



# The dynamics of university's roles in the Participatory Guarantee System (PGS) learning process: A case of the Nan agricultural communities in Thailand

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## Abstract

This study analyzed the roles of the School of Agricultural Resources, Chulalongkorn University in the learning process of a Participatory Guarantee System (PGS) group in Nan province, Thailand. It used a historical approach to analyze in-depth the learning process of the PGS organic agriculture Nan Group, from 2014 to 2019. The use of a historical approach was to study, understand and interpret past events. It aims to reach insights about past events and understand the impact of the past on subsequent events related to development process. The learning process was differentiated in three stages, i.e. introduction, implementation, and expansion stage of PGS. The findings emphasized a university as a crucial community development actor. More specifically, the roles of the School of Agricultural Resources, Chulalongkorn University were dynamic over the three stages and included not only the role of an expert but also a facilitator in the development of the PGS organic agriculture Nan Group. In particular, during the introduction stage, at which there was almost no knowledge about organic agriculture, let alone PGS, and key actors in PGS development were not presented, the roles of the School were influential in facilitating the required knowledge and skills, and building the network of PGS actors. In terms of policy implication, universities must give serious attentions to communities' empowerment and shared efforts between universities and communities rather than the traditional and separated approach in teaching, research and outreach.

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## Introduction

The rise in population and the growth of incomes mean an increase in demand for food consumption. However, in terms of sustainability, environmental degradation

presents a key challenge if intensive production practices and agrochemical overuse are pursued and continue. To this end, organic agriculture offers a significant response to sustainability transition.

Previous studies on organic agriculture have advocated the potential benefits of Participatory Guarantee System (PGS) as it can empower local smallholder farmers and facilitate food system sustainability (Hatanaka, 2020; Kaufmann et al., 2020; Loconto & Hatanaka, 2017).

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Still, to achieve the benefits and objective of PGS, the learning process underpinning one of the six elements of the International Federation of Organic Agriculture Movements (IFOAM)'s PGS principle, must be adhered to (International Federation of Organic Agriculture Movements [IFOAM], 2007). This learning process creates and develops capabilities of local farmers in PGS groups and consequently enables them to design, apply and assess the groups' PGS organic agriculture standards for their production practices.

Importantly, rural communities maintain their own strengths and resources that can be leveraged to advance the development of the communities. To this end, universities can serve as a crucial actor in community development (Armijo, 2005). Drawing on a case of a PGS group in the Nan agricultural communities, Thailand, where its recent development has progressed in a sustainable direction, this study applied the concept of technological learning in a development context as an analytical framework to analyze the learning process of the PGS group and the roles of a university in the learning process in three stages.

The stakeholders involved in the process of PGS development in the Nan agricultural communities included: (1) Producer—the groups of farmers in the Nan agricultural communities; (2) Buyer—*Lemon Farm* and local consumers in Nan province; (3) University—School of Agricultural Resources, Chulalongkorn University; and (4) Others (supporting organizations)—Office of Agriculture and Cooperatives and local administration offices in Nan. The School of Agricultural Resources, Chulalongkorn University's participation in the PGS development was particularly significant and can be identified in three stages. In the first—*introduction stage*, the role of the university was a combination of a knowledge facilitator and a network facilitator. In the second—*implementation stage*, the role was a combination of a knowledge provider and a knowledge advisor and facilitator. In the third—*expansion stage*, its role was a knowledge provider.

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## Literature Review

### *Participatory Guarantee System (PGS) in the Organic Agriculture Sector*

Although Third-Party Certification (TPC) has been widely adopted and applied for the inspection and certification process of organic agriculture standards, it has been criticised for its high costs and complexity of the process (Fouilleux & Loconto, 2017). In particular, most smallholder farmers find TPC difficult and expensive to implement. Participatory Guarantee System (PGS) has been developed as an alternative to TPC and perhaps more

efficient in terms of costs and related processes, especially for those smallholder farmers to enter local organic markets.

According to IFOAM, PGS is “locally focused quality assurance systems. They certify producers based on active participation of stakeholders and are built on a foundation of trust, social networks and knowledge exchange” (International Federation of Organic Agriculture Movements [IFOAM], 2008). The IFOAM general principles of PGS, consist of six key elements. They are shared vision, participatory, transparency, trust: integrated-based approach, learning process, and horizontality (IFOAM, 2007).

As such, PGS is a democratic governance development system which involves a learning process of local stakeholders. This learning process creates and develops capabilities of local farmers in PGS groups and consequently enables them to design, apply and assess the groups' PGS organic agriculture standards for their production practices. An individual local PGS group designs and develops its standards for its PGS group members. The individual group also has its logo that the members can put on their PGS certified products. So, the group's products will have to target specific local markets, which recognise its logo (International Federation of Organic Agriculture Movements [IFOAM], 2019).

Previous studies have emphasized different forms of knowledge and skills, and roles of organizations in the governance process of PGS organic agriculture standards (Hatanaka, 2020; Hruschka et al., 2021; Loconto & Hatanaka, 2018; Montefrio & Johnson, 2019). However, these studies have so far limitedly analyzed the development process of PGS groups from the early stage, during which there was almost no knowledge about organic agriculture, let alone PGS, and key actors were not well structured or in place. This knowledge and structural condition of rural agricultural communities is important and therefore needed to be considered. Hence, the understanding and explanation of development of PGS groups from the very early stage will help informing policies for less developed agricultural communities like Thailand.

### *Technological Capabilities, Learning Process and the Roles of Universities*

The concept of technological capabilities and learning process explains the differences in the abilities of organizations (particularly firms) to carry out technical change. Different frameworks and categories of technological capabilities have been developed (Bell & Pavitt, 1993; Kim, 1997; Lall, 1992; Liefner & Schiller, 2008; Viotti, 2002; Wong, 2002; Zawislak et al., 2012). These studies classified technological capabilities in terms of the level of complexity—from imitative to innovative,

and the scope of technical activities spanning along the value chain of businesses—investment, production and operation.

Learning refers to various costly and deliberate processes by which additional technical skills and knowledge are acquired by individuals and organizations (Bell, 1984). In addition, learning is cumulative and leads to an increase in individuals or organizations' existing skills and knowledge. Learning can involve knowledge and skill from different sources, both internal and external to organizations. Hence, learning can be generated by various mechanisms covering external sourcing and internal knowledge creation activities (Bell, 1984; Bell & Pavitt, 1993; Kim, 1997; Lall, 1992).

Universities play an important role in providing the new knowledge and skills needed to meet the challenges of sustainable development in a community (Armijo, 2005; Tonon, 2020). Typically, the academic functions of universities include the roles of universities that contribute to society, which are: (1) teaching (education); (2) research (knowledge generation) and (3) outreach (direct knowledge transfer or the so-called “third mission”). Universities use their academic capabilities to carry out their outreach role, in the process of technological upgrading and learning of counterpart organizations (Liefner & Schiller, 2008).

Hence, universities can play a key role in development of organizations' technological capabilities as universities create new technical skills and knowledge, and develop human resources (Bell & Figueiredo, 2012; Dantas & Bell, 2009; Liefner & Schiller, 2008). In effect, these new technical skills and knowledge and human resources are initial resources that counterpart organizations can acquire and further contribute to internal capability accumulation processes in organizations or firms (Bell & Figueiredo, 2012).

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## Methodology

This study adopted a case-study method. The objective of the research was to analyze the roles of a university—the School of Agricultural Resources, Chulalongkorn University—in the learning process of the PGS organic agriculture Nan Group. The selection of the agricultural communities in Nan province, Thailand as a case was a combination of an intrinsic and instrumental choice. On the one hand, the case of agricultural communities in Nan province, Thailand was empirically significant and interesting because of the recent changes of development strategies in the Nan agricultural sector towards sustainability. On the other hand, the agricultural communities in Nan would provide an essential explanation to less developed communities in one of the remote parts of Thailand. In effect, the case was in contrast to the already investigated

more successful PGS cases such as Japan (Hatanaka, 2020), Chile (Hruschka et al., 2021) and the Philippines (Montefrio & Johnson, 2019). The research questions explored in the study were as followed:

1. Can the learning process be differentiated in stages? What were they?

2. What were the knowledge and skills which were acquired and developed by the PGS organic agriculture Nan Group in each stage of the learning process to enable the group to implement PGS organic agriculture standards?

3. What were the roles of a university, the School of Agricultural Resources, Chulalongkorn University, in the learning process underpinning the PGS organic agriculture Nan Group development?

## Data Collection

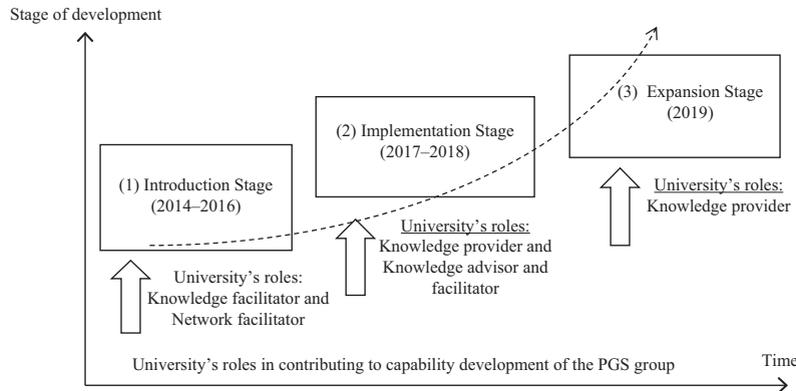
This study collected both primary and secondary data. Semi-structured interviews were planned in order to obtain in-depth information and data on the learning process of the PGS organic agriculture Nan Group and the roles of the School of Agricultural Resources in the learning process. The proposed interviewees were key stakeholders involved in each stage of the learning process. The interviewees included farmers, officials of district agricultural cooperatives, offices of agriculture and cooperatives and local administration offices in Nan province, Hug Muang Nan Foundation, Thai Health Promotion Foundation, Health Society Company Limited and Pracharath Rak Samakkee Social Enterprise, and faculty members and researchers of the School of Agricultural Resources, Chulalongkorn University at the Nan learning center. The data and information obtained from the interviews were complemented with the data from secondary sources including documents and previous study reports carried out in agricultural communities in Nan province. The interview topics and scope of data from secondary sources are described in [Table 1](#).

## Data Analysis

The starting point of the empirical analysis was at the introduction of the PGS concept in 2014. The analysis covered a six-year period, i.e. 2014–2019. The analysis of data was guided by the research objective and an analytical framework developed and based on literature on technological capabilities and learning in a development context (Bell & Pavitt, 1995; Dantas & Bell, 2009; Kim, 1997; Lall, 1992; Liefner & Schiller, 2008; Viotti, 2002; Wong, 2002). The framework was outlined in the three-stage capability development of the PGS organic agriculture Nan Group and the roles of a university in capability development ([Figure 1](#)).

**Table 1** Topics and scope of data from interviews and secondary sources

Sources of data	Topics and scope of data
Interviewees	Organization’s roles in PGS development Types of knowledge and skills required in PGS development Sources of knowledge and skills in PGS development Linkages and interactions with other organizations Factors influencing direction of PGS development
Documents, reports, newspaper, sound and video files	Description of key events in PGS development Development of key events in PGS development Explanation of activities in key events in PGS development



**Figure 1** The analytical framework of the three-stage capability development of the PGS organic agriculture Nan Group and the roles of a university in capability development

The results from the analysis provided preliminary answers to the research questions. Subsequently, an explanation building strategy was used to develop a cogent understanding and explanations to the research questions.

**Results and Discussion**

*The Challenges of Agricultural Communities in Nan, Thailand*

Nan is a province situated in the remote northern part of Thailand. Nan province is divided into 15 districts, covering a total area of 11,472 km<sup>2</sup>. Most of the areas are mountain and forests (85%). In 2020, the population was 476,727 (Department of Provincial Administration, 2021). Although its tourism sector has recently gained popularity, the agriculture sector remains the major economic sector in Nan.

Nonetheless, the agricultural communities in Nan faced economic and environmental challenges. Nan had a high level of poverty with an extreme environmental degradation and poor agricultural practices involving monoculture farming, pollution and harmful agrochemical overuse. So, the life of farmers in Nan has been a vicious cycle of growing debts, overusing agrochemicals and deteriorating health.

This vicious cycle facing farmers was coupled with another challenge encountered by the Nan residents. As farmers turned to non-food cash crops, Nan needed to bring in foods from external sources, with unknown quality and unpredictable quantity. This was a real food safety and food security concern for Nan.

*The Learning Process of the PGS organic agriculture Nan Group and the Roles of the School of Agricultural Resources, Chulalongkorn University*

From the analysis, the learning process of the PGS group can be differentiated in three stages, namely, introduction, implementation and expansion stage. Each stage of PGS development had different learning mechanisms and associated activities, depending on the skills and knowledge required for PGS development. To this end, the School of Agricultural Resources of Chulalongkorn University played crucial roles in the development of the PGS group in each stage.

*The introduction stage*

Beginning in 2014, the first stage—introduction—can be described by the period during which new knowledge in organic agriculture and PGS system was introduced to agricultural communities in Nan province. Prior to that, local farmers knew almost nothing about organic farming, let alone PGS.

As the problems of environmental degradation and poor agricultural practices in Nan were raised by its residents very seriously, local organizations in the agricultural sector, including agricultural cooperatives, local government, universities and non-governmental organizations (NGOs), held a number of meetings to discuss and find alternatives to alleviate the problems. It was also expected that the change could help improving food security and food safety in Nan.

A faculty member of the School of Agricultural Resources at the Nan learning center who also joined the stakeholder meetings put forward the concept of organic farming practice and participatory guarantee system (PGS). However, there were some difficulties to introduce a PGS initiative. The communities knew almost nothing about organic farming, let alone PGS. So, it was a huge challenge to introduce a novel concept of PGS to the communities, given that the knowledge about organic farming practice was non-existent.

The key role of the School of Agricultural Resources was therefore to facilitate the concept of organic farming practices and PGS system to the agricultural communities in Nan. However, using a conventional in-class training method would not be effective for introducing such a novel concept of organic farming and PGS to a group of farmers, who were practically not willing to change their routine practices.

The learning process of the agricultural communities in Nan was hence designed by the School of Agricultural Resources. The 4th year undergraduate students, advised by the faculty members of the School, developed their senior projects with a group of rice farmers in the Tha Wang Pha district in Nan. The objective of the project was to understand the existing rice farming practice and also to introduce the concept of organic agricultural practice to the farmers. In addition, the students developed a new business model of organic rice based on a PGS concept. To this end, the group of rice farmers understood organic agricultural practice and learned the potential business opportunity of PGS through interacting with the students and being advised by the faculty members. In essence, the approach used for the rice farmer group's learning process was a participatory learning approach.

Over two years, the group was convinced to change their existing farming practices and expressed their intentions to adopt PGS. Also, the knowledge of organic agriculture practice was diffused to other agriculture communities in other districts in Nan province.

Moreover, a faculty member of the School sought market collaboration with one of the leading PGS networks, i.e. Lemon Farm Organic PGS Network, managed by the Health Society Company Limited. The company owns 17 *Lemon Farm* shops in Bangkok and its vicinity, to trade organic and natural food products and supplies

(Lemon Farm, 2021). This is the PGS network clearly driven by a private buyer. In addition to being a major market outlet for organic products, the company became a source of knowledge in organic farming practice and PGS during the implementation stage of PGS development.

In summary, the roles of the university i.e. the School of Agricultural Resources, Chulalongkorn University were extremely significant. The first and most important role was to facilitate the conceptual knowledge of organic farming practice and PGS concept to the agricultural communities in Nan, via a participatory learning approach, utilising the students' projects. The second role was to find and connect the Nan local communities with the market for organic agricultural products, namely *Lemon Farm*. The connection with Lemon Farm Organic PGS Network was crucial and became a key step in PGS development.

#### *The implementation stage*

The second stage—implementation—demonstrated the learning process, by which the communities adopted and assimilated the PGS system into their production practice. The first official training of organic agriculture and PGS for the first cohort of farmers in three districts, namely Bo Klue, Phu Piang and Na Noi was launched in March 2017, by the School of Agricultural Resources, Chulalongkorn University in collaboration with the Health Society Company Limited. Subsequently, more trainings in PGS related topics, such as farm audits and certifications, and organic agriculture standards, were organised. An IFOAM expert was then invited by the Health Society Company Limited to consult the group for farm area management. So, in addition to the School, the Health Society Company Limited became the other important source of knowledge in organic farming and PGS system development.

In December 2017, the first PGS group in Nan was officially established. The group called itself the “PGS organic agriculture Nan Group”. It was composed of farmer communities in six districts of Nan province, i.e. Bo Klue, Tha Wang Pha, Wiang Sa, Na Noi, Muang and Phu Piang. In total, there were 35 households with a total area of 75.50 Rai (or 12.08 hectares). The members of the PGS organic agriculture Nan Group obtained several further trainings on farm area management, farm audits and certifications to prepare themselves for PGS assimilation and implementation.

In March 2018, the official adoption and implementation of PGS was confirmed and it became a milestone of the PGS organic agriculture Nan Group. At this milestone, the group was officially certified by Lemon Farm Organic PGS.

Once the PGS was adopted, assimilated and implemented, members of the PGS group developed their capabilities in organic agriculture and PGS further through farm visits and audits as well as production planning and quality

controls of products. Importantly, this was the learning process of PGS as the members of the group learned from each other through peer reviews and consultations or learning-by-doing and -interacting. As a result, the role of the School of Agricultural Resources became an advisor and facilitator to the group.

As time went by, the PGS organic agriculture Nan Group gradually developed its capabilities and built its capacities in organic agriculture productions. More farmer communities in other districts in Nan applied to join the group. In June 2018, the group was enlarged with members from nine districts in Nan including Bo Klue, Tha Wang Pha, Wiang Sa, Na Noi, Muang, Phu Piang, Song Kwae, Pua and Santisuk. In total, there were 46 households with a total area of 350.75 Rai (or 56.12 hectares). Furthermore, in 2019, the number of the members of the group became 110 households with a total area of 698.25 Rai (or 111.72 hectares). Three other districts added to the group included Thung Chang, Chiang Klang and Mae Charim.

The enlarged number of the members of the group turned to be a new challenge as the capacities of production increased much more than the growth of demand from the market or *Lemon Farm*. In other words, the supply of organic products from the PGS organic agriculture Nan Group was exceeding the demand from *Lemon Farm*. Consequently, the group sought to find alternative markets to absorb the excess supply of its organic products. Nonetheless, the group lacked such marketing capability and thereby turned to the School of Agricultural Resources for knowledge and skills in marketing. To this end, the PGS organic agriculture Nan Group gradually entered the next stage of development.

In summary, the roles of the School of Agricultural Resources, Chulalongkorn University during the implementation stage were dynamic. At the beginning of this stage, the key role of the School was a knowledge provider, i.e. to arrange and to provide scientific and technical knowledge and skills in organic agriculture, farm area management, farm auditing and farm certification process to the PGS group. Nevertheless, when PGS was officially implemented by the group, the role of the School became an advisor and facilitator to the group. The School advised and facilitated the learning among the members of the PGS group as they started to learn increasingly from each other.

#### *The expansion stage*

The growth of the PGS organic agriculture Nan Group during the implementation stage of PGS presented a new challenge for the group to sustain the implementation due to an imbalance between demand and supply of organic products. During the expansion stage, the role of the School of Agricultural Resources shifted and became

a knowledge provider. The School provided advanced knowledge in online marketing and digital technologies to help the PGS organic agriculture Nan Group sustain the growth of the group.

In 2019, the researchers of the School developed online market platforms on LINE and Facebook Application and created the group's own brand for their organic products. The brand name "Krasib-Raks" bore a remembrance to the local famous wall painting in Nan. As a result, buyers would recall the origin of the group's organic agricultural products.

To this end, the creation of the group's own brand "Krasib-Raks" and development of buyers' community on online application platforms became a part of the learning process for the group to gain advanced knowledge in digital marketing. Subsequently, the group worked collaboratively with the School of Agricultural Resources to develop a mobile application for production and marketing of its organic products. The mobile application called "Digital Agriculture Market" was created to connect the members of the PGS organic agriculture Nan Group with potential buyers regarding the weekly volumes of the group's organic products. Furthermore, the Digital Agriculture Market mobile application went beyond an initial marketing objective to include features that would become a decision support system for precision farming. In other words, the group benefited from the acquired new knowledge and skills in digital technologies to enhance its production and marketing capabilities.

In summary, during the expansion stage, the role of the School of Agricultural Resources shifted once again from an advisor and facilitator to a knowledge provider. The learning process of the PGS organic agriculture Nan Group involved the acquisition of new knowledge and skills in online marketing and digital technologies through working collaboratively with the researchers of the School. To this end, the School of Agricultural Resources supported the PGS organic agriculture Nan Group to negotiate the new marketing challenge successfully and to sustain and expand the implementation of PGS.

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## Discussion

The study enhances existing understandings on the roles of universities or experts on PGS governance development previously investigated by Hatanaka (2020); Hruschka et al. (2021); Loconto and Hatanaka (2018); Montefrio and Johnson (2019). Most of these studies suggested that experts or universities had a focused role in incorporating scientific knowledge in PGS standards development and inspection. The focused role of universities in providing scientific knowledge was

applicable when rural communities were well structured and ready to assimilate such knowledge without difficulties.

However, this research suggested that less developed rural communities with limited capabilities would struggle to absorb and use most of the scientific and expert knowledge. Therefore, the roles of universities during the early stage of PGS development would be building the communities' understandings of sustainable agriculture through facilitating and demonstrating concepts and ideas of organic agriculture practice and PGS system to the communities. Also, universities could facilitate the building of a linkage between agricultural communities and markets.

The first stage—introduction—took a significant and longer time than the implementation or expansion stage, i.e. about three years from 2014 to 2016. This highlighted the substantial efforts required and the roles of universities needed for the development of a PGS system where rural agricultural communities were less developed and a market actor was not presented. Hence, this result complemented the previous analyses of other PGS cases where the communities were articulated and so much ready to adopt the PGS system (e.g. Hatanaka, 2020; Hruschka et al., 2021; Montefrio & Johnson, 2019).

In short, each stage of the learning process had distinct characteristics and needed different types of knowledge and skills. The roles of the School of Agricultural Resources were dynamic and varied in each stage of the learning process of the PGS group. By way of answering the research questions, Table 2 summarizes the characteristics of knowledge and skills and the roles of a university, i.e. the School of Agricultural Resources, during the three stages of the learning process and the outcomes of the PGS organic agriculture Nan Group development.

## Conclusion and Recommendation

This paper contributes to the existing debates and understandings on PGS as a governance mechanism empowering local smallholder and facilitating food system sustainability. The result emphasized universities as a crucial community development actor (Armijo, 2005). Still, the roles of universities in PGS governance development were dynamic and included not only the role of experts but also facilitators for building the PGS group network, especially during the early stage of development.

In addition, the study emphasized that it would be beneficial to foster sustainable development when local communities engaged with universities utilizing a participatory learning approach in the learning process (Mbah, 2018). This process has a resemblance to the deliberative process of a governance development pointed out by Hatanaka (2020).

In terms of policy implication, the roles of universities in a development context are crucial. More particularly, the role of universities in outreaching and integrating teaching and research into the outreaching activities is essential to the development of rural communities. Therefore, the government and public research funding agencies must promote and financially support university-community linkages. The promotion of university-community linkages bears a resemblance to technological upgrading through university-industry linkages, which have been fostered in industrial sectors (Brimble & Doner, 2007; Liefner & Schiller, 2008). Furthermore, in accordance with the changing needs of rural communities, universities should give attentions to communities' empowerment

**Table 2** Key characteristics of knowledge and skills, the roles of a university and the outcomes of the PGS group development in each stage of the learning process

Stage	Characteristics of Knowledge & Skills	Roles of Universities	Outcomes of the PGS group development
Introduction (2014–2016)	<i>Conceptual knowledge:</i> Organic Farming Practices and PGS	(1) <b>Knowledge facilitator:</b> Facilitation and demonstration of concepts and ideas to convince the group to form a partnership through participatory learning approach (2) <b>Network facilitator:</b> Connecting the PGS group with market	(1) Farmers developed clear understandings on organic farming practices and PGS and desired to form a PGS group (2) A network of the PGS stakeholders was formed to incorporate the key buyer.
Implementation (2017–2018)	<i>Technical knowledge:</i> Organic Agriculture, and Monitoring, Verification and Compliance Assurance of PGS organic standards	(1) <b>Knowledge provider:</b> Arrangement of technical knowledge and skills to the PGS group through training (2) <b>Knowledge advisor and facilitator:</b> Facilitation of group learning through consultation	Organic agriculture practices and a PGS system was adopted and implemented fully by the PGS organic agriculture Nan group.
Expansion (2019)	<i>Technical Knowledge:</i> Application of new technologies to enhance production and marketing, within PGS system	<b>Knowledge provider:</b> Arrangement of technical knowledge and skills to the group through collaborative projects	New market or buyers were created on online application platforms to enhance marketing channel for the PGS organic agriculture Nan group

and shared efforts between universities and communities rather than the traditional and separated approach in teaching, research and outreach. In other words, the key contributions of universities to societies should be integrated and directed towards the economic and social development of the societies (Liefner & Schiller, 2008; Tonon, 2020).

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### Conflict of Interest

The authors declare that there is no conflict of interest.

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