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The influence of farmer characteristics on risk preferences in red onion farming in Rejoso District, Nganjuk Regency

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Abstract

Shallots are a promising farming business that can increase income for farmers who can be cultivated in the dry season and rainy season. However, shallot farming in the rainy season has a high risk so that a farmer's courage is needed in making decisions to cultivate in that season to get profit. This study aims to analyze the effect of farmer characteristics on risk preferences in shallot farming in Rejoso sub-district, Nganjuk district. Using multiple regression analysis, this study considered eight independent variables, namely age (X1), education (X2), experience (X3), land size (X4), livelihood (X5), access to information technology (X6), number of family dependents (X7), and production objectives (X8) against the dependent variable of risk preference (Y). The analysis shows that the regression model has an R Square value of 0.488, indicating that 48.8% of risk preference is influenced by farmers' internal factors, while 51.2% is influenced by other external factors. The ANOVA test showed the significance of the model ($p < 0.05$), with the variables of education, experience, land size, land ownership status, livelihood, access to information, number of family dependents, and production objectives having a significant effect on risk preference, while age had no significant effect. Overall, the results of this study provide insights into how farmer characteristics influence risk decisions in shallot farming, which is important for the development of agricultural strategies and policies in the area.

Keywords: Farmer Characteristics; Risk Preference; Multiple Linear Regression; SPSS

1. Introduction

Shallots (Allium cepa L) are a horticultural commodity with high economic potential and increasing demand, along with population growth and the culinary industry. Based on BPS data (2022), the average shallot consumption per capita in Indonesia reached 2.49 kg per month, with an increase in household consumption of 8.33% in 2021. Onion farming serves an important function in meeting domestic needs and as a major source of income for farmers, and has export opportunities to countries such as Malaysia, Thailand and Singapore.

To achieve optimal yields, environmental conditions, including climate, are highly influential. Shallots grow ideally at a temperature of 25-32°C and rainfall between 350-600 mm per year. Although more suitable for planting in the dry season, rainy season cultivation is possible as prices tend to be high ahead of major religious holidays. However, risks such as pest attacks, diseases and market price fluctuations often disrupt farming activities.

Farmers' risk preferences are influenced by individual characteristics, such as age, education, experience, land size and access to information. Previous research shows that older and more experienced farmers tend to be more risk-taking, while highly educated farmers tend to be more cautious. In Rejoso sub-district, as the center of shallot production, farmers are suspected to be risk-averse due to concerns about crop failure and price fluctuations.

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This study aims to understand the characteristics and risk preferences of shallot farmers in Rejoso sub-district, as well as the influence of these characteristics in decision-making. The results of this study are expected to help formulate effective risk management strategies to increase shallot farmers' production and income

2. Material and methods

This research method uses a survey method. The survey method is a way to get data from a place by direct interview using a questionnaire (Sugiono, 2017). The research was conducted from July to August 2023 in Rejoso District, Nganjuk Regency, East Java. The determination of the location was carried out *purposively* in 5 (five) villages in Rejoso District in Nganjuk Regency which had the highest shallot production.

Determination of respondents in the study was carried out by *purposive sampling* technique with consideration of farmers who planted shallots in the dry season and rainy season. The sampling method is calculated using the Isaac and Michael formula.

Determination of the sampling amount using the Slovin formula, which is to determine the minimum sample (s) if the population size (N) is known at the α significance level with the following formula:

$$s = \frac{\lambda^2\ .N\ .P\ .Q}{d^2\,(N-1) + \lambda^2\ .P\ .Q}$$

Description:

- s : minimum sample size
- N : total population
- λ : percentage of allowance for inaccuracy 10%

The population of shallot farmers in Rejoso Subdistrict in the study was 2,706 farmers, so the number of farmer samples based on the Isaac and Michael is as follows.

$$s = \frac{2{,}706.\,2606\ .\,0{,}5.\,0{,}5}{0{,}1^2\,(2606-1) + 2{,}706.\,0{,}5.\,0{,}5}$$

- n = rounded to 126 farmers

The sources and collection techniques used in the study were primary data and secondary data. Primary data includes the identity of respondents, namely age, education, experience, land area, land ownership status, livelihood, access to technological information, number of family dependents, and production objectives. Secondary data were obtained from the Food Crops and Agriculture Office, BPS in the form of data on the amount of shallot production in 2022, previous research journals and other literature sources. According to Sugiyono (2017), survey collection techniques are data that can be done by interview (interview), questionnaire (questionnaire), observation (observation) and a combination of the three. So in addition to the data above, other data comes from observation, questionnaire data and interviews directly to farmers, as well as literature review.

The analysis used for the influence of farmer characteristics on the risk preferences of shallot farming in Rejoso Subdistrict uses multiple linear regression analysis with the following formula (Soemodihardjo, 1999):

$$Y = a + b1X1 + b2X2 + b3X3 + b4X4 + b5X5 + b6X6 + b7X7 + b8X8 + e$$

Description:

- Y = Risk preference (score)
- X_1= Age (Years)
- X_2= Education level (ordinal)
- X_3= Experience (Years)
- X_4= Land area (Hectares)
- X_5= Livelihood (ordinal 0/1)
- X_6= Access to Information and technology (Score)

- X_7= Number of family dependents (people)
- X_8= Production Purpose (Score)

3. Results and discussion

3.1. Effect of Farmer Characteristics on Risk Preferences of Shallot Farmers

3.1.1. Classical Assumption Test

The classic assumption test is a test of assumptions that must be met which is a regression model to avoid obtaining biased results. The classical assumptions are as follows:

Normality Test

The normality test is carried out to determine whether the confounding variables (residuals) have a normal distribution (Ghozali, 2018). Checking the normality assumption is necessary to decide whether parametric or nonparametric tests should be used (Orcan 2020) . To detect whether the residuals are normally distributed or not, namely by using the Kolmogorov-Smirnov test tool using a significance level of 0.05 with the basis for decision making if the significance number of the Kolmogorov-Smirnov Sign Test> 05 then the data is normally distributed, if the significance number of the Kolmogorov-Smirnov Sign Test <0.05 then the data is not normally distributed. The results of the research normality test can be seen in Table 1.

Table 1 One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		126
Normal Parameters[a,b]	*Mean*	0E-7
	Std. Deviation	1.03103137
Most Extreme Differences	*Absolute*	0.048
	Positive	0.043
	Negative	-0.048
Kolmogorov-Smirnov Z		0.538
Asymp. Sig. (2-tailed)		0.934

a. Test distribution is Normal.; b. Calculated from data. Source: Primary data analysis, 2024

The Kolmogorov-Smirnov test results show that the *Asymp. Sig. (2-tailed) value* of 0.934. This value has a value greater than 0.05, so it can be concluded that based on the *Kolmogorov-Smirnov* test the research data is normally distributed.

Multicollinearity Test

The multicollinearity test was carried out with the aim of testing whether the regression equation found a correlation between the independent variables. A good regression model should not have a correlation between the independent variables. Detection to determine the presence or absence of multicollinearity symptoms in the regression model of this study can be done by looking at the Variance Inflation Factor (VIF) value, and the tolerance value (Salmeron-Gomes, Garcia-Garcia, and Garcia-Perez 2024) . If VIF < 10 and tolerance value ≥ 0.10 then the regression is free from multicollinearity (Ghozali, 2018). VIF test results in Table 2.

Table 2 Coefficients Research Data

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
X1	0.447	2.237
X2	0.528	1.893
X3	0.543	1.841
X4	0.895	1.117
X5	0.741	1.349
X6	0.725	1.379
X7	0.909	1.100
X8	0.846	1.182

a. Dependent Variable: Y Source: Primary data analysis, 2024

The VIF test results show that in each variable the VIF value is smaller than 10 and the tolerance value is greater than or equal to 0.1. This shows that each independent variable does not occur correlation.

3.1.2. Heteroscedasticity Test

Detection of heteroscedaticity can be done with the *scatter plot* method by plotting the ZPRED value (predicted value) with SRESID (residual value). A good model is obtained if there is no certain pattern on the graph, such as gathering in the middle, narrowing then widening or vice versa, widening then narrowing.

The results of the hetero kesditisitas test using *scatterplot* show that the endogenous variables do not have certain patterns on the graph, such as collecting in the middle, narrowing then widening or vice versa, widening then narrowing. It can be concluded that the data in this study do not have hetero cesditisity and meet the requirements of classical assumptions.

3.2. Influence of Farmer Characteristics on Risk Preference for Shallot Farming

Multiple regression analysis with independent variables including age (X_1), education (X_2), experience (X_3), land size (X_4), livelihood (X_5), access to information technology (X_6), number of family dependents (X_7), and production objectives (X_8) against the dependent variable of risk preference (Y) shallot farming provides results in Tables 3 and 4.

Table 3 Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	0.698a	0.488	0.448	1.070	0.488	12.275	9	116	0.000	0.677

a. Predictors: (Constant), X1, X6, X8, X4, X5, X7, X3, X2; b. Dependent Variable: Y Source: Primary data analysis, 2024

The results of the summary model data analysis show that the R value is the *correlation coefficient* (*muktiple correlation coeffisient*) between the predictors ($X_1$to X_9) and the dependent variable (Y) has an R value of 0.698 indicating a fairly strong relationship between *predictors* and Y. R Square shows the coefficient of determination of 0.488. This shows that the *predictors* equation model has an effect of 0.488 on the *dependent variable.* This shows that the risk preference of shallot farming is influenced by internal factors of 0.488 and the remaining 0.512 is influenced by other factors such as season, commodity prices, availability of production infrastructure or government policies. *Adjusted R Square* is an adjusted version of R Square, to consider the number of variables in the model that are useful especially if there are *predictors* of a value of 0.448 which means that the model is not too *overfit* is still quite good. Std Error The Estimate

1.070 shows that the standard error or standard error of the model estimation the smaller the value the better the model predicts the actual value of Y.

R Square Change 0.488 equal to the R Square value is the first model which shows the change in R Square due to the inclusion of independent variables. F change 12.275 and Sig F change 0.000 is a significance test for the regression model as a whole, the Sig value of 0.000 indicates that the model is statistically significant because <0.05, which means that the variables X_1 to $X_{(2)}$ simultaneously have a significant effect on Y.

Table 4 Anova

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	126.550	9	14.061	12.275	0.000[b]
	Residuals	132.878	116	1.146		
	Total	259.429	125			

a. Dependent Variable: Y; b. Predictors: (Constant), X1, X6, X8, X4, X5, X7, X3, X2 Source: Primary data analysis, 2024

Regression test results Table 5. Anova is used to assess the overall independent variable on the dependent variable. The *Regression Sum of Squares* value is 126.550. This shows the amount of variation that can be explained by the regression model. *Residual Sum of Squares* is 132,878. Shows the variation that cannot be explained by the model. Total Sum of Squares of 259,429. Shows the total variation in the data. F-statistic of 12.275. This value is generated from *Mean Square Regression* divided by *Mean Square Residual*. This F value is used to assess whether the relationship between the independent and dependent variables is significant or not. The significance (p-value) of 0.000 [b]is smaller than 0.05, meaning the model is significant.

Table 6 Coefficients is used to assess the significance of the spatial multiple regression test. The significance value of each dependent variable shows that $X_{(1)}$ is>0.05 and the other variables are smaller than 0.05. This indicates that X_1i.e. age of the farmer is not significant and the other variables are significant i.e. X2 to $X_{(8)}$.

The regression equation formula is

$$Y = 1.470 + 0.268 X_2 + 0.030 X_3 + 0.603 X_4 + 0.521 X_5 + 0.688 X_6 + 0.495 X_7 + 0.210 X_8 + 0.553 X_{(9)}$$

Table 5 Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.470	0.792		1.856	0.066
X1	0.001	0.011	0.011	0.109	0.914
X2	0.268	0.133	0.184	2.016	0.046
X3	0.030	0.012	0.230	2.547	0.012
X4	0.603	0.263	0.161	2.288	0.024
X5	0.688	0.324	0.164	2.121	0.036
X6	0.495	0.218	0.177	2.269	0.025
X7	0.210	0.100	0.146	2.097	0.038
X8	0.553	0.236	0.170	2.347	0.021

a. Dependent Variable: Y Source: Primary data analysis, 2024

Age (X_1) has a significance value of 0.914. This indicates that age has no significant effect on the risk preference of shallot farming. Age is not a dominant factor in determining risk preferences, especially when farmers have access to good information or technology support. Risk decisions are more influenced by other factors than age. The results of this study are in line with research conducted by Yusuf, *et al* (2021) on rice farmers in West Java Province which states that age has no significant effect on farmers' risk preferences and Alpízar, *et al* (2011) which states that age has no significant effect on risk preferences among farmers. Other factors that influence risk preference include income**,** access to credit, and social capital. This suggests that the decision to take risks is more influenced by economic and social conditions than age.

The effect of age on the risk preferences of shallot farmers has been analyzed in various studies, with results that tend to show different relationships depending on the specific context and socio-economic conditions of farmers. These results are in line with research conducted by Meraner and Finger (2017) where farmers' risk preferences vary according to risk-related risk preference decisions depending on the agricultural context.

Education (X_2) has a significance value of 0.046. This shows that education has a significant effect on the risk preference of shallot farming. The higher the level of education, the more farmers prefer high risk preferences. Onion farming requires more critical knowledge because the level of farming tends to require more skills. Farmers who have decided to do shallot farming show an orientation of increasing income so that they tend to be ready with the risks. *The Unstandardized Coefficients* value of education of 0.268 is positive indicating that each increase of one unit of education variable will increase the risk preference by 0.268. Farmers' education level has a significant influence on risk preferences in shallot farming as shown by various studies. Higher education levels are associated with improved risk management strategies and a more positive attitude towards risk taking. According to Raj and Thomas (2022), farmers with higher levels of education tend to have a more risk-conscious approach, often leading to better agricultural risk management and conversely many farmers with lower levels of education exhibit risk-averse behaviors that may hinder their ability to adopt innovative practices or technologies (Obalola and Ayinde 2018).

Farming experience (X_3) has a significance value of 0.012. This shows that farming experience has a significant effect on the risk preference of shallot farming. *The Unstandardized Coefficients* value of farming experience of 0.030 is positive, indicating that each increase in one unit of farming experience variable will increase risk preferences by 0.030. In accordance with the statement of Sriyadi (2024) farmers with more experience in shallot farming tend not to avoid risk because they have developed strategies to reduce risk over time. Farmers who have had considerable experience in farming have an effect on decision making in doing their farming. (Agustin, F. 2022).

Land area (X_4) has a significance value of 0.024. This shows that land area has a significant effect on the risk preference of shallot farming. *Unstandardized Coefficients* value of land area of 0.603 positive indicates that each increase of one unit of land area variable will increase the risk preference by 0.024. In accordance with the statement of Cetin and Esengun (2012) farmers with larger land areas tend to be more risk averse, while farmers who have smaller land areas tend to avoid risk and according to Ayinde and Obala (2017), stating the same thing farmers who have larger land areas tend to take high risks, because it shows that a larger land area provides a buffer against production risks, encouraging more risk-tolerant behavior.

Livelihood (X_5) has a significance value of 0.036. This shows that livelihood status has a significant effect on the risk preference of shallot farming. *The Unstandardized Coefficients* value of livelihoods of 0.688 is positive, indicating that each increase of one unit of livelihood variables will increase risk preferences by 0.688. In accordance with the conditions in the field that shallot farmers in Rejoso District that the influence of farmers' livelihoods which are the main source or only rely on agriculture shows that farmers avoid higher risks because of their dependence on one source of income according to the opinion of Obalola and Ayinde (2018) onion farmers tend to avoid risks influenced by factors of education and market access. Whereas according to Tura (2018) those who have alternative sources of income tend to adopt more risk-tolerant behavior, farmers with diversified income report better risk management strategies.

Access to information (X_6) has a significance value of 0.025. This shows that access to information has a significant effect on the risk preferences of shallot farming. *Unstandardized Coefficients* value of information access of 0.495 positive indicates that each increase of one unit of information access variable will increase the risk preference by 49.5%. The research shows that increased access to information, especially through communication technology and extension services, correlates with a more informed risk-taking attitude among farmers.

Facts in the field where the research shows that farmers to access information often utilize social media such as looking for information on shallot prices throughout Indonesia by utilizing price plans, shallot farming techniques, intensive assistance from extension workers and many successful farmers who often share knowledge through farmer group meetings, millennial farmer ambassadors, seed breeders to exchange ideas about shallot farming. Regarding Information and Communication Technology (ICT), farmers who use ICT show smaller price expectation errors, leading to more measured risk-taking in their farming decisions (Haile and Kalkuhl, 2016). Access to extension services is a critical factor affecting risk preferences. Farmers with better access tend to be more risk-averse, as they receive guidance on how to manage uncertainty (Ayinde and Obalola, 2017).

The number of family dependents (X_7) has a significance value of 0.038. This shows that the number of family dependents has a significant effect on the risk preference of shallot farming. *The Unstandardized Coefficients* value of the number of family dependents of 0.210 positive indicates that each increase of one unit of the variable number of family dependents will increase the risk preference by 0.210. Facts in the field show that on average farmers who have many family dependents are more willing to take risks than farmers who have small family dependents, this is because the cost of living is greater so that the tendency is more willing to take risks in order to meet the needs of family members. In line with research conducted by Antadima and Katongu (2024) that the number of family dependents has a significant effect on the level of motivation of farmers in shallot cultivation in Tanggedu because most family needs can be met with shallot farming. Therefore, most farmers make shallot cultivation their main livelihood. In contrast to the opinion of Prabowo, *et al*. (2021) which states that agricultural activities for farmers are not enough to meet family needs, so farmers generally do various other jobs.

Production objectives (X_8) has a significance value of 0.021. This shows that the status of production objectives has a significant effect on the risk preferences of shallot farming. *Unstandardized Coefficients* value of production objectives of 0.553 positive indicates that each increase of one unit of variable production objectives will increase risk preferences by 53.3%. The fact at the research site that shallot farming in the rainy season aims to provide shallot seeds for the planting season in the next dry season but does not demand the possibility that shallot farmers also sell crops when prices are high. This is in accordance with the statement of Sarma (2022) that production objectives affect the perception of control and social norms and psychological aspects of risk management. According to Moser and Mubhoff, (2015) production objectives can determine the types of inputs farmers choose that align farmers' risk preferences with desired outcomes.

The greatest influence on the variables studied based on the value of Beta (*Standardized Coefficients*) is the value of the regression coefficient that affects the largest siqnifikan is variable X_3compared with other variables. Because if the value of X_3increases by one standard deviation then the value of risk preferences of farmers will increase by 0.230. So a farmer the more experienced the more willing to take risks. While based on the value of B (*Unstandardized coefficients*) is $X_4$and X_6which shows a very large change that is the value of $X_4$of 0.603 can be interpreted that every increase of one level of education of a farmer will increase risk preferences by 0.603, and $X_6$of 0.688 can be interpreted that every increase of one unit will increase risk preferences.

4. Conclusion

The effect of farmer characteristics on risk preferences in shallot farming in Rejoso Subdistrict, Nganjuk Regency in shallot farming using multiple regression analysis. The results of the analysis show that farmer characteristics, such as education, experience, land size, livelihood, access to information, number of family dependents, and production objectives, have a significant influence on risk preferences, while age shows no significant influence.

Compliance with ethical standards

Disclosure of conflict of interest

The author(s) declares no conflict of interest.

References

[1] Agustin, F. 2022. Analysis of Production Risk and Farmer Behavior in Facing Red Onion Farming Risk in Nagari Paninggahan, Junjung Sirih District, Solok Regency. Ekasakti Journal of Research and Community Service, 2(2), 159-166.

[2] Akber, N., Paltasingh, K. R., Mishra, A. K., and Goyari, P. 2024. Land Ownership Security, Farm Investment, and Investment Risk in Indian Agriculture: Evidence from Nationally Representative Survey. Journal of Agricultural and Applied Economics.

[3] Ayinde, O. E., and Obalola, T. O. 2017. Effect of Socioeconomic Characteristics and Income Status on Onion Farmers Risk Attitude in Sokoto State, Nigeria. 50(3), 141–146.

[4] Central Bureau of Statistics. 2022. Horticulture Statistics 2021. Indonesian Statistics Agency. Indonesia

[5] Brick K. Visser M. and Burns J. 2012. Risk aversion: experimental evidence from South African fishing communities. American Journal of Agricultural Economics. (1) 94: 133-152.

[6] Çetin, I., & Esengün, K. 2012. Socio-economic analysis of dry onion growing farms according to risk attitude in Amasya province. 29(1), 81–92.

[7] Haile, M. G., and Kalkuhl, M. 2016. Access to Information and Price Expectation Errors of Smallholder Farmers: Theory and Empirics (pp. 513–541). Springer, Cham.

[8] Obalola, O. T., & Ayinde, O. E. 2018. Risk and risk management strategies of smallholder onion farmers in Sokoto state, Nigeria. Acta Agriculturae Slovenica, 111(3), 559–566.

[9] Prabowo, A., Kusumaningrum, A., & Hasanah, U., 2021. Motivation of farmers to grow pomelo in Pucang Agung Village, Bayan District, Purworejo Regency. Surya Agritama: Journal of Agriculture and Animal Husbandry, 10(1), pp.1-15.

[10] Raj, N. M., and Thomas, A. 2022. Factors influencing the risk attitude of vegetable farmers in Kerala. Journal of Krishi Vigyan, 10(2), 160–166.

[11] Sriyadi, S. 2024. Farmer Behavior on the Risk of Garlic Farming on the Slopes of Mount Lawu, Karanganyar Regency, Central Java. In E3S Web of Conferences (Vol. 595, p. 01023). EDP Sciences.

[12] Sugiono. 2017. Mixed Methods Research. Alfabeta. Bandung.