International Journal of Agriculture, Environment and Bioresearch

Vol. 11, No. 04; 2026

ISSN: 2456-8643

THE IMPACT OF RICE FOOD ESTATE DEVELOPMENT ON FARMERS' RICE FARMING INCOME IN KAPUAS REGENCY

Ilman Taufiq Perdana[a,1,*], Luthfi Fatah [b,2] and Muhammad Fauzi [b,3]

[a]Master of Agricultural Economics Study Program, Faculty of Agriculture, Lambung Mangkurat University, Indonesia

[b]Faculty of Agriculture, Lambng Mangkurat University, Indonesia

[1]ilmantaufiq15@gmail.com; [2]luthfi@ulm.ac.id*; [3]mfauzimakki@ulm.ac.id

https://doi.org/10.35410/IJAEB.2026.1065

Received: 6 June 2026/Published: 19 July 2026

ABSTRACT

The projected surge in Indonesia's population to 306 million people in 2035 triggers the risk of a food crisis, so the government develops a food estate as a National Strategic Program (2020-2024) in Kapuas Regency. This study aims to analyze the impact of the development of the Food Estate area on rice farming income and farmers' perception of the development of the Food Estate area which will be carried out from March – June 2026. Respondents consisted of 52 farmers in the area (simple random) and 8 farmers outside the area (census). Data were analyzed using revenue analysis, multiple linear regression, and the Likert scale. The results show that farming in the area is more profitable with an average income of IDR 39,353,818/Ha, compared to outside the area of IDR 21,418,533/Ha. Simultaneous tests proved the regression model to be very feasible (F-count = 17.058; Sig. 0.000) with an Adjusted R-Square of 58.0%. Partially, the status of the region, the outpouring of Labor in the Family (TKDK), the length of formal education, and the intensity of fertilizer have a positive and significant effect on income. On the other hand, Out-of-Family Labor (TKLK) does not have a significant effect due to substitution by agricultural mechanization. Government intervention through the Food Estate area development program through the assistance of study programs, farmer education and improvement of agricultural infrastructure has proven successful in increasing production efficiency and planting index to 2-3 times a year which directly increases the income of rice farmers in Kapuas Regency. The results of the perception evaluation showed that farmers "quite agreed" with responding very positively to the effectiveness of Alsintan, certainty of land status (SHM), ease of access to study assistance, and the performance of farmer groups and PPL. However, farmers responded negatively to irrigation, soil acidity, manyar bird pests, lack of guaranteed grain selling prices, income instability, and ecological impacts that have not been properly mitigated.

Keywords: Food Estate; Impact; Usahtani; Regression; Likert scale.

1. INTRODUCTION

The projected population surge from 276 to 306 million people in 2035 (BPS, 2016) and supply chain disruptions due to Covid-19 (FAO, 2020) demand the acceleration of food security. As a mitigation, the government has established a large-scale integrated food center area (>25 Ha) (Agricultural Research and Development Agency, 2011; Setiawan, 2021) into the National Strategic Program 2020 – 2024 (Nuraisyah, et al., 2025). Centered in Central Kalimantan, Kapuas Regency prioritizes rice through massive infrastructure interventions, inputs, and land

Vol. 11, No. 04; 2026

ISSN: 2456-8643

conversion. This is evidenced by the realization of the printing of 2,000 hectares of rice fields from 21,226 hectares of potential land in the Dadahup DIR area in 2023, which macro has a direct impact on the regional economy, especially rice farming income. Therefore, an analysis of the impact of food estate on the income level of rice farming and farmers' perception of food estate development in Kapuas Regency is crucial as an input for policy evaluation to ensure that the program is able to improve the welfare of farming communities in Food Estate development areas.

This study aims to (1) analyze the impact of the food estate program on rice farming income; (2) analyze farmers' perceptions of food estate development in Kapuas Regency. The results of this research are expected to (1) be used as a consideration and input for *stakeholders* in decision-making and policies in the context of the development of food estate areas in Kapuas Regency; (2) used as a reference for researchers and other interested parties in conducting further studies or research.

2. RESEARCH METHODS

Place and Time of Research

This research was carried out in Kapuas Regency, Central Kalimantan Province, during the period from March to June 2026.

Data Types and Sources

The data collection in this study combines primary data from observations and structured interviews with farmers inside and outside the *food estate area*, as well as secondary data from literature studies and related agencies.

The selection of the research location in Dadahup District was determined purposively based on the involvement of the area in the *food estate* program, with a total of 60 samples of rice farmers consisting of the *with group* (A4 Harapan Baru and A2 Petak Batuah Village) as many as 52 respondents through *the Simple Random Sampling* method, as well as the *without* groupusing the census method because there are only 8 farmers who are still supporting rice farming in Dadahup Village.

Data Analysis

Analysis for Purpose 1

To analyze the impact of *the food estate program* on the income of rice farming farmers in Kapuas Regency by looking at the coefficient of dummy variables from the multiple regression analysis as follows:

$$Yi = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \delta D_i + \varepsilon_i \quad (1)$$

Where:

Yi : Income from Rice Farming per Year/Ha (Rp)
B0 : Konstanta
b1X1 : Length of Education (Years)
β2X2 : Fertilizer Use per Year/Ha (Kg)
b3X3 : TKDK Per Year/Ha (HOK)
b4X4 : TKLK per year/ha (HOK)
D : Variabel *Dummy* Presence in the development area *food estate* (1 = Join the program

Vol. 11, No. 04; 2026

ISSN: 2456-8643

food estate, 0 = Not joined)

d : Variable coefficients *Dummies* which measures the average amount of income difference between the participating and non-participating groups, assuming the other variable is constant (*ceteris paribus*).

Ei : *Error term* (Error term)

By looking at the coefficient value of the *dummy variable* (the presence of farmers in the *food* estate area) using multiple linear regression analysis, it can be seen how the direction and magnitude of the impact caused by the *dummy* variable on rice farming income with the state of other independent variables are constant (*cateris paribus*).

Classic Assumption Test. The use of *the Ordinary Least Squares* (OLS) method in multiple linear regression analysis requires the fulfillment of the classical assumption test so that the resulting model is BLUE (*Best Linear Unbiased Estimator*). If this assumption is not met, the estimator becomes biased and inefficient, so that the conclusions of Test F and Test t regarding the impact of *food estate* programs on farmers' income become invalid. The classical assumption test carried out includes:

1. Normality Test
   It is used to ensure that the residual values (errors) of the model are distributed normally. This is an absolute requirement that the probability values in the t-test and the F-test are accurate in measuring the significance of each variable. The residual value (error) is declared to be normally distributed when the Histogram *Standardized Regression Residual* forms a bell curve pattern, or *the Normal Probability Plot graph* shows a straight diagonal line from the bottom left to the top right.

2. Multicollinearity Test
   It aims to detect strong correlations between independent variables. Multicollinearity can artificially magnify *standard errors*, causing variables that should have a significant impact to look statistically insignificant. The Multicollinearity test can be seen from a *tolerance* value greater than 0.1 or a VIF value smaller than a value of 10.

3. Heteroscedasticity Test
   On *cross-section* data (such as a sample of 60 farmers in this study) to ensure a constant value residual variance (homoskedasticity). Violation of this assumption will make the range of estimates too wide and the final conclusions unreliable. Heteroscedasticity occurs when the distribution of data forms a certain pattern. On the other hand, if the distribution of the data does not form a certain pattern and the points are randomly spread both above and below the number 0 on the y-axis, then there is no heteroscedasticity in the regression model.

Coefficient of Determination R^2 (*Adjusted* R2). The interpretation of the R^2 (*Adjusted* R2) determination coefficient was used to determine the magnitude of the proportion of independent variables on rice farming income. The *adjusted* R2 value has a range between 0 - 1 or ($0 < R^2 \leq 1$). This indicator is used to measure the feasibility and validation of the regression model, namely to ensure that the equation built is comprehensive enough in absorbing the determinants of rice farming income, so that the conclusion about the impact of *food estate* development explained through a partial test (t-test) has a strong validity basis and is free from the bias of other variables.

Vol. 11, No. 04; 2026

ISSN: 2456-8643

Test F

Test statistics:

$$(2) F_{Hit} = \frac{Kt_{regresi}}{Kt_{sisa}} = \frac{\sum \hat{y}_i^2 / k}{\sum \hat{e}_i^2 / n-k-1}$$

Test criteria:

1. If Fcal > Ftabel (α; n-k-1) which means that the independent variables tested together/simultaneously have a real effect on the bound variable.
2. If Fcal ≤ Ftable (α; n-k-1) which means that together/simultaneously the free variables have no real effect on the bound variables.

T test

Test statistics:

$$t_{hit} = \frac{\beta_i}{Se(\beta_i)}$$

(3)

with:

β_i : Regression Coefficient of Independent Variable I-i

Or (β_i): Standard error (Standard error) estimated regression coefficient

Test criteria:

1. If the tcount > ttable (n-k-1 : α/2) it means that the independent variable (Xi) has a real effect on the bound variable.

If $t_{calculates} \leq t_{table}$ (n-k-1 : α/2) which means that the independent variable (Xi) has no real effect on the bound variable.

Analysis for Purpose 2

To answer objective 2 to analyze rice farmers' perception of food estate development using likert scale analysis. As for supporting this, a scale of values is used for respondents' response responses as shown in Table 1. The classification of the level of perception after data collection was carried out to determine the category of the level of perception of the *Food Estate* program in Kapuas Regency is specifically presented in Table 1.

Table 1. Respondents' perceived level of response

Weight Value	Response Interval	Value	Class Range	Total Score	Remarks
1	1,00 – 1,80		52 – 93,6	624 – 1123,2	Strongly disagree
2	1,81 – 2,60		93,61 – 135,2	1123,21 – 1622,4	Disagree
3	2,61 – 3,40		135,21 – 176,8	1622,41 – 2121,6	Simply Agree
4	3,41 – 4,20		176,81 – 218,4	2121,61 – 2620,8	Setuju

Vol. 11, No. 04; 2026

ISSN: 2456-8643

5	4,21 – 5,00	218,41 – 260	2620,81 – 3120	Strongly agree

Sources:1) Primary Data Processing (2026)
2) Sugiyono (2013)
3) Mangkuatmodjo (1997)

3. RESULTS

Respondent Characteristics

Age of the Farmer. Based on the age criteria of the respondents in Table 2, the demographic structure of farmers in the study area is dominated by the productive age group which is centered on the criteria of the age range of 45 – 54 years (46%) and 35 – 44 years (27%).

Table 2. Respondents' age group

No.	Age Group	Quantity	Percentage (%)
1.	25 – 34 Years	4	7
2.	35 – 44 Years	16	27
3.	45 – 54 Years	28	46
4.	55 – 64 years old	10	17
5.	≥ 65 years old	2	3
Quantity		**60**	**100**

Source: Primary Data Processing (2026)

Education Level. From the aspect of education level in Table 3, the respondents' formal education level was dominated by the Low criterion (≤ elementary) of 50%, which was strictly balanced by the secondary criterion (junior high school – high school equivalent) of 48%.

Table 3. Respondents' education level

No.	Education Level	Quantity	Percentage (%)
1.	Low (≤ SD)	30	50
2.	Secondary (Junior High School – High School Equivalent)	29	48
3.	Height (> high school)	1	2
Quantity		**60**	**100**

Source: Primary Data Processing (2026)

Long experience in farming. In Table 4, the data shows that the majority of respondent farmers are in the experienced criterion (> 10 years), which is 80%. Meanwhile, as many as 20% of the respondent farmers are in the criteria of being sufficiently experienced (5-10 years).

Table 4. A Long Career in Pastoral Work

No.	A Long Career in Farming	Quantity	Percentage (%)
1.	Sufficiently Experienced (5-10 Years)	12	20
2.	Experienced (> 10 Years)	48	80
Quantity		**60**	**100**

Source: Primary Data Processing (2026)

Number of Family Dependents. In terms of household structure in Table 5, the majority of farmers are in the criteria of small family dependents (≤ 3 people) of 83% and as many as 17% of respondent farmers are in the criteria of medium family dependents (4-6 people).

Vol. 11, No. 04; 2026

ISSN: 2456-8643

Table 5. Number of dependents of the respondent's family

No.	Number of Family Dependents	Quantity	Percentage (%)
1.	Small (≤ 3 Persons)	50	83
2.	Medium (4-6 people)	10	17
Quantity		**60**	**100**

Source: Primary Data Processing (2026)

Land Area. In Table 6 there is a striking difference, where 100% of farmers in the *With* group fall into the criteria of Land Area (≥ 1 Ha). On the other hand, *the Without group* was dominated by the criteria of Medium (62.5%) and Narrow (37.5%) land.

Table 6. Land area of group respondent farmers *with*

No.	Cultivated Land (Ha)	Group *With*		Group *Without*	
		Number (People)	Percentage (%)	Number (People)	Percentage (%)
1.	Narrow Land (< 0.5 Ha)	0	0	3	37,5%
2.	Medium Land (0.5 - 0.99 Ha)	0	0	5	62,5%
3.	Large Land (≥ 1 Ha)	52	100%	0	0

Source: Primary Data Processing (2026)

Results of Income Analysis and Multiple Linear Regression

Income. Based on the results of the research, it is evident that the existence of farming in *the food estate* area provides a significant difference in income.

Table 7. Income of Rice Farmers Group *with*

No.	Description	Group *With* For Usahatans	For ha	Group *Without* For Usahatans	For ha
1.	Reception	124.710.192	50.909.936	10.047.500	25,220,000
2.	Explicit Fees	27.957.942	11.266.442	1.497.801	3,801,467
Average Income		**96.752.251**	**39.353.818**	**8.549.699**	**21.418.533**

Source: Primary data processing (2026)

Farmer groups in the area (*With*) enjoy an average net income of IDR 39,353,818 per hectare, almost double compared to farmer groups outside the area (Without) which only reaches IDR 21,418,533 per hectare.

Multiple linear regression. The impact of the *food estate* program on farming income in Kapuas Regency can be seen from the value of the coefficient of *the dummy* variable (the presence of farmers in the *food estate area*) in the multiple linear regression analysis with the circumstances of other independent variables (length of formal education, fertilizer use per year/Ha, use of TKDK and TKLK per hectare) considered constant (*cateris paribus*) whose modeling formulation yields the following regression equation:

Y = -11.656.119,20 + 639.498,362 (X1) + 16.838.556 (X2) + 158.857,851 (X3) + 71.538,096 (X4) + 24.798.438,21 (D)

Vol. 11, No. 04; 2026

ISSN: 2456-8643

Table 8. Results of regression analysis of variables that affect rice farming

Model	*Unstandardized Coefficients*		t	*Say.*	*Collinearity Statistic*	
	B	*Std. Error*			*Tolerance*	*LIVE*
Constant	-11.656.119,20	7.083.403,884	-1,646	0.106		
Length of Education (X1)	639.498,361	338.202,376	1,891	0,064	0,814	1,229
Fertilizer Usage/Ha (x2)	16.838,556	9.971,550	1,689	0,097	0,382	2,620
TKDK/Ha (X3)	158.857,851	60.917,016	2,608	0,012	0,202	4,953
TKLK/Ha (X4)	71.538,096	87.536,159	0,817	0,417	0,282	3,542
Kawasan *food estate* (D)	24.798.438,21	4.802.475,448	5,614	0,000	0,295	3,388

Source: Primary data processing (2026)

Classic Assumption Test. Before the regression model is used to test the impact hypothesis partially, a series of classical assumption tests are first carried out to ensure that the resulting estimator equation is *the Best Linear Unbiased Estimator* (BLUE).

1. Normality Test

   Based on the data distribution indicator (through graphs), the residual from the regression model is shown to be distributed normally. This shows that the samples taken have represented the population well and met the basic requirements of parametric testing.

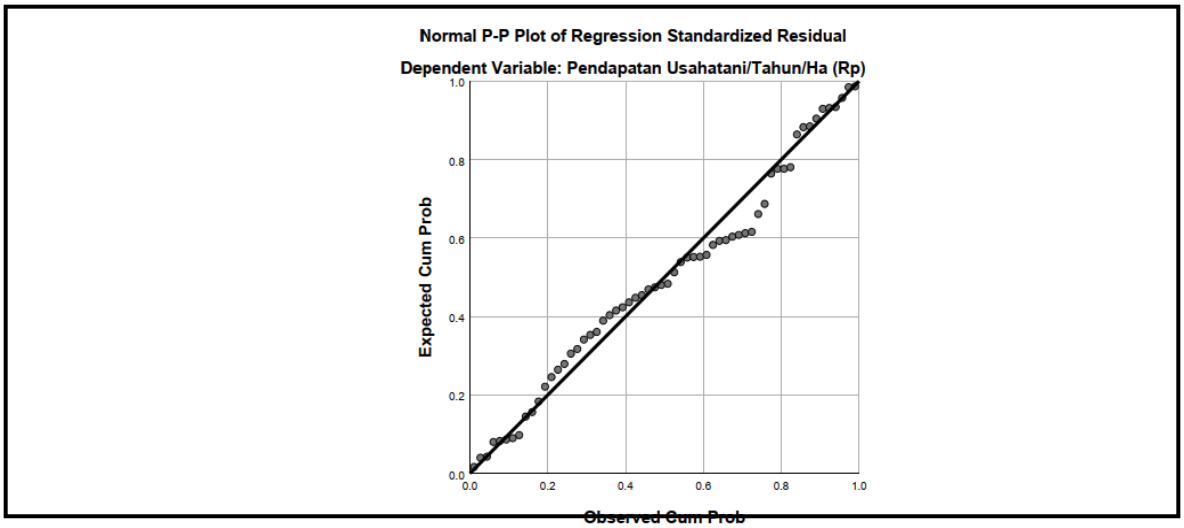

Image 1. Normality test results

2. Multicollinearity Test

   Based on the results of the multicollinearity test (Table 8), the regression model is free from serious symptoms of multicollinearity between independent variables with *a Variance Inflation Factor* (VIF) value for all variables below 10 (VIF < 10) and a *Tolerance* value of more than 0.10.

3. Heteroscedasticity Test

Vol. 11, No. 04; 2026

ISSN: 2456-8643

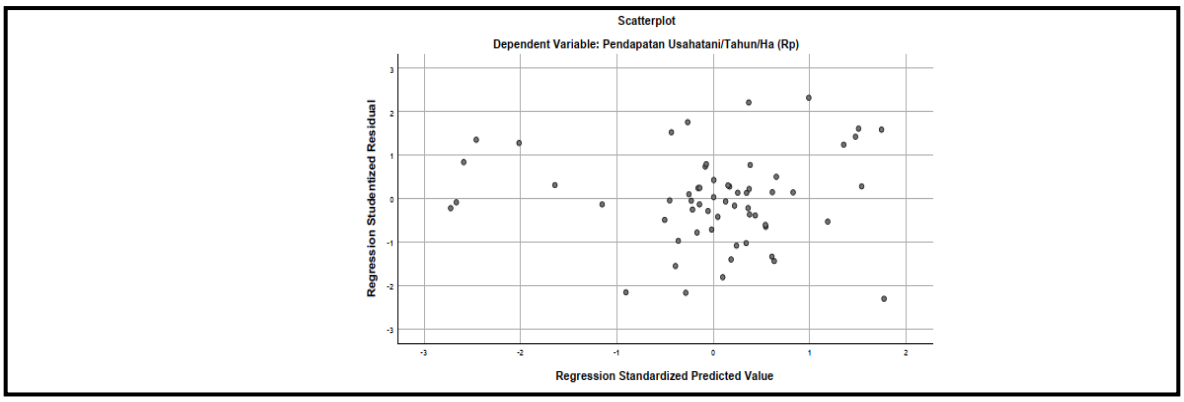

Image 2. Uji heteroskedastik.

Based on the results of the test through *the Scatterplot* graph, the data points appear to be randomly spread around the Y axis (farm income) and do not form a specific pattern. This indicates the absence of symptoms of heteroscedasticity (fulfilling the assumption of homoscedasticity),

Determination Coefficient Test (R 2-Adjusted). Referring to the value of the determination coefficient (*Adjusted* R-Square) obtained from the calculation results is 0.580. This value shows that the regression equation built is quite comprehensive in absorbing the determinants of rice farming income at the research site. Human capital allocation, physical inputs, and regional policies were able to explain the majority of income variations before partial testing was conducted. Meanwhile, the remaining 42% variation was influenced by variables outside of this mathematical model.

Test F. Based on the results of the F test (simultaneous), an F-calculation value of 17.058 was obtained which was greater than the F-table (2.39), with a significance probability value of 0.000 < α = 0.05 (5%). These results show that all independent variables, namely the length of formal education (X1), fertilizer use/Ha (X2), TKDK/Ha (X3), TKLK/Ha (X4), and *the Food Estate* program area (D), together (simultaneously) have a real and significant influence on rice farming income (Y).

Test t. Based on the results of the t-test (partial) in Table 8, it is known: independent variables of the use of TKDK/Ha have a positive and very significant effect (thit = 2.608; Sig. 0.012 < α=5%) with the addition of 1 contribution HOK of Rp158,857/hectare with an increase in income (*ceteris paribus*); the variables of *the Food Estate program area* have a positive and significant effect (thit = 5,164; Sig. 0.000 < α=5%) by farming in the *Food Estate* area, farmers get additional rice farming income of around Rp 24,798,438/hectare (*ceteris paribus*); the variable of length of formal education had a positive and significant effect (thit = 1.891; Sig. 0.064 < α=10%) with an additional 1 year of education contributed to increasing income of Rp639,498/hectare (*ceteris paribus*); the variable of fertilizer use/Ha had a positive and significant effect (thit = 1.689; Sig. 0.097 < α=10%) with the addition of 1kg of fertilizer per hectare contributed to increasing income by Rp 16,838/hectare; on the other hand, the variable use of TKLK/Ha had no significant effect (thit = 0.817; Sig. 0.417 > α=10%)).

Farmers' Perception. This Likert Scale based on farmer perception analysis serves as a crucial qualitative evaluation to confirm the limitations of quantitative findings. The results of the previous regression test showed an Adjusted R-Square value of 58.0% in explaining the variation

Vol. 11, No. 04; 2026

ISSN: 2456-8643

in income, leaving 42% of the variation influenced by external factors outside the model. The accumulation of a perception score of 1,742 (the category of "somewhat agreed") comprehensively dismantles these external variables, which significantly affect the achievement of rice farming income in the Food Estate Area of Kapuas Regency (Appendix 2).

4. DISCUSSION

Respondent Characteristics

The results of the study show that farmers' human resources are ready to respond *to food estate* innovations. Demographically, the average productive farmer is 47.67 years old (Table 2) with mature farming experience of 28.57 years (Table 4). This field finding was confirmed by Hermawan et al. (2025) and Risdianto et al. (2024), where age and experience are strategic capital for managerial flexibility and risk mitigation in new land. Although the majority of respondents have basic education (Table 3), this obstacle is effectively compensated by the role of regional extension workers as *an accelerator* of technology adoption. In addition, an average of 3 family dependents (Table 5) provides double benefits as providers of Family Labor (TKDK) that saves labor costs, in line with the cost efficiency study of Tenriawaru et al. (2025).

From the aspect of land tenure (Table 6), there are striking differences. All farmers in the *with* group (100%) control large land (≥ 1 Ha), so they have succeeded in achieving economies *of scale* and optimizing mechanization. In contrast, *the Without group* was hampered by the dominance of medium (62.5%) and narrow (37.5%) land. This fact in the field directly proves the conclusion of Basundoro and Sulaeman (2022) that the area of cultivated land and water system infrastructure is an absolute prerequisite for the effectiveness of *the food estate* program.

The Impact of the Food Estate Area Development Program on the Income of Rice Farmers in Kapuas Regency

From the results of the study, the main determinant of the striking income difference between the *with* group and *the Without* group in Table 7 is rooted in the intervention of *the food estate program* which has succeeded in reducing operational costs (*cost efficiency*) through production facilities subsidy facilities (saprodi) and land mechanization as well as improving water governance that allows farmers to be able to optimize their land to do 2 – Plant 3 times for a year. Theoretically, minimizing this input cost is the main prerequisite for maximizing farming profits (Soekartawi, 1995), so that it automatically converts the efficiency value into a much greater net profit for *the With* group. This finding is in line with Tenriawaru et al. (2025) that cost structure and land optimization greatly affect the income level of farmers. The success of this land optimization efficiency ultimately confirms that the *food estate* program is not only oriented to national food security on a macro level, but also significantly improves the economic welfare prospects of local farmers.

From the results of the data analysis in Table 8, it shows how partially independent variables can explain the situation in the field, namely: The variables of the length of formal education in this study support the theory of human capital, in line with Tenriawaru et al. (2025) that education is an important social determinant that affects income levels rationally and efficiently. The fertilizer use variables in this study show the biophysical characteristics of the land that require precise nutrient management, where the capital allocation for saprodi is proven to be positively correlated with crop yields. In line with the research of Tenriawaru et al. (2025), increasing the use of fertilizers can increase production and income as long as the elasticity value is ≥ 1; The

Vol. 11, No. 04; 2026

ISSN: 2456-8643

TKDK/Ha variable in this study proves the importance of family members' dedication to activities that require precision (such as water supervision and pest mitigation), so that the quality of harvests increases without burdening household cash-outflow; The TKLK/Ha variable inthis study does not provide meaningful statistical meaning. This is because the intervention of *the food estate program* triggers the substitution of human labor by massive mechanization. According to Hermawan et al. (2025), modern agricultural tools and machinery are taking over labor-intensive work (land processing and harvesting), so that the needs and costs of TKLK have decreased drastically and lost their significance as a determinant of income; The variables of the food estate *program area* in this study are proof thatthe government's intervention in ensuring the availability of study programs, mechanization and an active role between agencies is a comprehensive solution that effectively reduces *the Total Variable Cost* (TVC) thereby creating a much wider profit margin for farmers in *food estate* areas. In line with Parulian's (2024) research, government intervention is one of the factors that affect farmers' farming income in an area.

Farmers' Perception of the Food Estate Area Development Program on Farmers' Rice Farming Income in Kapuas Regency

The dominance of the "enough agree" score reflects *conditional support* from the farming community. Positively, farmers directly feel the *relative advantage* of the program facilities. This is evidenced by the high appreciation for the certainty of land status (Strongly Agree), mechanization efficiency, as well as the proactivity of extension workers and ease of access to study programs (Agree). This positive reception is in line with Parulian (2024) which emphasizes the crucial role of local governments and extension workers in Central Kalimantan as the foundation for increasing farming income.

However, the accumulation of rejection appears in the biophysical aspects of the land and the market. Farmers responded negatively (disagreed) to unreliable irrigation, soil acidity, and massive manyar bird pests. It also sparked concerns over long-term ecological sustainability (Strongly Disagree). These technical problems and pests also cause income instability (Disagree) which results in a decline in harvest potential from 3 – 4 tons/Ha to 2 – 3 tons/Ha. This decline represents structural barriers that affect the effectiveness of agricultural policies.

In addition, the highest rejection (Strongly Disapprove) lies in the lack of certainty of the selling price of grain, the basic price regulation from the government becomes an *absolute safety net* to protect them from losses. In line with the opinion of Ellis (1993), farmers tend to have a risk-averse nature. In conclusion, this "moderately agree" score is a critical evaluation that demands a comprehensive approach from water system improvement to market price guarantees. This is crucial so that *food estates* are not limited to food securitization on paper, but a tangible manifestation of a food security strategy that prospers farmers in a sustainable manner.

5. CONCLUSION

This study shows that there is a difference in income between farmers in the *Food Estate* area (*With* group) who get higher income than farmers outside the *Food Estate* area (*Without* group) with the status *of the Food Estate* areais a factor that significantly affects the level of rice farming income received by farmers (α=5%). Other factors that also significantly affect income are: the use of TKDK/Ha (α=5%), the length of formal education (α=10%) and the use of

Vol. 11, No. 04; 2026

ISSN: 2456-8643

fertilizers/Ha (α=10%). On the other hand, the use of TKLK/Ha was found to have no significant effect on income levels.

Overall, farmers' perceptions of the development *of the Food Estate* area are in the category of "Quite Agree", which represents conditional support due to two contradictory realities:

- Supporting Aspects: certainty of land legality (SHM), assistance with production facilities and Alsintan, active assistance for PPL and Farmer Groups.
- Inhibiting Aspects: unfinished irrigation projects, high soil acidity, explosions of manyar bird pests, absence of guaranteed lower price of grain, and zero compensation.

The accumulation of technical and ecological obstacles ultimately demotivates farmers, triggers the transfer of the profession of the younger generation to the oil palm plantation sector, and has an impact on the massive abandonment of rice fields.

This study has limitations because it uses *cross-sectional* data types so that it cannot see the dynamic picture of the impact *of food estate* development on farmers' rice farming income from time to time, this is due to the limited time and cost of the researcher and the difficulty of respondents in remembering data that has occurred for a long time (in the past) which can increase the potential for biased data. Therefore, further research is recommended to use data analysis using *time-series* and *cross-sectional* data to obtain a more comprehensive understanding of the impact of *food estate* development on farmers' rice farming incomes.

REFERENCES

Central Bureau of Statistics. (2016). *Indonesia Statistics 2016*. Jakarta: BPS. Retrieved from https://www.bps.go.id/id/publication/2016/06/29/7aa1e8f93b4148234a9b4bc3/statistik-indonesia-2016.html

Basundoro, A. F., & Sulaeman, F. H. (2022). Reviewing the development of *food estates* as a national resilience strategy in the era of the Covid-19 pandemic. Journal of Lemhannas RI, 8(2), 27-41. Accessed from https://jurnal.lemhannas.go.id/index.php/jkl/article/download/307/189/

Ellis, F. (1993). *Peasant economics: Farm households in agrarian development* (2nd ed.). Cambridge, UK: Cambridge University Press.

Food and Agriculture Organization. (2020). *Simulating rising undernourishment during the COVID-19 pandemic economic downturn*. Rome: FAO. Retrieved from https://openknowledge.fao.org/items/f80e45e5-ff2d-41f2-be2f-bb9adec9d303

Hermawan, S., Rusli, B., & Darto, D. (2025). Factors influencing the implementation of public policies in the agricultural sector: A literature review. Scientific Journal of Public Administration, 11(2), 187-199. Accessed from https://jiap.ub.ac.id/index.php/jiap/article/download/1814/1713

Mangkuatmodjo, S. (1997). *Introduction to statistics*. Jakarta: Rineka Cipta.

Nuraisyah, T. K., Khalila, K., Putri, S. R. R., Nisa, N. A., & Qulbi, S. H. (2025). The development *of food estates* in Indonesia: An analysis of opportunities, challenges, and threats domestically and globally. *Journal of Syntax Admiration, 6*(2), 1099-1115. doi:10.46799/jsa.v6i2.2110

Parulian, J. (2024). The role of local governments in the implementation of *food estate programs* in Central Kalimantan province [Thesis/Final Project, Institute of Domestic Government].

Vol. 11, No. 04; 2026

ISSN: 2456-8643

IPDN repository. Accessed from http://eprints.ipdn.ac.id/24908/1/Repository%20Jonathan%20revisi%20new.pdf

Risdianto, A., Jotham, F. M., & Nurdin. (2024). Analysis of the implementation of the "*Food estate*" policy in an effort to protect agricultural sustainability. Journal of Agrarian Studies and Food Sovereignty, 3(1), 45-56. Accessed from https://idjpcr.usu.ac.id/jkakp/article/download/14748/7554

Setiawan, F. (2021). What is a *food estate*. *South Bangka Regency Food, Agriculture and Fisheries Office*. Derived from https://dppp.bangkaselatankab.go.id/post/detail/1110-apa-itu-food-estate

Tenriawaru, A. N., Syam, S. H., & Aprilia, W. (2025). Determination of economic and social factors on rice farming income in Awangpone District, Bone Regency. Journal of Agrimanex: Agribusiness, Rural Management, and Development Extension, 6(1). Accessed from https://journal.unsika.ac.id/index.php/agrimanex/article/view/13113

Vol. 11, No. 04; 2026

ISSN: 2456-8643

Appendices 1. The formula used analyzes farming income.

Total Cost Formula

TC = TCe + TCi

Description :

TC	: Total Cost of Farming (Rp)
TCe	: Total Cost of Agricultural Explic Farming (Rp)
TCi	: Implicit Total Cost of Farming (Rp)

Explicit Cost Formula

TCe = ∑Xi . Pi

Description :

Xi	: Number of explicit inputs used by agriculture i-i
Pi	: Explicit input price of agriculture i-i
TCe	: Total Cost of Agricultural Explicit Farming (Rp)

Implicit Cost Formula

TCi = ∑Xi . Pi

Description :

Xi	: Total use of implicit inputs of agriculture i-i
Pi	: Implicit input price of agriculture i-i
TCi	: Implicit Total Cost of Farming (Rp)

Depreciation Cost Formula

$$\mathbf{D} = \frac{A-R}{N} \; X \; Ln$$

Description:

D	: The amount of depreciation value every year (Rp)
A	: Initial purchase value (Rp)
R	: Estimated residual value (Rp)
N	: The economic life of the item (years)
Ln	: Duration of effective use of the farming (Month)

Admission Formula

TR = Y.Py

Description :

TR	: *Total Revenue* / Revenue (Rp)
Y	: Amount of agricultural production (kg)
P y	: Product price (Rp/kg)

Revenue Formula

I = TR – TCe

Description :

I	: Income / Income (Rp)
TR	: *Total Revenue* / Revenue (Rp)
TC e	: Total Cost of Agricultural Explicit Farming (Rp)

Vol. 11, No. 04; 2026

ISSN: 2456-8643

Appendices 2. Farmers' Perception of the Development of the Food Estate Area Program.

Dimensions	Indicator	Remarks	Answer Categories					Shoes	Ket.
			STS (1)	TS (2)	CS (3)	S (4)	SS (5)		
Infrastructure and Technical	Irrigation system reliability	No problems with the irrigation system made	0	23	29	0	0	133	Disagree
	Effectiveness of mechanization	With mechanization, farming activities become more efficient in terms of time and cost	0	0	18	31	3	193	Setuju
	Land suitability	There are no problems in farming related to *food estate land*	0	35	17	0	0	121	Disagree
	Pests and Diseases	The absence of pest and disease attacks that affect agricultural production	18	19	15	0	0	101	Disagree
Quantity								**546**	
Economy & Markets	Certainty of the selling price of grain	There is certainty of the selling price of grain during fluctuating prices	23	29	0	0	0	81	Strongly Disagree
	Ease of access to capital/study program	There is and easy access to financial capital assistance and saprodi assistance	0	0	30	22	0	178	Setuju
	Income Stability	Stable farmers' income in every season	0	34	18	0	0	122	Disagree
Quantity								**381**	
Institutional & information	PPL Performance	Extension and education activities for farmers are increasingly active	0	0	24	28	0	184	Setuju
	Transparency of program information	Information about the program is accessible to all parties	0	27	25	0	0	129	Disagree
	The Role of POKTAN	POKTAN as a means of discussion and developing farmers' skills	0	0	32	20	0	176	Simply Agree
	Security of land	Clear and legally	0	0	0	16	36	244	Strongly

Vol. 11, No. 04; 2026

ISSN: 2456-8643

status	provable land ownership status							agree
Environmental impact *of Food Estate*	No environmental impact either in the short or long term	24	28	0	0	0	80	Strongly Disagree
Quantity							**813**	
Total Score							**1.742**	**Simply Agree**