

A feasibility study on cultivating shallots (*Allium ascalonicum* L) in Selo District, Boyolali Regency, Indonesia

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A Feasibility Study on Cultivating Shallots (*Allium Ascalonicum* L) in Selo District, Boyolali Regency

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Abstract. The success of agricultural enterprises is closely related to various factors, including climate change that cannot be controlled by humans. Climate greatly affects the risk of horticultural production, one of which is shallot. The purpose of this study was to determine the income, profits of farmers, and the feasibility of cultivating shallot plants in the highlands of Selo, Boyolali. This research was conducted in Senden Village, Selo District, Boyolali Regency. The basic method used in this research is descriptive. Methods of data collection using questionnaires and observations. The results of the research showed that the total cost was Rp. 7,754,932.53, the revenue is Rp. 14,566,666.67, and the income is Rp. 8,064,783.3. The result showed that the shifting of seeds during the high intensity of rainfall in Selo District, Boyolali Regency was feasible to be developed. The findings also showed that there are simple ways of shallot cultivation to respond to climate change. Most costs are spent on buying shallot seeds. To reduce the cost of production facilities, farmers are expected to be able to make their shallot seeds so that profits can be maximized.

1. Introduction

The objective of agricultural development was directed at increasing agricultural production to meet food needs and domestic industrial needs, increase food needs and domestic industrial needs, increase exports, increase farmers' income, expand employment opportunities and encourage the equal distribution of business opportunities [1]. Agricultural development also contained land use the highlands and lowlands have their uses and characteristics in their use. Recently in Indonesia, the temperature increase in the dry season was more significant than that of the wet season. Moreover, precipitation from June to September is the wet season markedly increased. These changes in flow were closely related to climate change[2].

Shallots are one of the horticultural plants used as an ingredient that cannot be separated from the daily cooking of all Indonesians. Shallots are a vegetable commodity that has high economic value, both in terms of meeting national consumption, a source of income for farmers, and its potential as a source of foreign exchange [3]. Selo Subdistrict is the second-largest shallot producer in Boyolali Regency. The problem that farmers often face recently was in June to September there is still high intensity of rain fall[4]. So that they are shifting their seeds from Brebes seed into Balinese seeds. Although the Balinese type of shallot has a low price in the market, farmers start to cultivating it, because the Bali type of shallot is suitable for planting in the highlands and high humidity. Economically, the shifting of changing production input seeds must be feasible for the farmer[5]. The shifting of the seeds will affect the input production costs and labor costs incurred by farmers for cultivating shallots. From the problems above, it was necessary to know the shallot farming after the shifting use of Brebes seeds into Balinese seeds.

2. Method

Research This was carried out from May to October 2018 for shallot farmers in Senden Village, Selo District, Boyolali Regency. The sampling method used was purposive or deliberately as many as 30 farmers who are members of the Agro Utamaning Tani farmer group which has a land area of between 1000 - 3000 m². The method used in this research is observation, which is direct observation involving the five senses, namely directly observing the place to be used as research, then conducting interviews using a questionnaire and as a primary data collection aid. Data were analyzed using:

2.1 Break-Even Point

$$a. \text{ BEP Revenue (Rp)} = \frac{FC}{1 - \frac{VC}{R}}$$

Note :

FC: Fixed costs

VC: Variable costs

R: Revenue

$$b. \text{ BEP of production (kg)} = \frac{FC}{P - AVC}$$

Note :

FC: Fixed costs

P: Production price

AVC: Variable cost per unit

$$c. \text{ BEP Price (Rp / Kg)} = \frac{TC}{Y}$$

Note :

TC: Total cost

Y: Total production

2.2 Appropriateness Analysis

$$R / C \text{ Ratio: } \frac{TR}{TC}$$

Note :

TR: Total Revenue (Rp)

TC: Total Cost

2.3 Capital Productivity

$$\mu / C \text{ ratio: } \frac{\mu}{TC}$$

Note :

μ : Benefit

TC: Total cost

If obtained:

The value of μ / C ratio > the prevailing bank interest rate means that the business is feasible.

If the value of μ / C ratio \leq the bank interest rate applies, the business is not feasible [6], [7].

2.4 Labor productivity

$$\text{Labor productivity} = \frac{R}{\sum HOK}$$

Note :

R: Total Revenue

\sum HOK = Total labor used.

If obtained:

TK productivity value > prevailing wage level, the business is feasible.

The productivity value of TK \leq at the prevailing wage level means that the business is not feasible[8].

2.5 Price Change Analysis

$$\text{Price Change} = \frac{100}{P} \times \text{BEP price}$$

Information :

P: The selling price of shallots at the farmer level.

3. Results and Discussion

3.1 Respondent Identity

Based on the research, it is known that the respondent farmers in this study have an age range of 30-75 years. Most of the respondent farmers are in the productive age group. This age indicates that there are opportunities for improvement in the application of technology and innovation. Based on the research, it is known that most of the respondents are junior high school graduates. It is known that the average education of the respondent farmers is still low, the farmers lack awareness of the importance of education. Because education is very influential on new things and decision making regarding the farming being undertaken[9]. The higher the education, the faster the farmers will accept innovation[10].

A large number of dependents in the family affects the head of the family in working to meet the needs of his family. In addition, the number of family dependents also shows a large number of at least the number of workers in the family who help the farming process. Productive age family members who help the farming process will reduce the costs incurred by farmers to pay for labor outside the family. Ownership of land area with a vulnerability of 0.1 - 0.15 ha is 30% with the number of owners of 9 people, 0.16 - 0.2 ha of 43.33% with the number of owners of 13 people, 0.21 - 0.25 ha of 16.66% with the number of owners of 5 people, and ownership of land area with a vulnerability of 0.26 to 0.3 ha of 10% with the number of owners of 3 people.

3.2 Use of Production Facilities and Red Onion Farming Labor.

Table 1. The Average Cost of Production Facilities in Onion Farming in Senden Village, Selo District, Boyolalli Regency in 2018.

No.	Description	Farming (0.19 Ha)		Per Hectare	
		Physical	Rp	Physical	Rp.
1	Seed (Kg)	254.5	3,817,500.00	1,339.47	20,092.10
2	Fertilizer				
	- ZA (Kg)	294.16	260,166.70	1,548.21	1,369.29
	-Quail dirt	33.56	807,500.00	176.63	4,250,000.00
	-Leaf Fertilizer (kg)	2.13	66,166.67	11.21	348,245.63
3	Pesticide				
	-Prevantone (l)	1.15	80,500.00	6.05	423,684.21
	-Curacron (l)	0.86	58,566.67	4.52	308,245.63
4	Gasoline (l)	1.20	10,800.00	6.31	56,842.10
5	Mulch (roll)	2.34	381,600.00	12.31	2,008,421.05

amount	5,432,800.00	28,593,684.2
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Based on the analysis from the table above, the most incurred cost was for the purchase of shallot seeds, namely Rp. 3,817,500 this is because farmers cannot produce their seeds, therefore farmers have to pay for the purchase of seeds while the least amount spent is for the purchase of curacron pesticides, namely Rp. 58,566.67, and the average use of farming for one shallot cultivation period with a land area of 0.19 hectares requires a cost of Rp. 5,432,800.

Table 2. Average Costs of Onion Farming Outside Family Employment in Senden Village, Selo District, Boyolali Regency in 2018

No.	Description	Farming (0.19 Ha)		Per Hectare	
		Physical	Rp.	Physical	Rp.
1	Soil Processing	1.58	391,666.67	8.31	2,061,403.53
2	Guludan Making	3.10	279,000.00	16.31	1,468,421.05
3	Mulch Installation	0.87	91,750.00	4.57	482,894.73
4	Planting	0.80	74,666.70	4.21	392,982.63
5	Weeding	0.14	13,600.00	0.73	71,578.94
6	Fertilization 1	0.22	18,250.00	1.15	96,052.63
7	HPT Control 1	0.20	18,750.00	1.05	98,684.21
8	HPT Control 2	0.20	18,750.00	1.05	98,684.21
9	HPT Control 3	0.20	18,750.00	1.05	98,684.21
10	Harvest	1.56	144,500.00	8.21	760,526.31
	amount	21.18	1,069,083.33	46.64	5,626,754.37

Based on the data analysis above, the average use of TKLK (Outside Family Workers) for one planting period of shallot farming with a land area of 0.19 Ha which incurs the most costs is in land cultivation, namely 1.58 HKO of Rp. 391,666, 67 because the sample farmers have used tractors to cultivate their land and this is done by workers outside the family. Farmers use tractors with a rental system per day. The average use of farming for one planting period with a land area of 0.19 hectares requires a cost of Rp. 1,069,083.33.

Table 3. Average Cost of Domestic Workers in Onion Farming in Senden Village, Selo District, Boyolali Regency in 2018

No.	Description	Farming (0.19 ha)		Per Hectare	
		Physical	Rp	Physical	Rp
1.	Soil Processing	0	0	0	0
2.	Guludan Making	1.16	105,000.00	6.10	552,631.57
3.	Mulch Installation	2.02	204,916.67	10.63	1,078,508.79
4.	Planting	2.02	185,000.00	10.63	973,684.21
5.	Weeding	2.02	185,000.00	10.63	973,684.21
6.	Fertilization 1	0.72	61,250.00	3.78	322,368.42
7.	Fertilization 2	0.85	72,500.00	4.47	381,578.94
8.	HPT Control 1	0.46	41,375.00	2.42	217,763.15
9.	HPT Control 2	0.46	41,375.00	2.42	217,763.15
10.	HPT Control 3	0.46	41,375.00	2.42	217,763.15
11.	Harvest	2.06	189,000.00	10.84	994,736.84
	amount	12.26	1,126,792.00	64.52	5,930,484.21

Based on the data analysis above, the use of TKD (Domestic Workers) for one growing season of shallot farming with an average land area of 0.19 Ha. The manpower for installing mulch incurred the most costs, namely HKO 2.02 in the amount of Rp. 204.917 because after

installing the mulch the farmers have to classify the mulch to plant shallots, so the mulch classification is calculated from the mulch installation expenditure. The labor wage applicable in Senden Village, Selo District, Boyolali Regency is Rp. 90,000 / HKO. Even though using labor in the family, the amount of cost which is the expense in shallot farming is also calculated and is included in the calculated costs. The total internal labor cost is Rp. 1,126,792.

Table 4. Depreciation of Agricultural Equipment Per One Planting Period in Onion Farming in Senden Village, Selo District, Boyolali Regency in 2018

No.	Description	Farming		Per Hectare	
		Physical	Rp	Physical	Rp
1.	Hoe	2	26,600.00	10.52	140,000.00
2.	Spray Tool	1	18,875.67	5.26	99,345.63
3.	Tax		499.16		2,627.15
	amount		45,974.16		241,969.24

The hoe was used by farmers for the manufacture of mounds while the spray tool functions as a tool for applying a certain amount of active pest-fighting ingredients to onion plants. The average total cost of depreciation of onion farming tools is Rp. 45,974.16 and the hoe is the equipment that has the highest depreciation cost. The calculation of this depreciation cost by calculating the purchase value minus the residual value then divided by the economic age of the object, the analysis shows that the hoe has the highest depreciation value of Rp. 26,600. Meanwhile, the smallest depreciation value is tax, which is Rp 499.16.

Table 5. Average Costs in Onion Farming per One Planting Season in Senden Village, Selo District, Boyolali Regency in 2018

No.	Description	Farming	Per Hectare
		Rp	Rp
1	Production input costs	5,432,800.00	28,593,684.20
2	Outside Family Labor Costs	1,069,083.00	5,629,752.63
	amount	6,501,883.30	34,220,438.40

From table 5 it is known that the total costs incurred for one planting season with an average land area of 0.19. The total cost in shallot farming consists of input costs, namely the cost of seeds, fertilizers, pesticides, and mulch. The cost of labor is labor outside the family which is the cost paid by farmers in shallot farming. Meanwhile, labor in the family is a cost calculated in shallot farming. The supporting tools in shallot farming are included in the depreciation cost because the tools are not used up. The total cost incurred is Rp. 6,501,883.3 with the largest expenditure on production facilities of Rp. 5,432,800, and the smallest expense, namely for the cost of labor outside the family, which is Rp. 1,069,083.

3.3 Analysis of Revenue and Income of Onion Farming One Planting Season

3.3.1 Revenue onion farming

Table 6. Shallot Farming Revenue Per One Planting Season Utamaning Agro Farmer Group of Senden Village, Selo District, Boyolali Regency 2018

No.	Description	Farming (Rp)	Per Hectare (Rp)
1	Production Price (Rp / Kg)		8,000.00
2	Total Production (Kg)	1,820.83	9,583.31
3	Total Revenue	14,566,666.67	76,666,666.70

Revenue from shallot farming is received by farmers in one planting period with an average land area of 0.19 hectares. From the primary data analysis, it is known that the selling price of shallots at the time of research was Rp. 8000, which determines the price is collectors then for the average shallot farming production of 30 respondent farmers is 1,820.83 Kg with a production range between 900 - 3,000 Kg with a total income of Rp. 14,566,666.67.

3.3.2 *Income onion farming*

Table 7. Onion Farming Income Per One Season in Senden Village, Selo District, Boyolali Regency 2018

No.	Description	Farming Rp	Per Hectare Rp
1.	Total Revenue	14,566,666.67	76,666,666.70
2.	Expenses	6,501,883.30	34,220,438.40
3.	Total income	8,064,783.33	42,446,228.10

In carrying out shallot cultivation, there is income received by farmers as a result of production. The revenue is the harvest of shallots. Expenditures are also issued by farmers in carrying out shallot farming. Expenditures are costs including fixed costs and variable costs. Fixed costs, namely depreciation costs, including depreciation of agricultural equipment and depreciation of agricultural land taxes. Meanwhile, variable costs are costs for production facilities and labor. The total income of respondent farmers in Senden Village, Selo District, Boyolali Regency is Rp. 8,064,783, 33 this result is total revenue subtracted from all costs or total costs incurred by farmers or non-fixed costs with a harvesting age of 3 months so that the average income of the respondent farmers is Rp. 8,064,783.33. Total income itself is often referred to as profit.

From table 8 analysis for one-time shallot farming with an average land area of 0.19 Ha, there are several costs incurred. These costs include fixed costs and variable costs. The fixed costs include the depreciation cost of the equipment used in shallot farming and the land tax used in shallot farming. Meanwhile, the variable costs include shallot seeds, fertilizers, pesticides, mulch, and labor. In variable costs, some costs are calculated by the farmer, which means costs that are not incurred by the farmer but are calculated in the cost of farming. The cost that is calculated is the cost of labor in the family. The total cost of farming is Rp. 7,754,932.53 and revenue of Rp. 14,566,666.67, and an income of Rp. 8. 064,783.3 This income is the result of a reduction in revenue with variable or calculated costs while the total profit is Rp. 6,892,017.47.

Table 8. Analysis of Shallot Farming in the Utamaning Agro Farmer Group of Senden Village, Selo District, Boyolali Regency in 2018

Description	Physical	Depreciation	The amount of costs
a. Variable cost			
1. Seed (Kg)	254.50		3,818,500.00
2. Fertilizer			
- ZA (Kg)	294.17		260,166.70
- Quail Manure (Kg)	33.57		807,500.00
- Leaf Fertilizer (Kg)	2.13		66,166.67
3. Pesticides (ml)			
- Prevaton (ml)	1.15		80,500.00
- Curacron (ml)	0.86		58,566.67
4. Gasoline (liter)	1.20		10,800.00
5. Mulch (roll)	2.34		381,600.00
6. Family Worker (TKK)	12.26		1,126,792.00
7. Outside Labor (TKL)	8.91		1,069,083.00
amount			7,708,958.37
b. Fixed cost			
1. Hoe	1.00	26,600.00	356,666.67
2. Spray tool	1.00	18,875.00	505,333.30
3. Tax		499.16	9,983.33
amount		45,974.16	
Total			7,754,932.53
c. Revenue			14,566,666.67
d. Income			8,064,783.30
e. Profit			6,892,017.47

3.4 Feasibility of Onion Farming for One Planting Season

Table 9. Feasibility of Onion Farming for One Planting Season in Senden Village, Selo District, Boyolali Regency 2018

No.	Description	Per UT
1.	BEP Receipt (Rp)	95,779.50
2.	BEP Production (Kg)	12.07
3.	BEP Price (Rp)	4,259.09
4.	R / C Ratio	1.87
5.	π / C ratio (%)	88.00
6.	Labor Productivity (Rp)	687,755.74
7.	Price changes (%)	53.23

BEP for shallot farming revenue for one planting season is Rp. 95,779.5 less than the revenue of shallot farming of Rp. 14,566,666.67. In other words, every revenue of Rp. 95,779.5 means that the farm does not get a loss or profit and it can be said that it is feasible to be cultivated. BEP production of 12.07 Kg which means that in shallot farming in one planting season there will be no loss because the amount of production is equal to 1820.83 Kg > BEP, which means that farmers get profit and it can be said that the farming is feasible to be operated. BEP price for shallot farming in one growing season is Rp. 4,259.09 / Kg. This means that the selling price of shallots is Rp. 4,259.09 / Kg farmers do not get profit, so the selling price should be higher than that price. In the research area in Senden Village, Selo District, Boyolali Regency, the selling price of shallots is Rp. 8000 > BEP, which means that the respondent farmers get benefits and can be said to be feasible to be cultivated [5].

An R / C ratio of 1.87 means that each cost is Rp. The 1.00 spent will yield Rp. 1.87. Based on the criteria that farming can be said to be feasible to be cultivated if it has an R / C value of ≥ 1 [11], then shallot farming in Senden Village, Selo District, Boyolali Regency can be said to be feasible to be cultivated. π / C ratio of 88% > the bank interest rate in effect in August 2018 was 7% at the local BNI KUR, based on the criteria μ / C ratio > the prevailing bank interest rate, the

business is feasible to run, thus shallot farming in Senden village, Selo sub-district, Boyolali district is said to be feasible to work on.

From table 9 it can be seen that the labor productivity of Rp. 687,755.74 and the prevailing wage rate per HOK of Rp. 90,000 so it can be concluded that labor productivity > the prevailing wage level, based on the test criteria if labor productivity > the prevailing wage level is said to be feasible, then shallot farming in respondent farmers in Senden Village, Selo District, Boyolali Regency is feasible to be cultivated. The 53.23% change in price can be concluded that farming can be said to be feasible if there is a decrease in the product price or an increase in the production price of 53.23% then it will not cause a loss and if the price reduction exceeds 46.77%, the farmer will suffer losses.

4. Conclusion

The amount of farming costs from 30 samples of farmers in shallot farming for one planting period in Senden Village, Selo District, Boyolali Regency is Rp. 7,754,932.53, -, resulting in a revenue of Rp. 14,566,666.67, resulting in an income of Rp. 8,064,783.33 and get a profit of Rp. 6,892,017.47. The result showed that the shifting of seeds during the high intensity of rainfall in Selo District, Boyolali Regency was feasible to be developed. The findings also showed that there are simple ways of shallot cultivation to respond to climate change. Most costs are spent on buying shallot seeds. To reduce the cost of production facilities, farmers are expected to be able to make their shallot seeds so that profits can be maximized.

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