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ANALYSIS OF RICE FARMERS' INCOME (ORYZA SATIVA L.) IN JATI MAKMUR VILLAGE, NORTH BINJAI DISTRICT

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Abstract

Indonesia is known as an agrarian country where most of the population depends on agriculture, particularly rice farming, which plays a strategic role as both a primary food source and a major income generator for farmers. One of the rice-producing regions in North Sumatra Province is Binjai City, with Jati Makmur Subdistrict identified as an area with high potential but experiencing a decline in rice production over the past two years. This study aims to analyze the income of rice farmers and assess the feasibility of lowland rice farming in Jati Makmur Subdistrict, Binjai Utara District, Binjai City. The research employed a descriptive quantitative approach. A total of 31 farmers were selected from a population of 310 households using simple random sampling. Primary data were collected through observation, interviews, and documentation, while secondary data were obtained from related institutions. The results showed that the average revenue of rice farmers reached IDR 16,395,000 per hectare per planting season, with a total production cost of IDR 6,801,703, resulting in a net income of IDR 9,593,297. The R/C and B/C ratio analysis indicated values greater than 1, suggesting that rice farming in the study area is financially viable and profitable. However, improving cost efficiency, optimizing input use, and providing agricultural support are essential to ensure sustainable farming practices. In conclusion, despite limitations in land size and technology, rice farming in Jati Makmur remains economically feasible and has the potential for further development with appropriate policy support and technical assistance.

Keywords: Farmer Income, Rice Farming, Lowland Rice, Farming Feasibility, Jati Makmur

Abstrak

Indonesia dikenal sebagai negara agraris di mana sebagian besar penduduknya bergantung pada pertanian, khususnya pertanian padi, yang memainkan peran strategis sebagai sumber pangan utama dan sumber pendapatan utama bagi petani. Salah satu wilayah penghasil padi di Provinsi Sumatera Utara adalah Kota Binjai, dengan Kecamatan Jati Makmur diidentifikasi sebagai wilayah berpotensi tinggi namun mengalami penurunan produksi padi selama dua tahun terakhir. Penelitian ini bertujuan untuk menganalisis pendapatan petani padi dan mengevaluasi kelayakan budidaya padi sawah di Kecamatan Jati Makmur, Kabupaten Binjai Utara, Kota Binjai. Penelitian ini menggunakan pendekatan kuantitatif deskriptif. Sebanyak 31 petani dipilih dari populasi 310 rumah tangga menggunakan metode sampling acak sederhana. Data primer dikumpulkan melalui observasi, wawancara, dan dokumentasi, sedangkan data sekunder diperoleh dari lembaga terkait. Hasil penelitian menunjukkan bahwa pendapatan rata-rata petani padi mencapai IDR 16.395.000 per hektar per musim tanam, dengan total biaya produksi sebesar IDR 6.801.703, sehingga menghasilkan pendapatan bersih sebesar IDR 9.593.297. Analisis rasio R/C dan B/C menunjukkan nilai lebih dari 1, menunjukkan bahwa pertanian padi di wilayah studi secara finansial layak dan menguntungkan. Namun, meningkatkan efisiensi biaya, mengoptimalkan penggunaan input, dan memberikan dukungan pertanian sangat penting untuk memastikan praktik pertanian yang berkelanjutan. Kesimpulannya, meskipun terdapat keterbatasan dalam

ukuran lahan dan teknologi, pertanian padi di Jati Makmur tetap secara ekonomi layak dan memiliki potensi untuk pengembangan lebih lanjut dengan dukungan kebijakan yang tepat dan bantuan teknis.

***Kata kunci**: Pendapatan Petani; Pertanian Padi; Padi Dataran Rendah; Kelayakan Pertanian, Jati Makmur*

INTRODUCTION

Indonesia is known as an agricultural country, where the agricultural sector plays an important role in supporting the national economy. Most of the Indonesian population makes the agricultural sector their main livelihood and source of family income. Agriculture is also the foundation for creating a prosperous and prosperous society (Sopamena & Pattiselanno, 2020). In this case, rice (*Oryza sativa* L.) is a very strategic staple food commodity because it is not only the main source of carbohydrates for the Indonesian people, but also a source of livelihood for millions of small farmers throughout the archipelago (Turangan, Manese, & Pangemanan, 2019).

As a major food crop, rice plays an important role in supporting national food security. Along with the increasing population and the increasing need for rice consumption, increasing rice productivity has become a priority in agricultural development. In the context of sustainable agricultural development, the agricultural sector is expected to directly contribute to increasing farmer incomes through efficient and integrated farming practices. According to Hamzah (Jacob, 2018), increasing farmer incomes is the foundation for developing integrated agricultural businesses, enabling farmers to meet household needs and earn a reasonable profit.

North Sumatra Province is a rice-producing region that contributes significantly to national rice production. According to data from the Central Statistics Agency of North Sumatra Province, total rice production in 2021 was recorded at 601,109 tons , declining slightly to 599,428 tons in 2022. Although rice productivity remained relatively stable (from 53.39 ku /ha to 53.21 ku/ha), several districts/cities experienced fluctuations, as shown in Table 1 below:

Table 1. Area, Production, and Productivity of Rice in North Sumatra 2021–2022

Regency/City	Planted Area (ha) 2021	2022	Production (tons) 2021	2022	Productivity (ku/ha) 2021	2022
Deli Serdang	53,981.21	53,984.69	323,107.61	328,854.79	59.86	60.92
Binjai	1,426.14	1,244.91	7,395.93	6,266.34	51.86	50.34
Total North Sumatra	**105,475.11**	**92,459.03**	**601,109.09**	**599,428.22**	**53.39**	**53.21**

Binjai City itself is recorded as one of the areas contributing to quite large rice production, although production decreased from 7,395.93 tons in 2021 to 6,266.34 tons in 2022. If reviewed further, in North Binjai District, rice production actually increased from 6,811 tons (2021) to 8,307 tons (2022). However, a different condition occurred in Jati Makmur Village, one of the villages in

the sub-district, which actually experienced a significant decline in terms of land area, production and productivity as presented in Table 2 .

Table 2. Area, Production, and Productivity of Rice in Jati Makmur Village in 2021–2022

Year	Land Area (ha)	Production (tons)	Productivity (tons/ha)
2021	61.2	115	1.70
2022	44.6	92.6	1.54

This decline is due to various structural constraints faced by farmers, such as limited access to modern agricultural technology, the lack of permanent irrigation, and rising prices for production inputs like fertilizers and pesticides. Furthermore, farmers in Jati Makmur generally use only rudimentary tools and have limited knowledge of pest and disease control, resulting in suboptimal yields. The resulting grain is sold as dry grain at around Rp 8,000/kg, which significantly impacts farmers' incomes (Hutami, Maaruf, Ramli, & Apriyanto, 2023).

Despite facing various challenges, the majority of the people of Jati Makmur Village still depend on rice cultivation for their livelihood because this commodity is considered relatively easy to manage and is the backbone of the household economy. Therefore, a study is needed that can look further into the extent to which rice cultivation contributes to farmers' income. Based on this, the author is interested in conducting research with the title "Analysis of Rice Farmers' Income (Oryza Sativa L) in Jati Makmur Village, North Binjai District, Binjai City."

METHOD

This research was conducted in Jati Makmur Village, North Binjai District, Binjai City, which was selected purposively with the consideration that this area is one of the areas with the highest rice production in North Binjai District based on data from the Central Statistics Agency of Binjai City and information from local farmers. The population in this study were rice farmers living in Jati Makmur Village, with a population of 310 heads of families according to the results of a pre-survey in March 2024, and the sampling technique used was simple random sampling by taking 10% of the total population, resulting in 31 respondents. The data used in this study are primary and secondary data, where primary data was obtained through direct observation in the field, interviews with farmers using questionnaires, and documentation of agricultural activities, while secondary data was obtained from relevant agencies and literature (Achmad et al., 2022).

Data analysis was conducted quantitatively descriptively, with the income formula calculated based on the difference between total revenue (TR) and total costs (TC), namely Pd = TR – TC; while total costs consist of fixed costs and variable costs, formulated as TC = FC + VC. Revenue is obtained from the multiplication of the selling price (P) and the amount of production (Q), with the formula TR = P × Q. To assess the feasibility of farming, the R/C ratio and Benefit Cost Ratio (B/C) analysis were used, where R/C is calculated by dividing total revenue by total costs (R/C = TR / TC) and B/C is calculated with the formula B/C = TI / TC, with the feasibility criteria: B/C > 1 means feasible, B/C < 1 is not feasible, and B/C = 1 is break-even. The operational definition

in this study includes income as the difference between revenue and total costs, income as the result of production multiplied by the selling price, production is measured in kilograms, the selling price is stated in rupiah per kilogram, total costs are the accumulation of fixed and variable costs, labor costs are expenses for workers' wages, and R/C and B/C are used to assess the efficiency and feasibility of rice farming (Irwan, Zusmelia, Virginia, Amelia, & Siahaan, 2022).

RESULTS AND DISCUSSION

Respondent Characteristics

Farmers are the primary actors in the rice farming activities that are the object of this research. To obtain accurate information regarding the implementation of their farming activities, the identity of the farmer respondents is a crucial element in supporting the smooth data collection process (Yi, 2019). In this study, the identity of the respondent farmers includes several important aspects, namely age, education level, number of family members, experience in farming, and the area of land cultivated. These characteristics provide a general overview of the social and economic conditions of farmers that can influence the yield and efficiency of rice farming in Jati Makmur Village, North Binjai District, Binjai City.

Table 3. Respondent Characteristics by Age

No	Age Group (Years)	Number of people)	Percentage (%)
1	31–40 Years	7	22.58%
2	41–50 Years	6	19.35%
3	> 50 Years	18	58.06%
Amount		**31**	**100.00** %

Based on Table 1, the majority of respondents were in the age group over 50 years, namely 18 people or around 58.06% of the total respondents. This indicates that most respondents are farmers in the elderly category . The next age group is 31–40 years old with 7 people (22.58 %) and 41–50 years old with 6 people (19.35%). Thus, only around 41.94 % of respondents are classified as productive age (31–50 years). The distribution of respondents' ages tends to be dominated by those aged over 50 years, which may indicate that the agricultural sector in the study area is still dominated by older farmers. This can also be a concern for the sustainability of the agricultural sector if the participation of the younger generation is still low (Hoang, Nguyen, Wilson, Ho, & Khanal, 2021).

Table 4. Respondent Characteristics According to Education

No	Level of education	Number of people)	Percentage (%)
1	D1/D3	3	9.68%
2	Elementary School	10	32.26%
3	Senior High School	9	29.03%
4	Junior High School	9	29.03%

Amount	**31**	**100.00 %**

Based on Table 2, the majority of respondents had a basic education level, namely elementary school (10 people or 32.26 % of the total respondents). Followed by high school and junior high school education levels, each with 9 people (29.03 %). Meanwhile, only 3 people (9.68 %) had higher education (D1/D3). Overall, 90.32 % of respondents had a maximum education of high school level or below, which indicates that the majority of farmers in the study area have a relatively low educational background.

Table 5. Respondent Characteristics According to the Number of Family Dependents

No	Number of Family Dependents	Number of people)	Percentage (%)
1	2	12	38.71%
2	3	5	16.13%
3	4	4	12.90%
4	5	10	32.26%
	Amount	**31**	**100.00 %**

Based on the data in Table 3, the largest number of family dependents is held by respondents with two dependents, namely 12 people or 38.71% of the total respondents. This group represents the largest proportion, indicating that most respondents have a relatively light family burden. A total of 10 respondents or 32.26 % have five dependents, which is a group with large family dependents (Wahyudi & Wafi, 2021). The remaining consists of five respondents (16.13 %) with three dependents and four respondents (12.90%) with four dependents. This distribution indicates that the majority of respondents have between two and five dependents . This condition reflects the variation in the economic burden of farming households, which is likely to influence their decisions regarding farming management and the need for stable income.

Table 6. Respondent Characteristics According to Farming Experience

No	Farming Experience	Number of people)	Percentage (%)
1	1–10 Years	4	12.90%
2	11–20 Years	12	38.71%
3	> 20 Years	15	48.39%
	Amount	**31**	**100.00 %**

Based on Table 4, the majority of respondents, 15 (48.39%), have more than 20 years of farming experience. This indicates that nearly half of the respondents are highly experienced farmers and have been involved in agriculture for a long time. Twelve respondents (38.71 %) have between 11 and 20 years of farming experience. This indicates that most respondents have been farming for a considerable period of time, at least more than a decade. Meanwhile, only four respondents (12.90 %) have 1–10 years of farming experience. This indicates that the proportion

of new farmers is relatively small compared to those with experience (Jamaludin, Fauzi, & Nugraha, 2021). The distribution of respondents' farming experience shows that the majority come from groups of farmers who have been involved in agriculture for a long time. This can impact the level of knowledge and skills in managing a farm, although it can also be a challenge if openness to innovation or new technology is still low.

Table 7. Respondent Characteristics According to Land Area

No	Land Area (ha)	Number of people)	Percentage (%)
1	< 0.1 ha	1	3.23%
2	0.1 – 0.5 ha	30	96.77%
Amount		**31**	**100.00 %**

Table 5 shows that almost all respondents, 30 people (96.77%), own land between 0.1 and 0.5 hectares. Meanwhile, only one respondent (3.23 %) owns less than 0.1 hectare. This distribution indicates that the majority of respondents are farmers with limited or small-scale land ownership (Saleh et al., 2021). This limited land area is likely to affect production capacity, income, and farmers' ability to develop their farming businesses. This condition can also be taken into consideration in designing programs to improve farmer welfare, such as assistance with production facilities, appropriate agricultural technology, or appropriate financing schemes for small farmers.

Analysis of Costs and Income of Paddy Farming Business

1. Fixed Cost

Fixed costs are a type of cost whose amount does not change regardless of the amount of production obtained by farmers. These costs remain constant for farmers throughout a single planting season, regardless of the volume of production. In rice paddy farming, fixed costs generally include depreciation of owned production equipment, such as hoes, buckets, sprayers, and other tools . Fixed costs may also include land and building tax (PBB) if the land used is certified. However, based on data obtained from respondents in this study, no fixed expenses such as land tax were found, because most farmers do not yet have official certificates for the land they cultivate (Sujianto et al., 2022).

In this study, the fixed cost components calculated were the depreciation of agricultural tools in the form of hoes and buckets owned by the respondents. Depreciation is calculated based on the estimated economic life of the equipment and the assumed average price of the equipment in the field. This study assumes that the price of a hoe is Rp 100,000 with an economic life of two years, while the price of a bucket is Rp 50,000 with an economic life of one year. Because the current planting system has two planting seasons per year, equipment depreciation is calculated per season.

Table 8. Average Fixed Costs of Paddy Farming per Respondent

No	Tool Components	Average Fixed Cost per Respondent (Rp)
1	Hoe	Rp. 3,245,968
2	Bucket	Rp. 1,169,355
Amount		**Rp. 4,415,323**

This value shows that the fixed expenses incurred by rice farmers at the research location are relatively small compared to other variable costs. This reflects that most agricultural equipment is durable and does not require repurchase each season. Hoes and buckets are routinely used in farming activities, including land preparation, watering, and post-harvest operations. Furthermore, the low fixed costs indicate that most of the agricultural equipment used by farmers has a relatively long lifespan, thus reducing the cost burden each season. This factor is important in supporting production efficiency and can help increase farmers' profit margins in the long term (Santoso et al., 2023).

Thus, fixed costs contribute to the financing structure of rice farming businesses, but their value is not too large and tends to be stable over time, so that their influence on total production costs is relatively small compared to variable cost components.

2. Variable Costs

Variable costs are all expenses incurred by farmers for production needs that are not fixed and depend on the volume or intensity of farming activities carried out. These costs vary according to the level of production input use, the area of land cultivated, and the frequency of field activities. In other words , the greater the production activity or the larger the area of land cultivated, the higher the variable costs incurred by farmers. In this study, the variable costs analyzed include several main components, namely: fertilizer, pesticides, labor, seeds, sacks, tractor rental, and diesel fue (Saragih, Kuswardani, & Hasibuan, 2019). All of these components are direct inputs used in the rice farming process, from land preparation to post-harvest.

Table 7. Average Fixed Costs of Paddy Farming per Respondent

No	Component	Average Variable Cost per Respondent (Rp)
1	Fertilizer	Rp. 370,677
2	Pesticide	Rp. 253,677
3	Labor	Rp. 896,774
4	Seed	Rp. 94,677
5	Bag	Rp. 26,484
6	Tractor Rental	Rp. 146,516
7	Solar	Rp. 28,452
Total		**Rp. 1,817,258**

This breakdown of variable costs illustrates that the financing structure of lowland rice farming relies heavily on direct inputs that are consumable and incurred routinely each season. The largest variable cost component is labor, accounting for nearly 50% of total variable costs (RAHAMAN et al., 2022). This indicates that lowland rice farming in the research location still relies on manual labor and is not yet fully mechanized. Efficient use of production inputs such as fertilizer, labor, and pesticides is key to managing cost structures and determining farmer profitability. Effective and efficient variable cost management will significantly impact the sustainability of farming, particularly in the face of challenges such as climate change, fluctuating input prices, and labor availability (Badeni & Saparahayuningsih, 2022).

3. Income from Paddy Farming

Table 8. Description of Rice Farming Income

No	Description	Average Value (Rp)
1	Revenue (TR = Y × P)	
	A. Production (Y) (Kg)	3,279
	B. Production Price (P) (Rp)	5,000
	Total Revenue	16,395,000
2	Cost	
	A. Variable Cost (VC)	
	- Total Workforce	3,477,600
	- Fertilizer	
	• Urea	851,987
	• TSP	474,919
	• ZA	103,583
	• Post	87,948
	- Pesticides	
	➢ Insecticide	412,959
	➢ Herbicides	377,302
	- Other Costs	
	• Tractor Rental	207,692
	• Bag	102,185
	• Solar	116,308
	• Seeds	329,815
	Total Variable Cost (VC)	6,542,298
	B. Fixed Costs (FC)	
	- Tax	-
	- Equipment Depreciation	

	• Hoe	47,747
	• Sprayer	211,658
	Total Fixed Cost (FC)	259,405
3	Total Production Cost (TC)	6,801,703
4	Income (PD = TR – TC)	9,593,297

Based on the research results presented in Table 8, it can be seen that the average income obtained by farmers from paddy farming is IDR 16,395,000 per hectare per season. This income was obtained from an average production of 3,279 kilograms of rice per hectare with a selling price of IDR 5,000 per kilogram. This income reflects the gross income earned before being reduced by various production cost components.

In carrying out farming, farmers incur costs which are divided into two types, namely variable costs and fixed costs. Variable costs are the largest component in the production cost structure, with an average total of Rp 6,542,298 per hectare per season. These costs include expenses for labor, fertilizer, pesticides, tractor rental, diesel fuel, sacks, and seeds. Labor costs are the largest among other components, indicating that the rice cultivation system still relies heavily on human labor (Widodo et al., 2023).

In addition to variable costs, farmers also bear fixed costs of IDR 259,405 which consist of depreciation of agricultural tools such as hoes and sprayers. In this study, no expenditure on taxes was found because the majority of respondents did not have land certificates, so they were not subject to land and building tax (Riyadi, 2019).

Adding up the total production costs, consisting of variable and fixed costs, the total expenditure for farmers is Rp 6,801,703 per hectare per season. After subtracting these total production costs, the net income earned by farmers from lowland rice farming is Rp 9,593,297 per hectare per season. This income value indicates that lowland rice farming at the research site still provides significant profits for farmers (Mitra & Putra, 2024).

However, the magnitude of these profits is greatly influenced by the volume of production and the efficiency of input use. Therefore, to increase income, farmers need to pay attention to selecting superior varieties, using fertilizers and pesticides appropriately, and managing their workforce more efficiently. In this way, the income generated can be more optimal and the welfare of farmers can continue to be improved.

Discussion

The results of the study show that paddy farming in Jati Makmur Village generally still provides significant profits for farmers. This is reflected in the average net income of Rp 9,593,297 per hectare per planting season. This figure is obtained from total revenue of Rp 16,395,000 minus total production costs (fixed and variable costs) of Rp 6,801,703. The production cost structure shows that variable costs still dominate farmers' expenses, particularly labor, which reaches Rp 3,477,600. The high reliance on manual labor indicates minimal mechanization of the rice cultivation process in this region. Other costs, such as fertilizer and pesticides, also contribute

significantly, demonstrating that efficient use of these inputs significantly determines profit margins.

These findings align with research by Marzuki et al. (Saogo & Chaerani, 2022) which showed that variable cost components, particularly labor and fertilizer, are determining factors in production cost efficiency and farmer profitability. The study concluded that the more efficient the use of production inputs, the higher the net income earned by farmers. Furthermore, a study by Silalahi & Sembiring (Masitah, Yoesoef, Lubis, & Kusumawati, 2023) stated that a farm cost structure dominated by variable costs indicates the need for intervention from the government or related institutions in the form of production input assistance or mechanization technology to reduce costs and increase productivity (Edy, Alzarliani, Santika, & Amin, 2023).

The fixed costs in this study only include depreciation of tools in the form of hoes and sprayers, which in total are worth IDR 259,405. Low fixed costs indicate that most farmers use their own production equipment with a fairly long lifespan. This can support long-term cost efficiency, as explained by Soekartawi (Taufik Hidayat, 2024) that tools that have a long economic life can reduce fixed costs per planting season.

With relatively high net income and a cost structure that can still be optimized, the potential for developing lowland rice farming in the research area is significant (Saranani, 2020). To sustainably increase farmer profits, training in the appropriate use of inputs, increased access to subsidized fertilizers, and assistance with agricultural tools and machinery (alsintan) that can reduce reliance on manual labor are needed (Gusvita, 2020).

CONCLUSION

1. The Income of Rice Farmers in Jati Makmur Village

The results of the study indicate that the average net income earned by rice farmers in Jati Makmur Village per hectare per planting season is Rp 9,593,297. This income is obtained from total revenue of Rp 16,395,000 minus total production costs of Rp 6,801,703, which consists of variable costs and fixed costs. This income value indicates that lowland rice farming in the study area is still quite financially profitable for farmers.

2. Feasibility of Paddy Farming in Jati Makmur Village

Based on the large difference between revenue and production costs, it can be concluded that lowland rice farming is economically feasible. With a net income of nearly IDR 10 million per hectare per season and a cost structure that can still be reduced, this farming activity is considered efficient. Furthermore, the income-to-cost ratio indicates a high level of profitability, making this farming business a potential primary livelihood for local farmers. However, increased efficiency in the use of production inputs and support for production facilities are still needed to enhance the long-term viability and sustainability of this business.

Suggestions

1. For Farmers

Farmers are advised to be more efficient in using production inputs such as labor, fertilizer, and pesticides to reduce variable costs. The use of appropriate agricultural tools and machinery (alsintan) also needs to be increased to reduce reliance on expensive and scarce manual labor.

2. For Local Government

The government is expected to provide support in the form of subsidies for production inputs (fertilizer, superior seeds, pesticides), agricultural extension services, and access to agricultural credit. Furthermore, providing agricultural equipment and training in the use of modern agricultural technology is crucial for increasing productivity and cost efficiency.

3. For Financial and Private Institutions

Financial institutions such as farmer cooperatives and agricultural banks need to provide access to low-interest financing for small farmers so they can develop their farming businesses sustainably. The private sector can also be involved in providing agricultural equipment and agricultural product markets through partnership schemes.

4. For Further Researchers

Further research can be conducted by expanding the research area or including additional variables such as marketing aspects, access to capital, use of digital agricultural technology, and climate risk factors, in order to provide a more comprehensive picture of the feasibility and sustainability of lowland rice farming.

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