

Study of Factors Influencing Rice Farming Income (Case Study: Kuta Jungak Village, Siempat Rube District, Pak-Pak Bharat Regency, North Sumatra Province)

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Abstract

This study aims to determine the production costs, the amount of revenue and income, feasibility, and factors that influence the income of rice farming in Kuta Jungak Village, Siempat Rube District, Pakpak Bharat Regency. The method of determining the research area was done intentionally (purposive), and the method of determining the sample was done by the Simple Random Sampling method, with a total of 45 rice farmers. The analysis methods used were cost analysis, revenue, income, Revenue Cost Ratio (R/C), and multiple non-linear regression. The results showed that the total production cost was Rp112,116,612 while the total revenue was Rp184,283,910, resulting in a total income of Rp72,167,298. The R/C ratio value of $1.64 > 1$, which means that rice farming is feasible to pursue. The results of the study indicate that production factors such as land area, labor, seeds, fertilizer, pesticides, and selling price significantly influence rice farming income. Simultaneously, the variables of land area, labor costs, seed costs, fertilizer costs, pesticide costs, and selling prices significantly influence rice farming income. Partially, the variables of labor costs, seed costs, and fertilizer costs significantly influence income. Meanwhile, the variables of land area, pesticide costs, and selling prices do not significantly influence rice farming income. The coefficient of determination R^2 is 0.340, which means that land area, labor, seeds, fertilizer, pesticides, and selling prices influence 34% of rice farming income. Other factors outside of this study influence the remaining 66%.

Keywords— Feasibility; Income; Production Factors; Rice Farming

Introduction

Indonesia is recognized as an agrarian nation, with a significant portion of its populace dependent on agriculture for sustenance. Indonesia is an archipelagic nation with significant potential in both maritime and agricultural natural resources. The agricultural sector is crucial for national growth, especially in fulfilling the food requirements of the population. The successful advancement of the agricultural sector is anticipated to enhance national food security, grounded in varied food sources, local institutions, and Indonesian cultural values (Nugroho & Ramadhan, 2021).

Rice is a fundamental food item of significant strategic importance, necessitating focused efforts to enhance its productivity. The government significantly manages food commodities, especially rice, from the pre-production phase, encompassing the provision of high-quality seeds, fertilizers, pesticides, irrigation infrastructure, and financial support (Abdurrozzaq Hasibuan et al., 2022). The harvested area, production, and productivity of rice fields by province are presented in Table 1.

Table 1. Harvested Land Area, Rice Production, and Productivity Paddy Fields by Province in Indonesian in 2023-2024

No	Province	Harvested Area (Ha)		Production (Tons)		Productivity (Tons/Ha)	
		2023	2024	2023	2024	2023	2024
1	Jawa Timur	1.698.083,3 1	1.616.985,0 5	9.710.661,3 3	9.270.435,2 9	5,52	5,73
2	Jawa Tengah	1.642.761,2 3	1.554.777,1 4	9.140.039,2 0	8.891.297,0 5	5,56	5,72
3	Jawa Barat	1.583.656,2 8	1.475.362,0 9	9.084.107,5 3	8.626.879,9 1	5,74	5,85
4	Sulawesi Selatan	967.790,21	951.308,60	4.876.386,1 1	4.818.429,3 9	5,04	5,07
5	Lampung	530.108,09	531.715,12	2.757.898,1 9	2.791.347,5 3	5,20	5,25
6	Sumatera Selatan	504.143,03	521.092,21	2.832.773,9 2	2.909.411,6 7	5,62	5,58
7	Sumatera Utara	406.109,49	419.463,48	2.087.474,1 5	2.204.875,5 1	5,14	5,26

(Source: Central Bureau of Statistics of Indonesia 2025)

Based on Table 1, North Sumatra Province experienced an increase in all indicators of lowland rice farming between 2023 and 2024. The harvested area increased from 406,109.49 hectares to 419,463.48 hectares, indicating an expansion of the planted area. Production also increased from 2,087,474.15 tons to 2,204,875.51 tons, in line with the increase in productivity from 5,14 tons/ha in 2023 to 5.26 tons/ha in 2024.

North Sumatra Province is a prominent rice-producing area in western Indonesia. Rice cultivation in this province is distributed throughout several regencies and cities, notably in regions with good soil and sufficient irrigation infrastructure, including Deli Serdang, Serdang Bedagai, Langkat, Labuhan Batu, and Simalungun. Rice cultivation in North Sumatra benefits from favorable climatic conditions, ample water resources, and governmental assistance aimed at enhancing productivity via the distribution of high-quality seeds, fertilizers, and farmer training. The harvested area, production, and productivity of paddy fields by Regency/City in North Sumatra Province are presented in Table 2.

Table 2. Harvested Area, Production and Productivity of paddy fields by Regency in North Sumatra Province in 2023-2024

No	Regency/City	Harvested Area (Ha)		Production (Tons)		Productivity (Tons/Ha)	
		2023	2024	2023	2024	2023	2024
1	Deli Serdang	52.360,90	50.213,59	312.405,53	313.546,4	5,97	6,24
2	Serdang Bedagai	49.742,27	51.117,61	302.038,88	333.128,7	6,07	6,52
3	Simalungun	27.573,66	34.503,33	143.824,15	198.121,31	5,21	5,74
4	Tapanuli Utara	25.293,86	24.187,41	126.829,90	124.068,50	5,01	5,13
5	Langkat	24.435,48	24.760,51	119.871,01	120.291,33	4,90	4,85
6	Mandailing Natal	19.833,89	22.625,80	78.282,95	95.562,19	3,95	4,22
7	Pakpak Bharat	1.125,85	1.675,43	4.364,62	6.926,07	3,88	4,13

(Source: North Sumatra Central Statistics Agency 2025)

Based on Table 2 Data. Obtained from the Central Statistics Agency of North Sumatra Province, the results of rice production in all regencies/cities in North Sumatra in 2023-2024 Serdang Bedagai Regency became the largest producer of paddy rice in North Sumatra in 2024, with a total production reaching 333,128.70 tons. Followed by Deli Serdang and Simalungun. Meanwhile, Pakpak Bharat Regency produced 6,926.07 tons, which means it is relatively low compared to other regencies.

Pakpak Bharat Regency, situated in North Sumatra Province, possesses considerable agricultural potential, especially for paddy rice cultivation. In Pakpak Bharat Regency, the predominant population in Siempat Rube District depends on agriculture for their livelihood, given its vast land area. Table 3 presents data on the harvested area, production, and productivity of rice fields in Pak-Pak Bharat Regency.

Table 3. Harvested Area, Production and Productivity of Paddy fields by District in Pak-Pak Bharat Regency in 2023-2024

No	District	Harvested Area (Ha)		Production (Tons)		Productivity (Tons/Ha)	
		2023	2024	2023	2024	2023	2024
1	Kerajaan	370,00	368,00	2.065,69	1.876,80	5,58	5,10
2	Sitellu Tali Urang Julu	350,00	300,00	1.577,80	1.440,00	4,51	4,80
3	Salak	347,00	460,00	1.570,00	2.235,60	4,52	4,86
4	Siempat Rube	335,00	366,00	1.642,41	1.793,40	4,90	4,90
5	Pergetteng Sengkut	302,00	288,00	1.510,00	1.411,20	5,00	4,90
6	Tinada	237,70	190,00	1.105,71	912,00	4,65	4,80
7	Sitelu tali urang jehe	71,90	50,90	331,37	241,75	4,61	4,75

(Source: Central Statistics Agency of Pak-Pak Bharat Regency 2025)

According to the data in Table 3, paddy rice production in the Pak-Pak Bharat Regency, Siempat Rube sub-district ranks fourth in harvest area, following the Salak sub-district. In 2023, the harvested area was 335.00 hectares, but in 2024, it climbed to 355.00 hectares. In 2023, the Siempat Rube sub-district achieved the highest production following the Kingdom sub-district in comparison to other sub-districts. In 2024, the output of the Simpat Rube sub-district rose to 1,793.40.

Siempat Rube District is a significant agricultural region in Pakpak Bharat Regency, North Sumatra Province. Data from the publications "Siempat Rube District in Figures" and "Pakpak Bharat in Figures," issued by Statistics Indonesia (BPS), indicate that rice is the predominant food crop farmed by most farmers in the region. Table 4 presents data on the harvested area, production, productivity, and growth of paddy fields in Siempat Rube District from 2020 to 2024.

Table 4. Harvested Area, Production, Productivity and Growth of Paddy Fields in Siempat Rube District 2020-2024

No	Year	Harvested Area (Ha)	Production (Tons)	Productivity (Tons/Ha)	Production Growth (%)
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1	2020	183	640,5	3,50	-
2	2021	213	745,5	3,50	16,39%
3	2022	250	875	3,50	17,36%
4	2023	335	1.642,41	4,90	88,04%
5	2024	366	1.793,40	4,90	9,19%
Total		1.347	5.696,81	20,3	
Mean		269,40	1.139,36	4,06	0,32

(Source: Central Statistics Agency, Siempat Rube District 2020-2024)

According to the data presented in Table 4, the harvested area, production, and productivity of lowland rice have experienced annual increases. The most significant growth transpired in 2023, reflecting an increase of 88.04%. Rice agriculture has undergone substantial expansion in the past five years.

Kuta Jungak Village is a rural locality predominantly dependent on agriculture. Rice cultivation constitutes a primary source of living in Kuta Jungak Village; yet, despite the reliance on rice farming, farmers' incomes remain subject to instability in production outcomes. Notwithstanding escalating production expenses, farmers persist in their efforts to cultivate it.

This research phenomena pertains to the internal challenges faced by rice growers in Kuta Jungak Village, Siempat Rube District, Pak-Pak Bharat Regency. The primary internal issue is that certain farmers struggle to secure funding for additional agricultural endeavors. The researcher's findings reveal that the majority of farmers squander production inputs in rice cultivation, leading to diminished profits. The second issue is the insufficient awareness among rice farmers regarding the adoption of sustainable agricultural practices, such as the use of organic fertilizers, since they continue to perceive chemical fertilizers as more efficacious in enhancing their agricultural output.

External factors, like pest and disease infestations, infrastructure deficiencies, and environmental conditions, can incur supplementary expenditures, hence affecting rice cultivation profitability. Additional concerns, like escalating fertilizer costs and restricted availability, may compel rice producers to curtail their usage. The author intends to perform a study entitled "Factors Influencing Rice Farming Income in Kuta Jungak Village, Siempat Rube District, Pak-Pak Bharat Regency."

Literature Review

Rice plants can adapt to various climate conditions in tropical and subtropical regions between 45° North and 45° South latitude. Rice grows optimally in areas with relatively warm temperatures, high humidity, and a rainy season of approximately four months. Ideal rainfall for rice growth ranges from 200 mm per month or around 1,500–2,000 mm per year. Rice cultivation can be carried out in both the dry and rainy seasons. In the dry season, production yields are generally higher as long as irrigation water availability remains guaranteed. Conversely, in the rainy season, even though water supplies are abundant, productivity can decrease due to suboptimal pollination. The planting season significantly influences rice growth. Planting in the dry season with adequate irrigation tends to produce better yields than in the rainy season. This is because pollination and fertilization during the dry season are not disrupted by rainfall, leading to a higher number of full-grain crops. Conversely, during the rainy season, these processes can be disrupted, leading to higher empty grain (Maulana, 2023).

Rice production in Indonesian generally remains heavily dependent on irrigated rice paddy systems. However, this high reliance on irrigated land faces various challenges in the future, particularly as agricultural land is increasingly converted to non-agricultural uses. This land conversion phenomenon has reduced planted areas and contributed to the decline in total national rice production. Furthermore, the trend of declining land productivity due to soil fertility degradation has exacerbated this situation.

Therefore, to maintain and increase rice farming productivity, more innovative and efficient agricultural technologies are needed to increase rice production sustainably (Uwiringiyimana & Antriandarti, 2025).

Research conducted by Pirngadi et al. (2023) entitled "Analysis of Farmers' Income and Factors Affecting Paddy Production in Baktinya District, North Aceh Regency". The purpose of this study was to analyze rice farming income and examine the factors that influence rice production in Baktiya District, North Aceh Regency. The sampling method used random sampling with 140 rice farmers as respondents, while the data analysis method used the Cobb-Douglas Function Analysis approach. The results of this study showed that the net income received by rice farmers in Baktiya District, North Aceh Regency, within one year was IDR 39,526,000/ha/year. A model description examining the factors influencing rice production in Baktiya District revealed that all independent variables had a positive effect on rice production. A partial test showed that land area and fertilizer significantly influenced rice production in Baktiya District.

A study by (Perwata et al. (2024) entitled "Analysis of Factors Influencing Rice Farming Production and Income in Malili District, East Luwu Regency". This study aims to determine the factors of production and income from rice farming. Determination of the number of samples using Slovin's formula and obtaining 43 farmers from a population of 1,181 farmers. The results showed that factors affecting rice farming include the use of fertilizers and pesticides, labor, and depreciation of agricultural equipment. While land area and seeds are not factors in rice farming. Rice paddy farming achieved a net income of 30,164,767 / ha / MT, with total costs of 9,035,233 / ha / MT and an R/C ratio of 4.34.

The research conducted by Nuryanti B et al. (2024) entitled "Analysis of Income and Production Factors of Rainfed Lowland Rice Farming in Allaere Village, Tanralili District, Maros Regency" aims to analyze the income and production factors that influence the results of rainfed lowland rice farming in Allaere Village, Tanralili District, Maros Regency. The study found that land area and fertilizer use significantly influenced production, while seeds did not. The average income of rainfed lowland rice farmers in the area reached IDR 4,886,746.53 per planting season, with a total production cost of around IDR 2,342,533.47. That indicates that rainfed lowland rice farming in the area remains economically profitable.

A study by Simanjuntak et al. (2021), entitled "Analysis of Factors Influencing Lowland Rice Farming Income,". This study aims to determine the effect of land area, labor, and capital on rice production in Tong Marimbun Village, Siantar Marimbun District. Primary data was obtained from a sample of 30 rice farmers. Multiple linear regression was used to determine the effect of land area, labor, and capital. The feasibility study used the revenue-to-cost (R/C) ratio method to determine feasibility. The results showed that all four variables—land area, labor, and capital—significantly influenced rice production in Tong Marimbun Village, Siantar Marimbun District. The partial analysis of the four independent variables showed that land area, labor, and fertilizer costs significantly affected rice production. Pesticide costs, however, did not significantly affect rice production in Tong Marimbun Village, Siantar Marimbun District. The research results indicate that lowland rice farming in Tong Marimbun Village, Siantar Marimbun District, is feasible to develop, with an R/C value of 2.04, meaning that every Rp 1 spent will generate Rp 2.04 in revenue. The average income per farm is Rp 5,327,206.

Research Method

The research area was determined purposively by considering the characteristics of the area relevant to the research objectives. Kuta Jungak Village, located in Siempat Rube District, Pakpak Bharat Regency, was chosen as the research location because this village is one of the rice-producing

villages in the region. The sample was determined using the Simple Random Sampling method. The population in this study were all rice-growing farmers in Kuta Jungak Village, Siempat Rube District, Pak-Pak Bharat Regency with a total of 85 families. From this total population, the Slovin formula was used to produce a sample of 45 rice-growing farmers. The data collected in this research are primary and secondary data, and primary data was obtained from direct interviews with farmers. Secondary data is obtained from literature studies in the form of books, journals, research results and statistical data from relevant agencies related to the research topic, such as BPS North Sumatera, BPS Pak-pat Bharat Regency and BPS Siempat Rube District. The data analysis method uses analysis of rice paddy farming income, analysis of rice paddy farming feasibility and multiple non-linear regression analysis tests. Multiple Nonlinear Regression Analysis is very suitable for use in rice farming. This method allows modeling curved mathematical relationships by converting the model into a natural logarithm of variables such as land area, labor costs, seed costs, fertilizer costs, pesticide costs, and selling prices, which often exhibit very large variations (heterogeneous across farmers). It can stabilize variance, making predictions of rice farming income more valid.

Results and Discussion

1. Analysis of Rice Farming Income

Table 5. Analysis of Rice Farming Income

No	Variable	Total	Mean
1	Total Rice Farming Revenue	184.283.910	4.095.198
2	Total Rice Farming Costs Production	112.116.612	2.491.480
3	Rice Farming Income	72.167.298	1.603.718

Source: Processed Primary Data

Table 5 shows that total rice farming revenue was Rp184,283,910, with an average revenue of Rp4,095,198 per farmer. To achieve this revenue, farmers incurred total production costs of Rp112,116,612, or an average of Rp2,491,480 per farmer. After deducting production costs, total rice farming revenue was Rp72,167,298, with an average revenue of Rp1,603,718 per farmer.

These results indicate that farmers' revenues exceeded their production costs, resulting in positive income. Therefore, the rice farming business operated by farmers can be considered profitable and still viable as a source of income.

2. Feasibility Analysis of Rice Farming

Table 6. Analysis Revenue Cost Ratio (R/C)

No.	Variable	Total	Mean
1	Rice Farming Revenue (Rp)	184.283.910,00	4.095.198
2	Total Rice Farming Costs (Rp)	112.116.611,90	2.491.480
	R/C	1,64	1,64

Source: Processed Primary Data

Table 6 shows that total rice farming revenue was Rp184,283,910.00, with an average of Rp4,095,198 per farmer, while total production costs were Rp112,116,611.90, with an average of Rp2,491,480 per farmer. Based on the comparison between revenue and production costs, the Revenue Cost Ratio (R/C) was 1.64.

An R/C value greater than 1 indicates that the respondents' rice farming business is profitable and

feasible. An R/C value of 1.64 means that every Rp1.00 spent will generate Rp1.64 in revenue, or a profit of Rp0.64. Therefore, rice farming at the study site is operating economically and efficiently in generating income for farmers.

3. Factors That Influence Rice Farming Income

Regression Coefficient

The regression coefficient is used to determine the extent of each independent variable (X) 's influence on the dependent variable (Y). The regression coefficient shows how much rice farming income changes for each independent variable (X).

Table 7. Multiple Linear Regression Coefficient

No	Variabel	B	Std. Error	Beta	t	Sig.
	(Constant)	-289.352.346.203	566.828.163.715		-.510	.613
1	LnLand area	-.229	.166	-.207	-1.379	.176
2	LnLabor cost	.384	.137	.405	2.806	.008
3	LnSeed cost	.062	.027	.352	2.311	.026
4	LnFertilizer cost	.526	.169	.462	3.101	.004
5	LnPesticide cost	.026	.033	.107	.774	.444
6	Selling price	-.010	.033	-.042	-.314	.756

Source: Processed Primary Data

In the table 7, the results of SPSS processing can be formed into a multiple linear regression function as follows:

$$Y = b_0 X_1^{b_1} X_2^{b_2} X_3^{b_3} X_4^{b_4} X_5^{b_5} X_6^{b_6} + e$$

$$\ln Y = \ln b_0 + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + e$$

$$\ln b_0 = 289058572.204194$$

$$\ln b_1 = -0,229$$

$$\ln b_2 = 0,384$$

$$\ln b_3 = 0,62$$

$$\ln b_4 = 0,526$$

$$\ln b_5 = 0,26$$

$$\ln b_6 = -0,10$$

So the regression function formed is:

$$Y = b_0 X_1^{-0,229} X_2^{0,384} X_3^{0,062} X_4^{-0,526} X_5^{0,026} X_6^{-0,010} + e$$

1. If the land area increases by 100%, rice farming income decreases by 22.9%.
2. If labor costs increase by 100%, rice farming income increases by 38.4%.
3. If seed costs increase by 100%, rice farming income increases by 6.2%.

4. If fertilizer costs increase by 100%, rice farming income increases by 52.6%.
5. If pesticide costs increase by 100%, rice farming income increases by 2.6%.
6. If the selling price increases by 100%, rice farming income decreases by 1.0%. That is due to low production levels, which also result in low incomes for farmers. High production costs can reduce farmers' incomes.

The Influence of Simultaneous Production Factors on Rice Farming Income

Table 8. Simultaneous Test Results (F)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	25544190411637 19700.000	6	425736506860619900.00 0	3.263	.011 ^b
Residual	4957978672062 319600.000	38	130473122949008416.00 0		
Total	7512397713226 039300.000	44			

Source: Processed Primary Data

Table 8 shows the results of the simultaneous test (F-test) on the regression model used in the study. The analysis revealed an F-value of 3.263 with a significance level (Sig.) of 0.011. The significance value is less than 0.05 ($0.011 < 0.05$); thus, the regression model is considered statistically significant.

These results indicate that all independent variables included in the model collectively have a significant effect on the dependent variable. Therefore, the constructed regression model can explain variation in the dependent variable and is suitable for further analysis.

The Influence of Partial Production Factors on Rice Farming Income

1. Effect of Land Area (X_1) on Rice Farming Income

The test results for the land area variable (X_1) on income obtained a t-value of $0.176 > 0.05$ with a regression coefficient of -0.229, indicating that the land area variable partially does not have a positive and significant effect on rice farming income in Kuta Jungak Village, Siempat Rube District, Pak-Pak Bharat Regency, North Sumatra Province. The results of the study indicate that land area has a negative and insignificant effect on rice farming income. That indicates that increasing land area has not significantly increased farmers' income. That is thought to be due to farmers' inability to manage larger areas of land optimally constrained by limited capital, labor, technology, and managerial skills. Furthermore, increasing the area of cultivated land can lead to a greater increase in production costs than in revenue, so that farmers' net income does not increase significantly. These findings indicate that increasing farmers' income is determined not only by land area, but also by the efficiency of input use, land productivity, and farm management capabilities.

These results align with research (Juliansyah, 2023) that found the land area variable had a negative and insignificant effect on rice farming income. The size of the land farmers cultivate does not guarantee efficient farming. Farming is efficient when farmers manage production costs; conversely, it is inefficient when they cannot.

These findings contradict those of Ambarwati et al. (2022), who found that the land area variable has a positive and significant effect on rice farming income. The size of the land cultivated by farmers

ensures that farming will be more productive and profitable. Farming will be efficient if farmers can use the land optimally; conversely, it will be inefficient if they cannot manage the land well.

2. Effect of Labor Cost (X_2) on Rice Farming Income

The test results for the labor cost variable (X_2) on income showed a t-value of 0.008 (< 0.05) and a regression coefficient of 0.384. That indicates that the labor variable has a partial, positive, and significant effect on rice farming income in Kuta Jungak Village, Siempat Rube District, Pak-Pak Bharat Regency, North Sumatra Province.

These results align with research (Juliansyah, 2023) that found labor costs have a positive and significant effect on rice farming income. That is because higher labor costs indicate more intensive farm management, which increases land productivity and ultimately increases farmer income.

3. Effect of Seed Cost (X_3) on Rice Farming Income

The test results for the seed cost variable (X_3) on income yielded a t-value of $0.026 < 0.05$ for seed costs, with a regression coefficient of 0.062. That indicates that seed costs have a partial positive and significant effect on rice farming income in Kuta Jungak Village, Siempat Rube District, Pak-Pak Bharat Regency, North Sumatra Province. These results align with those of Huda et al. (2021) stated that higher seed costs would increase seed use, thereby boosting rice production. This increase in rice production would increase farm income. These findings contradict those of (Saragih, (2020) stated that the seed price variable does not significantly impact Ciherang farming income. The seed price farmers must pay per 1 kg is IDR 2,000/kg. The average seed usage from the sample is 63 kg, where each hectare of rice requires 30 kg of seed for planting.

4. Effect of Fertilizer Cost (X_4) on Rice Farming Income

The test results for the fertilizer cost variable (X_4) on income (Y) yielded a t-value of 0.004 (< 0.05) and a regression coefficient of 0.526. That indicates that the fertilizer cost variable has a partial, positive, and significant effect on rice farming income in Kuta Jungak Village, Siempat Rube District, Pak-Pak Bharat Regency, North Sumatra Province. These findings align with research Nuryanti et al. (2024) stated generally, farmers in the research location used fertilizer as recommended. However, some farmers still used less or more urea fertilizer than recommended. If the rice plants are more fertile, rice production and income will increase. These findings contradict Listiani et al. (2019) research stated that effect occurs because farmers tend to use fertilizers at doses below recommended levels. This excessive use of fertilizer by farmers results from fertilizer subsidies, which lower fertilizer prices and help increase rice productivity, thereby boosting farmer income.

5. Effect of Pesticide Cost (X_5) on Rice Farming Income

The test results for the pesticide cost variable (X_5) on income (Y) yielded a t-value of 0.444 ($p\text{-value} = 0.05$), with a regression coefficient of 0.026. That indicates that the pesticide variable has a partial positive, but insignificant, effect on rice farming income in Kuta Jungak Village, Siempat Rube District, Pak-Pak Bharat Regency, North Sumatra Province. These findings align with Simanjuntak et al. (2021) research, which found the field results show that pesticide costs are not a factor in increasing rice farmer production, and assuming that each additional unit of pesticide cost will reduce production by +0.001 IDR. These findings contradict those of Listiani et al. (2019) stated the decline in farmers' incomes is due to excessive pesticide use. That is because rice plants are attacked by various pests that can reduce agricultural yields. To mitigate this risk, farmers use pesticides to quickly reduce pest populations attacking rice plants, resulting in high pesticide costs. Excessive pesticide use and failure to follow recommended dosages will impact both the environment and rice crop productivity..

6. Effect of Selling Price (X_6) on Rice Farming Income

The test results for the selling price variable (X_6) on income (Y) yielded a t-value of 0.756 (p-value = 0.456), with a regression coefficient of -0.010. That indicates that the pesticide variable has a partial negative, insignificant effect on rice farming income in Kuta Jungak Village, Siempat Rube District, Pak-Pak Bharat Regency, North Sumatra Province. This finding contradicts research Aisyah & Yunus, (2019) that found the relationship between selling prices and rice farmers' income is positive, meaning an increase in the selling price of unhusked rice will increase rice farmers' income. Therefore, a higher price of unhusked rice will increase farmers' income.

Conclusion

Based on the results of research and discussion regarding the Study of Income and Factors Influencing Income from Paddy Farming in Kuta Jungak Village, Siempat Rube District, Pak-Pak Bharat Regency, the following conclusions were obtained:

The total revenue from lowland rice farming reached Rp 184.283.910, with total costs incurred by rice farmers totaling Rp112,116,612, and total net income from rice farming reaching Rp72,167,298. The revenue-to-cost ratio (R/C) for lowland rice farming in Kuta Jungak Village is 1.64, indicating that this rice farming business is feasible. Based on the results of a study of factors influencing lowland rice farming income, simultaneously, the variables of land area, labor costs, seed costs, fertilizer costs, pesticide costs, and selling price all influence income. Partially, labor, seeds, and fertilizer variables significantly influence rice farming income. However, the variables of land area, pesticides, and selling price do not.

The first recommendation is that rice farmers in the research area employ skilled labor with knowledge of technical cultivation management, technological innovation, and agricultural communication. The second recommendation is for rice farmers to use certified, high-yielding seeds to increase productivity and farm income. The third recommendation is that rice farmers should be aware of the importance of using organic fertilizers to prevent land damage from excessive chemical fertilization.

The first recommendation is that the government should implement education and training programs to improve the quality of agricultural human resources to support sustainable agriculture and food security. The second recommendation is to facilitate access to subsidized fertilizer so that farmers can easily obtain fertilizer for their rice paddy farming. The third recommendation is to make certified seeds more affordable for farmers, thereby achieving desired production and farmer welfare.

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