UDC 332

INCOME AND ENERGY CONSUMPTION CORRELATIONS IN RICE FARMING HOUSEHOLDS OF THE CENTRAL AREA OF FOOD PRODUCTION, SOUTH KALIMANTAN

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ABSTRACT
The increase in population and land conversion causes limited land and weakening agricultural productivity so that an alternative is needed to answer the problem of food supply. The government has made efforts to empower women farmers to improve the use of yard land. The implementation of empowering peasant women in tidal land has considerable potential, due to the wide availability of land. The attention of meeting the needs of healthy vegetables can be supported by the availability of farmer household yard land in tidal land in South Kalimantan. This study aims to analyze the influential factors on the empowerment model of women farmers in optimizing the use of yard land for the development of healthy vegetable farming in increasing the diversity of community food consumption in tidal lands. The number of samples used was 100 samples. The analytical tool used in this study uses Structural Equation Modeling (SEM) analysis. The results showed that 88.7% of the empowerment of the farmer women's group was influenced by its exogenous latent variables, while 11.3% was influenced by other variables outside the model. While the household economy of peasant women is influenced by exogenous latent variables by 76.8%, while the remaining 24.2% is influenced by other variables outside the model. The results of the analysis of the path coefficients in the structural model show that there are 5 paths that have a significant influence. The path is between X1 (individual characteristics) to Y1 (empowerment of peasant women's groups); X1 (individual characteristics) to Y1 (empowerment of peasant women's groups), X3 (institutional role of peasant women's groups) to Y1 (empowerment of peasant women's groups), X5 (external environment) to Y2 (peasant women's household economics) and Y1 (farmer women's empowerment) to Y2 (peasant women's household economics).Suggestions that can be given are based on the results of research that to increase the empowerment of peasant women in an effort to encourage improvements in the household economy of farm women can be done through improving the quality of the characteristics of farm women, the institutional role of farmer groups that need to be encouraged to be even better, and the external environment that continues to be strengthened in order to create a cycle for the empowerment model of farm women to optimize the use of yard land For the development of healthy vegetable farming in increasing the diversity of food consumption of people in tidal lands.

KEY WORDS
Energy consumption, income, rice, farmers.

Food has always been a strategic issue in development both at the global and national levels, because the fulfillment of food is the right of every citizen who must be guaranteed quantity and quality, safe and nutritious. The Government of Indonesia continues to be committed to strengthening food security as an effort to provide food for 270.2 million Indonesians, so that they become healthy, active and productive human resources, as well as competitive in accordance with the mandate of Law Number 18 of 2012 and PP No 17 of 2015 concerning food security and nutrition. This commitment is in line with efforts to achieve the

second goal in *Sustainable Development Goals* (SGDs), namely eliminating hunger (*zero hunger*) by 2030 (BKP, 2020).

In the 2020 map of Indonesia's food security and vulnerability, one of the main characteristics that cause high vulnerability to food insecurity in Indonesia is the high number of people living below the poverty line (BKP, 2020). Based on data released by BPS, the poverty rate in Indonesia for 10 years has decreased, from 13.33% in 2010 to 9.78% in 2020. The poverty rate also decreased in South Kalimantan Province, from 5.11% in 2010 to 4.38% in 2020, although the decline slowed compared to the previous decade. In 2021, the poverty rate rose again, both at the national level, including South Kalimantan, caused by the negative impact of the Covid-19 pandemic which limited people's movements and hampered the economy in all sectors. This pandemic lifted the poverty rate back to the national level (10.14%) and South Kalimantan to 4.83%.

If the poverty of South Kalimantan Province is viewed in aggregate in 2020, the percentage of poor people of 4.38% increased to 4.83% in 2021. Among this percentage, the majority come from agricultural households. This is supported from BPS data, that there are 36.33% in 2020 and 38.41% in 2021 of poor households in South Kalimantan Province who have the main source of income in the agricultural sector, while the rest are non-agricultural and do not work. The agricultural sector is the main sector with the third largest share of Gross Regional Domestic Product (GRDP) in South Kalimantan after mining and processing industry, which is 13.93% in 2021.

In the 2020 map of Indonesia's food security and vulnerability, one of the main characteristics that cause high vulnerability to food insecurity in Indonesia is the high number of people living below the poverty line (BKP, 2020). The issue of food security is technically directly proportional to the availability of agricultural business land. This problem arises due to the rate of population growth, decreasing agricultural area, extreme climatic conditions and land quality, causing food insecurity (Bahar et al., 2020). The right step for the government to deal with conditions like this is to conduct an analysis of food security to overcome food insecurity. Prevention efforts and efforts to overcome them must be implemented quickly and managed properly to avoid food insecurity. Food insecurity can be overcome by improving food security (Fauzi et al., 2019).

The focus of food security is not only on regional food supply but also at the household and individual levels. Household welfare is related to the fulfillment of basic human needs, namely food, so household welfare is related to food security. Household food security (family) can be interpreted as the ability of families to access food properly to meet the lives of their family members. Household food security is actually an indicator of the formation of regional food security both in the region and regionally. Household food and non-food expenditure is one indicator of household food security. The availability of sufficient food regionally does not necessarily guarantee that there is no problem of food insecurity in households. The higher the proportion of food expenditure means the lower the level of household welfare. The decline in the level of household welfare means that more and more poor households, in this situation household prioritize the fulfillment of their food needs and only focus on cheap and useful food to overcome hunger, so that the quality of food is less considered. Households with a high level of welfare will be able to meet their needs not only for food, but also for non-food (Praza, 2020).

One of the food production centers (rice) in South Kalimantan is Barito Kuala Regency. Every year the Barito Kuala Regency area makes a very large contribution, such as in 2022 the production produced is 20.94% of all South Kalimantan or 182,840 tons (BPS, 2023). Barito Kuala Regency is an area that is a potential development for tidal land. Tidal land itself is a suboptimal land in South Kalimantan.This study aims to determine the relationship between household income and percent of energy consumption adequacy in rice farming households in food production centers in South Kalimantan.

METHODS OF RESEARCH

This research will be carried out in Barito Kuala Regency. The choice of research site is purposive (deliberate) for reasons because Barito Kuala Regency is the center of rice production in South Kalimantan. The time of this research is carried out from May to November 2023 starting from preparation, field surveys, data analysis and processing of discussion results for reporting.

The subjects in this study were farmers in Barito Kuala Regency. The number of samples used in this study was 100 farmers. The sample of 100 farmers was spread across various types of land ranging from tidal land type A, type B and type C. Sampling is carried out by *proportionate sampling* technique on various types of tidal land.

The data processing process in this study includes *coding, entry, cleaning* and analysis. The collected data was processed and analyzed using the Microsoft Excel 2010 computer program to store the research database and Statistical Program Social Sciences (SPSS) version 21.0 for Windows to analyze the relationship of each variable. To answer goal 1, namely analyzing the income and poverty level of rice farmer households in food insecure areas using the formula of farmer household income from various businesses, namely *on-farm, off-farm* and *non-farm* with the following formula:

$$I_{rt} = I_{on} + I_{off} + I_{non}$$

Where: I_{rt} = Household income of rice farmers (Rupiah); I_{on} = Income from farming (Rupiah); I_{off} = Income from agriculture (Rupiah); I_{non} = Income from outside agriculture (Rupiah).

To analyze the poverty rate of rice farmer households using poverty line indicators from the Central Bureau of Statistics. The poverty line of South Kalimantan Province in rural areas in 20 22 is Rp. 558,856/capita/month (BPS South Kalimantan Province, 2022). If the income obtained is less than Rp. 558,856 / capita / month, it is classified into the poor category which means that it has not been able to meet the needs of life.

To answer the second objective, namely analyzing the level of food security of farmer households in food insecure areas. Measuring the Share of Food Expenditure (PPP) used the following equation (Purwaningsih et al. 2010; Ilham and Sinaga 2007; Nurdiani and Widjojoko 2016):

PPPi = PPiTP x 100%

Where: PPPi =i i-th Share of Food Expenditure (%); PPi = i-th Food Expenditure for food expenditure (Rp/month); TP = Total Household Expenses (Rp/month).

The measurement of the level of energy adequacy follows the following equation (Mulyo et al. 2015; Purwantini et al. 2002; Suharyanto 2015; January 2014):

Real Energy Consumption at Household Level: KErt = BPj100 x BDD100 x KGji
Number of Adult Equivalent Units (JUED): JUED = JEAU/JKEA
Adult Equivalent Energy Consumption (KED): KED = KErt/JUED
Energy Adequacy Percentage (PKE): PKE = (KED/2,150) x 100%

Where: KGij = content of certain nutrients (i) from food (j) or food consumed according to its unit (cal); BPj = weight of food or food – j consumed (cal); BBD = edible part (in % or grams of 100 grams of food or food – j); KErt = household-level real energy consumption (kcal); KED = equivalent (equivalent) energy consumption of adults (kcal) (Per one adult equivalent unit is equivalent to a man aged 20–59 years, with a body weight of about 62 kg with moderate activity, meaning that the number of family members under and above that age is equivalent to

a man aged 20–59 years); JUED = number of equivalent units of adults (souls) (equivalent to the number of household members); JKEA = total recommended energy adequacy (kcal) of 2,150 kcal/capita/day based on WKNPG X of 2012 (Permenkes No. 28 of 2019); PKE = percentage of energy adequacy (%).

To analyze the data on the relationship between household income and the percent adequacy of energy consumption in rice farming households in the central area of food production in South Kalimantan, using the *Product Moment* correlation formula, namely:

$$r_{xy} = \frac{n \sum XY - (\sum X).(\sum Y)}{\sqrt{[n \sum X^2 - (\sum X)^2][n \sum Y^2 - (\sum Y)^2]}}$$

Where: r_{xy} = Nillai *correlation product moment*; n = Number of samples; X = Household income of rice farmers; Y = Percent adequacy of energy consumption.

RESULTS AND DISCUSSION

Farmers in this study are all at a productive age, which is around 42 years. In general, age can also be an important point that is positively related to life experience. The higher a person's age, of course, his life experience will be more. Many life experiences will shape a person's way of thinking and also shape the way a person makes decisions.

The number of household members is the sum of all existing members of the household, but excluding the head of the household. In general, the more household members, of course, the more expenses, especially food expenditures. However, the more household members who can play a role in helping in work or business, it can certainly add value to income. The number of household members owned by farmers tends not to be so different, only in the range of 2-3%.

Through education a person can improve self-quality, because education when viewed from the farmer's side is a process so that someone can change for the better, starting from knowledge, skills and attitudes. Formal education is a form of education that is officially recognized by the government. The higher a person's education, of course, the better the way of thinking for that person in making decisions. Meanwhile, if it is observed, that the higher the level of education, there is a tendency for the number of farmer housewives to be smaller. This can be seen in the education level of farmer housewives who have entered college, but not until graduation only 3%.

Land is a factor of production of a farm, the greater the area of land owned, the more production produced. Although it can be known, there are other production factors that determine the production results of a farm. This also applies to every farm, as well as rice farming. Rice farming in this study has an average land area of 1.12 ha. Many tidal swamps in Barito Kuala Regency are generally in the form of acid sulfate tidal swamps, including agricultural land in this study area (Belawang, Cerbon and Tabukan Districts). The important thing to understand in acidic sulfate soil types, namely with shallow pyrite depth conditions. This means that farmers must be careful in terms of land management, so that later it will not be fatal to their farming.

Household income is a source of farmers' finances which will later be used to meet both food and non-food needs. In economics, income has an influence on the demand for goods and services. The household income of rice farmers in tidal swamps in Barito Kuala Regency can be seen in Figure 1.

Based on the data presented in Figure 1, it shows that the number of farmers with the highest income group, namely > IDR 1.5000,000 / capita / month, is only 10% of the number of farmers. Meanwhile, the number of farmers with the lowest income group is ≤ IDR 750.000 / capita / month by 12.00%. In addition, farmers with the most income are in the income group between IDR 1,000,001 – IDR 1,250,000 / capita / month.
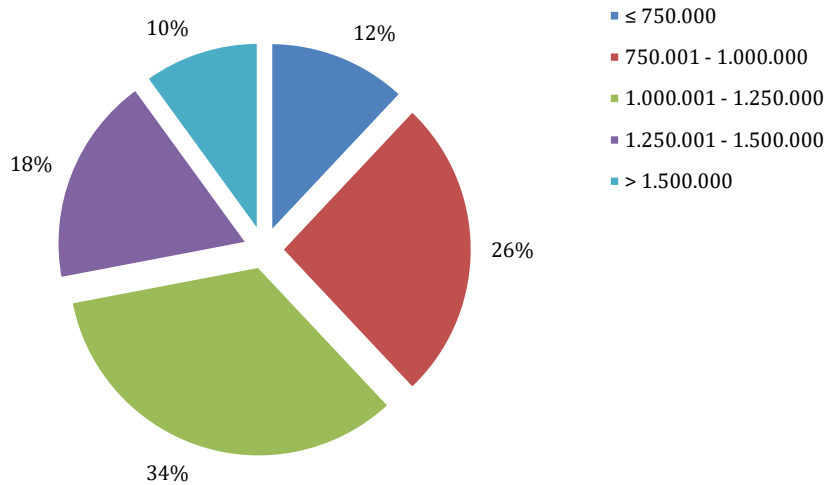
Figure 1 – Distribution of household income of rice farmers

The average income of rice farmers per capita per month is IDR 1,113,624. The household income of farmers in this study can be seen from various sources of business/employment. This is because, not all rice farmers in this study area only work in rice farming, but there are some farmers who have side jobs. The income of farmers based on the type of work can be seen in Table 1.

Table 1 – Average farmer household income by type of work

No	Category	Types of Jobs	Number of Farmers	Average Income (Rp/year)	Average Income (Rp/month)
1.	*On-farm*	Rice Farming	100	21,824,168	1,818,681
		Citrus Farm	40	6,496,000	541,333
2.	*Off-farm*	Farm worker	47	2,272,500	189,375
		Fisherman	15	357,000	29,750
		Palm Oil Plantation Workers	14	1,350,000	112,500
3.	*Non-farm*	Ojek Driver	8	374,800	31,233
		Tukan Building	4	270,000	22,500
		Stalls/Traders	9	739,200	61,600
		Other	22	820,000	68,333
Total				34,503,668	2,875,306

Source: Primary Data Processing, 2023.

Based on the data presented in Table 1, it shows that the average household income of rice farmers is IDR 2,875,306/month. The income of rice farming, which is an *on-farm* business, contributes the most compared to income from other types of work, which is IDR 1,818,681 / month. While orange farming income is the largest income contributing to household income compared to other jobs / side businesses, namely with an orange farming income of IDR 541,333 / month.

Orange farming is a side business that is only done by certain farmers. This citrus farming requires a larger initial capital compared to rice farming. Especially at the time of processing of shipyards used to grow oranges. In addition, for 4 years farmers will not get income, so farmers must have a business to meet their living needs and for their orange farming costs. With so many considerations, so that only some respondent farmers are engaged in citrus farming.

Farmwork is work done by farmers to help rice and non-rice farming carried out after their rice farming activities are completed. For example, when the processing of rice farming land is

complete, but there are still other farmers who have not finished and need assistance, then this respondent farmer will become a farmworker on the other farmer's land. In addition, respondent farmers act as farm laborers in non-rice businesses, for example in helping other farmers' fishing vacations or citrus plant yards.

Barito Kuala is a district that has a river flow connected to the Barito River. So that along the large river flow in Barito Kuala Regency has the potential for capture fisheries. With this condition, some rice farmers also have side jobs as fishermen. Although now based on income distribution, it shows that fishermen's income is relatively small, which is only IDR 357.00 / year or IDR 29,750. This is because only a small percentage of farmers have side jobs as fishermen.

Oil palm plantations managed by private companies in recent years have begun to multiply and have business use rights on land in the vast area of Bartio Kuala Regency. This certainly has both positive and negative impacts. If we look at one positive side, then for some local communities (farmers) can provide jobs, so that they can increase the income of farmer households. Although rice farmers who participate in plantations are only limited to casual daily laborers or there are some members of the farmer's household who become permanent laborers, but at least they can still provide additional household income. Although the real hope, wanting to be able to join the company as a better worker (for example as a manager or foreman), but on the one hand with low educational qualifications, of course it will be difficult to happen.

Other side jobs in the form of *non-farm* businesses which mean businesses / side jobs that are outside of agricultural businesses, such as motorcycle taxi drivers, builders, stalls / trades and others. Work as a builder is only part of the community that has the expertise that can do the business. While the job as a motorcycle taxi driver is also a small part of the respondent farmers who try, because some farmers who do not do it think that this job is not too certain to generate income, and requires a lot of time to wait for their people who will ride ojek. The stalls/trades cultivated by respondent farmers tend to be in the form of food trade or in the local language "*warung pencerekenan*". Farmers who work on this are also only a small part, considering that the capital needed in this business is quite large.

Farmer household food consumption is the amount of farmer consumption of energy and protein, which comes from household food. The amount of energy consumption tends to be limited by the financial resources owned by the farmers themselves. This energy consumption is calculated based on per capita consumption based on the *food recall* method. This method records the nutritional content consumed for 24 hours from various allocations of the type of food consumed. This means that the size of the energy consumption received depends on the type and volume of food consumed. The energy consumption of rice farmers is presented in Figure 2.
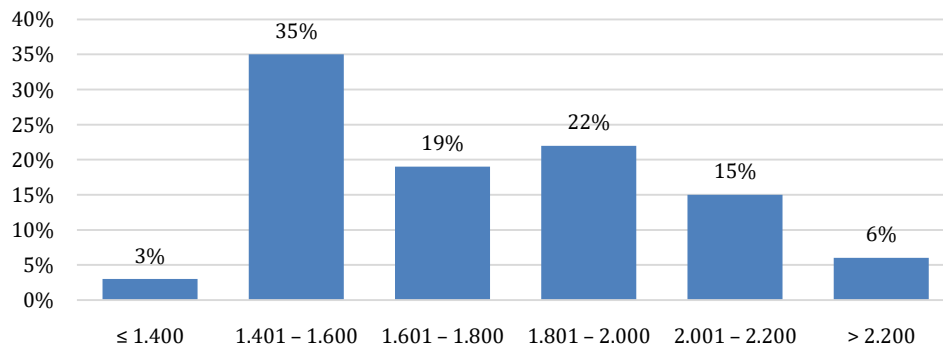

Figure 2 – Distribution of respondents based on the level of energy consumption in rice farmers (calories/capita/day)

Based on the data presented in Figure 1, it shows that the dominance of rice farmers in tidal swamps in Barito Kuala Regency consumes energy ranging from 1,401-1,600 calories/capita/day, which is as much as 35%, while energy consumption starting from > 2,200 calories / capita / day is only 6%. Based on the average result that energy consumption by rice farmers in tidal swamps is 1,757 calories / capita / day. This means that there is still a shortage of3.93 calories/capita/day compared to the energy adequacy figure.

Efforts to increase energy consumption can be done not only by increasing the volume of food consumed, but also by adding diversity to the types of food to be consumed. So by consuming foods that have more energy and protein content, it can certainly increase food security.

Analysis of the correlation of income with percent adequacy of energy consumption in rice farming households was carried out with *a product moment* correlation test. The results of *the product moment* correlation test analysis are presented in Table 2.

Table 2 – Product Moment Correlation Test Results

Correlations			
		Kecukupan_Energi	Income
Kecukupan_Energi	Pearson Correlation	1	.564[*]
	Sig. (2-tailed)		.000
	N	100	100
Income	Pearson Correlation	.564[*]	1
	Sig. (2-tailed)	.000	
	N	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

Based on the data presented in Table 2, it shows that there is a significant relationship between household income and percent adequacy of energy consumption of rice farmer households. This is indicated by the *product moment* correlation value of 0.564, with *a sig* value. (*2-tailed*) of 0.000 which is smaller than the real test level (α=0.05).

CONCLUSION

The average income of rice farmer households is IDR 2,875,306 / month, with the income of rice farming which is an *on-farm* business contributes the most compared to income from other types of work, which is IDR 1,818,681 / month.

The energy consumption by rice farmers in tidal swamps is 1,757 calories/capita/day, which means there is still a shortfall of 393 calories/capita/day compared to the energy adequacy rate.

There is a significant relationship between household income and the percent adequacy of household energy consumption of rice farmers, this is shown by the product moment correlation value of 0.564, with the sig value. (2-tailed) of 0.000 which is smaller than the real test level (α=0.05).

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