

Risk Management Strategy on Shallot Farming in Bantul and Nganjuk Regency

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ABSTRACT

The objectives of this research were to understand farmers' perception to risk and risk management strategy on shallot farming. The research was conducted in Bantul and Nganjuk Regency. The number of samples taken were 57 farmers in Bantul and 90 farmers in Nganjuk. Analysis used was frequency table that disaggregate based on agroecosystem and cropping pattern. The result showed that according to farmers' perception, production and price risk were high. Farmer's decision to follow dominant cropping pattern and production system reflected on the ex ante risk management strategies done by the farmers as their own respectation. In the interactive risk management strategies, farmers tended to use chemical fertilizers over chemical pesticides. In ex post risk management strategy, in the failure of shallot farming, they kept cultivating shallot that their capital got on cash and input for shallot farming.

Keywords: Ex Ante, Ex Post, Interactive, Risk Management, Risk Perception

INTRODUCTION

Uncertainty and risk are quite essential features in agriculture. Musser and Patrick (2001) followed Baquet *et al.* (1997) and define five major sources of risk in agriculture. Production risk concerns variations in crop yields and in livestock production are due to weather conditions, diseases and pests. Marketing risk is related to the variations in commodity prices and quantities that can be marketed. Financial risk relates to the ability to pay bills when due, to have money to continue farming, and to avoid bankruptcy. Legal and environmental risk concerns the possibility of lawsuits initiated by other businesses or individuals and changes in government regulation related to environment and farming practices. Finally, human resources risk concerning the possibility that family or employees will not be available to provide labour or management.

Risk can not be eliminated but can be reduced through a risk management. For individual farmer, risk management involves finding the preferred

combination of activities with uncertain outcomes and varying levels of expected returns. Risk management strategy can be divided to ex-ante, interactive, and ex post strategy (Adiyoga and Sutiarto, 1999). Ex ante strategies adopted before a risky event occurred can reduce risk. Ex post strategies adopted to cope with losses from risks that have already occurred (Sen and Choudary, 2011). Musser (1998) concluded that the geographic location and environment have an influence on the perception of risk and risk management carried out by farmers.

The objective of this research are to understand farmers perception to risk and risk management strategy of farmers.

MATERIALS AND METHODS

This research were conducted in Bantul (Yogyakarta) and Nganjuk Regency (East Java) from May to June 2014. Based on its agroecosystem, Bantul had two kinds of agroecosystem, i.e. wetland and coastal sandy land. Meanwhile, Nganjuk only had wetland

Coastal sandy, Bantul Regency											
1	2	3	4	5	6	7	8	9	10	11	12
	Horticulture non shallot				Shallot I				Shallot II		
					Hot pepper						
Wetland, Bantul Regency											
1	2	3	4	5	6	7	8	9	10	11	12
Paddy		Shallot I				Shallot II			fallow	Paddy	
		Hot pepper									
Twice/year, Nganjuk regency											
1	2	3	4	5	6	7	8	9	10	11	12
Paddy			Soybean		Shallot I			Shallot II			
3 times/year											
1	2	3	4	5	6	7	8	9	10	11	12
Paddy			Shallot I			Shallot II			Shallot III		
4 times/year											
1	2	3	4	5	6	7	8	9	10	11	12
Shallot I			Shallot II			Shallot III			Shallot IV		

Figure 1. Cropping Pattern in Bantul and Nganjuk Regency

agroecosystem. Based on the dominant cropping pattern, farmers in Bantul cultivated shallot twice a year, while farmers in Nganjuk done the cultivation twice or more a year. The numbers of samples taken were 57 farmers in Bantul and 90 farmers in Nganjuk. Analysis used was frequency table which disaggregate based on agroecosystem and cropping pattern.

RESULT AND DISCUSSION

Cropping Pattern

There were some differences in shallot growing season between Bantul and Nganjuk. First, growing season in Bantul was started on March (wetland) and June (coastal sandy), while in Nganjuk, the growing season was strated on April by farmer who cultivated more than twice a year and June by farmers who cultivated more than twice. In addition, there was differences in the second growing season. An abbandan shallot harvest occur in August and September.

Risk Perception

There was yet consensus existed on the notion of risk in scientific literature. Different domains of science applied different concepts of risk. These concepts of risk could be grouped according to the epistemological foundation (Zinn, 2009). Some authors argued that risk did not exist beyond it being a psychological construct (Sjöberg *et al.* 2004).

From a realist perspective, it was assumed that “real risk” could be measured objectively. Individual

perceptions of risk, however, differed from one person to another. This difference, as we would see, could not be explained solely by the imperfect knowledge on the real risk being observed. Moreover, individuals had different perceptions of reality because of their different interpretation of reality. For all perceptions of reality, brain was filtering the incoming information. This filtering process was strongly related to social and cultural background, and personal history of each individual (Proske and Proske, 2008). Risk perception was a mental interpretation of the physical sensations produced by an external stimulus. They were thus not permanent and were shaped if new information was obtained (Senkondo, 2000).

Farmers also defined the risk of farming with different perceptions (Table 1). Most farmers in Bantul (46%) and Nganjuk (45,6%) defined risk as everything that might result in the financial loss of shallot farming. Some of them considered that risk was everything that might endanger the profitability of shallot farming, but the impacts could be prevented or reduced if farmers were cautious from the beginning.

According to Bantul and Nganjuk farmers, there were a common perception that farming failure happened when production and prices obtained were relatively low (50% and 55,6%). However, Nganjuk farmers prioritized price (28.9%) more than production (16.7%) as an indicator of success or failure in farming. On the other hand, Bantul farmers prioritized production than price. This was related to post-harvest management. Almost all shallot farmers in Nganjuk did not have

Table 1. Farmers' Perceptions Regarding Risks in Shallot Farming

No	Farmers' Perceptions	Bantul N=78 (%)	Nganjuk N=90 (%)
1	Risk as perceived by farmers		
	a. things that may cause the occurrence of unexpected low shallot production	3	3
	b. everything that may result in the financial loss of shallot farming	46	46
	c. everything that may endanger the profitability of shallot farming, however the impacts can be prevented or reduced if farmers are cautious from the beginning	33	33
	d. consequences for farmers in cultivating shallot, such as providing capital, making inputs available, etc	18	18
2	Farming failure as perceived by farmers		
	a. relatively low yield of production	28	16.7
	b. relatively low price of output	22	28.9
	c. relatively low yield and price of output	50	55.6
3	Production risk of shallot farming as perceived by farmers		
	a. high	77	76.7
	b. moderate	23	17.8
	c. low	0	4.4
4	Price risk of shallot farming as perceived by farmers		
	a. high	69	73.3
	b. moderate	29	21.1
	c. low	1	3.3
5	Farmers' reasons for cultivating shallot, even though it is very risky		
	a. risk impacts can be reduced or prevented	41	35.6
	b. experience has shown that there is a limited choice	13	14.4
	c. cultivating other crops is considered riskier	1	4.4
	d. provide more revenue expectation	42	40.0

a habit to bring the crops home, but they tend to sell their crops in the fields with a tebas (buy crop before harvest) mechanism. This caused farmers great loss when shallot price was relatively low since they could not delay the sale. Unlike farmers in Bantul who always brought their crops home and did some post-harvest handling, such as drying and cleaning of dirt, so that there was little added value and to arrange sale time though it was no longer postponed due to recessive needs.

According to Patrick *et al.* (1985) and Wik *et al.* (1998), an important source of risk faced by farmers was the production and price risks. The results showed that the perception of most shallot farmers in Bantul and Nganjuk assumed that production (77 and 76.7%) and price risk (69 and 73.3%) were high. The high risk production indicated that production technology had not yet fully mastered or applied by farmers. Many farmers did not use certified seed, unbalanced fertilizer application, and shallot cropping pattern yearly. The price risk considered by farmers indicated that the price was really beyond the control of farmers and an external factor.

Although shallot farming was considered risky,

farmers still grew shallot from year to year because they thought shallot farming provided a great revenue expectations.

Risk Management Strategy

a. Ex Ante Risk Management Strategy

Risk management strategy pursued by farmers before appearing of risk was basically shown to reduce variability revenue. Figure 1 showed the dominant cropping pattern done by Bantul and Nganjuk farmers. Based on the experience of farmers, such cropping patterns were most profitable.

In the first growing season, shallot farmers in Bantul cultivated shallot using intercropping system with red chilli. According to farmers, intercropping system could obtain a big income, made efficient use of inputs, and anticipated the losses on shallot plants and wait for the right time to plant shallot in the next season. In the second growing season, farmers did not do intercropping because the weather did not support. On the other hand, farmers in Nganjuk always planted shallot with monoculture because most farmers thought that it was easier to manage.

For anticipating losses, farmers in Bantul and Nganjuk preferred to use their own seeds from crops

Table 2. Ex Ante Risk Management Strategy

No	Description	Bantul (2 time/year) in percentage		Nganjuk (time/year) in percentage	
		Wet land (n=50)	Coastal sandy (n=27)	2 (n=30)	≥3 (n=60)
1	Reasons for consistently following the existing cropping system				
	a. experience has shown that it is the most profitable crop rotation	20	70	50	72
	b. suitable to local climate	26	11	30	10
	c. suitable to topography and fertility of land	10	-	-	2
	d. if it is different, it may invite pest attack	28	4	13	3
	e. to keep of fertility and sustainability	2	15	7	12
	f. others (group agreement)	14	-	-	-
2	Shallot production system on first growing season				
	a. monoculture	14	-	100	100
	b. multiple cropping or sequential cropping	86	100	-	-
3	Shallot production system on second or other growing season				
	a. monoculture	50	89	100	100
	b. multiple cropping or sequential cropping	50	11	-	-
4	Reasons for adopting monoculture production system:				
	a. farming management is easier	8	4	50	42
	b. shallot growing is better	16	37	10	18
	c. shallot production is higher	10	-	30	10
	d. quality of production is better	4	-	7	20
	e. profit is more	-	-	3	10
	f. climate is not support to multiple cropping	24	56	-	-
5	Reasons for adopting the multiple cropping production system:				
	a. in general, it provides higher net income as compared to mono cropping	48	26	-	-
	b. input use, especially land and labor, is more efficient	18	59	-	-
	c. crops are compensating to each other, if one of them fails	28	11	-	-
	d. shallot grows very well	4	4	-	-
6	Number of Shallot varieties used:				
	a. always single variety in all parcels cultivated	70	96	97	95
	b. more than one variety in the same parcel cultivated	10	-	-	2
	c. more than one variety in different parcel cultivated	18	4	3	3
7	Source of shallot seeds:				
	a. own-produced	88	78	77	87
	b. buy from others	12	22	23	13
8	Number of locations/parcels cultivated for shallot in a year:				
	a. only one	20	59	77	85
	b. more than one	80	41	23	15
9	All of land was cultivated for shallot:				
	a. yes	80	26	100	97
	b. no	20	74	-	3

because it was more economist. If they wanted to buy seed, farmers preferred to buy uncertified seed which was derived from other farmers. The absence of quality assurance and certification of artificial seed from farmers themselves by the government led to lower productivity level achieved than potential productivity of the same variety.

However, farmers in Nganjuk owned farming

lands in different locations, they preferred to plant their lands with shallot in the same season (100% and 94%). On the other hand, farmers in Bantul did not fully plant their lands with shallot. Even in coastal sandy land, farmers (74%) did not cultivate shallots in the whole farming area.

b. Interactive Risk Management Strategy

Treatments done by farmer for any dead crop

Table 3. Interactive Risk Management Strategy

No	Description	Bantul (2 time/year) in percentage		Nganjuk (time/year) in percentage	
		Wet land (n=50)	Coastal sandy (n=27)	2 (n=30)	≥3 (n=60)
1	If some plants are not survive:				
	a. no revoked	38	59	-	2
	b. revoked and replanting	24	-	43	72
	c. revoked but no replanting	38	41	53	27
2	Planting distance in the first growing season:				
	a. 20x20 cm	80	4	-	-
	b. 15x20 cm	18	19	-	-
	c. 15x15 cm	2	59	50	15
	d. 15 x 10 cm	-	19	3	2
	e. 10x10 cm	-	-	47	83
3	Planting distance in the second growing season or other:				
	a. 20x20 cm	56	81	-	-
	b. 15x20 cm	28	15	-	-
	c. 15x15 cm	10	4	50	15
	d. 15x10 cm	6	-	3	2
	e. 10x10 cm	-	-	47	83
4	Type of fertilizer used:				
	a. just single fertilizer	-	-	-	2
	b just compound fertilizer	10	-	-	5
	c. single and compound fertilizer	30	-	40	78
	d. single and organic fertilizer	2	37	3	-
	e. compound and organic fertilizer	4	-	-	-
	f. single, compound, and organic fertilizer	54	63	57	15
5	The use of fertilizer in dry season vs. wet season:				
	a. no difference in type and amount	30	7	10	25
	b. no difference in type, but difference in amount	34	74	37	20
	c. different in type and amount	34	19	53	55
6	Tendency of farmers in pest and disease control:				
	a. chemical pesticide	100	81	100	100
	b. botanical pesticide	-	-	-	-
	c. chemical and botanical pesticide	-	19	-	-
7	Pest and disease controlling method:				
	a. preventive	38	33	10	48
	b. curative	18	15	20	7
	c. preventive and curative	44	52	70	43
8	Mixing pesticides in controlling pests and diseases:				
	a. yes, as a preventive measure	28	37	20	48
	b. yes, as a curative measure	36	15	10	3
	c. yes as a preventive and curative measure	36	48	70	48
9	Reasons for mixing pesticides:				
	a. controlling some pests and diseases simultaneously	52	30	63	85
	b. cost-saving effort by mixing expensive pesticide and the cheap one	4	19	10	8
	c. trial and error show that the result of mixing pesticides is more effective than the use of single pesticide	6	-	-	3
	d. time and labor-saving	38	48	23	3
10	Actions taken when there is labor shortage:				
	a. Maximize family labor	48	44	50	83
	b. take turn with other farmers in using the available labor	30	33	17	7
	c. look for hired labor from outside the village	22	22	33	10
11	Actions taken if there is capital shortage:				
	a. borrowing from formal institution	24	48	53	38
	b. borrowing from informal institution	60	48	43,3	62
	c. selling some assets	16	33	3,3	-

were: 1) farmers did not revoke, for it could damage roots from surrounding plants and the worries for spreading disease inside; 2) farmers revoked and replanted with the condition that the crop was under

10 days old. If the crop was more than 10 days old, they did not do replanting, for said crop growth would not be the same as others; and 3) they did revoke, but did not do replanting because it

Table 4. Ex Post Risk Management Strategy

No	Description	Bantul (2 time/year) in percentage		Nganjuk (time/year) in percentage	
		Wet land (n=50)	Coastal sandy (n=27)	2 (n=30)	≥3 (n=60)
1	The status of shallot farming in supporting the family:				
	a. fully depends on income from shallot farming	-	-	-	5
	b. mostly depends on income from shallot farming	84	89	100	95
	c. partly depends on income from shallot farming	16	11	-	-
	d. does not depend on income from shallot farming	-	-	-	-
2	If shallot farming fails, the effort to support the family will come from:				
	a. income from other farming	34	59	23	7
	b. to take saving	10	7	7	13
	c. borrowing money from other farmers or other sources	8	15	13	42
	d. looking for additional job	44	19	33	15
	e. selling some assets	4	-	23	23
3	If there is a loss in shallot farming, actions taken for funding the next planting:				
	a. the size of next planting is adjusted to the available capital	18	15	20	5
	b. adding capital by using part or all of the saving	16	19	-	13
	c. adding capital by selling some assets	18	15	13	20
	d. adding capital by borrowing money	44	48	30	22
	e. borrowing inputs from shops	4	4	37	40
4	Actions taken following the failure of shallot farming:				
	a. stop cultivating shallot because of the fear repeating the loss	-	-	-	-
	b. keep cultivating shallot and trying to look for the cause of failure	98	96	90	95
	c. keep cultivating shallot and without trying to look for the cause of failure	-	-	-	5
	d. just cultivating on time or safe growing season	2	4	10	-

would cause difference in plant growth.

There was a difference in planting distance between growing season in Bantul caused by monoculture intercropping system. In monoculture, most farmers used close plant spacing, although it was also influenced by the size of shallot seeds.

All coastal sandy land farmers used organic fertilizers derived from animal manure, while only a few wetland farmers use it. If they used organic fertilizers, they used manufactured organic fertilizers, such as Petroganik. Even for farmers in Nganjuk who cultivated shallot three times or more in year, there were only 15 percent farmers used organic fertilizer.

In terms of the amount of fertilizer used, there were farmers who used the same type of fertilizer, but at different amount. The doses in the rainy season usually reduced, especially N (Nitrogen). Organic fertilizers derived from animal manure had the ability to store water too much and long. There were also farmers who used different types and

quantities of fertilizer. They did that because of the reason mentioned. On the other hand, farmers in Nganjuk, especially those who planted shallot twice year, would add ZA and KCl in the second growing season in order to avoid porous, for shallot will be stored in long-term (5-6 months preparation for seed on first growing season the following year).

On the issue of capital, most farmers in Bantul used capital from Baitul Maal Wa Tamwil (BMT), while farmers in Nganjuk used capital from Bank Rakyat Indonesia (BRI). According to farmers, borrowing money in BMT was more flexible in terms of collateral and maturity. BMT provided a lag return time at the time of harvest, and if the crop failed, it could be restate and they only had to pay for the administrative costs.

Informal institutions were utilized by farmers if the capital from neighbour, brother, farmer groups, or input agricultural stores was lacking. Researchers did not find a system of *ijon* (the system of purchasing crops while it was still green and taken at harvest

time) by middlemen. Form of a loan from agricultural input store was inputs purchased after harvest but it was more expensive than by cash. The debt from agricultural inputs store was mostly done by farmers in Nganjuk.

Farmer groups in Nganjuk also had a function to give credit facility inputs, especially chemical fertilizers. The system used was similar to agricultural input store that was more expensive (dispute of IDR 5000 per sacks) with payment time at harvest. Otherwise, farmers' groups in Bantul provided capital loans to farmers in the form of cash, but in a very limited nominal.

d. Ex Post Risk Management Strategy

In the event of crop failure, even though farmers have carried out ex ante and interactive risk management strategy, the only option that could be done to overcome the problem of farming was ex-post risk management strategy. Several strategy done by farmers were: a) covering family needs by revenues from other farming; b) finding other occupation; c) selling assets.

According to farmers, shallot farming provided great revenue expectations that become the basis of most of the family income. They would grow shallot constantly in the next period despite the failure in the previous period.

If there were losses, farmers in Bantul who cultivated shallot constantly in which the dominant strategy done was by borrowing cash from formal institutions (preferably BMT) or family relatives. Otherwise, most farmers in Nganjuk would borrow input from agricultural input store. Many stores provided loan capital inputs to farmers in the with the purchasing system after harvest but the price was more expensive than cash.

CONCLUSION

According to farmers' perceptions, shallot had a high risk in production and prices. Perception of farmers on farming failures included the instability achieved production and financial losses that were caused by fluctuative price. Farmers' decision to follow the dominant cropping pattern and production system reflected ex ante risk management strategies done by farmers as their own respectation. In the interactive risk management strategies, farmers tended to use chemical fertilizers which its impact to production was instantly faster than organic fertilizer. In the control of pests and disease, farmers tended to use chemical pesticides by mixing and spraying based on calendar system. Ex post management

strategisis related to each other if the failure in shallot farming to some extent considered to disturb the source of family income and business continuity, then several strategy done by farmers were a) covering family needs by revenues from other farming; b) finding other occupation; c) selling assets.

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