

# COMPARATIVE ANALYSIS OF ORGANIC AND INORGANIC RICE FARMING IN SWAMPY LAND OF BABIRIK DISTRICT

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## Comparative Analysis of Organic and Inorganic Rice Farming In Swampy Land of Babirik District

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### Abstract

**Background:** Babirik District, North Hulu Sungai Regency is one of the areas that conducts organic and non-organic rice cultivation in lebak (fresh water) swamp, not only to meet daily needs but also to get income from the product sale. The selling price of organic rice products is higher than non-organic, but, only a small percentage of farmers use organic farming methods. This research conducted with the aim of analyzing (1) technical management of organic and non-organic rice farming in swampy land; (2) cost structure and costs of organic and inorganic rice farming; (3) comparison of the income and profits of organic and non-organic rice farmers; (4) the causes of slow-growing organic rice farming in the study area.

**Material and methods:** with a purposive sampling method, two villages (Teluk Limbung and Murung Kupang Village) were chosen with a total of 60 farmers were used, with 30 farmers for each. In this study, a descriptive analysis was carried out with the help of questionnaires, then by using the formula for calculating implicit costs, explicit costs, total costs, revenues, revenues, profits and T test appraisal.

**Results:** The cost of organic rice farming in lebak swamps was higher than non-organic. Revenue and income from organic rice farming were higher than non-organic. For the benefits of organic and inorganic rice farming in swampy swamp land produces negative values. From the t test it was found that the income of the two farms was not significantly different, while the profits were significantly different.

**Conclusion:** Organic rice farming was more profitable than non-organic rice farming in lebak swamp land.

**Keyword:** Comparative analysis, organic rice, non-organic rice, lebak swamp land.

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### I. Introduction

Rice is one of the main commodities cultivated by farmers. South Kalimantan Province is one of the provinces that has the largest paddy fields in Kalimantan Island. With so much land available, it will also encourage the community to carry out farming activities to meet their daily needs and serves as the people's livelihood. However, some lands are not utilized in farming activities.

Based on data from the Office of Food Crops and Horticulture in South Kalimantan Province (2018)<sup>2</sup>, with a total land area of 549,989 ha, there are still 101,420 ha uncultivated land, with a division of 24,049 ha not planted with rice but used to grow other crops and as many as 77,371 ha not planted by anything. Of this amount, swamp land is still marginal in agricultural business.

Organic rice has a higher selling price compared to non-organic. Especially if the organic rice has received an organic certification which is an added value for the product itself. However, only a small proportion of farmers in Babirik District are working on organic rice. Even though organic rice has the potential to increase farmers' incomes with the high selling price. Of the total area of lebak swamp available in Babirik, increasing income through organic rice farming is still possible. Most farmers still carry out non-organic rice farming. Therefore, the structure of costs in organic rice farming as well as the income was very crucial to be analyzed.

### II. Material and Methods

Hulu Sungai Utara Regency has the potential to develop swamp land. Babirik District is one area that produces organic rice, especially organic rice for swamp land. With an area of 4,500 ha of lebak land, around 148.9 ha are used for growing organic rice. Of this amount, only 3.2% is in swamp land in Babirik<sup>1</sup>.

The study was conducted in Babirik District, North Hulu Sungai Regency. The time of the study was in March 2019 to January 2020. The village determined for respondent farmers were Teluk Limbung and Murung Kupang Village. The number of samples was 60 people with 30 people for every village.

To answer the first objective, a descriptive analysis was carried out on the system of organic and non-organic rice by structured questionnaires and direct interviews with respondent farmers. Furthermore, for the

second and third purposes concerning the costs and income of organic and non-organic rice farming costs were classified into explicit and implicit costs.

Organic farming is a way of farming without any chemical substances such as fertilizers and chemical pesticides. So that in the implementation there is a different treatment with agriculture in non-organic<sup>3</sup>. The emergence of organic agriculture is driven by human awareness to consume agricultural products free of pesticide residues and to preserve the environment. The application of chemical fertilizers will continuously cause an imbalance of soil biological ecosystems, so fertilization to meet soil nutrient elements is not achieved<sup>9</sup>. The cost structure is the composition of costs incurred to produce an item or service. Some cost structures in organic and inorganic rice farming activities include land costs, seed costs, labor costs, pesticide costs, chemical fertilizer costs, depreciation costs for equipment and supplies and sharing costs by farmers who use leased land (cultivator)<sup>6</sup>. In calculating farming income, costs are classified into two, explicit costs and implicit costs. Explicit costs themselves are costs that are actually spent by the farmer through purchases or payments for farming needs, while implicit costs are not actually incurred or are only calculated<sup>5</sup>.

#### Explicit costs

$$TC_e = \sum X_i \cdot P_{xi}$$

Where:

- TC<sub>e</sub> = explicit costs of organic or inorganic rice farming (IDR)
- X<sub>i</sub> = Number of explicit inputs for organic or inorganic rice farming (unit)
- P<sub>xi</sub> = Price of explicit input of organic or non-organic rice farming (IDR)

#### Implicit costs

Implicit costs are costs that are only calculated as costs even though it is not really an expenditure that is actually paid by organic or non-organic rice farmers.

$$TC_i = \sum X_i \cdot P_{xi}$$

Where:

- TC<sub>i</sub> = implicit cost of organic or inorganic rice farming (IDR)
- X<sub>i</sub> = Number of implicit inputs for organic or inorganic rice farming (unit)
- P<sub>xi</sub> = Implicit input price for organic or inorganic rice farming (IDR/unit)

#### Total costs

Total costs are the sum of explicit and implicit costs. The total cost of organic and inorganic rice farming can be formulated as follows:

$$TC = TEC + TIC$$

Where:

- TC = Total cost of organic or inorganic rice farming (IDR)
- TEC = Total explicit costs of organic or inorganic rice farming (IDR)
- TIC = Total implicit cost of organic or inorganic rice farming (IDR)

#### Reception

$$TR = Y \cdot P_y$$

Where:

- TR = Acceptance of organic or inorganic rice farming (IDR)
- Y = Output produced or produced during one planting period for organic or inorganic rice farming (kg)
- P<sub>y</sub> = Price of organic or inorganic rice farming output (IDR/kg)

#### Farm income

Farm income will also encourage farmers to be able to allocate it to various other uses such as production costs for the next period, savings or to meet the needs of their families<sup>4</sup>.

$$NR = TR - TEC$$

Where:

- NR = Total organic or inorganic rice farming income (IDR)
- TR = Total organic or inorganic rice farming revenue (IDR)
- TEC = Total explicit costs of organic or inorganic rice farming (IDR)

#### Benefits

$$\pi = TR - TC$$

where:

- $\pi$  = Benefits of organic or inorganic rice farming (IDR)
- TR = Total organic or inorganic rice farming revenue (IDR)
- TC = Total cost of organic or inorganic rice farming (IDR)

**T test**

To see whether there was a real difference between organic rice farming and non-organic rice in lebak swamp, a comparison test was conducted using t-test.

$H_0 : \mu_1 = \mu_2$

$H_1 : \mu_1 \neq \mu_2$

Information:

$\mu_1$  = Organic rice income or profit in swampy swamp land

$\mu_2$  = Non-organic rice income or profits in swamp land

And for the fourth objective it was answered by drawing conclusions from the results of field interviews conducted with the respondent farmers.

**III. Result**

**Age.** The average age of organic rice respondent farmers in Teluk Limbung Village was 50 years and non-organic rice respondent farmers in Murung Kupang Village were 48 years. From these two villages, the age range of respondents ranged from 27 years to 65 years.

**Level of education.** Most of the respondent farmers had elementary school education or equivalent, for organic rice respondent farmers there were 14 people and non-organic rice respondent farmers were 18 people or 47% and 60%.

**The number of dependents.** The majority of organic rice farmers had a family of between 3-4 people, with up to 50% of the total organic rice respondent farmers. Then most of the dependents of families of non-organic rice farmers also ranged from 3-4 people with a total of 36.7% of the total non-organic rice respondent farmers.

**Land Ownership and Area.** The status of ownership of farmers' land was own property and rent (profit sharing). The average area of land for organic rice farmers was 0.59 ha and non-organic rice farmers was 0.46 ha. But it was different from the area of planting land. The average planting area for organic rice farmers was 0.40 ha and non-organic was also of 0.40 ha.

**Process of Organic and Non-Organic Rice Farming in the Swamp Land**

The activities	Organic rice farming in swampy land	Non-organic rice farming in swampy land
Seeding	The seeds were washed in water and then soaked for 24 hours and then drained in plastic for two days.	The seeds were washed in water and then soaked for 24 hours and then drained in plastic for two days.
Land preparation	Manually done to clear the planting land from weeds and the land was left to stand for 15-20 days before planting.	Spraying herbicides to kill weeds in the field. Then cleaned before planting
Planting	Planting was done with a spacing of 25 x 25 cm and planting time follows the height of the water in the swampy swamp land.	Planting was done with a spacing of 20 x 20 cm and planting time follows the height of the water in the swampy swamp land.
Maintenance	Performed manually such as cleaning weeds that grow and repel pests in the land	Chemical pesticides are sprayed on fields disturbed by pests and weeds.
Harvest	The harvest time was done when the seeds were fully ripe, and the harvest time was uncertain because it follows the maturity level of the seed that depends on the previous planting time.	The harvest time was done when the seeds are fully ripe, and the harvest time was uncertain because it follows the maturity level of the seed that depends on the previous planting time.

**Cost Structure and Costs of Organic and Non-Organic Rice Farming in the Lebak Swamp Land**

Based on the results of the data obtained, it was found that there were differences in the average total cost of organic and non-organic rice farming activities in the lebak swamp area amounting to IDR 871,789/farming or IDR 368,593/ha. The following is a table of cost structures and nominal values for each activity:

**Table 1.** Average implicit costs and explicit costs of organic farming in the lebak swamp farming in 2018.

Cost structure	Organic rice	
	Farm (IDR)	Hectare (IDR)
<b>Implicit costs</b>		
Own land	3,092,477	6,380,000
Labor in the family	1,957,581	4,340,122
<b>Total</b>	<b>5,050,158</b>	<b>10,720,123</b>
<b>Explicit costs</b>		
Seed	136,017	344,139
Outside family labor	2,216,866	5,269,510
Pesticide Chemical	0	0
Fertilizer	0	0
Profit Sharing	339,973	860,173
Depreciation	226,497	572,963
<b>Total</b>	<b>2,919,353</b>	<b>7,036,785</b>
<b>Total Cost (I+E)</b>	<b>7,969,511</b>	<b>17,756,908</b>

**Table 2.** Average implicit costs and explicit costs of non-organic farming in the lebak swamp farming in 2018.

Cost structure	Organic rice	
	Farm (IDR)	Hectare (IDR)
<b>Implicit costs</b>		
Own land	2,185,425	5,197,500
Labor in the family	2,429,550	6,034,364
<b>Total</b>	<b>4,614,975</b>	<b>11,231,864</b>
<b>Explicit costs</b>		
Seed	210,890	523,794
Outside family labor	1,357,833	3,372,501
Pesticide Chemical	265,850	660,261
Fertilizer	29,432	73,105
Profit Sharing	292,483	726,452
Depreciation	326,258	810,338
<b>Total</b>	<b>2,481,747</b>	<b>6,166,452</b>
<b>Total Cost (I+E)</b>	<b>7,097,722</b>	<b>17,398,315</b>

**Comparison of Income and Profit Level for Organic and Non-Organic Rice Farmers in the Lebak Swamp Land**

**Reception.** According to Soekartawi et al (1986), farm receipts are multiplications between the production obtained and the selling price. As for revenues from organic rice farming in 2018 amounting to IDR 17,461,002/ ha. Receipt of non-organic rice farming is IDR 13,771,703/ ha with a difference of around IDR 3,689,299/ ha.

**Income.** The income from farming will provide the value in the form of money that will be obtained by farmers after deducting the amount of revenue from the total costs actually incurred by farmers during one planting period (explicit costs). The income of organic rice farming was IDR 10,424,217/ha. Non-organic rice farming income was IDR 7,605,252/ha. So, there was a difference of IDR 2,818,965/ha.

**The advantage.** The profit of organic rice farming in 2018 was (IDR 295,906)/ha and the profit for non-organic rice farming in 2018 was (IDR 3,626,612)/ha. Calculation of profits that produce a minus value was caused by the factor of farming activities with aims to meet the daily needs of farmers or subsistence farming.

**T test.** Based on the t-test Independent Test for income, the sig (2-tailed) value was 0.493, greater than  $\alpha$  (0.05). This shows that  $H_0$  was accepted and  $H_1$  was rejected so that the income of organic rice farming in the lebak swamp area was not significantly different from non-organic. For profit, the results of the Independent Test t test obtained a sig (2-tailed) value was 0.048, less than the value of  $\alpha$  (0.05) where  $H_1$  was accepted, meaning that the benefits of organic rice farming in lebak swamps were significantly different from the benefits of non-organic rice.

**Causes of Organic Rice Farming Slowly Developing in Babirik District**

For farmers who seek non-organic farming, especially organic rice, had a risk of crop failure due to weeds or pests that attack during the growing season. During the organic farming process, farmers cannot use chemical pesticides to kill weeds or pests since organic farming must produce chemical free products. On the other hand, weed or pest control for organic farming must be done manually and required additional labor work and work time to burden the farmers in terms of labor costs.

Organic rice products can be sold at high prices if the product is sold in the form of rice ready for cooking, but not in the form of milled dry grain. Especially if there is an organic certificate included in the

packaging when selling to consumers. Even organic rice farmers still sell it in the form of harvested unhusked rice, but some of them sell it to farmers organization which is then reprocessed into packaged ready-to-cook rice and marketed to consumers.

Organic rice farmers provide a reason to sell in the form of harvested unhusked rice because they did not have the packaging equipment. This makes the selling price of products from organic rice farming was not optimum for the farmers themselves. In other words, farmers' sales in the form of harvested unhusked rice or milled unhusked rice were not much different from the results of non-organic rice farmers' products.

#### IV. Conclusion

Based on research results

1. Organic rice farming activities were not using chemical pesticides, while non-organic rice were always. The average amount of land cultivated by organic rice farmers was smaller than that of non-organic due to weeds that attack and cannot be overcome by farmers who had limited planting time. It was not only depends on water availability, but also on pest attack. If the land experiences drought, farmers would use water pumps to irrigate the land.
2. The total cost of the organic rice farming activities in the lebak swamp area was greater than the total cost for the non-organic. The largest total cost component was for labor, domestic and external.
3. The total value of income and the total income received by organic rice farmers from swamps was higher than non-organic rice farmers. The difference between implicit costs and explicit costs had an influence on the total value of the benefit, so that in this study the value of the benefits obtained was negative.
4. The income from organic and non-organic rice farmers in the swampy land had no significant difference. The benefits of organic and non-organic rice farmers in the swampy land had a significant difference.
5. Organic rice farming was still not or slow to develop, especially in Babirik District itself is the lack of interest and knowledge of farmers about organic rice farming. In addition to farming methods that pay close attention to the level of plant organism such as not using drugs made from chemicals, labor costs for organic rice farming in lebak swamps are also greater than non-organic ones.

#### V. Suggestion

Provisions or policies from the local government regarding organic farming was required, especially for rice commodities, such as the provision of assistance/subsidies that can help farmers to farmers to independently carry out organic farming activities, freedom on selling of the products, marketing of rice products, freedom of distribution of certified seeds to farmers to be more easily obtained.

Forms of farmers themselves, counseling can be given to increase knowledge and stimulate farmers' interest in organic rice farming. The biggest cost of organic rice was the labor cost as it required a lot of labor during the production process so that in the future further research is needed on the efficient use of labor for organic rice farmers in lebak swamp land.

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