HUMAN RESOURCES ON RICE FARMING PRODUCTIVITY IN SUMBERMANJING, MALANG DISTRICT

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ABSTRACT

This study examines the role of human resources in influencing rice farming productivity in Sumbermanjing, Malang District. Human resources, which include the knowledge, skills, and experience of farmers, are critical in enhancing agricultural efficiency and output. By employing the Ordinary Least Squares (OLS) method, the study analyzes the impact of human capital—such as education level, training participation, and work experience—on the productivity of rice farming. The results indicate that higher levels of education, access to training programs, and relevant experience significantly contribute to improved productivity. This paper suggests that strengthening human resource capabilities in the farming community, through education and training, can lead to substantial increases in rice farming productivity..

INTRODUCTION

Agriculture is undeniably the backbone of Indonesia's rural economy, and rice farming plays a critical role in ensuring both food security and economic stability in many regions, especially in Malang District, where Sumbermanjing is located. Indonesia is one of the largest rice producers in Southeast Asia, with rice being a staple crop for the majority of the population. According to the Indonesian Ministry of Agriculture (2022), the country's rice production must continuously meet the growing demands of an expanding population. In Malang District, rice farming serves not only as a vital livelihood for many households but also as a key factor in sustaining the local economy. However, despite its importance, rice farmers in this region still face numerous challenges that hinder their full potential for productivity. These include outdated farming practices, limited access to technology, and insufficient agricultural support services (Purnomo & Widiastuti, 2021).

The productivity of rice farming is shaped by both external and internal factors. External factors such as weather conditions, climate change, and market fluctuations undoubtedly affect agricultural outcomes. However, internal factors, particularly those related to human resources, are increasingly recognized as crucial determinants of productivity. Human resources in agriculture refer to the knowledge, skills, and labor provided by the farmers. Farmers' decisions, practices, and their ability to innovate or adapt to changes in the agricultural environment are largely influenced by the quality of their human capital (Suryana et al., 2023). While economic resources such as land and capital are essential, human capital is often the driving force that determines how effectively those resources are utilized. Consequently, understanding the role of human resources in rice farming is critical for improving agricultural productivity in the region.

Human capital, in the context of agriculture, involves a combination of education, training, and experience. It is well-documented that a higher level of education enables farmers to access better information and adopt more efficient and productive

agricultural techniques. Educated farmers are generally more adept at using new technologies, managing farm operations effectively, and responding to challenges like pest infestations or crop diseases (Prabowo et al., 2020). In Indonesia, many rural farmers still rely on traditional knowledge passed down through generations, but the need for formal education and exposure to modern agricultural methods has never been greater. In Sumbermanjing, where agricultural practices are still largely conventional, the introduction of educational programs could significantly improve farm productivity.

Furthermore, agricultural training plays a pivotal role in the development of human resources in rural areas. Various programs aimed at enhancing the technical skills of farmers can empower them to adopt sustainable farming practices and increase yields. However, the availability and accessibility of such training programs are often limited, especially in remote areas like Sumbermanjing. According to a report by Widodo et al. (2021), while agricultural extension services have made strides in some parts of Indonesia, many farmers in rural districts still lack direct access to modern training. The need for targeted agricultural education and training initiatives is therefore essential in overcoming barriers to productivity in these areas. In Sumbermanjing, extending the reach of these training programs could be a game-changer, especially when coupled with financial support and technical resources.

Experience is another key component of human resources that cannot be overlooked. Experienced farmers possess invaluable practical knowledge gained through years of working on the farm. This accumulated experience allows them to make informed decisions about crop management, irrigation techniques, and pest control, often leading to improved farm productivity (Gunawan et al., 2021). However, experience alone may not be sufficient to guarantee optimal productivity if it is not complemented by the willingness to adopt new methods and technologies. There is often a generational gap between older farmers, who rely on traditional practices, and younger farmers, who are more open to adopting technological innovations. Bridging this gap by fostering intergenerational knowledge transfer could play a crucial role in enhancing productivity.

Despite the critical role of human capital in improving agricultural productivity, the current state of human resources in Sumbermanjing presents a significant challenge. Many farmers in the region are still operating under outdated farming techniques, limited access to information, and minimal exposure to modern agricultural technologies (Rahayu, 2023). According to research by Santosa et al. (2022), farmers in Malang District often face difficulties in accessing formal education and agricultural extension services, which limits their ability to innovate or improve their farming practices. In rural districts like Sumbermanjing, these challenges are even more pronounced due to the geographical remoteness and lack of infrastructure. Hence, improving the quality of human resources through education and training is essential for increasing rice farming productivity in the region.

The potential benefits of improving human resources in rice farming extend beyond individual productivity gains. Enhanced productivity at the farm level can contribute to broader economic improvements within the community. For example, higher yields can lead to increased household incomes, which in turn can stimulate local markets and contribute to regional economic growth. Additionally, increased rice production can help address food security concerns by ensuring a stable supply of rice at affordable prices for both local and national consumption (Mulyani & Fitria, 2021). Beyond economic benefits, enhancing human resources also strengthens the social fabric of rural

communities, as farmers become more engaged in knowledge-sharing networks and collaborative agricultural practices.

Research has consistently shown that human resource development has a strong correlation with agricultural productivity. However, the specific ways in which human capital influences rice farming productivity in Indonesia, and more specifically in Sumbermanjing, remain underexplored. While numerous studies have examined agricultural productivity in various regions of Indonesia, few have focused on the unique challenges faced by farmers in Malang District. For example, a study by Prasetyo (2023) highlighted the role of education in improving farming techniques in West Java, while Nasution (2020) explored the impact of agricultural training on productivity in North Sumatra. However, these studies have not directly addressed the context of Sumbermanjing, making this research particularly relevant and timely.

This study aims to fill this research gap by specifically examining the impact of human resources—particularly education, training, and experience—on the productivity of rice farming in Sumbermanjing. Using the Ordinary Least Squares (OLS) regression method, this research will quantify the relationship between human capital factors and rice productivity in the region. The OLS method, widely used in econometrics, will provide statistical estimates of how variables such as farmer education, participation in training programs, and years of farming experience contribute to rice yields. By employing this robust analytical technique, the study seeks to offer empirical evidence of the significance of human resources in boosting agricultural productivity in rural Indonesia.

The research will be conducted through a survey of 120 rice farmers in Sumbermanjing, collecting data on their educational background, training history, work experience, and farming practices. In addition, interviews with local agricultural extension officers and community leaders will provide valuable qualitative insights into the specific challenges faced by farmers in the region. By combining both quantitative and qualitative methods, this study will offer a comprehensive understanding of how human resources can be leveraged to improve rice farming outcomes.

Through the analysis of human capital factors, this study will provide recommendations for policy interventions aimed at enhancing agricultural productivity in Sumbermanjing. These recommendations will focus on improving access to education and training programs, promoting technology adoption, and facilitating greater collaboration between farmers, local governments, and agricultural extension services. It is anticipated that such interventions will lead to higher yields, improved livelihoods, and greater food security in the region.

The broader implications of this research extend beyond Sumbermanjing to other rural areas in Southeast Asia, where rice farming remains a dominant agricultural activity. By understanding the link between human capital and productivity, policymakers in other rice-producing regions can design targeted interventions to boost agricultural efficiency and sustainability. In this way, this study contributes to the broader effort to enhance food security and economic development in the region.

METHODS

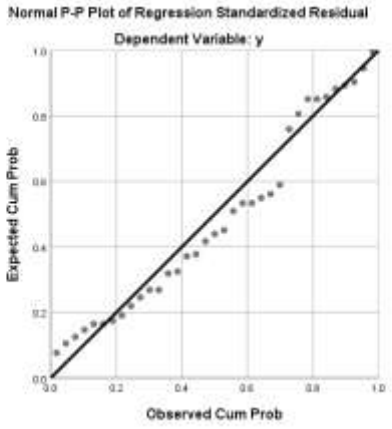
To assess the impact of human resources on rice farming productivity in Sumbermanjing, Malang District, this study employs a quantitative research design using the **Ordinary Least Squares (OLS)** regression method. The OLS method is a statistical technique that estimates the relationship between a dependent variable (in this

case, rice farming productivity) and one or more independent variables (such as education level, training, and work experience).
Primary data were gathered through a survey administered to 120 rice farmers in Sumbermanjing. The survey focused on collecting information regarding the demographic characteristics of farmers, their educational background, participation in agricultural training programs, work experience, and farming techniques used. The dependent variable, rice farming productivity, was measured by the average crop yield (tons per hectare) reported by each farmer
The collected data were analyzed using the OLS regression method, which allows for the estimation of the relationship between the dependent and independent variables. This method is appropriate as it provides estimates of the coefficients that indicate the direction and magnitude of the effect of human resource factors on farming productivity.This analysis will allow for the identification of which human resource factors are most strongly associated with increases in rice farming productivity and to what extent each factor contributes to productivity.

RESULT AND DISCUSSION

The purpose of normality testing is to determine whether or not the independent and dependent variables in a regression model have a normal distribution. A normal or nearly normal distribution, as determined by examining the data's distribution using a Normal P-Plot graph, characterizes a decent regression model. The data is considered normal if it displays a straight line pattern on the graph. Results of the normalcy test utilizing graphs of normal probability, specifically:

Figure 1. Normal Plot Graph



Source: Processed primary data

It may be inferred that the regression model satisfies the normality assumption based on the SPSS output results, which demonstrate how the data (dots) are distributed around the diagonal line and follow its direction in the normal probability plot graph.

Tabel 2. Multicollinearity Test Results

Coefficient[a]

Model		Collinearity Statistic	
		Tolerance	VIF
1	(Constant)		
	X1	.833	1.201
	X2	.848	1.179
	X3	.970	1.031

Source: Data processed by SPSS in 2024

There are three different values for tolerance: 0.833 for the variance inflation factor (VIF) and 1.201 for the tolerance value; 0.848 for the variance inflation factor (VIF) and 1.179 for the tolerance value; and 0.970 for the variance inflation factor (VIF) and 1.031 for the tolerance value. There was no multicollinearity between the independent variables in the regression model, according to the results of the multicollinearity test, which also revealed that each independent variable's tolerance value was above 0.10 and its variance inflation factor (VIF) value was less than 10.

The Ftable value is 2.58 and the Ttable value is 1.679 based on the Ftable and Ttable calculations in Appendix 6, which determine the percentage point for the F distribution with a probability of 0.05 and the percentage point for the T distribution with a probability of 0.05. Thus, the following is an arrangement for the regression equation:

$$Y = -9137929{,}195 + 161760{,}974X1 + 580660{,}715X2 + 182384{,}954X3 + 482119{,}824X4$$

With a positive value of 161760.974 for the regression coefficient β1 (age), rice farmers' income will increase by IDR 161,760.974 if their age increases by 1 year, providing all other variables remain constant. It is less than the error level of 0.05, making it statistically significant at a significance level of 0.026.

The length of education, or regression coefficient β2, has a positive value of 580660.715. This means that if all other factors remain constant, the income of the rice farmer will increase by IDR 580,660.715 if their education increases by one year. It is less than the error level of 0.05, making it statistically significant at a significance level of 0.013.

The rice farmer's income will increase by IDR 182384.954 if their farming experience grows by 1 year, providing all other variables remain constant, according to the regression coefficient β3, which measures farming experience. It is less than the error level of 0.05, making it statistically significant at a significance level of 0.013.

The regression coefficient β4 (participation in extension) has a positive value of 482119.824, meaning that rice farmers' income will increase by IDR 482119.824 if involvement in extension increases once while maintaining the same values for the other variables. It is less than the error level of 0.05, making it statistically significant at a significance level of 0.005.

Based on the explanation of the interpretation above, it can be seen that the contribution of the independent variable to the dependent variable is the age variable of 161760.974, the length of education variable of 580660.715, the farming experience variable of 182384.954 and the participation in counselling variable of 482119.824. So it can be concluded that the variables age, length of education, farming experience, and participation in extension have a positive effect on rice farmers' income. If the variables of age, length of education, farming experience and participation in extension increase, this will be followed by an increase in income.

The farmer's age is one of the factors in the farmer's human resources and in this research, especially in Sumbermanjing, Malang District, it shows that the farmer's age influences the income of rice farmers. Researchers discovered this phenomenon during research in Sumbermanjing, Malang District, namely when the ages of the respondents in Sumbermanjing, Malang District were of productive age, namely 15-64 years. This can explain that as farmers get older, the more knowledge they have about farming. So it will affect the income of rice farmers.

The length of education referred to in this research is the length of time a farmer has taken formal education (school) in years. Length of education is a factor in farmers'

human resources and in this research the length of education of farmers in Sumbermanjing, Malang District influences the income of rice farmers. Researchers discovered this phenomenon during research in Sumbermanjing, Malang District, namely the length of education that the majority of respondents had completed was elementary school (primary school) or had been completed for 6 years. The large number of rice farmers who have a length of education of 6 years, this is still categorized as far from the 12 years of compulsory education set by the Indonesian government or falls into the category of having a low length of education.

Farming experience is the length of time a farmer has been involved in farming activities to date in years. In this research, especially in Sumbermanjing, Malang District, it shows that farming experience influences the income of rice farmers. Researchers discovered this phenomenon during research in Sumbermanjing, Malang District, namely that the respondent's farming experience of >30 years is quite a long experience in farming and the longer the farming experience, the easier it is to overcome various problems that occur and minimize the losses that will be faced. So it will affect the income of rice farmers.

CONCLUSION

Based on the analysis that has been carried out, it can be concluded that the human resource factors (age, years of education, farming experience, and participation in extension) that are most significant and influence the income of rice farmers in Sumbermanjing, Malang District are participation in extension. This can also be seen from the facts in the field that rice farmers attend counseling only once every three months, whereas the intensity of the counseling should be given once a month. So that farmers can obtain new information and technology in managing rice farming, this will increase their income.

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