Income Analysis and Break-Even Point of Mustard (*Brassica juncea* L.) business: A Case Study of the LubukMakmur and TaniMakmur Farmer Groups in Mugirejo Village, Samarinda City, Indonesia

ABSTRACT

Horticulture is a field that has great potential to be developed in the agricultural sector, because it has advantages that are much higher than other commodities, such as high economic value and significant added value. The prospects for farming in Samarinda City have good prospects and most vegetable farmers rely on income from mustard farming.The research aims to analyze production costs and receipts as well as income from mustard greens farming in Mugirejo Village, Sungai Pinang District, Samarinda City. This research was conducted for four months starting from March 2024 to June 2024. The research was conducted at the LubukMakmur and TaniMakmur Farmers Groups, Mugirejo Village, Sungai Pinang District, Samarinda City. The method used in sampling was purposive sampling with a sample size of 22 respondents. The data analysis method used was an analysis of production costs, revenues, income, and BEP. The results of this study indicate that the duration of mustard cultivation from land preparation to harvesting in one mustard planting season is 40 days, with a planting area of 0.755 m2 or 0.034 ha, farmers spend production costs to run mustard farming activities of IDR 1.269.916,63 respondents^{-1}planting season^{-1} or IDR 40.976.680,00 respondents^{-1}planting season^{-1}ha^{-1}. The average income received by mustard farmers is IDR2.642,471.59 respondents^{-1}planting season^{-1} or IDR 85.419.034,09respondents^{-1}planting season^{-1} ha^{-1}. The average income received by farmers in running mustard farming in the research area is IDR1.372.554,96 respondents^{-1}planting season^{-1} or IDR39.994.979,00 respondents^{-1}planting season^{-1} ha^{-1}. The BEP selling price and BEP production volume of mustard farming in Mugirejo Village are respectively IDR8,696.39 kg^{-1} and 81.20 kg^{-1}. The BEP value is smaller than the average selling price and production values, so it can be concluded that mustard farming is profitable.

Keywords: Farming, Income, BEP, Mustard, Farmer Groups.

1. INTRODUCTION

The agricultural sector has an important role in strengthening the national economy. The ever-increasing demand for agricultural products, including food, encourages farmers to increase production to meet market needs. The importance of the agricultural sector is one of the components of national development in improving community welfare. One way is to realize community welfare through economic development and focusing special attention on the agricultural sector. The development of the agricultural sector must be able to protect its productive resources, for example maintaining soil fertility, protecting surface and ground water supplies, and being able to adapt to climate change. Therefore, it is necessary to develop a sustainable agricultural model. [1] stated that sustainable agriculture is a solution or anticipatory step in overcoming global climate impacts and also has broader goals because agriculture must contribute to the sustainability of large areas and social communities.

One agricultural sector that has great potential to make a significant contribution to the economy is horticulture. Horticulture is a field that has great potential for development in the agricultural sector, because it has advantages that are much higher than other commodities, such as high economic value and significant additional value. Another advantage of horticulture is that

it also has a big impact on welfare and health, as well as increasing income for both farmers and non-farmers. This makes horticultural crops an important choice for all levels of society, both for consumption and as a source of income [2].

Vegetable production in East Kalimantan is dominated by several types of vegetables, one of which is mustard greens. In 2022, Balikpapan, KutaiKartanegara, and Samarinda will be the 3 regions in East Kalimantan with the highest mustard greens production. Mustard greens production in Samarinda City in 2022 is 552.72 tons. The mustard harvest area in Samarinda in 2022 will be 87.95 ha with a productivity of 6.28 tons/ha. This shows that the mustard commodity has great potential to be developed to support farmers' income in the Samarinda region [3].

Farming in Samarinda City has good prospects and most vegetable farmers rely on income from mustard greens farming. Sungai Pinang District is one of the agricultural production centers in Samarinda City, Mugirejo Village is one of the horticultural production centers with the production of various types of vegetables, one of which is mustard greens. Production of mustard greens in Mugirejo is the largest among other types of vegetable crops. The number of vegetable farming groups in this sub-district is 8 farmer groups with 126 farmers joining them.

The problems often faced by mustard greens farmers in Mugirejo Village are the high level of damage to vegetables caused by pests and diseases, harvest and post-harvest handling that is not yet optimal, and climate change which can affect farmers' income from mustard farming. Production and selling prices required for farmers to reach the break-even point, it is necessary to calculate the Break Even Point (BEP) which is an important tool in measuring the feasibility of farming. BEP analysis can provide farming owners with information regarding several levels of sales volume and their relationship with the possibility of making a profit or gain according to the level of sales in question [4]. In the context of mustard greens farming, BEP analysis becomes increasingly relevant considering the increasingly tight market competition and high price fluctuations. , and increasing production costs.

The research aims to analyze production costs and receipts as well as income from mustard greens farming in Mugirejo Village, Sungai Pinang District, Samarinda City.

2. RESEARCH METHODS

2.1. Time and Place

The research was carried out from March - June 2024 at the LubukMakmur and TaniMakmur Farmer Groups, Mugirejo Village, Sungai Pinang District, Samarinda City, East Kalimantan, Indonesia.

2.2. Method of collecting data

The data collected consisted of primary data obtained through direct observation and interviews with farmers, namely production and sales data for 2 growing seasons; and secondary data obtained from agencies, village profiles, or related parties in research and literature studies, such as books, journals, and also theses.

2.3. Sampling Method

The sampling method used was purposive sampling; The farmer groups selected are farmer groups that are active and match the criteria required as a sample [5]. The total sample was 22 farmers who were actively cultivating mustard greens in the last 1 year, consisting of 11 respondent farmers in the LubukMakmur Farmer Group and 11 respondent farmers in the Makmur Farmer Group who planted mustard greens.

2.4. Data analysis methods

2.4.1. Production cost

Production costs are all costs incurred by farmers to process agricultural products. Mathematically the total cost can be calculated using the following formula [6]:

$$TC=TFC+TVC$$

Note: TC = Total Cost) (IDRplanting season^{-1}); TFC = Total Fixed Cost (IDRplanting season^{-1}); and TVC = Total Variable Cost (IDRplanting season^{-1})

2.4.2. Revenue

Revenue was obtained by multiplying the production obtained by the selling price. This is stated in the following formula [7]:

$$TR=P \times Q$$

Note: TR = Total Revenue (IDRplanting season^{-1}); P = Price (IDR kg^{-1}); and Q = Quantity (kg planting season^{-1}).

2.4.3. Income

Income was the difference between receipts and all costs. This is expressed by the following formula [8]:

$$I=TR-TC$$

Note: I = Income (IDRplanting season^{-1}); TR = Total Revenue (IDRplanting season^{-1}); andTC = Total Cost (IDRplanting season^{-1}).

2.4.4. Break Event Point (BEP)

BEP is calculated using the following formula [9]:

2.4.4.1. BEP selling price (IDR kg^{-1}) = TC : Y

Note: BEP selling price = Break Event point (IDR kg^{-1});TC = Total Cost (IDR);and Y = Total Production (kg)

2.4.4.2. BEP production volume (kg) = TFC : (P – VC)

Note:BEP production volume (kg planting season^{-1}); TFC= Total fixed costs (IDR); P Selling price per product (IDR kg-1); and VC = Variable costs per product (IDR kg^{-1}).

3. RESULTS AND DISCUSSION

3.1. General description of the LukburMakmur Farmers Group and the Makmur Farmers Group

The LubukMakmur Farmers Group was formed in 2005 with around 60 farmers as members, but in 2010 this farmer group was divided into two groups, namely the LubukMakmur Farmers Group and the Makmur Farmers Group. The LubukMakmur Farmers Group has 24 farmers as members, while the Makmur Farmers Group has 17 members. All members of the LubukMakmur Farmers Group and the Makmur Farmers Group cultivate vegetables, the types of vegetables cultivated consist of mustard greens, kale, spinach, celery, cucumber, and papaya.

Some of the farmers from both farmer groups are beef cattle breeders, they implement a system of integrating cattle with vegetables, apart from being farmers, members of the farmer groups also have side jobs or main jobs as livestock breeders, construction workers, and RT heads.

3.2. Respondent Characteristics

Respondent characteristics based on primary data include:

3.2.1. Respondent's age

Age influences the farmer's ability to carry out his farming business. In general, younger farmers tend to have stronger physique and energy than older ones. However, older farmers usually have more experience and are receptive to implementing the latest innovations. Data on the age of respondents is 18 people aged 33 – 64 years (82.00%) and 4 people aged > 64 years (18.00%).

3.2.2. Level of education

Education is a determining factor that can influence farmers in managing their farming. The level of education will influence the farmer's ability to absorb new information or new technology in the agricultural sector, as well as an important factor in increasing insight and work skills. The educational level of the respondent farmers is: 4 people (18.18%) have not completed elementary school, 9 people have completed elementary school (40.91%), 3 people have not completed elementary school (13.64%), 6 people have completed high school (27.27%). %).

3.2.3. Number of family dependents

The number of family dependents is one of the factors that will influence farmers in managing their farming business and a person's decision to work. The number of dependents of farmers determines the number of farmers, both for food, clothing, shelter, and other needs. Respondent data is based on the number of family dependents, namely the largest number of dependents ranges from 1-3 people (68.18%) and the smallest number of dependents ranges between 4-6 people (31.82%). This shows that in this research area, there are still many needs that must be met by farmers for their family members.

3.2.4. Length of farming experience

Length of farming experience plays a role in adapting farmers to keep their farms in line with the latest advances in agricultural technology. The length of farming experience that farmers have usually makes them more skilled in the farming business they are currently running. Respondent data is based on the length of the respondent's farming experience, namely that the range of respondents' experience in mustard greens farming ranges from 5 years to 35 years with an average of 19 years. The farming experience of respondents who have the highest amount of farming experience is in the 11-15 years group (31.82%), and there are 3 people with 5-10 years of farming experience (13.64%), 11-15 years there are 7 people (31, 82%), 16-20 years there are 4 people (18.18%), 21-25 years there is 1 person (4.44%), 26-30 years there are 6 people (27.27%) and 31-35 years there is 1 person (4.55%).

3.2.5. Land ownership

Farmers' land ownership consists of their land, leased and rented. Respondent data is based on land ownership, namely 8 people own land (36.36%), 10 people borrow and use land (45.45%), and 4 people rent land (18.18%).

3.2.6. Land area

The land area owned by farmers in the research area varies greatly, starting from 400-4000 m^2, with the land area used for mustard farming activities ranging from 150-600 m^2. Not all of the existing land area is used for cultivating mustard greens, this is because there is cultivation of other types of vegetable plants such as kale, spinach, celery, cucumber, and papaya, so the planting area is shared with other types of vegetable plants, which causes the planting area for mustard greens to be small. The range of mustard planting area ranges from 100-600 m^2 with an average of 343.18 m^2. The highest percentage of respondents planted with mustard greens with a

land area ranging from 100-200 m^2 was 36.36%, while the percentage of land area planted with mustard greens at least 401-500 m^2 was 9.09%.

3.3. General Description of Mustard Green Farming

The stages of mustard cultivation carried out by farmers in the research area are (1) land processing; (2) nursery; (3) planting; (4) maintenance includes watering, fertilizing and spraying pesticides on plants; and (5) harvesting mustard greens is carried out 15-20 days after planting, the mustard greens that have been cleaned are then tied using rubber bracelets with the size of 1 bunch 200 - 300 gr, after that the mustard greens are sold to middlemen.

3.4. Mustard Farming Production Costs

Production costs consist of fixed costs and variable costs. Fixed costs include equipment depreciation costs and land rental costs, while variable costs include seed costs, fertilizer costs, pesticide costs, and other costs. Revenue is the average production and selling price of mustard greens farming in 2 planting seasons. The results of the analysis of production costs and revenues are presented in Table 1.

Table 1. Description of production costs and income from mustard farming

No	Cost Description	Total (IDR mt^{-1})	Average (IDR $responden^{-1}$ mt^{-1})
1	Production costs		
A	Fixed costs		
	Equipment depreciation costs	1.169.416,67	53.155,30
	Land rental costs	216.666,67	54.166,67
	Fixed Cost Amount	1.386.083,34	107.321,97
B	Variable Costs		
	Seed costs	882.000,00	40.090,91
	Fertilizer costs	6.920.250,00	314.556,82
	Pesticide costs	105.832,50	4.810,57
	Labor costsKerja	17.569.625,00	798.619,32
	Other costs	99.375,00	4.517,05
	Total Variable Costs	25.577.082,50	1.162.594,66
C	Total Production Costs	26.963.165,84	1.269.916,63

Source: Primary Data (processed), 2024. mt = planting season

The costs incurred by respondents to carry out farming consist of fixed costs and variable costs. The total costs incurred by respondents in the study were IDR 26,963,165.84 $planting\ season^{-1}$ with an average of IDR 1,269,916.63 $respondents^{-1}planting\ season^{-1}$ if converted to hectare units with an average planting area of 0.034 ha then the total costs were IDR 40,976,680.00 $respondents^{-1}planting\ season^{-1}$ ha^{-1}.

3.5. Mustard Farming Revenue

Revenue is the average production and selling price of mustard greens farming in 2 planting seasons. The results of the acceptance analysis are presented in Table 2.

Table 2. Revenue from mustard farming

No	Cost Description	Total (IDR mt^{-1})	Average (IDR $responden^{-1}$ mt^{-1})
	Production (kg mt^{-1})	3.100,50	140,93
	Price (IDRkg^{-1})	18.750,00	18.750,00
	Revenue (IDR mt^{-1})	58.134.375,00	2.642.471,59

Source: Primary Data (processed), 2024. mt = planting season

Based on Table 2, shows that the selling price of mustard greens is IDR 18,750.00 kg^{-1} with total mustard production on a planting area of 0.755 ha of 3,100.50 kg planting $season^{-1}$ with an average of 140.93 kg $respondents^{-1}$planting $season^{-1}$ and the average planting area 0.034 ha. The productivity of mustard greens on an area of 1 ha is 4.11 tons ha^{-1}. Based on this, the total income from mustard greens is IDR 58,134,375.00 planting $season^{-1}$with an average of IDR 2,642,471.59 $respondents^{-1}$ planting $season^{-1}$. If converted to hectares with an average planting area of 0.034 ha, the receipt is IDR 85. 419,034.09 respondents-1 planting $season^{-1}ha^{-1}$.

3.6. Income

Incomewas the remainder of the total revenue obtained minus the total costs. The total income of mustard greens farmers is presented in Table 3.

Table 3. Income from mustard farming

No	Description	Total (IDR mt^{-1})	Average (IDR $responden^{-1}$ mt^{-1})
1	Revenue	58.134.375,00	2.642.471,59
2	Costs Total	26.963.165,84	1.269.916,63
	Income	31.171.209,16	1.372.554,96

Source: Primary Data (processed), 2024. mt = planting season

Based on Table 3, shows that the total income in the research area is IDR 31,171,209.16 mt-1 with an average of IDR 1,372,554.96 $respondents^{-1}$planting $season^{-1}$ and if converted to hectares with an area of 0.034 ha to equalize production it becomes IDR 39,994,979.00 $respondents^{-1}$planting $season^{-1}ha^{-1}$. One mustard planting season for mustard plants is 40 days from sowing the seeds to harvesting. When compared with the income of the Women Farmers Group in Lempake Village with an average planting area of 0.06 ha by farmers in Lempake Village, it is IDR 250,527.00 $respondents^{-1}$planting $season^{-1}$or IDR 4,175,450.00 $respondents^{-1}$planting $season^{-1}$ ha^{-1} [10]. This is because in this area the production costs incurred and selling prices are lower if the production costs incurred and selling prices are lower for farmers in the research area, so it can affect income.

3.7. Break Event Point Mustard Farming

BEP is a situation where the business being run has no profit and no loss. In this data analysis, the BEP determined includes the selling price BEP and production volume BEP. The results of the break-even point analysis for mustard farming are presented in Table 4.

Table 4. Breakeven Point for Selling Price and Production Volume

No	Description	Value
1	Average Price (kg mt^{-1})	18.750,00
	BEP Selling Price (kg mt^{-1})	8.696,39
2	Average Production (kg^{-1} mt^{-1})	140,93
	BEP Production Volume (kg^{-1} mt^{-1})	81,20

Source: Primary Data (processed), 2024

Based on Table 4, the data can be converted into diagram form as seen in Figure 1.

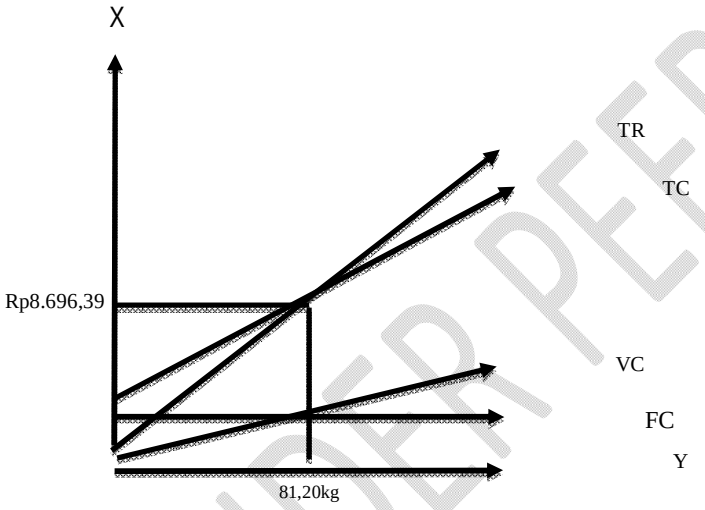

Figure 1. BEP Selling Price and BEP Production Volume in Mugirejo Village

Based on Table 4, shows that the BEP selling price in the research area is IDR 8,696.39 kg-1 and the BEP production volume is 81.20 kg planting $season^{-1}$. The BEP value is smaller than the selling price and production amount in this study, therefore it can be said that the mustard greens farming in this study experienced a profit.

The results of the research show that the BEP value for the selling price of mustard farming is IDR 8,696.39 kg^{-1}, which means that mustard farming is experiencing a state of no profit and no loss or break even because the price of mustard greens set by farmers is IDR 18,750.00 kg^{-1}. This shows that farmers have experienced profits. The research results show that the break-even BEP production volume for mustard farming is 81.20 kg^{-1}, which means that mustard farming experiences no profit and no loss or breaks even if the average production obtained is 140.93 kg, this shows that mustard farming is experiencing a profit.

When compared with the BEP, the selling price by the Prosperous Women Farmers Group in Lempake Village with an average planting area of 0.11 ha by farmers in Lempake Village is IDR 2,165.04 kg^{-1} [10]. This is because in these areas the selling price is lower so the BEP value is also lower. Next, compared with BEP, the production volume was 17.91 kg planting $season^{-1}$. This is due to lower production costs and selling prices.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. Conclusion

Based on the results of research and data analysis, conclusions are drawn, namely:

1. Production costs incurred by mustard greens farmers in Mugirejo Village are IDR 1,269,916.63 $respondents^{-1}$planting $season^{-1}$ or IDR 40,976,680.00 $respondents^{-1}$planting $season^{-1}$ ha^{-1}. The income received by mustard greens farmers was IDR 2,642,471.59 $respondents^{-1}$planting $season^{-1}$ or IDR 85,419,034.09 $respondents^{-1}$planting $season^{-1}$ ha^{-1}.
2. The income from mustard farming in Mugirejo Village is IDR 1,372,554.96 $respondents^{-1}$planting $season^{-1}$ or IDR 39,994,979.00 $respondents^{-1}$planting $season^{-1}$ ha^{-1}.
3. The break-even selling price and production volume of mustard greens farming in Mugirejo Village are respectively IDR 8,696.39 kg^{-1} and 81.20 kg^{-1}.

4.2. Suggestion

Based on the results of data analysis and discussion in this research, the following suggestions can be obtained:

1. Farmers can sell their mustard harvest to the market instead of just selling directly to middlemen because the selling price is higher to increase revenue and income.
2. Farmers need to increase their knowledge in using production costs more efficiently so that they can increase farmer income.
3. The government can carry out outreach activities regarding pests and diseases so that farmers can be equipped with insight into the right solutions to deal with pests and diseases that can reduce or damage the production of mustard greens planted.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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