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The influence of decision making of farmers choosing rice varieties on rice productivity levels in Central Lampung Regency

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Abstract. This study aims to determine the influence of decision making of farmers choosing rice varieties on rice productivity levels. The data analysis method used in this study is descriptive and quantitative analysis. This research was conducted in Bangun Rejo Subdistrict, Central Lampung Regency. The number of respondents in this study was 73 samples. The data used is primary and secondary data. The data analysis in this study was conducted with multiple linear regression tests. The results showed that the decision-making process of choosing rice varieties by farmers is done by considering several things, namely the suitability of varieties to the needs of farmers, the suitability of varieties with the experience of farmers, the level of complexity in the application of varieties, as well as the relative advantages of varieties. The decision-making of farmers choosing rice varieties positively affects 90.4 percent of rice productivity. The more appropriate farmers choose rice varieties that suit the needs, conditions of the land, type and intensity of pest attacks in the area, it will support the acquisition of high productivity.

1. Introduction

Rice is a very important food crop in the world after wheat and corn. Indonesian people make rice as one of the main food sources in the form of rice consumed daily. Various efforts have been made to increase rice production, but still not able to meet the national rice needs. One of the causes of unmet national rice needs is due to the decrease in the amount of production in October to December 2018.

Rice production produced in October to December 2018 was 3,900,000 tons while consumption in October to December 2018 amounted to 7,450,000 tons, resulting in a shortage of 3,510,000 tons. This decline continues until 2019. There was a decrease in rice production by 7.75 percent or by 2,630,000 tons. The decrease in rice production is due to a long drought and not optimal cultivation efficiency conducted by farmers [1].

Bangun Rejo subdistrict is one of the sub-districts in Central Lampung Regency and is the sub-district with the highest rice productivity rate with rice productivity of 53.59 tons per hectare [2]. The high productivity rate is due to farmers who have started to apply technology to increase production. One of the technologies used is the use of superior rice seed varieties as a production component. There are three types of rice varieties grown by farmers, namely hybrid superior rice varieties (HSV), superior rice varieties inhibrida, and local rice varieties. Based on data by the Department of Agriculture Food Crops and Horticulture (2019) for the last five years farmers in Bangun Rejo Subdistrict dominant to plant superior rice varieties inhibrida. inhibrida superior rice varieties have a potential yield of 8−10 tons per hectare, but based on data by the Center for Agricultural Extension Bangun Rejo District (2017) it is known that the rice harvest obtained by farmers in Bangun Rejo Subdistrict is 4−5 tons per hectare [3]. Based on this, it is known that there is a gap between the potential that should be produced and the results obtained by farmers, but this does not change the decision of farmers to continue to use rice seed varieties inhibrida as inputs in their farming [4].

The act of choosing and using rice varieties begins with the decision-making process in choosing rice varieties has a very important role in farming activities. This is because varieties contribute the most in increasing rice production by 56.1 percent [5]. Decision making is influenced by social, educational, and economic environmental factors. Based on this, research needs to be done on "Decision Making Farmers Choose Rice Varieties in Bangun Rejo Subdistrict, Central Lampung Regency" to know the influence of decision-making of farmers choosing rice varieties on rice productivity levels.

2. Research Methods

This research was conducted in Bangun Rejo Subdistrict, Central Lampung Regency. The determination of the location of the research was done deliberately (purposive) with the consideration that Bangun Rejo Subdistrict is the sub-district with the highest rice productivity level in Central Lampung Regency. The research was conducted using survey methods and involved as many as 73 respondents. The types of data used in research are primary data and secondary data. Primary data is obtained through direct interviews with respondents using questionnaires (list of questions) that have been prepared. Secondary data was obtained from agencies related to research such as the Central Bureau of Statistics, the Department of Agriculture for Food Crops and Horticulture, and the Agricultural Extension Center of Bangun Rejo Subdistrict. Respondents in this study were rice farmers spread in Sidomulyo Village, Sinar Luas Village, Tanjung Jaya Village, and Tanjung Pandan Village. The population is 1,592. The sample determination refers to Sugiarto (2003) as follows:

$$n = \frac{NZ^2S^2}{Nd^2 + Z^2S^2}$$

$$\frac{1.592(1,96)^2(0,05)}{1.592(0,05)^2 + (1,96)^2(0,05)}$$

$$\frac{305,79}{3,98 + 0,19}$$

$$= 73$$

Information:
n = number of samples
N = number of rice farmers population
d = sample variation (5%= 0.05)
Z = confidence level (95%= 1.95)
S = degree of deviation (5%=0.05)

Based on the calculation above obtained the number of samples obtained as many as 73 respondents, then taken the number of respondents proportionally refers to Nazir (1988) with the following formula:

$$ni = \frac{Ni}{N} \; x \; 73$$
$$n1 = \frac{423}{1592} x73 = 19$$
$$n2 = \frac{302}{1592} x73 = 14$$
$$n3 = \frac{520}{1592} x73 = 24$$
$$n4 = \frac{347}{1592} x73 = 16$$

Information:
n1= Number of samples in Sidomulyo Village
n2= Number of samples in Sinar Luas Village
n3= Number of samples in Tanjung Jaya Village
n4= Number of samples in Tanjung Pandan Village

Sampling is done using simple random sampling using raffle. The number of samples for Sidomulyo Village is as many as 19 farmers and the number of samples for Sinar Luas Village is as many as 14 farmers. The number of samples for Tanjung Jaya Village is as many as 24 farmers and the number of samples for Tanjung Jaya village is as many as 16 farmers [6]. The data analysis method used in this study is descriptive and quantitative analysis. Descriptive analysis is used to look at the stages of decision-making of farmers in choosing rice varieties. Quantitative analysis is used to determine the factors that influence farmers' decisions in choosing rice varieties. Quantitative analysis is conducted using multiple linear regression analysis tests [7]. The multiple linear regression equations defined are as follows:

$$Y = a+b1X1+b2X2+b3X3+b4X4+\varepsilon$$

Information:
Y = Decision of farmers to choose varieties
a = Coefficient of constants
b1= Regression coefficient
X1 = individual factors
X2 = environmental factor
X3 = social factors
X4 = economic factors
ε = Error, variable interference

3. Result and Discussion

3.1. Respondents' General Circumstances
This study involved respondents as many as 73 rice farmers in Bangun Rejo Subdistrict, Central Lampung Regency. Respondents were rice farmers spread in Sidomulyo Village, Sinar Luas Village, Tanjung Pandan Village, and Tanjung Jaya Village with proportional sampling for Sidomulyo Village as many as 19 farmers, Sinar Luas Village as many as 14 farmers, Tanjung Jaya Village as many as 24 farmers, and Tanjung Pandan Village as many as 16 farmers. The identity of respondents in this study included age, level of formal education, and area of arable land. Here are the identities of respondents in this study.

Table 1. Division Identity of the respondent.

	Classification	Total	Percentage (%)
Age	0-14 age	0	0
	15-64 age	63	86.31
	>65 age	10	13.69
Education	Primary School	23	31.50
	Junior High School	33	45.20
	Senior High School	17	23.30
Area of arable land	0,50-1,00 Ha	44	60.27
	1,01-1,50 Ha	15	20.55
	1,51-2,00 Ha	14	19.18

Based on Table 1 it is known that most respondents are in the productive age range with an age range of 15-64 years. Of the 86.31per cent in the productive age range and 13.69 per cent in the non-productive age range in addition, the majority of respondents were in junior high school education with a percentage of 45.20 per cent, and as many as 31.50 per cent of respondents were in primary school education level, 23.30 per cent were in high school level. The level of education will affect the ability of farmers to capture the information provided. Education serves to develop abilities, improve the quality of life and human dignity both individually and socially [8].

Based on the table above, it is also known that most of the respondents have a land area with a narrow classification of 60.27 percent and the remaining 20.55 percent have land with a medium classification, 19.18 percent have land with a wide classification. This is due to the area of land that is divided through generations, causing the area of land owned will be narrower for each generation.

Table 2. Classification of varieties planted by respondents.

Varieties	Number of respondents (Soul)	Average length of use (Years)
Inhibrida	64	12.09
Hybrid	9	10

Based on Table 2 it is known that the majority of respondents prefer to plant varieties of inhibrida. As many as 80 percent of respondents planted rice varieties of inhibrida. Some types of rice varieties of inhibrida planted by respondents are: Inpari 30, Ciherang, Inpari 31, and Mekongga. This variety of inhibrida has been used on average for 10-15 years. It appears that farmers are more likely to choose the inhibrida variety because this variety has long been used by farmers. The duration of this use indirectly gives farmers a sense of trust in the variety, so the majority of farmers prefer to use rice varieties inhibrida.

3.2. Analysis of the effect of decision-making farmers choose rice varieties on rice productivity level
Decision making is an alternative selection process of several alternatives that exist to be followed up as a solution to the problem. Decision making is an action that is done over and over again. Decision making to choose rice varieties is very important in farming activities. According to Noviyanti, et al (2020) varieties contributed the most in increasing rice production by 56.1 percent [7].

The effect of decision making on rice productivity levels in this study was analyzed through multiple linear regressions with SPSS 22 aids. The following is the result of an analysis of the influence of decision making on rice productivity levels. The effect of Decision-Making Farmers Choosing Rice Varieties on Rice Productivity Levels is known through simple linear regression analysis with SPSS 22 tools. The free variables in this study are the decision-making of farmers choosing rice varieties (X) and the bound variables in this study are Rice Productivity Level (Y). The regression results obtained can be seen in Table 3.

Table 3. The results of the regression analysis of the influence of individual decision-making farmers choose rice varieties on the level of rice productivity.

Variable	Coefficient	Significant	VIF
Constant (C)	1.016	0.014	
decision to choose rice varieties (X)	0.088	0.000	1.000
F count	666.129	0.000[b]	
R square	0.904		
Adjusted R-Square	0.951		

According to Table 3, it is also known that the R Square value is 0.904. This means that the influence of independent variables (the decision to choose rice varieties) on dependent variables (rice productivity rate) is 90.4 percent. Farmers' decision making in choosing varieties positively affects the level of rice productivity, meaning that the more appropriate farmers in deciding which varieties to plant, the higher the level of productivity obtained. It is adapted to the condition of arable land, the quality and quantity of grain, the resistance of varieties to pest and disease attacks, the ease of accessing seeds, as well as the adaptability of varieties to environmental changes.

4. Conclusion

Farmers' decision making in choosing rice varieties has a positive effect on rice productivity. The more appropriate farmers choose rice varieties that suit the needs, conditions of the land, types and intensity of pests and diseases that attack in the area, it will support the acquisition of high rice productivity.

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