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The Effect of Share Tenancy on Rice Productivity in Kulon Progo Regency

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ABSTRACT

Keywords: Share tenancy; land tenure status; rent; rice productivity

Abstract

Variations in land ownership status, such as self-owned land, rental farming, and profit-sharing system, are believed to influence the productivity of rice farming. In Kulon Progo Regency, the shrinking agricultural land area due to infrastructure development, rising price of farm land's rent, along with an increasing number of farmers without land's ownership, highlights the urgency of examining the effectiveness of the profit-sharing system. However, empirical evidence regarding its impact on productivity remains limited. This research is aimed to study whether the profit-sharing system achieves similar productivity levels compared to self-owned or rented land. In this research, proportional stratified random sampling is utilized as the main method of acquiring data samples. There are 92 respondents studied in this research. Descriptive quantitative analysis and double linear regression analysis of Cobb-Douglas production function were employed as methods of analysis in this study. The result showed there was no difference in level of productivity between self-owned land farming and rental farming. Fertilizer use and farming experience were found as factors that increase productivity in rice farming, while land area and labor were found as factors that decrease productivity. These findings support Cheung's theory, which asserts that there is no difference in productivity between profit-sharing and fixed-rent systems. Moreover, the results offer practical insights, suggesting that non-ownership land management, such as rental and profit-sharing, can serve as viable alternatives to improve land accessibility in the agricultural sector, particularly for young farmers.

INTRODUCTION

Productivity in the agricultural sector, particularly in rice farming, is influenced by various factors, one of which is land tenure status. The Marshallian theory posits that sharecropping systems inherently lead to inefficiencies in labor utilization. Consequently, land ownership and fixed rental arrangements are considered more efficient and result in higher productivity compared to sharecropping. In contrast, Cheung (2018) argues that there is no significant difference in efficiency and productivity between sharecropping, owned land, and fixed rental systems. This assertion is based on the assumption that both landowners and tenants behave rationally, aiming to maximize their respective returns without resulting in the other party receiving less than institutionally set wage standards. In the context of rice self-sufficiency, high land rental costs may lead to declining rice productivity (Koirala et al., 2016). Several challenges contributing to the agricultural crisis include high production costs, limited government support, and a significant drop in productivity (Koirala et al., 2016).

Koirala et al. (2016) Investigated the impact of land ownership on rice production in the Philippines using a stochastic frontier approach. Their findings revealed that capital, measured by land rental value, had a positive and significant effect on rice production. Goswami & Bezbaruah (2018) conducted a multiple regression analysis on rental inefficiencies in Eastern India. The results indicated that tenants may face incentive issues, such as overusing chemical fertilizers to maximize short-term profits while neglecting the long-term health of the soil.

Kalkuhl et al. (2020) studied the interaction between sharecropping tenure and fertilizer use, as well as livestock ownership, in Africa using a bivariate probit regression method. Their findings demonstrated that sharecropping interacts with farmers' risk management decisions, particularly regarding fertilizer application and livestock maintenance. De Almeida & Buainain (2016) analyzed the key factors influencing land rental and sharecropping in Brazil using descriptive analysis of 2006 census data. Their results indicated that a more equitable distribution of land ownership enhances the efficiency of the land rental market. Due to limited productive and financial resources, sharecroppers and renters tend to cultivate low-cost crops that require minimal investment and small plots of land.

Gautam & Ahmed (2019) explored the relationship between farm size and productivity in Bangladesh. They found that production efficiency decreases with larger farm sizes, indicating that large-scale farms are technically less efficient than small-scale one. Zeng et al. (2018) examined the effects of land rental arrangements—both fixed cash rent and sharecropping—on the adoption of improved crop varieties in Ethiopia. The study found that land rental arrangements did not influence varietal adoption among fixed-rent tenants but significantly increased adoption likelihood among sharecroppers.

Paltasingh (2018) investigated the role of land tenure security in the adoption of modern technologies in Eastern India using a Tobit model. The findings suggested that secure land tenure, whether through ownership or long-term rental contracts, supports the adoption of modern technologies, regardless of whether the arrangement is a fixed rent or sharecropping. Abay et al. (2021) studied trends in land market participation and rental price responses to land scarcity in Sub-Saharan Africa. They found that land scarcity significantly affects land value per hectare and rental prices paid by tenants. Land prices per hectare decrease as plot size increases. Production scale matters—farmers with better financial resources and greater potential to rent and cultivate land are more likely to benefit from the land rental market.

Shirzad et al. (2022) examined the impact of land tenure systems on agricultural production in Iran through content analysis. Their results indicated that land tenure protection is a key component ensuring long-term agricultural engagement, which contributes to the development of sustainable agricultural ecosystems. Ngango & Hong (2021) studied the impact of land tenure security on maize yield and technical efficiency among farmers in Rwanda using stochastic production frontier and probit models. Their findings indicated that land tenure security positively influences crop yields. Bidisha et al. (2018) conducted a study in Northern Bangladesh on the effects of rental structures and technical efficiency on household agricultural productivity using a binary logistic regression and stochastic frontier model. The study found that land under sharecropping arrangements exhibited lower productivity compared to owned or fixed-rent land. Output inefficiency was higher under sharecropping. Households with greater asset ownership were more likely to choose fixed-rent contracts over sharecropping, likely due to the increased income flexibility associated with asset ownership.

Contrary to the findings of Paltasingh et al. (2022), which supported the Marshallian inefficiency hypothesis by showing that owner-operators with secure lease arrangements are more efficient than sharecroppers, this study explores the possibility that sharecropping may yield greater benefits compared to ownership or fixed rental systems.

Séogo & Zahonogo (2023) examined the effect of land ownership rights on agricultural productivity in Burkina Faso using the Conditional Mixed Process (CMP) method. Their results showed that formal land ownership has a positive and significant impact on land productivity. Modernizing land tenure systems by granting formal land rights to farmers may improve agricultural productivity and reduce rural poverty.

This study complements previous research by reaffirming that sharecropping does not significantly differ in productivity compared to owned or rented land, and thus, sharecropping may serve as a viable alternative in addressing land access limitations and high rental costs.

In Kulon Progo Regency, land tenure status varies and significantly affects rice farming productivity. The land tenure systems observed in the study area include owner-operated, rental, and sharecropping arrangements. The extent of paddy fields in this region continues to decline due to various infrastructure development projects. Harini et al. (2021) state that Kulon Progo Regency has the lowest ratio of paddy field area, only 0.27%, compared to Sleman, Bantul, and Gunung Kidul. This condition limits tenant farmers' access to arable land.

Rice productivity in Kulon Progo Regency slightly increased from 67.19 quintals/ha in 2022 to 67.96 quintals/ha in 2023, an increase of only 0.77 quintals/ha, based on the 2024 Kulon Progo Statistics Report. This marginal growth may be attributed to the limited effectiveness of farming systems, particularly the sharecropping system, leading to low incentives for tenant farmers.

The effectiveness and profitability of sharecropping arrangements between landowners and tenant farmers in this region merit further investigation, especially considering rising land rental prices. The construction of Yogyakarta International Airport and major infrastructure improvements have led to significant land-use conversions, especially from mixed gardens and paddy fields (Utami et al., 2023). In light of these issues, this study poses the following research question 1) Does the sharecropping system in rice farming in Kulon Progo Regency offer greater benefits than owner-operated or rental systems?

The objective of this study is to examine differences in rice farming productivity based on land tenure systems, including ownership, rental, and sharecropping. This research contributes to the evaluation of which land tenure system is most advantageous and supportive of rice farming productivity in the study area.

RESEARCH METHODS

This study was conducted from September to October 2023 in Kulon Progo Regency, Special Region of Yogyakarta. The research location was selected using purposive sampling. The data type is cross-sectional. Sampling was carried out using proportional stratified random sampling, involving 92 respondents. Quantitative data were collected through direct observation and interviews using an open-ended questionnaire. Before conducting regression analysis to assess the significance of factors influencing rice productivity, normality and classical assumption tests were performed. The normality test determines whether the residuals are normally distributed. The test result showed a significance value of 0.823, which is greater than 0.05, indicating that the residuals are normally distributed. Classical assumption tests conducted include multicollinearity, heteroscedasticity, and autocorrelation tests. The multicollinearity test examines the linear relationship between two or more independent variables. The average Variance Inflation Factor (VIF) in this study was 2.03 (< 5), indicating no multicollinearity. The heteroscedasticity test assesses whether there is unequal variance in the regression model's residuals. The significance value was 0.226 (> 0.05), indicating no heteroscedasticity. The autocorrelation test checks whether error terms are uncorrelated. The p-value for this test was 0.809 (> 0.05), suggesting no autocorrelation.

Data on the factors affecting rice productivity were analyzed using multiple linear regression based on the Cobb-Douglas production function. This model measures the influence of independent variables such as land area (X_1), amount of seed (X_2), labor (X_3), fertilizer quantity (X_4), pesticide usage (X_5), education level (X_6), household size (X_7), farmer age (X_8), farming experience (X_9), and land tenure status, sharecropping (D_1) and rental (D_2)—on rice productivity (Y), using STATA software:

$$\ln Y = \ln\beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + \beta_7 \ln X_7 + \beta_8 \ln X_8 + \beta_9 \ln X_9 + D_1 + D_2 + e$$

where Y represents rice farming productivity, measured in kilograms per hectare (kg/ha). The independent variables in this model consist of X_1 (land area in square meters), X_2 (amount of seed in tons/ha), X_3 (labor used, measured in person-days per hectare or HOK/ha), X_4 (amount of fertilizer in tons/ha), X_5 (pesticide usage in liters per hectare), X_6 (farmer's level of education in years), X_7 (number of household members in persons), X_8 (farmer's age in years), X_9 (farming experience in years), and two dummy variables, D_1 and D_2, each representing a land tenure status, with D_1 assigned a value of 1 for the sharecropping system and 0 for others, and D_2 assigned a value of 1 for the rental system and 0 for others. Lastly, e denotes the error or disturbance term.

RESULTS AND DISCUSSION

Rice Farming Revenue

The land tenure status of farmers consists of three systems: ownership, rental, and sharecropping. In Kulon Progo Regency, land ownership typically results from purchase or inheritance. The rental system in the region costs approximately IDR 16,000,000 per hectare per year. In the sharecropping system, production costs are borne by the tenant farmer, with a profit-sharing ratio of 60:40, meaning that 60% of the output goes to the tenant farmer and 40% to the landowner.

Rice farming revenue in Kulon Progo Regency is derived from the total harvest sold at the determined price of harvested dry unhusked rice (GKP). Based on Table 1, the average cash income per planting season (MT) for rice farming is IDR 7,579,683 for owned land, IDR 9,592,789 for rented land, and IDR 8,971,149 for sharecropped land. Farmers in Kulon Progo typically sell their harvest in the form of GKP rice, with a selling price at the farmer level of IDR 5,000 per kg. The average rice production in Kulon Progo Regency is 1,516 kg on owned land with an average area of 1,614 m²; 1,919 kg on rented land with an average area of 1,927 m²; and 1,794 kg per planting season on sharecropped land with an average area of 1,994 m². According to Pratama et al.(2018), the revenue of both non-organic and semi-organic rice farming in Kudus Regency is calculated by multiplying the amount of GKP produced by its selling price. Semi-organic rice farming yields lower revenue than non-organic due to both lower production and a lower selling price of GKP compared to non-organic rice farming.

Rice Farming Costs

The total farming cost on land under ownership tenure is the lowest compared to that of rental and sharecropping systems, while the highest costs are incurred in rice farming under rental land tenure. The total cost of rice farming on owned land amounts to IDR 4,580,179, consisting of explicit costs of IDR 3,177,665 and implicit costs of IDR 1,402,514. The total cost borne by farmers on rented land is IDR 6,821,682, with explicit costs of IDR 5,892,117 and implicit costs of IDR 616,012. For farmers on sharecropped land, the total cost is IDR 6,986,864, with explicit costs amounting to IDR 6,400,288 and implicit costs of IDR 586,576. Bidisha et al. (2018) state that farmers using more inputs tend to incur higher production costs for the same output level. Therefore, higher costs are associated with the use of more productive inputs to increase productivity. Pratama et al. (2018) assert that semi-organic rice farming production costs can be lower than those of non-organic farming due to the smaller quantity, lower price, and different types of input factors used, such as fertilizer, pesticides, and labor, in semi-organic farming compared to non-organic rice farming. The more input factors used, the higher the production costs incurred.

Table 1. Calculation of Revenue and Production Cost

Component of Revenue	**Owned Land** **N = 63**	**Rented Land** **N = 26**	**Sharecropping** **N = 37**
Revenue			
Land area	1614	1927	1994
Production (Kg)	1516	1919	1794
Price (IDR)	5000	5000	5000
Revenue (IDR)	7,579,683	9,592,789	8,971,149
Component of Revenue	**Owned Land** **N = 63**	**Rented Land** **N = 26**	**Sharecropping** **N = 37**
Explicit Costs (IDR)			
Saprodi:			
Seeds	229,365	297,000	323,270
Inorganic Fertilize	396,294	468,779	502,615
Pesticides	98,616	101,670	117,203
Wage Labor (TKLK)	741,230	725,769	813,446
Depreciation	130,524	101,233	92,309
Miscellaneous Costs:			
Tractor Rental	354,175	488,849	435,392
Harvesting Machine Rental	368,556	593,981	605,622
Irrigation Fees	20,016	25,458	23,053
Land Rent/Share Payment	0	2,085,590	2,540,486
Harvest Labor (TKLK)	838,889	1,003,788	946,892
TOTAL EXPLICIT COSTS	**3,177,665**	**5,892,117**	**6,400,288**
Implicit Costs (IDR)			
Family Labor (TKDK)	404,841	430,577	383,784
Self-Owned Land Rent	861,012	0	0
Own Capital Interest	136,661	185,435	202,792

TOTAL IMPLICIT COSTS	**1,402,514**	**616,012**	**586,576**
TOTAL COSTS	**4,580,179**	**6,508,129**	**6,986,864**

Source: Primary Data (2024)

Income and Profit from Rice Farming

Income is derived from the difference between total revenue and explicit (cash) costs, while profit is obtained from the difference between total revenue and total costs (including both explicit and implicit costs). Table 2 indicates that the average income of farmers, whether owning land, leasing land, or farming under a sharecropping system, does not differ significantly. Farmers who cultivated their land reported the highest income, amounting to IDR 4,402,018, compared to those who leased land or practiced sharecropping. However, the highest profit was recorded by farmers who leased land, with an average profit of IDR 3,084,660. In comparison, the profit of farmers who owned their land and those under sharecropping arrangements amounted to IDR 2,999,504 and IDR 1,984,285, respectively. Overall, rice farming in Kulon Progo Regency remains profitable across different land tenure systems—owned, leased, or sharecropped—indicated by the positive values of both income and profit. Nevertheless, these figures are lower than the findings of Listiani et al. (2019), who reported an average rice farming income of IDR 8,924,425 per 0.5 hectares per season in Jepara Regency. Additionally, research by Abay et al. (2021) highlights that farmers with greater financial capital and the capacity to lease and manage larger tracts of land are more likely to benefit from land rental arrangements.

Table 2. Income and Profit from Rice Farming

Component of Revenue	Owned Land N = 63	Rented Land N = 26	Sharecropping N = 37
Revenue	7,579,683	9,592,789	8,971,149
Explicit Costs	3,177,665	5,892,117	6,400,288
Implicit Costs	1,402,514	616,012	586,576
Total Costs	4,580,179	6,508,129	6,986,864
Income	4,402,018	3,700,672	2,570,861
Profit	2,999,504	3,084,660	1,984,285

Source: Primary Data (2024)

Respondent Characteristics

Age

The study involving 92 rice farmers in Kulon Progo Regency found that the average age of the farmers was 58 years, which falls within Generation X (ages 43–58). Of these, 44 farmers were classified as Baby Boomers (ages 59–77), and 5 farmers were categorized as Pre-Boomers (above 77 years). Furthermore, 10 farmers belonged to the Millennial generation.

Table 3. Farmer Age Group Distribution

Age Group	Age Range (Year)	Number of Farmers	Percentage (%)
Generation Z	11-26	0	0
Millennials	27-42	10	10.87
Generation X	43-58	33	35.87
Baby Boomers	59-77	44	47.83
Pre Boomers	>77	5	5.43
Average	**58**		
Total		**92**	**100**

Source: Primary Data (2024)

Formal Education

Table 4 shows that among the 92 farmers surveyed, the majority had completed senior high school (SMA), accounting for 40 individuals (43.48%). At the higher education level, 1 farmer (1.09%) had obtained a Diploma (D_2), and 8 farmers (8.70%) held a Bachelor's degree. On the other hand, 5 farmers (5.43%) had never received any formal education. These findings illustrate the diversity of educational backgrounds among local farmers.

Table 4. Farmer Distribution by Formal Education Level

Education Level	**Number of Farmers**	**Percentage (%)**
No Formal Education	5	5.43
Elementary School	25	27.17
Junior High School	13	14.13
Senior High School	40	43.48
Diploma (D2)	1	1.09
Bachelor’s Degree	8	8.70
Total	92	100

Source: Primary Data (2024)

Farming Experience

Based on the data presented in Table 5 regarding farming experience, the majority of farmers in Kulon Progo Regency have been engaged in agriculture for over 30 years, totaling 36 individuals (39.13%). Two experience groups, those farming for 16–20 years and those for 26–30 years, each consist of 12 farmers (13.04%). These are followed by 10 farmers (10.86%) with 21–25 years of experience. Farmers with 6–10 years and 11–15 years of experience each account for 7 individuals (7.60%). The group with the least experience (1–5 years) comprises only 8 individuals (8.69%). This distribution indicates that the agricultural sector in Kulon Progo Regency is predominantly composed of highly experienced farmers, whereas the proportion of newer or younger farmers remains relatively low.

Table 5. Farmers by Years of Farming Experience

Years of Farming	**Number of Farmers**	**Percentage (%)**
1-5	8	8.69
6-10	7	7.60
11-15	7	7.60
16-20	12	13.04
21-25	10	10.86
26-30	12	13.04
>30	36	39.13
Total	92	100

Source: Primary Data (2024)

Household Size

Table 6 indicates that among the 92 farmers surveyed in Kulon Progo Regency, the most common household size was four members (including the head of household), comprising 30 farmers or 32.60% of the total. In contrast, households with seven members were the least common, represented by only one farmer. These figures suggest that approximately one-third of the farmers have nuclear family structures, with four members being the typical household size.

Table 6. Farmers by Household Size

Number of Household Members	**Number of Farmers**	**Percentage (%)**
1	5	5.43
2	20	21.74
3	24	26.08
4	30	32.60
5	7	7.60
6	5	5.43
7	1	1.09
Total	92	100

Source: Primary Data (2024)

Land Area Utilization

Table 7 presents findings on landholding size among the 92 farmers surveyed. The majority of respondents (25%) own land within the range of 0.11–0.20 hectares. Most farmers possess land areas smaller than 0.5 hectares, reflecting a pattern of small-scale farming. Notably, only one farmer (1.09%) owns more than 1 hectare of land. These results illustrate the generally limited landholdings characteristic of the farming population in Kulon Progo Regency.

Table 7. Farmers by Land Area

Land Area (Hectares)	**Number of Farmers**	**Percentage (%)**
0.01-0.10	20	21.74
0.11-0.20	23	25
0.21-0.30	21	22.83
0.31-0.40	14	15.22
0.41-0.50	13	14.13
0.51-0.60	0	0
0.61-0.70	0	0
0.71-0.80	0	0
0.81-0.90	0	0
0.90-1.00	0	0
>1.00	1	1.09
Total	92	100

Source: Primary Data (2024)

Land Tenure Status

Table 8 presents data on the land tenure status of 92 farmers surveyed in Kulon Progo Regency. The majority of respondents (63 farmers) cultivated the land they owned. Additionally, 26 farmers operated under a rental arrangement, while 37 farmers engaged in sharecropping. Field observations also revealed that some farmers combined multiple land tenure arrangements; for example, owning a portion of their land while also renting or sharecropping additional plots.

Table 8. Farmers by Land Tenure Status

Land Tenure Status	Number of Farmers
Owned	63
Rented	26
Sharecropping	37

Source: Primary Data (2024)

Production Inputs

The data on input usage indicates that farmers in Kulon Progo Regency apply seeds at a rate of 0.03 tons/ha, fertilizer at 0.65 tons/ha, labor at 95.7 person-days/ha (HOK/ha), and pesticides at 2.81 liters/ha. These figures reflect a relatively intensive input usage pattern, tailored to the typically small landholdings in the region, aimed at optimizing land productivity.

Analysis of the Impact of Production Factors on Rice Productivity

A multiple linear regression analysis was conducted using the Cobb-Douglas production function in natural logarithmic form to evaluate the influence of various production factors on rice productivity in Kulon Progo Regency. In this model, rice productivity serves as the dependent variable, while the independent variables include land area, seed usage, labor, fertilizer, and pesticide—representing key agricultural inputs. Socioeconomic variables such as education level, household size, age, and years of farming experience were also incorporated to assess the influence of farmer characteristics on productivity. Furthermore, dummy variables for sharecropping and rental arrangements were included to examine potential productivity differences based on land tenure status. The regression results are presented in Table 9.

Table 9. Multiple Linear Regression Results for the Production Function and Rice Productivity

Productivity	Expected Sign	Coefficient	t-Statistic	P > |t|
Land Area	+	-0.276***	-4.89	0.000
Seed	+	0.019ns	0.60	0.550
Labor	+	-0.264***	-4.07	0.000
Fertilizer	+	0.186***	4.88	0.000
Pesticides	+	0.002ns	0.08	0.934
Education	+	0.091ns	1.25	0.216
Household Size	+	0.049ns	1.02	0.312
Age	+	-0.189ns	-1.30	0.197
Farming Experience	+	0.090**	2.39	0.019
Sharecropping	+	-0.004ns	-0.07	0.942
Rental	+	0.029ns	0.55	0.583
_cons		2.868	4.57	0.000
R-squared				0.5180
Adjusted R-squared				0.4443
F				7.03***
Prob > F				0.0000

Source: Primary Data (2024)

*** = significant at 99% level (α=0.01)

** = significant at 95% level (α=0.05)

* = significant at 90% level (α=0.1)

ns = not significant

The regression analysis yielded an adjusted R-squared value of 44.43%, indicating that the independent variables, including land area, seed, labor, fertilizer, pesticides, education, household size, age, farming experience, and the dummy variables for sharecropping and rental, collectively explain 44.43% of the variation in rice productivity. The remaining variation is attributable to other factors not captured in the model. While this moderate R-squared value suggests the model does not capture all determinants of productivity, it also highlights the potential for further research to explore additional influencing factors. As noted by Studenmund (2016), measures of fit such as R^2 or adjusted R^2 represent just one dimension of model quality; the theoretical soundness and expected direction of the estimated coefficients are equally important.

The results of the F-test indicate that the independent variables, including land area, seeds, labor, fertilizers, pesticides, education, number of family members, age, farming experience, profit-sharing dummy, and rental dummy, collectively have a statistically significant effect on rice productivity.

The t-test results for land area (X_1) show a regression coefficient of -0.276, which is significant at the 1% level. This negative and significant relationship implies that a 1% increase in land area is associated with a 0.276% decrease in rice productivity. This finding suggests that land size management plays a critical role in influencing rice productivity. It aligns with research by Gautam and Ahmed (2019), which found that large-scale farms are often technically less efficient than smaller ones. However, this finding contrasts with that of Koirala et al. (2016), who reported a positive and significant effect of land area on productivity at the 5% significance level.

Labor Variable (X_3) has a regression coefficient value of -0.264 at a 99% confidence level. This variable demonstrates a negative and statistically significant influence on rice productivity in Kulon Progo Regency. An increase of 1% in labor input is associated with a 0.264% decrease in rice productivity. This inefficiency may be attributed to the small scale of farming operations. This finding aligns with the Marshallian Theory, which posits that sharecropping systems in land management tend to be inefficient in labor utilization. Similar conclusions were drawn by Merliana et al. (2021), who found that labor had no significant effect on rice production in Sukoharjo Regency. However, these results contradict those of Ngango & Hong (2021) who reported a significant and positive effect of labor on maize production in Rwanda. Additionally, research by Pawitri et al. (2021) on organic rice farming in Sragen Regency found that labor positively influenced the increase in organic rice production.

Fertilizer Variable (X_4) has a regression coefficient of 0.186 at a 99% confidence level. This indicates a positive and significant effect of fertilizer use on rice productivity in Kulon Progo Regency. A 1% increase in fertilizer use leads to a 0.186% rise in rice productivity. These findings are consistent with Séogo & Zahonogo (2023), who assert that higher productivity levels can be achieved through intensive fertilizer application.

Farming Experience Variable (X_9) has a regression coefficient of 0.090 with a 95% confidence level, indicating that farming experience has a positive and significant effect on rice productivity in Kulon Progo Regency. An increase of 1% in farming experience correlates with a 0.090% increase in rice productivity. This is in line with the findings of Paltasingh et al. (2022), who stated that experienced farmers better understand their local agricultural conditions. Furthermore, such experience facilitates higher profits as farmers can explore improved production methods and innovate.

Seed Variable (X_2) has no significant effect on rice productivity in Kulon Progo Regency. This result supports the findings of Ngango & Hong (2021), who found that seed use did not significantly affect harvest outcomes for both landowners and non-landowners.

The pesticide variable (X_5) does not show a significant effect on rice productivity in Kulon Progo Regency. Similarly, the education variable (X_6) does not have a significant influence on rice productivity. The household size variable (X_7) also does not exhibit a significant impact on rice productivity, nor does the age variable (X_8) show a significant effect on rice productivity in Kulon Progo Regency.

Dummy Variable for Sharecropping (D_1) has no significant effect on rice productivity in Kulon Progo Regency. Zeng et al. (2018) argue that sharecropping farmers may achieve higher productivity and economies of scale due to access to larger and more fertile landholdings compared to other land tenure systems. Kalkuhl et al. (2020) also indicate that sharecropping systems may influence risk management decisions, such as fertilizer usage. Dummy Variable for Leasing (D_2) also does not have a significant effect on rice productivity in Kulon Progo Regency. This contradicts the findings of Koirala et al. (2016), who reported a positive and significant impact of land leasing on production at a 10% significance level. De Almeida and Buainain De Almeida & Buainain (2016) explain that tenant farmers or sharecroppers tend to farm rice with minimal costs and on small plots, potentially resulting in suboptimal yields.

These findings are consistent with Cheung (2018), which posits no significant productivity difference between sharecropped and fixed-rent land tenure. Paltasingh (2018) also notes that ownership status, including private ownership and long-term lease contracts (either fixed rent or sharecropping), supports the adoption of modern technologies. Shirzad et al. (2022) emphasize that secure land tenure encourages farmers to sustain agricultural operations, contributing to a viable agricultural ecosystem.

Séogo & Zahonogo (2023) further highlight that formal land tenure rights may enhance agricultural productivity and reduce rural poverty in Burkina Faso. However, such outcomes are hindered by imperfect land markets and strong customary land tenure systems that still influence the majority of production decisions. Paltasingh et al. (2022) also report that land ownership variables are statistically insignificant, suggesting that tenant farmers and sharecroppers perform similarly in terms of efficiency. Bidisha et al. (2018) found that sharecropped land has a significantly negative coefficient, indicating lower productivity per hectare and greater output inefficiency compared to owned or fixed-rent land.

CONCLUSION

Rice farmers in Kulon Progo Regency cultivate land under various tenure systems, including private ownership, leasing, and sharecropping. Land area (as a control variable) and labor input negatively affect rice productivity. In contrast, fertilizer use and farming experience contribute positively to increased productivity. There is no significant productivity difference among the different land tenure systems (owned, leased, or sharecropped).

RECOMMENDATIONS

Given that sharecropping and leasing systems yield similar productivity levels to owner-cultivated land, these tenure models could serve as viable alternatives for young farmers, who often face challenges in accessing land. It is recommended to promote the legal and transparent use of leasing and sharecropping systems. This can be supported by conducting surveys among young farmers to identify their difficulties in land access and preferences regarding tenure systems. Additionally, comprehensive quantitative data on land size, distribution, and types suitable for collaborative arrangements should be collected to formulate targeted and effective policies.

This study has limitations, particularly in its depth of data regarding potential variables influencing productivity, such as the adoption of modern agricultural technologies and tenure system preferences. Further research is required with broader coverage and more in-depth approaches, especially concerning land accessibility and the long-term sustainability of leasing and sharecropping systems.

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