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THE INFLUENCE OF RAISA TECHNOLOGY APPLICATION ON FARMER'S INCOME IN MUARA TELANG DISTRICT OF BANYUASIN REGENCY, INDONESIA

Utari Natasha Nabila Kintan*, Andy Mulyana, Wulan Sari Dwi

Department of Agribusiness, University of Sriwijaya, Indonesia

*E-mail: nabila.kintan@gmail.com

ABSTRACT

The purpose of this research was to analyze the influence of RAISA technology application on Farmer's Income in Muara Telang District, Banyuasin Regency; This research conducted in Telang Makmur, Telang Rejo and Sumber Hidup Village, Muara Telang District. The method used was the survey method. Total of respondent in this research was 240 farmers in 3 villages which divided into two groups (farmers that applied RAISA technology and conventional farmers). The analysis method was using Farming Analysis. The result was the application of RAISA technology had significant impact on Farmer's income in Muara Telang District. Based on farming analysis, farmers that used RAISA technology had higher income than conventional farmers.

KEYWORDS

Paddy, cooperators, conventional, socio-economics, tidal land.

Based on Rachmawatie (2020), the government nowadays is intensively implemented programs to increase the agricultural output capacity especially in rice production, because the demand of rice as one of the main food sources and the highest energy supplies in Indonesia. In addition, increasing rice production was also to improved welfare by increasing farmers' income. For realization, sub-optimal land can be used, like tidal or swamp land, but the use of the land in various areas has not shown optimal result (Nugroho *et al*, 2016). In order to overcome these obstacles, based on the Suwanda *et al* (2014) which discussed the used of tidal land in various areas, it still doesn't showed optimal results. To actualize that, Balai Pengkajian Teknologi Pertanian (BPTP) has been doing a lot of research and dissemination of specific site agricultural technology by creating compatible and synergistic technology packages, one of the research results was RAISA Technology. RAISA was an enhanced technology package specifically for tidal land, component of technology draws from integrated and resource management (PTT) but became super and actual because used latest innovation to support increased productivity by look after the sustainability and land's quality in the future (Widyantoro, 2019). This technology has been done in various areas in Indonesia; one of those areas was in Banyuasin Regency. This technology was applied in Banyuasin Regency for the first time in Tungkallir District in 2019 and in Muara Telang District in 2020. Based on that description, the researcher was interested to see how the influence of RAISA technology application in increase farmers' income, this research conducted in Telang Makmur, Telang Rejo and Sumber Hidup Village, Muara Telang District.

METHODS OF RESEARCH

This research conducted in Telang Makmur, Telang Rejo and Sumber Hidup Village, Muara Telang District. The location of this research was chosen intentionally (purposive sampling) by considering Muara Telang District as the latest assisted by government, extension and Balai Pengkajian Teknologi Pertanian (BPTP), and has the most rice farmers who used RAISA technology. Data collection in the field has been carried out from March 2022 until completed. Method that used in this research was survey method, carried out directly to the research location and interviews with farmers.

The sampling techniques in this research was *Disproportionate Stratified Random Sampling*, this sampling technique was because the respondent population were not



homogeneous and stratified which means not proportional in determining the sample. Total of respondent in this research was 240 farmers in 3 villages which divided into two groups (farmers that apply RAISA technology and conventional farmers).

Table 1 – Number of Samples and Proportion of each village

No	Village	Populations (person)		Σ Sample(person)		Percentage (%)	
		Cooperators	Conventional	Cooperators	Conventional	Cooperators	Conventional
1	Sumber Hidup	527	158	40	40	76,9	23,1
2	Telang Makmur	485	168	40	40	74,3	25,7
3	Telang Rejo	433	115	40	40	79	21
Total		1445	441	120	120		

Source: Primary data, 2021.

Data collected in this research was primary data and secondary data, primary data through direct observation and interviews with farmers based on questionnaire, secondary data obtained through library researched. Analysis method that used in this research to analyze the influences of RAISA technology application in farmer's income was farming analysis.

Farming input data included all costs incurred in rice farming, both fixed and variable costs. While the output of the results obtained, revenue that calculated the amount of the results obtained multiplied by selling price. Fixed costs was costs that didn't depend on the amount of production and not exhausted in one growing season, calculated in rupiah units per hectare per season. In this research, fixed costs consisted of Hoes, Machetes, Sickles, Slashing Machines, and Hand Sprayers. Fixed costs incurred for depreciation of tools used in farming. The formula used in calculating depreciation was:

$$\text{Depreciation of Equipment} = \frac{\text{Purchase value} - \text{Residual Value}}{\text{Economic Age}}$$

Variable costs was costs incurred in rice farming for the purchase of all production facilities consists of seeds, pesticides, fertilizers, ameliorants, sacks, rental of agricultural machinery (tractors, combine harvesters, etc), and operational wages for agricultural machinery.

The data that has been collected was tabulated and analyzed descriptively using farm analysis which includes:

- Cost Analysis:

The total cost (TC) incurred by farmers in rice farming was calculated by adding total fixed costs (TFC) with variable Costs (TVC) with following formula:

$$TC = TFC + TVC$$

Where: TC = Total Cost (Rp/Ha); TFC = Total Fixed Costs (Rp/Ha); TVC = Total Variable costs (Rp/Ha).

- Revenue Analysis to determine total revenue (TR):

Total Revenue was the total amount of production multiplied by the selling price of the production unit obtained by the farmer in carrying out rice farming using the following formula:

$$TR = Y \times P_y$$

Where: TR = Total Revenue (Rp/Ha); Y = Amount of Production (Kg/Ha); P_y = Production Price (Rp/Kg).

- Income Analysis:

Revenue was total revenue (TR) minus total costs (TC) using the following formula:

$$\pi = TR - TC$$



Where: π = Farmer's Income (Rp/Ha); TR = Total Revenue (Rp/Ha); TC = Total Costs (Rp/Ha).

There was an effect of the application of RAISA technology on farmers' income if the results of the farm analysis of tidal rice farming carried out by farmers that applied RAISA technology were greater than conventional farmers.

RESULTS AND DISCUSSION

Rice farming in the tidal land was the main livelihood for farmers in Muara Telang district in earning income to fulfill the daily needs of their families. Farmers needed costs to run their farms, production costs were all costs incurred by farmers in tidal rice farming activities starting from the preparation of tools to the process of harvesting rice until it was ready to marketed (Pradnyawati *et al*, 2021). In this study production costs consist of fixed costs and variable costs.

Fixed costs was costs that didn't depend on the amount of production and not exhausted in one growing season, calculated in rupiah units per hectare per season. Fixed costs consisted of Hoes, Machetes, Sickles, Slashing Machines, Hand Sprayers and paranet. Fixed costs incurred for depreciation of tools used in farming.

Table 2 – Average Fixed Costs of Rice Farmers that applied RAISA technology (cooperators) and Conventional Rice Farmers (non-cooperators) in Tidal Rice Farming Muara Telang District, 2022

No	Fixed Costs	Cooperators (Rp/Ha)	Conventional (Rp/Ha)	Fixed Difference (Rp/Ha)	Costs	Percentage of (%)
1	Telang Makmur Village	2.143.480,91	2.020.884,72	122.596,19		5,7
2	Telang Rejo Village	2.076.100,15	1.360.692,71	715.407,44		34,5
3	Sumber Hidup Village	2.756.361,67	2.145.262,48	611.099,19		22,2

Source: Data Analysis, 2022.

Based on table 2, fixed costs by farmers that applied RAISA technology was different with fixed cost that conventional farmers used. it can be seen that the used of fixed costs by farmers that applied RAISA technology was higher than conventional farmers, which was 6% in Telang Makmur village, 34% in Telang Rejo Village and 22% in Sumber Hidup Village. Depreciation of equipment in fixed costs depended on usage age in each area of farmers land. So it can be concluded that fixed costs was depended on number of tools used in farmer's land area and wide of area that cultivated by farmers (Siagian *et al*, 2019).

Variable costs in this research were costs that incurred by sample farmers to paid production input and services that was used in one production season. Variable costs was costs incurred in rice farming for the purchase of all production facilities consists of seeds, pesticides, fertilizers, ameliorants, sacks, rental of agricultural machinery (tractors, combine harvesters, etc), and operational wages for agricultural machinery. The details of variable costs in each village can be seen in table 1.3 below.

Table 3 – Average Variable Costs of Rice Farmers that applied RAISA technology (cooperators) and Conventional Rice Farmers (non-cooperators) in Tidal Rice Farming Muara Telang District, 2022

No	Variable Costs	Cooperators (Rp/Ha)	Conventional (Rp/Ha)	Variable Difference (Rp/Ha)	Costs	Percentage (%)
1	Telang Makmur Village	6.133.275,05	5.195.210,57	938.064,48		15,3
2	Telang Rejo Village	6.308.208,22	4.821.737,98	1.486.470,24		23,6
3	Sumber Hidup Village	6.486.681,34	5.479.660,78	1.007.020,56		15,5

Source: Data Analysis, 2022.



Variable costs was depended on amount of production input used in farmer's land area and the wide of area that cultivated by farmers. The greater area that by farmers used, the greater costs of production input needed. Based on table 1.3 Variable costs by farmers that applied RAISA technology was different with variable costs that conventional farmers used. it can be seen that the used of variable costs by farmers that applied RAISA technology was higher than conventional farmers, which was 15% in Telang Makmur village, 24% in Telang Rejo Village and 16% in Sumber Hidup Village. This happened because basically the used of RAISA technology required more production inputs than conventional methods, which farmers used more amount fertilizers than conventional method did, moreover farmers that applied RAISA technology used ameliorant and pesticides more than the conventional farmers did.

Table 4 – Average Total Costs of Rice Farmers that applied RAISA technology (cooperators) and Conventional Rice Farmers (non-cooperators) in Tidal Rice Farming Muara Telang District, 2022

No	Total Costs	Cooperators (Rp/Ha)	Conventional (Rp/Ha)	Total Costs Difference (Rp/Ha)	Percentage (%)
1	Telang Makmur Village	8.276.755,96	7.216.095,29	1.060.660,67	12,8
2	Telang Rejo Village	8.384.308,37	6.182.430,69	2.201.877,68	26,3
3	Sumber Hidup Village	9.243.043,01	7.624.923,26	1.618.119,75	17,5

Source: Data Analysis, 2022.

This can be seen that the used of Total Costs by farmers that applied RAISA technology was higher than conventional farmers, which was 13% in Telang Makmur Village, 26% in Telang Rejo Village and 18% in Sumber Hidup Village. That was because the used of variable inputs by farmers that applied RAISA technology was more than conventional farmers. Moreover total costs were depended on farmers cultivating area, the bigger area that farmers used, the greater amount of costs that needed. After computed costs of this research, then calculated farmers' revenue and income to see whether there was a difference in income between farmers that applied RAISA technology and conventional farmers.

Revenue and Income was a reward from the relationship between the factors of production of land, labor, capital and management, or the remainder of the reduction in the valued of the receipts obtained with the costs incurred. the following table was the result of calculating the average revenue and income in Muara Telang District.

Table 5 – Average Production, Revenue and Income Analysis (Rp/Ha) of Rice Farmers that applied RAISA technology (cooperators) and Conventional Rice Farmers (non-cooperators) in Tidal Rice Farming Muara Telang District, 2022

I. Telang Makmur Village				
	Description	Cooperators (Rp/Ha)	Conventional (Rp/Ha)	Percentage (%)
1	Production (kg)	6.025	4.730	21,5
2	Revenue (Rp)	25.033.875	19.653.150	21,5
3	Total Costs (Rp)	8.276.755,96	7.216.095,29	12,8
4	Income (Rp)	16.551.683,67	12.436.059,24	24,9
II. Telang Rejo Village				
	Description	Cooperators (Rp/Ha)	Conventional (Rp/Ha)	Percentage (%)
1	Production (kg)	5.774	4.029	30,2
2	Revenue (Rp)	23.962.100	16.720.350	30,2
3	Total Costs (Rp)	8.384.308,37	6.182.430,69	26,3
4	Income (Rp)	15.577.791,63	10.537.919,31	32,4
III. Sumber Hidup				
	Description	Cooperators (Rp/Ha)	Conventional ((Rp/Ha)	Percentage (%)
1	Production (kg)	5.607	4.131	26,3
2	Revenue (Rp)	23.549.400	17.350.200	26,3
3	Total Costs (Rp)	9.243.043,01	7.624.923,26	17,5
4	Income (Rp)	14.306.356,99	9.725.276,74	32

Source: Data Analysis, 2022.



Total Revenue was the total amount of production multiplied by the selling price of the production unit obtained by the farmer in carrying out rice farming. In this study, the prices used in each sample village were different, average selling price in Telang Makmur was Rp.4.155, and in Telang Rejo was Rp.4.150 and Sumber Hidup Rp. 4.200. According to table 5 there was difference in revenue between farmers that used RAISA technology and conventional farmers, which farmers used technology had higher revenue than conventional farmers in each village even though costs in RAISA technology was bigger than conventional method. That was because rice yields that produced by farmers applying RAISA technology was higher than conventional farmers. Total revenue automatically influenced the income, which In Telang Makmur Village, farmers that used RAISA technology had 32,4% of income higher than conventional farmers. Likewise in Telang Rejo and Sumber Hidup which income was 32,4% and 32% higher than conventional farmers. This analysis of income was used to determine the success of the farming itself. This analysis could describe the current state of farming so that it could evaluate the planning of farming activities in the future.

CONCLUSION

According to results of farming analysis, there was difference income between farmers that used RAISA technology conventional farmers, which farmers using technology had higher income than conventional method. In Telang Makmur Village, farmers that used RAISA technology had 32,4% of income higher than conventional farmers. Likewise in Telang Rejo and Sumber Hidup which income was 32,4% and 32% higher than conventional farmers. This analysis described that the used of RAISA technology influenced on Farmer's Income, which means whenever farmers using RAISA technology there was probability to had higher income than using conventional method.

Based on the conclusions of the results of this study, some of the suggestions that the researcher gives was as follows: It was suggested to farmers who applied RAISA technology to continued applying RAISA technology when doing their farming, for conventional farmers, it was recommended to converted the method of farming to used RAISA technology because RAISA technology could helped in increasing rice farming income, especially rice farmers in tidal land.

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