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Analysis of Farmers' Income from Lebak Rice Farming in Gandus District, Palembang City

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Abstract

The agricultural sector plays an important role in improving community welfare and supporting food security in Indonesia. One of the important rice-producing areas is Gandus District, which is dominated by lebak swamp rice farming. This study aimed to analyze the income and welfare conditions of lebak rice farmers in Gandus District. The research used a quantitative survey method with 87 respondents selected through simple random sampling from a population of 658 farmers. Data were collected through interviews, questionnaires, and secondary sources, then analyzed descriptively using farm income analysis. The results showed that the average total production cost of rice farming was IDR 4,273,380 per land unit per year, while the average revenue reached IDR 28,421,092 per year. The average farmer income was IDR 24,147,713 per land unit per year. Rice farming in Gandus District is considered profitable; however, farmers generally cultivate rice only once a year due to flooding and drought conditions in lebak swamp land. As a result, farming income is often insufficient to fully support household needs, causing many farmers to seek additional income from other occupations. Therefore, stronger government support through agricultural assistance, extension services, and farming facilities is needed to improve farmer welfare and maintain the sustainability of rice farming.

Keywords: Agricultural Sustainability; Farmer Welfare; Farm Income; Lebak Swamp Land; Rice Farming

1. Introduction

The agricultural sector is an influential sector in national economic growth. The role of the agricultural sector in economic development is as a source of income, and the opening of job opportunities, poverty alleviation, and increasing national food security. The agricultural sector has become one of the main sources of job creation for the Indonesian people, with the rice commodity as one of the mainstay crops. This is inseparable from the geographical and climatic conditions of Indonesia which are very supportive of agricultural activities. South Sumatra Province is one of the regions that contributes significantly to national rice production. The development of agriculture in an area not only aims to increase production, but also leads to an increase in community income, an increase in employment expectations, an improvement in the standard of living of farmers and an increase in welfare [1].

South Sumatra Province is one of the leading rice-producing provinces in Indonesia. In 2024, the harvested land area will reach 521,092 hectares and in 2025, the harvest area will increase by 114,361 hectares, bringing the total area to 635,453 hectares. Rice production in South Sumatra Province will reach 2,909,412 tons in 2024, and will increase by 684,300 tons, bringing the total production to 3,593,712 tons in 2025 [2].

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Palembang City is one of the areas in South Sumatra Province, although Palembang is an urban area, it still has an area used to produce rice. Supporting geographical factors, such as the availability of water and fertile soil, make this area ideal for agricultural activities [3].

Agricultural land in Palembang mostly consists of swamp rice fields located around the Musi River, especially in Gandus, Kertapati, and Kalidoni Districts. Gandus District is known as one of the rice producing centers in Palembang. The existence of rice fields in Gandus District, which is on the outskirts of the city, makes the land vulnerable to changing functions, especially into residential and industrial areas.

Gandus District recorded a harvest area of 620.8 hectares with rice production reaching 3,539 tons. This figure shows that Gandus District is one of the sub-districts that has a significant contribution to rice production in Palembang City. The large harvest area is an indication that optimal land management can provide high production yields with great agricultural potential, especially in rice cultivation in swamp land [4].

The swamp land is an area that is submerged in water for a certain period of time (at least one month), with the water level affected by rainfall, both from the location and the surrounding area. Based on the height and duration of the waterlogging, swamp land is divided into three categories: shallow valley, middle valley, and deep valley. Lebak Pematang land is a type of lebak land that has a standing water level of less than 50 cm for less than 3 months. Meanwhile, the middle lebak land is land with a standing height of between 50-100 cm that is submerged for 3-6 months. Deep valley land is land that has a standing water level of more than 100 cm and is submerged for more than 6 months [5]. Rawa Lebak is divided into Lebak Pematang (which is good for development into residential areas, agriculture, etc.), Lebak Tengah (for agriculture), and Lebak Dalam which are always flooded throughout the year, either as a surface water reservoir or reservoir for fishery cultivation [6][7][8].

Based on data information from the Palembang City Agriculture and Food Security Office, by 2025, the total area of lebak rice fields in Gandus District will reach 620 hectares. The land consists of 93 ha (15%), 217 ha (35%) of the middle valley, and 310 ha (50%) of deep valley. The average productivity of swamp rice in Gandus District was recorded at 5.70 tons/ha. Agricultural areas, especially rice fields in suburban areas such as Gandus District, must be strengthened with maximum results in order to increase the income of the farmers who manage them. This is because without an improvement in welfare for farmers, there is a high risk of changing the function of rice fields to other uses, such as housing and industry [4]. Eighty percent of the people in Gandus District depend on rice farming as their main source of income, while the remaining income is obtained from additional occupations such as labor work and gardening to support household needs [9][10]. However, success in managing swamp land is not only determined by the area of land, but also by the level of experience of farmers in cultivating the land. Farmers who have been involved in farming activities for a long time usually have a better understanding of land characteristics, appropriate cultivation techniques, and how to optimize yields in a cost-efficient manner [11].

Income is one of the factors that can determine the attractiveness of farmers to choose the agricultural business they want to manage, in addition to the factor of ease of farmers in managing their business and supporting skills. Farmers' income is influenced by the cultivation of agricultural processing, can be influenced by labor, land area, capital, and efficiency of marketing channels are factors that affect farmers' income. The income level of a farmer depends on the level of income and expenditure during a given period. The personal income of the product from the total production quantity and selling price per unit. While cost is the value of production equipment used in the production process, wages and the like. Based on the explanation above, This research to analyze income of rice farmers in Gandus District, Palembang City.

2. Material and methods

2.1. Place and Time of Research

This research was held in Gandus District, Palembang City. The selection of the location was made deliberately because Gandus District is known as one of the largest rice-producing areas in Palembang City. This research process lasts from January 2026 until April 2026.

2.2. Research Methods

The method applied in this study is a survey with a quantity-based approach. Surveys are a technique commonly used in social research to collect information with the aim of explaining the characteristics of a very large population that cannot be observed directly [12]. In quantitative research, various data in the form of numbers are used that will be

calculated and analyzed afterwards. The data used in this study consisted of primary data and secondary data. Primary data was obtained by interviewing rice farmers directly using questionnaire tools. Secondary data was obtained from interviews with various related parties and library sources, such as books, the internet, and journals.

2.3. Sample Withdrawal Methods

The sample extraction method used in this study is the simple random sampling method or simple random method. The number of populations with almost the same characteristics to be observed is 658 rice farmers in Gandus District, Palembang City. With the same activities, they have their own land. To determine the number of sample sizes, the Slovin formula was used as follows [13]

$$N = \frac{n}{1 + n(e)^2}$$

Description:

- n = Sample Size
- n = population size
- e = Desired Accuracy Limit due to population sampling errors. The confidence interval used is 90%.

$$N = \frac{658}{1 + 658(10\%)^2} = 86.8 = 87$$

The calculation of the sample using the slovin formula above, the number of samples used in this study is 87 heads of rice farming families in Gandus District, Palembang City.

2.4. Data Collection Methods

The research data consists of primary data and secondary data. Primary data were obtained by observation and direct interviews using questionnaires as a guide to the list of questions. Meanwhile, secondary data is obtained from related agencies such as the National Statistics Agency, regional data as well as various literature or other related supporting literature and literature sources.

2.5. Data Processing Methods

The data obtained from the field is processed and analyzed qualitatively and quantitatively. The data is processed in tabulation form, analyzed mathematically using the help of *the Microsoft Excel* program and then described descriptively. The results of the analysis are expected to be able to answer the goals to be achieved.

To calculate the income of rice farmers in Gandus District, Palembang City. So it is calculated by revenue minus the total cost of production. The difference between the value of production (revenue) and the costs incurred is farming income. Systematically it can be written as follows [14]

$$I = TR - TC$$

Where:

- I = Revenue (Rp/ha/th)
- TR = Total Revenue (Rp/ Ha /Th)
- TC = Total Cost (Rp/Ha /Th)

To calculate income in farming using the formula:

$$TR = P \times Q$$

Where:

- TR = Total Revenue (Rp/Ha/Year)
- P = Product Price (Rp/Kg)

- Q = Total Products (Rp/Ha/Th)

To find out the total cost use the following formula:

$$TC = FC + VC$$

Where:

- TC = Total cost (Rp/Ha/Yr)
- FC = Fixed fee (Rp/Ha/Year)
- VC = Variable cost (Rp/Ha/Th)

3. Results and discussion

3.1. Overview of Rice Farming in Gandus District

Gandus District has a very large area of swamp rice fields, with an average land size of 1,043 hectares, where the majority of the population depends on swamp rice planting activities. The land used by rice farmers in Gandus District is private property. Farmers take advantage of the middle lebak swamp area, which is generally used by farmers in Gandus District to plant rice once a year, usually between April–June for planting, with harvest around August–October, depending on the season. The rice harvest is used to meet household needs and sold in the form of grain.

For example, farmers carry out rice farming in Gandus District only once a year, this happens due to seasonal factors. In the rainy season, farmers' rice fields cannot be planted with rice because the land is flooded by water which has a high enough volume so that it is not possible for seeding and planting, especially in the swamp land type. Meanwhile, in the dry season in the rice fields, there will be drought which affects the soil structure to be cracked so that the land cannot be planted.

Rice farming activities occur from April to June, starting with land clearing and seed sowing in March where the seeds are obtained from government assistance. The types of seeds used are various, namely Ciherang rice seeds and IR 32. Furthermore, planting is carried out in April after going through the seeding stage for 20-30 days, when the height of the rice plant is about one inch or approximately 20-30 cm. The rice seedlings that have been sown are then planted on 3-5 cultivated land with an average distance of 20 cm x 20 cm.

The process from post-harvest to sale of Harvested Dry Grain in Gandus District has now turned into a very efficient step thanks to the use of machines. After the combine harvester machine completes the stages of cutting, threshing, and cleaning in the field, the grain is immediately put into sacks placed at the edge of the rice field, ready to be sold. Most farmers opt for an on-site system of selling to waiting collectors by transport truck, to avoid additional transportation costs and the risk of heavy shrinkage.

Based on interviews conducted with farmers in Gandus District regarding their economic and social conditions, farmers revealed that the income from farming in the swamp land is not enough for daily needs. They are only able to plant and harvest once a year. To meet the needs of their families, some farmers work as rubber farmers. The average income from the rubber business they earn reaches IDR 300,000 - IDR 500,000 per week, which can help them meet their daily needs.

3.2. Rice Farming Income in Gandus District

3.2.1. Fixed Costs of Rice Farming

Fixed costs are costs incurred by farmers that are not used up in one use during the production process such as the purchase of tools, namely hoes, sickles, machetes and sprayers. The fixed costs for farmers in Gandus District are the cost of shrinking hoes, sickles, machetes and sprayers. Hoes are used for tillage before planting and seedbeds to shape the soil to be more suitable for use as a planting medium. Machetes are used to clean weeds that can interfere with the growth of rice plants. Sprayers are used to spray pesticides to eradicate plant pest organisms. Sickles are used at harvest time to cut rice stalks. Table 1 will explain the details of the fixed costs of rice farmers in Gandus District as follows.

Table 1 Average Fixed Costs in Rice Farming in Gandus District

Description	Average Depreciation Cost (Lg)	Percentage (%)
Hoe	15,885	14
Sickle	10,552	10
Stuttgart	12,483	11
Sprayer	71,494	65
Quantity	110,414	100

The costs incurred by farmers in Gandus District with a total expenditure of Rp110,414/lg are due to the fixed costs that can be used more than 1 time of production. The highest fixed cost incurred by farmers is the cost of depreciation of sprayer equipment of Rp71,494/lg or 65 percent used in farming activities for the pesticide spraying process, and the lowest fixed cost incurred by farmers is the cost of sickle tools of Rp10,552/lg or 10 percent used by farmers in farming activities to cut rice stalks.

3.2.2. Variable Costs of Rice Farming

Variable costs are costs incurred by rice farmers and are exhausted in one production, variable costs in this study consist of the cost of seeds, fertilizers, medicines, and labor costs. The average variable cost of rice farming can be seen in the following table.

Table 2 Average Variable Cost of Rice Farming in Gandus District

Description	Average Variable Cost (Lg)	Percentage (%)
Seed (kg/lg)	371,816	9
Urea Fertilizer (kg/lg)	405,342	10
NPK Fertilizer (Kg/Lg)	469,253	11
Pesticide (Ltr/Lg)	234,945	6
Workforce	2,681,609	64
Quantity	4,162,966	100

Seeds are one of the important elements that affect success in agriculture. The selection and use of quality seeds in farming is a must that must be fulfilled by farmers to obtain high-quality products. Based on the research that has been conducted, the majority of respondent farmers get seeds through purchase, and most of them choose Ciherang and IR 32 varieties seeds. This is because both varieties are considered by farmers to have a good taste and are liked by the community around the research site. The average use of seeds reached 46 kg/lg/mt at a price of 8000/kg.

The use of chemical fertilizers used by the respondent farmers is urea fertilizer, and NPK. The low purchasing power of farmers and the limited fertilizer available cause the use of fertilizer not to be in accordance with the recommended dose, so that the average use of urea fertilizer is 176 kg/lg/mt at a price of 2300/kg and the use of NPK fertilizer is 188 kg/lg/mt at a price of 2500/kg.

Based on the Regulation of the Minister of Agriculture of the Republic of Indonesia Number 13 of 2018 concerning the Use of N, P, K Fertilizer Doses for rice-on-rice fields, the recommended dosage for Gandus District is Urea as much as 250 kg/ha and NPK 300 kg/ha per planting season. When compared to the actual condition of the respondent farmers, there was a shortfall of 74 kg/ha for urea and 112 kg/ha for NPK. This difference in dose has the potential to reduce the productivity of rice plants because the available macronutrients N, P, and K are not optimal to support the vegetative and generative growth phases. Low purchasing power and limited availability of subsidized fertilizers are the main factors that have not reached the recommended dose at the farmer level [15].

Based on the results of interviews at the research site, the pests that attack rice field plants in Gandus District are caterpillars that attack rice stems and leaves, birds that attack when the rice begins to turn yellow and rats that damage

the crop area, as for the type of pesticide used by the respondent farmers, namely Regen. The average pesticide use is 3 ltr/lg at a price of 80,000/liter.

Labor is one of the elements of production that needs to be adequately considered in production activities. This depends not only on the availability of labor, but also on the quality and variety of labor types that need to be considered. The number of workers is often linked to quality, gender, season, and wages. If the aspect of labor quality is neglected, it can cause disruptions in the production process [14].

Labor is also one of the crucial components in the management of rice farming. The utilization of labor in rice farming includes various activities such as land cultivation, planting, weed cleaning, fertilization, and harvesting. The results of interviews at the research site showed that generally rice field farmers in Gandus District employ workers with a wage system that applies to Rp 100,000 per day and does not distinguish between men and women.

3.3. Total Cost of Production of Rice Farming

The total cost of production is the sum of the total fixed costs and the total variable costs. The small size of the production cost can affect income, the larger the production cost, the greater the reduction in income, which means that the income to be received is small. The average total cost of rice farming production in Gandus District can be seen in Table 3. Follows

Table 3 Rice farming production costs in Gandus District

Description	Average Depreciation Cost (Lg)	Percentage (%)
Fixed Fees	110,414	5
Variable Costs	4,162,966	95
Quantity	4,273,380	100

total expenses that include fixed costs and variable costs. Every activity in farming always involves costs to manage the business in order to get the desired results [14]. The total cost for paddy farming in Gandus District is shown in the table above. This shows that the total expenditure made by paddy farmers in Gandus District consists of variable costs of Rp4,162,966 and fixed costs of Rp110.414. The average total expenditure for paddy rice farming reached Rp4,273,380/lg.

3.3.1. Rice Farming Revenue

Revenue refers to the total money received by farmers from the sale of grain products, which is calculated from the yield times between the production volume and the selling price. If production increases, the income obtained by farmers will also increase. Income is the amount of profit that farmers make from farming activities, which is calculated from the difference between the total revenue and the total costs incurred. The average income received by farmers who were sampled in Gandus District is as follows.

Table 4 Average Rice Farming Revenue in Gandus District

Description	Value (Rp/Th)
Production (Kg/Lg/GKP)	4,659
Price (Rp/Kg)	6,100
Receipts (Rp/Lg)	28,421,092

Revenue from the paddy farming business is obtained by multiplying the production obtained during one planting season by the selling price that applies at the farmer level. The amount of revenue received by farmers depends on the amount of production and the selling price applied. Revenue is calculated by multiplying the amount of production by the price sold (Wafda, 2014). The average rice production yield obtained by farmers in Gandus District during one planting season varies depending on the area of land they manage. The average farm revenue in Gandus District reached Rp. 28,421,092 with an average production of 4,659 kg/lg and the average price applicable at the farmer level was Rp. 6,100/kg. The standard of rice production in lebak rice fields is greatly influenced by the typology of inundation. Based

on IAARD data, shallow valley land with inundation of 25–50 cm has a production potential of 4.5–6.0 tons/ha GKP, middle valley with inundation of 50–100 cm is 3.5–5.0 tons/ha GKP, while deep valley with inundation of >100 cm is only 2.5–4.0 tons/ha GKP.

3.3.2. Rice Farming Income

The income in question is the income of rice farming. Rice farming income is obtained from the difference between the revenue and the total cost of production incurred. The amount of revenue and the total cost of rice farming production will affect rice farming income. The average income of rice farming can be seen in Table 5. follows.

Table 5 Average Income of Rice Farming in Gandus District

Description	Value (Rp/Th)
Admission (Rp/Lg/Th)	28,421,092
Total Production Cost (Rp/Lg/Th)	4,273,379
Income (Rp/Lg/Th)	24,147,713

Income from agricultural activities is the difference between the total income and the total expenditure incurred by farmers in a single planting season. This income becomes a financial source for farmers to meet the needs of their families. The income obtained by farmers can be assessed by how much rice yield they harvest; The more results obtained, the higher the income obtained, as long as the costs incurred do not exceed the revenue. The analysis of farm income aims to assess whether the agricultural activity is profitable or not [16]. The income of paddy rice farming in Gandus District can be seen in table 4.15. This shows that the average income of farmers in paddy farming is IDR 28,421,092, the average total farming cost is IDR 4,273,379, and the average income of rice farming is IDR 24,147,713/lg/year

4. Conclusion

The average cost incurred in rice farming per year in one production planting season in Gandus District is Rp. 4,273,379, and revenue is Rp. 28,421,092, resulting in income of Rp. 24,147,713. Government should pay more attention and increase the support provided to rice farmers in Gandus District, both in terms of counseling, assistance in the form of seeds, fertilizers, pesticides, or agricultural tools and machinery for rice farming businesses in order to improve the welfare of farmers.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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