

Article

Farmers' Perception and Drivers of Membership in Rice Production Community Enterprises: Evidence from the Central Region, Thailand

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Abstract: In rapidly developing economies such as Thailand, farmers face multiple challenges preventing them from improving their livelihoods, and are therefore reverting to collective action as a means to overcome those obstacles. Community enterprises (CEs) have recently emerged as a new form of such collective action, yet there is limited evidence regarding farmers' perception of rice production CEs (RPCEs) and the specific factors influencing their decision to join. In order to fill this gap, primary data were collected through questionnaires administered to 406 farmers in six districts in Uthai Thani province in the central region of Thailand. A weighted average index (WAI) was employed to assess the farmers' perception of RPCEs' role, and a binary logit regression model was used to investigate the determinants of perception and membership in RPCEs. The results revealed that both members and non-members perceived RPCEs as a saving source but not a credit provider. Compared to non-members, members put more emphasis on the product competition with rivals. Decision to join was associated with small landholdings, diversity of rice varieties cultivated, participation in networks, membership of economic groups, access to extension services, access to credit, and proximity to the market. The results suggest that production-oriented and marketing-oriented policies should be promoted in order to encourage farmers to cultivate organic rice and rice for the niche market to supply to RPCEs in order to generate greater group income.

Keywords: community enterprise; rice production; perception; decision to join; membership; Thailand

1. Introduction

Improving agricultural productivity and commercialization of agricultural products among smallholder farmers is widely perceived as a key approach for rural development, poverty alleviation, and food security. The main challenges include poor access to credit services [1], inadequate infrastructure and physical dispersion of smallholders [2], the high transaction costs of accessing input and output markets, technical incapability [3], and changing consumer preferences [4]. Collective action is often suggested as a tool to overcome those obstacles [5].

Collective action is defined as a group of people who collaborate in order to pursue members' shared interests [6]. It is the coordinated behavior of a group toward a common interest or purpose [7]. Collective action groups can be of many types such as labor-sharing groups or self-help groups, and perform a wide range of activities including agricultural production, management of natural



resources, and technology dissemination. Moreover, collective action can involve more complex farmer associations, as well as cooperative societies engaged in marketing activities, input supply, and provision of specialized services.

Community enterprises (CEs) represent one type of collective action. CE refers to a group of individuals in a community that acts in pursuit of a common good [8]. It is formed as a result of a local community's entrepreneurial activities, employing their social resources, structures, and networks [9]. CEs are managed and governed by local citizens who aim to pursue a common purpose in a manner that is meant to yield sustainable individual and group benefits over a short and long period [8,10]. Local knowledge, culture, resources, and capacity to run CEs relies on people and the natural resources in their community areas. Local people use CEs as a means for enhancing their livelihoods by creating new sources of income, securing better access to their resources and consolidating their land claims [11].

CEs employ entrepreneurial means to solve their economic, social, cultural, and environmental issues. In many studies, entrepreneurship has been identified as a significant path towards sustainable products and services, and addresses many environmental and social concerns [12]. Recently, it has been considered as a solution for numerous environmental and social preoccupations [13–15]. Entrepreneurial knowledge and innovative abilities play a vital role in finding opportunities for sustainable development [14] and ensuring a more sustainable future. Hence, entrepreneurs are the engines of sustainable development [16].

Meanwhile, CEs are also similar to cooperatives in being member-owned and controlled trading organizations [17,18]. CEs are distinguished between community cooperatives, which have more membership control, and community non-profits, which are more about producing social benefits for the community [17]. An empirical study in India defined the meaning of CEs following the definition of cooperatives: the association of people in pursuit of common economic, social, and cultural goals through a jointly-owned and democratically-controlled enterprise [19]. CEs and cooperatives are interchangeable [18].

In Thailand, CEs were introduced after the financial crisis in 1997. Following the economic collapse, the government developed the concept of sufficiency economy and self-reliance, which were important parts of community thinking as strategies to survive the crisis and bypass this concept into government projects. CEs have been a grassroots economic development means for increasing the potential and roles of rural communities since then [20], and have become part of the community-based income generation program of the Thai government as an instrument for stimulating self-employment [21]. Local people contribute finance and local resources for production, and participate in production and sale activities [22]. According to a recent report by the Secretariat of Community Enterprise Promotion Board (SCEB) [23], the highest registered number of CEs in the crop production sector operate in the rice production community enterprise (RPCE). Rice plays a crucial role in the livelihoods of the Thai people and is an important cash crop for the country. One-fifth of the territory, or 70 million rai, is used for paddy farming [24]. Over two million farmers are paddy farmers, more than any other type of farmer. [25]. Furthermore, rice is the major export, with an average value of over US billion dollars per year. In 2012, it generated an export value of approximately \$436.4 million [26].

Previous studies on CEs indicate that most challenges they face are related to management aspects. These include lack of experience in organizational management, high costs of production, lack of working capital [27], weak information systems, poor product design [28], and lack of knowledge and skills on the part of the entrepreneur [29]. Regarding farmers' perception, some studies have shown that farmers' perception of CEs is mostly positive because they associate cooperatives with the possibility of obtaining assistance from their government representatives [30]. Farmers have indicated that the availability of loans, improvement of profit, and services provided by the cooperatives such as finance, training, and transportation influenced them to join [31]. Cooperative members improve their knowledge and skills through various training, and develop farming practices due to accessibility of farm inputs [32]. Nonetheless, few studies have thus far assessed farmers' perception of RPCEs or the factors influencing perception and the decision to join an RPCE. Such evidence is critical to inform

policy, help paddy farmers to receive the advantages associated with membership of RPCEs, increase their chances to enhance paddy farming, and thus improve their livelihoods.

2. CEs and RPCEs in Thailand

CEs were introduced in Thailand after the 1997 economic crisis. CEs have been promoted as an income generation program through the provision of a training program and enlarged sources of funding. In 2005, the Royal Government of Thailand issued the "CEs Promotion Act" to support and build an enabling environment and encourage the formation of CEs. By helping small micro-businesses, CEs become legal entities, and the Act improved these enterprises' chances of receiving both recognition and various types of government support. In addition, the micro-finance sources of support for CE implementation come from many organizations, such as local administrative organizations, the Bank for Agriculture and Agricultural Co-operatives, non-governmental organizations, shared interests, and self-organization [33]. The CE program was one of the biggest public interventions implemented in the country [21].

CEs are also used to solve the limitation of cooperatives and private companies that prevents grassroots groups from acting as collective entrepreneurs [34]. With fewer regulations, seven or more villagers who aim to produce and market a product or service can register as CEs [35]. All existing groups, e.g., organically formed groups and top-down process groups, were encouraged to register to receive support from the government in accordance with the CE Act 2005. At the time of this research, there were more than 85,000 CEs with over 1.4 million members across Thailand [36]. CEs are divided into two types: goods and services. Goods cover 18 items, including crops (e.g., rice, cassava, etc.), livestock, fishery, and food processing, while services include such as community shops, and tourism. CEs became a foundation for the "one tambon (sub-district) one product" (OTOP) scheme in 2001; approximately 68% of OTOP producers are CEs, and 34% of CEs in the country are engaged in OTOP activities [37].

RPCEs were the highest registered crop production type [23]. Principally, CEs should be set up by grassroots groups to solve problems together at household and community level, but many have instead been formed by a top-down process. In 2005, the number of registered RPCEs was relatively high because they consisted of both the existing paddy farmer groups and newcomers (Figure 1) [38]. Between 2008 and 2009, the number of registered RPCEs declined and then picked up again around 2010. Since 2015, the government has promoted the Large Agricultural Plot Scheme (LAPS) policy [39]. This policy was aimed to increase rice production and enhance the competitiveness of small-scale rice farmers by encouraging them to establish neighboring agricultural land groups in order to share plans for cropping and marketing development. Many paddy farmers formed RPCEs to benefit from this project in the form of inputs, training, machines, and micro-finance. Some farmers left their old RPCEs and joined new RPCEs following this government project.

The current study considers seven RPCEs, four of which were initially formed as farmer groups with the objective to reduce production cost. The three others were initiated by government promotion. All RPCEs have a common membership size, ranging approximately from 35 to 68 members. RPCEs access the market though offering organic rice and rice for the niche market since commercial rice (conventional rice) is dominated by mills/middle. In the past, RPCEs were open to all individuals, but now several of them require farmers with a willingness to provide produces to the group. All RPCEs are managed by an elected chairperson and the board following the democratic principle of one person, one vote. Common share is the main payment of membership for all RPCEs; it averages 100 baht/share but can be up to 1,000 baht/share. Fee registration is paid for some RPCEs at an average of 100 baht. Although the type of activities within RPCEs may differ, they often include distributing inputs to members and stabilizing outputs by setting a minimum threshold. Regarding marketing, RPCEs collect dried and fresh rice from members and participate in post-harvest activities such as rice milling and packaging. They have customers in both local and urban markets.



Figure 1. The number of registered RPCEs (rice production community enterprises) in Thailand from 2005–18. Data source: SCEB, 2019.

3. Materials and Methods

3.1. Study Area

Uthai Thani province was chosen purposely for the study. It is located in the central part of the country (Figure 2). The central region is Thailand's major location for commercial rice production. Farmers in this region normally grow at least two crops of rice per year due to the availability of the irrigation system and sufficient water. The share of farm income of households that depend on rice production in this region is about 27% (three-fifths of total household income), constituting the largest share in Thailand [40]. The total population of this province is 329,433 [41], and most people rely on agriculture for their livelihoods, in particular rice production. The total of agricultural land accounted for 260,217.44 ha, of which 103,421.76 ha was used for rice farming and the rest for field, orchard and perennial crops [41]. The field data were collected between February and April 2019.



Figure 2. Map of Uthai Thani province (study area)

3.2. Sampling Methods, Population and Sample Size

A multi-stage sampling procedure was used to select sample households for the empirical analysis. In the first stage, Uthai Thani province was purposely selected. In the second, six out of eight districts, namely Mueng, Thap Than, Sawang Arom, Lansak, Nongkhayang, and Nongchang were selected due to their similarity of in terms of agro-ecology. A total of seven RPCEs were purposely selected from Mueng, Thap Than, Lansak, Sawang Arom, Nongkhayang, and Nongchang districts. Subsequently, based on the complete list of households in each village served by each RPCE, a total of 406 representative households (178 members and 228 non-members) were randomly selected.

A household survey was conducted through a semi-structured questionnaire and face-to-face interviews for the primary data. Secondary data were collected from relevant sources, including the Ministry of Agriculture and Cooperatives, National Statistical Office, and District Administrative Office. Moreover, group discussions and chairperson/key person interviews were held, where participants were asked about the overall role of RPCEs, e.g., activities, management, problems and the benefits of RPCEs for their members and their community.

3.3. Methods of Analysis

The data analysis used quantitative and qualitative methods and was carried out with STATA version 15. Chi-square and *t*-test were used to assess the associations between characteristics of the survey respondents (reported in Table 2). Furthermore, weighted average index, and regression modeling were applied to in this research (reported in Tables 3 and 4). To interpret the results of the logistic regression, we reported the marginal effects, which are interpreted as marginal changes of the dependent variables as a result of changes in the respective explanatory variables [42,43].

3.3.1. Weighted Average Index (WAI)

The weighted average index (WAI) was employed to assess the farmers' perceptions of RPCEs' role. The *WAI* formula is as follows [44]:

$$WAI = \sum \frac{S_i F_i}{N}$$
(1)

where the WAI is ($0 \le WAI \le 1$), S_i denotes the scale value assigned based on the response, F_i denotes the frequency of responses, and N denotes the total number of responses. The level of perception was measured on a five-point scale with varying weights. The degree was weighted as 1 for "*Very Strong*" (*VS*), 0.75 for "*Strong*" (*S*), 0.5 for "*Medium*" (*M*), 0.25 for "*Weak*" (*W*), and 0 for "*Very Weak*" (*VW*). Numerous studies have used this approach to examine farmers' perceptions and associated decision-making [45–47].

3.3.2. Binary Logistic Regression Model

The binary logistic regression model was applied to evaluate the relationship of the observed characteristics with perception and probability of membership. Logistic regression is often used in socio-economic and environmental research when the outcome variable is binary [48] and it has also been frequently applied when assessing the factors influencing farmers' motivations and decisions [49,50]. The probability of being a RPCEs member can be modeled as a function of selected independent variables. Two separate logit regressions were estimated to determine the factors influencing farmers' perception of RPCEs and the factors determining their decision about whether to be an RPCE member. The logit model formula is as follows [51]:

$$P_i = F(Z_i) = F(\alpha + \beta X_i) = \frac{1}{1 + e^{-Z_i}} = \frac{1}{1 + e^{-(\alpha + \beta_i)}}$$
(2)

where *e* represents the base of natural logarithms, P_i is the probability that an individual farmer has a positive perception of CEs and will make the decision to join an RPCE (0 = no, 1 = yes) given X_i , where X_i is the set of explanatory variables that influence perception and the choice of membership of RPCEs, and β the coefficients of the explanatory variables. Equation (3) can be restated as:

$$Log_e \frac{P_i}{1 - P_i} = Z_i = \alpha + \beta X_i \tag{3}$$

We followed the standard stepwise regression procedure. Model selection was undertaken using the frequently applied statistical tests, such as log likelihood ratio tests and pseudo R^2 [3,52].

3.4. Variables

3.4.1. Outcome Variable

The outcome variables are perception and membership. Both are dichotomous variables. Perception measures household level in terms of their perception of RPCEs by providing the value 1 if a farmer has a positive perception of RPCEs, making them a treatment group member. Membership measures household level in terms of decision to join an RPCE. The variable takes the value 1 if a farm household has RPCE membership, making them a treatment group member. It takes the value 0 if a farm household does not have RPCE membership, making them a control group member [53–57].

3.4.2. Explanatory Variables

Previous studies have shown that farmers' perceptions and decisions to join different forms of cooperatives and agricultural groups are influenced by household level and individual socio-economic and demographic characteristics. The membership of cooperatives is positively associated with age [53,54], education level [54], farming experience [58,59], and family size [49].

Regarding asset endowment, previous studies have found that the size of landholding and ownership of livestock are associated with the likelihood of cooperative membership [43,55,56]. Rice farm size is the factor influencing farmers to join RPCEs. For example, farmers with larger farm sizes are more likely to belong to cooperatives in China [60]. Prior studies have shown that the degree of agro-commodity diversity is linked with the decision to join a cooperative [55]. Based on the existing literature and feedback from fieldwork, we therefore include a variable measuring the diversity of rice varieties cultivated.

Empirical studies have shown that individual social networks are involved in the adoption of technologies and other innovations among smallholder farmers [42], and access to a social network is probably an important variable in membership decisions [3]. Personal preferences for working in groups are reflected by membership of other groups [61], thus, membership of an economic group enhances household members' knowledge and generates ideas related to production and marketing. Extension service has an effect on farmers' decision to join an RPCE, reflecting the important role of government extension services in promoting and developing RPCEs. Credit enables farmers to overcome their financial constraints and adopt innovations; thus, it is likely that access to credit will be associated with organizational membership [50]. Distance to market can influence farmers to become members of RPCEs. For example, previous studies have found a relationship between the probability of cooperative membership and collection centers in Ethiopia [49] and India [62]. The variables and their measurement are described on the Table 1.

Variables	Description
Outcome variables	
Membership status	Membership status in a RPCEs (rice production community enterprise) (1 = member; 0 = otherwise)
Perception	If household had a positive perception on RPCEs $(1 = yes; 0 = no)$
Explanatory Variables	
Age	Age of household head (years)
Education	The education level of the household head (1 = illiteracy; 2 = primary; 3 = secondary; 4 = bachelor degree and above)
Family size	Number of family members
Farm experience	Number of years since the household head started rice production
Landholding	Total land size owned by household (hectares)
Rice farming size	Total rice farming size (hectares)
Off-farm employment	Household member has off-farm employment $(1 = yes; 0 = no)$
Number of cattle	Number of cattle owned by household
Diversity of rice varieties	Number of rice varieties household cultivates in agricultural year
Network with agricultural experts	Number of agricultural experts household head knows
Network with customers	Number of rice customers (clients) household head has
Membership in economic group	Household participates in economic group (other than RPCEs) $(1 = \text{yes}; 0 = \text{no})$
Extension service	Household has been visited for demonstration plot/home by agents or has participated in farmer training $(1 = \text{yes}; 0 = \text{no})$
Access to credit	Household has access to credit $(1 = yes; 0 = no)$
Distance to market	Distance to nearest market (mill) in km
Trust	Household trust in RPCEs' implementation (0 = none; 1 = low; 2 = moderate; 3 = high)

Table 1. Description of variables and their measurement.

4. Results

4.1. Socio-Economic Characteristics of the Respondents

As shown in Table 2, the demographic characteristics, i.e., age and education level, were similar and insignificantly different. The mean age of members and non-members was 57 years, and most farmers in both groups were educated to primary level. Farmers in the member group who had attained a bachelor's degree or above were more numerous than those in the non-member group, at 30.34% and 26.32% respectively. Farm experience was significantly different between members and non-members. Members had more rice farming experience (30 years) than non-members (27 years).

Table 2. Descriptive statist	cs of sample households	by CE membership status.
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*7 • 11	Members	Members (N = 178)		Non-Members (N = 228)	
Variables	Mean	Std. Dev	Mean	Std. Dev.	
Age (years)	57.42	12.36	57.24	11.57	0.877 1)
Education level (%)					$0.485^{(2)}$
Illiteracy	26.97%		31.58%		
Primary school	38.76%		35.96%		
Secondary school	3.93%		6.14%		
Bachelor's degree and above	30.34%		26.32%		
Rice farm experience (years)	29.94	16.30	27.19	14.0	0.069 *1)
Landholding size (hectares)	2.30	2.18	2.73	2.64	0.079 * ¹⁾
Rice farm size (hectares)	3.43	2.89	2.92	1.87	0.030 **1)
Rice income (baht)	111,727	85,139.27	102,537	68,699.08	0.229 ¹⁾
Total income (baht)	209,671	126,994.2	193,591	99 <i>,</i> 870.98	0.154 1)

Note: ¹⁾ Independent sample t-test of proportions; ²⁾ Chi-square test; ***, **, and * denote 99%, 95%, and 90% confidence levels, respectively.

Regarding the economic variables, there was a slight difference in the average size of landholding between members and non-members. Members had a smaller landholding size at 2.30 ha, while non-members averaged 2.73 ha. Adversely, the average rice farming land for members was larger (3.43 ha) than for non-members (2.92 ha). There was no significant difference in rice income and total income, but members had a slightly higher rice income (THB 111,727) and total income (THB 209,671) than non-members (THB 102,537 and 193,591 respectively).

4.2. Farmers' Perception of RPCEs' Roles

Table 3 shows the farmers' perceptions of RPCEs. Overall, farmers perceived RPCEs' role as a saving source as *strong* and top among all. Supplying farm inputs at fair price, knowledge and skill improvement, increasing social network, and increasing income were rated as *medium*. Finally, product competition with rivals and provision of credit service were rated as *weak*.

Members		Non-Members		Total	
(n = 178)		(n = 228)		(n = 406)	
WAI	Ι	WAI	Ι	WAI	Ι
0.66	S	0.64	S	0.65	S
0.67	S	0.49	Μ	0.57	М
0.65	S	0.48	Μ	0.55	М
0.58	Μ	0.49	Μ	0.53	М
0.50	М	0.36	W	0.42	М
0.47	Μ	0.33	W	0.39	W
0.33	W	0.11	VW	0.21	W
	Mem (n = WAI 0.66 0.67 0.65 0.58 0.50 0.47 0.33	Members (n = 178) WAI I 0.66 S 0.67 S 0.65 S 0.58 M 0.50 M 0.47 M 0.33 W	Members Non-M (n = 178) (n = WAI WAI 0.66 S 0.64 0.67 S 0.49 0.65 S 0.48 0.58 M 0.49 0.50 M 0.36 0.47 M 0.33 0.33 W 0.11	Members Non-Members $(n = 178)$ $(n = 228)$ WAI I WAI I 0.66 S 0.64 S 0.67 S 0.49 M 0.65 S 0.48 M 0.58 M 0.49 M 0.50 M 0.36 W 0.33 W 0.11 VW	MembersNon-MembersTo $(n = 178)$ $(n = 228)$ $(n =$ WAIIWAIIWAI0.66S0.64S0.650.67S0.49M0.570.65S0.48M0.550.58M0.49M0.530.50M0.36W0.420.47M0.33W0.390.33W0.11VW0.21

Table 3. Farmers' perception regarding RPCEs' roles.

(I) Interpretation: (VS) Very strong, (S) Strong, (M) Medium, (W) Weak, (SW) Very weak.

Comparing the two groups, it was found that, for both members and non-members, role as a saving source was rated as strong, while increasing social network was rated as medium. Members rated supplying farm inputs at fair price and knowledge and skill improvement as strong, while non-members rated them as medium. Increasing income and product competition with rivals were perceived as medium by members, and weak by non-members. Provision of credit service was considered as weak by members, and very weak by non-members.

4.3. Factors Affecting Farmers' Perception Level

Based on the results in Model 1 (Table 4), the perception level of farmers is related to demographic, socio-economic, and infrastructure variables. Age and education influence positive perception of RPCEs. Farmers who grow a diversity of rice varieties have a 15% increase in positive perception of RPCEs. Moderate and high levels of trust also increase positive perception by 19% and 53% respectively. Meanwhile, family size has a negative significant effect on perception level, by about 3.6%.

	Model 1: Perception		Model 2: Decision to Join		Marginal Effect	
Description –	Coef.	Std. Err.	Coef.	Std. Err.	Perception	Decision to Join
Constant	-1.869	0.777	-1.106	0.763		
Age	0.025 *	0.013	-0.001	0.014	0.005	-0.000
Education	0.209 **	0.106	0.067	0.103	0.046	0.017
Family size	-0.170 *	0.093	-0.172 *	0.096	-0.036	-0.043
Farm experience	-0.001	0.011	0.018 *	0.011	-0.000	0.005
Rice farm size	0.009	0.057	0.104 *	0.061	0.002	0.026
Landholding	-0.45	0.051	-0.160 ***	0.057	-0.010	-0.040
Off-farm employment	0.182	0.355	0.360	0.362	0.040	0.090
Diversity of rice varieties cultivated	0.677 **	0.282	1.045 ***	0.233	0.147	0.261
Number of cattle	-0.062	0.048	0.031	0.046	-0.014	0.008
Network with agricultural experts	0.073	0.070	0.176 ***	0.066	0.016	0.044
Network with customers	0.142	0.152	0.720 ***	0.260	0.031	0.180
Membership in economic group	0.290	0.296	0.734 ***	0.283	0.063	0.183
Extension service	0.139	0.276	0.613 **	0.268	0.030	0.153
Access to credit	-0.131	0.430	0.849 **	0.417	-0.028	0.212
Distance to market	-0.011	0.013	-0.037 **	0.014	-0.002	-0.009
Trust (none)						
Low	-0.396	0.430			-0.092	
Moderate	0.771 **	0.314			0.190	
High	3.057 ***	0.500			0.526	
$LR X^2$	133.36		136	.24		
Pseudo R ²	0.2428		0.24	447		
Log likelihoods	-207.955		-210	0.210		

Table 4. Determinants of perception and decision to join rice production CEs for paddy farmers (n = 406).

Note: ***, **, and * denote 99%, 95%, and 90% confidence levels, respectively.

4.4. Factors' Influencing Farmers' Membership in RPCEs

In Model 2 (Table 4), the results show that the probability of being a member of an RPCE significantly increases with rice farming experience and rice farm size. Farmers who have cultivated a diversity of rice varieties are more likely to participate in RPCEs, with an approximate 26% probability of participation. Additionally, social networking with agricultural experts and customers is a significant factor in a farmer's decision to join an RPCE. Networking with agricultural experts and customers increases the probability of RPCE membership by 4% and 18% respectively. Membership of an economic group and access to extension service increases the likelihood of RPCE membership by 18% and 15% respectively. Furthermore, farmers who can access credit tend to participate in RPCEs. Conversely, family size and landholdings are negatively associated with membership. For farmers with smaller landholdings, every unit fewer of land results in a 4% higher probability of participation in RPCEs. Distance to market has a significantly negative effect, with each kilometer further away from the market decreasing the likelihood of membership by 1%.

5. Discussion

5.1. Farmers' Perception of RPCEs' Role

Members and non-members agreed that RPCEs play a vital role as a source of savings. This is consistent with a previous study in Tanzania, which showed that farmer groups promoted saving behavior among members [63]. Members contribute shares, which they will regain if they resign from the group. Furthermore, some RPCEs contribute dividends and provide a deposit account for members.

RPCEs provide inputs to members in the forms of credit and coordination. Due to group purchasing, farmers gain market power and receive better prices for agricultural inputs and other necessities [64]. Regarding credit, the input costs are deducted from the output payment for organic farming members selling their outputs to RPCEs, while other cases use cash payment. In terms of coordination, RPCEs faced with a shortage of capital coordinate partners to buy inputs for their members, and members pay them directly. In fact, RPCEs have a small number of members, which hinders the economies of scale for procurement of inputs. RPCEs achieving a lower input price are not only able to serve low prices to their members, but also to make a profit for the group through charging interest, e.g., 0.5% per month, or 3% for the total input cost.

Members and non-members perceived RPCEs' role as being capacity builders, and this perception was particularly strong among members. Government agencies, and non-profit organizations provided various services, such as knowledge transfer and trainings to members in farmer groups in Thailand [65]. This result is consistent with previous studies in Bhutan, and Canada showing that farmer groups act as a knowledge platform and provide access to information and trainings for their members [66,67].

Members and non-members perceived the role of RPCEs as network builders as medium. In the study area, agricultural groups, e.g., RPCEs, cooperatives, and farmer groups, built social networks in the province for reducing transaction costs, facilitating knowledge transfer, enabling the flow of information, and exchanging resources. Research from other regions in Thailand has shown that the RPCE in Uttaraditch province created a network with external bodies [68]. RPCEs with small numbers of members benefit from this network for scale economies achieved in product aggregation through pooling their input procurement with the network. In our study area, some RPCE leaders developed networks with neighboring provinces, e.g., Pitsanulok and Kampheangphet, which benefits all RPCE members. Networking with customers benefits mostly organic farming members and those producing rice for niche markets. Some organic farming members had local customers and contacted them directly at the farm gate. Moreover, RPCEs supported these members in finding customers while waiting for premium market price.

There was a difference in perception regarding the role of RPCEs as income generation enablers, with members perceiving this role more positively. In fact, low input prices can increase the income of all members, but purchasing members' produce at a high price can only increase the income of farmers

who cultivate organic rice and rice for niche markets. In 2018, RPCEs bought the organic Khao Dok Mali 105 for 15 baht/kg while mills purchased it at 10–12 baht/kg. However, some households are reluctant to shift to organic farming because of an unsecure market for this type of rice, which drops yield during the transitional period and uses insufficient household labor [69].

The perception of competition with rivals was also different between the two groups. Agricultural products are competitive when they provide good value for money, quality, and safety in accordance with consumer demand [70]. Production innovation can contribute to organic business development [71]. Some RPCE members prefer cultivating organic rice because of its perceived high quality. Organic rice of RPCEs perceived the Organic Thailand Certification and 5-star OTOP product award. They also favor specific rice varieties, such as Red Jasmine rice, Sinlek rice, and Rice Berry, which are most popular varieties among the health cautious consumers. Furthermore, members prioritize more modern packaging, which can be used not only for household consumption but also for gifts. Meanwhile, non-members perceived that organic rice and rice for the niche market consumption constituted a temporary trend, which is consistent with the prior studies, which showed that farmers had a negative perception of organic farming [69].

Neither members nor non-members perceived RPCEs as providers of credit service, which is linked to the low capacity of RPCEs to lend credit. As pointed out by the study in China, agricultural cooperatives provide very little help with respect to credit facilities for their members [72]. However, when interviewed, some leaders and committees stated that the provision of credits by RPCEs is not necessary and will increase debt to farmers instead of helping them, and that there are already other sources of micro-credit from government programs and commercial banks.

Finally, our findings show that socio-economic factors such as age and education, as well as trust, are the main factors associated with positive perception of RPCEs. The findings suggest that age, education, small size of family, diversity of rice variety cultivated, and trust—in particular moderate and high trust—in RPCEs are significant factors that influence paddy farmers to have a more positive perception of RPCEs.

Individuals' perception and demographic characteristics can be factors of behavioral intention and decision-making [73,74]. Analyzing such characteristics may provide a vehicle for understanding the decision-making process of the people being studied and their resultant production methods. In the findings, older and more highly educated farmers were likely to have a more positive perception of RPCEs. This is consistent with a previous study that showed that older and highly educated farmers were more likely to have a positive perception of soil [75,76]. It can be implied that older and highly educated farmers know more about RPCEs and are more willing to accept new production and marketing styles. Trust is the feeling that one is not being exploited by others [77], and has been found to be crucial in a farmer group context covering members and directors [78,79]. The study found that farmers who have high or moderate trust have a positive perception on RPCEs. Farmers' positive perceptions are of high importance for development of cooperatives [78,80].

5.2. Factors Influencing Farmers' Membership in RPCEs

The results of the quantitative analysis showed that landholding, diversity of rice varieties cultivated, networking with agriculture experts and customers, membership in economic groups, extension service, access to credit, and distance to market were the most significant factors influencing membership in RPCEs.

Land is a basic resource for smallholder farmers. The likelihood of cooperative membership increased among landholders with intermediate levels of assets, called the middle-class effect [54]. However, this effect could be explained by the conditions under which collective action can be effective for landholders [49]. Several studies found a relationship between membership and larger landholdings [3,42,81], but this study showed a negative association. Small farmers are more likely to be RPCE members, which could imply that RPCEs are of benefit to poor farmers; this is in line with

previous studies in Ethiopia and Costa Rica showing that farmers with small landholdings are likely to join cooperatives [49,61].

The probability of RPCE membership increases with the number of rice varieties cultivated. RPCE membership enables farmers to acquire market information on new products in the market. Members are encouraged to cultivate diversity of rice varieties, e.g., rice berries, red brown jasmine rice, and rice for niche markets, in order to offer product varieties to consumers. Similarly to the previous finding, agro-commodity diversification increases the propensity of farmers to join a cooperative [55].

Social networking effects are important for individual decisions, and in the particular context of agricultural innovations, sharing information [82]. In this study, being part of a social network with agricultural experts and customers had a positive and significant effect on RPCE membership. This is consistent with previous research in Ethiopia, where social networks increased the probability of membership in a coffee cooperative [3].

Membership in economic groups (other than rice production RPCEs) also increases the probability of RPCE membership. In economic groups such as food processing and occupational promotion groups, members participate in regular meetings, share their experiences in cultivation and new crop varieties, discuss problems, explore new opportunities for farming and livelihoods, make decisions, plan, and implement other community development programs. This is in agreement with the findings of other studies, which affirmed a positive correlation between group membership and technological uptake [83,84].

Access to extension service is positively associated with probability of membership. Agricultural extension officers are likely to inform and discuss with farmers about the advantages of RPCEs and to affect farmers' decision about membership of an RPCE, a finding that is consistent with the results reported by previous studies that showed that farmers with access to agricultural extension services were likely to be cooperative members [56,60].

Access to credit is very important to small farmers as it helps to diversify their economic base. The more farmers have access to sources of finance, the more likely they are to join RPCEs. Consistently, increase of membership depends on access to credit by farmers in Kenya and Ghana [42,50]. Access to credit services is the main source of finance for medium and lower income households for agricultural production. Farmers are financially empowered if they have access to credit or loans, which help them to adopt modern agricultural technologies [85].

Finally, distance to market was found to be negatively associated with the probability of RPCE membership. Similar findings have been reported for membership of cooperatives in Ethiopia [55], India [62], and Kenya [86]. Farmers located very near to the market are likely to be RPCE members. Farmers in remote areas may prefer selling to traders at lower prices at the farm gate rather than being members of farmer groups.

6. Conclusions and Recommendations

CEs is a form of collective action that employs entrepreneurial activities, local resources, social structures, and networks for improving local people' livelihoods. For almost two decades, the Royal Thai Government has promoted CEs and allocated more resources to support grassroots in joining CEs. The RPCE subgroup constitutes the highest registered number of CEs, but few studies have examined farmers' perception or the factors influencing their perception of and decision to join RPCEs. This study has attempted to establish empirical evidence for the perception of farmers on RPCEs' roles and determinants of farmers' perception and decision to join RPCEs by using survey data from households in Uthai Thani province.

The results show that the socio-economic characteristics of the two groups are similar. However, members had more experience and larger rice farm sizes, while non-members had larger landholdings. Regarding farmers' perception of RPCEs' role, on the whole the perception of the two groups was different. Members and non-members strongly agreed that RPCEs constituted a saving source, but they did not perceive them as a credit provider. There was a disparity in perceptions between the two

groups on supplying farm inputs, knowledge and skill improvement, increasing income, and product competition with rivals. The most significant determinants of farmers' positive perception level were education, diversity of rice varieties cultivated, and high and moderate trust. Furthermore, the most significant factors influencing farmers' decision to join RPCEs were found to be small landholdings, diversity of rice varieties cultivated, networking with agricultural experts and customers, membership in economic groups, extension service, access to credit, and close proximity to market.

Member participation is key to the survival of RPCEs, and securing more benefits for members could in turn improve participation and guarantee sustainable RPCE development. The government should intensify support for RPCEs in order to improve their economic activities in a way that would ensure benefits to members, in particular credit service and supply of members' produce to RPCEs to create income for the group. The negative perception and unsecure market for organic rice and rice for niche markets are the main obstacles blocking farmers from supplying to RPCE groups. The government policy should be production-oriented and make use of participatory training courses, farm visits, on-farm trials to encourage farmers to adopt organic farming, and marketing-oriented endeavors, e.g., price guarantees, standard certification, and promotion of consumption of this rice at both local and country level. Furthermore, government agencies should promote RPCE membership to farmers who have small landholdings, cultivate a diversity of rice varieties, network with agricultural experts and customers, are members of economic groups, have access to extension and credit services, and live near the market. These farmers can access more information and gain more benefits from RPCEs than those with the opposite attributes.

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