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Comparison of cost and return between paddy production and rice seeds production of Ban Na Ngam rice mill community enterprise in Chachoengsao province of Thailand

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Abstract The rice production classified to produce paddy for sale and consumption and grow rice to produce rice seeds. When comparing the cost of return of both productions, it was found that the rice seed production members had an average income net was 4,995.90 baht per rai, an average profit net was 3,496.04 baht per rai and an average cost net was 1,499.66 baht per rai. The paddy production members had an average income net of 4,234.11 baht per rai, an average profit net of 1,943.89 baht per rai, and an average cost net of 1,943.89 baht per rai. The information showed that the rice seed production member had an average cost net at a lower level than the cost net of the paddy production member. Most of the production costs come from the variable costs with the higher level of proportions for both members, except the variable costs that the paddy production members had the higher level from the spending on chemical pesticides.

Keywords: Costs and return, Rice seeds, Community enterprise

Introduction

Rice is an economic plant and a vital food cultivated in almost countries of the Asia continent including Thailand, (Access to Seeds Foundation, 2016). In formal times, the important role of rice in Thai people's lifestyles was focusing on rice planting for consuming or exchanging with other factors to our living only (Pongsrihadulchai, 2018). However, nowadays rice farming has the new goal of consumption in households to be selling increasingly (Lucky Agriculture. 2018). Thailand has been the big rice exporter since 1851 (Siamwalla, 1975); unfortunately, in 2019 we had the least level of production in ten years with only twenty-four million tons or reducing thirty-six percent when compared to 2011 producing thirty-eight million tons (Statista, 2020). Therefore, it has been seen that nowadays Thailand is facing rice production problems with many factors affecting reducing production capacity, especially from the crisis of

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Corona Virus-19, the economic problem and another significant factor or the quality of rice species problem.

The scarcity situation of rice seeds in Thailand represented an insufficient production problem with the agriculturist requirements (Rice Department, 2012). Besides, it specified that recently the produced certified rice seeds were gradually reduced (Rice Department, 2014). According to the information of Rice Seed Center (2018), it was found that there was a demand for rice seeds of approximately 1.117 million tons and it had a supply of approximately 0.42 million tons or about 35 % of all rice seed demands (Schöley and Padmanabhan, 2016). In this case, the Rice Department has established the Rice Center with the concept idea to gather agriculturists in nearby areas for producing rice seeds to sell in the communities. Therefore, it can not only solve the scarcity problem of rice seeds, but the agriculturists can also gain increasing incomes from selling good rice seeds instead of selling for the paddies (Rice Seed Center, 2017). In the same way, nowadays the Thai government has given importance to this subject increasingly by handling the supporting budgets for the seeds amounting to million baht (Department of Agricultural Extension, 2016). However, although nowadays there is good promotion of rice seeds, this problem is still the significant one for culturists, (Napasintuwong, 2018a; Schöley and Padmanabhan, 2016; Louwaars and de Boef, 2012), especially in 2018-2019 that Thailand couldn't maintain for the Thai rice champion position. Then, to the above information it has seen that in 2018 our Thai Jasmine Rice was in the second rank while Malee Rice of Cambodia grasped the first rank and next, in 2019 Lokjei Rice of Vietnam would be topped up as the first rank instead, (Bangkok Insight, 2019). Therefore, the main cause was the lack of good rice seed development and lack of good quality development until it has seen that most agriculturists can't produce for good rice seeds to use in their households, (Napasintuwong, 2018b) including the lacking of knowledge to the rice seed production by using the complex procedure based on the higher budgets than planting for the common paddies. Therefore, it resulted in the agriculturists facing the scarcity problem of good quality rice seeds until gaining low productivity with the bad quality and low prices, except for the high production costs, (Olayide and Heady, 1982; Osagie, 2014).

The rice seed problem for the big and small farmers, it represented that the small farmers always face this problem more than the big farmers without the price negotiation power from the sellers with the production factors. However, it can solve this problem when many agriculturists have gathered up in the group of the community enterprise, (Ohen and Ajah, 2015). Produce quality products at a low cost by developing quality rice seeds. In this case, it refers to the Ban Na Ngam rice mill community of Sanam Chaikhet district in Chachoengsao province or the first rank in rice seed production, such as Thai Jasmine Rice 105 in Eastern Thailand. What's

more, the leaders of the community enterprise still have experience in rice seed production for a long time with a high level of capacity (Kaewphrakob, 2020).

Therefore, good rice seed production depends on the difficult step procedure with more delicateness than normal paddy production. In this case, it results in a higher level of rice seed selling prices than the normal paddies. For example, the rice seed price of Thai Jasmine 105 is at 26 baht per kilo and the paddy price of Thai Jasmine is at 15 baht per kilo. Additionally, the different results between them were 11 baht per kilogram (Seed Research and Development, 2020). However, there are many agriculturists with the seed who still face high costs productivity problems and most of them still lack the return costs information to decide on the investment or the production alternation. Thus, the analysis of costs and returns becomes a significant tool for deciding to aid the agriculturists in solving the practice problem (Lessley *et al.*, 1991). In the same way, it is involved with the important standard for determining the production effectiveness to the agricultural costs, (Ciaian *et al.*, 2013).

With this case, it can assist the agriculturists to decide for solving with the risk problems in agriculture production, (Netayarak, 2007; Thongpan, 2013) including of a higher level of total return to make the reducing costs production with the agricultural competition ability and the agricultural system development (Ciaian *et al.*, 2013) and finally, this information would be beneficial to the agricultural promotion further. Therefore, the object was to compare the costs and returns between paddy production and rice seeds production of Ban Na Ngam rice mill community enterprise members in Sanam Chai Khet district from Chachoengsao province.

Materials and methods

This study used quantitative research. The structured questionnaire survey was conducted with an interview from 22 Ban Na Ngam rice mill community enterprise members in Sanam Chaikhet district from Chachoengsao province during August to October 2021. We classified into two groups, the good standard rice seeds members in the rice seed production project which was tested by the Rice Department using for purposive sampling with 11 people and the paddy members for selling into the mill with 11 people. The questionnaire included information on costs and the returns of the rice production of agriculturists (Chachoengsao Provincial Office, 2019). Moreover, economic and social conditions for the community enterprise members of the Ban Na Ngam rice mill community in the Sanam Chaikhet district of Chachoengsao province. Other information included getting data on genders, ages, education levels, conditions, member numbers in households, experiences in rice production, durations of member group participation, laboring of rice production per season, agricultural area and water usage with other factors.

Data were analyzed using descriptive statistics for explaining the economics and social condition information for Ban Na Ngam rice mill community enterprise members in Sanam Chaikhet district for Chachoengsao province including using T-Test of independent t-test by making a comparison of costs and returns for the paddy and the rice seed production.

Results

Ban Na Ngam rice mill community enterprise is located in Tha Kradan sub-district, Sanam Chaikhet district, Chachoengsao province, Thailand. The enterprise had 22 members, 11 of which were paddy produce members and 11 rice seeds produced. The enterprise's main objective was to share and exchange common knowledge on rice production and management. The enterprise combined the rice yield of Khao Dawk Mali 105 (KDML 105) from all its farmer members**.** The enterprise members used rice seeds allocation from the enterprise and kept rice seeds after harvest. The rice seeds are not of good quality resulting in a small amount of paddy production. The enterprise therefore produced quality rice seeds under the knowledge and monitoring of the Rice Department. But not all members produce rice seeds.

Information on economics and social conditions for Ban Na Ngam rice mill community enterprise members

The information on the economics and social conditions of Ban Na Ngam rice mill community enterprise members is shown in Table 1. The personal information of the agriculturists or the rice seed production members is related to genders, ages, incomes and statuses. Moreover, it was found that most of them were female 63.6 % and ages between 51 – 60 years 63.6 % including marrying and graduating from primary school 81.8 % together with living with 3-4 family members in the household 45.5 %, attaining the rice farming experiences for 10 – 15 years with 27.3 %, gaining the incomes in agriculture works per year for more than 30,001 baht with 63.6 % and occupying for totals land ownership as 21 – 30 rai or with 54.5 %.

In the personal information of the paddy production members, it was found that most of them are female at 54.5 % and ages between 51 – 60 years at 72.7 % including being in married status at 90.0 % and graduating from primary school at 81.8 % together with living with 3-4 family members in the household with 54.5 %, attaining the rice farming experiences for 10 – 15 years with 36.4 %, gaining the incomes in agriculture works per year for more than 30,001 baht with 45.5 % and occupying for totals land ownership as 21 – 30 rai or with 45.5 %.

Table 1. Information on economics and social conditions for Ban Na Ngam rice mill community enterprise members

General Characteristic	Members of Rice Seed Production		Members of Paddy Production	
	Frequency	%	Frequency	%
Gender				
Male	4	36.4	5	45.5
Female	7	63.6	6	54.5
Age (Year)				
41-50 years old	3	27.3	1	0.1
51-60 years old	7	63.6	8	72.7
More than 61 years old	1	9.1	2	18.2
Education Level				
Grade 1-3	9	81.8	9	81.8
Grade 4-6	1	9.1	0	0.0
Grade 7-9	0	0.0	0	0.0
Grade 10-12	1	9.1	2	18.2
Status				
Single	1	9.1	0	0.0
Married	9	81.8	10	90.9
Divorced	0	0.0	1	9.1
Widowed	1	9.1	0	0.0
Member Numbers as the Laborer in Household (People)				
1 – 2 People	3	27.3	2	18.2
3 – 4 People	5	45.5	6	54.5
4- 5 People	3	27.3	2	18.2
More than 5 People	0	0.0	1	9.1
Incomes of Agricultural Field Per Year				
Below 10,000 Baht	0	0.0	1	9.1
10,001 – 15,000 Baht	0	0.0	0	0.0
15,001 – 20,000 Baht	0	0.0	0	0.0
20,001 – 25,000 Baht	1	9.1	2	18.2
25,001 – 30,000 Baht	3	27.3	3	27.3
More than 30,001 Baht	7	63.6	5	45.5
Totals Land Ownership				
Below than 10 Rai	0	0.0	1	9.1
11 – 20 Rai	5	45.5	3	27.3
21 – 30 Rai	6	54.5	5	45.5
More than 31 Rai	0	0.0	2	18.2

Costs information and incentives for rice

The costs and incentives of rice farming are shown in Table 2. The data analysis of Ban Na Ngam rice mill community enterprise members in Sanam Chaikhet district from Chachoengsao province totaling twenty-two people. It can be classified into two groups that are the good standard rice seeds members in the rice seed production project tested by rice. The department used purposive sampling with eleven people and the paddy

members for selling into the mill by using simple randomization with eleven people totaling twenty-two people with the cost categories:

Table 2. Costs and incentives of rice farming for Ban Na Ngam rice community enterprise members (Unit: Baht per rai)

Programs	**Rice Seed Production Member (n = 11)**		**Paddy Production Member (n = 11)**	
	Baht	**%**	**Baht**	**%**
Fixed Costs				
Land Rent Costs	66.19	93.8	87.60	19.6
Equipment and Machine Costs	-	-	270.50	60.6
Land Tax Costs	4.38	6.2	0.46	0.1
Totals Fixed Costs	70.57		446.62	
Variable Costs				
Manure Costs	22.23	1.6	14.02	0.8
Chemical Fertilization Costs	-	-	-	-
Organic Fertilization Costs	235.57	16.5	106.52	5.8
Seed Costs	-	-	87.92	4.8
Chemical Pesticide Costs	127.02	8.9	256.65	13.9
Labor Costs	841.60	58.9	1,128.34	61.2
Oil Costs	125.35	8.8	250.15	13.6
Water or Electric Costs	-	-	-	-
Equipment and Machine Fixing Costs	77.32	5.4	-	-
Totals Variable Costs	1,429.09		1,843.60	
Totals Costs	1,499.66		2,290.22	
Totals Incomes	4,995.90		4,234.11	
Average Productivity (Kilo per Rai)	356.85		312.25	
Productivity Price (Baht per Kilo)	14.00		13.56	
Profit Net	3,496.24		1,943.89	

The comparison of the costs and incentives with the rice farming of Ban Na Ngam rice mill community enterprise members in Sanam Chaikhet district from Chachoengsao province is shown Table 2. It was found that the rice seed members had an average income net of 4,995.90 baht per rai, an average profit net of 3,496.04 baht per rai and an average costs net of 1,499.66 baht per rai; namely, the fixed costs and the variable costs. In this case, the average fixed cost net was 70.57 baht per rai and the average variable costs net was 1,499.66 baht per rai, respectively. In the same way, the average fixed costs net of 70.57 baht per rai. It is comprised of the land

rent costs at 66.19 baht per rai at 93.8 % and the land tax costs at 4.38 baht per rai or 6.2 %. The average variable costs net with 1,499.66 baht per rai it is comprising of manure costs with 22.23 baht per rai or with 1.6 %, the organic fertilizer costs with 235.57 baht per rai or with 16.5 %, the chemical pesticides with 127.02 baht per rai or with 8.9 %, the labor costs with 841.60 baht per rai or with 58.9 %, the oil costs with 125.35 baht per rai or with 8.8 %, the fixing of equipment and machines with 77.32 baht per rai or with 5.4 %, respectively.

Similarly, according to the costs and the incentives with the rice farming of Ban Na Ngam rice mill community enterprise members in Sanam Chaikhet district from Chachoengsao province. It was found that the paddy members had an average income net was 4,234.11 baht per rai, an average profit net of 1,943.89 baht per rai and an average costs net of 2,290.22 baht per rai; namely, the fixed costs and the variable costs. In this case, the average fixed cost net was 446.62 baht per rai and the average variable costs net was 1,843.60 baht per rai, respectively. In the same way, the average fixed costs net with 446.62 baht per rai it was comprised the land rent costs at 87.60 baht per rai at 19.6 %, the equipment and the machine cost with 270.50 baht per rai with 60.6 % and the land tax costs with 4.06 baht per rai or with 0.1 %. The average variable costs net was comprised the manure costs at 14.02 baht per rai or 0.8 %, the organic fertilizer costs at 106.52 baht per rai or 5.8 %, the rice seed costs at 87.92 baht per rai or 4.8 %, the chemical pesticides with 256.65 baht per rai or with 13.9 %, the labor costs with 1,128.34 baht per rai or with 61.2 %, the oil costs with 250.15 baht per rai or with 13.6 %, respectively.

Table 3. Making a comparison between costs and incentives for the paddy and the rice seed production of the rice mill community enterprise members

Program	Group Sampling Number		Rice Seed Production Member		Paddy Production Member		t	Sig.
	n_1	n_2	$\bar{X}$	S.D.	$\bar{X}$	S.D.		
Production Costs	11	11	1,499.66	0.499	2,290.22	0.580	3.226*	0.003
Productivity	11	11	356.85	0.690	312.25	0.596	2.146*	0.012
Incomes	11	11	4,995.90	0.614	4,234.11	0.723	5.543**	0.001
Price	11	11	14.00	0.726	13.56	0.583	0.621	0.534
Profit Net per Rai	11	11	3,496.24	0.495	1,943.89	0.621	3.098*	0.012

* With statistical significance in the level of .05 ** With statistical significance in the level of .01

Comparison between costs and incentives for the paddy and the rice seed production

The comparison of the costs and the incentives with the rice farming of Ban Na Ngam rice mill community enterprise members in Sanam Chaikhet district from Chachoengsao province. It was found that all costs of the rice seed production members were in the lower values from the paddy production members with statistical significance in the level of 0.05, except the productivity, the incomes, the price and the profit net per rai to have the productivity quantities in the higher level with statistical significance in the level of 0.05, 0.01, 0.05 and 0.05 (Table 3).

Discussion

According to the cost information and incentives analysis, it was found that most of the production costs come from the variable costs with the higher proportions for both members, except the variable costs that the paddy production members had the higher level from the spending of chemical pesticides. Besides, it may result from the problem of the bad quality in the paddies including the incomplete soil adjustment before starting the new farming season. It conforms with the research of Raufu (2014) claiming that the soil adjustment before new farming can level up the nutrients in the soil for gaining increased productivity. When considering the total costs, it was found that the costs of rice seed production were at a lower level than the total costs of the paddy production, except for the productivity, the income, the price and the profit net per rai.

Most of the production costs have variable cost proportions more than the fixed costs conforming to the research of Chiaothamai (1992) including of Phantharat (2004), Sanukit (2010), Phakphanit (2012), Sieubsane (2013) and Inoko (1984). Another reason, the productivity of the rice seed production was at a higher level because the members have a good selection procedure for the quality rice seeds, such as a good rice plot selection with the same specie to grow without diseases or insects before picking up the good seeds per ear of rice directed to each specie. After that, it will bring the ear of rice is to be kneaded or dried approximately for 1-2 days with a density of approximately 14 % and contained with seeds in ventilated containers, such as cloth bags and sags and other containers. In this case, there was the productivity percent at a higher level than the paddy production members; thus, it is conforming to the research of Phaktraharn and Suriya (2020) that Thansirin rice with seed production and Thansirin rice with paddy production had the productivity per rai with 353.92 kilograms per rai and 432.22 kilograms per rai. In this case, it has been seen that the productivity per rai of Thansirin rice with seed production was at a lower level than the paddy pattern due to the separation with the unsuitable weight and bad quality. In the same way, it conforms to the research of Srisurin *et al.* (2018) that the profit net of the rice production for the

Korkhor 10 species was 705.54 baht per rai, so the average profit net was at a lower level than Thansirin rice in paddy production. Furthermore, this result conforms to the research of Pokpong and Morphorphor (2009) that the average productivity per rai of the paddy production was at a lower level than the rice seed production, except for the total costs, the variable costs and the total costs with cash to be in the higher level. As a result, it represents that the paddy production has gained fewer incentive values than the rice seed production due to the lower productivity than the total costs, the variable costs, and the total costs with cash.

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