Randwick International of Social Sciences (RISS) Journal
Vol. 3, No. 4, October 2022 | Page: 870-877
ISSN Online: 2722-5674 - ISSN Print: 2722-5666
http://www.randwickresearch.com/index.php/rissj

The Effect of Behavior and Characteristics of Shallot Farmers on Production Risk in Deli Serdang District

DOI: https://doi.org/10.47175/rissj.v3i4.509

| Siti Nur Arafah[1,*] | Sri Fajar Ayu[2] | Rulianda P. Wibowo[3] |

[1,2,3] *Master of Agribusiness, Universitas Sumatera Utara, Indonesia*

*sfa@usu.ac.id

ABSTRACT

Horticulture is part of the agricultural sector which has received quite a lot of attention by the government to continue to be developed. Shallots are horticultural crops that are currently widely grown in Indonesia and have high economic value and demand. The development of shallot farming is basically aimed at increasing the productivity and welfare of farmers. However, shallot cultivation does not fully provide maximum benefits for farmers. This happens because of the risk in the implementation of onion farming. The risk factors that occur are production risk and shallot price risk. Production and price risks will reduce the income of shallot farming so that the household income of farmers decreases. Therefore, agricultural development through increasing productivity must be in line with the handling of the risks faced. The research area was determined purposively, namely in Liang Pematang Village, Sinembah Tanjung Muda Hulu District, Deli Serdang Regency, with the consideration that the area is one of the shallot production centers in Deli Serdang Regency. The sample in this study were farmers who were working on shallots in the research area. The samples taken were 30 shallot farmers. Farming risk level analysis using Failure Mode and Effect Analysis (FMEA). From the results of the study, it is known that the characteristics of shallot farmers are farmers of productive age and the dominant education is quite high at the high school level. Most farmers own more than 2,000 m2 of land, and have been farming for more than 10 years and the land used is their own land. The risks faced in shallot farming based on severity from the highest to the lowest are the selling price of shallots, fertilizer prices, weather conditions, Pest attacks, availability of seeds, diseases and labor.

KEYWORDS

Shallots; farmer characteristics; risk sources; failure mode and effect analysis (fmea)

INTRODUCTION

Agriculture is a sector that contributes significantly to the Indonesian economy. The agricultural sector contributes to the fulfillment of national food and raw material needs in the food industry sector, as a provider of employment, and as a source of livelihood for the majority of Indonesian people. The agricultural sector consists of several sub-sectors including food crops, horticulture, fisheries, forestry, livestock and plantation sub-sectors.

Horticulture is a sector that gets a lot of attention from the government to continue to be developed. The supply of national horticultural products is directed to meet the needs of domestic consumers, either through traditional markets, modern markets, as well as foreign or export markets (Directorate General of Horticulture, 2015). In addition, horticultural

commodities can be a source of income for the community and farmers, both small, medium and large scale.

Shallots are horticultural crops that are currently widely grown in Indonesia and have high economic value and demand. In Indonesia, shallots are developed and cultivated by farmers from the lowlands to the highlands. One of the shallot production centers in Indonesia is in North Sumatra Province. North Sumatra is ranked as the seventh largest shallot producer in Indonesia (Central Bureau of Statistics, 2021).

Tabel 1. Harvest Area and Production of Shallots of North Sumatra 2016-2020.

Year	Harvest Area (Ha)	Production (Ton)
2016	1.538	13.368,3
2017	2.090	16.103,2
2018	2.083	16.336,8
2019	2.246	18.071,7
2020	3.038	28.830

Source: BPS 2021

The development of shallot farming is basically aimed at increasing the productivity and welfare of farmers. Increasing farmers' income is the main key towards improving farmers' welfare. The increase in income, among others, is achieved through increasing farm productivity (Zakaria, 2009).

However, in practice shallot cultivation does not fully provide maximum benefits for farmers. This happens because of the risk in the implementation of onion farming. The risk factors that occur are production risk and shallot price risk. Action to avoid risk is quite a difficult thing to do, so the easiest thing is how to manage risk properly. Risks that are managed properly will minimize the losses obtained. Production risk and price risk will reduce onion farming income so that farmers' household income decreases. Therefore, agricultural development through increasing productivity must be in line with the handling of the risks faced.

RESEARCH METHODS

The research area was determined purposively, namely in Liang Pematang Village, Sinembah Tanjung Muda Hulu District, Deli Serdang Regency with the consideration that the area is one of the shallot production centers in Deli Serdang Regency. The sample in this study were farmers who were working on shallots in the research area. In this study, the samples taken were 30 shallot farmers. To obtain data in the study, it was conducted by direct interviews with shallot farmers.

Risk analysis in onion farming uses Failure Mode and Effect Analysis (FMEA), which is a form of qualitative analysis that aims to identify the failure mode of a cause of failure and the impact of failure caused by each component in a system. In FMEA, every possible failure is quantified for priority treatment. The quantification of priority determination is carried out based on the multiplication between the frequency rating, the level of damage and the level of risk detection (Gasperz, 2012).

Assessment or measurement of risk sources is defined from three components, namely severity (S), occurrence (O) and detection (D). The rating scale used is adopted from previous research with a table of scale values as follows (Syamsiyah et al., 2019):

Tabel 2. The Scale of Severity

Scala	Description
10	The harmful effects caused are very high
9	The effect is very high
8	The effect is very high
7	The effect is high
6	The effect is moderate
5	Low effect
4	The effect is very low
3	Small effect
2	The effect is very small
1	Has no effect arising from the cause of failure

Table 3. The scale of Occurance Frequency

Scala	Description
10	Happens more than 1 time in 1 day
9	Happens every 3-4 days
8	Happens every week
7	Happens every month
6	Happens every 3 months
5	Happens every 6 months
4	Happens every year
3	Happens 1-3 years
2	Happens 3-4 years
1	Happened more than 4 years

Tabel 4. The scale of Abality to Detect

Scala	Description
10	Absolute uncertainty (the cause of failure is not detected)
9	The cause of the failure is very difficult to detect
8	The cause of the failure is difficult to detect
7	The cause of the failure detected is very low
6	Cause of failure detected low
5	Cause of failure detected low medium
4	The cause of the failure is quite detectable
3	Cause of failure detected high
2	The cause of the failure detected is very high
1	The cause of the failure is almost certain to be detected

For each identified risk source, severity (S) occurrence (O) and detection (D) are calculated using a rating scale that has been prepared and then the risk priority level or Risk Priority Number will be calculated using the Risk Priority Number formula as follows:

Risk Priority Number (RPN) = O*ccurance* x *Severity* x *Detection*

The results of the Risk Priority Number (RPN) and Risk Score Value (RSV) are validated and grouped using a scatter diagram to obtain a risk profile that must be prioritized to be addressed immediately.

RESULTS AND DISCUSSION

Characteristics of Shallot Farmers

The characteristics of each farmer are different and can affect the cultivation techniques of each farmer. This will also affect the decision-making process of farmers as a result of the risks involved in farming shallots. The characteristics of farmers in the research area are as follows;

Table 2. Characteristics of Sample Farmers in the Research Area

No.	Description	People	Percentage (%)
1.	Farmers' Age (Years old)		
	• 15-64	29	96,66
	• > 64	1	3,44
2.	Level of Education		
	• College	1	3,33
	• ≥ Senior High School	14	46,67
	• Junior High School	8	26,67
	• Primary School	7	23,33
3	Farming Old (Years)		
	• ≥ 10	18	60
	• < 10	12	40
4.	Cultivated Land Area (Ha)		
	• ≥ 2.000 m^2	17	56,67
	• < 2.000 m^2	13	43,33
5.	Land Ownership		
	• One's own	23	76,67
	• Rent	7	23,33

Source: Primary Data Processing, 2022

The sample farmers in the study area were dominated by farmers of productive age, namely 15-64 years, as many as 29 people or 96.66% of the 30 sample farmers. These results indicate that shallot farming in the study area is carried out by farmers of productive age. Productive age is the most appropriate age to carry out work activities such as farming because physically they are still good, have high spirits and have an obligation to support their family. Farmers of productive age will work better and more optimally than non-productive farmers (Winarso et al., 2021).

Education can have a big influence on a person's mindset. If we look at the education level of the sample farmers in the research area, it is quite diverse and dominated by farmers with a high school education level, namely 14 people or 46.67% of the 30 samples. Farmers with higher levels of education generally have a mindset that is more open in accepting new innovations and understands technology more quickly, is easier to accept the explanations given and is more active in asking questions, expressing opinions in fourm and seeking information about agriculture so that they can develop and bring agricultural products in a better direction. Farmers with higher education are also wiser in making decisions in farming activities. (Novia, 2011)

Farming experience is the length of time that farmers have done in pursuing their farming business. It can be seen from the results of farmer research with farming duration of more than 10 years as many as 18 people or 60% of the 30 research samples. Farmers who have been involved in farming activities for a long time usually have a better understanding and knowledge of land conditions than farmers who have just been in the world of agriculture. The length of farming will affect cultivation techniques and farmer decision making.

Farmers with a long period of farming are accustomed to cultivating shallots so that they are aware of the risks and problems that will be faced. This experience will then influence most of the attitudes and actions of farmers in making farming decisions. In addition, farmers who have been involved in farming activities for a long time will be more selective and precise in choosing the type of innovation that is applied, and be more careful in the decision-making process in carrying out their farming activities, but on the other hand, farmers who are less experienced will usually make decisions faster because usually will bear more risk (Agatha & Wulandari, 2018).

The land cultivated by shallot farmers in the dominant research area is their own land. Cultivated land area > 2,000 m2 as many as 17 people or 56.67%. The land cultivated by shallot farmers can be said to be quite large and from previous research it is explained that the area of arable land will affect farmers' income, because the larger the arable land, the greater the production from farming (Maramba, 2018). Meanwhile, the area of arable land will be directly proportional to the risk of onion farming. The higher the arable area, the higher the production risk. The increase in production risk has an impact on reducing the income of shallot farming, non-shallot farming, and non-agricultural income so that the household income of farmers decreases. This increased risk has an impact on reducing the welfare of farmer households (Pamusu et al., 2019 :Nainggolan, et al., 2022)

Sources of Shallot Farming Risk

The sources of risk faced by farmers are analyzed by looking at the Risk Priority Number and Risk Score Value of each risk source. The results of measuring values in each risk source are shown in the following table:

Tabel 7. Results of Measurement of Risk Sources in Shallot Farming

Source of Risk	Severity	Occurance	Detection	RPN
Weather Conditions	6,80	7,73	3,87	203,34
Pest Attack	6,57	6,47	3,57	151,46
Disease	5,13	6,30	3,97	128,28
Seed Availability	6,53	5,50	3,70	132,95
Labor	3,83	6,53	3,90	97,67
Selling price	6,93	9,53	8,03	530,99
Price of Fertilizer and Pesticide	7,13	5,0	7,9	281,77

Source: Primary Data Processing, 2022

Based on the results of the study, the severity of a risk can be seen from the value of the Risk Priority Number (RPN). The levels of the highest to lowest Risk Priority Number (RPN) are as follows:

Selling Price of Shallots

The selling price is the risk with the highest level of value. The selling price of shallots is one of the determining factors for the success of a farm. It is generally believed that the higher the selling price of shallots, the higher the income level of farmers (Fatahullah, 2021). The price received between farmers in one farmer and another in the study area varies. This happens because the shallot sales system in the research location is from farmers to collectors or middlemen and there are also some farmers who sell directly to the market. Farmers who sell shallots to collectors or middlemen usually tend to have low selling prices. In addition, the selling price of shallots is also influenced by the large amount of production produced by the farmers. That is, if the farmers produce shallots together at the same time, the selling price of shallots will fall.

Prices of Fertilizers and Pesticides

Onion plants need to be cared for to produce good production. Therefore, fertilizers and pesticides are very important things to pay attention to. Prices of fertilizers and pesticides affect the selling price of shallots, because the higher prices of fertilizers and pesticides will burden the farmers. If farmers raise prices, buyers will reduce the amount they buy. One of the risks that can affect income is the cost of fertilizers and pesticides which are very expensive, so that when starting red onion farming, farmers are forced to borrow to cover the initial costs (Fatahullah, 2021).).

Weather Conditions

The average rainy day in Deli Serdang Regency in 2021 is 14 days with an average monthly rainfall of 211.96 mm. The average monthly rainfall is included in the medium category. When viewed monthly, there are several months where rainfall exceeds 300 mm and is included in the high category, namely in January, August, September, October and November. Uncertain weather can also affect the success of onion cultivation. When planting shallots, the weather should not be too hot or it doesn't rain too often. In months with relatively high and long rainfall, it can cause high disease attacks on plants, on the other hand, infrequent rainfall tends to make the land dry which also has an impact on high pest attacks, on the other hand many farmers have difficulty finding water sources and there must be additional costs. for spraying water during the dry season. Weather or climate is the most driving factor for the occurrence of risk. This is because the weather/climate can affect the growth process of shallot plants and also affect the level of pest and disease populations (Ghozali & Wibowo, 2019).

Pest Attack

Shallots are one of the horticultural commodities that are quite a lot attacked by pests. This results in the resulting production not being as expected, due to fluctuations in production that cannot be accurately predicted by farmers. In onion farming in Liang Pematang Village, Sinembah Tanjung Muda Hulu District, Deli Serdangg Regency, there are many shallot plants affected by pests such as thrips, armyworms and aphids.

Availability of Onion Seeds

Seeds are a source of risk because seeds are a determining factor in production yields. That the number of seeds as one of the factors that affect the production of shallots (Rijal et al., 2016). Generally, shallot farmers in Liang Pematang Village use shallot seeds of the canopy variety (Nganjuk). Farmers use this type of seed because it is the most resistant to pests and diseases in the study area. Farmers get seeds from outside by ordering them from distributors, which are then shipped directly. The dependence of farmers in buying these seed varieties makes farmers reluctant to develop seed varieties that are suitable for their agricultural land, so that if the ordered variety of seeds is not available when the planting season arrives, they will use other types of seeds that are susceptible to pests and diseases in the area or even postpone the planting schedule.

Disease Attack

Diseases found in shallots in the study area include fusarium wilt and leaf spot. Fusarium wilt disease is characterized by yellowing of the leaves, twisted leaves and rotting of the base of the stem. If such symptoms are found, the plant is removed and destroyed. The damage caused by these pests and diseases can reduce the production of shallots so that pests and

diseases are the source of the risk of shallot production. To beat the disease, farmers use fungicides because this disease is caused by fungi (Ghozali & Wibowo, 2019).

Labor Availability

Labor is one of the factors that can cause the risk of shallot production because it is related to the cultivation process from land preparation to harvesting (Ghozali & Wibowo, 2019). The shortage of labor becomes a risk in onion farming because when the planting season arrives and farmers start planting at the same time, it becomes difficult to find labor. This is because the onion cultivation process requires a lot of manpower, while the workers at the research location only come from the village, considering the location of the village is difficult to access. Therefore, when farmers find it difficult to find labor, farmers will wait their turn, resulting in delays in the shallot cultivation process.

CONCLUSION

From the results of the study, it is known that the characteristics of shallot farmers are farmers of productive age and the dominant education is quite high at the high school level. Most farmers own more than 2,000 m2 of land, and have been farming for more than 10 years and the land used is their own land. The risks faced in the shallot business based on the severity from the highest to the lowest are the selling price of shallots, fertilizer prices, weather conditions, Pest attacks, availability of seeds, diseases and labor.

REFERENCES

Agatha, M. K., & Wulandari, E. (2018). Analisis Faktor-Faktor yang Mempengaruhi Produksi Kentang di Kelompok Tani Mitra Sawargi Desa Barusari Kecamatan Pasirwangi Kabupaten Garut. *Jurnal Ilmiah Mahasiswa Agroinfo Galuh*, *4*(3), 772–778. https://jurnal.unigal.ac.id/index.php/agroinfogaluh/article/view/1643

Badan Pusat Statistik. (2021). Provinsi Sumatera Utara Dalam Angka 2021. In *BPS Sumatera Utara*.

Direktorat Jendral Hortikultura. (2015). Statistik Hortikultura.

Fatahullah. (2021). Analisis Risiko Pendapatan Petani Bawang Merah di Desa Soki Kecamatan Belo Kabupaten Bima.

Gaspersz, Vincent, 2012, All in One: Production and Inventori Management, Edisi 8, Bogor

Ghozali, M. R., & Wibowo, R. (2019). Analisis Risiko Produksi Usahatani Bawang Merah di Desa Petak Kecamatan Bagor Kabupaten Nganjuk. *Jurnal Ekonomi Pertanian Dan Agribisnis*, *3*(2), 294–310. https://doi.org/10.21776/ub.jepa.2019.003.02.7

Maramba, U. (2018). Pengaruh Kateristik Terhadap Pendapatan Petani Jagung DiKabupaten Sumba Timur. *Jurnal Ekonomi Pertanian Dan Agribisnis*, *2*(2), 94–101.

Nainggolan, S., Fitri, Y., & Hutasoit, V. (2022). Income and Welfare Analysis of Rubber Farmers of Sarolangun Regency Jambi - Indonesia. *Randwick International of Social Science Journal*, *3*(2), 427-434. https://doi.org/10.47175/rissj.v3i2.444

Novia, R. A. (2011). Respon Petani Terhadap Kegiatan Sekolah Lapangan Pengelolaa Tanaman Terpadu (SLPTT) Di Kecamatan Ajibarang Kabupaten Banyumas. *Mediagro*, *7*(2), 48–60.

Pamusu, S. S., Harianto, H., Kuntjoro, K., & Winandi, R. (2019). Dampak Risiko Produksi Terhadap Kesejahteraan Rumahtangga Petani Bawang Merah di Kabupaten Sigi. *Jurnal Ekonomi Pertanian Dan Agribisnis*, *3*(2), 429–438. https://doi.org/10.21776/ub.jepa.2019.003.02.18

Rijal, M., Jakfar, F., & Widyawati, W. (2016). Analisis Faktor-Faktor Yang Mempengaruhi Produksi Usahatani Bawang Merah Di Desa Lam Manyang Kecamatan Peukan Bada.

Jurnal Ilmiah Mahasiswa Pertanian, *1*(1), 488–497. https://doi.org/10.17969/jimfp.v1i1.1321

Syamsiyah, N., Sulistyowati, L., Kusno, K., & Nur Wiyono, S. (2019). Identifikasi Risiko Usahatani Mangga Dalam Pengembangan Agrowisata Di Kabupaten Cirebon. *Sosiohumaniora*, *21*(1), 11. https://doi.org/10.24198/sosiohumaniora.v21i1.11062

Winarso, R. H., Syafrial, & Widyawati, W. (2021). Analisi Efisiensi Teknis Multi-Stage Menggunakan Data Envelopment Analysis (DEA) dan Regresi Tobit Pada usahatani Bawang merah Studi Kasus di Desa Torongrejo, Kecamatan Junrejo, Kota Batu, Jawa Timur. *Journal Ekonomi Pertanian Dan Agribisnis (JEPA)*, *5*(4), 1191–1205.

Zakaria, W. A. (2009). Penguatan Kelembagaan Kelompok Tani Kunci Kesejahteraan Petani. *Prosiding Nasional Dinamika Pembangunan Pertaniaan Dan Pedesaan*, 294–315.