


TRANSITIONING TO ORGANIC RICE FARMING IN THAILAND: DRIVERS AND FACTORS

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ABSTRACT

This research focuses on determining the drivers and factors that influence conversion to organic rice farming to better inform local and national policies. It provides an insight into the procedures in the decision-making process of farmers and the practices they use. Questionnaire and interview data from farmers in the leading rice production region, Surin, were analyzed using logistic regression to understand the drivers of organic rice farming and the barriers and challenges of adapting to this practice. The findings highlight the critical role of extension farm officers in promoting, educating, and motivating farmers to adopt organic farming. The ability to access (affordable) loans through local cooperative and land ownership was also a key motivational factor. Young people (under 25) are not engaging with farming generally, and this is a major barrier to long-term growth of the organic rice industry in Thailand.

Contribution/Originality: The research presented underpins the relevance of understanding the extrinsic and intrinsic motivations in farmers' decisions to switch to organic farming and how this can better inform the development of government policies.

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1. INTRODUCTION

The adverse impacts of industrialized agriculture on social, ecological, and economic sectors in the last 50 years have prompted more sustainable methods of farming that protect the environment and provide more healthy food for the world's growing population (Bacenetti, Fusi, Negri, Bocchi, & Fiala, 2016). Growing media coverage has increased consumer awareness about food safety and quality and, in some cases, has led to individuals questioning the health benefits of mass-produced food from conventional farms and a corresponding movement towards increasing demand for organic foods (IFOAM, 2016): in particular, more sustainable agricultural production approaches, which are a major driver of organic rice farming, that are friendlier to the environment, particularly in light of climate change and the role played by intensive agricultural practices in the creation of greenhouse gases and deforestation (Wani, Chand, Najjar, & Teli, 2013).

Food products purported to be 'organic' are produced with minimal impact on the environment using an agricultural system that operates as naturally as possible and without synthetic fertilizers (Charles, 2009). Organic products have continued to see unprecedented growth in the last 15 years (FAO, 2016; IFOAM, 2016; Seerasarn, 2015). The organic industry has seen double-digit growth in the last two decades, in terms of both market share and organically managed agricultural land (FAO, 2016). The global market for organic food surpassed US\$100 billion in 2018 (IFOAM, 2020). However, at the same time, it is important to acknowledge that despite the growing demand for organic food amongst European consumers, the development of organic farmland is slowing and, in some cases, stagnating or even decreasing (Far Eastern Agriculture, 2018; IFOAM, 2016). Although it has become increasingly globally important, the concept of organic farming is still insufficiently promoted (Tudorache & Sârbu, 2013). In light of its potential as a more sustainable form of agriculture, it contributes less to climate change and greenhouse gases and increases in food security, and produces much healthier food for the world's growing population; organic farming lags far behind conventional farming, and strategies need to be developed to create a better balance between the two (IFOAM, 2016).

Rice is a staple food for more than half of the world's population and in recent years, particularly in Asia and Europe, there has been a steady increase in the proportion that is organic (Sam, 2015). Drivers for more organic rice are related to the environmental and health factors identified above. Another prime reason is the increasing demand for plant protein, which is organic. According to SyndiGate Media (2016) by 2021 the organic rice protein market is projected to be growing at a rate of over 18% and with a market value of US\$96.5 million. This growth is a direct outcome of consumers' increasing preference for plant protein and nonallergen, lactose-free, and gluten-free products. These factors provide new growth opportunities for players in the organic rice protein market. Thailand is the world's third leading rice exporter (Shahbandeh, 2019) and the Thai Government has made it part of their long-term strategy to produce more organic rice, particularly for the Chinese market where demand continues to grow for such premium products (Bandumula, 2018). The Thai Government has made a concerted push to increase the proportion of farmers engaged in the organic method of farming. This has been achieved through a range of strategies, including policy development – for example, the 'Crop diversification' program (Kasem & Thapa, 2011) financial incentives (Ellis, Panyakul, Vildoza, & Kasterine, 2006) and training programs (Seerasarn, 2015). While there has been an increase in the number of farmers adopting organic rice farming, the rate has been relatively slow compared to that for conventional methods. 'Buying-in' to this method of farming by local rice farmers in Thailand is still limited (Aker, Heiman, McWilliams, & Zilbermann, 2005). It ranges from a lack of developed markets or of financial feasibility, being too labor intensive, ineffective government policies (Seerasarn, 2015) to the failure of the government to develop strategies to get the younger generation involved in agriculture (Shams & Fard, 2017). The Thai government recognizes that organic rice production, while more labor intensive, is much more profitable for local farmers as it is a premium product, is more sustainable, is a more marketable product, and has significant potential to transform local economies and contribute to national growth (Department of Agriculture Extension [DOAE], 2019).

The area of the world's land given over to organic farming is approximately 361.25 million rai (1 rai = 1,600 m²). Most organic products are produced in the area of Oceania (Australia and neighboring islands), comprising 47% of organic farm production area, while Europe accounts for 23% and Asia just under 30% (Office of Agricultural Economics, 2019). China is the number one organic rice producer in Asia, accounting for approximately 45%, while Thailand is ranked seventh (6.2% of the total); hence the need to grow this part of the agriculture industry. Organic rice accounts for 59% of organic products in Thailand (Surin Provincial Commercial Office, 2019).

In 2018, Thailand exported 11.13 million tons of rice and exported 11.13 million tons of rice (Office of Agricultural Economics, 2019). The organic product market in Thailand is worth 2,700 million baht, of which the domestic market comprises 30% (800 million baht). The value of the organic market grew continuously for over three years from 2014, with a domestic trading value of 500 million baht and average annual expansion of 20%, while the export market comprised 70% (1,900 million baht). Overseas marketing channels continue to expand and provide opportunities for Thai farmers and entrepreneurs who wish to export organic products (Business Nation, 2018).

However, adaptation to organic rice farming has been growing at a slower rate than that of conventional inorganic rice (Mekong Common, 2016; Seerasarn, 2015). The Thai government has recognized that trying to convert existing farmers to organic rice farming is critical to growing this lucrative industry. The barriers to conversion to organic rice farming need to be clearly understood, along with those factors that influence farmers to engage in this method of farming. This research, therefore, aims to explore the factors that have contributed to farmers' adoption or nonadoption of organic rice farming, to inform strategies and better decision making at the local level that will encourage more farmers to take up this practice.

The economic, environmental, and social benefits of organic rice farming to Thailand are immense and, therefore, convincing farmers to convert to this practice is a national priority (Department of Agriculture Extension [DOAE], 2019; Pornpratansombat, Bauer, & Boland, 2011). Because there is still inadequate information about why some farmers convert to organic farming and others do not, it is therefore important to gain an understanding from the perspective of existing farmers, both organic and nonorganic, as to why they choose to adopt organic farming practices or otherwise. This research, therefore, explores factors contributing to the adoption/nonadoption of organic rice farming using as an example Surin Province, northern Thailand, as a case study.

The research aimed to determine the drivers and factors that influence rice farmers to switch to organic farming to better inform local and national policies. The key objectives were to: (1) engage with a wide range of rice farmers to facilitate data collection and explore the drivers and challenges of organic rice farming in Thailand; (2) undertake

qualitative and quantitative data analysis to determine the key drivers and factors influencing farmers decision to convert or not convert to organic rice farming; and (3) formulate recommendations to inform government strategies.

2. METHODOLOGY

The study was undertaken mainly around Muang Surin and Sikhoraphum, districts of Surin Province, northeastern Thailand (Figure 1). Surin Province is among the leading areas of organic rice farming in Thailand, and a considerable number of farmers in the district have shifted from conventional to organic rice farming (Mekong Common, 2016). As highlighted by the Bureau of Agricultural Economics Research (2014) this shift is due to many rice farmers having faced difficulties due to accumulated debts and health problems associated with chemical use on farms and, overall, they are battling with the challenge of environmental degradation as a result of their involvement in 'modern farming' practices that are chemically intensive (Bureau of Agricultural Economics Research, 2014). At the same time, some farmers are increasingly finding that conventional agricultural methods utilizing chemicals cannot guarantee consistent rice yields, particularly for smallholdings, and so they have turned to organic farming. There is an added financial benefit in that they may get a higher price for their products, which contributes to farms becoming more economically viable (Tashi & Wangchuk, 2016). That said, the exact driver(s) for this conversion to organic rice production are not clearly understood. This research, within the study area described, provides the opportunity to gain greater in-depth understanding to better inform regional and national policies.

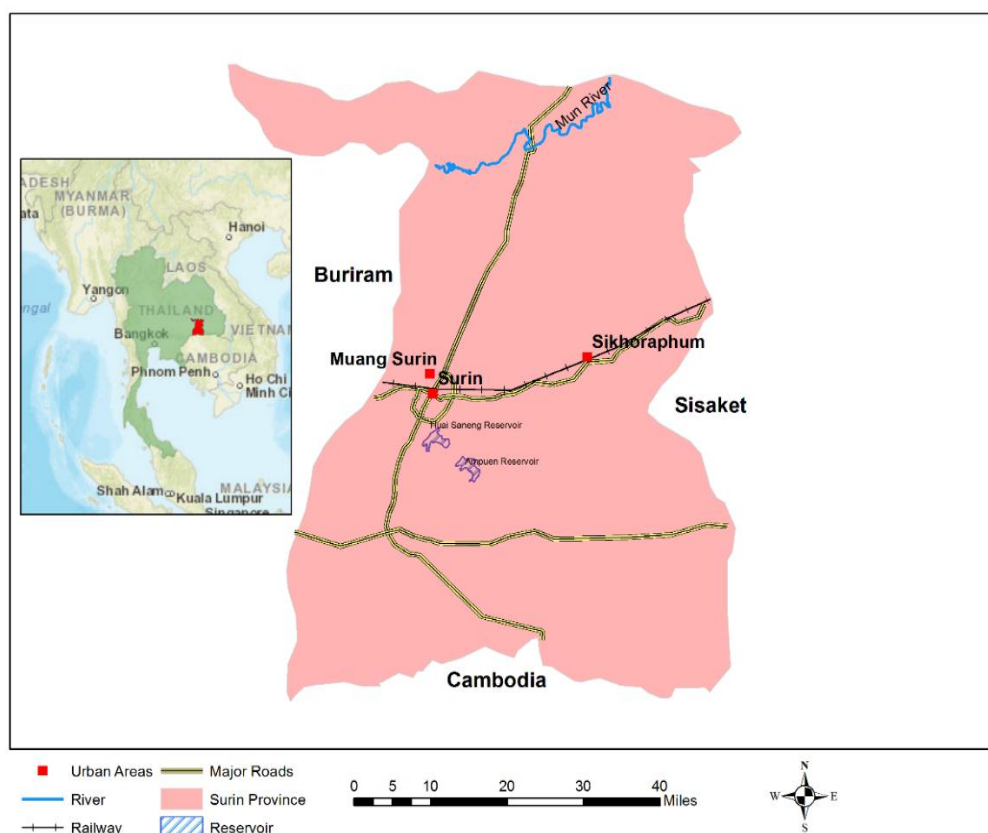


Figure-1. Location map of Surin Province.

2.1. Data collection and analysis

A mixed-method approach (questionnaire and interviews with farmers) was conducted to understand why some farmers had converted and others not. Logistic regression analysis and bivariate correlation were performed to determine the factors that best predict adaptation/nonadaptation of organic rice farming. The questionnaires were distributed to farmers in the field. It was as important to understand why farmers had converted to organic rice as to why others had not. As such, both groups of farmers were selected. Farmers were selected at random to ensure a geographical spread of respondents. At least ten farmers from each of the 17 districts were selected, to ensure adequate spatial distribution of the respondents. Additional farmers ($N = 30$) were randomly selected from the 17 provinces to participate in a focus group and further interviews. Firstly, this study uses descriptive and thematic analysis to identify the similarities and differences between two farming groups (organic and inorganic). Statistical analyses were then used to explore some of the most common factors associated with the adoption of organic farming (Ullah et al., 2015). A nonparametric bivariate correlation statistical test and logistic regression analysis were undertaken to determine which factors were best suited to determining conversion to organic farming. Logistic regression as a statistical method is useful in this context, where there are many proposed independent variables. In the logistic regression undertaken, the dependent variable (organic or inorganic) is coded as 1 (TRUE, organic) or 0 (FALSE, inorganic). The goal of logistic regression is to determine the best fitting model to describe the

relationship between organic and inorganic farming. The logistic regression process goes through a series of iterations, first inputting all the variables. Then, gradually through several stages, it eliminates the less significant ones to create a 'best bit model'. The final iteration of the logistic regression generates the coefficients, and their standard errors and significance levels, of a formula to predict a logit transformation of the probability of the presence of the characteristic of interest:

$$\text{logit}(p) = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_kX_k$$

where p is the probability of the presence of the characteristic of interest, and logit transformation is defined as the logged odds:

$$\text{odds} = \frac{p}{1-p} = \frac{\text{probability of presence of characteristic}}{\text{probability of absence of characteristic}}$$

3. RESULTS AND DISCUSSION

One of the main themes that emerged from the analysis of the data gathered from interviews was that among the key drivers for switching to organic farming by local farmers was the need to provide healthy food for their family. As one female farmer stated: "the rice and other vegetable produce using fertilizer makes us ill" (Seerasarn, 2015). Farmers also stated that many organic products are used for their family while the nonorganic component is sold on. Other farmers cited the protection of the environment as their main driver for switching to organic farming. Common comments included: "fertilizer pollutes the river"; "soil is being destroyed, becomes hard and is difficult to farm"; and "wildlife needs to be protected". Farmers alluded to the changes they had witnessed over their lifetime in terms of the changing landscape and disappearance of flora and fauna that were once common to the area. Overall, organic farmers believed in a need to encourage more wildlife and most mentioned the need to integrate their farming practice with the encouragement of wildlife: statements such as "organic farming brings more bees and insects" and "the bees are good for our plants; it makes them healthier" (Charles, 2009). The benefits of bees and other insects were associated with the perception of healthier and more robust rice crops and other vegetable produce. Farmers also felt that the presence of insects and other wildlife is an indication of a healthy environment, which is what should be typical of rural communities.

Organic farmers also alluded to the effects on the farming community of taking loans to mechanize and buy fertilizer. They had experienced personal loss on their farms in the past due to debt incurred and/or seen fellow farmers going out of business. As one 79-year-old farmer stated: "20 years ago we were told to gain more yield and produce more, so we had to take some loans from the bank to invest in a machine and chemical fertilizers. We ended up in debt and lost our farm" (Seerasarn, 2015). Organic farmers were now more likely to take a loan from their local agricultural cooperative society/bank than from a commercial bank. Avoidance of large loans associated with the purchase of fertilizer and machinery is among the most common themes that emerged from organic rice farmers. However, those farmers who have not switched to organic farming perceived the opposite to be true. These nonorganic farmers believed that, without the loans, they would not be able to maintain a profitable farm: "the loan has enabled us to extend the farm and employ more people" (Ellis et al., 2006).

Some farmers believe that organic farming is neither practical on a large scale nor profitable. Organic farming, they believe, is too labor intensive; unless you have a large family to support, it is not viable: "organic farming takes too many people; it is not profitable to pay them all". Organic farmers, on the other hand, tended to utilize their family to help on the farm: "we are a family of 7, we all come together to help" (Kasem & Thapa, 2011). Other farmers alluded to the fact that, with organic farming, there is much more weeding and care required but they prefer to do so because there are no chemicals to deal with. They receive help from family members, spreading the workload to keep these farms viable.

Friends and agricultural extension officers appear to play a key role in helping encourage farmers to convert to organic farming. Farmers indicated that it was not until their friends or farming colleagues who had adopted organic farming told them about the benefits to be realized that they changed their practices. A farmer of 20 years stated: "my friend has been a part of Rice Fund Surin (RFS), and told me about growing better rice. I went to see his farm and since then, I have been doing organic rice farming". As one reason that they continue to engage in organic rice farming practices, other farmers alluded to visits from agricultural extension officers and the help provided; to access loans from a local cooperative to develop an integrative pest management system; to certification of the farm as an organic producer; and to access to markets where they can get a higher price for their products.

For those farmers who did not convert, the main factors were that they are familiar with what they did and to change was perceived as being too risky. The following comment typifies the comments from some farmers: "We have been doing this for years, why change, we are a profitable farm and not worth taking the risk?" (Ellis et al., 2006).

If farmers cannot see the benefits of switching to organic farming, this is a major challenge for the government in trying to influence such a change. It also reflects failure of the local message to communicate the benefits and opportunities.

Other farmers cite the high labor input: "This is modern times; there is no need to hire lots of workers to tend for the crops, just too much hassle" (Seerasarn, 2015). This represents a major challenge and barrier to organic farming. Larger and (usually) more profitable farms are moving away from large labor forces. The question is, does the government need to subsidize farmer-owners to encourage them to hire a larger workforce? The challenges of weed control associated with organic farming require a larger labor force, and this is a major barrier. There needs to be

much more research conducted to develop organic weedkillers and weed control mechanisms. As such, government grants to research institutes must be a focus of any government policy.

3.1. Factors influencing the adaptation of organic rice farming

A nonparametric correlation and binary logistic regression were performed to evaluate the most significant factors contributing to adoption of organic farming. All independent variables were utilized in the analysis. Correlation at the 0.01 and 0.05 confidence levels was accepted as significant relationships (Table 1). At the 0.01 level, the experience of farming both organic and inorganic rice, the higher price received for their products, getting information about organic farming from other sources (in other words, not through formal government channels and gender) all show statistically significant relationships with the choice of farming practice. At the 0.05 confidence level, the variables showing a strong relationship were land tenure (Table 2), visits from extension officers, evidence of the difference in price they received for organic compared to inorganic rice, and access to loans (Table 3). The binary logistic model, which explores the best set of variables predicting likely farming practice, is outlined in Table 3. As part of the logistic regression, a log-likelihood ratio of 99.930 was obtained and the chi-square statistic for the goodness of fit of the model is 26.906, significant at the 1% level (Table 4). Thus, the overall model is significant and a good fit when assessing the contribution of individual predictors in a given model.

Table-1. Results of bivariate nonparametric correlations.

	Gender	Land owned	Experience	Con-income	Informed about organic via, e.g., media	Different in price received for organic/compared to inorganic	Higher Price received	Cooperative-loan	Extension, visits
Pearson Correlation	0.170*	0.259**	0.209*	0.173*	0.169*	0.215*	0.217*	0.251**	0.244**
Sig.***	0.046	0.005	0.018	0.043	0.046	0.016	0.015	0.006	0.007
N	100	100	100	100	100	100	100	100	100

Note: * and **, 5 and 1% level of significance, respectively (1-tailed).
***, 1-tailed.

Table-2. Landownership and its relationship to organic/inorganic farm practice (percent).

	Tenant	Owned	Other
Organic	4.0	56.0	7.0
Inorganic	6.0	27.0	0.0

Table-3. Results of binary logistic regression.

	β	S.E.	Wald	Sig.	Exp. (β)
Land owned	-2.269	0.763	8.851	0.003	0.103
Higher price received	0.489	0.309	2.506	0.013	1.631
Extension, visits	0.937	0.597	2.462	0.017	2.553
Farm size	-0.036	0.026	1.970	0.160	0.964
Gender	0.439	0.530	.688	0.007	1.551
Income (non-organic rice) -	-0.334	0.231	2.081	0.049	0.716
Other-information	-0.527	0.626	0.708	0.040	0.590
Experience	-0.482	0.990	0.237	0.026	0.617
Constant	0.728	2.026	0.129	0.019	2.070

Table-4. Results of omnibus testing of model coefficients.

Block	Chi-square	Sig.	-2 log likelihood	Cox & Snell R^2	Nagelkerke R^2
Model	26.906	0.001	99.930	0.236	0.328

3.2. Discussion and policy implications

It has been reaffirmed by this research that organic rice farming is labor intensive. Large families with upwards of 5–7 members helping are more likely to be engaged in organic farming than in nonorganic. This is very common regarding organic farms, particularly when on a small scale (Kafle, 2011). This *per se* can be a barrier to organic farming; if a cheap and readily available labor force is unavailable, then there is less chance of a farm engaging in organic farming and it is more likely to continue with conventional methods, utilizing chemical-based fertilizer and weedkiller. This is one of the first issues that government policy needs to address; otherwise, organic farming will not be sustainable (IFOAM, 2016). The use of innovative practices and technology (for example, precision agriculture, robotics, irrigation systems, organic fertilizer) and modern machinery needs to be an integral part of the push if Thailand is to become a leader in the organic rice farming industry. Farmers must have access to efficient machinery and technology without creating large debts, which points to the government needing initially to subsidize this industry for it to reap long-term benefits (Mekong Common, 2016; Tashi & Wangchuk, 2016). There is also the need to invest in research and development of higher-yielding rice varieties, to ensure sustainability and profitability (Bacenetti et al., 2016). For example, in part of Surin Province some farmers have trialed a new technique known as the System of Rice Intensification (SRI), which uses fewer seeds per acre, can be started in a greenhouse,

and, overall, gives better yields and is resistant to extreme climate changes (Mekong Common, 2016). It is this type of innovation and research that needs to be encouraged and funded to better drive organic rice farming initiatives.

One of the main findings of the research was that organic rice farmers tended to be more experienced and older, with only a small proportion of the under-30s involved in the agriculture industry. While it is good that organic farmers are more experienced, it is worrying that the younger generation is not actively involved in farming generally and organic farming more specifically. For example, in Europe, which has seen a boom in organic farming, it is the younger generation who appear to be adapting to emerging technologies and that are taking more interest in health and environmental issues dominating the organic farming landscape (IFOAM, 2016). Encouraging more of the younger generation to become involved in farming has to be a major focus. The Thai government, if it wishes to become a leader in organic rice farming, needs to develop strategies to better target resources to engage, empower, and encourage more youngsters to become involved in organic farming. As is typical of most developing and middle-income countries, the younger generation chooses to move away from rural communities and/or enters careers other than farming. Organic farming does require a bigger labor force than conventional farming; there will be an impact on the ability of labor and farm ownership/managers to adopt organic farming as well as to maintain existing farms. As highlighted above, organic farmers tend to be much older and experienced than their inorganic counterparts. This is contradictory to results from studies – for example, by Hattam, Lacombe, and Holloway (2012) – where younger farmers influenced by the adoption of new technology were more interested in adopting organic farming than older farmers. As such, in this study, age does play a vital role in influencing adaptation. However, the farming experience of the household head is a driver for the adoption of inorganic farming. Organic adopters were more experienced than their inorganic counterparts. Encouraging the younger generation to become involved in farming is a challenge in a country like Thailand, where youngsters gravitate to major urban centers rather than rural ones. As one 36-year-old female farmer stated: “It is only because I lost my job in a factory in the city that I returned to the farm. The family owned the land and after speaking with the Surin Farmers Support (SFS) I decided organic farming was the most economical way to farm” (Seerasarn, 2015).

Unless the government can develop strategies through education programs, viable jobs in agriculture, the development of production facilities and associated jobs in rural areas, and the use of technologies, it is unlikely to attract more youngsters to farming, vital for the inorganic farming industry.

This result corresponds to the results of Läßle (2010) and Ramesh et al. (2010). They outline that the conversion of conventional to organic land was due to the expected additional benefit from organic produce; the benefits in these cases were perceived as the difference in price received compared to inorganic rice. Generally, farmers who got a higher price for their products were more likely to adapt: “I farm both types of rice together, but for the organic rice I get a better price. This is what keeps the farm going” (male farmer in Surin).

However, that said, some organic farmers cultivate inorganic rice alongside organic products. They cite the convenience and the security of selling to two different markets. A study by Musara, Chimvurahwe, and Borerwe (2012) found that adopters had more diversified crops and farming practices, borne out by the current study. Farmers who owned their land were more likely to be adopters of organic practices. This is due to the control they have over what they can do and the confidence to plan long term.

Kallas, Serra, and Gil (2010) suggested that small farms need ‘credit’ to adapt to organic farming. Where farmers were able to access loans, they were more likely to adopt organic farming. As highlighted in the present study, farmers were more likely to adopt if the loan was from a cooperative society rather than from the government or a commercial bank. This may be due to several factors, including accessibility (less bureaucracy), lower interest rates, more favorable payment terms, and, generally, more understanding and trust from the cooperative society than from either the government or commercial sources. However, the biggest driver for taking loans from local cooperatives was the ability to incur less debt and avoid the negative experience of farmers who have taken large loans from commercial entities, such as banks, to buy machinery and fertilizer to increase productivity on their farm: “The Cooperative bank understands use, the loans are small and they give us longer to pay it back. It means we are not incurring large debt and we don’t have to worry they will come and take our farm away if we run into trouble” (farmer of 20 years in Surin).

In Surin Province, the farmers formed a small group in their district called the Surin Small-scale Farmers Network, in association with SFS, now called the Community for Agro-Ecology Foundation (CAEF), which develops workshops to share learning about sustainable agriculture techniques and to exchange experiences. Local farmers interested in organic farming in Surin went on to develop RFS, which created a pool of funds from which members can borrow (Mekong Common, 2016). It is this type of local funding that appears to drive organic farming and which central Government needs to support and invest in more than it currently does. As such, it is imperative for greater adoption of organic farming; there needs to be much easier access to loans for farmers, and at much more favorable terms than those currently being offered by commercial banks, to help them to adapt to organic rice farming. Furthermore, loans need to be structured in such a way that farmers cannot incur significant debt (for example, by very low interest rates and longer repayment times). These loans should be available through local rather than national or regional financial institutions.

In addition, this study found the extension service to be one of the most powerful drivers of organic rice farming. Whilst organic rice farmers appear to be influenced by friends and concern for the environment, it is the visit and support provided by extension officers that gives them the confidence to share good practices and encourages them to contribute most to starting and continuing organic rice farming. This area needs to be funded and supported by central, regional, and local governments if more farmers are to adopt organic rice farming practices (Rana, Parvathi, & Waibel, 2012).

This study did not find any significant results for parameters influencing the adoption decision of farmers based on the variables, education, the channels through which they sell their products, or the size of the farm, as highlighted by studies such as Ullah et al. (2015), Shams and Fard (2017) and Pradhan, Tripura, Mondal, Darnnel, and Murasing (2017). The dominant drivers of the adoption decision were found to be farming experience, land ownership, assets, access to credit from a local source (for example, cooperative banks/credit unions), and the extension service provided by local bodies such as Extension Services.

4. CONCLUSION

The findings of this study highlight the critical role of extension farm officers in promoting, educating, and motivating farmers to adopt organic farming. Where extension officers provided support through training, working with cooperatives, and helping to create standards of good farm practice, there was a higher probability of farmers converting to organic farming. Farmers who participated in training and/or those who had visits from extension officers appear to have gained a better understanding of organic farming, which influenced their decision to convert to this method of farming. Those farmers with greater experience tend to be more likely to be engaged in organic farming. However, there is a worrying trend of an aging farming workforce and the government needs to invest more in encouraging the younger generation to take up farming. Numerous studies have shown that the younger population adapts much more quickly to organic farming, and strategies to better engage this section of society need to be put in place with a degree of urgency. The ability to access loans at the local level – for example, farmers' cooperatives – is a strong driver in adopting organic farming. Farmers cite that they trust working with local organizations that understand them and that do not require them to incur large debts as drivers for adopting the organic method. The Thai government, therefore, needs to provide the support and funds to these smaller entities to drive organic farming more effectively at the local scale. Land ownership is a strong driver: those who own land are much more confident in deciding to change to organic farming, and they are more likely to want to protect the environment and land for future generations. Mechanisms to help finance farmers to own their property should be a key policy drive in encouraging more widespread organic farming.

Land ownership is a key driver in the conversion to organic farming. To promote more organic farming, the government needs to establish a program to encourage more farmers to purchase their farm property. Farmers trust local cooperatives and, as such, we recommended channeling these loans through such institutions and providing favorable terms (e.g., low interest).

The challenges of weed control associated with organic farming require a greater input of labor, and this is a major barrier. There is a need for more research to develop organic weedkillers and weed control mechanisms. As such, grants to research institutes must be a focus of any government policy.

This research has, and will continue to, inform the development of both local policy and national strategies. The key role of the extension officer has been pivotal to Surin becoming a leading area in the promotion of organic farming, and the government needs to continue to fund this role. This could be achieved by building local capacity through training more local officers, providing increased funding to local educational institutions, and the provision of funding for more training to farmers in their local area. Farmers do not want to have to leave their farms to go to a city to access training, and it is imperative that more local training is developed and provided.

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