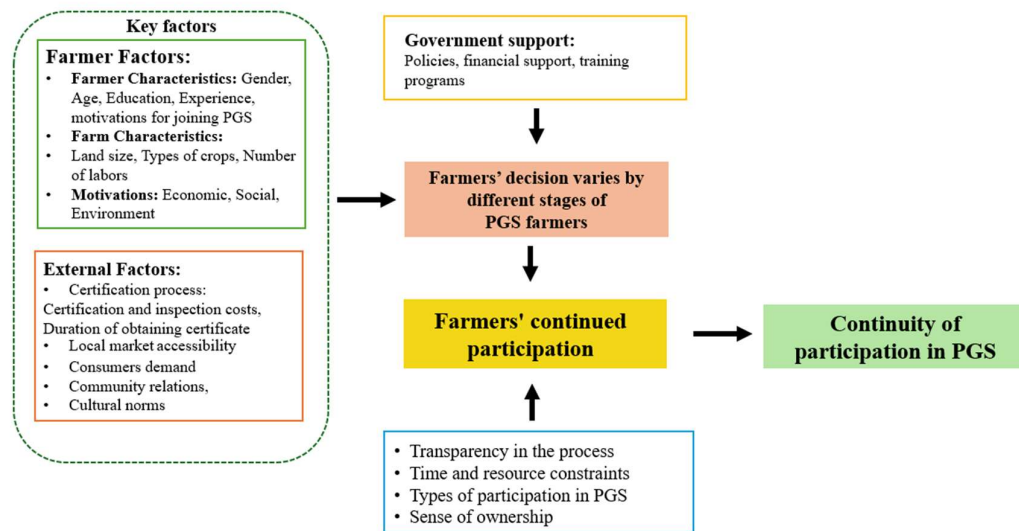
To maintain farmers' motivation for continued participation in PGS groups, several key factors are essential. Social capital, including trust and community support, is crucial for sustaining engagement (Anselmi & Vignola, 2022; Farreras & Salvador, 2022). Government support through policies, funding, and training enhances group legitimacy and continuity (Dorville & Lemeilleur, 2023; Hruschka et al., 2024). Economic benefits, such as market access and reduced costs, serve as strong incentives for farmers to stay involved (Enthoven & Van den Broeck, 2023; Kaufmann et al., 2022). Additionally, flexibility in decision-making and effective management help maintain commitment and build a sense of ownership, contributing to the sustainability and continuity of PGS groups.



The role of the government is also crucial, providing various support mechanisms that shape the development and direction of PGS. These include institutional support to establish the legal foundation for organic agriculture, market institutionalization through standards for organic labeling, demand creation via government procurement programs, and technical and financial support, such as training, extension services, subsidies, and loans (Bellamy et al., 2023; Phromthep & Torut, 2024). Overall, the study aims to offer a comprehensive understanding of the factors influencing the continuity of PGS in Thailand, providing insights into how these systems can be strengthened and expanded for long-term success.

**Figure 1.1**

*Conceptual framework*



This conceptual framework examines factors influencing farmers' continued participation in Participatory Guarantee Systems (PGS) for organic vegetables in Thailand, considering different PGS stages (initial, intermediate, advanced). It identifies individual motivations, barriers, and contextual influences affecting engagement. The framework categorizes these influences into farmer-specific characteristics, farm characteristics, and external factors.

The framework also explores how participation types, transparency, constraints, and ownership impact farmer engagement continuity. It highlights the role of government

support in shaping farmers' decisions to continue participating. By analyzing these elements, the framework aims to provide insights into factors ensuring the long-term viability of PGS groups, contributing to sustainable organic vegetable production in Thailand.

### ***Continuity***

In the context of PGS for organic vegetables in Thailand, continuity refers to the ability of a group to operate smoothly in the long term and achieve its ultimate goal of obtaining organic certification. The concept of continuity in PGS groups involves consistent farmer participation in activities like meetings, peer reviews, and training sessions. It also requires external support from the government, such as favorable policies, infrastructure, and market support. Effective management in PGS activities is crucial to address challenges and maintain farmer engagement. Active participation fosters ownership, information exchange, and capacity building, enabling PGS groups to sustain operations and retain members long-term.

The study assesses continuity by examining internal and external factors influencing participation. We will use quantitative and qualitative methods to evaluate their relationship with the sustainability of farmers' involvement. Additionally, we will analyze the role of government support through qualitative analysis. Evaluating both internal and external factors will provide a clearer picture of PGS groups' ability to maintain operations and sustain member engagement.

## **CHAPTER 2**

### **LITERATURE REVIEW**

This section reviews recent studies on sustainable agriculture, organic farming, and the role of PGS in supporting small-scale organic farmers. It highlights key concepts of sustainable agriculture, focusing on how it addresses global challenges like climate change and food security. Organic farming is valued for its environmental benefits and its role in achieving the SDGs, making it a critical component of sustainability efforts.

The section also explores the evolution of quality assurance systems in organic farming, focusing on the shift from TPC to PGS as an alternative certification method. It examines global and Thai studies on PGS, looking at its development, community empowerment, and sustainability impacts. The review discusses challenges related to scaling and market access, while highlighting the benefits PGS provides to smallholder farmers. Finally, this chapter covers how government support influences PGS scalability and sustainability, and how PGS is being implemented in Thailand.

#### **2.1 Sustainable Agriculture and Organic Farming**

The world is rapidly changing due to population growth, urbanization, technology, and climate change, making sustainable agriculture and food systems a critical challenge. With the global population expected to reach 9 billion by 2050, sustainable agriculture is essential to ensure sufficient and nutritious food despite climate change and resource constraints (Mishra et al., 2019; Wekeza et al., 2022). Unlike conventional farming, which often harms the environment, sustainable practices promote ecological balance and resource conservation (Yadav et al., 2013; Jouzi et al., 2017). Dijk et al. (2021) predict a significant rise in global food demand by 35% to 56% by 2050, emphasizing the urgent need for sustainable agriculture to meet future needs while protecting the environment.

Sustainable agriculture is a farming approach designed to meet current food and fiber needs while ensuring future generations can do the same, balancing environmental health, economic profitability, and social well-being (Gamage et al., 2023). Organic agriculture (OA) is a holistic production system that emphasizes sustainable agroecosystem management by minimizing synthetic inputs, promoting ecological

balance and biodiversity, and fostering the well-being of all system components (Albersmeier et al., 2009; Jouzi et al., 2017; Nandwani & Nwosisi, 2016; Saffeullah et al., 2021). Key characteristics of OA include the exclusion of synthetic inputs, focus on ecological balance and biodiversity, a holistic production system, and a long-term sustainability focus.

The International Federation of Organic Agriculture Movements (IFOAM) outlines four principles: Health, Ecology, Fairness, and Care. These principles enhance the health of all system elements, foster harmony with natural ecosystems, ensure fair relationships, and manage agriculture responsibly, promoting sustainability, biodiversity, equity, and careful assessment of technologies for a healthy and ecologically sound system. Based on these common themes, organic agriculture can be defined as a holistic production system that emphasizes the sustainable management of agroecosystems by minimizing synthetic inputs, promoting ecological balance and biodiversity, and fostering the health and well-being of soil, plants, animals, and humans.

Organic farming (OF), a key component of organic agriculture, uses natural methods to control pests and diseases, emphasizes crop rotation and companion planting, and focuses on soil health, biodiversity conservation, and reduced environmental impact (Gamage et al., 2023; Mishra et al., 2019). Key practices in organic farming include promoting soil fertility, nitrogen self-sufficiency, maximizing resource efficiency through recycling and composting, minimal or no tillage, and water conservation. Natural pest and disease control methods are preferred, and chemical use is minimized to protect the environment and human health (Yadav et al., 2013).

Organic farming actively contributes to achieving various Sustainable Development Goals (SDGs) (Wekeza et al., 2022; Gamage et al., 2023). It addresses SDG 2 (zero hunger) by promoting sustainable food systems and tackling food insecurity. Additionally, OF creates employment and economic opportunities for farmers, addressing SDG 1 (no poverty) (Jouzi et al., 2017; Wekeza et al., 2022). It also supports SDG 3 (good health and well-being) by providing healthier food options and SDG 5 (gender equality) by increasing women's participation in agriculture and decision-making, offering safer and more accessible jobs (Saffeullah et al., 2021; Setboonsarng & Gregorio, 2017). Furthermore, OF supports environmental goals by reducing water

pollution (SDG 6 - clean water and sanitation), mitigating climate change (SDG 13 - climate action), minimizing impacts on water bodies (SDG 14 - life below water), and promoting soil health (SDG 15 - life on land) (Setboonsarng & Gregorio, 2017). Overall, organic farming provides a holistic approach to sustainable development, contributing to multiple SDGs for a better future.

Organic agriculture has seen notable global growth, with organic farmland exceeding 76.4 million hectares in 2021, a 1.6% increase from the previous year (as shown in Figure 2.1). The organic market also expanded, reaching nearly 125 billion euros, reflecting rising consumer demand. Additionally, in 2021, there were at least 3.7 million organic producers globally. Asia accounted for 49% of these producers, followed by Africa with 31%, Europe with 12%, and Latin America with 8% (as shown in Figure 2.2). There was a 4.9% increase in the number of producers compared to 2020, with over 170,000 new producers, highlighting the increasing adoption of organic practices across 191 countries worldwide (Willer et al., 2023, pp.53-55).

**Figure 2.1**

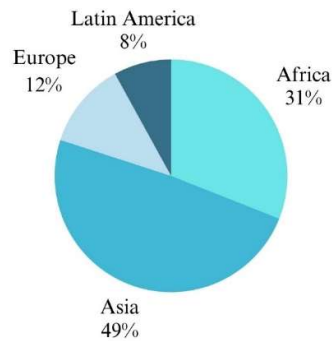
*Growth of Organic Agriculture land and organic share 2000-2021*



*Source:* (Willer et al., 2023, p.42)

**Figure 2.2**

Contribution of Organic Agriculture producers in 2021



*Source:* (Willer et al., 2023, p.53-55)

## 2.2 Evolution and Impact of Quality Assurance Systems in Organic Agriculture

Certification, as a technological practice, often reinforces the advantages of large producers instead of promoting equity among all producers (Gomez Tovar et al., 2005). Ascui et al. (2019) highlight those standards, while often seen as neutral, play a significant role in shaping social, economic, and political dynamics. They influence who can participate in markets, create power dynamics, and control practices. Standards often favor larger, well-resourced entities, excluding smaller players and concentrating power among those who set or meet the standards. This can lead to economic power for industries like certification bodies. Standards also impact environmental practices and social norms, sometimes reinforcing inequalities. However, those who feel excluded often push back, leading to changes within the established power structures.

The evolution of certification in organic agriculture shows a shift from first- and second-party models to the dominance of third-party certification. Initially, organic certification involved self-declarations by farmers (first-party) or assurances from farmer organizations (second-party). Over time, especially with the institutionalization of organic standards in Europe in the late 1980s, third-party certification became the norm. This model involves independent certifiers who verify compliance with organic

standards and has become the global standard (Fouilleux & Loconto, 2016). Since 1991, the European Union (EU) has regulated the organic sector, set production and marketing standards and requested inspections to ensure compliance. The EU's third-party certification system involves either government agencies or private companies accredited by the government (Cuéllar-Padilla, 2018).

Quality assurance in organic agriculture offers several benefits. Lohr (1998) emphasizes that certification assures consumers of product quality, protects producers from fraud, and improves market efficiency. It bridges the information gap between producers and consumers, building trust in organic labels. Certification logos on product labels significantly influence consumer perception and willingness-to-pay, highlighting the importance of quality assurance in shaping market dynamics (Janssen & Hamm, 2012).

Certification allows producers to access premium markets and differentiate their products, leading to increased market opportunities and economic benefits, especially for smallholders (Gomez Tovar et al., 2005; Anselmi & Vignola, 2022). It also offers environmental benefits, such as reduced chemical usage and improved soil health, and can lead to higher productivity and yields for certain crops (Gordon et al., 2020). However, critics argue that the current certification system may deviate from the original principles of the organic movement, which focused on sustainability and harmony with nature. They believe that the certification process is pushing organic farming towards a more industrial, profit-driven model (Elrick et al., 2022).

The "conventionalization debate" within the organic agriculture movement, discussed by Fouilleux & Loconto (2016), questions whether the institutionalization and commercialization of organic farming are causing it to resemble conventional agriculture. As organic farming becomes more mainstream, driven by market forces, standardization, and regulation, there are concerns that it is straying from its original ideals of sustainability, social justice, and small-scale, ecologically diverse practices. Some argue that it has become overly commercialized and disconnected from the movement's original goals. They advocate for PGS as a more accessible, community-oriented alternative.

### **2.3 Participatory guarantee systems (PGS)**

The section discusses PGS as a cost-effective alternative to traditional TPC in organic agriculture, addressing high costs and bureaucratic challenges. It reviews global and Thai studies, focusing on sustainability, community empowerment, economic benefits, and scalability.

### ***2.3.1 The emergence of PGS***

Since the 1990s, TPC has dominated the organic sector, creating significant challenges for small-scale farmers and driving the rise of PGS. The high costs and bureaucracy of TPC, along with the exclusion of smallholders, are the main factors behind this shift (Cuéllar-Padilla & Ganuza-Fernandez, 2018; Binder & Vogl, 2018; Brito et al., 2022; Kaufmann & Vogl, 2018; Iannucci & Sacchi, 2022; Banjara, 2015; Hruschka et al., 2022; Sacchi et al., 2024).

TPC often imposes financial and administrative burdens on small-scale farmers, especially in the Global South. These include expensive external audits and extensive paperwork, making certification difficult to achieve. The requirement to separate extension services from certification, as mandated by ISO 17065, further complicates the process (Cuéllar-Padilla & Ganuza-Fernandez, 2018; Binder & Vogl, 2018; Brito et al., 2022). As a result, many smallholders are excluded from TPC because they lack the resources and technical know-how to meet its strict requirements (Binder & Vogl, 2018; Hruschka et al., 2022; Sacchi et al., 2024).

In response, PGS has emerged as a more affordable and accessible alternative. PGS leverages local knowledge and social networks, reducing the need for costly audits and fostering a certification process that is more inclusive and adaptable to local contexts (Gomez Tovar et al., 2005; Janssen & Hamm, 2012; Anselmi & Vignola, 2022; Fouilleux & Loconto, 2017; Iannucci & Sacchi, 2022). This shift reflects a desire to minimize bureaucracy and make organic certification more attainable for small-scale farmers (Anselmi & Vignola, 2022). PGS operates as a self-governed system, often outside of third-party certification and organic regulations, with key stakeholders involved in designing and managing the system internally, rather than following external rules (IFOAM - Organics International, 2019, pp. 12).

PGS, as defined by IFOAM - Organics International (2008), are "locally focused quality assurance systems based on active participation of stakeholders and built on trust, social

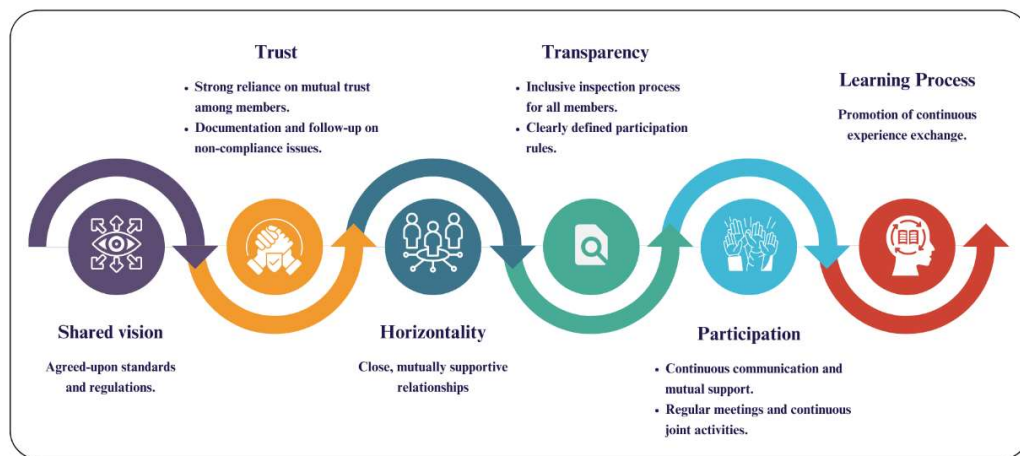


networks, and knowledge exchange." PGS is guided by principles that emphasize collective involvement and shared responsibility. Stakeholders work together to define goals, such as organic production standards, social justice, fair trade, environmental protection, and community empowerment. Active participation from producers, consumers, and relevant actors is crucial at every stage of PGS, ensuring transparency through open access to information and decision-making processes. Trust is built on the integrity and commitment of all participants to uphold the shared vision. The system operates democratically, promoting equal participation and decision-making power. Additionally, PGS encourages continuous learning and knowledge exchange to adapt to local contexts and build capacity among stakeholders (IFOAM - Organics International, 2019, pp. 15-20).

The key elements of PGS, as illustrated in Figure 2.3, include six essential components that work together to ensure its effectiveness and sustainability. A shared vision, grounded in mutually agreed-upon standards and regulations, promotes consistency and fairness within the group. Trust plays a crucial role, as members depend on each other to adhere to these standards, supported by proper documentation and corrective measures for any non-compliance. PGS values horizontality, encouraging close, supportive relationships in a non-hierarchical environment. Transparency is maintained through an open inspection process and clear participation rules, ensuring active involvement from all members. Participation is fostered through continuous communication, mutual support, and regular collaborative activities, keeping everyone aligned with the group's objectives. Finally, the learning process encourages ongoing experience exchange, which drives continuous improvement and adaptation within the PGS framework.

**Figure 2.3**

*Key Elements of Participatory Guarantee Systems (PGS)*

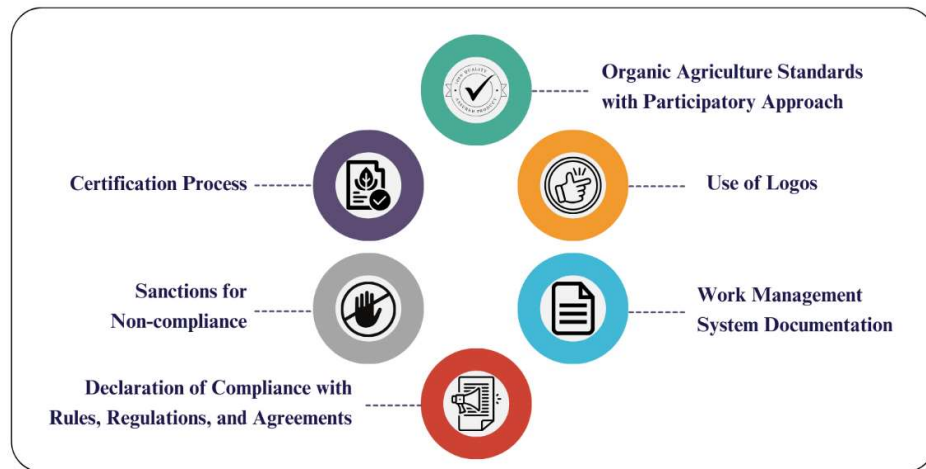


Adapted from (The Land Development Department, 2016, p. 6)

Moreover, documents and Internal Controls of the Group, as shown in Figure 2.4, outlines the key components that keep a Participatory Guarantee System (PGS) group running smoothly and transparently. These elements ensure standards are met and proper governance is maintained. The Organic Agriculture Standards, created through a participatory approach, ensure all members follow the same guidelines. The regulated use of logos guarantees that only compliant products carry the PGS certification, protecting the brand's integrity. Detailed documentation of management processes tracks progress and ensures accountability. Members must formally declare their commitment to the group's rules, which promote consistency and adherence to standards. Sanctions for non-compliance provide deterrents and help uphold the group's integrity. The certification process, which includes inspections and assessments, ensures that products meet organic standards before receiving the PGS label. Together, these elements form the foundation of the group's internal controls, playing a crucial role in maintaining standards, building trust, and contributing to the PGS's overall success and credibility.

**Figure 2.4**

*Documents and internal controls of the group*



Adapted from (The Land Development Department, 2016, p. 6)

### ***2.3.2 Review of key studies on PGS globally and in Thailand.***

The literature on PGS covers several key themes with significant implications. This section will explore ten main topics: PGS as an alternative to third-party certification, community building and local empowerment, the impact of PGS on sustainability, challenges and opportunities for PGS development, the role of consumers and other stakeholders, institutionalization and regulation of PGS, the use of technology in PGS, market access and economic impact, The existing literature on the scalability, continuity, and sustainability of PGS, and Research on PGS in Thailand.

#### ***2.3.2.1 PGS as an alternative to Third-Party Certification***

Several studies point out the challenges of third-party certification (TPC), particularly the high costs and bureaucracy, which can make it difficult for smallholder farmers in developing countries to access certification. In contrast, Participatory guarantee systems (PGS) offer a more accessible and inclusive alternative by leveraging local knowledge and social networks, reducing the need for expensive external audits and extensive paperwork (Iannucci & Sacchi, 2022; Hruschka et al., 2022; Elrick et al., 2022; Kaufmann et al., 2023). The study by Kaufmann et al. (2023) further emphasizes

that while PGS has lower upfront certification costs, it requires a significant time investment in the certification process, which can place an uneven burden on members.

#### ***2.3.2.2 Community building and local empowerment***

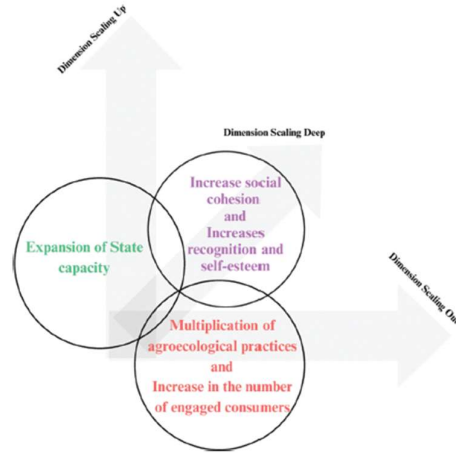
Trust, social networks, and knowledge exchange are essential to how PGS operates. PGS empowers farmers by promoting collective decision-making and strengthening community ties (Home et al., 2017). The system depends on mutual trust, shared responsibilities, and active participation, which help build social cohesion and support local community development (Ge et al., 2022; IFOAM - Organics International, 2008; Anselmi & Vignola, 2022; Ninnin & Lemeilleur, 2022). Gajdić et al. (2023) also emphasize the importance of collaboration and trust in agri-food supply chains, noting their positive impact on performance. Similarly, Cavallet et al. (2018) and Farrera & Salvador, (2022) discuss how PGS enhances social capital and supports community-based management. PGS fosters strong community bonds and trust through frequent face-to-face interactions and dense social networks. This social cohesion is essential for their sustainability and effectiveness. By relying heavily on social capital, PGS creates a supportive environment where participants feel motivated to cooperate and uphold community norms. (Farrera & Salvador, 2022)

#### ***2.3.2.3 Impact of PGS on sustainability***

PGS can lead to improved sustainability performance, including increased adoption of agroecological practices, enhanced biodiversity, and better soil health (Grovermann et al., 2024; Nadirli & Babayev, 2022). The study by Brito et al. (2023) specifically explores how PGS contributes to the territorialization of agroecology, demonstrating its potential to drive transformative change in agri-food systems beyond just technical aspects. Research on the impact of PGS on economic, environmental, and social dimensions of sustainability shows mixed results. While PGS can enhance farm profitability, agroecological performance, and social empowerment, it may also lead to lower yields and increased labor requirements (Grovermann et al., 2024).

**Figure 2.5**

*Participatory certification contributions to the territorialization of agroecology in three dimensions: scaling up, out and deep. Brito et al. (2023)*



#### **2.3.2.4 Challenges and opportunities for PGS development**

The literature outlines several challenges in developing PGS, including uneven participation, internal organizational issues, limited institutional support, and barriers to market access (Anselmi & Vignola, 2022; Farreras & Salvador, 2022). Enthoven & Van den Broeck (2023) emphasize the disconnect between the perceptions of farmers, traders, and consumers regarding pesticide-free vegetables, which complicates market access for PGS-certified products. Home et al. (2017) discusses the resource limitations and lack of institutional support that PGS faces. Mettpranee (2017) also highlights these challenges, particularly in terms of limited participation, noting that not all farmers in the PGS trial achieved certification. This suggests barriers such as time constraints, resource shortages, or differing levels of interest and commitment among farmers. PGS-certified products frequently struggle to access mainstream markets and compete with third-party certified products. Limited consumer awareness and understanding of PGS can also reduce market demand and create price disparities (Enthoven & Van den Broeck, 2023; Kaufmann et al., 2022). Another significant challenge for PGS initiatives is balancing standardization with the flexibility needed to adapt to local contexts. Striking this balance is essential for maintaining the integrity and credibility of PGS

while accommodating the diverse needs and circumstances of different communities (Hruschka et al., 2024; Sacchi et al., 2024).

Despite these challenges, there are significant opportunities for PGS development. PGS systems can enhance the sustainability of local food systems by empowering small-scale farmers through more accessible and inclusive certification methods (Anselmi & Vignola, 2022; Baird, 2024). Moreover, the effectiveness of training programs in improving certification outcomes, as highlighted by Mettpranee (2017), underscores the potential for PGS to evolve through targeted capacity-building efforts. By addressing knowledge gaps and building confidence among farmers, PGS can not only increase participation rates but also ensure the long-term sustainability of organic practices within local communities.

#### ***2.3.2.5 The Role of Consumers and other stakeholders***

The active involvement of producers, consumers, and other stakeholders in decision-making is crucial for fostering trust, building community, and promoting sustainable agricultural practices (Anselmi & Vignola, 2022; Ninnin & Lemeilleur, 2024; Phromthep & Torut, 2024). PGS emphasizes this collaborative approach, ensuring transparency, trust, and shared responsibility within the food system (Nikolaidou et al., 2022; Kamondetdacha & Janhom, 2022). However, Kaufmann et al. (2022) note that engaging consumers and raising awareness about PGS can be challenging, highlighting the need for effective communication and strategies to boost participation.

#### ***2.3.2.6 Institutionalization and Regulation of PGS***

The growing interest in PGS has led to its institutionalization in many countries, with studies showing different approaches to regulation. These range from detailed, prescriptive frameworks to more flexible models. A common challenge is balancing standardization with local autonomy and the lack of specific support structures (Hruschka et al., 2024; Sacchi et al., 2024). Integrating PGS into national regulations offers both opportunities and challenges. While it can lend legitimacy and support to PGS initiatives, it also risks adding bureaucracy, enforcing standardization, and potentially undermining PGS's core values (Hruschka et al., 2024; Sacchi et al., 2024; Lemeilleur & Sermage, 2022). Dorville and Lemeilleur (2023) highlight these issues in a study on French PGS, showing the difficulty of maintaining PGS flexibility and adaptability under European organic regulations.

### ***2.3.2.7 The use of technology in PGS***

Emerging technologies like blockchain can strengthen PGS by enhancing transparency, traceability, and data management, addressing challenges such as certification integrity and sustainability monitoring. Thanujan et al. (2022) suggest using blockchain in organic food supply chains to tackle trust and scalability issues. Blockchain's transparency and immutability improve traceability, allowing stakeholders to track a product's journey from farm to table, which can build consumer trust and ensure the integrity of PGS certifications. Nadirli & Babayev (2022) also propose that technology can streamline data collection and analysis for monitoring and evaluating PGS sustainability. Digital tools can help PGS groups efficiently gather and analyze data on sustainability indicators, track progress, and make informed decisions.

### ***2.3.2.8 Market access and economic impact***

PGS can improve market access for small-scale farmers by offering a more affordable alternative to third-party certification. However, the economic benefits are not always evenly distributed, and challenges like overproduction and price volatility can occur. PGS has been particularly effective in enhancing market access in local and niche markets, where consumers value direct connections with producers and the transparency of the certification process (Kaufmann et al., 2022; Iannucci & Sacchi, 2021). The lower costs and reduced bureaucracy make PGS more economically viable for small-scale farmers compared to third-party certification (Kaufmann et al., 2023). Nelson et al. (2015) emphasize PGS's role in improving market access for smallholder farmers, especially in developing countries, while Binder and Vogl (2018) explore its economic impacts on local markets and farmers' income.

### ***2.3.2.9 The existing literature on the scalability and continuity of PGS***

The literature shows that PGS can be effective, scalable, and sustainable when certain conditions are met. PGS has seen significant global growth, indicating its potential for broader adoption. However, scaling up PGS presents challenges, including the time and effort required for participation, uneven involvement, and difficulties in maintaining consistency across different groups (Anselmi & Vignola, 2022; Hruschka et al., 2022). Strong leadership, effective communication, and knowledge-sharing are crucial for facilitating the scaling process and ensuring the quality and integrity of PGS certifications (Kamondetdacha & Janhom, 2022).

The continuity of PGS depends heavily on strong social capital, trust, and community engagement, which can be difficult to sustain, especially with changes in membership and external pressures (Anselmi & Vignola, 2022; Farreras & Salvador, 2022). While formal recognition and institutional support can enhance the legitimacy and continuity of PGS, balancing standardization with flexibility is important to preserve the participatory and adaptive nature of these systems (Dorville & Lemeilleur, 2023; Hruschka et al., 2024). Ensuring market access and economic benefits for PGS-certified producers is essential for sustainability. Strategies like collective marketing, value chain development, and consumer awareness campaigns can improve the economic viability of PGS (Enthoven & Van den Broeck, 2023; Kaufmann et al., 2022).

#### ***2.3.2.10 Research on PGS in Thailand***

Research on PGS in Thailand, particularly in Ban Khlong Phai, Rayong province, and Nan province, highlights how PGS has been adapted to the local agricultural context. Studies emphasize the role of community engagement, local knowledge, and university-community partnerships in the certification process, which makes PGS more accessible to Thai farmers, especially smallholders who might find third-party certification systems costly and complex (Poolsamran et al., 2023; Kamondetdacha & Janhom, 2022). Additionally, research in Phra Nakhon Si Ayutthaya Province reveals factors influencing the adoption of PGS, such as gender, education, land ownership, and knowledge of organic farming, demonstrating the importance of tailored approaches to increase PGS adoption among Thai farmers (Premasuk et al., 2022).

Despite the benefits of PGS in improving market access, economic resilience, and community empowerment, several challenges remain. These include the need for continuous capacity building, risks of inconsistent implementation across regions, and difficulties in gaining widespread market recognition for PGS-certified products (Mettpranee, 2017). Studies also suggest that for PGS to scale effectively within Thailand, stronger institutional support and alignment with national agricultural policies are necessary (Suwannakit, 2016). However, with the right support, PGS has significant potential to promote sustainable agriculture in Thailand.

Mettpranee's (2017) study explores the factors influencing the successful adoption of PGS among Thai farmers and the economic benefits of transitioning from conventional to PGS organic farming. The findings highlight the critical role of farmer training,



organic farming experience, and support from both the government and private sector in facilitating this transition. The study shows that PGS adoption leads to significant economic benefits, including reduced production costs and increased income. Specifically, farmers' average annual income rose by 47.54%, from 93,675.82 baht before PGS adoption to 138,211.60 baht after adopting PGS. This income boost resulted from selling organic produce at higher prices due to PGS certification, which built consumer trust, and from reduced reliance on expensive external inputs through the use of on-farm and locally available resources.

#### **2.4 Factors Influencing Farmers' Decisions to Join PGS**

Farmers are attracted to PGS for several economic, social, and knowledge-based reasons. Economically, PGS offers a more affordable alternative to third-party certification, which is particularly beneficial for small-scale farmers with limited resources (Iannucci & Sacchi, 2022; Hruschka et al., 2022; Elrick et al., 2022; Kaufmann et al., 2023). While PGS-certified products may not always command premium prices, they provide access to niche markets and direct sales opportunities, leading to better incomes for farmers (Jacobi et al., 2023). A study in Peru by Enthoven and Van den Broeck (2023) shows that farmers are primarily motivated by economic incentives, such as market access, premium prices, and reduced production costs. However, barriers like limited market access, lack of governmental support, and insufficient consumer awareness can hinder farmers' motivation to join PGS (Anselmi et al., 2022). Dissatisfaction with third-party certification, due to high costs, bureaucracy, or perceived unfairness, also drives farmers to seek alternatives like PGS (Cuéllar-Padilla & Ganuza-Fernandez, 2018).

Social and knowledge-based factors also play a significant role. PGS relies on trust and social networks within communities, appealing to farmers who value collaboration and peer-to-peer knowledge exchange (Ge et al., 2022). The system empowers farmers by giving them greater control over the certification process, including participation in decision-making and standard setting (Kamondetdacha & Janhom, 2022). However, challenges such as limited knowledge of organic practices can either encourage or deter farmers from joining PGS (Thammatin, 2021). Premasuk et al. (2022), in a study on organic farmers in Phra Nakhon Si Ayutthaya Province, Thailand, found that factors

like gender, education level, land ownership, knowledge of organic agriculture, and media exposure influence farmers' willingness to adopt PGS.

PGS emphasizes continuous learning, enabling farmers to improve their skills and farming practices. Environmental concerns, alignment with local social and cultural values, and dissatisfaction with third-party certification costs and bureaucracy are also motivating factors (Jacobi et al., 2023; Cuéllar-Padilla & Ganuza-Fernandez, 2018). The importance of these factors varies depending on the specific context and individual circumstances of farmers.

## **2.5 Farmer Participation as a Key to PGS Success and Sustainability**

The literature on PGS highlights the critical role of farmer participation as a core principle and operational mechanism of these systems. Active involvement of farmers is a core principle that defines PGS, influencing every stage of the certification process. Additionally, the role of consumers also significantly impacts the effectiveness and expansion of the PGS system.

### ***2.5.1 Empowering Farmer Participation in PGS***

Farmers actively shape PGS rules, conduct peer reviews, and promote collective action (Anselmi & Vignola, 2022; Brito et al., 2023). This participation ensures the system's integrity and functionality. Farmer involvement in decision-making empowers them to certify their own products, contrasting with top-down certification (Ninnin & Lemeilleur, 2022). Information exchange and capacity building during inspections, even within legal frameworks, lead to more robust outcomes when farmers participate directly (Kaufmann et al., 2023). Farmer participation in standard-setting and governance results in more relevant and locally tailored standards (Kamondetdacha & Janhom, 2022). Active stakeholder participation is crucial for PGS to deliver benefits like market access, empowerment, food security, improved livelihoods, and local development (Kaufmann et al., 2020).

Their research shows that when farmers are involved in these critical processes, the resulting standards are more relevant and tailored to local contexts. This local relevance is crucial for ensuring that PGS remains adaptable and effective across different regions and farming practices. Kaufmann et al. (2020) highlight that the active participation of stakeholders is considered a prerequisite for PGS to deliver the numerous benefits

associated with them include inclusion in organic production and market access for smallholder farmers, empowerment of farmers, positive effects on food security and resource management, improvement in the livelihoods of smallholder farmers and their communities, promotion of local development. Importantly, the active engagement of all stakeholders is crucial for PGS to function properly, ensure their sustainability, and realize their full potential.

**Figure 2.6**

*Framework for rural development participation, Kaufmann et al. (2020)*



### 2.5.2 Challenges in Farmer Participation

The literature on PGS highlights several challenges impacting their effectiveness due to farmer participation issues. These include unequal power dynamics within PGS groups, where some farmers may dominate, potentially marginalizing others (Anselmi & Vignola, 2022). The significant time commitment required for participation, such as attending meetings and conducting peer reviews, can burden small-scale farmers with limited resources (Anselmi & Vignola, 2022; Kaufmann et al., 2020; Kaufmann et al., 2023). Additionally, addressing knowledge gaps and providing adequate training is challenging, particularly for farmers with limited access to resources (Anselmi & Vignola, 2022). Internal conflicts, social dynamics, and limited institutional support further complicate collaboration and decision-making within PGS groups (Anselmi & Vignola, 2022; Jacobi et al., 2023). Finally, time constraints, perceived lack of expertise, and logistical challenges can hinder consistent farmer participation, especially in resource-limited regions (Banjara, 2015; Hruschka et al., 2022).

To better understand these participation challenges, Rogers' Diffusion of Innovations Theory provides a useful framework for understanding the challenges of farmer participation in PGS, highlighting five key attributes influencing adoption: relative advantage, compatibility, complexity, trialability, and observability. If farmers do not perceive clear benefits, find the system incompatible with their practices or cultural beliefs, or find it too complex by PGS procedures, they may be less likely to participate. The inability to experiment with PGS on a smaller scale and the lack of visible benefits among peers can also hinder adoption.

Rogers further categorizes individuals based on their willingness to adopt innovations: Innovators, Early Adopters, Early Majority, Late Majority, and Laggards. This categorization helps explain the variation in PGS participation rates. Overall, addressing these challenges and ensuring adequate support for farmers are vital for PGS to reach its full potential in promoting sustainable food systems.

## **2.6 The Role of Government in Supporting PGS**

The literature on PGS emphasizes the critical role of government support in influencing the success and sustainability of these systems. Government interventions are pivotal in shaping the adoption, implementation, and overall effectiveness of PGS. This section will explore the impact of government interventions and examples of government interventions across various contexts.

### ***2.6.1 Impact of Government Interventions***

Government recognition and support significantly enhance the legitimacy and credibility of PGS, fostering consumer trust and improving market access for PGS-certified products (Jacobi et al., 2023). In Brazil, formal recognition of PGS has led to widespread adoption and integration into the organic market. Supportive policies, like those in Brazil, provide legal standing, access to resources, and increased visibility, helping PGS integrate into the broader agricultural landscape (Bellamy et al., 2023; Jacobi et al., 2023).

These interventions also ensure economic viability by creating stable demand through public procurement programs and market development initiatives, which incentivize farmer participation. For instance, Brazil's National School Feeding Program and Food Acquisition Program have been key in creating market opportunities for PGS farmers.

Additionally, government support in the form of technical training, extension services, and financial assistance strengthens the capacity of PGS initiatives and helps farmers meet organic production and certification requirements, which is especially crucial for smallholder farmers facing resource constraints and technical challenges (Bellamy et al., 2023; Jacobi et al., 2023).

Studies indicate a positive correlation between government support and successful PGS outcomes. In Brazil, for example, the institutionalization of PGS and supportive policies have significantly increased the number of PGS-certified farmers and expanded PGS initiatives (Lemeilleur et al., 2022). Government recognition boosts the legitimacy and credibility of PGS, fostering consumer trust and improving market access for PGS-certified products (Jacobi et al., 2023). Additionally, government interventions like technical assistance and financial support enhance sustainability by promoting agroecological practices and increasing the resilience of farming systems (Nadirli & Babayev, 2022).

#### ***2.6.2 Examples of government interventions across various context***

This session explores the different forms of government interventions that play a crucial role in the success and sustainability of PGS. Government support can take many forms, including legislation, financial assistance, technical support, and the integration of PGS into national organic standards. The table 2.1 also highlights the importance of integrating PGS into public procurement systems and national organic standards, as seen in Bolivia, Brazil, India, and France. Educational programs, such as those implemented in Peru, and collaboration with NGOs, as observed in Nepal, are also vital in building the capacity of PGS participants. Moreover, some governments have recognized and promoted PGS as a valid certification system, as in Mexico, or facilitated market access for PGS products, as in Vietnam.

The study by Thammatin (2021) notes that the Thai government's policy on supporting organic agriculture is part of a 20-year national strategy (2018-2037), with a focus on enhancing competitiveness by boosting productivity and diversifying agricultural products. This strategy aims to maintain existing income bases while creating new high-income opportunities through promoting unique local agriculture, safe agriculture, bio-agriculture, and processed agriculture (Office of the National Economic and Social Development Council, 2018, p. 7). Additionally, the National Organic Agriculture

Development Strategy (2017-2021) supports the growth of organic agriculture by increasing production areas, yields, consumption, and networks, while also aiming for Thai organic products to meet international standards (Office of Agricultural Economics, 2017). Poolsamran et al. (2023) further highlight the Thai government's role in promoting organic durian production through PGS, recognizing it as a viable certification mechanism for organic agriculture, although the study does not explicitly explore the impact of these government interventions.

**Table 2.1**

*Government Interventions Supporting the Development on PGS*

No	Type of Government Intervention	Country	Citation
1.	Legislation Supporting PGS	Brazil	Lemeilleur (2020)
2.	Financial, Institutional, and Technical Support	India, Thailand	Bellamy (2023), Poolsamran et al. (2023)
3.	Integration of PGS into National Organic Standards and Legal Framework	Bolivia, Brazil, India, France, Thailand	Lemeilleur (2020), Thammatin (2021), Bellamy (2023), Dorville (2023)
4.	Educational and Capacity Building Programs	Peru	Kaufmann et al. (2020)
5.	Incorporation of PGS into Public Procurement	France	Dorville (2023)
6.	Recognition and Promotion of PGS as a Valid Certification System	Mexico	Lemeilleur & Sermage (2022)
7.	Collaboration with NGOs for PGS Implementation	Nepal	Banjara (2015)
8.	Facilitation of Market Access for PGS Products	Vietnam	Enthoven & Van den Broeck (2023)

The review of key studies on PGS highlights the crucial role of government interventions in shaping their adoption, implementation, and success. Supportive policies, market institutionalization, technical assistance, and financial support can

enhance the effectiveness, scalability, and sustainability of PGS, contributing to a more inclusive, equitable, and sustainable food system. However, the studies also emphasize the need for context-specific approaches and continuous adaptation to ensure that PGS initiatives remain responsive to the diverse needs and challenges of local communities and farming systems.

## **2.7 Organic agriculture and PGS in Thailand**

This section explores the expansion of sustainable organic farming in Thailand, focusing on significant government strategies, legislation, and certification initiatives. The analysis commences with scrutinizing Thailand's organic agriculture national strategies, followed by an exploration of the evolution of organic farming policies over time. Ultimately, this text delves into the process of PGS certification in Thailand and the crucial government support for promoting sustainable farming practices.

### ***2.7.1 Sustainable Organic Agriculture in Thailand***

The National Strategy 2018-2037 for organic agriculture development centers on two key strategies. First, the Strategy for Enhancing Competitiveness aims to boost productivity and the value of agricultural products by promoting high-quality, safe agriculture through the use of technology and innovation, with a strong focus on research and development. Second, the Strategy for Growth Based on Environmental Quality supports a bio-based economy and encourages sustainable consumption and production, positioning organic agriculture as a crucial element in achieving sustainable growth. (The Land Development Department, 2017, p. 37)

Level 2 Plans for organic agriculture development include three key components. The Master Plans under the National Strategy focus on aligning with organic agriculture through safe agriculture initiatives, which aim to enhance the value and quality of agricultural products. These plans also promote sustainable agriculture by managing agricultural pollution and emphasize research and innovation in environmental fields to support the green economy, with organic farming playing a significant role. The Economic Reform Plan prioritizes creating high-value agriculture, with organic farming as a central approach, and focuses on developing human resources to meet the agricultural sector's needs, ultimately boosting farmers' incomes. The 13th National Economic and Social Development Plan sets goals such as establishing the country as a leader in high-value agricultural products and processed agriculture and fostering a

circular economy and low-carbon society, where organic farming is crucial. This plan also emphasizes using knowledge, technology, and innovation to drive economic value, promote social opportunities, and transition towards environmentally sustainable production and consumption. (Office of Agricultural Economics, 2022, p.19)

The Level 3 Plan related to organic agriculture development is the BCG Economy Model Action Plan (2021-2027). This plan aims to develop a bio-based, circular, and green economy to achieve sustainable economic growth. It outlines four strategies relevant to organic farming: ensuring the sustainability of resources and biodiversity, strengthening communities and grassroots economies, enhancing the development of industries under the BCG model, and building the capacity to respond to global changes. (Office of Agricultural Economics, 2022, p.19)

### ***2.7.2 Evolution of Organic Agriculture Policies and Strategies***

Organic agriculture has been practiced in Thailand since the 1980s, gaining momentum in the late 1990s and early 2000s due to government policies and NGO support. The Department of Land Development initiated the drive to develop organic agriculture practices in 2005. Subsequently, in 2007, the first National Organic Agriculture Development Strategy (2007-2011) was announced, focusing on four main strategies: strengthening knowledge and innovation, developing traditional and commercial organic farming, and managing and coordinating the advancement of organic agriculture. This strategy involved various government agencies and implemented 104 projects with a budget of 4,826.8 million baht. (Greenet, 2013; FFTC Agricultural Policy Platform, 2017)

After the conclusion of the first strategy in 2011, there was a gap period where no new strategy was immediately announced. This delay may have been due to factors such as policy changes, government shifts following the 2011 coup, and the need to evaluate the success and challenges of the first strategy before drafting a new one. During this time, other plans were utilized to continue supporting organic agriculture. (Greenet, 2013; FFTC Agricultural Policy Platform, 2017)

In 2016, the second National Organic Agriculture Development Strategy was introduced. The new plan aimed to position Thailand as a regional leader in sustainable organic agriculture, focusing on promoting research, innovation, and knowledge



transfer, developing organic products and services, and advancing markets and certification standards. However, Participatory Guarantee Systems (PGS) were not explicitly mentioned in the strategy. (Greenet, 2013; FFTC Agricultural Policy Platform, 2017)

In 2017, the Action Plan for Organic Agriculture 2017-2022 continued to push for the expansion of organic farming areas, the strengthening of farmers, and the promotion of organic agricultural markets. The plan envisions Thailand as an ASEAN leader in organic agriculture, adhering to the Sufficiency Economy Philosophy and gaining international recognition by 2021. It prioritizes research and innovation, organic production and management, and market and standard development. Key targets include expanding organic farming area to at least 1.3 million rai, reaching 80,000 organic farmers, and achieving a 3% annual growth rate in organic product value by 2022. PGS is highlighted in sub-issue 3.1 related to the development of markets, products, services, and organic standards, with a target to increase the number of farmers or farmer groups entering the PGS by at least 20% per year. Sub-issue 3.2 pushes for the promotion of PGS certification for organic farmers and groups, and efforts to raise awareness about PGS among all sectors. Sub-issue 3.3 aims to increase recognition of PGS-certified organic products, enhancing consumer understanding. (Greenet, 2013; FFTC Agricultural Policy Platform, 2017)

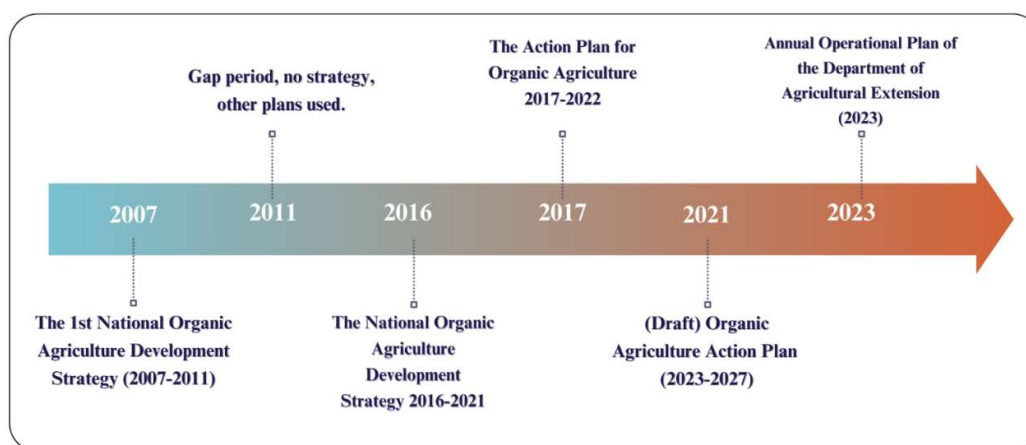
In 2021, the drafting of the Organic Agriculture Action Plan 2023-2027 began, aiming to build on the previous plan's successes. This draft plan focuses on expanding organic farming to at least 1.3 million rai by 2027, increasing the number of organic farmers to 130,000, and promoting PGS and GAP 9000 standards. (Greenet, 2013; FFTC Agricultural Policy Platform, 2017)

In 2023, the Department of Agricultural Extension's Annual Operational Plan outlined activities and projects to further promote organic agriculture. These include developing learning centers to improve agricultural production efficiency, promoting farming based on the Sufficiency Economy Philosophy, and supporting agricultural career development, particularly in Thailand's southern border provinces. (Greenet, 2013; FFTC Agricultural Policy Platform, 2017)

Other related plans include the Department of Agricultural Extension's 2024 Operational Plan, which outlines activities and projects related to promoting organic agriculture, such as developing learning centers for enhancing agricultural production efficiency, promoting farming according to the Sufficiency Economy Philosophy, and supporting agricultural career development in Thailand's southern border provinces. (Office of Agricultural Economics, 2022, p.19)

**Figure 2.7**

*Evolution of Organic Agriculture Strategies in Thailand*









## 2.8 Organic Agriculture Standards in Thailand

The key international organic agriculture standards and national organic agriculture standards that are widely recognized and popular in Thailand. (see in Table 2.2) These globally acknowledged standards have been adopted by many countries and are also utilized by Thai farmers and organic agriculture businesses to enhance the quality and credibility of their products.

**Table 2.2**

*International Organic Agriculture Standards*



International Organic Agriculture Standards	Labels
International Federation of Organic Agriculture Movements (IFOAM)	




USDA NOP (National Organic Program)	
EU Organic	
JAS (Japanese Agricultural Standard)	
Canada Organic Regime (COR)	
Bioagricert	

The organic agriculture standards in Thailand, which are established and overseen by various government agencies and private sectors. These standards have been developed to promote and regulate the production of organic agricultural products, ensuring their quality and acceptance both domestically and internationally. In Thailand, organic agriculture standards under the Third-party certification system can be categorized into two main groups based on the entities that set the standards, as shown in the Table 2.3.

**Table 2.3**

*Organic Agriculture Standards under TPC in Thai*






Organic Agriculture Standards	Labels
Government	
Organic Thailand	
Private sectors	
Organic Agriculture Certification Thailand (ACT)	

Northern Organic Agriculture Standard Organization (NOASO)	
Surin Organic Agriculture Standard (SOA)	
Phetchabun Organic Agriculture Standard (POA)	

While organic agriculture standards set by NGOs or non-governmental organizations often take the form of a PGS, these standards emphasize the involvement of all stakeholders in the certification process, including farmers, consumers, local organizations, and NGOs. Examples of these standards are listed in Table 2.4.

**Table 2.4**

*Organic Agriculture Standards under PGS in Thai*

Organic Agriculture Standards	Labels
Thai Organic Agriculture Foundation (TOAF) *Focus area	
Lemon Farm ORGANIC-PGS: LF-PGS	
Thai PGS Organic Plus	
Koh Phangan Organic Club	
Earth Safe Standard	

SDGs PGS standards	
Organic agriculture in Phatthalung	
Organic agriculture in Nan	
PGS Thai Green Market	

While there are various PGS systems in operation, this study focuses on the government-managed Participatory Guarantee System for Organic Agriculture. This system is a collaborative effort between the Department of Land Development (Ministry of Agriculture and Cooperatives) and the Thai Organic Agriculture Foundation (TOAF).

The PGS process in Thailand has a 4-tier structure, operating from the bottom up. ( as shown in Figure 2.6) As each group network strengthens, they elect representatives to a regional assembly that sets policies and guidelines. The Thai Organic Agriculture Foundation (TOAF), under the National PGS Assembly, issues certificates.

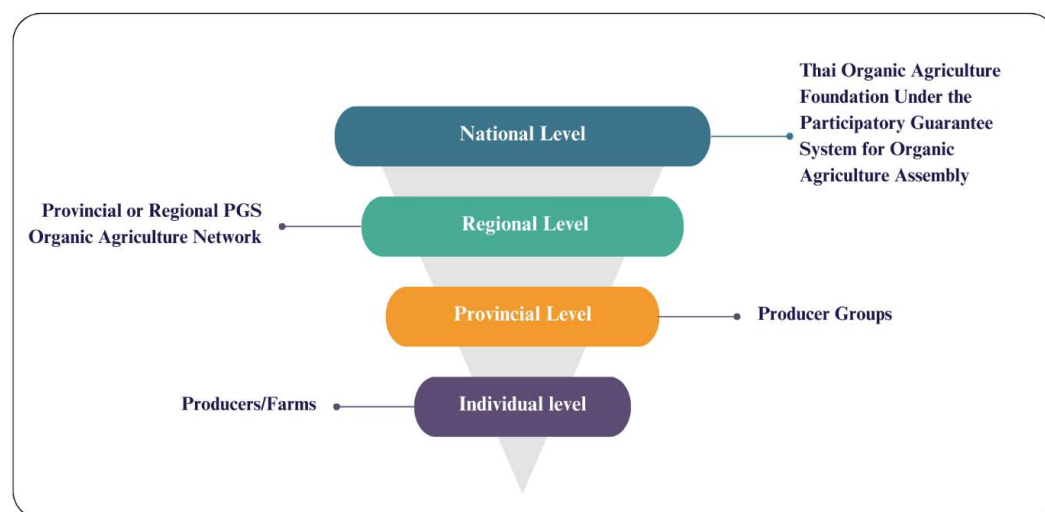
The PGS process involves multiple levels, each with key roles. Farmers, the foundation, must understand and follow organic standards while participating in group activities. PGS producer groups act as hubs, managing documents, inspecting farms, advising farmers, and communicating between farmers and regional networks. Provincial/regional coordinators represent farmer groups, organizing training, verifying documents, coordinating with the central body, and building trust in PGS through inspections and information sharing. The central management organization (TOAF) oversees the entire system. It develops curricula, manages quality assurance, promotes

PGS, maintains a database, issues membership numbers, grants and revokes logo use, conducts testing, and sets up traceability. It also connects PGS networks and liaises with the National Assembly. The National Assembly is the ultimate goal, overseeing policy, regulations, and certification criteria. Each stage has distinct but interconnected activities aimed at building networks and issuing PGS certificates, allowing members to use the logo.

PGS groups are typically divided into three stages 1. Initial groups (farmers who have participated for 1 year), 2. Intermediate groups (farmers with 2-4 years of participation), and 3. Advanced groups (those with more than 4 years of participation who have received certification).

**Figure 2.8**

*PGS Organizational Structure in Thailand*



Adapted from (The Land Development Department, 2016, p. 14)

#### *Qualifications for PGS Organic Producer Groups*

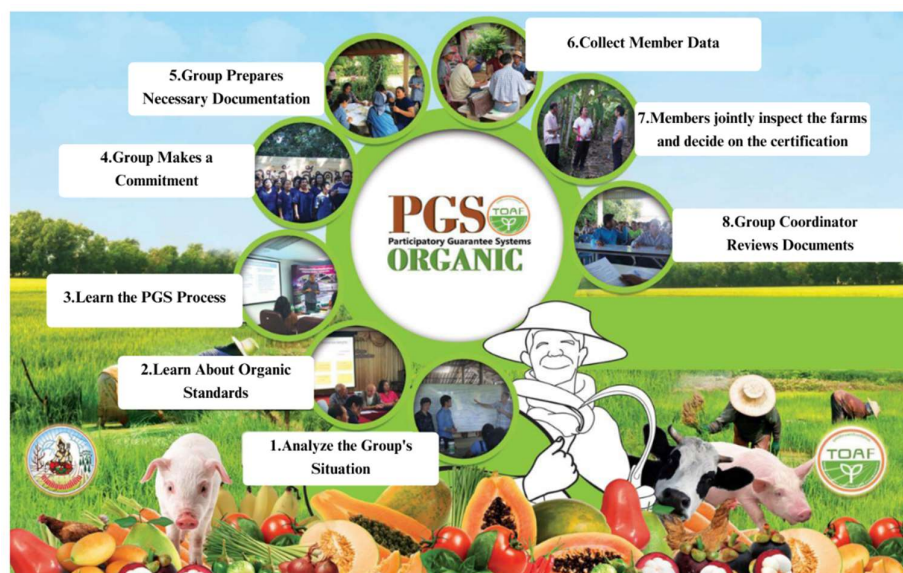
1. Minimum of 5 members: The group should consist of at least 5 farmers who share similar production practices or reside in the same village. The production area must also be suitable for organic farming.

2. Commitment to organic farming: The group demonstrates a genuine dedication to practicing organic agriculture continuously, aiming to improve their quality of life and take responsibility for consumers, resources, and the environment.
3. Voluntary participation: The group willingly participates and seeks certification under the PGS standard to build trust and expand their market reach.
4. Strong capacity: The group possesses the capability to manage their group effectively, including collective production and marketing efforts.
5. Network of partners: The group receives support from government agencies, educational institutions, local organizations, or private entities in various aspects such as mentorship, learning opportunities, and market access.

The Participatory Guarantee System (PGS) certification process in Thailand involves 8 key steps. ( as shown in Figure 2.9)

**Figure 2.9**

*Steps to PGS Certification*



1. Analyze the Group's Situation: The group assesses its current state and readiness for PGS participation.
2. Learn About Organic Standards: Members receive training on organic agriculture standards to understand the requirements.

3. Learn the PGS Process: The group is trained on PGS procedures and implementation.
4. Group Makes a Commitment: The group collectively pledges to adhere to PGS standards and procedures.
5. Group Prepares Necessary Documentation: The group organizes and prepares all required documentation for compliance.
6. Collect Member Data: The group gathers data on participating members relevant to certification.
7. Members jointly inspect the farms and decide on the certification: The group conducts joint farm inspections and makes decisions on compliance and certification.
8. Group Coordinator Reviews Documents: The coordinator and members review documents and finalize the certification process.

Upon completing these steps, the farmer group registers with the Thai Organic Agriculture Foundation (TOAF). TOAF then issues a certificate, valid for 12 months from the group's approval date, and grants permission to use the PGS logo. (as shown in Figure 2.10) Renewal depends on the group's decision or network acceptance.

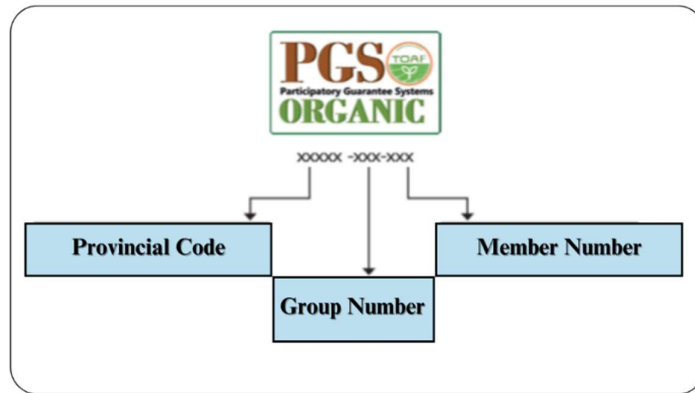
Two logo types are available:

- PGS Network Symbol: Members can use this on clothing, hats, bags, and promotional items to show their part of the PGS network.
- Organic Seal: This sticker or logo is exclusively for certified producers. (Verification is possible through the regional network's database or the central system manager.)



**Figure 2.10**

*PGS Organic Certification Code Structure*



## 2.9 Chapter Summary

The conventional TPC system, though widely used, poses several challenges for small-scale farmers. High costs, administrative complexity, and bureaucratic hurdles significantly hinder access to TPC (Banjara, 2015; Hruschka et al., 2022). Smallholder farmers often lack the financial and technical resources to meet TPC's rigorous standards (Sacchi et al., 2024). Additionally, TPC's reliance on external audits adds complexity and reduces adaptability to local contexts (Fouilleux & Loconto, 2016), leading to the exclusion of many small-scale producers from certified organic markets.

In response, PGS has emerged as a cost-effective and inclusive alternative, especially in developing countries. PGS reduces certification costs, minimizes bureaucratic processes, and fosters local adaptability through community-driven verification. By leveraging local knowledge, trust, and social networks, PGS empowers farmers to actively participate in the certification process, reducing dependence on costly external audits (IFOAM - Organics International, 2019). The decentralized, peer-review nature of PGS offers greater flexibility and transparency, making it more suitable for smallholders with limited resources (Kaufmann & Vogl, 2018).

Studies show that PGS provides economic, social, and environmental benefits, such as increased income through better market access, enhanced community participation, and

promotion of agroecological practices (Home et al., 2017; Grovermann et al., 2024; Mettpranee, 2017; Kaufmann et al., 2022). However, barriers persist. Internal challenges include diverging motivations, uneven participation, and lack of trust, while external obstacles encompass limited institutional support, cultural attitudes, and time constraints. Concerns about legitimacy in markets dominated by TPC, significant time commitments, technical difficulties in transitioning to agroecological production, and social dynamics within PGS groups also hinder adoption (Anselmi & Vignola, 2022; Hruschka et al., 2022; Chaparro-Africano & Páramo, 2022; Kaufmann et al., 2020; Cuéllar-Padilla et al., 2022). While PGS participation enhances trust, social cohesion, and knowledge exchange among farmers, maintaining consistent participation remains challenging due to its voluntary nature, time limitations, and uneven member commitment (Hruschka et al., 2022; Mettpranee, 2017; Anselmi & Vignola, 2022; Farreras & Salvador, 2022).

In Thailand, PGS groups progress through three stages Initial, Intermediate, and Advanced reflecting different levels of farmer experience and commitment. Applying Rogers' Diffusion of Innovations Theory, farmers in the Initial stage are Innovators and Early Adopters who establish the system. As PGS evolves, farmers in Intermediate and Advanced stages correspond to the Early Majority and Late Majority, joining later and contributing to the initiative's continuity. Understanding these dynamics is crucial for developing strategies to sustain participation and ensure the long-term success of PGS groups for organic vegetables in Thailand.

Government support plays a crucial role in PGS development. While some studies have examined the impact of legislation and financial support, limited research exists on the effectiveness of different intervention models, such as direct regulation versus indirect support through subsidies and educational programs (Lemeilleur et al., 2022; Nadirli & Babayev, 2022; Bellamy et al., 2023; Jacobi et al., 2023). Concerns about political stability and consistent government support are significant, especially in countries where policies may change due to political shifts. This research will analyze how government support mechanisms influence the continuity of PGS for organic vegetables in Thailand.

A gap exists in the literature regarding the key factors influencing farmers' decisions to join and continue participating in PGS, especially in Thailand's organic vegetable

sector. Research is needed to explore the motivations, barriers, and contextual influences affecting farmers at different stages from those considering joining initial PGS groups to those in intermediate and advanced certified groups. Understanding these factors is essential for developing strategies that encourage sustained farmer participation and ensure the continuity and long-term success of PGS systems. Additionally, there is a lack of research on context-specific approaches, particularly in tailoring PGS initiatives to the unique needs and challenges of local contexts and farming systems in Thailand. Investigating the region-specific motivations that drive farmers, especially in less-studied regions like Southeast Asia, is crucial. By exploring these areas, this study aims to enhance the sustainability and success of PGS initiatives.

## CHAPTER 3

### METHODOLOGY

This chapter presents the overall research design which includes the study areas, the data collection, and the data analysis methods. The study used both quantitative and qualitative methods and both primary and secondary data for achieving the objectives of the study.

#### 3.1 Study areas

This study focuses on two provinces in central Thailand: **Kamphaeng Phet** and **Nakhon Pathom**. These provinces were selected based on their agricultural practices, proximity to different markets, and the varying levels of farmer participation in PGS.

##### 3.1.1 Kamphaeng Phet

Kamphaeng Phet, located in central Thailand about 354 kilometers from Bangkok, is the third-largest province in the region, covering 5,379,687.5 rai (8,607.5 square kilometers). The province is divided into 11 districts (Mueang Kamphaeng Phet, Khanu Woralaksaburi, Khlong Khlung, Phran Kratai, Sai Ngam, Lan Krabue, Khlong Lan, Sai Thong Watthana, Bueng Samakkhi, Pang Sila Thong, and Kosamphi Nakhon), 78 sub-districts, and 823 villages. As of December 2023, its population is 705,384, with 347,718 males and 357,666 females living in 263,518 households. The industrial sector, including mining, quarrying, and manufacturing, drives Kamphaeng Phet's economy, contributing 48.05% to the Gross Provincial Product (GPP). Agriculture follows, accounting for 20.96% of the GPP (Table 3.1). (Office of Provincial Agriculture and Cooperatives Kamphaeng Phet, 2023)

**Table 3.1**

*Sectoral Contribution to Kamphaeng Phet's GPP (Data as of 2019)*

Sector	Percentage of GPP
Manufacturing	28.54%

Agriculture	20.96%
Mining and Quarrying	17.99%
Other sectors	32.51%

Agricultural land dominates Kamphaeng Phet province, covering approximately 3.6 million rai, or 67.19% of the total area. Field crops comprise the largest share (53.46%), followed by rice cultivation (37.07%). Orchards and perennial crops occupy 8.93%, while other agricultural uses, like mixed farming and aquaculture, account for a smaller portion. The province supports a vibrant farming community with 77,548 registered farmer households as of 2020. Mueang Kamphaeng Phet district leads with the highest number of registered farmers (20,279 households), followed by Khanu Woralaksaburi (12,345) and Phran Kratai (11,290). The province's agricultural workforce is substantial, comprising 103,614 agricultural households and 115,848 workers. (Office of Provincial Agriculture and Cooperatives Kamphaeng Phet, 2023)

**Table 3.2**

*Land Use Distribution in Kamphaeng Phet*

No.	Land Use Type	Area (Rai)	Percentage
1	Field Crops	1,932,305.60	53.46%
2	Rice Cultivation	1,339,947.00	37.07%
3	Orchards & Perennial Crops	322,946.96	8.93%
4	Mixed Farming/Crop Rotation/Orchards	9,677.93	0.27%
5	Pasture and Animal Shelters	5,286.39	0.15%
6	Aquaculture Farms	4,343.68	0.12%
	Total	3,614,507.56	100.00%

Kamphaeng Phet Province was selected for this study because of its growing reputation as a center for organic and sustainable farming. The province's varied landscape, with

a significant portion dedicated to organic agriculture (3,272.42 rai and 367 farmers), provides an ideal setting to study the adoption and impact of organic farming methods. The increasing interest in organic agriculture in Kamphaeng Phet stems from consumer demand for healthier food and a growing awareness of the need for environmental protection and sustainable soil management. The government's active involvement in numerous organic agricultural development projects further supports this trend. Currently, 668.78 rai of farmland in the province is certified organic. (Governor's Office of Kamphaeng Phet Province, 2023)

### **3.1.2 Nakhon Pathom**

Nakhon Pathom, located in central Thailand, is one of five provinces within the Bangkok Metropolitan Region. Situated 56 kilometers from Bangkok along Phetkasem Road, it covers 1,355,204 rai (0.42% of Thailand). The province comprises 7 districts, 106 sub-districts, and 930 villages. As of 2021, its population was 922,078, with 442,736 males and 479,352 females living in 416,553 households. Agricultural land dominates, accounting for 622,919 rai (45.96% of the total area). (Office of Provincial Commercial Affairs Nakhon Pathom, 2021)

**Table 3.3**

*Land Use Distribution in Nakhon Pathom*

<b>No.</b>	<b>Land Use Type</b>	<b>Area (Rai)</b>	<b>Percentage</b>
<b>1</b>	Rice Cultivation	270,094	20.00%
<b>2</b>	Field Crops	63,759	4.70%
<b>3</b>	Orchards	174,197	12.85%
<b>4</b>	Fisheries	113,031	8.34%
<b>5</b>	Livestock & Feed	1,838	0.14%
	Total Area	637,488	100.00%

Nakhon Pathom province has a strong economy, boasting a higher average Gross Provincial Product (GPP) per capita than its provincial group and ranking 9th in the country. In 2020, the province's GPP reached 349,926 million baht, demonstrating a robust and diversified economy. The industrial sector leads, contributing 52.21% to the GPP, followed closely by the service sector at 41.96%. Although agriculture contributes a smaller share of 5.82%, it remains vital, engaging 49,963 households and employing 103,189 workers out of the total population of 922,171. (Office of Provincial Commercial Affairs Nakhon Pathom, 2021)

**Table 3.4**

*Sectoral Contribution to Nakhon Pathom's GPP (Data as of 2020)*

Sector	Percentage of GPP
Industry	52.21%
Services	41.96%
Agriculture	5.82%

Nakhon Pathom province has a strong economy, boasting a higher average Gross Provincial Product (GPP) per capita than its provincial group and ranking 9th in the country. In 2020, the province's GPP reached 349,926 million baht, demonstrating a robust and diversified economy. The industrial sector leads, contributing 52.21% to the GPP, followed closely by the service sector at 41.96%. Although agriculture contributes a smaller share of 5.82%, it remains vital, engaging 49,963 households and employing 103,189 workers out of the total population of 922,171. (Office of Provincial Commercial Affairs Nakhon Pathom, 2021)

The province also serves as a hub for agricultural processing, connecting production sources across regions. The production of fruits, vegetables, and ornamental plants is on the rise, with key economic crops including rice, sugarcane, orchids, and pomelos. Nakhon Pathom is recognized as a major vegetable production area in the country, cultivating a variety of vegetables that contribute significantly to the province's

economy. The main vegetable cultivation areas are concentrated in Mueang Nakhon Pathom and Kamphaeng Saen districts, although cultivation is present throughout the province. (Governor's Office of Nakhon Pathom Province, 2023)

A significant challenge in Nakhon Pathom is the extensive use of chemicals in agricultural production, which leads to chemical residues in the soil and soil degradation. This results in increased production costs for agricultural products. Moreover, the majority of crop production has not yet achieved GAP standards, and there is a lack of direct marketing channels for safe agricultural products. Additionally, there is a need to adjust attitudes towards farming practices and adapt to the rapidly changing society. While there's a growing interest in sustainable agriculture, the actual area dedicated to organic farming remains relatively small. The total area under organic farming is 579.40 rai, with 96 farmers/plots, of which 498.79 rai are certified, involving 71 farmers/plots.

Although the provincial development plan emphasizes promoting organic agriculture, the results have not yet met expectations. The designation of this province as another study area is to identify the underlying factors in a context that differs from Kamphaeng Phet Province, which has a larger number of participating farmers. The additional reasons for selecting these two provinces as study areas are because they represent diverse farmer groups at various stages of development and have varied market proximity. This allows us to examine how these factors influence the success and sustainability of PGS groups in different contexts.



**Figure 3.1**

*Geographical Scope of Kamphaeng Phet and Nakhon Pathom*



### **3.2 Research Design**

The study is exploratory in nature and aims to investigate the factors influencing farmer participation and the role of government support mechanisms in the PGS system in Thailand. To achieve this, a mixed-methods approach will be employed, integrating both qualitative and quantitative data collection and analysis. The research will be conducted in three main phases, each aligned with the specific objectives of the study (see Figure 3.2).

Phase 1: Qualitative Data Collection (Reconnaissance Visits, In-Depth Interviews)

In Phase 1, the study will visit farms to observe farming practices, assess group situation within PGS groups, and engage informally with farmers in Kamphaeng Phet and Nakhon Pathom. The research will conduct in-depth interviews with farmers to explore key factors influencing their decision to join PGS at different stages (Initial, Intermediate, Advanced). Thematic analysis of the interview data will identify motivations for joining, perceived benefits, and external influences. These insights will directly inform Objective 1 by clarifying what drives farmers to join PGS, which the study will analyze further in Phase 2.

#### Phase 2: Quantitative Data Collection (Survey)

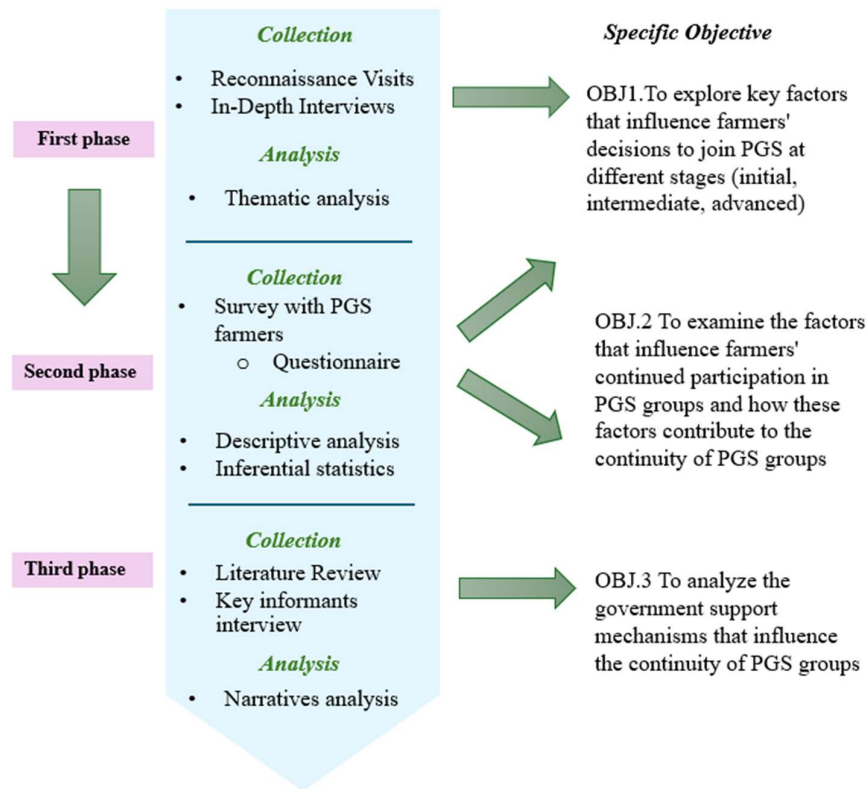
In Phase 2, the study will distribute surveys to farmers in the same provinces to gather quantitative data for Objectives 1 and 2. The survey will expand on the qualitative findings by measuring farmers' perceptions and attitudes toward motivations, benefits, and external influences identified in the interviews. Likert scale questions will quantify how these factors impact their decision to join PGS, addressing Objective 1. The survey will also investigate what drives continued participation, supporting Objective 2. The study will use descriptive and inferential statistical analyses to identify significant relationships between these factors and participation decisions.

#### Phase 3: Literature Review and Key Informant Interviews

In Phase 3, the study will address Objective 3. This will involve a literature review of relevant strategies, policies, and mechanisms, as well as key informant interviews to gather in-depth information on significant aspects. Narrative analysis of this data will highlight key findings related to contextual insights from their experiences with implementing or interacting with these mechanisms, challenges, and areas for improvement.

**Figure 3.2**

*Research design*



### 3.2.1 Sampling Design of the Study

As of 2021, Kamphaeng Phet had 24 PGS farmer groups with 205 members, of which about 150 were vegetable farmers. In contrast, Nakhon Pathom had 11 PGS groups with 67 members, including around 59 vegetable farmers. The sample size calculation will be based on the number of farmers and the number of groups from this data.

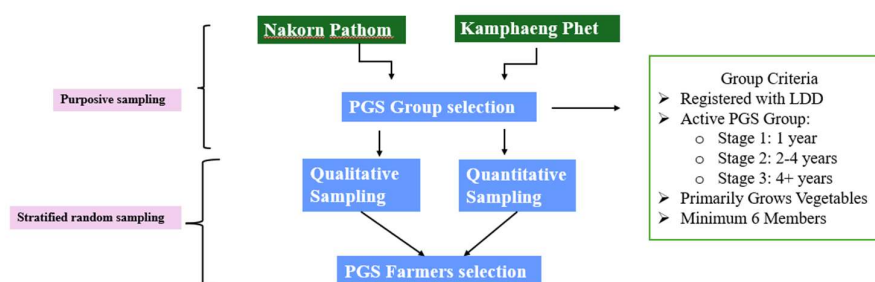
The sampling strategy for the research involves a combination of purposive and random sampling. The study utilizes purposive sampling to select the PGS groups participating in the study for both phases. To ensure that the chosen groups possess specific characteristics that align with the research objectives. The use of purposive sampling also aims to gather in-depth data from groups to understand the factors influencing farmers' decisions to join and remain in the PGS system.

The study will use stratified random sampling to randomly select farmers from selected groups, ensuring balanced sampling across different stages. This method compares

factors influencing participation and continuity in the PGS system, reducing sampling bias and resulting in more neutral research findings. The number of farmers in each stage is proportional.

**Figure 3.3**

*Sampling Design*



### 3.2.1.1 *Qualitative Sampling*

In Phase 1, purposive sampling will be used to select PGS groups in Kamphaeng Phet and Nakhon Pathom provinces that meet the following criteria:

- Active PGS group registered with the Land Development Department (LDD) at different stages.
- Primarily cultivating organic vegetables
- Minimum 6 members

Within these selected groups, minimum 20 respondents from both provinces will be further chosen for in-depth interviews based on the following criteria, ensuring representation across various stages of PGS participation and farm sizes:

- PGS membership stage: Stage 1, Stage 2, and Stage 3 (equal proportion of interviewees from each stage)
- Farm size: Small (less than 5 rai) / Large (5 rai or more)
- Experience: Has served on the farm inspection committee or has undergone the farm inspection process

Each in-depth interview is estimated to last approximately 30-45 minutes, with flexibility depending on the depth of information obtained. These interviews will provide rich qualitative data on the factors influencing farmer participation and engagement in PGS.

### 3.2.1.2 Quantitative Sampling

In Phase 2, the study employs quantitative sampling by first selecting PGS groups using the same purposive sampling approach as in Phase 1. However, instead of conducting interviews, farmers within these selected groups are randomly chosen for a questionnaire survey. This random selection is proportionate to the number of farmers in each province, ensuring balanced representation. To determine the optimal sample size for accurate research results, the study utilized the Yamane formula, maintaining a 95% confidence level and minimizing potential errors in the quantitative data collection process. (see in Table 3.5)

**Table 3.5**

*Sampled Farmers for Survey*

Province	Vegetable farmers (N)	$n = N / 1 + (N \times e^2)$	Sample size (n)
Kamphaeng Phet	150	$209/(1+ (209 \times 0.05^2))$	137
Nakhon Pathom	59		
Total	209		

Yamane’s formula:

n = corrected sample size,

N = population size, and

e = Margin of error (MoE),

e = 0.05 based on the research condition (95% confident)

Calculate the number of farmers to be sampled in each province (proportionally):

- Kamphaeng Phet:  $(150/209) \times 137 = 98$  farmers (approximately)
- Nakhon Pathom:  $(59/209) \times 137 = 39$  farmers (approximately)

**Formula to calculate the number of farmers to be sampled from each stage:**

The number of farmers to be sampled from each stage

$$= \left( \frac{\text{Number of farmers in the stage}}{\text{Total number of farmers}} \right) \times \text{Total number of farmers to be sampled}$$

Where:

- The total number of farmers to be sampled in Phase 2 is 137.
- The total number of farmers = 209 (from both provinces)

Equations for each stage in Kamphaeng Phet province:

- Stage 1:  $(65/209) \times 137 = 42.61 \approx 43$  farmers
- Stage 2:  $(60/209) \times 137 = 39.32 \approx 39$  farmers
- Stage 3:  $(25/209) \times 137 = 16.38 \approx 16$  farmers

Equations for each stage in Nakhon Pathom province:

- Stage 1:  $(15/209) \times 137 = 9.83 \approx 10$  farmers
- Stage 2:  $(30/209) \times 137 = 19.66 \approx 20$  farmers
- Stage 3:  $(14/209) \times 137 = 9.18 \approx 9$  farmers

**Phase 3: Key Informant Interviews**

In Phase 3, Semi-structured interviews will be conducted with key informants, including provincial or regional government officials, PGS group leaders, representatives from the Thai Organic Agriculture Foundation (TOAF) and Mr. Organic Agriculture (PGS mentor). The semi-structured format captures specific information about government policies and support programs while also allowing

informants to share detailed explanations and contextual insights from their experiences with implementing or interacting with PGS programs.

**Table 3.6**

*Farmer Selection for Survey by Province and Stage*

Phase	Province	Number of Groups Selected (Approx.)	Number of Farmers in Each Province	Number of Farmers by Stage		
				1	2	3
Phase 2 Survey	Kamphaeng Phet	16	98	43	39	16
	Nakhon Pathom	8	39	10	20	9

### 3.2.2 Question for Qualitative and Quantitative Data

#### 3.3.2.1 Qualitative Approaches

The qualitative data collection for this study will involve two parts: in-depth interviews with PGS farmers and semi-structured interviews with key informants.

In the qualitative phase of the study, in-depth interviews (IDIs) will be conducted with farmers across the selected provinces (Kamphaeng Phet and Nakhon Pathom). The IDIs with farmers will provide critical insights that contribute to Objective 1, focus on understanding the factors influencing decisions to join the system, across different PGS stages (Initial, Intermediate, Advanced). Open-ended questions will be used to facilitate in-depth discussions, allowing farmers to share their experiences and perspectives in detail. The interviews will be organized into five parts:

1. Demographic and background: Collect demographic data and information on the farmer's background.
2. Reasons for Joining PGS: Explore the reasons why farmers decided to join the PGS system.

3. Experience with PGS: Examine their experiences while participating in the PGS.
4. Challenges with PGS: Identify the obstacles to maintaining participation and discuss factors influencing the continuity of their engagement.
5. Future Plans: Investigate their plans for future participation in the PGS system or their intentions to leave.

The information collected during this stage will also be used to refine and adjust the questionnaire survey for the quantitative phase. A consent form for the interviews can be found in Appendix A, and the full set of interview questions is available in Appendix B.

Semi-structured interviews will be conducted with key informants, including provincial or regional government officials, PGS group leaders, and representatives from the Thai Organic Agriculture Foundation (TOAF). The semi-structured format captures specific information about government policies and support programs while also allowing informants to share detailed explanations and contextual insights from their experiences with implementing or interacting with PGS programs. These interviews will use a combination of open-ended and specific questions tailored to the informants' roles. The full set of interview questions for key informants is available in Appendix C. The interviews will be organized into three parts:

1. Demographic and background: Collect demographic data and information on the interviewers' background
2. Identify Key Support Mechanisms: Identifying the government policies, programs, and other support mechanisms
3. Assess Impact on Continuity: Key informants will assess the impact of the identified support mechanisms on the continuity of PGS groups based on their perception.

### **3.3.2.2 Quantitative Approaches**

The quantitative questionnaire will use close-ended questions to gather information required to address objectives 2. Likert scales will measure farmers' perceptions, and attitudes. The questionnaire will be conducted in five parts, as follows:



1. Farmer demographics and background: age, gender, and educational background, farming experience and duration in organic farming
2. Farm structure: land size, types of crops, labor using, farming income
3. Motivation for joining PGS: reasons for joining PGS (economic, social, environmental)
4. External factors influencing PGS participation: certification process, government support and policies in PGS participation, market accessibility, consumers demand, community relations
5. Factors influencing continued participation: transparency in the process, types of participation in PGS, time and resources constraint, sense of ownership, challenges faced during the initial, intermediate, and advanced stages of PGS

In parts 1 and 2 (Demographics and Farm Structure) will use open-ended, multiple-choice, and short-answer questions. These sections are designed to capture factual data about the farmers and their farm operations.

In part 3 to 5 will focus on measuring Nakorn Pathom and Kamphaeng Phet's farmer's perception levels regarding factors influencing their decision and continued participation. The survey will use 5-point Likert scales to measure farmers' perceptions on various factors. The Likert scale will be structured as shown in Table 3.9. The full questionnaire survey may be seen in Appendix D

**Table 3.7**

*Likert scale key in questionnaire survey*

Not at all	Slightly	Moderately	Quite a bit	Extremely
1	2	3	4	5

### **3.2.3 Data analysis**

For Objective 1, thematic analysis will be used to identify key patterns and common themes from data collected through in-depth interviews with current and former PGS farmers. The analysis will focus on themes such as motivations for joining PGS, perceived economic or social benefits, external influences, and challenges faced at

different stages of participation (Initial, Intermediate, Advanced). This qualitative data will help explore the factors influencing farmers' decisions to join PGS and inform the quantitative phase using surveys. Descriptive statistics and multiple linear regression will further analyze survey data to quantify the significance of these factors.

For Objective 2, both descriptive and inferential statistical analyses will be used. Descriptive statistics will summarize the sample characteristics, including demographics (age, gender, education), farm structure (size, crop types), and PGS participation levels. Measures like means, medians, frequencies, and standard deviations will be calculated. Multiple Linear Regression will then assess the relationships between factors and continued participation in PGS. This will help identify which factors significantly influence the likelihood of farmers staying in or leaving the PGS system.

For Objective 3, narrative analysis will examine key informant interviews and secondary data related to government support mechanisms. The analysis will organize qualitative data into themes, focusing on policies, strategies, and support systems that affect PGS group continuity. The results will offer insights into how government initiatives influence the continuity of PGS groups.

**Table 3.8**

*List of variables*

Variable	Types	Unit	Description
<b>Dependent variable</b>			
Y <sub>1</sub> = Motivation to Join PGS	Ordinal	Score (1-5)	Farmers' rating of the importance of various factors influencing the decision to join the PGS system.
Y <sub>2</sub> = Intention to Continue Participation	Ordinal	Score (1-5)	Farmers' perception of their decision to continue participating in the PGS system in the future.
<b>Independent variable</b>			
X <sub>1</sub> = Age	Continuous	Years	Age of respondent
X <sub>2</sub> = Gender	Categorical	1 = male 2 = Female	Gender of respondent

		3 = Others	
X <sub>3</sub> = Education	Numerical	(years)	Respondent's number of years of formal education.
X <sub>4</sub> = Farming experience	Numerical	(years)	Respondent's duration as farmer
X <sub>5</sub> = Duration in organic farming	Numerical	(years)	Respondent's duration as PGS farmer
X <sub>6</sub> = Land ownership status	Categorical	1 = owned 2 = rented 3 = both	Ownership status of respondent's farmland (if both, specify the proportion)
X <sub>7</sub> = Land size	Numerical	Rai	Total land area operated by the respondent
X <sub>8</sub> = Labor (Family)	Numerical	Number of workers	Number of family members working on the farm.
X <sub>9</sub> = Labor (Non-Family)	Numerical	Number of workers	Number of hired workers on the farm.
X <sub>10</sub> = Type of crop	Categorical	List of crops	Types of major crops grown by the respondent.
X <sub>11</sub> = Total Production Costs	Numerical	Baht	Total production costs
X <sub>11.1</sub> = Fertilizer costs	Numerical	Baht	Total fertilizer costs
X <sub>11.2</sub> = Labor Cost (Non-Family)	Numerical	Baht	Total cost of hired labor for farm work.
X <sub>11.3</sub> = Herbicide Cost	Numerical	Baht	Total cost of organic pesticides/herbicides used.
X <sub>11.4</sub> = Irrigation Cost	Numerical	Baht	Cost associated with water or irrigation systems used.
X <sub>11.5</sub> = Seed cost	Numerical	Baht	Total cost of seeds used for planting.
X <sub>12</sub> = Gross income	Numerical	Baht	Total gross income from vegetable production.
X <sub>13</sub> = Reduction in Production Costs	Ordinal	Score (1-5)	Respondent's perception of the reduction in production costs

X <sub>14</sub> = Increase in income	Ordinal	Score (1-5)	Respondent's perception of Increase in income
X <sub>15</sub> = Knowledge exchange	Ordinal	Score (1-5)	Respondent's perception of Knowledge exchange with other farmers through PGS
X <sub>16</sub> = Community recognition	Ordinal	Score (1-5)	Respondent's perception of Recognition and support from the community
X <sub>17</sub> = Environmental improvement	Ordinal	Score (1-5)	Respondent's perception of environmental improvement
X <sub>18</sub> = Protecting biodiversity	Ordinal	Score (1-5)	Perception of biodiversity protection through PGS
X <sub>19</sub> = Certification process	Ordinal	Score (1-5)	Perception of the certification process (time, cost, etc.)
X <sub>20</sub> = Market accessibility	Ordinal	Score (1-5)	Perception of Accessibility new market
X <sub>21</sub> = Consumer Demand Influence	Ordinal	Score (1-5)	Influence of increasing consumer demand
X <sub>22</sub> = Community relations	Ordinal	Score (1-5)	Perception of good community relations
X <sub>23</sub> = Government policies and support	Ordinal	Score (1-5)	Influence of government policies, training, and support
X <sub>24</sub> = Transparency	Ordinal	Score (1-5)	Influence of Transparency in the PGS process
X <sub>25</sub> = Financial stability	Ordinal	Score (1-5)	Influence of Financial stability from PGS participation
X <sub>26</sub> = Time and resource constraints	Ordinal	Score (1-5)	Influence of time and resource constraints
X <sub>27</sub> = Role and Responsibility in PGS Group	Ordinal	Score (1-5)	Influence of the individual's role and sense of responsibility within the PGS group on their decision to continue participating.

X <sub>28</sub> = Social Influence and Support from Other Farmers	Ordinal	Score (1-5)	Influence of social support and community relations with other farmers in the PGS group on the decision to join or continue participating.
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### 3.3 Chapter summary

A summary of this study's third chapter may be seen in Table 3.11

**Table 3.9**

*Research Objectives, Data Sources, Instruments, and Analytical Procedures*

Specific Objectives	Data Source	Instrument	Analytical Procedure
1. To explore key factors that influence farmers' decisions to join PGS at different stages (initial, intermediate, advanced).	PGS farmers	In-depth Interviews, Survey	Thematic analysis, Descriptive statistics, Multiple Linear Regression
2. To examine the factors that influence farmers' continued participation in PGS groups and how these factors contribute to the continuity of PGS groups.	PGS farmers (current and former)	Survey	Descriptive statistics, Multiple Linear Regression
3. To analyze the government support mechanisms that influence the continuity of PGS groups.	Key informants (government officials, PGS group leaders, TOAF representatives)	Literature and Interviews	Narrative analysis

**Table 3.10***Budget allocation for research*

No.	Activity	Price (Bath)
1.	Transportation	5,000
2.	Accommodation	5,000
3.	Trust-building Gifts/ Refreshment	8,000
4.	Equipment	2,000
	Total	20,000

**Table 3.11***Timeline plan for research*

Task	2024							2025				
	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May
Proposal Writing												
Proposal Defense												
Proposal Revision												
Data Collection												
Data Analysis												
Thesis Writing												
Thesis Defense												
Thesis Revision												
Final Presentation												

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## **APPENDICES**



## **APPENDIX A**

### **Consent form**

Thank you for agreeing to participate in the research titled “PARTICIPATORY GUARANTEE SYSTEMS FOR ORGANIC VEGETABLES IN THAILAND: A STUDY ON FARMER PARTICIPATION AND GOVERNMENT SUPPORT”, conducted by Chanikan Mahora, a student from the Asian Institute of Technology. This research aims to explore the key factors that influence farmers' decisions to join the PGS and their continued participation in the system. The interview will last approximately 30-40 minutes, and the survey will take about 15 minutes to complete.

To ensure full information disclosure about the research and use of data, please read the following information sheet and sign below to certify that you fully understand and consent to the following conditions

- The interview will be audio-recorded, and a transcript will be created for data analysis purposes.
- Your responses will be anonymized, and personal information will not be included in any reports or publications. The researcher (Chanikan Mahora) will be the only person who has access to the raw data (audio recordings and transcripts).
- Data will be used solely for academic research purposes and will not be shared for commercial use.

#### **Your Rights**

- You are free to withdraw from the study at any time without providing a reason or facing any negative consequences.
- You may decline to answer any question that you feel uncomfortable with during the interview or survey.
- Any changes to the conditions of your participation will only occur with your explicit approval.

I, \_\_\_\_\_, consent to voluntarily participate in this research study and fully understand and approve the information as written above on \_\_\_\_\_(date) .

## **APPENDIX B**

### **Questions for in-depth interview**

#### **Part 1: Background Information**

Q1: How did you first hear about PGS?

Q2: How long have you been a part of the PGS program?

#### **Part 2: Reasons for Joining PGS**

Q3: What made you decide to join PGS? Was it about better prices, being part of a community, helping the environment, or something else? Tell me more about that.

Q4: Were there any other reasons, aside from money, community, or the environment, that made you want to join PGS?

Q5: In your view, what are the main reasons why other farmers join PGS?

Q6: Why do you think some farmers choose to leave PGS?

#### **Part 3: Experience with PGS**

Q7: What are the best things about being in a PGS group? Any unexpected, good things?

Q8: Has being in PGS helped you learn new things or improve your farming? If so, how?

Q19: What kind of activities do you do in your PGS group? How do these activities help you and the group?

Q10: Do you think getting along well with others in the group helps everyone stay interested in organic farming and keep being part of PGS?

#### **Part 4: Challenges with PGS**

Q11: What are some of the difficulties or problems you've faced as a member of a PGS group?

Q12: What can the PGS group or others do to help farmers overcome these difficulties and make PGS stronger?

Q13: What challenges have you faced in participating in PGS that affected your decision to continue or leave the system at different stages?

**Part 5: Future Plans**

Q14: What are your plans for the future with PGS? Will you stay in it? What changes would you like to see?

## APPENDIX C

### Questions for Key Informant

#### **Part 1: Demographic and background**

Q1	Name	
Q2	Gender	Male / Female
Q3	Age	( ) Years
Q5	Role	( ) Policy Implementers ( ) Users
Q6	Experience in PGS system	( ) Years

#### **Part 2: Identify Key Support Mechanisms**

Q6: Can you describe your experience with government support for PGS groups in your area?

Financial support (e.g., subsidies, grants)	Training programs (e.g., organic farming techniques, PGS group management)	Technical assistance (e.g., access to agricultural experts, guidance on certification processes)	Market access support (e.g., promoting organic products in local and international markets)	Policy and regulatory support (e.g., simplifying certification processes, reducing bureaucratic barriers)
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Q7: In your opinion, what are the most significant government support that have helped sustain PGS groups for organic vegetables?

Q8: Are there any differences in how government support is provided at the PGS groups for vegetables and others crops?

#### **Part 3: Assess Impact on Continuity**

<b>➤ For Government Officials (National and Regional Levels)</b>
Questions
Q9.1: What are the future plans and strategies of the Ministry to further strengthen and expand PGS in the country?
Q9.2: Do you get some feedback from PGS farmers both stayed and left
Q9.3: How does the government monitor and evaluate the effectiveness of these policies and support mechanisms?
Q9.4: What plans does the government have to enhance or modify these support mechanisms to better sustain PGS groups in the next 5 years?
<b>➤ For PGS Groups Representatives</b>
Questions
Q9.1: From your perspective, what government policies have been most beneficial for the continuity of your PGS group? and how have these policies been implemented and supported your activities?
Q9.2: Can you provide examples of how these interventions have influenced your decision to remain in the PGS group?
Q9.3: Have there been any challenges or barriers in accessing government support for your PGS activities?
Q9.4: In your opinion, what additional support should the government provide to enhance the sustainability of PGS groups?
<b>➤ For TOAF Representatives (Thai Organic Agriculture Foundation)</b>
Q9.1: Can you discuss any collaborative efforts between TOAF and government agencies to support PGS groups?
Q9.2: What additional government support do you believe is necessary to enhance the continuity and growth of PGS groups in Thailand?
Q9.3: In your opinion, are there any gaps or areas for improvement in the current policies supporting PGS groups?
Q9.4: Are there any new or upcoming policies in next 5 years that TOAF believes could significantly impact the continuity of PGS groups?
<b>➤ Mr. Organic Agriculture (PGS Mentor)</b>
Q9.1: In your experience as a mentor, what are the key challenges that PGS groups face in maintaining continuity and achieving long-term sustainability?

Q9.3: What role do you see government support playing in the continuity of PGS groups? Are there specific policies or interventions that you believe have been particularly effective or ineffective?
Q9.4: In your view, what improvements could be made to existing government support mechanisms to better address the needs of PGS groups and foster their long-term success?
Q9.5: Beyond government support, what other factors or initiatives do you believe are crucial for ensuring the continuity and growth of PGS groups in Thailand?

Q10: What additional suggestions do you have for promoting participation and ensuring the continuity of PGS vegetable groups in Thailand?

## APPENDIX C

### Questionnaire for Farmer Survey

#### **Part 1: Farmer demographics and background**

Q1	Name	
Q2	Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Others
Q3	Age	<input type="checkbox"/> Years
Q4	Education (years of formal education)	<input type="checkbox"/> Years
Q5	Farming experience	<input type="checkbox"/> Years
Q6	Duration in organic farming under PGS system	<input type="checkbox"/> Years

#### **Part 2: Farmer structure**

Q7	Is your land owned or rented?	<input type="checkbox"/> Owned <input type="checkbox"/> Rented (Please specify the lease term and rental fees) <input type="checkbox"/> Both (Specify the proportion)
Q8	land sizes	<input type="checkbox"/> Rai
Q9	How many workers do you employ on your farm?	<input type="checkbox"/> Family labor <input type="checkbox"/> Hired labor
Q10	Type of crop (Select the crops you grow)	<input type="checkbox"/> Gawng Tong (Chinese cabbage) <input type="checkbox"/> Pak Bung (Water spinach) <input type="checkbox"/> Kha-na (Kale) <input type="checkbox"/> Cucumbers <input type="checkbox"/> Lettuce (Green Oak, Red Oak) <input type="checkbox"/> Chili Peppers (Phrik Khi Nu, Phrik Jin Da) <input type="checkbox"/> Eggplants <input type="checkbox"/> Long beans <input type="checkbox"/> Pak Choi (Bok Choy) <input type="checkbox"/> Garlic Chives

		( ) Pak Kad Khao (Napa Cabbage) ( ) Spring onions ( ) Others
Q11	Total Production costs	( ) Bath Fertilizer costs: _____ Baht Labor cost (non-family): _____ Baht Herbicide cost: _____ Baht Irrigation cost: _____ Baht Seed cost: _____ Baht
Q12	Gross income (from vegetable production)	( ) Bath / monthly ( ) Bath / Yearly

### **Part 3: Motivation for joining PGS**

To what extent do you believe the following factors affect your decision to participate in PGS?

Please rate each statement from 1-5

(1 = Not at all, 2 = Slightly, 3 = Moderately, 4 = Quite a bit, 5 = Extremely)

Q	Motivation	1 Not at all	2 Slightly	3 Moderately	4 Quite a bit	5 Extremely
<i>Economic Motivation</i>						
Q13.1	Reduction in production costs through PGS participation influences my decision to join.					
Q13.2	Increase in income (higher product prices, lower production costs) from PGS participation affects my decision to join.					
<i>Social Motivation</i>						



Q14.1	Knowledge exchange with other farmers in PGS affects my decision to participate.					
Q14.2	Recognition and support from the community influence my decision to join PGS.					
<b><i>Environmental Motivation</i></b>						
Q15.1	Contribution to environmental improvement (e.g., reducing chemical use) through organic farming motivates my decision to join PGS.					
Q15.2	Protecting biodiversity on my farm and maintaining the local environment through PGS participation affects my decision to join					

#### **Part 4: External factors influencing PGS participation**

To what extent do you believe the following factors affect your decision to participate in PGS?

Please rate each statement from 1-5

(1 = Not at all, 2 = Slightly, 3 = Moderately, 4 = Quite a bit, 5 = Extremely)

Q	External factors	1 Not at all	2 Slightly	3 Moderately	4 Quite a bit	5 Extremely
Q16.1	Certification process affects my decision to					

	remain in or withdraw from PGS (Time, Cost, Requirement)					
Q16.2	Local market accessibility facilitates my participation in PGS					
Q16.3	Increasing consumer demand influences my decision to join PGS					
Q16.4	Good community relations are a key factor influencing my decision to join PGS					
Q16.5	Government policies and support (training, financial aid, technical assistance) influence my decision to join and continue participating in PGS					

#### **Part 5: Factors influencing continued participation or withdrawal**

To what extent do you believe the following factors affect your decision to participate in PGS?

Please rate each statement from 1-5

(1 = Not at all, 2 = Slightly, 3 = Moderately, 4 = Quite a bit, 5 = Extremely)

Q	Continued participation	1 Not at all	2 Slightly	3 Moderately	4 Quite a bit	5 Extremely
Q17	Transparency and fairness in PGS group processes affect my					

	continued participation.					
Q18	Financial stability from PGS participation affects my decision to continue.					
Q19	Time and resource constraints in farming affect my ability to continue participating in PGS.					
Q20	Consistent government policies promoting organic farming influence my decision to continue.					
Q21	Influence from other farmers in the community and social norms affect my continued participation in PGS.					
Q22	Personal sense of ownership and responsibility within the PGS group influence your decision to remain an active participant					

## **VITA**

This section presents a short description of the educational and professional achievements of the student.