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Income Risk and the Decision on Onion Farming

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Abstract

Keywords:

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The onion cultivation often faced various risks caused by many factors, so farmers need to make the right decision to start onion cultivation by paying attention to these risks. Therefore, this research was conducted with the aim of 1) analyzing the income risk faced by farmers in developing onion farming, 2) knowing the factors that affect the farming risk, 3) knowing the factors that influence farmers' decisions in planting onion. The research was conducted in Purworejo Village for 4 months with 30 onion farmers as the sample. To analyze the income risk faced by farmers in developing onion farming, it was done by calculating the coefficient of variation (CV). Minimum income was calculated by the residual formula of the squared income function and to determine the factors that influence farming income and farmers' decisions in planting onion, multiple linear regression analysis was performed. The research showed that the risk of onion farming income was quite high, reached 79.72% and the factors that influence were land area, total production, selling price, and production costs. Meanwhile, the factors that influence the decision making of onion farmers were education, age, and farmer experience.

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INTRODUCTION

Onions were one of the leading vegetable commodities that had long been cultivated by farmers intensively. This vegetable commodity was included in the spices groups that were not replaced and had a function as a food flavoring and traditional medicinal ingredients. This commodity was also a source of income and

job opportunities that contributed greatly to regional economic development (Ministry of Agriculture, 2016).

Malang Regency was one of the third largest onion-producing regency in East Java, with the largest contributor was Nganjuk Regency with 38,051 tons, followed by Probolinggo Regency with 6,046 tons, then Malang Regency with 2,597 tons, and Kediri Regency with 1,162 tons (Kurnia Adhiwibowo and Annisa Ramadhanty, 2019). One of the centers for onion production was Purworejo Village, Ngantang Sub-district, which was an area with a large domination land area for onion and one of the centers for onion production in Malang Regency.

In performing their farming, onion farmers often faced internal and external problems. Internal problems were problems that can be controlled by the farmer himself, while external problems were problems that were beyond the control of the farmer. The internal problems of farmers included problems of narrow land owned, low mastery of technology, and weak capital. Meanwhile, external problems included climate change problems, attacks by plant pests, and fluctuating selling price problems. This problem may create risks and uncertainties for farmers (Saptana et al., 2010).

In general, farmers always faced various risks in their agricultural activities, ranging from production risk, market risk; financial risk to policy risk. This risk phase will affect farmers' decisions in determining the commodities to be cultivated (Mutisari, 2019). Lawalata (2017) added that onion farmers, like other farmers, often faced problems such as high risk of failure, low productivity and low efficiency. The low level of productivity showed that the management of onion farming was not efficient. This was also supported with the fact that the onion commodity was a plant that had a high risk of failure. The success of onion farming which performed by a farmer was basically determined by the amount of income, risk and level of efficiency that will be faced by the farmer. The income amount was influenced by the level of production, the price of production and the costs to be incurred for the production process, in addition, the income amount was also influenced by the risks that will be faced (Ghozali & Wibowo, 2019).

The income risk of onion farming was one of the risks that often faced by farmers due to price fluctuations that occurred during harvest and famine seasons. Kurniati (2014) stated that the level of production will affect the amount of farmer's income, therefore to optimize production and stabilize his income, farmers must create optimal conditions. However, in reality, not all farmers can create optimal conditions for their farming. An interesting thing that needs to be studied was how much income risk faced by farmers in developing onion farming along with the factors that affect this risk and how the attitude of farmers in overcoming these risks (Fauzan, 2016).

Every onion farmer, including onion farmers in Purworejo Village, Malang, certainly expected efficiency and optimization in farming activities to increase the amount and value of income. In dealing an environment that was completely uncertain like nowadays, of course a farmer must be able to minimize the risks that may occur and must allocate the available resources as optimally as possible to get sufficient income to support his family's and develop their farming.

In previous research with the same aim, the variables used did not include farmers' experiences in cultivating onion, even though the experience of onion farmers had quite impact on their income.

From those description, this research was conducted with the aim of 1) analyzing the income risk of onion farming; 2) to analyze the factors that influence the income of onion farming; 3) knowing the factors that influence the decisions of onion farmers to the the risk of onion farming in Purworejo Village.

RESEARCH METHODS

The research location was chosen purposively in Purworejo Village, Ngantang Sub-district, which was one of the centers of onion production in Malang Regency, East Java. The research was conducted from October 2019 - February 2020. The number of samples used was 30 onion farmers. The type of data used was primary data obtained through interviews with farmers, including data of the respondents' characteristics, the amount and cost of production inputs, production, and the selling price of onion. Primary data was needed to calculate the cost, revenue and income of onion farming. Meanwhile, secondary data were obtained from BPS (Central Bureau of Statistics) Malang Regency, Food Crops and Horticulture Department of Malang Regency, and several supporting previous research.

To achieve the expected aims, data analysis that used was:

1. To analyze the risk of onion farming income was done by calculating the coefficient of variation. An analysis of variations in onion farming income can show the risk of onion farming income faced by farmers. If there were only small variations, the phase of risk faced by farmers was also small. Conversely, if the coefficient of variation was large, the greater the risk faced by farmers (Fauzan, 2016). The following formula for calculating KV was:

$$KV = \frac{S}{\bar{x}} \cdot 100\%$$

Whereas:

KV : Coefficient of Variation

S : Standard Deviation of Farming Income

\bar{x} : Average Farming Income

The minimum income calculated to show the lowest income amount possibly received by the farmers. If the score was less than zero, so that, high chance of the farmers will face loss.

Minimum income formula was as the following:

$$L = E - 2 V$$

Information:

L : Minimum Limit of the Income

E : Average Farming Income

V : Standard Deviation

2. To determine the factors that affect the income of onion farming, multiple linear regression methods were used. According to Nduru et al. (2014) multiple linear regressions explained the connection between multiple changes

permissible in the regression model, as well as the direct impression of a dependent variable. In this case the component that became the dependent variable was income, while the independent variable was land area, total production, production costs, and land area. The multiple linear regression method was mathematically formulated as follows:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon_i$$

Whereas:

Y = Income
 X₁ = Land Area
 X₂ = Total Production
 X₃ = Selling Price
 X₄ = Production Cost
 β₀ = Intercept
 β₁-β₄ = Coefficient of Regression
 ε_i = Error

- To find out the factors that influence farmers' decisions in planting onion, it performed using multiple linear regression methods. Harlan (2018) stated that multiple linear regressions can find a connection between variables. In this case, the independent variable was the age of the farmer, the experience of the farmer, the farmer's number of dependents, and the farmer's level of education, while the dependent variable was the farmer's decision to plant onion. The following was the systematics of the multiple linear regression method on the factors that influence farmers' decisions in planting onion.

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon_i$$

Whereas:

Y = Farmer Behavior
 X₁ = Level of Education
 X₂ = Farmer Dependent
 X₃ = Farmer Experience
 X₄ = Farmer Age
 β₀ = Intercept
 β₁- β₄ = Coefficient of Regression
 ε_i = Error

RESULT AND DISCUSSION

The Income Risk of Onion Farming

The income risk of onion farming in Purworejo Village can be determined by Coefficient of Variation (KV) analysis. This analysis compared the standard deviation value with the average value so that we can find out the amount of income risk in onion farming. Income is the value obtained by onion farmers from the revenue of production sale after deducting the costs incurred in conducting onion farming. The income earned by farmers was often not in accordance with farmers' expectations, so it was necessary to analyze the risk of income by finding the coefficient of variation.

A small coefficient of variation (KV) indicated that the average variability value at this risk is low. This indicated a small income risk. Vice versa, if the value of the

coefficient of variation (KV) is greater, it showed that the average variability value at this risk is high. The results of the analysis showed that onion agribusiness in Purworejo Village faced a high risk of up to 79.72%, which means that each one rupiah of income received by farmers will face a risk of 0.7972 or 79.72%. The minimum income was Rp. 1,942,265 with a maximum income Rp. 111,270,800. This was in line with the research of Saptana et al. (2010) in Bantul that the level of risk faced by onion farmers is quite high, in which 0.727 or 72.7%, which means that for each one rupiah of income received by farmers, the risk faced was 0.727 rupiah. The contributing factors included low selling prices and the influence of imported onions. Most of the onion farmers' sale their crops to collector traders at the village if the price was appropriate because the farmers do not want to bear the transportation costs if they were sold directly to the market. Currently, what affects the selling price is the present of imported onions, which tends to lower the selling price. In such a condition, farmers are forced to sell at a price determined by the collector traders, because farmers do not want to bear losses if they hold their production and do not sell them until the selling price rises.

According to Zuhriyah (2012), there were several other factors that presumed to be a source of risk, such as, 1) weather and climatic factors that affect the productivity of onion, which in turn caused prices to fluctuate from time to time, 2) diseases and plant pests that were frequently encountered in onion planting activities, can attack starting from the roots, sweet potatoes, stems, leaves, and even the tips of the leaves. They not only attack when plants were on land, but pests and diseases can attack them in storage. The emergence of these diseases and disasters was often unpredictable.

The two factors were closely related to the productivity of onion where it can also have an adverse impact on marketing. If there were obstacles in the onion production process, it was possible that the income of onion farmers will also be disrupted.

The Factors that Affecting Onion Farming Income

The factors that affect the onion income can be identified by multiple linear regression analysis. This analysis can show the influence of the dependent variable (land area, total production, selling price, and production costs) on the income of onion farmers. The results of multiple linear regression analysis on the factors that affect the onion income in Purworejo Village were presented in the following table 1.

Table 1. Factors that Affecting Onion Farmer's Income in Purworejo Village, Ngantang Sub-district, Malang

Variable	Coefficient	Std. Error	t-Statistic	Prob.	VIP
Land Area	-1884336	481180.6	-3,92	0,0005	4.6
Production Amount	9369,872	65,59728	142,84	0,0000	9.2
Selling Price	1232,130	367,9412	3,349	0,0021	3.3
Production Cost	-0,964729	0,022265	-43,33	0,0000	5.9
R-squared		0,999715			
Adjusted R-squared		0,999679			
F-statistic		27229,57			
Durbin-Watson stat		1,606958			

Source: Processed from Primary Data (2020)

Table 1 showed that the R-square value is 0.999, means that 99.9% of the independent variables affected the onion income simultaneously and the remaining 0.1% is influenced by other things outside the variables studied. The t-test result showed that the regression coefficients that have a significant effect on the onion farming income in Purworejo Village were land area, total production, selling price, and production costs. This was also supported by the results of the F-test which showed the calculated F value ($\alpha = 1\%$) of 27229.57 which is statistically significant, which means that the independent variables collectively have a significant effect on onion income. Thus, each addition or reduction in the income factor will increase the onion farmers' income

Pratiwi & Hardyastuti (2018) stated that the wider the farmers' land and the higher the selling price of the commodities planted; the higher income that farmers get. Vice versa, increasing the land area can help increasing farm production extensively or with a wider area, the amount of farm production will also increase. Meanwhile, production costs can adjust to the needs of farmers.

Factors that Influence the Farmers' Decision to the Onion Farming Risk

To find out the factors that influence the farmers' decision in planting onion in Purworejo Village was done by multiple linear regression analysis. The result showed in the following table 2.

Table 2. Factors that Influence the Onion Farmers' Decision in Purworejo Village, Ngantang Sub-District, Malang

Variable	Coefficient	t-Statistic	Prob.
Level of Education	-5.76	-2.35	0.0243
Farmer's Dependent	-1.21	-0.87	0.3897
Farmer Experience	0.35	2.82	0.0078
Farmer Age	-0.02	-2.35	0.0243
C	52.63	6.24	0.0000

Source: Processed from Primary Data (2020)

From table 2, it can be seen that from the four variables analyzed; the education variable had a smaller p-value ($<$) 0.05, which is 0.0243, in other words the level of education had a significant effect on farmer decision making. The farmer responsibility variable had a p-value of 0.3897, which is greater ($>$) 0.05, which means that the number of dependents of the farmer had no effect on onion farmers' decision. While the variables of experience and age with each p-value of 0.0078 and 0.0243, both are smaller ($<$) than 0.05, which means that both the experience and age of the farmers had a real influence in affecting farmers' decisions in farming onion.

Therefore, there were three variables that have a significant effect on the decision making of farmers in farming onion in Purworejo Village, such as the level of education, experience, and age of the farmers which had a significant effect. Meanwhile, Lawalata's research result (2017) on a similar topic stated the factors that influence the behavior of onion farmers in Bantul to the onion farming risk were education, age of farmers, income from onion farming and income outside of onion farming. From this, it can be seen that both were influenced by the change in education and age of the farmer.

CONCLUSION

Based on the research results, both the production risk and the income of onion farming were high. Factors that affect the income of onion farmers, such as land area, amount of production, selling price, and production costs. These factors can simultaneously affect the income of onion farmers. Meanwhile, the factors that influence farmers' decisions in farming onion were the age of the farmers, the farmer's education level, and the farmer's experience.

RECOMMENDATION

With the high level of income risk of onion farmers in Purworejo Village, farmers need to be careful in doing onion farming, so that the combination of input used can achieve maximum output and onion farming can run efficiently. The solution that can be done is to do farm management as a group to gather farmer strength based on the potentials owned by farmers.

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