Available online at https://journal.rescollacomm.com/index.php/ijeer/index

International Journal of Ethno-Sciences and Education Research

e-ISSN 2776-7590

Vol. 1, No. 3, pp. 61-65, 2021

Risk Control Of Onion (*Allium ascalonicum L.*) Production On Surjan Land

Aliudin[1]*, Aris Supriyo Wibowo[2], Setiawan Sariyoga[3], Mohamad Arief Setiawan[4]

[1,2,3] *Researcher and lecturer of Agriculture Faculty, Agribusiness Departement, Sultan Ageng Tirtayasa University, Indonesia*
[4]*Faculty of Agriculture, Universitas Padjadjaran, Indonesia*

**Corresponding author email: aliudin@untirta.ac.id*

Abstract

Onion is one of the commodities of annual vegetable crops that have high economic value, a type of short-lived plant, can be propagated vegetatively or generatively, can be developed in low to highland areas and can be cultivated throughout the year. High demand for onions was not followed by supply of onion in the market. This is caused by high risks in the cultivation of Onions. As the theory of supply, the level of supply of a commodity will be affected by the amount of commodities produced. The research aims to analyze the risk factors for onion production and onion supply behavior. The method of this research was survey methode. The location of this research was at Tonjong, Kramatwatu subdistrict. The population of onions farmers was 117 farmers and the amount of the sample used in this research is 54 farmers. Sort of datas that used in this research were primary data and secondary data. The analysis data that used are risk analysis, and multiple linear regression analysis. The results showed that the level of risk of onion in Tonjong Village was 1621.91 or 32 percent of the productivity value obtained by farmers. The source of the risks on Onion farming in Tonjong Village are climate and weather, pests and plant diseases, land fertility, and the effectiveness of using inputs. There are two factors that significantly influence the behavior of onion offering in Tonjong Village, the cost variable of fungicide and the variable cost of insecticide.

Keywords: Onions, Risk Analysis, Risk Control

1. Introduction

Onions (*Allium ascalonicum L.*) were one of the annual vegetable commodities that have high economic value, a type of short-lived plant, that can be propagated vegetatively or generatively, can be developed in low to highland areas, and can be cultivated throughout the year (Razzianto et al., 2021). Onion is one of the food ingredients that cannot be separated from the daily dishes of the Indonesian people, because of that the demand for onions in Indonesia was very high, it was reaching 3.014 kg / capita / year (Wahyuningsih, Iriana, 2012). Based on the level of household consumption according to the results of the National Socio-Economic Survey for onion commodities in Indonesia, amounting to 2.634 kg / capita / year. The high demand for onion is not followed by the supply of onion on the market. This is caused by the scarcity of onion production so that the high demand for onion cannot be fulfilled.

Onion farmers often face problems including low productivity and pest and disease attacks. The low level of productivity shows that the management of onion farming has not been efficient. Unfriendly natural conditions will increase the risk of farming such as crop failure due to flooding, drought and pest and disease attacks. This risk is still compounded by price fluctuations and market structures that are detrimental and make the farmers always avoid the risk. The success of onion farming is basically determined by the amount of income, risk and also the level of efficiency that will be faced. Land management is one of the determinants of the success of onion cultivation techniques. In addition to soil factors, environmental stresses due to climate change also increase the difficulty of farmers in managing their land (Villano, Renato, et al. 2005). Therefore, land management technology which can overcome soil problems and environmental stress caused by climate change is needed (Sunaryo,T. 2007).

The surjan system is an example of an land arrangement attempt that combines wet and dry systems side by side, this system can be used in anticipating climate change. Land management with a surjan system also allows farmers to diversify food. Onion production in Banten Province in 2017 was 9,941 quintals scattered in Pandeglang Regency, Lebak Regency, Tangerang Regency, Serang Regency and Serang City. Serang Regency is the largest onion center in Banten Province with a total of 818 quintal of onion production, and then Tanggerang Regency at 1,078 quintals, Pandeglang Regency at 223 quintal, Lebak Regency at 120 quintal, and Serang City at 2 quintals. Likewise, the

production of onions in Serang Regency is mostly in the District of Kramatwatu with a production of 5,740 quintals (BPS, 2018).

Onion production in Kramatwatu sub-district has fluctuations in production from 2012-2016 (BPS, 2018). Kramatwatu Subdistrict has three villages which are centers of onion production, namely Tonjong, Toyomerto, and Terate. The highest production of onions is located in Tonjong Village with a total production of 860 tons. Onion production centers are only found in the three villages and fluctuations in production in the District of Kramatwatu, are likely due to the high risk of onion crop production. The high risk factors are due to the production of onions that require special treatment, including land that has a certain character, capital or high production costs, high technology, and the right planting time due to the onion rain season has a great risk of failure (Utami, 2009; Dewi et al., 2021). Farmers in Tonjong Village, meanwhile, cannot find out or research about the high risk factors for onions. Like supply theory, the level of supply of a commodity will be influenced by the amount of commodity produced. Therefore, the researcher intends to see and analyze the risk factors for onion production and the behavior of onion supply in Tonjong Village, Kramatwatu District, Serang Regency.

2. Materials and Methods

The method of this research is survey. Data collection techniques that used are interviews with onion farmers and related parties such as extension workers, questionnaires, observation and literature study (Sugiyono. 2012). The sampling technique that used in this research is random sampling. The samples of this research is 54 onion farmers spread in Tonjong Village, Kramatwatu District. The determination of 54 farmers from 117 farmers was obtained by using a random number Table. The critical value or accuracy limit that used in this study is 10 percent. The analytical methods used include risk analysis, and multiple linear regression analysis.

3. Data Analysis

The analysis data using risk analysis, and multiple linear regression analysis. Several measures used to analyze the level of risk are the value of variance, standard deviation, and coefficient variation. This research uses linear regression analysis. The model mathematically can be written as follows:

$Y = f(X_1, X_2, ..., Xn)$

$Y = a_0 + a_1X_1 + a_2X_2 + ... + anXn + e$

Where about:

Y = Onion demand with the assumption that the demand is the amount of onion production in Tonjong Village which is supplied to the market

X1 = Price of onions seeds (IDR / kg)

X2 = Price of NPK Ponska fertilizer (IDR / kg)

X3 = Price of TSP fertilizer (IDR / kg)

X4 = Insecticide Cost (IDR / liter)

X5 = Fungicide Costs (IDR / liter)

X6 = Price of onions (IDR / kg)

e = error element (error)

4. Results and Discussion

4.1. Risk Analysis of Onion Production

Based on the results of the research, the expected value illustrates that the average level of productivity expected by onion farmers in Tonjong Village is 5146.42 (ceteris paribus). The standard deviation value of onion farming in Tonjong Village is 1621.91 or 32 percent of the productivity value obtained by farmers (ceteris paribus). The coefficient of variance value of 0.32 indicates that for every one rupiah produced, the risk faced is 0.32. This means that if onion farmers want to take a high risk, then onion farming in Tonjong Village will continue.

In terms of farm income, the level of income expected by onion farmers in Tonjong Village is based on the expected value of 14,706,828.83. While the risk received by onion farmers in Tonjong Village is 99 percent of the income earned by farmers with a standard deviation of 14,559,044.23. Based on these results, when compared with the risk calculation from the productivity side, the risk value calculated from the income side is higher than the risk calculated from the onion productivity side.

4.2. Risk sources of Onion Production in Tonjong Village, Kramatwatu District, Serang Regency

Climate and Weather Factors

Control of weather and climate risks in onion farming is by predicting weather and climate by having knowledge about the weather and climate through information from the local Meteorological Agency. Characteristics of rice fields which are rain-fed rice fields, the farmers must have a source of water either by making irrigation or wells to meet water needs during the planting period. So, the farmers do not rely on rain water or even during the rainy season farmers can carry out production but even during the dry season farmers can produce onions, because onion production in the rainy season with high intensity and frequency and moist soil structure is not good to grow onions.

Factors of Pests and Plant Diseases

Plant pests and diseases are the most important problems faced in onion cultivation activities, 100 percent of onion farmers admit that pests and diseases greatly affect onion production in Tonjong Village. There are various types of pests that can cause the failure of onion harvest in Tonjong Village, ranging from grayak caterpillars (Spodoptera exigua), onion caterpillars or trips (Thrips tabaci Lind.), Soil caterpillars (Agrotis ypsilon Hufn.), and so on. The part of the onion plant that is attacked also varies.

In addition to pests, there are also many diseases that attack onion plants ranging from fungi, bacteria to viruses and the most often attacking onion plants are bacteria and fungi.

Land Fertility

Most of the land in Tonjong Village is not land owned by the farmers but belongs to PT. Java Beka. Based on observations and interviews with respondents that the land in the village of Tonjong began to diminish its fertility due to the use of chemical drugs that control pests and diseases that are not controlled. However, farmers in the village of Tonjong do land for about two months a year so that this can help to restore land fertility.

Effectiveness of Using Inputs

Onion farming has the most important component of the input variables such as seeds, fertilizer and medicines, and labor. The more effective and efficient use of inputs, the smaller the production risk faced. Seedlings that used in onion farming in Tonjong Village generally use seeds from Brebes Regency, namely bima brebes varieties, and bima curut. The labor force in Tonjong Village can be said to be deficient because almost all residents of Tonjong Village are engaged in farming. So, it takes quite a long time to work out the stages of onion farming. The seeds utilization, medicines and fertilizers as well as labor on this onion plant is also not optimal due to limited capital from farmers. Input prices in onion farming are quite high, therefore, farmers are expected to be able to use seeds, fertilizers and medicines as efficiently as possible and cultivate land for onions according to the available capital.

4.3. Risk Control that carried out by Farmers

Based on the results of the study, there are several things done by onion farmers to minimize risk, including by regulating cropping patterns by using a surjan system. The Surjan system is one of the mixed cropping systems which is characterized by differences in the height of the planting fields on an area of land. This height difference is at least 50 cm. The planting field is made lengthwise so that from above it will look like alternating stripes, because each different planting field is planted with different planting commodities. Based on the characteristics of the surjan system found in the village of Tonjong there are three types of commodities planted, namely rice, onions and red chili. This is done by farmers if farmers suffer losses on the onion farming, farmers still have hope in the farming of rice and red chili, and vice versa. Especially for onion plants the surface of the soil must be higher than the land for growing rice. In January it is planted with onions and rice. In February there are plants of onions and rice then before harvesting onions, planted with red chili.

The onion farmers in Tonjong Village also control pests and plant diseases by spraying and fertilizing. Fertilization is usually carried out two to three times each planting season at the age of 10 HST, 25 HST and 35 HST. While spraying is done by farmers using fungicides, insecticides, herbicides or other types of pesticides in accordance with existing pests and diseases, by spraying twice a week or even two days if the attack is severe. Farmers are aware that the use of chemical drugs can affect the level of land fertility, this knowledge farmers get from counseling conducted by local extension agents. Postharvest management is also carried out by onion farmers to minimize the risks to be faced, for example sorting and drying. The grading and storage process is not carried out by onions farmers because the farmers' harvest will be taken directly by collectors to the Rau Trade Center (RTC) Market or middlemen even sometimes by traders.

Although the risk of price uncertainty is very high, onion farmers in Tonjong Village continue to work onions. Farmers will immediately sell the harvest onions because farmers do not have a storage warehouse. Therefore, even though the price of onions is very low, farmers will still sell directly without having to wait for the price of high onions.

4.4. Analysis of Factors that Affecting Demand Behavior

Based on the results of multiple linear regression it is known that not all variables have a significant effect on the level of onion supply in Tonjong Village at a 95 percent confidence interval. There are only two variables that significantly influence the onion supply behavior in Tonjong Village. The variables are the fungicide cost variable (X_4) and the insecticide cost variable (X_5). In addition, the model of the results of multiple regression analysis can be written as follows:

$$Y = 455{,}010 + 0{,}06\ X_1 - 0{,}629\ X_2 + 0{,}874\ X_3 + 0{,}007\ X_4 + 0{,}006\ X_5 - 0{,}182\ X_6$$

Based on the multiple regression equation model above, the constant obtained at 455,010 means, if the independent variable (X) equals zero then the production or supply of onions (Y) has a result of 455,010. Explanation of each independent variable from the above model equation can be explained below

4.5. The Price of Seeds (X1)

The variable price of onions seeds (X1) has a positive coefficient value of 0.063. This means that there is a positive relationship between the variable price of onion seeds with the amount produced. That is, if the price of seeds has increased by 1%, then the amount produced will increase by 0.063. This result is not in accordance with the theory of supply which states that input prices are negatively correlated to the magnitude of supply. This happens because of the tendency of the price of onion seeds to increase at the onset of the onion planting season and is usually followed by an increase in the output price of onions in the previous planting season.

Judging from the t-value of this variable, the variable price of onion seeds does not significantly affect the level of onion supply in Tonjong Village.

4.6. The Price of NPK Ponska (X2)

The Ponska NPK variable (X2) has a negative coefficient. This means that there is a negative relationship between the NPK Ponska price variable and the amount of onions produced. This is in accordance with the theory of supply, namely the input price has a negative effect on the level of supply. The higher the input price, the tendency of producers to increase supply will decrease. The coefficient value of the variable price of NPK Ponska Fertilizer is 0.629 which means that if the price of NPK Ponska fertilizer goes up by 1%, the amount of onion production will decrease by 0.629.

Judging from the t-value of the variable price of NPK Ponska fertilizer does not significantly affect the amount offered or produced at the real level of five percent. This is because the price of NPK Ponska fertilizer is relatively affordable by onion farmers in Tonjong Village and is a fertilizer that is always used for onion farming both during the first and second fertilization. Although there is a change or an increase in the price of NPK Ponska fertilizer, farmers will not be affected and will continue to use the fertilizer because the price changes are not significant.

4.7. The Price of TSP Fertilizer (X3)

TSP fertilizer price variable (X3) has a positive coefficient value of 0.874. This means that there is a positive relationship between the variable price of TSP fertilizer with the amount of onion offered or produced. That is, if the price of TSP fertilizer increases by 1%, then the amount of onion production or the amount offered will increase by 0.874. Judging from the t-value of the variable price of TSP fertilizer, it is known that the variable has no significant effect on the amount of onion offered or produced at the real level of five percent. The price of TSP fertilizer has no significant effect because TSP fertilizer is a subsidized fertilizer so that it is relatively more stable and affordable, depending on the place or stall of fertilizer purchase.

4.8. The Fungicide Costs (X4)

The variable cost of fungicide (X4) has a positive coefficient of 0.007. This has a positive relationship between the cost of fungicides and the amount of onion produced or offered. That is, each increase in fungicide costs by 1% will increase the amount of onions produced or offered by 0.007.

Judging from the value of t-count, the fungicide cost variable significantly affects the amount of onion produced at the real level of five percent. Land characteristics in Tonjong Village are rain-fed rice fields, so that planting onions is carried out during the rainy season between December and January. Therefore, the condition of the soil becomes moist so that the onion plants are very vulnerable to diseases, especially those caused by fungus or fungi. This is a reason for farmers to use fungicides even though the price is relatively high.

4.9. The Insecticide Cost (X5)

The insecticide cost variable (X5) has a positive coefficient of 0.006. This has a positive relationship between the cost of the insecticide and the amount of onion produced or offered. That is, each increase in the cost of insecticides by 1% will increase the amount of onions produced or offered by 0.006.

Judging from the value of t-count, the insecticide cost variable significantly influences the amount of onions produced at the real level of five percent. The difference in planting time causes pests such as caterpillar pests. This is a reason for farmers to use insecticides even though the price is relatively high compared to the price of fungicides.

4.10. The Price of Onions (X6)

The onion price variable (X6) has a negative coefficient. That is, there is a negative relationship between the variable price of onions with the amount of onion produced. This is not in accordance with the theory of supply, namely the price of output influences the supply level. The coefficient of the variable price of onions is 0.182 which means that if the price of onions increase by 1%, the amount of onion production will decrease by 0.182.

Judging from the t-value value of the variable onion prices do not significantly affect the amount offered or produced at the real level of five percent. This is because onion farmers in Tonjong Village in the field of onion do not pay too much attention to the prices that occur at harvest time, especially the price of onions fluctuate each year making it difficult for farmers to predict the price of onions in the planting season the following year.

5. Conclusion

The Onion farmers in Tonjong Village experience various risks in running their businesses. Based on the calculation results, the level of risk of onions faced by farmers in Tonjong Village is 1621.91 or 32 percent of the productivity value obtained by farmers. In terms of farm income, the level of income risk received by onion farmers in Tonjong Village is 99 percent of the income earned by farmers with a standard deviation of 14,559,044.23. The risk sources of onion production in Tonjong Village are climate and weather, pests and plant diseases, the level of land fertility, and the effectiveness of using inputs. Based on multiple regression analysis through the t test with a confidence level of 95%, there are two factors that significantly influence the onion supply behavior in Tonjong Village, namely the variable cost of fungicide and variable cost of insecticide. The fungicide cost variable has a negative coefficient and the insecticide variable has a positive coefficient. While the seed price variable, the NPK Ponska fertilizer price variable, the TSP fertilizer price variable, and the onion price variable have no significant effect on the real level of five percent.

References

Dewi, T., Martono, E., Hanudin, E., & Harini, R. (2021). Heavy metals contamination assessment in agricultural soil for shallot in Wanasari, Brebes Regency, Central Java Province. In *IOP Conference Series: Earth and Environmental Science* (Vol. 752, No. 1, p. 012056). IOP Publishing.

Razzianto, D., Suminartika, E., Noor, T. I., & Kalfin (2021). Analisis Struktur Biaya Usaha Tani Bawang Merah Berdasarkan Tujuan Pasar Menggunakan Metode Cobb-Douglas Stochastic Frontier Production Function. *Jurnal Matematika Sains dan Teknologi*, 22(1), 23-36.

Sugiyono 2012. *Business Research Methods (Quantitative and Qualitative Applications)*. Bandung: Alfabeta

Sunaryo, T. 2007. *Financial Risk Management*. Jakarta: Salemba Empat

Utami, Anisa Dwi. 2009. *Risk Analysis and Behavior of Shallots in Brebes Regency Onions [thesis]*. Bogor: Faculty of Economics and Management, Bogor Agricultural University.

Villano, Renato, et al. 2005. *Agricultural Risk Analysis in Fars Province of Iran: A Risk-Programming Approach (Agricultural Risk Analysis in the Fars Province of Iran: A Risk-Programming Approach)*. United Kingdom: University of New England.

Wahyuningsih, Iriana. 2012. *Risk Analysis and Behavior of Shallots in Perbawati Village, Sukabumi District, Sukabumi Regency*. Bogor: Faculty of Economics and Management, Bogor Agricultural University.

.