FINANCIAL ANALYSIS AND ALLOCATIVE EFFICIENCY OF WETLAND RICE FARMING IN LEBAK SWAMP IN SUNGAI PANDAN SUB-DISTRICT, HULU SUNGAI UTARA REGENCY

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ABSTRACT

Effective management of rice paddy cultivation requires the careful selection and optimal combination of various production factors. However, in practice, rice farmers in Awayan District continue to face numerous challenges. A primary challenge is the farmers' insufficient understanding of how to utilize production factors efficiently. This research aims to examine the factors influencing production, assess technical efficiency, and evaluate the allocative (price) efficiency of input utilization in superior rice cultivation in Awayan District, Balangan Regency. The study employs both primary and secondary data sources. Primary data encompasses input usage and output quantities from superior rice farming operations conducted by Pitap Irrigation farmers. The analytical method employed is multiple regression analysis. The findings reveal that production factors including cultivation area, seeds, fertilizers, pesticides, and labor significantly influence superior rice production in Awayan District. The utilization of these production factors in superior rice farming operations demonstrates technical efficiency. However, regarding allocative efficiency, the use of cultivation area and seeds proves to be significantly inefficient. Similarly, the allocative use of fertilizers and pesticides also exhibits significant inefficiency. In contrast, labor utilization, while not statistically significant, demonstrates allocative efficiency. This study aims to analyze the amount of cost, revenue, profit and feasibility of paddy rice farming, analyze what production factors affect paddy rice production, and analyze the allocative efficiency (price efficiency) of production factors used by farmers in paddy rice farming in Sungai Pandan District, North Hulu Sungai Regency. The population of this study is 3,345 farmers, selected purposively from 3 villages with a total population of 536 farmers. Of these, 60 people were taken using the proportionated random sampling technique with details of 23 people from Pondok Babaris Village, 17 people from Rantau Karau Hulu and 20 people from Rantau Karau Hilir. The results of the study show that the average cost is Rp. 6,321,410 per farm, the average income obtained from rice paddy farming in Sungai Pandan District is Rp. 8,278,783 per farming, the average profit obtained by paddy rice farmers is Rp. 2,047,373 per farming, and the average value of the Return Cost Ratio 1.33 farmer companies with an average land area of 0.47 ha of farming. The results of the statistical testing of the Cobb-Douglas type production function show that together (simultaneously) the production factors (land area, number of seeds, fertilizers, labor and drugs) have a real effect on the production of paddy rice, while the testing of the production factors of land area, number of seeds and labor has a real effect on the production of paddy rice, except for the production factors of fertilizers and medicines. Statistically testing the allocative efficiency there are three

factors of production, namely the number of seeds and drugs whose use is efficient or marginal products equal to the price of the production factor. The use of land area, fertilizer and labor is not yet efficient, so it needs to be increased to achieve an efficient point.

Keywords: Farmer; Rice Paddies Farming; Adaptive Efficiency; Production Function; Production Factors.

1. INTRODUCTION

The agricultural sector has an important strategic advantage in the national economy, and it is even hoped that in this reform era it can be at the forefront of overcoming the economic crisis. This agricultural sector is the pillar of life for the majority of the population.

Agricultural commodities, especially rice field crops, can be classified as commercial commodities because their main use is to balance market needs with the prices set there. Dependence on rice has resulted in higher demand, the policies taken by the government to realize national development goals are by improving economic life through agricultural development [1].

Farmers in carrying out their farming hope that every rupiah spent will generate a commensurate income. However, the amount of income produced or received by farmers is greatly influenced by production costs during farming activities and the amount of agricultural production produced. The amount of production produced can affect farmers' income. Meanwhile, efficiency is an effort to use the smallest input to get certain production [2].

Quoting the results of the release of [3], it shows that the development of rice production in North Hulu Sungai Regency from 2019-2023 has increased and decreased every year. Year In 2019 rice production was 96,296 tons, in 2020 it was 94,175 tons, in 2021 it was 73,787 tons, in 2022 it was 25,623 tons and in 2023 rice production was 80,975 tons. The rise and fall of rice production is influenced by the

Many factors include uncertain weather and climate factors, pest and disease attacks, and the availability of production factors.

The population of North Hulu Sungai Regency is dominated by one sector, namely the agricultural sector. Most of the population makes a living as farmers and fishermen. North Hulu Sungai Regency has 10 (ten) sub-districts. Sungai Pandan District has the largest planting area in North Hulu Sungai Regency which is 2,397 Ha, harvest area is 2,157 Ha, production is 12,353.44 tons and productivity is 52.59 Ku/Ha. With high productivity, farmers can increase their incomes, meet people's food needs, and contribute to national food security.

According to [4], increasing production through efficient pricing is also called allocative efficiency, lowering the threshold for farmers' success in achieving the maximum amount of profit achieved at marginal product value, each production factor given is equal to its marginal cost or shows the ability of the business to use inputs in the best proportion possible at all levels of input prices and available technologies.

Rice farming in swamp land is different from dry land or rice fields that use irrigation. The area of rice fields in Sungai Pandan District is 4,444.87 hectares divided into 33 villages. For the land area in Pondok Babaris Village is 378.19 Ha, Rantau Karau Hulu is 248.38 Ha and Rantau Karau Hilir is 306.48 Ha of swamp land area.

This problem is caused by farmers' capital which is generally limited and mostly sourced from previous farming products. This capital is used to measure factors of production such as fertilizers, seeds, labor wages and medicines, so that the application of technologies that are recommended for increased productivity cannot be met. Also, the input price of agricultural production is sharp. This can cause farmers to generally not be able to afford these production inputs in farming activities.

The purpose of farming is to provide maximum and sustainable profits to farmers from one season to the next and from year to year. In this way, farming can continue to grow through the accumulation of capital taken from a portion of the profits obtained, which is achieved by maximizing production while minimizing expenses [5]. The feasibility of farming is carried out to ensure that the business is able to generate profits greater than the costs incurred. Based on the background of this problem, the author wishes to conduct a research with the title "Financial Analysis and Allocative Efficiency of Rawa Lebak Rice Rice Farming in Sungai Pandan District, North Hulu Sungai Regency".

1.1. Objectives and Research
The objectives of this study are:
1. To analyze the amount of cost, revenue, profits, and feasibility of paddy rice farming
2. To analyze what production factors affect rice production
3. To analyze the allocative efficiency (price efficiency) of production factors used by farmers in paddy farming in Sungai Pandan District

2. RESEARCH METHODS
2.1. Place and Time of Research
This research was carried out in Sungai Pandan District, North Hulu Sungai Regency, South Kalimantan Province. The time for this research was carried out for approximately 3 months (February-April 2025).

2.2. Data Types and Sources
2.3. The data used in this study are primary data and secondary data.
Primary data obtained directly from respondents, based on a questionnaire directly to farmers who carry out rice field farming. Secondary data sources are data that are needed to support the analysis of the maximum discussion. Secondary data can be in the form of written evidence, journals, reports from researchers and agencies related to the research. In this case, it supports researchers such as from books, research journals, and others.

2.4. Sample Withdrawal Method
Sampling was carried out using based on data obtained from the BPP of Sungai Pandan District, the total population of paddy rice farmers in Sungai Pandan District is 3,345 farmers, the number spread across 33 villages. Furthermore, 3 villages that meet the criteria were selected purposively because in the three villages there are a large number of farmers. So 3 villages were selected, namely Pondok Babaris Village, Rantau Karau Hulu and Karau Hilir region with a total population of 536 farmers. Furthermore, to determine the selected sample by proportional

random sampling. There were 60 selected respondents with details of 23 people from Pondok Babaris Village, 17 people from Rantau Karau Hulu and 20 people from Rantau Karau Hilir.

2.5. Data Analysis
For Objective 1 carried out is an analysis of total costs, revenues, profits and feasibility of farming. The series of analyses carried out include:
1. Total Cost
According to [5] the total cost can be calculated with the following formula:

$$TC = TFC + TVC$$

2. Acceptance
   According to [5] to calculate admission, the following formula can be used:
   $$TR = P \text{ x } Q$$
3. Advantage
   According to [6] to calculate profit the formula is used:
$$\pi = TR - TC$$

4. Feasibility
   According to [7] R/C of paddy farming can be calculated using R/C analysis with the formula:

R/C ratio$= \dfrac{TR}{TC}$

For goal 2, namely to analyze the influence of land use, seeds, fertilizers, labor and drugs on rice farming production. Given that the production factors used consist of more than two variables, the analysis is carried out using multiple linear regression models, especially *Cobb-Douglas* type production function models. Mathematically, this model can be written as follows:
$$Y = b_0 \, X_1{}^{b1} X_2{}^{b2} X_3{}^{b3} \, X_4{}^{b4} \, X_5{}^{b5} e^u$$
The Cobb-Douglas *function model* if transformed to a linear shape becomes the following equation:
$$LnY = Ln \, Ln + Ln + Ln + Ln + Ln + \beta_0 + \beta_1 \, X_1 \beta_2 \, X_2 \beta_3 \, X_3 \beta_4 \, X_4 \beta_5 \, X_5 \, \varepsilon_i$$

Classic Assumption Test
One of the conditions for applying multiple linear regression equations is the fulfillment of classical assumptions. The classical assumption test includes several tests, such as normality, multicollinearity, autocorrelation, and heteroscedasticity [8].
a. The normality of a data can be assessed through the *Kolmogorov-Smirnov Goodness of Fit* Test. The rule of decision states that if the significance value is greater than α = 0.05 (5% error rate), then the data can be considered normal [8].
b. The presence of multicollinearity in the proposed multiple linear regression model can be detected through VIF (*Variance Inflation Factor*). Generally, if VIF ≥ 5, the variable has a multicollinearity problem.
c. The Heteroscedasticity test means that there should be no significant relationship between the

interference or residual variables and any independent variables that exist [9].

To answer objective 3, namely to analyze the efficiency conditions of farming, the production factors used by farmers in paddy rice farming are used to use an efficiency test, namely allocative efficiency. The price efficiency if the maginal product (NPMxi) is equal to the production price Xi using a formula, for example, the *Cobb-Douglas* production function is:

$$Y = b_0 X_1{}^{bi}$$
$$PMxi = b_i b_0 X_1{}^{bi-1}$$
$$= \frac{bi\, b_0\, X_1{}^{bi}}{Xi}$$
$$PMx = b_i \frac{\bar{Y}}{\bar{x}_i}: \text{ where } NPMxi = .\ b_i \frac{\bar{Y}}{\bar{x}_i} \bar{P}_y$$
$$NPMxi = \bar{P}_{x_i}$$
$$\frac{NPMxi}{\bar{P}_{x_i}} = 1$$
$$\frac{bi\ \bar{Y}\ \bar{P}_y}{\bar{X}_i\ \bar{P}_{x_i}} = 1$$
$$K_i = 1$$

2. RESULTS AND DISCUSSION
2.1 Respondent Characteristics
2.1.1 *Farmer Age*
Age is one of the things that can affect a person's physical ability in carrying out a production process and the process of farmers' skills in managing their farming. Young farmers tend to have a bolder attitude and thinking in making a decision and are more responsive to what happens in the environment related to their farming.
Based on the results of the study, the average age of rice farmers shows that the largest age group is 46-64 years old (51.7%), while the lowest age group is the age group <35 years old (3.3%). Productive age provides farmers with physical strength, strategic thinking skills, and openness to technological innovations that can support increased agricultural yields.

2.1.2 *Education Level*
Education for farmers is very important, because formal education provides the basis for the ability to calculate, assess, and analyze which is very useful in rice farming. Through formal education, farmers can gain the knowledge and skills necessary to increase the productivity and efficiency of their farms.
Based on the results of the study, 90% of rice farmers' education is low because most of them are only elementary to junior high school and there are still farmers who do not attend formal school. The remaining 10% have high school and S1 education. This means that the educational status of rice farmers in Sungai Pandan District is still quite low, mostly only at the elementary level/equivalent.

2.1.3 *Family dependents*
The number of family members, both siblings and non-siblings, who live in the same household and depend on the household is referred to as the level of household dependency. Even so, the amount of household expenses is often influenced by the number of dependents.

Based on the results of the study, it shows that family dependents are between 1-6 rice farmers. The majority of the number of dependents of rice farming families is 3-4 people, which is as much as (48.3%). Meanwhile, the number of dependents of the smallest family of rice farmers is between 5 – 6 people, which is as many as (13.3%). This happened because some of the farmer's children who had families immediately moved into their own homes. A large number of family members can affect the level of household income.

2.1.4 Farming Experience

Experience in farming affects the way farmers run their businesses. Experienced farmers can make decisions quickly in the use of production factors, which can affect productivity. Farmers' experience is very important because it is the basis for decision-making related to paddy rice farming business.

1.Based on the results of the study, it was shown that the respondent farmer's farming experience was the highest >(46.6%) of the respondent's 20 years of farming, while the respondent's farmer experience was between 5-10 years (21.7%). With a high level of experience in farming, a farmer can manage and manage his farming business more effectively.

2.2 Cost, Revenue, Profit and Feasibility of Rice Field Farming
2.2.1 Cost

In farming, costs are all economic sacrifices made by farmers to obtain agricultural production in a certain period. These costs are very important to analyze because they affect farmers' income and profits. The calculations are as follows:

- Fixed Fees

Fixed costs are costs that are not affected by the amount of production. Based on the results of the study, it shows that the fixed cost of rice field farming with an average land area of 0.47 ha reaches an average of Rp 2,836,733/farmer or Rp 6,033,963/ha. Of the amount of these costs, the largest cost is incurred to pay for land holdings. In the calculation of fixed costs, the cost component includes the cost of equipment depreciation, PBB costs, land acquisition costs and own land rental costs.

Table 1. Fixed Costs in Rice Field Farming

No	Cost Component	Agribusiness (Rp)	Per Hectare (Rp)	(%)
1	Equipment Depreciation	38.079	81.020	1,34
2	United Nations	39.060	82.989	1,38
3	Land grabbing	505.633	1.074.292	17,82
4	Rent Your Own Land	2.253.961	4.795.662	79,46
	Sum	2.836.733	6.033.963	100

Source: Primary data processing, 2025.

- Variable Costs

The variable costs discussed in this study refer to the expenses used in one production cycle in the paddy rice farming business in Sungai Pandan District. Variable costs are costs whose total will change along with changes in the volume of activities including the cost of seeds, fertilizers, labor and medicines.

Table 2. Variable Cost of Rice Farming

Cost Component	Agribusiness		Per Hectare		Percentage
	Sum	Cost (Rp)	Sum	Cost (Rp)	
Seed	28,68	270.485	61,03	574.685	7,96
Fertilizer	9,47	94.667	20,11	201.133	2,79
Workforce	53,50	2.408.125	113,83	5.123.670	70,94
Medications	3,47	191.333	7,37	406.516	5,64
Thresher	107,52	430.067	228,76	915.035	12,67
Sum		3.394.677		7.221.039	100

Source: Primary Data Processing, 2025.

Based on Table 2, it shows that the variable costs of paddy rice farming companies are Rp 3,394,677 and Rp 7,221,039/ha. Farmers who grow paddy fields have to pay for seeds, fertilizers, labor and medicines and thresher rent.

These costs are from variable costs. Because labor is expensive and requires high compensation, the cost of paying labor accounts for the highest portion of the overall cost at 70.94%. Fertilizer is the least variable cost to be incurred because it uses the least compared to other inputs at 2.79%.

• Total Cost

All fixed costs and variable costs incurred by farmers in the process of cultivating paddy rice during one planting season will be added to the total cost.

Table 3. Average Total Cost of Rice Field Farmers

No	Cost Component	Agribusiness (Rp)	Per Hectare (Rp)	(%)
1	Fixed costs	2.836.733	6.033.963	45,52
2	Variable costs	3.394.677	7.221.039	54,48
	Sum	6.231.410	13.255.002	100

Source : Primary data analysis, 2025.

Based on the results of the study on table 3, it shows that the total cost of rice field farming is on average Rp 6,231,410/farmer or Rp 13,255,002/ha, of this amount, the largest cost is in variable costs which reach 54.48%.

2.2.2. Acceptance

[10] defines revenue as the result of the time between production and selling price. The quantity and price of output produced per unit determine the amount of money farmers receive for every rupiah invested in their agricultural business. Income from agricultural businesses increased in line with the level of production and the price of rice.

Table 4. Average Income of Rice Field Farmers

	Description	Agribusiness	Per Hectare
1	Production (kg)	1.182,68	2.512,78
2	Rice price (Rp/kg)	7.000	7.000
	Admission (Rp)	8.278.783	17.589.483

Source : Primary Data Analysis, 2025.

Table 4 shows the average yield of rice paddy production by farmer companies of Rp 1,182.68/Kg / Year with an average price of paddy rice for farmer paddy of Rp 7,000/Kg. In production and production selling prices, the average revenue of paddy farming is 8,278,783/farmer with an average revenue per hectare of Rp 17,589,483.

1.2.3. Advantage

The difference between the revenue received and the costs that have been incurred during production is known as profit. Profit is known as net profit, calculated as total receipts minus total expenses.

Table 5. Average Profits of Rice Farmer

	Description	Agribusiness	Per Hectare
1	Acceptance	8.278.783	17.589.483
2	Total Cost	6.231.410	13.255.002
	Advantage	2.047.373	4.334.481

Source : Primary Data Analysis, 2025.

Based on research conducted during one planting season in paddy rice farming from table 5, with an income of IDR 8,278,783/farmer with an average income per hectare of IDR 17,589,483/ha, then the total cost incurred by paddy farmers is IDR 6,231,410/farmer and IDR 13,255,002/ha, then a profit of IDR 2,047,373/farmer and IDR 4,334,481/ha.

2.2.4. Feasibility

The profit divided between the revenue received and the costs incurred during production is known as the Return Cost Ratio. The Return Cost Ratio is known to measure the feasibility of a developed business.

Table 6. Average Return Cost Ratio of Rice Farmers

No	Description	Agribusiness	Per Hectare
1	Acceptance	8.278.783	17.589.483
2	Total Cost	6.231.410	13.255.002
	Return Cost Ratio	1,33	1,33

Source : Primary Data Analysis, 2025.

Based on research conducted during one planting season in paddy rice farming like as table 6, with a revenue of IDR 8,278,783/farmer with an average income per hectare of IDR 17,589,483/ha, then the total cost incurred by paddy farmers is IDR 6,231,410/farmer and IDR 13,255,002/ha, then a *Return Cost Ratio* (R/C) of 1.33/farmer and IDR 1.33/ha is obtained.

2.2.5 *The Influence of the Use of Production Factors in Rice Field Farming*

The form of production function of the *Cobb-Douglas* function type model that has been determined as a model that needs to be estimated is independent variables including land area, seeds, fertilizers, labor and drugs needed as X, and Y as rice field production. The regression analysis of *the Cobb-Douglas* function type model was used to estimate the production factors in rice field farming, with the results of the analysis:

In Y = Ln 4,705 + 0,516 Ln X_1 + 0,509 Ln X_2 + 0,074 Ln X_3 + 0,213 Ln X_4 + 0,016 Ln X_5

SE   (1,047)   (0,119)   (0,261)   (0,138)   (0,098)   (0,092)

t_{hit} (4,495)   (4,322)   (1,948)   (0,534)

(2,176)   (0,178)

Based on the results of the regression analysis in Table 7, it can be seen that the value of the determination coefficient (R^2 -*adjusted*) of is 0.834. This means that the high and low yield of paddy rice production of 83.4% is determined by the size of the independent variables (land area, number of seeds, fertilizers, labor and medicines) of the function, while the remaining 16.6% is determined by other variables that are not included in the function model.

Table 7. Results of Regression Analysis of Production Factors Affecting Production

Type	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			FAST Tolerance	
Production)	4,705	1,047		4,495	0,00 0		
Land Area (X1)	0,516	0,119	0,566	4,32 2	0,00 0	0,16 4	6,10 8
Seeds (X2)	0,509	0,261	0,208	1,94 8	0,05 7	0,24 6	4,06 0
Fertilizer (X3)	0,074	0,138	0,041	0,53 4	0,59 6	0,46 7	2,14 1
Workforce (X4)	0,213	0,098	0,171	2,17 6	0,03 4	0,45 8	2,18 5
Medicine-Obatan_(X5)	0,016	0,092	0,013	0,17 8	0,85 9	0,51 3	1,94 9

R^2 -adjusted = 0.834; F_{hit} = 60,360; p = 0.000

Classic Assumption Test.

This study applies the OLS (Ordinary Least Squares) method, therefore testing the model used is needed to ensure that there is no violation of the model's basic assumptions. The exams carried out include:

a. Normality Test

This study applied Kolmogorov-Smirnov statistical analysis to the residual of the equation, with the test criterion that if the probability value > 0.05 then the data is normally distributed and if the probability value is < 0.05 then the data is abnormally distributed. The significance value of Kolmogorov-Smirnov indicates a value of 0.200. Since the result is greater than α = 0.05 (5% error rate), the tested data is normally distributed.

b. Mutilinearity Test

Based on the results of the study, it was shown that the production factors that affected rice production did not show that there was a multicollinearity between the variables in the model. It can be seen from the value of the Variance Inflation Factor (VIF) that it is above 5.

c. Heteroscedasticity Test
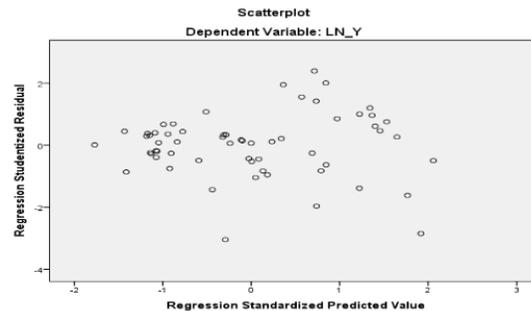
Figure 1. *Scatter plot* heteroscedasticity test

Based on Figure 1 it appears that the scattered plots are spread randomly both above and below zero on the *Studentized Residual Regression* axis. Therefore, using the graph analysis method, it can be stated that in the existing regression model, heteroscedasticity is found.

For the F test, it is known that the value of Fhit (60.360) with a *probability* value of 0.000 < 0.05 (*a=5%), means that the Ho hypothesis is rejected and H₁ accepted. This shows that the area of land (X1), the number of seeds (X2), the amount of fertilizer (X3), the number of laborers (X4) and the number of medicines (X5) together have a significant effect on the production* of paddy rice (Y).

2.2.6 Production Factors of Land Area

One of the production factors that affect the level of production needed to produce agricultural products is land. Land area is the most important factor in increasing rice production. Based on the results of the research on the area of land use of rice farmers, the average planting area is 0.47 Ha. The land used by farmers in Sungai Pandan District is a type of swamp. The land area received by farmers is uneven, because of the ability of farmers to manage their farming. Some of the land used by farmers is privately owned and some are profit-sharing.

The variable of land area has a significant effect on paddy rice production, which can be seen from the t-test, which is 4.322) with a *probability value* of 0.000 <0.1 (*a=10%) So that Hi is accepted and Ho is rejected, this means that this means that the land area has a significant effect on paddy rice production at the level (a=10%). In other words, an increase in land area by 1% with other inputs fixed, can increase paddy rice production by 0.516%.*

2.2.7 Seed Production Factors

Seeds are one of the key factors that affect the production output of a commodity. Seed quality also contributes significantly to crop yields. The use of superior seeds can increase productivity. The respondent farmers use Mikongga, Ciherang and Siam Mutiara seeds. The average use of seeds in paddy rice farming is 28.68 kg/hectare and 61.03 kg/ha depending on the area planted by farmers.

The variable of the number of seeds has a significant effect on rice field production, the result of the t-test is thit (1.948) with a probability value of 0.057 <0.1 (*a=10%). So Hi is accepted and Ho is rejected, meaning that the number of seeds has a significant effect on the production of*

paddy rice at the current level (a=10%). This means that an increase in the number of seeds by 1% with other inputs can increase paddy rice production by 0.509%. Rice yields will increase along with the increase in the number of seeds. Seed productivity is what makes agriculture successful.

2.2.8 Fertilizer Production Factors

Although fertilizers are important for soil fertility, not all types of fertilizers exert the same effect. Fertilizer is one of the important elements in the production process that can increase crop yields to the maximum if given at the appropriate dosage and time. The timely use of fertilizer and the selection of various fertilizer compositions based on soil nutrient needs are very important. The use of urea fertilizer in paddy rice farming averaged 9.47 kg/hectare and 20.11 kg/ha depending on the rice plants that have been planted.

The variable amount of fertilizer does not have a significant influence on rice field production, as can be seen from the t-test, namely thit (0.534) with *a probability* value of $0.596 > 0.1$ (*a=10%). So Ho was accepted and Hi was rejected, this means that the amount of fertilizer does not have a significant effect on paddy rice production. That the addition of fertilizer by 1% with other inputs can still reduce paddy rice production by 0.074%.* If farmers want to increase the use of fertilizer to get high production, this will certainly make production decrease.

Rice field agricultural production can be increased by providing the right fertilizer to plants. Urea fertilizer is a fertilizer that is commonly used by farmers because it is related to the growth and development of paddy fields. Farmers use urea fertilizer to stimulate the growth of paddy fields so that they grow quickly. In terms of rice paddy farming, namely urea fertilizer, the average fertilizer use is 9.47 kg per farm, or 20.11 kg per hectare.

2.2.9 Factors of Labor Production

Labor is one of the key factors in running an agricultural business, especially for paddy farming businesses that are highly dependent on the season. An effective workforce, having adequate expertise, skills, and abilities is an essential element to achieving goals in agriculture. The quality of the workforce used greatly affects the implementation of farming with the expertise and skills possessed, success in carrying out the farming business can be achieved. Most of the labor used by the respondent farmers comes from outside the family. The labor involved in this study is the labor used during the agricultural production process in the rice fields. The use of labor includes various stages, ranging from land cultivation, seeding, planting, fertilizing, weeding, spraying, harvesting to harvesting transportation. In the cultivation of rice field farming, both workers within the family and workers outside the family are employed. Information about the workforce, both within the family and outside the family, who are involved in rice care activities can be seen in the following table 8:

Table 8. Labor Use

no	Activities	HOK per Farmer		Total	HOK per Ha		Total
		TKDK	TKLK		TKDK	TKLK	

No.	Activity						
1.	Land Cultivation	5,95	3,65	9,60	12,64	7,75	20,39
2.	Seeding	3,76	1,83	5,59	7,99	3,90	11,89
3.	Planting	7,45	6,00	13,45	15,82	12,75	28,57
4.	Fertilization	2,45	0,76	3,21	5,20	1,62	6,82
5.	Weeding	2,78	1,96	4,74	5,91	4,16	10,07
6.	Spraying	2,10	0,80	2,90	4,47	1,70	6,17
7.	Harvest	7,16	5,23	12,39	15,20	11,11	26,31
8.	Harvesting Transportation	0,96	0,67	1,63	2,04	1,42	3,46
	Sum	32,61	20,90	53,51	69,27	44,41	113,68

Source :Primary data processing, 2025.

Table 8 shows that the average labor usage reached 53.51 HOK/farming or 113.68 HOK/ha. Based on the table above, it can be seen that the use of labor for paddy rice farming uses more labor outside the family than labor in the family. The use of labor in larger families is due to the fact that rice fields require quite a lot of labor.

The variable of the number of workers has a significant effect on rice field production, which can be seen from the t-test, namely thit (2.176) with a probability value of 0.034<0.1 (α=10%). So Hi was accepted and Ho was rejected, thus meaning that the number of workers had a significant effect on paddy rice production. This means that an increase in the number of workers by 1% can increase paddy rice production by 0.213%. The output of paddy fields will increase in proportion to the amount of labor needed, up to the limit of the age and physical strength of the farmer. In rice cultivation, this rice field requires labor within the family and labor outside the family. The total workforce in the family is 32.61 HOK per farmer or 69.27 HOK per ha. Meanwhile, the total labor force outside the family is 20.90 HOK per farm or 44.41 HOK per ha. The workforce here includes land cultivation, seeding, planting, fertilizing, weeding, spraying, harvesting and harvesting transportation.

2.2.10 Drug Production Factors
Agricultural medicines are a supporting production factor that plays a very important role in increasing rice field production. The use of drugs appropriately and efficiently is able to control plant pests and diseases so that rice production increases significantly. Spraying of pesticide drugs is carried out only when the plant is infested with pests or diseases. Although pesticide drugs do not play a role in increasing production yields, their use aims to keep production levels stable. The results of the study showed that the use of pesticide drugs in Pondok Babaris Village,

Rantau Karau Hulu and Rantau Karau Hilir used pesticides of the Tuntas, Dharmasan and Biowasil types.

The variable number of drugs did not have a significant influence on rice field production, which can be seen from the t-test, namely thit (0.178) with a probability value of 0.859 > 0.1 (a=10%). So Ho was accepted and Hi was rejected, this means that the amount of fertilizer does not have a significant effect on paddy rice production. It shows that the addition of medicines by 1% with other inputs can reduce paddy rice production by 0.016%.

The increasing number of pesticide drugs used to the recommended limit of the use of drugs, the production of paddy rice will increase. The use of doses and types of drugs must be paid attention to because in the OPT control section there are main factors to improve the quality and quantity of agricultural production. In terms of rice farming cultivation, namely using Tuntas, Dharmasan and Biowasil medicines. The average use of pesticides is 3.47 liters per farm, or 7.37 liters per hectare.

2.11 Analysis of Allocative Efficiency of Production Factors in Rice Field Farming

Testing of the allocative efficiency of production factors was carried out by t-test. The t-test is used to evaluate the efficiency of allocative production factors, such as land, seeds, fertilizers, labor, and drugs. Ho will be accepted under conditions that are declared insignificant if the t-hit is smaller than the t-table. Since many farmers operate only on the basis of habits and experience, rationality is often criticized in agricultural activities. A number of problems that hinder farmers' decisions, such as lack of capital and difficulties in obtaining means of production, may be the main cause of this. Thus, it is possible to determine whether or not a farmer is efficient in carrying out his duties by looking at the results of his allocative efficiency. When the price of the factor of production (PXi) and the value of the marginal product (NPMxi) is the same, then the allocative efficiency is achieved.

Table 9. The Value of Allocative Efficiency in Rice Field Farming

Independent variables	NPMxi	Pxi	Ki	Skiing	Thit	Information
Land (X1)	9.091.481	105.000.000	0,09	0,020	49,993	Inefficient
Seeds (X2)	146.968	110.000	1,34	0,685	0,124	Efficient
Fertilizer (X3)	64.709	10.000	6,47	12,067	6,388	Inefficient
Workforce	32.969	45.625	0,72	0,332	2,285	Inefficient

(X4)					
Medica tions	38.18 3	53.33 3	0, 72	4,11 7	0,47 3	Efficie nt

Source: Primary data processing, 2025.

Based on the results of the study, it can be seen that the use of seed production factors and drugs used is efficient. Meanwhile, the use of production factors of land area, fertilizer and labor is inefficient. Table 9 involves the results of statistical testing of the allocative efficiency of the use of production factors in farming.

2.12 Production Factors of Land Area

The land area has a marginal product value (NPMx_1) of IDR 9,091,481. The price of the land area production factor (Px_1) is IDR 105,000,000/ha. This NPM x_1 value means that every increase in the area of arable land to carry out paddy rice farming as much as one hectare will increase revenue by Rp 9,091,481. The price efficiency index () between the value of marginal products of land area (NPMx₁) and the price of land area production factor (K_iPx_1) is 0.09 with a value of t-hit (49.993) > t-table (1.671) at *a=5%. So Hi was accepted and Ho was rejected, this means that the land area is inefficient in its use. This means that the use of land area production factors has not reached an efficiency level because its use is excessive, so its use needs to be reduced to achieve efficient conditions.*

2.13 Seed Production Factors.

Seeds have a marginal product value (NPMx_2) of IDR 146,968. The price of land production factor (Px_2) is Rp 110,000/Kg. Based on this NPMx_2 figure, every additional one kg of seeds used to regulate paddy rice production will result in an increase in income of Rp 146,968. With t-hit (0.124) < t-table (1.671) at a = 5%, the price efficiency index (Ki) between the price of the factor of production number of seeds (Px_2) and the value of marginal product of the number of seeds (NPMx_2) is 1.34. The fact that Ho was accepted and Hi was rejected means that the number of seeds was already efficient in its use.

2.14 Fertilizer Production Factors

Fertilizer has a marginal product value (NPMx_3) of IDR 64,709. The price of fertilizer production factor (Px_3) is Rp 10,000/kg. This NPMx_3 value means that every additional use of fertilizer to carry out paddy rice farming of one kilogram will increase income by Rp 64,709. With t-hit (6.388) > t-table (1.672) at a = 5%, the price efficiency index (Ki) between the price of fertilizer production factors (Px_3) and the value of marginal products of fertilizer (NPMx_3) is 6.47. The fact that Ho was rejected and Hi was accepted shows that the fertilizer is inefficient in its use. This means that the use of fertilizer production factors has not reached an efficiency level because its use is excessive, so its use needs to be increased to achieve efficient conditions.

2.15 Factors of Labor Production

The workforce has a marginal product value (NPM$_{X_4}$) of Rp 32,969. The price of labor production factors (P$_{X_4}$) is Rp 45,625/HOK. This NPM$_{X_4}$ value means that every additional use of labor to organize paddy rice farming as much as one HOK will increase revenue by Rp 32,969. The price efficiency index (Ki) between the value of the marginal product of the number of labor (NPM$_{X_4}$) and the price of the production factor of the number of labor (P$_{X_4}$) is 0.72 with a value of t-hit (2.285) > t-table (1.671) at *a=5%. So Ho is rejected and Hi is accepted, this means that the workforce is still inefficient in its use. This means that the use of labor production factors has not reached an efficiency level because its use is excessive,* so its use needs to be reduced to achieve efficient conditions.

2.16 Drug Production Factors

The value of marginal products (NPM$_{X_5}$) of medicines is IDR 38,183. The pesticide production factor (P$_{X_5}$) is Rp 53,333 per liter. Based on this NPM$_{X_5}$ figure, every liter of more pesticides used to grow paddy rice will result in an increase in income of Rp 38,183. With a t-hit value (0.473) < t-table (1.671) at *a* = 5%, the price efficiency index (Ki) between the price of fertilizer production factors (P$_{X_5}$) and the value of organic fertilizer marginal products (NPM$_{X_5}$) is 0.72. Based on the fact that Ho was accepted and Hi was rejected, the pesticides used were efficient. The use of dosage and type of pesticide drugs must be very concerned because this part of pesticides is very common for paddy rice plants.

3. CONCLUSIONS AND SUGGESTIONS

Conclusion

Based on the results and discussions in this study, the following conclusions were obtained:

1. The cost incurred in paddy farming averaged Rp 6,231,410 per farm. The average revenue obtained from paddy rice farming in Sungai Pandan District is Rp. 8,278,783 per farm, the average profit obtained by paddy rice farmers is Rp. 2,047,373 per farming, and the average feasibility value is 1.33 farms.
2. The results of the *Cobb-Douglas* production function analysis test showed that the factors of production of land area, number of seeds, fertilizers, labor and drugs had a real effect on rice field production together (simultaneously). On the contrary, the test results partially show that The production factor is the area of land, the number of seeds and the labor have a real effect, while the production factor that does not have a real effect is fertilizer and medicine.
3. The results of the efficiency analysis show that there is one factor of production, namely the number of seeds and drugs whose use is efficient or marginal products equal to the price of the production factor. The use of land area, fertilizer and labor is inefficient, so its use needs to be reduced to achieve efficient conditions.

Suggestion

Based on the results of research on paddy farming in Sungai Pandan District:

1. Farmers are expected to pay more attention to the use of production factors which affect the production output received by farmers, with the amount of productivity obtained will increase the production of paddy rice which means that they will get greater profits.
2. For the North Hulu Sungai Regency agriculture office to provide intensive rice farming coaching for paddy rice farmers who are very limited in terms of farming methods so that

they are able to develop the farming they manage.

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