Research article

Discussion about A Model in Operation and Accumulation of Joint-Use Fund Management by Rice Farmer-groups

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Abstract Substantial number of rice farmer-groups are established under the promotion of group farming policies in Thailand. The groups voluntarily form joint-use funds and operate their business with them. The objective of this study is to make the model of joint-use fund management by rice farmer-groups with two approaches: 1) observing the characteristics of successful cases in the rice farmer-groups established by two policies in Northeastern Thailand; and 2) simulating a fund management on the groups based on one case group in Khon Kaen province. The case groups established funds using the resources provided by the government. Through operating the group's business, members invest in-cash or in-kind input and pay the service charges into the fund. Then the accumulated capital was used for providing returns to members' investments and scaling-up the groups' business. Based on actual accounting data of one case group, we simulated revolving joint-use fund by rice farmer-group. The result showed that the group assumed to accumulate enough amount of assets to provide sufficient service for all members using the initial fund derived from government support. A conceptual model of joint-use fund management for the rice farmers group was described. The model will be utilized to guide rice farmer-groups in developing their business and becoming independent from government support.

Keywords group farming, community, government support, northeastern Thailand

INTRODUCTION

Small and family-run farms are evaluated as important agents to achieve a stable and sustainable food supply (FAO and IFAD, 2019; FAO, 2014). Generally, in the area where small family farms are dominant, most farmers face challenges to scale-up their business because of land fragmentation and lack of production resources (HLPE, 2013). On the other hand, group farming is one of the major means to improve the productivity of small family farms facing resource constraints. It helps to achieve economies of scale and respond to the external environment. For instance, East Asian countries (e.g. Japan and South Korea) achieved a dramatic improvement in agricultural productivity through spreading group farming (Wong, 1977).

In Thailand, the government adopted group farming concept into agricultural development policies and established many farmer-groups, especially related to rice production. Some studies mentioned that the rice farmer-groups received in-cash and in-kind resource supports from government and operated their business through managing and utilizing joint-use funds (Ohara et al., 2021; Tanaka and Yasunobu, 2019). It is also indicated that a substantial number of groups stopped their operation in the early years because of the difficulty to continue their business

(Uchook, 2018). At present, the joint-use funds are voluntarily operated by members of the groups. However, to the best of our knowledge, there is no manual and/or guideline regarding how such kind of activities have been implemented. Therefore, to suggest a model of handling joint-use fund is supposed to be benefitable for encouraging farmer-groups to continue/expand their business.

OBJECTIVE

We consider a model of joint-use fund management by rice farmer-groups in Thailand through achieving the following objectives: 1) To investigate the characteristics of joint-use fund management among the groups which continuously accumulate the fund; 2) To simulate the cycle of accumulating joint-use fund and scaling-up the business; and 3) To conceptualize joint-use fund management for depicting a model based on the above results.

METHODOLOGY

To achieve the objectives of this study, we adopted the following approaches. First, we explored the actual situation of how rice farmer-groups manage their own business and joint-use fund, with the cases of rice farmer-groups established by the encouragement of policies. Then, we conducted the simulation of revolving joint-use fund based on one case which conducted the lending business of combine harvester and kept its account record, and finally, the conceptual model was induced from the results.

Survey Site Selection

In this study, we selected cases of rice farmer-groups located in Khon Kaen and Ubon Ratchathani provinces in, the Northeastern region. The groups were established under the promotion of two political programs: Community Rice Seed Center (CRSC) and Large Land Plot of Rice (LLPR), proceeded by the Ministry of Agriculture and Cooperatives (MOAC), Thailand.

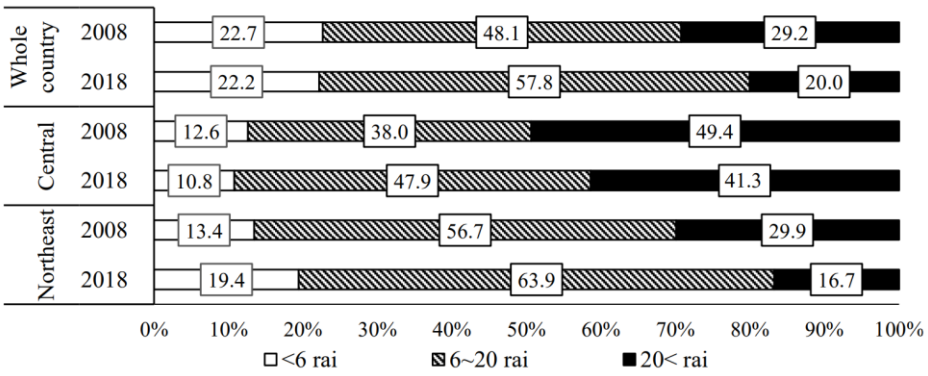

Fig. 1 Changes in the distribution of rice production scale among farmers in Thailand
Source: Author's creation with the data opened at the website of Office of Agricultural Economics, Ministry of Agriculture and Cooperatives, Thailand [https://www.oae.go.th].
Remark) 1 rai = 0.16 ha.

To consider modeling of joint-use fund management, the domain (area and crop) which needs the model is suitable for the target in this study. In Thailand, Northeastern region and Central region are the main production areas of rice. The production scale of rice on each farm in Northeastern region is smaller than Central region and group farming policies aiming at small-scale rice farmers are mainly extended in Northeastern region. Moreover, in Northeastern region, the ratio of large-scale farmers is decreasing in total number of rice producers. Fig. 1 shows the changes in production scale of rice among farmers from 2008 to 2018. At the national level, the ratio of farms operating more than 20 rai (= 3.2 ha, 1 rai = 0.16 ha) decreased from 29.2% to 20.0%

and this tendency was especially clear in Northeastern region; the decrement on the ratio of farms operating more than 20 rai in each region is as follows: whole country, -31%; Central, -16%; Northeast, -44%. From the above, the model proposed by this study will be mainly applied to the field in Northeastern Thailand and it is reasonable to adopt rice farmer-group located in Northeastern Thailand as the cases.

Sampling and Data Collection

Various policies related to group farming have been introduced in Thailand. This study aimed the groups established under two policies targeting rice farmers: Community Rice Seed Center (CRSC) and Large Land Plot of Rice (LLPR).

CRSCs have been established since the beginning of 2000s (1,650 CRSCs was existed in 2016/2017) as a local supplier of rice seed (Orachos, 2018). To cope with the shortage of rice seed certified the quality, Thai government tried to realize the self-supply of rice seed in each rural communities through establishing the groups of rice farmers for engaging the multiplication of certified rice seed provided by the government institutions (Moonfoui et al., 2007). LLPRs are also rice farmer-group targeting to perform the economics of scale on rice production in Thailand. The program was started from 2016 and 3,759 plots were established until March 2022, and about 60% of them were in Northeastern region (DOAE, 2022). The activities of LLPRs are jointly procurement and use of capital, equipment, and materials (e.g., machinery, miller, storage, rice seed, group fund), joint shipment to the contracted miller and produce GAP certified rice or rice seed. Both two policies are promoted by the Rice Department, the Ministry of Agriculture and Cooperatives, and certain number of LLPRs are established based on existing CRSCs.

Surveyed groups were 34 CRSCs (Ubon Ratchathani: 21 in 90 groups, Khon Kaen: 13 in 92 groups), and 4 LLPRs in 48 groups in Khon Kaen province. All groups were sampled randomly. Regarding the case CRSCs, the data was originally used in Tanaka and Yasunobu (2019). Face-to-face interview was conducted for group leaders with structured questionnaire in August and September 2015. The data of case LLPRs included both of which deriving from Ohara, et al. (2021) and which was collected by authors. On our survey, group interview to a few members including leader was conducted regarding how to manage joint-use fund in August 2018 and July 2019.

RESULTS AND DISCUSSION

Exploring Actual Situation of Joint-Use Funds Management among CRSCs and LLPRs

Table 1 shows how CRSCs accumulated their joint-use funds. All groups accumulating more than 100,000 THB (1 Thai Baht (THB) = 0.031 US$, average in 2021) managed their funds more than 10 years. The larger funds have the tendency that the average amount of fund per member is larger. The groups which accumulate and enlarge the funds continuously supposed to succuss increasing the amount of resource which each member can use.

Table 1 Accumulation of joint-use funds among CRSCs

Accumulation class of joint-use fund (unit: THB[*1])	Frequency (N = 19[*2])	Average number of members	Average term of accumulating fund (unit: years)	Average amount of fund (unit: THB)	Average amount of fund per member (unit: THB/member)
~99,999	5	31.0	5.6	49,547	1,411
100,000~149,999	4	35.5	14.5	130,000	4,040
150,000~199,999	6	41.0	13.2	166,417	5,170
200,000~	4	42.0	13.8	282,413	7,859

Source: Reorganized by author with the data treated by Tanaka and Yasunobu (2019).
*Remarks) *1: THB is an abbreviation of Thai Baht (1 THB = 0.031 US$, average in 2021).*
**2: Excluded 8 groups which did not answered amount of fund from 34 surveyed groups.*

Table 2 Activities for input and use of joint-use funds among CRSCs (N=27)

Input to fund	Frequency	Use of fund	Frequency
In kind return of rice seed with interest	18	Loan service	18
Share sales	8	Purchasing materials	13
Membership fee	7	Purchasing seeds from members	12
Resales of provided materials	4	Investment for machinery and facility	8
Machinery use charge	4		

Source: Reorganized by author with the data treated by Tanaka and Yasunobu (2019).
Remarks) Using the data of 27 groups, excluding 7 groups which did not have joint-use fund from 34 surveyed groups.

The activities for accumulating and using joint-use fund among the case groups are itemized in Table 2. All case groups received certain amount of free rice seed as government support. Eighteen groups divided the seed to members and then members return for the dividend in kind with interest after harvesting. Apart from that, some groups collected membership fee or sold shares to members. The groups having machinery provided lending service for members. Regarding use of the funds, the most major use of join-use fund was loan service for supporting members' livelihood. Other ways of using the fund were joint procurement of materials, investment for expanding equipment, and compensation of rice seed sales for members.

On the other hand, in the cases of LLPRs, main income sources were revenue of machinery lending and investment from members through selling share (Table 3). In terms of the share system, 3 of 4 case groups sold group's share to members. The shareholders could get dividend depending on the amount of group's revenue and the number of possessed shares. All case groups provided members with a lending service of machinery leased by the government. The price of lending charge was lower than the charge of private contractors in the area. In case non-members rent the machinery, the charge was higher than the price for members. However, the groups rarely lend machinery to non-members because they did not possess enough number of machines to provide service for all members. To prepare enough amount of machinery and equipment, and provide services without competition, groups need to revolve their initial fund deriving from government support and to accumulate joint-use fund for capital investment. In contrast to CRSCs, no LLPRs provided loan service to members. Since LLPRs have operated for a few years, they did not have enough amount of fund to launch financial business.

Table 3 Accumulation and use of joint-use funds among LLPRs

		Group A	Group B	Group C	Group D
Number of members		200	67	204	52
Govt. support	Free lending of machinery	1 trailer 2 harvesters	1 tractor 1 harvester 1 trailer 1 drill seeder	1 drill seeder 1 harvester	4 drill seeders
	Provision of rice seeds (2016~2019)	KDML105[*1]: 15 t RD6[*1]: 8.6 t	KDML105: 13 t RD6: 2 t	KDML105: 2.25 t RD6: 15 t	KDML105: 30 t RD6: 150 t
Input to fund		Share sales Rice sales Machine use charge	Share sales Rice sales Machine use charge	Share sales Rice sales Machine use charge	Seed sales Machine use charge
Use of fund		Running cost[*2] Dividend of share Reward of committee	Running cost Dividend of share Reward of committee	Running cost Dividend of share Reward of committee Community welfare	Running cost Reward of committee Machinery purchase[*3]

Source: Reorganized by author with the results of Ohara et al. (2021) and the survey in 2018 and 2019.
*Remarks) *1: KDML105 and RD6 are the name of rice variety. KDML105 is non-glutinous variety, and the variety is labeled "Jasmin rice" in market. RD6 is glutinous variety which is popularly eaten in Northeastern Thailand.*
**2: "Running cost" include maintenance of machinery, petrol, wedge for driver and miscellaneous expenses.*
**3: Group D purchased 9 drill seeders with their own fund in 2017.*

Simulation of Revolving Joint-Use Fund on Lending Combine Harvesters

We simulated revolving joint-use fund with the experience of lending combine harvester in one LLPR case (group A) and showed the path to accumulate joint-use resource enough to provide services for all members. The reasons why we choose LLPR as the case of this simulation include: LLPRs focus on joint-use of production resources, but CRSCs' main purpose is self-supply of rice seeds and LLPR program was started later than CRSC, we could collect the detailed information about initiation of revolving joint-use fund. The information was useful for simulating from the point of receiving subsidies. Among four cases of LLPRs, we could get detailed account data just from group A; in the cases of group B, C and D, we could not collect it because of missing some important records of bookkeeping.

Table 4 Simulation of revolving joint-use fund based on the case of group A

Items (Unit from (1) to (8): THB[*1])	1st year[*2]	2nd year	3rd year	4th year	5th year
Number of operated combine harvesters	2	2	3	4	5
Harvested paddy area by group's combine harvester[*3]	400	400	600	800	1,000
Unit: rai (% in 1,000 rai[*1] = total registered area)	(40%)	(40%)	(60%)	(80%)	(100%)
(1) Total income	324,550	284,550	386,825	489,100	611,375
Rice sales[*4]	60,000	40,000	20,000	0	0
Investment from member	20,000	0	0	0	0
Revenue of lending combine harvester[*5]	244,550	244,550	366,825	489,100	611,375
(2) Total cost	96,728	96,728	133,516	170,305	207,094
Running cost for lending combine harvester[*5]	73,577	73,577	110,365	147,154	183,943
Reward for committee members	15,400	15,400	15,400	15,400	15,400
Meeting	5,193	5,193	5,193	5,193	5,193
Miscellaneous expenses	2,558	2,558	2,558	2,558	2,558
(3) Dividend for shareholders[*6]	29,400	29,400	46,662	63,759	80,856
(4) Benefit: (1) – (2) – (3)	198,422	158,422	206,647	255,036	323,425
(5) Amount of fund at the beginning of FY	0	198,422	106,844	63,491	68,527
(6) Amount of fund at the end of operation: (4) + (5)	198,422	356,844	313,491	318,527	391,952
(7) Cost for purchasing combine harvester	0	250,000	250,000	250,000	0
(8) Balance of fund at the end of FY[*7]: (6) - (7)	198,422	106,844	63,491	68,527	391,952

Source: Reorganized by author with the results of the survey in 2018 and 2019.

*Remarks) *1: 1 THB = 0.031 US$ (average in 2021). 1 rai = 0.16 ha.*

**2: 1st year's data is based on the actual account information of group A in 2017/18. The cost-benefit data from 2nd to 5th year is estimated based on the data of 1st year.*

**3: On the simulation, volatility of harvested area caused by disasters or/and crop failures is not considered. Average area of each registered plot is 5 rai and most of them are a part of each member's operated paddy. In case member's total harvested area is diminished because of disasters or/and crop failures, The area rolled by group's combine harvesters is supposed not to be affected since members can use the harvesters for their paddy plots other than registered one.*

**4: The government provide LLPRs rice seed for 3 years and the amount is gradually decrease. On the simulation, it is assumed that the group gets rice for sale from members as the return for providing rice seed provided by the government. Therefore, the amount of "Rice sales" gradually decreases from 1st to 3rd year and does not account from 4th year.*

**5: Regarding "Revenue of lending combine harvester" and "Running cost for lending combine harvester", the amount is assumed to change proportionately to "Harvester paddy area by group's combine harvester" based on the 1st year's data. The value rates are as follows; "Revenue of lending combine harvester": 611 THB/rai, and "Running cost for lending combine harvester": 183 THB/rai (including petrol cost, wage for operator, insurance, and maintenance fee). Both of values were actual data of group A in 2017/18.*

**6: "Dividend for shareholders" is estimated based on the following calculation. When the group established, all members purchased 1 share (100 THB / share) and they receive dividend form the group's revenue equally. The amount of dividend was 20 % of the balance between "Revenue of lending combine harvester" and "Total cost" = (2).*

**7: "Balance of fund at the end of FY" = (8) is entirely carried forward as "Amount of und at the beginning of FY" = (5).*

As shown in Table 4, group A had 200 members and 1,000 rai registered paddy field (5 rai for each member). Each combine harvester assumed to roll 200 rai in one fiscal year and the cost of purchasing one combine harvester was set 250,000 THB. If the fund accumulated more than 250,000 THB, the group shall purchase an additional combine harvester. The goal of this

simulation is to prepare the number of combine harvesters which is enough to harvest on all registered paddies. Based on the above assumptions, the group can independently continue its function after the withdrawal of government supports. The group purchased combine harvester and expanded its business from third fiscal year. When the number of combine harvester reach to five, the group achieved to prepare enough number of combine harvesters for providing all members with a lending service.

Conceptual model of Joint-Use Fund Management in Rice Farmers-group

Based on the observation of actual cases and the simulation of revolving joint-use fund, we induced a conceptual model of joint-use fund accumulation by rice farmer-group (Fig. 2).

This model was formed on the precondition which farmer-group receive an initial provision of goods (e.g., free lease of machinery, rice seed, fertilizer) from the government. Group members bring in-cash and in-kind inputs as investments (share purchase or membership fee) and charge of services (machinery charge or in-kind return for seed provision). Accumulated capital on the fund is used for providing returns to members (lending machinery, joint procurement of rice seed, dividend for members who hold shares).Through this input-use cycle, the group keeps enlarging their fund even after finishing the 3 years provision of materials from the government and success to accumulate enough amount of fund (including cash and fixed assets) to provide sufficient returns for all members.

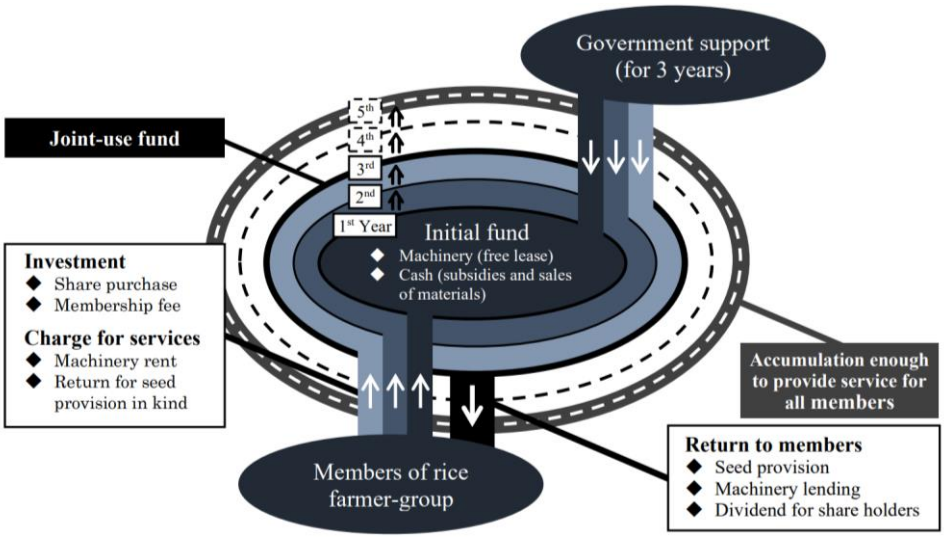

Fig. 2 Conceptual model of revolving joint-use fund by rice farmer-group

CONCLUSION

The aim of this study is to simulate a model for the joint-use fund management using cases of rice farmer-groups located in Northeastern Thailand.

We found both of rice farmer-group (CRSCs and LLPRs) managed joint-use fund through the cycle of input/use. The groups provided services to members with the resources provided by the government and investments from members. A revenue generated by the group was accumulated as a joint-use fund and used for dividend to members, running cost, and capital investment. We simulated this management cycle of joint-use fund with the account information of one LLPR group in 2017. The result of the simulation showed that the group can increase the amount of joint-use fund and the scale of operation in terms of machinery rental service to members. From the third year, the group became to keep running their operation without government support, and in the fifth year, the group can scale-up their operation enough to provide service for all members.

From the simulated result, we depicted a conceptual model of joint-use fund management on rice farmer-group. The figure showed that farmer-groups form an initial fund with resources provide by government. Through revolving the input-use cycle with the initial fund, the groups keep enlarging the size of join-use fund even after reducing government support and achieve to accumulate joint-use fund enough to provide sufficient service for all members. This discussion showed the potential path in which famer-groups could become independent from government support through voluntary joint resource management.

However, the result should be refered with a limitation in mind. In this study, the sample size was not enough to represent the whole situation of rice farmers groups. In addition, simulating revolving joint-use fund was just conducted with regard to lending service of combine harvester. The simulation also had the limitation related to a reliability of result because the conditions were assumed based on just one case of LLPRs. From the above, the conceptual model still stands on many assumptions.Therefore, further studies are required considering more cases of rice farmer-group on top of including other activities contributing for accumulation of joint-use fund.

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