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Financial study and the relationship between farmer identity and the income of lowland rice farmers in Selubuk Village, Air Napal District, North Bengkulu Regency

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ABSTRACT

Introduction: This study aims to analyze the financial feasibility and identify the influence of total production, planting area, and farmer identity (age, education level, farming experience, number of family dependents) on the income of lowland rice farmers in Selubuk Village, Air Napal District, North Bengkulu Regency. **Methods**: This study used a quantitative approach with a survey method on 29 farmer respondents selected from 97 farmer families using the Slovin formula. Primary data were collected through questionnaires and interviews, while secondary data were obtained from related agencies. Data analysis included cost-revenue analysis (R/C ratio) and multiple linear regression analysis. **Results**: The results showed that lowland rice farming in Selubuk Village was financially feasible with an R/C ratio value of 3.39. The regression analysis results indicated that simultaneously, total production, planting area, age, farming experience, education level, and number of family dependents had a significant effect on farmer income (Sig. F = 0.000). Partially, the variables of total production, planting area, farming experience, and education level had a positive and significant effect on farmer income ($p < 0.05$). However, a multicollinearity problem was detected between the total production and planting area variables, which needs attention in the interpretation of their individual coefficients. The variables of age and number of family dependents did not have a significant effect on farmer income ($p > 0.05$). **Conclusion**: In conclusion, lowland rice farming in Selubuk Village is profitable, and income improvement can be focused on production factors, experience, and increasing farmer education capacity, considering the close relationship between production and land area.

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INTRODUCTION

The main food crop commodity in Indonesia is rice, which is the staple food for almost all Indonesian people (Adistya *et al.*, 2023; Fangohoi *et al.*, 2022). As a staple food, 95% of Indonesian people consume rice. Rice cannot be replaced by other commodities, therefore the demand for rice is very high (Sulistyanto et al, 2013). To meet basic needs, 80% of farmers in Indonesia are rice farmers (Saragih & Ayu, 2018). Rice plants are also planted in various countries in the world, as a crop that has resulted in rice becoming the world's main fundamental product (Lumintang, 2015; Fatmawati 2013). Rice production in our country must be maintained to remain healthy and sustainable because: (a) rice is the staple food of the Indonesian people (Mariyono, 2018), (b) maintaining food security Nawaz (2022), (c) many rice farmers have created jobs (Seidu *et al.*, 2004), (d) it has become the main livelihood of farmers (Zhang *et al.*, 2022). According to Hasan *et al.*, (2017) stated that the economic growth and prosperity of the people of a country can be seen from the production of rice as the staple food produced by that country. Theoretically, the research results of Ritonga *et al.*, (2019), show that to increase economic capacity indirectly, human knowledge and skills are needed which are useful for accepting, developing, and adopting new technology.

BPS data (2021), productivity, and the national rice planting index experienced a simultaneous decline. The rice harvest area in Indonesia will be 10.52 million hectares in 2021, a decrease of 10.66 million hectares compared to 2020. Data BPS (2022) rice planting area in Bengkulu Province also decreased in 2021, namely 55,705.00 hectares, average production was 271,117.00 tons and productivity was 48.67 ku/ha. The majority of North Bengkulu's population has agricultural land that produces food crops, especially rice, in 2021 it will have a harvested area of 3,649.00 hectares with a productivity of 43.03 ku/ha and a production of 15,701.00 tonnes (BPS, 2022). BPS data (2021, 2022) shows a decline in productivity and rice field area in Indonesia, including North Bengkulu. This indicates

challenges in maintaining rice production and increasing farmer income, so research on factors that influence income is increasingly relevant.

The income of rice farmers can affect national income because agricultural sector income can contribute to total non-agricultural income, especially farmer income is very closely related to the identity of farmers. After all, they are the main actors. Sanogo *et al.* (2023), who studied the factors influencing the application of climate-smart agricultural technology in agricultural systems, showed that farmer identities such as age, education level, farming experience, number of family members, land area, and social status together influenced rice farming income. Sisvaberti (2014) stated that the characteristics possessed by farmers greatly influence farmers' decisions in managing their farming business, especially financing issues such as the socio-economic conditions of farmers and the maturity of farmers in running their farming business. Furthermore, according to Chaerani (2019), the area of land, age of the farmer, farming experience, and level of education required for farming are natural characteristics inherent in a person. Apart from that, several other research results state that the background of farmers such as age, education level, farming experience, and participation in a community can also influence farmers' income (Chen & Liu, 2023; Jian *et al.*, 2024; Van Ewijk *et al.*, 2024; Zou & Wang, 2022)

Selubuk Village, Air Napal District, is a village in North Bengkulu Regency, most of whose residents are rice farmers, which is the main livelihood besides gardening and animal husbandry. So far, rice farmers in Talang Kering village, Air Napal subdistrict, have not paid attention to input, output, and factors that cause high or low income from rice farming. This is because farmers cultivating rice only carry out habits and experiences handed down from their previous families and only act as price takers because farmers already have debts to collecting traders or owners of rice milling machines to meet their daily needs or purchase fertilizer, etc. Apart from that, farmers in rice fields in Selubuk village have limited knowledge and do not have the desire to develop, they feel that they are enough with what they have so they live by digging holes and covering holes.

Each region has different factors that can influence farmer income. Therefore It is necessary to conduct financial research and how much the identity of farmers can influence the income of lowland rice farmers in Selubuk Village, Air Napal District, North Bengkulu Regency. This research is important to identify key factors that can increase the income of rice farmers in Selubuk Village so that it can provide a basis for developing more effective and sustainable agricultural policies. This study aims to analyze the financial feasibility of rice farming in Selubuk Village based on the calculation of financial feasibility and the influence of total production, planted area, and farmer identity on the income of rice farmers in Selubuk Village, Air Napal District, North Bengkulu Regency. The research gap in this study lies in the minimal studies that link farmer identity with rice farmer income. Most previous studies have focused more on economic factors such as capital, agricultural technology, and government policies without considering the social aspects and farmer identity. This study also complements it by looking at a more specific area, namely Selubuk Village, Air Napal District, North Bengkulu Regency, which has not been widely studied in this context. Most major studies have been conducted in areas with higher agricultural intensification, so this study offers a more local perspective. In addition, the approach used in this study is multidisciplinary, including economic and social analysis. Previous studies tend to focus only on economic aspects, while this study looks at how farmer identity, such as experience, education, and perceptions of social status, can affect their financial management and income. This gap provides an opportunity to dig deeper into the socio-economic dynamics of farmers in the area, which may differ from other areas, and provide new insights into more targeted policies to improve farmer welfare.

METHODS

Research already carried out from January to March 2023 in Selubuk Village. The location was chosen deliberately because Selubuk Village is one of the villages where the population predominantly cultivates lowland rice. Selubuk Village is an ideal location for this research because it has relevant social and economic characteristics. As an area with a majority of rice farmers, this village offers the right context to examine the relationship between farmer identity and their income. Social diversity, limited access to modern agricultural technology and markets, and economic conditions that are different from other areas provide deep insights into how farmer identity influences their financial decisions and income management. In addition, social factors that influence perceptions of the farming profession are also important elements in this study. Qualitative and quantitative methods are used in the form of primary data and secondary data. The research uses primary data and secondary data. Quantitative data in the form of farmer income, production costs, and land area will be analyzed using descriptive statistics to describe the basic characteristics of the data and regression analysis to identify the relationship between financial factors and farmer identity to their income. Qualitative data in the form of in-depth interviews with farmers, participant observations in the field, and documentation related to farming activities will be analyzed using thematic analysis to identify key themes that emerge related to farmer identity and its influence on economic decisions and income earned. Primary data was obtained directly from rice farmers who were designated as samples or respondents with the help of

questionnaires and lists of questions, interviews, and field observations. Meanwhile, secondary data was obtained from government agencies/agencies and institutions related to this research.

The number of Selubuk rice farmers is 97 families. The Slovin formula was used to take the sample size because this formula was considered easy and practical (Hidayat, 2013). This research used a sample of 29 respondents. Next, the data was analyzed using descriptive and quantitative analysis.

Analysis of total production costs, total revenue, and total income

According to Soekartawi (2016), the sum of variable costs (VC) and fixed costs (FC) is total production costs (TC = FC + VC). The product of total production (Y) and price (Py) is total revenue (TR = Y - Py). The difference between total revenue (TR) and total production costs (TC) is total revenue (Pd = TR – TC).

Analysis of R/C ratio and principal price

According to Soekartawi (2016), to find out whether farming activities are efficient or not, R/C ratio analysis is used. The R/C ratio is the result of total revenue (TR) and total production costs (TC). Farming is profitable or efficient if the R/C ratio value is > 1. If the R/C ratio = 1, then the farming business has no profit and no loss. If the R/C ratio is < 1, then it is not profitable (inefficient).

The comparison of total costs (TC) and total production (Y) is the cost of goods sold for rice per kilogram, which is the farmer's capital in one kilogram of rice.

Multiple linear regression analysis

The next analysis is multiple linear regression (SPSS), namely to determine the influence of the dependent variable (Y) and the independent variable (X) (Rahim & Hastuti, 2007; Ghozali, 2016) with the formula: $Y = a + b1X_1 + b2X_2 + b3X_3 + b4\ X_4 + b5X_5 + b6X_6$

Information :
AND : Total Income (Rp/kg)
a : Constant
b : Regression Coefficient
X_1 : Total Production (kg)
X_2 : Planted Area (ha)
X_3 : Age (years)
X_4 : Length of Farming (th)
X_5 : Education (years)
X_6 : Family dependents (life)

R test, F test, and T-test to determine the influence of farmer identity simultaneously/together and partially/individually on rice farmers' income (Hidayat, 2013). Classic Test ie classical assumption test in the form of the Multicollinearity and Normality test (Best Linear Unbiased Estimator = BLUE) to determine whether the linear estimator is unbiased (Ghozali, 2016).

RESULTS AND DISCUSSIONS

The results of research on 29 farmers in Selubuk Village who were respondents, the average age of farmers, farmer education, length of farming, family responsibilities, area planted can be seen below.

Table 1. Identity of average age, education, length of farming, family dependencies, and planted area

No	Description	Mean
1	Age (Years)	49.40
2	Education (Soul)	-
	Finished elementary school	21.00
	Finished middle school	4.00
	Finished high school	4.00
3	Length of rice farming business (Years)	16.90
4	Family dependents (Soul)	3.11
5	Rice planted area (Ha)	0.52

Table 1 shows that the average age of farmers is 49.40 years, these farmers are included in the productive age category with 16.90 years of rice farming experience. The average age of farmers is 49.40 years with 16.90 years of farming experience. This indicates that farmers have sufficient experience in rice farming, which may affect their ability to adopt new technologies and increase productivity (Purwadi, 2022). According to Onibala *et al.*, (2017) who stated that those of productive age are usually more dynamic and enthusiastic in farming, so they have the option to

increase creativity in rice farming. Most farmers only have elementary school (SD) education, this greatly influences their knowledge and ability to adopt and accept agricultural innovations. The relatively new farming experience is an average of 16.90 years due to a lack of interest in the agricultural sector so when people are over thirty years old they only become lowland rice farmers. The average number of family members is 3.11 people. The average planting area is 0.52 Ha, which is land inherited from their parents. According to Mandey (2019), the family plays an important role because it can help workers in farming to reduce labor outside the family. Analysis of Total Production Costs, Total Production, Total Revenue, Total Income, R/C ratio, and Cost Price can be seen below:

Table 2. Average total production costs, total production, total revenue, total income, R/C ratio, and cost price

No	Description	Nominal
1.	Total production cost (Rp/Ut)	6,056,077.00
2.	Total production (Kg/Ut)	1,958.13
3.	Total revenue (Rp/Ut)	20,560,365.00
4.	Total income (Rp/Ut)	14,504,288.00
5.	R/C ratio	3.39
6.	Tree price (Rp/kg)	3,092.78

Table 2 shows that the total production cost of lowland rice (from an area of 0.52 hectares) is Rp. 6,056,077.00 /Ut. Total rice production is 1,958.13 kg/Ut consisting of rice sold and consumed personally, rice is sold for Rp. 10,500-/kg, the total income of farmers is Rp. 20,560,365,- and the total income of farmers is Rp. 14,504,288.00/Ut. This shows that rice farming in Selubuk Village is quite profitable, but it is necessary to pay attention to price fluctuations and production costs to maintain sustainable profits (Budiman, 2024). The income received by lowland rice farmers is quite high and profitable compared to other areas. Research result Pebriantari *et al.*, (2016) stated that the income from lowland rice farming is Rp. 14,553,144,-/ha. Research results in Rustam (2014) stated that the farmer's income is Rp. 5,147,376.65 ha/UT. The results of research by Sarina and Hermawati (2018) show that the income from lowland rice farming in Bukit Peninjauan II Village is only Rp. 5,517,567 (0.5 hectare area). Furthermore, the results of research by Isontase *et al.*, 2017 show that the income from lowland rice farming is Rp. 19,383,057,-/ Ut (area 0.871 hectares) in Padang Siring village, South Bengkulu.

Total revenue (TR) is IDR. 20,560,365.00/Ut and total production costs (TC) Rp. 6,056,077.00 /Ut. So the R/C Ratio value is 3.39. An R/C Ratio value > 1 means it is worth developing and continuing. Expenditure costs Rp. 1,000,- receipts will be Rp. 3,390,-. Table 2 shows that the basic price of rice/kg from the results of lowland rice farming in Selubuk Village is Rp. 3,092.78 /kg. The cost price is the result of dividing total costs by the total production produced. The high and low cost of goods affects the high level of revenue. The average price of rice in hullers in Talang Kering village is higher, namely Rp. 10,500/kg. This caused farmers' income to be higher, while at the time of research, the price of rice was soaring. If we look at the land area, the average planting area for rice farming in Selubuk Village is lower, namely 0.52 ha, but the total revenue, total income, and R/C ratio are higher and the basic price is lower. The R/C ratio in Selubuk Village is higher, namely 3.39. The research results of Isontase *et al.*, (2017) stated that the R/C ratio was only R/C 2.51 in Padang Siring Village, Seginim District, South Bengkulu. Furthermore, the research results of Sarina and Hermawati, (2018) show that the R/C is 2.58 and the basic price is IDR. 4,482.212/kg in Bukit Peninjauan II Village. According to Priatmojo *et al.*, (2019), in the Rice Production Center of the Sumatra Region, the R/C is 2.69. Furthermore, Noer *et al.*, (2020) stated that in Sidomulyo Village, Central Lampung Regency, the R/C ratio was 1.22. From the description above, it can be seen that the lowland rice farming business in Selubuk Village is very feasible to develop. The high and low R/C depend on the high and low income and costs of farming, while the basic price depends on production costs and production. Likewise, the selling price of rice fluctuates depending on the harvest season and demand.

Classical assumption test

a. Multicollinearity test

Table 3. Multicollinearity test results

Model	Collinearity statistics	
	Tolerance	VIF
(Constant)		
Total production	0.080	12.575
Planting area	0.077	12.971
Age	0.803	1.245
Farming for a long time	0.768	1.301
Education	0.753	1.328
Family dependents	0.705	1.419

The multicollinearity test aims to identify whether there is a very high correlation between independent variables in the regression model. High correlation between independent variables can cause problems in estimation, such as the standard error of the regression coefficient being inflated and making the coefficient unstable (Hair *et al.*, 2019). The general guideline that is often used to detect multicollinearity is to look at the Tolerance and Variance Inflation Factor (VIF) values. If the Tolerance value is less than 0.1 or the VIF value is greater than 10, it indicates serious multicollinearity (Field, 2024; Mahendra *et al.*, 2017).

Referring to the results of the multicollinearity test presented in Table 3, it can be seen that the variable 'Total production' has a Tolerance value of 0.080 (<0.1) and a VIF of 12.575 (>10). Likewise, the variable 'Planted area' shows a Tolerance value of 0.077 (<0.1) and a VIF of 12.971 (>10). These values indicate a significant multicollinearity problem between the variables of total production and planted area. In contrast, the variables of age, length of farming, education, and family dependents show a Tolerance value above 0.1 and a VIF value below 10, which means there is no indication of serious multicollinearity involving these variables. The presence of multicollinearity between total production and planted area needs to be an important note, because it can affect the reliability and interpretation of the regression coefficients for both variables in the next analysis model.

b. Normality test

If the significance value is > 0.05, it means that the residual value is normally distributed and vice versa. A good regression model if the residual values are normally distributed.

Table 4. Normality test results

	Minimum	Maximum	Mean	Std. Deviation
Predicted value	7135.3447	29271.3301	16165.2409	5700.32182
Residual	-616.05017	560.91754	.00000	247.73987
Std. predicted value	-1.584	2.299	.000	1.000
Std. residual	-2.181	1.986	.000	.877

In Table 4 the sig value is 0.877 > 0.05; Thus, H0 is accepted, meaning the normality assumption is met.

The normality test was conducted to ensure that the residuals of the regression model were normally distributed, which is one of the crucial assumptions in linear regression analysis. Based on the results of the normality test presented in Table 4, a significance value (Sig.) of 0.877 was obtained. This significance value is greater than the commonly used significance level ($\alpha = 0.05$), so that the null hypothesis (H0) stating that the residuals are normally distributed cannot be rejected. Thus, it can be concluded that the normality assumption has been met for this regression model. The fulfillment of this assumption increases confidence in the validity and reliability of the results of the regression analysis that has been carried out (Ghozali, 2016).

Multiple regression test

The identity of farmers regarding the income of rice farming in Selubuk Village can be seen through Multiple Regression analysis with the variable income (Y) and the variables total production (X_1), planting area (X_2), age (X_3), length of farming (X_4), education (X_5) and family dependents (X_6).

Table 5. Regression results for total production, planting area, and farmer identity which influence rice income in Selubuk Village

Independent Variable	Unstandardized coefficients		Standardized coefficients	T	Say.
	B	Std. Error	Beta		
Constant	4554.871	603.091		7.553	.000
X_1	11.451	.359	1.097	31.870	.000
X_2	31.800	996.755	.112	3.194	.015
X_3	14.553	8.780	.018	1.658	.130
X_4	.135	.120	.012	2.726	.025
X_5	50.108	28.692	.020	2.746	.006
X_6	22.690	57.835	.005	2.392	.290
Dependent variable:	AND		Adjusted R square :	0.998	
R :	0.999		F count :	1,746.76	
R Square :	0.998		Say. F :	0.000	
			F Table :	3.84	
			t Table :	2.45	

Table 5 above, shows that the R^2 (Coefficient of Determination value) is 0.9980, meaning that 99.80% of the income variable is influenced by the variables total production, planting area, age, length of farming, education, and family responsibilities, the remaining 0.20% is influenced by other variables. Outside this research. Ghozali (2016)

explains that the relationship between the independent variable and the dependent variable is stronger if the Coefficient of Determination (R^2) gets closer to the value 1. In this study, the results of the regression analysis showed that land area has a significant positive regression coefficient, which means that the larger the land owned by farmers, the higher their income. This is because farmers with larger land can plant more rice, produce larger harvests, and ultimately increase their income. In contrast, production costs did not show a significant effect on farmers' income. This could be due to inconsistencies in production costs between farmers or the presence of other more dominant factors, such as weather conditions or agricultural techniques used. Although production costs are considered relevant in economic theory, in this context these external factors seem to have a greater effect on farmers' income.

The resulting multiple regression equation is Y = 4554.871+ 11,451 X_1 – 3183,660 X_2 + 14,553 X_3 + 0,135 X_4 + 50,108 X_5 + 22,690 X_6.

The results of the analysis of the F-count value (1,746.76) > F-table (3.84) and the value Sig. F (0.000) < α (0.05) means together/simultaneously the variables of production, planting area, age, length of farming, education and family responsibilities have a significant effect on the income of lowland rice farmers in Selubuk Village, Air Napal District, North Bengkulu Regency. Individually/partially, it is found that:

a. For X_1, namely the production variable, the sign obtained is 0.000 < 0.05 and t-hit (31.870) > t-tab (2.45), this means that production has a significant effect on the income of lowland rice farmers. If there is an addition of one unit of X_1 (production), income will increase by 11,451 units. Usma and Yanti's research, (2020) that production greatly influences farmers' income. Furthermore, Nugraha and Nugroho (2021); Arman (2014) state that increasing production will increase farmers' income and the rise and fall of income depends on the rise and fall of production.
b. For X_2, namely the planting area variable, the sign obtained is 0.015 < 0.05 and t-hit (3.194) > t-tab (2.45), this means that planting area has a significant effect on the income of lowland rice farmers. If there is an addition of one unit of X_2 (planted area) then income will increase by 31.38 units. Bahruddin Research, (2020); Hastin, (2018); Damayanti (2013); Prabandari *et al.*, (2013), that planting area has a significant effect on farmer income. The wider the planting area, the higher the production. Furthermore, Onibala *et al.*, (2017) stated that planting area is a factor that greatly influences the productivity of rice plants. If you want to increase the production of a commodity, you need to increase the planting area.
c. For X_3, namely the age variable, the sign obtained is 0.130 > 0.05 and t-hit (1.658) < t-tab (2.45), meaning that age does not affect the income of lowland rice farmers. When it happens addition of one unit X_3 (age) then income will decrease by 14.55 units. This is in line with research by Pratiwi and Fatchiya, (2021); Anggraeni *et al.*, (2020); Ramdhani *et al.*, (2019), that age does not affect farmers' income because increasing age causes a decrease in physical ability, energy, and skills which has an impact on decreasing income. Furthermore, Ritonga *et al.*, (2019) stated that the age factor greatly influences a person's activities in carrying out their activities.
d. For X_4, namely the length of the farming variable, the sign is 0.025 < 0.05 and t-hit (2.726) > t-tab (2.45), this means that the length of farming has a significant influence on the income of lowland rice farmers. If there is an addition of one unit of X_4 (length of farming) there will be an increase in income of 0.135 units. The success factor of farmers in facing problems is greatly influenced by the farmer's own experience. Research by Anggraini *et al.*, (2017) states that farmer experience has a significant effect on income. Suratiyah (2015) further stated that farming for a long time will continue to increase farming experience, activities carried out repeatedly will become experiences for subsequent activities.
e. For X_5, namely the education variable, the sign obtained is 0.006 < 0.05 and t-hit (2.746) > t-tab (2.45), this means that education has a significant effect on the income of lowland rice farmers. If there is an addition of one unit of X_5 (education), income will increase by 40.15 units. Research by Prilierdi *et al.* (2015) shows that farmer education and farming income have a positive relationship.
f. For X_6, namely the family dependent variable, the sign obtained is 0.290 > 0.05 and t-hit (1.392) < t-tab (2.45), this means that family dependents do not affect the income of lowland rice farmers. If there is an increase in one X_6 unit (number of family members) then income will decrease by 22.69 units. The research results are in line with Zulkarnain *et al.*, (2022); Arifin *et al.* (2019); Fitri, (2016); and Ramdhani *et al.*, (2019), that the income of lowland rice farmers is not influenced by the number of family members. In line with Djangaopa *et al.*, (2018) family income is assisted by other family members to meet family needs.

CONCLUSION

The Lowland rice farming in Selubuk Village, Air Napal District, North Bengkulu Regency is already profitable and worth continuing. Together or simultaneously, farmer identity in the form of production variables, planting area, age, length of farming, education, and family responsibilities have a significant effect on farmer income. Individually or partially, the variables of production, planting area, length of farming, and education have a significant effect, while

age and family responsibilities do not affect the income of lowland rice farmers in Selubuk Village, Air Napal District, North Bengkulu Regency.

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