**ANALYSIS OF GREEN MUSTARD (*Brassica juncea* L.) FARMING INCOME**

**IN THE BUKIT BIRU DISTRICT, TENGGARONG DISTRICT KUTAI KARTANEGARA DISTRICT (Case Study of Vegetable Farmers Association)**

**ABSTRACT**

Green mustard (*Brassica juncea* L.) leaf is a vegetable that is popular with all levels of society because it contains many nutrients and also has an affordable price ranging from Rp. 5,000-Rp. 10,000 per bunch. Some people believe that mustard greens can work as a blood cleanser, so people with kidney disease are advised to consume lots of mustard greens to improve kidney function. This research aimed to determine the amount of income obtained by vegetable farmers' associations from green mustard farming and to find out whether the mustard green business being operated in Bukit Biru Village was profitable or not. Sampling in this study used a saturated sampling technique, so the number of samples selected was 18 samples. The data analysis stage was carried out to obtain calculated values ​​for the green mustard farming business that had been carried out by farmers. This research used qualitative research. The results of the research show that the income obtained by the combination of vegetable farmers in Bukit Biru Village is IDR 3,951,111 per planting season. The average income of mustard green farming in Bukit Biru Village, Tenggarong District, Kutai Kartanegara Regency is IDR. 2,764,164 per growing season. The R/C Ratio value produced by the vegetable farmers' association in Bukit Biru Village is IDR 3.33, which means that every IDR 1 spent generates IDR 3.33 in income, so the green mustard farming business in Bukit Biru Village, Tenggarong District, Kutai Kartanegara Regency is profitable to cultivate as a side business to increase farmers' income.

Keywords: Income, Farming, Green Mustard Plants

1. **INTRODUCTION**

The horticulture sub-sector is one of the agricultural sectors that can contribute to the national economy. In general, this sub-sector is divided into groups of vegetable plants, medicinal plants, ornamental plants, and fruit [1]. Vegetables are one of the basic human needs and contribute 27% of the need for food crops, as for their role as a source of health, as stated in the 1991 Nutrition Seminar and 1997 BAPPENAS National Workshop on Food, "Every individual is recommended to consume a minimum of 150 grams of wet vegetables every day according to FAO recommendations" [2]. Therefore, vegetable commodity farming has good market prospects. Farming businesses that are run can play a role in maintaining environmental comfort, horticulture can accelerate the alleviation of farmer poverty by creating jobs and encouraging investment in rural areas [3].

Green mustard is a leaf vegetable that is popular with all levels of society because it contains many nutrients and also has an affordable price ranging from Rp. 5,000-Rp. 10,000 per bunch. Some people believe that mustard greens can work as a blood cleanser, so people with kidney disease are advised to consume lots of mustard greens to improve kidney function.

Green mustard production in Indonesia over the last 3 years has increased each period, namely in 2019 as much as 652,727 tons, in 2020 as much as 667,473 tons, and in 2021 as much as 727,467 tons [4]. Based on the area of ​​mustard harvested land in 2021, it was 69,239 ha, in 2020 it was 63,464 ha and in 2019 it was 60,871 ha [5], so it can be concluded that each period the area of ​​harvested land has increased. This indicates that green mustard farming has the opportunity to be developed because it has good cultivation prospects.

In the East Kalimantan Province region in 2021, the mustard harvest land area is 1,142.28 ha with a total mustard production of 6,914.63 tons which is divided into 10 districts/cities including Paser has a land area of ​​46 ha with a total production of 94 tons, West Kutai has a land area of ​​125 ha with a total production of 82.10 tons, Kutai Kartanegara has a land area of ​​320.06 ha with a total production 1,108.08 tons, East Kutai has a land area of ​​105.19 ha with a total production of 198.20 tons, Berau has a land area of ​​169.11 ha with a total production of 1,061.93 tons, Penajam Paser Utara has a land area of ​​74.77 ha with a total production of 199.72 tons, Mahakam Ulu has a land area of ​​5.30 ha with a total production of 1.01 tons, Balikpapan has a land area of ​​179.25 ha with a total production of 3,583 tons, Samarinda has a land area of ​​73.60 ha with a total production of 494.09 tons, and Bontang has a land area of ​​44 ha with a total production of 92.50 ha. Thus, it can be seen that Kutai Kartanegara Regency is in the first position which has the largest land area and total production is in the second highest position after Balikpapan City. Therefore, green mustard farming in Kutai Kartanegara Regency has good market prospects for development [6].

Bukit Biru sub-district is one of the sub-districts in Tenggarong District, Kutai Kartanegara Regency which cultivates many vegetable crops, one of which is mustard greens. At this location, there are 22 farmer groups consisting of 2 groups of women farmers and 2 groups of horticultural farmers. The area of ​​land owned is around 10 ha with mustard farming covering an area of ​​6 ha and the rest planted with secondary crops. One of the horticultural farmer groups is the Vegetable Farmers Association which was founded on January 24, 2013. This farmer group runs a green mustard vegetable farming business. While farming is running, farmers' awareness of recording and monitoring income from green mustard farming is still very minimal.

The research aims to find out the amount of income earned by vegetable farmers' associations from green mustard farming and to find out whether or not the mustard green business is profitable or not in Bukit Biru Village, Tenggarong District, Kutai Kartanegara Regency.

**2. RESEARCH METHODS**

**2.1. Time and Place**

This research was carried out for 3 months starting from December 2022 to February 2023 and was located in Dusun Bangun Rejo RT. 20 Bukit Biru Village, Tenggarong District, Kutai Kartanegara Regency.

**2.2. Data Types and Sources**

The data collection methods that will be used in this research are primary data and secondary data. Primary data is data obtained directly or through fieldwork research in the field obtained through observations, direct interviews with farmers, and questionnaires as a data source. The questionnaire given to farmers is in the form of structured questions including data on land area, farmers' education level, farming experience, production costs, and income. Secondary data is data obtained indirectly or through library research by researchers, namely through articles, journals, and literature studies from related agencies. Sampling in this research used a saturated sampling technique. Saturated sampling is a sampling technique by makes all members of the population as samples if the number of farmers is less than 30 people [7].

**2.3. Definition of Variables and Their Measurement**

To get a clearer understanding of what will be researched according to the concept put forward, operationally it can be described as follows:

1. The production costs that will be taken into account in this research are the costs incurred during one planting season (IDR planting season-1), which include:

 a) The costs of production facilities are in the form of seed costs, fertilizer costs, and finally pesticide costs (IDR planting season-1),

 b) Labor costs can be calculated based on the wage system that applies at the research location based on working day (IDR planting season-1),

c) Depreciation costs for agricultural equipment, namely costs obtained by calculating the purchase price multiplied by the number of tools and divided by the technical life of the tools such as machetes, sprayers, hoes, and sickles (IDR planting season-1),

2. Farming income is the result of production which is then multiplied by the selling price obtained from the farming business (IDR planting season-1).

3. Farming income is the difference between revenue and minus production costs (IDR planting season-1).

4. The R/C Ratio is a comparison between total revenue and total costs which states the value of revenue for every IDR spent.

**2.4. Data Processing Methods**

2.4.1 Total cost

The production process that has been carried out incurs several costs that are sacrificed. The total amount of fees charged can be calculated using the following formula [8].

TC = TFC + TVC

Information : TC = Total Cost; TFC = Total Fixed Cost; TVC = Total Variable Cost

2.4.2 Total Revenue

The total revenue obtained from the sale of certain goods multiplied by the selling price. The amount of revenue is influenced by production results so increasing farmers' production results can increase the amount of revenue received. Total revenue can be formulated as follows [9].

TR = P .Q

Information : TR = Total Revanue; P = Product Price; Q = Quantity or Production Amount

2.4.3. Income

Income or profit is obtained from total receipts minus total costs. Says that to find out farmer income, you can use the following formula [10].

I = TR-TC

Information : I = Income; TR = Total Revenue; TC = Total Cost

2.4.4. R/C Ratio

To be able to determine the progress and feasibility of the business, the R/C Ratio calculation can be used, which is the ratio of revenue to costs incurred in the farming business being carried out. The R/C Ratio formula is as follows [10].

R/C Ratio= TR/TC

Information :

* R/C Ratio > 1, stating that the business that has been carried out has resulted in a profit
* R/C Ratio = 1, stating that the business that has been carried out is neither profitable nor detrimental (break-even point).
* R/C Ratio < 1, states that the business that has been carried out does not produce a profit

**3. RESULT AND DISCUSSION**

**3.1. Characteristics based on respondent's age**

 Respondent characteristics based on age are presented in Table 1.

Table 1. Characteristics of Respondents Based on Age

|  |  |  |  |
| --- | --- | --- | --- |
| No | Age (Years) | Number (people) | Percentage (%) |
| 1 | 41 – 50 | 11 | 55,5 |
| 2 | 51 – 60 | 4 | 27,8 |
| 3 | 61 – 70 | 3 | 16,7 |
| Number | 18 | 100 |

Source: Primary Data (processed), 2023

Greens mustard farming activities: number and percentage of farmer respondents based on age characteristics in Bukit Biru Village, Tenggarong District. In Table 1, it is known that the age of the mustard farmer respondents was 10 people aged 41-50 years with a percentage of 55.5%, 5 people aged 51-60 years with a percentage of 27.8%, 3 people aged 61-70 years with a percentage of 16.7%.

3.2. Characteristics based on Education Level

Respondent characteristics based on education level are presented in Table 2.

Table 2. Characteristics of Respondents Based on Education Level

|  |  |  |  |
| --- | --- | --- | --- |
| No | Education Level | Number (people) | Percentage (%) |
| 1 | Tidak bersekolah | 3 | 16,7 |
| 2 | SD | 3 | 16,7 |
| 3 | SMP | 9 | 50 |
| 4 | SMA | 1 | 5.5 |
| 5 | S1 | 2 | 11.1 |
| Number | 18 | 100 |

Source: Primary Data (processed), 2023

Education is an important factor for farmers in accepting and implementing new technology, in addition to the abilities and skills of the farmers themselves. In Table 2 it is known that the education level of farmers is at school level with 3 people with a percentage of 16.7%, elementary school (SD) level with 3 people with a percentage of 16.7%, junior high school (SMP) with 9 people with a percentage of 50%, high school (SMA) with 1 person with a percentage of 5.5% and Strata 1 (S1) with 2 people with a percentage of 11.1%. The above findings were some what consistent with the findings of Chowhan (2021).

3.3 Characteristics based on gender

In this research, green mustard farming farmers examined a sample of 18 farmers where only male farmers were in this group of green mustard farmers. All members of the mustard farming association consist of only male farmers. This is because only men mustard farmers decide to do this work, women only act as additional staff to manage the mustard farming business when the men need the help of their wives or children to farm.

3.4. Characteristics Based on Land Area

Respondent characteristics based on land area are presented in Table 3.

Table 3. Characteristics of Respondents Based on Land Area

|  |  |  |  |
| --- | --- | --- | --- |
| No | Land Area (ha) | Number (people) | Percentage (%) |
| 1 | 0,50 | 9 | 50,0 |
| 2 | 0,75 | 6 | 33,3 |
| 3 | 1,00 | 3 | 16,7 |
| Number | 12 | 18 | 100 |

Source: Primary Data (processed), 2023

Based on Table 3, the average farmer's land area is divided into 3, namely 0.5 ha, 0.75 ha, and 1 ha, where 9 respondents have a land area of ​​0.5 ha with a percentage of 50%, 6 people have a land area of ​​0.75 ha with a percentage of 33.3% and the last 3 people have a land area of ​​1 ha with a percentage of 16.7%. The area of ​​land owned is not large because the land area is owned by himself and his own farming business in his yard grows green mustard. The area of ​​land will influence the amount of production cultivated and the welfare that farmers will obtain.

**3.5. Cost Analysis**

Costs are all expenses expressed in money that are needed to produce a product in a production process. The description of the research data relates to the costs incurred by respondent farmers in farming activities which include fixed costs (taxes and depreciation of equipment) and variable costs (seeds, fertilizer, pesticides, labor, and equipment) with the following details:

**3.5.1. Fixed Costs**

 Fixed costs are costs that are not used up in one planting and continue to be incurred even if the production obtained is large or small. The cost does not depend on the size of the production costs obtained, which include fixed costs, namely taxes and depreciation of equipment.

a) Land tax

 The cost of land tax in Bukit Biru Village varies depending on the size of the area owned by farmers, based on research conducted, the average area of ​​land planted with mustard greens is 1,900 m2, where the annual tax costs are IDR 501,108 or the average monthly tax payment for farmers in Bukit Biru Village is IDR 41,759. Depreciation costs are always the same from year to year. Meanwhile, tax fees will change according to government regulations.

b) Equipment depreciation

 The depreciation cost of tools is calculated based on the ownership of each mustard farmer. In this study, the depreciation value to be calculated is the depreciation of tools in the form of hoes, sickles, gembors, buckets, and sprayers. The average economic life of the equipment used by respondents is 2 to 5 years and the average cost for depreciation of the equipment itself is IDR 176,000. For more details, it is presented in Table 4 below.

Table 4. Amount of Fixed Costs in Green Mustard Farming in Bukit Biru Village

|  |  |  |
| --- | --- | --- |
| No | Cost Type | Average Value (IDR) |
| 1 | Land tax per year | 41.759 |
| 2 | Equipment depreciation | 58.666 |
| Total Average Fixed Costs | 100.425 |

Source: Primary Data (processed), 2023

In Table 4, it is shown that the recapitulation of depreciation tax costs each month is IDR 41,759 and the recapitulation of equipment depreciation is IDR 58,666 per farmer. The depreciation costs are costs obtained from reducing the initial value with the final value divided by the time of use multiplied by the number of tools owned by each farmer, while the tax calculation is obtained from the land per year divided by the period of one planting. So the total fixed costs are IDR 100,425. These results supported the findings of Chowhan et al. (2020).

3.5.2. Variable Costs

 Variable costs are all costs incurred by respondent farmers for purchasing seeds, fertilizer, pesticides, and labor costs whose costs change. For more details, it can be presented in Table 5 below.

Table 5. Recapitalization of Respondent Farmers' Non-Fixed Costs in Mustard Farming in Bukit Biru Subdistrict

|  |  |  |  |
| --- | --- | --- | --- |
| No | Cost Type | Total Overall Price (IDR) | Average Value of Farmers (IDR) |
| 1 | Seed | 1.850.000 | 231.250 |
| 2 | Fertilizer | 2.071.108 | 258.888 |
| 3 | Pesticide | 571.071 | 71.384 |
| 4 | Labor costs | 4.200.000 | 525.000 |
| Total | 8.692.179 | 1.086.522 |

Source: Primary Data (processed), 2023

Table 5 shows that the average non-fixed cost of mustard rice farming in Bukit Biru Village is IDR 1,086,522. Green mustard farmers spend Rp. 231,250 per planting for mustard seeds, Rp. 258,888 for organic and non-organic fertilization, Rp. 71,384 for the pesticides used and Rp. 525,000 for labor, so the total non-fixed costs incurred are Rp. 1,086,000.

3.5.3. Total Production Costs

Total production costs are the sum of fixed costs plus the number of variable costs, based on research results, the amount of fixed costs excluded from tax costs and equipment depreciation plus variable costs incurred from the costs of procuring seeds, fertilizers, pesticides, and providing labor wages. For more details, it can be presented in Table 6 below :

Table 6. Total Production Costs of Respondent Farmers in Farming in Bukit Biru Village

|  |  |  |
| --- | --- | --- |
| No | Cost Type | Value (IDR) |
| 1 | Fixed Cost |
|  | * Land tax
 | 41.759 |
|  | * Equipment depreciation
 | 58.666 |
| 2 | Variable Cost |
|  | * Seed
 | 231.250 |
|  | * Fertilizer
 | 258.888 |
|  | * Pesticide
 | 71.384 |
|  | * Labor cost
 | 525.000 |
| Total Cost Production | 1.186.947 |

Source: Primary Data (processed), 2023

Table 6 above shows that the average production cost is IDR 1,186,947, which is the cost that will be incurred every time the green mustard planting season occurs. Green mustard farmers in Bukit Biru Village sell their harvest to collectors at a price per kilogram of IDR 7,000, this price is the price agreed upon between the farmer and the collector or buyer. The above fixed and variable costs were inline with the findings of Chowhan et al. (2022).

3.5.4. Revenue from mustard farming

 Revenue is all income obtained from farming during one period calculated from sales or reappraisal, revenue can be obtained by multiplying the amount of production by the price. For more details, it can be presented in Table 7 below :

Table. 7. Analysis of Green Mustard Farming Revenues in Bukit Biru Village

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Land AreaM2 | Total Harvest Yield (Kg) | Price Kg-1(IDR) | Revenue Total (IDR) |
| 1 | 3.500 | 1.350 | 7.000 | 9.450.000 |
| 2 | 2.750 | 1.000 | 7.000 | 14.000.000 |
| 3 | 2.200 | 900 | 7.000 | 6.300.000 |
| 4 | 2.000 | 820 | 7.000 | 5.740.000 |
| 5 | 1.800 | 700 | 7.000 | 9.800.000 |
| 6 | 1.200 | 490 | 7.000 | 6.860.000 |
| 7 | 1.000 | 390 | 7.000 | 10.920.000 |
| 8 | 750 | 230 | 7.000 | 8.050.000 |
| **Total** | **5.880** |  | **71.120.000** |
| **Recapitulation** | **3.951.111** |

Source: Primary Data (processed), 2023

3.5.5. Analysis of Farming Income

 Revenue is the result of receipts minus the total of Fixed Costs and Non-Fixed Costs. In farming, information about the combination of production factors and price information is very necessary to anticipate existing changes. The results of the mustard farming income analysis can be seen in the following Table 8 below :

Table 8. Analysis of green mustard farming income in Bukit Biru Village

|  |  |  |
| --- | --- | --- |
| No | Description | Value (IDR) |
| 1 | Total revenue | 3.951.111 |
| 2 | Total production costs | 1.186.947 |
| Average Income | 2.764.164 |

Source: Primary Data (processed), 2023

Based on Table 8 above, shows that the total average income is IDR 83,951,111, and the total costs incurred are IDR 1,186,947. So, the total average income is reduced by the total average costs to obtain an average income of IDR 2,764,164. Therefore, it can be concluded that the income for each farmer in Bukit Biru Village for one planting season is IDR IDR 2,764,164.

3.5.6. R/C Ratio Analysis of Green Mustard Farming

 To see the level of economic profit from green mustard farming in Bukit Biru Village, you can find out using Return Cost Ratio analysis. R/C analysis is a comparison between revenue and costs. The results of the R/C Ratio analysis of mustard greens farming can be seen in Table 9.

Table 9. R/C Ratio of Mustard Farmers Association, Bukit Biru Village

|  |  |  |
| --- | --- | --- |
| **No** | Description | Value (IDR) |
| 1 | Total revenue | 3.951.111 |
| 2 | Total production costs | 1.186.947 |
| R/C *Ratio* | **3,33** |

Source: Primary Data (processed), 2024

Based on the R/C of the vegetable farmers' association per season (1.5 months), research results in Bukit Biru Village obtained an R/C value of 3.33, meaning that every expenditure of IDR 1 can provide income of IDR 3.33 with the R/C result being 3.33 > 1. This shows that green mustard farming in Bukit Biru Village is profitable and worth pursuing. Green mustard farming in Bukit Biru Subdistrict is profitable so that it can increase farmers' income and the level of welfare of farmers' lives will increase. The same thing is done in research analysis of pakcoy mustard farming (*Brassica rapa* L.) in Medan Deli District, North Sumatra where the results of the research stated that pakcoy farmers were able to improve the economy, farmers were able to improve their living needs, farmers were also able to send their children to school until they graduated from high school and even to college. Pakcoy mustard farming has had a positive impact on his family's livelihood. In cultivating pakchoy mustard, production sometimes experiences a decline and relatively fluctuating prices, making farmers in Medan Deli District have to be wise in managing their finances as best as possible [11]. The results of other research reported by [12] show that the total income of spoon mustard greens farmers in this business is an average of IDR 1,381,818. The total income of pakchoy spoon green mustard farmers averages IDR 772,077 and the results of the R/C ratio analysis in one harvest show that pakchoy spoon mustard farming is profitable for farmers so it can be continued and developed. The results of research [13] show that the amount of farming costs is IDR. 2,223,100, the farming income is IDR. 8,350,000 per hectare in one planting season, the amount of farming income is IDR. 6,126,900 per hectare per one planting season. The R/C of green mustard farming in Banjar Bangah, Baturiti Village, Tabanan Regency is 3.75%. This means that for every IDR. 1.00 spent, the green mustard farmer will receive IDR. 3.75 in income.

**4. CONCLUSIONS AND SUGGESTIONS**

**4.1. Conclusion**

Based on the results of research carried out in Bukit Biru Village, Tenggarong Kutai Kartanegara District (Case Study of the Vegetable Farmers Association), the conclusion obtained is that :

1. The total production cost for one planting is IDR 1,186,947. The income earned by green mustard farmers in Bukit Biru Village is IDR 3,951,111 per planting season

2. The average income of green mustard farming is IDR. 2,764,164, and an R/C ratio of 3.33 is obtained, which means that every IDR. 1 spent provides income of IDR. 3.33, then green mustard farming in Bukit Biru Village, Tenggarong Kutai Kartanegara District is very worthy of cultivation.

**4.2. Suggestion**

The suggestions for helping green mustard farming in Bukit Biru Village, Tenggarong Kutai Kartanegara District (Case Study of the Vegetable Farmers Association) are as follows:

1. For future researchers, research should be conducted on the feasibility analysis of other types of vegetable farming so that the feasibility of farming one type of vegetable versus another type of vegetable can be determined.

2. The government should provide appropriate selling price policies and assistance with agricultural equipment so that it can provide better profits for farmers.

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