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FACTORS AFFECTING FIELD RICE PRODUCTION (ORYZA SATIVA L.) IN EAST BARITO REGENCY, CENTRAL KALIMANTAN PROVINCE

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ABSTRACT
This study aims to determine the factors that influence the production of field rice farming in Kalamus Village, Paku District, East Barito Regency. The research location is in Kalamus Village, Paku District, East Barito Regency. Location determination using a purposive sampling method. The sampling technique in this study uses the Saturated Sampling Technique, where the number of samples is equal to the total population, namely 35 farmers. Data analysis using multiple linear regression. The results showed that field rice farming activities were still carried out subsistence to support food security for farmers and their families. Based on the results of multiple linear regression analysis, partially, the factors that significantly influence the production of upland rice are planting area, seeds, and labor. In contrast, the pesticide factor has no significant effect on production. Swid management has been carried out permanently or no longer moving, and pesticides have been used in clearing land and handling pests and diseases of Paddy Field plants. So it can be concluded that although the results of the Multiple Regression Test show that pesticides do not have a significant effect on the production of upland rice, this may occur because, in general, the cultivators did not carry out maintenance on their land, only relying on the generosity of nature. Still, now with permanent land conditions, without burning, farmers must be able to manage their land with technology, especially clearing land and weeds, as well as pests and diseases using pesticides.

Keywords: field paddy, production, subsistence, pesticides.

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INTRODUCTION

One of the agricultural sub-sectors that has an important role is the food crop sub-sector because it is not only a source of staple food for more than 95% of Indonesia's population but also a provider of employment and a source of income for around 21 million agricultural households. However, the rice harvested area in 2021 only reached 10.41 million hectares, or a decrease of 2.3%, compared to 2020, when the harvested area reached 10.66 million hectares or 245.47 thousand hectares. Paddy production in 2021 was 54.42 million tons, which also decreased by around 0.43% compared to 2020, with production reaching 54.65 million tons, or a decrease of 233.91 thousand tons (Indonesia, 2022). The decrease in rice production also impacts the decrease.

Technically, field rice, which generally grows and develops on dry land, has its advantages compared to lowland rice, including several varieties of dryland rice or dryland rice, which are generally resistant to moderate (*extreme*) drought (Paradise et al., 2022); (Putri et al., 2022); (Salsadilla & Hariyono, 2022).

Central Kalimantan Province, with an area of 153,564 km2, is the second largest area after Papua Province. Even though it has the most significant area compared to other provinces in

Kalimantan, the fact is that Central Kalimantan is not the province that has the largest area of harvested land and the most significant rice production in Kalimantan (Central, 2022).

Rice harvested area in Central Kalimantan in the last five years has decreased by around 50.58% or around 128,800 hectares or on average has decreased by around 25,760 hectares each year, resulting in a decrease in rice production by 55.17% or around 492,758 tons. With an average productivity level of 3.09 tons/hectare in 2021, the data can be seen in Table 1 below:

Table 1. Harvested Area, Production, and Productivity Rice in Central Kalimantan 2017-2021

Year	Harvested area (Ha)	Production (Tons)	Productivity (Tons/Ha)
2017	254,670	893,202	3.51
2018	147,572	514,769	3.49
2019	146,145	443,561	3.04
2020	143,275	457,952	3,20
2021	125,870	400,444	3.03

Source: Central Kalimantan BPS data, 2022

Based on Central Kalimantan BPS data, East Barito Regency is the fifth largest rice-producing district in Central Kalimantan, with an average productivity of 3 tonnes/ha. This is in line with the data in Table 2, as follows:

Table 2. Harvested area, production, and productivity Rice in East Barito Regency in 2019-2021

Year	Harvested area (Ha)	Production (Tons)	Productivity (Tons/Ha)
2017	8,887	32,721	3.68
2018	4,226	14,062	3,33
2019	5,519	17,069	3.09
2020	5,629	13,760	2.44
2021	5,346	17.139	3,21

Source: East Barito BPS, 2022

Based on BPS data from East Barito Regency, Paddy's harvested area in the last five years has relatively decreased the harvested area, around 39.84% or reaching 3,541 hectares, with an average decrease of around 708.2 hectares each year. Paddy production also decreased by around 47.62% or reached 15,582 tons.

Based on Data from East Barito Regency in Figures, the harvested area and production of Field Paddy decreased by around 45.58%, with an average decrease of 351 hectares yearly. The production also decreased by around 40.92%, with an average decrease of around 734 tonnes each year, meaning that field rice production was one of the causes of the decline in rice production in the East Barito Regency.

One of the subdistricts in East Barito Regency, with relatively low productivity of field rice, is Paku District, with a harvested area of around 170 hectares of field rice and a production of around 442 tons or a productivity of 2.60 tons/hectare. The low productivity of field rice in Paku District is caused by the decrease in land area and harvested area. One of the villages that have decreased field rice production is Kalamus Village. Kalamus Village has an area of around 40 km^2, only a harvest

area of around 25 hectares in 2021, with average rice productivity of only around 2 tons/hectare (Kalamus, 2022). Low rice productivity has resulted in a decrease in community interest in upland rice farming. It does not rule out the possibility that in the future, field rice farming will no longer be cultivated in this area; even though Paku District has the potential for developing upland rice farming when viewed from the geographical conditions of the area, it has dry land. Which is quite extensive, tends to be hilly, and is a mineral soil; some of these conditions play an essential role in upland rice farming.

Based on this background, this research is attractive, especially finding novelty in managing permanent Field Paddy with all the problems farmers face. Another interesting problem is that farmers already use pesticides on field rice plants. Previously, field rice was a non-pesticide or organic food crop, but with permanent management and tend to be intensive, pesticides are one of the technologies that help farmers manage their land. Previously, Field rice was not maintained intensively, relying on nature's grace.

The main problem in this research is the factors that influence the production of dry field rice on settled land, including planting area; variety and several seeds used; type and amount of pesticide used; and labor in the management of field rice farming. Based on the background and research problems, the research objectives were determined to determine the factors that influence the production of field rice in Kalamus Village, Paku District, East Barito Regency, Central Kalimantan Province.

METHODS

Place and time of research

This research was located in Kalamus Village, Paku District, East Barito Regency; the location selection was carried out purposively *(purposive sampling)*, considering that Kalamus Village is a village where the community still cultivates field rice. This research was carried out for six months, from June to November 2022.

Data source

The research data includes primary and secondary data; primary data comes from field rice farmers as respondents or data sources that provide information to researchers directly. Secondary data is all data obtained indirectly from the object under study in the form of books, literature, journals, and scientific reports related to research (Djam, 2014).

Sampling Method

The method used in this study uses a survey method. Determination of the sample using the saturated sample method, in which the entire population is used as a sample. The sampling technique in this study used the Saturated Sampling Technique, where saturated sampling is a sampling technique when all members of the population are sampled; this is done when the population size is relatively small or the researcher wants to make generalizations with minimal errors (Sugiyono, 2017). The population in this study were all field rice farmers in the village of Kalamus, namely a total of 35 family farmers.

Method of collecting data

Data collection is a systematic and standard procedure to obtain the data needed to support this research. The data collection techniques used are as follows:

1. Library studies, namely studies by studying books or other written materials, have something to do with the research being carried out.
2. Field studies, namely studies of collecting data directly into the field in the following ways: (1) Observation, namely data collection techniques carried out through field observations of research objects, (2) Interviews, namely direct communication with farmers or other parties relating to the problems studied utilizing question and answer, (3) Questionnaire, which is the primary tool used in this study, distributed with questions that have been prepared.

Data Processing and Analysis Methods

Researchers used multiple linear regression analysis to answer the research objective, namely to determine the factors that influence the production of field rice farming in Kalamus Village, Paku District, East Barito Regency. Multiple linear regression analysis is an equation model that explains the relationship of one independent/response variable (Y) with two or more independent variables/predictors (X_1, X_2, X_3, X_4). Multiple linear regression analysis is used because more than one factor affects dryland rice production. The tool used to analyze multiple linear regression in this study is the IBM SPSS (Statistical et al.) version 26 application.

The multiple linear regression equation is expressed mathematically by:

$$\mathbf{Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e}$$

Where:

Y	= Field Rice Farming Production
α	= Constant
β_1, β_2, β_3, β_4	= Regression coefficient values
X_1	= Planted Area (Ha)
X_2	= Seed (Kg)
X_3	= Pesticide (Liters)
X_4	= Labor (HOK)
e	= Errors

RESULTS AND DISCUSSION

Analysis of Factors Influencing Field Rice Production

The analysis used to determine the factors that influence the production of field rice farming in Kalamus Village, Paku District, East Barito Regency, uses the Multiple Linear Regression Analysis model. Data processing using computer aids with the SPSS version 26 program. Where the dependent variable is Field Rice Farming Production (Y), and the independent variables are Planted Area (X_1), Seed (X_2), Pesticides (X_3), and Labor (X_4). Before analyzing the data using multiple linear regression analysis, the data has passed the classical assumption test so that the estimation of parameters and regression coefficients is not biased. This classic assumption test includes normality, multicollinearity, autocorrelation, and heteroscedasticity tests.

Based on the study's results, what generally influences rice production is the factor of land area, Urea fertilizer, Phonska fertilizer, pesticides, and labor (Wadu et al., 2019). Output Regression Results Factors that influence Field Rice Production in Kalamus Village, Paku District, East Barito Regency can be seen in Table 3 below:

Table 3. Regression Output Results of Factors Affecting Field Rice Production

	Regression Coefficient	t value $_{count}$	Significant
Constant	23,284	.090	.929
Planted Area (X1)	1498,869	5.367**	.000
Seed (X2)	10,296	1,594*	.121
Pesticides (X3)	3,689	.420	.678
Labor (X4)	-7,438	-2,057**	048

Processed primary data sources, 2022.

*= Significance at 85% confidence level; t $_{table}$ = 0.15

**= Significance at 95% confidence level; t $_{table}$ = 0.05

Based on the results of the analysis using multiple linear regression, it can be described that; simultaneously with the F test, showing that all variables, namely the planted area factor (X_1), the seed factor (X_2), the pesticide factor (X_3), and the labor factor (X_4) which are included in the model, have a significant effect on field rice production, but partially using the t-test, showing that only the planting area factor (X_1), seed factor (X_2), labor factor (X_4), which is significant to the increase in field rice production (Y) in the village Kalamus, Paku District, East Barito Regency.

This can be explained by the fact that the planting area factor has a calculated $_{value}$ of 5.367 > t_{table} 2.042 and a significance value of 0.000 <0.05; it can be concluded that the planting area (X_1) has a significant (significant) effect on production (Y), with a positive value means that the addition of planting area will also show a significant increase in production. This can be explained by; External Planting factors affecting production, meaning that the area of land planted by farmers and their families increases, and the production area also increases, increasing production. The regression coefficient value of Planted Area (X_1) is 1498.869, meaning that each additional Planting of 1 ha will increase field rice production by 1498.869 Kg. Based on the results of this analysis, it is explained that the wider the land used, the greater the production produced. This is in line with the statement that the size of production from farming is influenced, among other things, by the narrowness of the land used (Rahmawati et al., 2019); (Sukmayanto et al., 2022). The land used by farmers in Kalamus Village, Paku District, East Barito Regency, when the research was conducted, was permanent cultivation land, meaning that farmers planted field rice without moving.

The second factor that is significant in the model used is the seed factor (X_2), which gets a $_{value}$ of 1.594 > 1.310 $t_{table,}$ which means that the seed (X_2) has a significant effect on field rice production (Y), meaning it is increasing (a lot) the number of seeds planted will increase the amount of production because the number of seeds planted is generally adjusted to the area of the planted area. The seed factor with a regression coefficient of 10.296 means that every additional 1 kg of seed will increase field rice production by 10.296 kg. In line with the study, the seed variable positively affects rice production (Marhan et al., 2020); (Sukmayanto et al., 2022). Seed is an essential factor in determining the success of upland rice farming. The seeds upland rice farmers use are local varieties in which field rice is divided into rich local varieties (Karangdukuh*, Radenweat*) and local

light varieties (*Palui* et al.). Heavy local varieties are rice seeds requiring a longer planting time than local light varieties. Therefore, rich local rice varieties will be planted faster than light local varieties. Heavy local varieties will be planted first in early November, while light local varieties will be planted a month later in December each year. The average number of rice seeds used is 20-35 kg/0.50-0.75 hectares. In contrast, the seeds planted are harvested from the previous planting season.

Furthermore, the Labor factor (X_4) gets a t_{count} value of $-2.057 < t_{table}$ 2.042, with a significance level of $0.048 < 0.05$, so that Labor (X_4) has a significant effect on Field Rice Production (Y), but has a coefficient value negative, meaning that if the workforce is increased, field rice production will decrease. This illustrates that the area of land for field rice farming has decreased if 10-15 years ago, there were still many farmers managing field rice, but the number of farmers/cultivators has decreased; this is indicated by the total population of cultivator farmers of only 35 people, and this number will likely decrease in the coming years, the impact of the management system that has been settled and the ban on forest and land burning. Labor is generally significant to production (Ashar & Balkis, 2018); (Rahmawati et al., 2019); (Sukmayanto et al., 2022). showing the value of the regression coefficient or the elasticity of labor, which is hostile (Yusmiati, 2020). The workforce used in field rice management in Kalamus Village, Paku District, East Barito Regency, generally only uses family labor.

Results of analysis of Pesticide production factors (X_3), with a t_{count} value of $0.420 < t_{-table}$ 1.310 and 2.042, which means that the pesticide factor (X_3) has no significant effect on field rice production. The regression coefficient is 3.689, which means that every addition of 1 liter of pesticide (X_3) will only increase rice production by 3.689 kg. Pesticides are one of the new agricultural technologies adopted by field farmers. Generally, the fields do not use pesticides in their management. The use of pesticides in sedentary cultivation is due to the increased intensity of pests and diseases; this is presumably due to the cultivation of land close to oil palm plantations, where intensive management uses pesticides in tackling pests and diseases that attack so that pests and diseases are eradicated from plantations. Palm oil shifted to community cultivation land. This is in line with research (Lailiyah et al., 2018); (Abas & Noer, 2019); (Wulan et al., 2022) that rice production is not always affected by the use of pesticides.

Farmers use pesticides to tackle pests and diseases in rice plants; the pesticides used are divided into herbicides, insecticides, and fungicides. Herbicides control weeds in rice plants; the herbicides used are Roundup, gramophone, Ultron, and Lindomin. Insecticides are used to prevent and control insect pests in rice plants; the insecticides used are vitako, dharmas, plenum, furan, and talon. Meanwhile, fungicides treat bacterial pests such as yellow stem borer. The fungicides used are Amistartop, antra col, topspin, and Explore.

CONCLUSION

Based on the results of the study showed that the factors influencing the production of upland rice farming on settled land, simultaneously or together (Test F), showed that the variables of planting area (X_1), seeds (X_2), pesticides (X_3), and labor Work (X_4) jointly influences field rice production (Y). However, partially or individually (t-test), it shows that the variables of planted area (X_1), seeds (X_2), and labor (X_4) have a significant or significant effect on field rice production (Y), while

pesticides (X_3) do not significant effect on Production (Y). Based on the results of this study, the researchers suggest that farmers be more open to technological advances in agriculture, especially understanding the use of pesticides, in managing their fields, so that they can help manage land optimally in Paddy Field farming. Further studies are needed because fertilizer or other factors have yet to be included in the model used by researchers, so it is suggested that future researchers include fertilizer or other factors as independent variables, considering that the managed land is now settled.

REFERENCES

Abas, A., & Noer, H. (2019). Faktor-Faktor Yang Mempengaruhi Produksi Tanaman Padi Gogo Di Kabupaten Morowali. *Jurnal Agrotech*, *9*(1), 16–25. https://doi.org/10.31970/agrotech.v9i1.29

Ashar, A., & Balkis, S. (2018). Faktor-Faktor Yang Mempengaruhi Produksi Padi Sawah (Oryza Sativa L.) Di Desa Binalawan Kecamatan Sebatik Barat Kabupaten Nunukan (Factors Influencing Production of Wetland Paddy (Oryza sativa L.) in Binalawan Village West Sebatik Subdistrict Nunukan Dist. *Jurnal Agribisnis Dan Komunikasi Pertanian (Journal of Agribusiness and Agricultural Communication)*, *1*(2), 65–73. http://dx.doi.org/10.35941/jakp.1.2.2018.1707.65-73

Djam, S. (2014). an dan Aan Komariah, 2014. *Metodologi Penelitian Kualitatif Bandung: Alfabeta*.

Indonesia, B. P. S. (2022). *Laporan Luas panen dan produksi Padi di Indonesia Tahun 2022*. Indonesia.

Kalamus, I. W. D. (2022). *Luas lahan pertanian di Desa Wuran 2022*. Kalamus.

Lailiyah, N., Timisela, N. R., & Kaplale, R. (2018). Analisis produksi padi sawah (Oryza sativa L) tadah hujan di Desa Lea Wai Kecamatan Seram Utara Timur Kobi. *AGRILAN: Jurnal Agribisnis Kepulauan*, *5*(2), 151–165.

Marhan, M., Ferrianta, Y., & Salawati, U. (2020). Analisis Faktor-Faktor Yang Mempengaruhi Produksi Padi Gogo Di Desa Belangian, Kecamatan Aranio, Kabupaten Banjar. *Frontier Agribisnis*, *4*(3). https://doi.org/10.20527/frontbiz.v4i3.2914

Paradisa, Y. B., Indrayani, S., Wibowo, H., Perdani, A. Y., Priadi, D., Deswina, P., Adi, E. B. M., Mulyaningsih, E. S., Sulistyowati, Y., & Anggraheni, Y. G. D. (2022). Evaluasi 36 Genotipe Padi Gogo Terhadap Cekaman Biotik Dan Abiotik Pada Enam Lokasi Berbeda: Evaluasi 36 Genotipe Padi Gogo Terhadap Cekaman Biotik Dan Abiotik Pada Enam Lokasi Berbeda. *AGROSAINSTEK: Jurnal Ilmu Dan Teknologi Pertanian*, *6*(1), 12–22. https://doi.org/10.33019/agrosainstek.v6i1.286

Putri, A. E., Ernawiati, E., Priyambodo, P., Agustrina, R., & Chrisnawati, L. (2022). Klorofil Sebagai Indikator Tingkat Toleransi Kekeringan Kecambah Padi Gogo Varietas Lokal Lampung, Lumbung Sewu Cantik. *Biota: Jurnal Ilmiah Ilmu-Ilmu Hayati*, 142–150. https://doi.org/10.24002/biota.v7i2.5150

Rahmawati, E., Nugroho, A. E., & Defri, A. (2019). Analisis Faktor yang Mempengaruhi Produksi Padi Sawah di Desa Sebulu Ilir Kecamatan Sebulu Kabupaten Kutai Kartanegara. *Rawa Sains: Jurnal Sains STIPER Amuntai*, *9*(2), 68–76. https://doi.org/10.36589/rs.v9i2.100

Salsadilla, P., & Hariyono, K. (2022). Respon Pertumbuhan dan Hasil Tiga Varietas Padi Gogo (Oryza sativa L.) pada Berbagai Kondisi Cekaman Kekeringan. *Berkala Ilmiah Pertanian*, *5*(1), 45–51. https://doi.org/10.19184/bip.v5i1.29356

Sugiyono, P. D. (2017). Metode penelitian bisnis: pendekatan kuantitatif, kualitatif, kombinasi, dan R&D. *Penerbit CV. Alfabeta: Bandung*, *225*, 87.

Sukmayanto, M., Hasanuddin, T., & Listiana, I. (2022). Analisis Produksi dan Pendapatan Usahatani Padi di Kabupaten Lampung Tengah. *Jurnal Ekonomi Pertanian Dan Agribisnis (JEPA)*, *6*(2),

625–634.

Tengah, B. P. S. P. K. (2022). *Luas Wilayah dan Kondisi Geografis Provinsi Kalimantan Tengah*. Palangka Raya.

Wadu, J., Yuliawati, Y., & Nuswantara, B. (2019). Strategi menghadapi risiko produksi padi sawah di Kabupaten Sumba Timur. *Jurnal Ekonomi Dan Bisnis*, *22*(2), 231–256.

Wulan, S., Indriani, R., & Bempah, I. (2022). Pengaruh Penggunaan Faktor-Faktor Produksi Terhadap Produksi Usahatani Padi Sawah Di Desa Bulotalangi Kecamatan Bulango Timur. *Agrinesia: Jurnal Ilmiah Agribisnis*, *6*(2), 118–125. https://doi.org/10.37046/agr.v6i2.15913

Yusmiati. (2020). *Analisis Faktor-Faktor Yang Mempengaruhi Produksi Usahatani Padi Di Kecamatan Libureng Kabupaten Bone*. Universitas Muhammadiyah Makassar.