

Analysis of consumption expenditures and determining factors of rice availability for households of lebak rice farmers in Kertapati District, Palembang

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ABSTRACT

Meeting nutritional needs is crucial for developing quality human resources, while food security depends on production capacity, purchasing power, and supply chain factors, influenced by socio-economic and ecological conditions. The research aimed to analyze the total income of farmer households, analyze the consumption expenditure of farmer households, and analyze the factors that influence the availability of rice for households of lowland rice farmers in Kertapati District, Palembang City. The research method used was a survey method. This research was carried out in July 2024 with a total of 50 samples selected simply at random. The data processing method used to answer the first and second objectives is mathematical calculations to calculate rice farming income, non-rice farming income and non-farming income, as well as calculating food and non-food consumption expenditure. Meanwhile, to answer the third objective, multiple linear regression analysis was used. The results of this research showed that: 1) The average total household income of Lebak rice farmers was 4,457,241 IDR/month. 2) household food consumption expenditure for Lebak rice farmers was 2,674,626 IDR/month, while non-food consumption expenditure was 1,594,396,-IDR/month. 3). The availability of rice for lowland rice farmers' households is 2.65 kg/month, which was included in the low criteria. Factors that influence the availability of rice for Lebak rice farming households were land area, income and age of the farmer. Land area and income has a positive effect, while farmer age has a negative effect.

Keywords: farmer households, food consumption, household expenditure, lowland rice, total income

INTRODUCTION

Meeting nutritional requirements is essential for human existence to cultivate quality human resources. The 2020-2024 Medium-Term Development Plan (RPJMN) emphasizes the significance of the agricultural sector in enhancing food security and competitiveness to develop Indonesian agriculture towards greater sophistication, autonomy, and modernization (Ministry of Agriculture, 2022).

Rice is a crucial commodity as over 90% of the Indonesian population considers it a staple diet. Owing to the rising population, along with enhanced education and economic levels, the demand for rice is consistently escalating in both quantity and quality. A robust food security

system can sustain the community's availability and nutritional requirements. Household food availability is determined by the capacity to produce food, purchasing power, and supply chain factors. Moreover, other factors influence food availability in a region, such as competition for land, human resources, and technology, food imports and assistance, as well as the range of food options present (Marshya et al., 2023).

The income of farmer households is a factor that can influence food availability. Income determinants might influence the dietary choices and consumption behaviors of agricultural households. The variety of food consumption can be affected by food availability, which is influenced by habitual conventions (traditions and beliefs) around food, nutritional

understanding, and food quality. The availability of food in each region varies due to farmers cultivating diverse crops influenced by natural conditions and ecological elements, including land type, climate, seasons, and biological resources (Prasetyaningtyas & Nindya, 2017). Farmer household living in food-insecure areas tend to have low food availability, mainly due to the limited land they own and low productivity (Ridwan & Dian Lestari, 2018).

Income influences the household's expenditure levels. As income rises, purchasing power and availability of higher-quality food improve. Income influences the type and quantity of food that may be acquired; so, restricted income results in inadequate food availability (Nisa & Triani, 2024). Due to the rise in agricultural production inputs like fertilizers and the escalating prices of essential commodities, farming households are compelled to expend greater financial resources, resulting in certain households facing difficulties in accessing food. Consequently, many households are susceptible to food insecurity.

The prospective expanse of swamp land in South Sumatra is around 3 million hectares, comprising 1.6 million hectares of marshland and 1.4 million hectares of swamp land. Palembang, located in the South Sumatra Province, possesses wetlands that can be utilized not only for residential construction but also for agricultural purposes. In Palembang City, sub-optimal land utilization for agricultural operations predominantly occurs in the suburbs, while central areas have largely been allocated for economic development. The limited land availability and escalating land conversion pose a significant challenge to farmers in Palembang City, jeopardizing their ability to sustain agricultural activities for family sustenance (Arbi et al., 2021).

Kertapati District is one of the sub-districts that significantly contributes to rice production in Palembang City. The area is characterized by marshes and possesses the capacity for rice cultivation to meet the food requirements of homes and the community. Table 1 illustrates that in 2020, Kertapati District produced 11,534.8 tons of rice, achieving a productivity level of 7.2 gkp/ton/ha (BPS, 2021).

Table 1. Harvest area, productivity, and rice production in Kertapati District, Palembang City in 2020

District	Harvest Area (ha)	Productivity (gkp/ton/ha)	Production (ton)
Iilir Barat II	10.30	5.2	53.6
Gandus	997.30	6.4	6,382.70
Seberang Ulu I	14.50	5.6	81.20
Kertapati	1,603.30	7.2	11,534.80
SeberangUlu II	4.80	5.2	25.00
Plaju	342.50	5.6	1,918.00
Iilir Barat I	12.60	5.6	70.60
Iilir Barat II	30.00	5.2	156.00
Kalidoni	813.30	5.2	4,229.20
Sematang	116.10	5.2	603.70
Borang			

Under this circumstance, it is essential to examine consumer expenditure and the factors influencing the availability of rice in the families of Lebak rice farmers. This investigation helps elucidate the extent of rice availability in the families of Lebak rice farmers and discern the elements influencing it. The objective of this research was to examine the overall income of agricultural households, assess the consumption expenditures of agricultural households, and investigate the factors influencing rice availability for rice farming households in Kertapati District, Palembang City.

MATERIALS AND METHODS

Place and Time

The study was conducted in Karyajaya Village, Kertapati District, Palembang City. The selection of the research location was conducted purposefully, considering that this area possesses extensive agricultural land, significant rice production, and the highest concentration of farmer households in Kertapati District. The data collection in the field were carried out from July to September 2024.

Methods

This research used a survey method. The sample was obtained using simple random selection, selecting 50 farmers from a population of 158 members. This study utilized primary and secondary data, which were subsequently processed by tabulation for systematic analysis employing several pertinent mathematical formulas.

To calculate the income of Lebak rice farming using the following formula (Sugesti et al., 2015):
Information:

$$\pi = TR - TC = (Y \cdot Py) - (FC + VC)$$

π = Total income from rice farming (IDR)
 TR = Total rice farming revenue (IDR)
 TC = Total cost (IDR)
 Y = Amount of rice production (kg)
 Py = Rice selling price (IDR/kg)
 FC = Total fixed cost (IDR)
 VC = Total variable cost (IDR)

Furthermore, if the total income for rice farming had been obtained, the formula for total income of farmer households was used with the following formula (Sugesti et al., 2015):

$$Prt = Pon\text{-}farm + Poff\text{-}farm + Pnon\text{-}farm$$

Information:

Prt = Household income of rice farmers
 Pon-farm paddy farming = Rice farming income
 Poff-farm = Non-rice farming income
 Pnon-farm = Non-farm income

Simultaneously, the expenditure on food and non-food consumption could be systematically studied in tabular form, focusing on the kind, quantity, and cost of consumed items. The calculations of PKP and PKNP were as followed (Vaulina et al., 2019):

$$\frac{PP}{PP + PNP} \times 100\%$$

$$\frac{PNP}{PP + PNP} \times 100\%$$

Information:

PKP = Proportion of Food Consumption (%)
 PKNP = Proportion of Non-Food Consumption (%)
 PP = Food Expenditure (IDR/month)
 PNP = Non-Food Expenditure (IDR/month)

Data Analysis

The analysis of the determinants of rice availability in Lebak rice farmers households uses multiple linear regression with a *Cobb-Douglas*

type production function, where rice availability was determined as a dependent variable while land area, income, grain price, number of family members, and farmer age were determined as independent variables). The equation of production functions was as followed (Karmini, 2018):

$$Y = \alpha \cdot X_1^{\beta_1} \cdot X_2^{\beta_2} \cdot X_3^{\beta_3} \cdot X_4^{\beta_4} \cdot X_5^{\beta_5} \cdot e^u$$

The above equation was then transformed into a logarithm form so that the parameters could be guessed using the smallest quadrant method or OLS (*Ordinary Least Square*) and then processed with the help of the IBM SPSS version 25 program to get more accurate results. Equations in logarithmic form could be written as followed:

Availability of Rice for Lebak Farmers' Households

$$\log Y = \log \alpha + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + \beta_5 \log X_5 + u$$

Information:

Y = Availability of household rice (kg/cap/ha)
 X_1 = Land area (ha)
 X_2 = Income (IDR/yr)
 X_3 = Grain price (IDR/yr)
 X_4 = Number of family members (person)
 X_5 = Farmer's age (years)
 α = Intercept
 $\beta_1 - \beta_5$ = Expected parameters/ regression coefficients
 e = Disturbing error (*error*)
 u = Residual

RESULTS

Production Costs and Receipts of Rice Farming Fixed Cost

Fixed costs were costs that must be incurred by farmers and do not run out in one use during farming. The fixed cost in question was the depreciation cost of agricultural tools. Agricultural tools used in rice farming were hoes, machetes, sickles, and hand sprayers. The average fixed cost for lebak rice farming in Kertapati District could be seen in Table 2.

Table 2. Average fixed cost of rice farming

Description	Average Fixed Cost (IDR /ha/year)	Percentage (%)
Hoe	43,194	18.79
Machetes	48,348	21.03
Sickles	52,426	22.80
Hand Sprayer	85,972	37.39
Total	229,940	100.00

The average fixed cost incurred was 299,940 IDR per hectare per year. The highest average fixed cost incurred by rice farmers was *hand sprayer* which reaches more than 37 percent of the total fixed cost of rice farming on lebak land.

Variable Cost

Variable costs were the amount of money that farmers have to spend on the materials needed in one year. The following average variable costs of rice farming could be seen in Table 3.

Based on Table 3 above, it could be seen that the average variable cost incurred by rice farmers was 3,751,805 IDR/ha/year. The average variable cost highest incurred for labor was 2,503,465 IDR/ha/year or 66.73 percent of the total variable cost. Table 3 also showed that rice farming on lebak land does not incur seed costs because rice seeds come from government assistance.

Table 3. Average variable cost of rice farming

Description	Average Variable Cost (IDR/ha/year)	Percentage (%)
Herbisida	344,525	9.18
Fertilizer	503,815	13.43
Description	Average Variable Cost (IDR/ha/year)	Percentage (%)
Pesticides	400,000	10.66
Seed	0	0.00
Workforce	2,503,465	66.73
Total	3,751,805	33.27

Total Cost

The total cost of production was the total amount of costs incurred in farming. The cost was in the form of a sum of fixed costs and variable costs. The calculation of the total production costs incurred by rice farmers in Lebak land could be seen in Table 4.

Table 4. Average total production cost of rice farming

Description	Amount (IDR /ha/year)	Percentage (%)
Fixed Cost	229,940	5.77
Variabel Cost	3,751,805	94.23
Total	3,981,745	100

The average total production cost was 3,981,745 IDR/ha/per year with a percentage of 94.23 percent of the total cost.

Rice Farming Receipts

Revenue was the result of the multiplication between the large amount of production and the selling price at that time. Rice farmers in Lebak land in Kertapati District still sell their production in the form of harvested dry grain (GKP). The higher the selling price and production produced, the greater the income obtained by farmers. The details of the average rice farming revenue could be seen in Table 5.

Table 5. Average rice farming revenue

Component	Value
Average Production (kg/ha/year)	5,041
Average Price (IDR)	6,214
Total Revenue (IDR/ha/year)	31,323,633

The average rice production in Lebak land was 5,041 kg/ha/year with a selling price of 6,214,- IDR. Thus, the average revenue of rice farming in Lebak land was 31,323,633 IDR/ha/year.

Income of Rice Farmers

Rice Farming Income

Rice farming income was obtained from the result of the reduction between revenue and total production costs calculated within one year. The average income from rice farming was 27,341,887,- IDR/year or 2,278,491,- IDR/month (Table 6).

Table 6. Average rice farming income

Description	Value
Total Production Cost (IDR/year)	3,981,754
Total Revenue (IDR/year)	31,323,633
Total Revenue (IDR/year)	27,341,887
Total Revenue (IDR/month)	2,278,491

Non-Farm Income

Rice farmers in Lebak land do not all earn income from relying only on rice farming, but there were some who have side jobs other than rice farming, including trading, raising livestock, vegetable farming, and as laborers. The following average income from outside rice farming could be seen in Table 7.

Table 7 showed that the average income from outside rice farming reaches 2,178,750 IDR/month. The largest source of income outside rice farming for farmers comes from vegetable farming, which was 4,000,000 IDR/month.

Table 7. Average income from outside rice farming

Source of Income	Average Income (IDR/month)
Trading	2,600,000
Livestock	1,200,000
Laborer	2,493,750
Vegetable Farming	4,000,000
Honorary personnel	600,000
Average	2,178,750

Total Income of Rice Farmer Households

The total household income of rice farmers was the total amount of income from rice farming and non-rice farming. The total income of rice farmers could be seen in Figure 1.

Total Household Income (IDR/month)

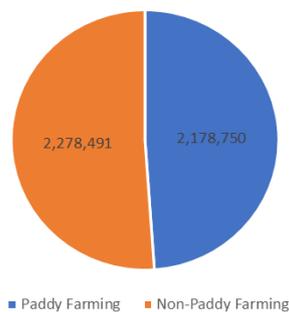


Figure 1. Total income of rice farmer households

Household Consumption Expenditure of Rice Farmers

Household consumption expenditure denotes the overall financial cost incurred by rice farmers to meet their families' daily needs. Household consumption spending was divided into two categories: food expenditure and non-food expenditure. Farmers' household consumption expenditure in the food category encompasses expenditures on rice, tubers, fish, meat, eggs, milk, vegetables, nuts, fruits, oils and fats, beverages, culinary spices, tobacco, and prepared meals and beverages. Non-food consumption expenditures include costs associated with domestic essentials and conveniences, various goods and services, healthcare, education,

clothing, taxes or insurance, and the needs of religious institutions and rituals. Table 8 and 9 depict the mean household consumption expenditure of rice producers.

Table 8. Average food consumption expenditure of rice farmer household

Food Consumption	Average (IDR /month)	Percentage (%)
Rice/other cereal	571,164	21.35
Tubers	77,152	2.88
Fish	210,360	7.87
Beef	45,000	1.68
Chicken	95,659	3.58
Egg	45,222	1.69
Milk	43,143	1.61
Vegetables	108,857	4.07
Beans	109,361	4.09
Fruits	110,576	4.13
Oil	74,238	2.78
Drinks & Beverage	167,779	6.27
Spices	226,846	8.48
Tobacco	619,857	23.18
Other	169,412	6.33
Total	2,674,626	100.00

Table 9. Average non-food consumption expenditure of rice farmer households

Non-Food Consumption	Average (IDR /month)	Percentage (%)
Housing and RT Facilities	280,778	17.61
Various Goods and Services	468,926	29.41
Education	269,929	16.93
Health	53,714	3.37
Clothes	34,167	2.14
Taxes & Insurance	225,455	14.14
Party/Religious Celebrations	261,429	16.40
Total	1,594,396	100.00

Proportion of Household Consumption Expenditure of Rice Farmers

The total household consumption expenditure of rice farmers could be calculated from the proportion of food consumption (PKP) and the

proportion of non-food consumption (PKNP). The proportion of household consumption expenditure of rice farmers in Lebak land was dominated by food consumption expenditure, which was 62.65 percent (Figure 2).

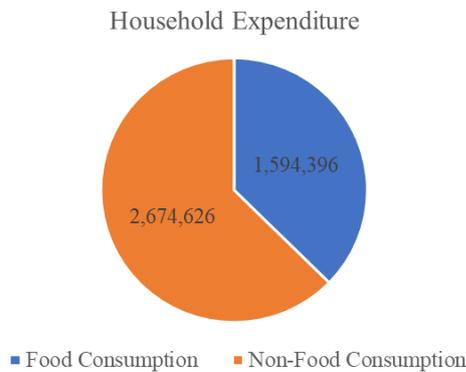


Figure 2. Average household consumption expenditure of rice farmers

Determinants of Rice Availability in Farmer Households

The results obtained using the cobb douglas-type multiple linear regression analysis could be seen in Table 10 as followed:

- The R-value of 0.757 indicates a robust association between the independent variables (Farmer Age, Land Area, Number of Family Members, Income, Grain Price) and the dependent variable (rice availability).
- R Square = 0.573 indicates that approximately 57.3% of the variability in rice availability was accounted for by the independent variables employed in the model. An F-value of 11.826 and a p-value less than 0.001 suggest that the overall model was statistically significant. The independent variables jointly exert a large impact on rice availability.
- The constant (intercept) of 3.030 signifies that when all independent variables were set to zero, the average monthly rice production was 3.030 kg. Nonetheless, this value lacks significance ($p = 0.305$).
- Land Area ($B = 0.838$, $p < 0.001$) = Land area exerts a considerable beneficial effect on rice supply. Every additional hectare of land enhances rice availability by 0.838 kg/month.
- Income ($B = 0.197$, $p = 0.006$): Farmers' income exerts a substantial favorable effect.

An increase of 1 million IDR/month in revenue will result in a 0.197 kg/month increase in rice supply.

- Grain price ($B = 0.000$, $p = 0.714$): The influence of grain price on rice availability was minimal, as the p value significantly exceeds 0.05. The number of family members ($B = 0.100$, $p = 0.438$) exerts a minor influence on rice availability.
- Farmer Age ($B = -0.039$, $p = 0.028$): Farmer age exerts a substantial negative effect. Each additional year of a farmer's age results in a reduction of rice availability by 0.039 kg/month.

Table 10. Multiple linier regression analysis

Model	Unstandardized Coefficients		Standardized Coefficients Beta	T	sig
	B	Std. Error			
(Constant)	3.030	2.920		1.038	.305
Land (ha)	.838	.143	.596	5.876	<.001
Revenue (Million IDR/month)	.197	.068	.292	2.881	.006
Price (IDR/kg)	.000	.000	-.038	-.369	.714
Number of Family Members (person)	.100	.128	.079	.782	.438
Age (year)	-.039	.017	-.234	-2.271	.028
R ²					0.573
R					0.757
F					11.826
Sig					<.001 ^b

a. *Dependent Variable:* Rice Availability (kg/month)

b. *Predictors:* (Constant), Farmer's Age (years), Land Area (ha), Number of Family Members (soul), Income (Million IDR /month), Price of Grain (IDR /kg)

DISCUSSION

Income serves as a key measure in assessing household wellbeing levels. Revenue is derived from the disparity between income and incurred

expenses. As expenses fall, income grows, resulting in an enhancement of welfare; conversely, as costs increase, income diminishes, leading to a decline in welfare (Aliismet et al., 2023).

The availability of staple food rice for rice farmers is also influenced by farm household income which comes from rice farming income, non-rice farming income and non-farming income. If the income of rice farming and its own production is not sufficient for the availability of staple food rice for the rice farmer household, non-rice farming income and non-farm business income can help meet the availability of staple food for the household rice itself (Mustika et al., 2022).

The total household income of Lebak rice farmers in Karyajaya Village comprises the aggregate of revenue derived from rice farming, non-rice farming, and non-agricultural sources. Additionally, it is incorporated into the income of the wife and children. Approximately 54% of rice farmers in Lebak engage in secondary occupations, primarily as laborers (59.25%), with a few involved in trading, ride-hailing services, and honorary positions. The aggregate monthly family income of Lebak rice farmers is 4,457,241 IDR. Rice cultivation accounted for 48.88 percent of overall income, and the remaining 51.11 percent is derived from non-rice agriculture and non-agricultural activities. Engaging in the non-agricultural sector is a strategy employed by individuals with lower average farming incomes to augment their household income, hence influencing the satisfaction of household rice requirements.

The findings of this study align with the research conducted by Rizki (2023) in Kramasan and Kemas Ridho Villages, which indicated that the majority of farmers engage in supplementary employment as laborers, while a minority are entrepreneurs, fishermen, or civil servants. Income is a crucial factor in ensuring food availability. Consequently, farming households need to seek additional income through non-agricultural activities. Non-agricultural income significantly influences the likelihood of a household being classified as non-poor. Mariyani et al. (2017) noted that the low income of farmers and the prices they must pay for rice can

adversely impact food availability for farming households.

Income influences household consumption expenditure. According to demand theory, an individual's income impacts the demand for goods and services. A change in income alters consumption levels; higher income enables individuals to enhance the quality, quantity, and variety of purchased consumer goods (Rahmi et al., 2013). Engel's theory posits that as household income increases, the proportion of expenditure on food consumption decreases. High-income groups exhibit a lower average propensity to consume compared to low-income groups. Conversely, low-income households typically allocate a larger portion of their income to essential needs, encompassing both individual necessities and consumption (food, clothing, housing) as well as certain social services (drinking water, sanitation, transportation, health, and education).

The demand for goods and services is influenced by an individual's income, which in turn affects the amount of consumption. The quality, quantity, and variety of consumer goods purchased are all influenced by income (Rahmi et al., 2013). Engel's theory posits that the percentage of expenditure on food consumption is lower in households with higher incomes, as the high-income group has a smaller average propensity to consume than low-income groups. Poor households, on the other hand, typically allocate a greater portion of their income to basic needs, which include individual needs and consumption (food, clothing, housing) and certain social service needs (drinking water, sanitation, transportation, health, and education). Multiple factors are projected to influence the availability of staple foods at the family level, including household size, maternal nutritional knowledge, food aid, food production, household income, and food expenditures.

The largest non-food consumption expenditure in farmer households is to buy goods and services, including the cost of vehicle fuel and cell phone credit, which is 468,926 IDR per month (29.41%) followed by housing and household facilities (17.61%). Judging from the proportion of food consumption expenditure which is larger than the proportion of non-food

consumption expenditure, it shows that rice farmer households in Lebak land, Kertapati District are categorized as low welfare levels. The results of the study are in line with research conducted by Pangaribuan et al. (2020), which showed that most households account for 60.76 percent of their food consumption expenditure. Likewise, Widya's research, (2015) shows that the proportion of household food expenditure of farm workers is 63.7 percent compared to the proportion of non-food consumption of 36.43 percent. This shows that household food consumption expenditure is greater than non-food consumption expenditure (> 50%), meaning that the level of household welfare is still low. The amount of consumption expenditure of farmers' households depends on the income received. If farmers' income increases, then the cost of consumption expenditure will also increase. Households with low incomes will tend to prioritize spending on food, while households with high incomes will do the opposite (Yunita et al., 2023). The land area and income exert a favorable influence, whereas the age of farmers has a negative impact. The results of this study align with the research by Mariyani et al. (2017), which indicates that land area, household income, education level, and farmer's age significantly affect the food availability of farming households.

The income variable is associated with household food security status via food availability. The findings of this study align with Susanti (2019) observation, indicating a favorable correlation between household income and food security status in the coastal region of Sidoarjo Regency. Similarly, the study by Sudiansyah et al. (2023) in Singaran Pati District, Bengkulu City, shows that factors positively influencing the food security level of rice farming households include income and land area. Meanwhile, expenditure, family size, household head's education, and household head's age negatively affect the household's food security level. Economic factors can also influence the food availability of farming households. The study by Marshya et al. (2023) on rice farming households in Sumabu Village, Luwu Regency, South Sulawesi, found that poverty and low income were major issues. The

primary occupation of the respondent farmers was farming, relying solely on agricultural income. However, some farmers sought to meet their household needs by taking side jobs outside the agricultural sector.

CONCLUSSION

The findings of this investigation are the aggregate monthly family income of Lebak rice farmers is 4,457,241 IDR. Income from Lebak rice cultivation constitutes 48.88 percent, whereas 51.12 percent is derived from non-rice and non-agricultural activities. The monthly household consumption expenditure of Lebak rice farmers totaled 4,269,022 IDR, comprising 62.65 percent for food and 37.35 percent for non-food items. A significant part of food consumption expenditure indicates that Lebak rice farmer households experience a low degree of welfare. The key determinants of rice availability in the families of Lebak rice farmers include land area, income, and the age of the farmers, all of which exert a major influence on rice availability. The land area and wealth exert a favorable influence, however the age of farmers has a detrimental effect.

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