

## The Influence of Socioeconomic Factors on Mustard Greens (*Brassica juncea* L.) Farming Income in Kampung Enam Village, Tarakan City

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### ABSTRACT

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Mustard greens (*Brassica juncea* L.) farming is an important source of household income for vegetable farmers, although income levels vary according to socioeconomic characteristics and resource ownership. This study aimed to analyze mustard farming income, determine its contribution to total household income, and examine the influence of socioeconomic factors on mustard farming income in Kampung Enam Village, Tarakan City. The research location was selected purposively, and 33 active mustard farmers with at least two years of farming experience were selected using purposive sampling. Primary data were collected through field observation, structured interviews, and documentation, while secondary data were obtained from relevant institutions and literature. Data were analyzed using farm income analysis, contribution analysis, and multiple linear regression. The results showed that average mustard farming income was Rp 402,961 per production cycle, derived from total revenue of Rp 563,404 and total production cost of Rp 160,443. The contribution of mustard farming income to total household income was 29%, which is classified as low. The regression model explained 73.1% of the variation in income, and the F-test indicated that all socioeconomic variables simultaneously affected income. Partially, only capital had a positive and significant effect on mustard farming income ( $b = 2.851$ ;  $p < 0.05$ ), while age, education, farming experience, family dependents, and land area were not significant. These findings indicate that improving farmers' access to capital is important for increasing mustard farming income, while income diversification remains necessary to strengthen household economic resilience.

### INTRODUCTION

Horticultural vegetables such as mustard greens (*Brassica juncea* L.) have an important role in smallholder farming systems because they have a relatively short production cycle, stable market demand, and the potential to provide regular income for farming households. In urban and peri-urban agricultural areas, mustard greens are commonly cultivated on limited land and marketed quickly after harvest [1]. This makes the crop attractive for farmers who depend on short-cycle commodities to support daily household needs. However, the income generated from mustard farming is not determined only by crop production, it is also influenced by the socioeconomic conditions of farmers and their access to production resources.

Socioeconomic factors such as age, education level, farming experience, number of family dependents, land area, and capital may influence the ability of farmers to manage production, adopt technology, purchase inputs, and respond to market conditions [2-3]. Farmers with

better education and experience may be more capable of making production and marketing decisions, while sufficient capital allows them to purchase seeds, fertilizers, pesticides, and equipment on time. Land area can also influence the scale of production, although the relationship between land and income depends on production efficiency and input management [4]. Therefore, understanding the socioeconomic determinants of farming income is essential for designing policies and programs to improve farmers' welfare.

In Kampung Enam Village, Tarakan City, mustard farmers face varied and fluctuating income levels. These variations reflect differences in resource ownership, farming capacity, production costs, market access, and bargaining position. Several problems are still encountered, including low productivity on some plots, dependence on traditional cultivation practices, limited access to capital, and weak bargaining power in marketing. These conditions can reduce the stability of household income and limit the ability of farmers to

improve their livelihoods. Because mustard farming is generally integrated with other vegetable farming activities, it is also important to assess how far mustard farming contributes to total household income.

Previous studies have shown that production factors and socioeconomic conditions can affect the income of vegetable farmers [5-8]. However, many studies have focused on general horticultural commodities or production centers in other regions, while studies on mustard farming in border urban areas such as Tarakan City remain limited. There is also a need for analysis that simultaneously evaluates farming income, income contribution to the household, and the socioeconomic determinants of income within one analytical framework. Such an integrated approach can provide clearer evidence on whether mustard farming functions as a primary source of livelihood or only as a complementary income source.

Based on these considerations, this study addressed three research questions: how much income is generated from mustard farming in Kampung Enam Village, how large is its contribution to total household income, and which socioeconomic factors influence mustard farming income. Therefore, the objectives of this study were to analyze the income of mustard farming, determine its contribution to total household income, and examine the effect of socioeconomic factors on mustard farming income in Kampung Enam Village, Tarakan City. The findings are expected to provide practical information for farmers, extension workers, and local agricultural institutions in strengthening vegetable farming development and improving farmers' economic resilience.

## MATERIALS AND METHODS

### *Research Site and Time*

The study was conducted in Kampung Enam Village, East Tarakan District, Tarakan City, Indonesia, over a period of six months. The research location was selected purposively because the area is one of the vegetable production centers, particularly for mustard greens, and because it has diverse farmer socioeconomic conditions that are relevant to the objectives of the study.

### *Sampling Method*

Respondents were selected using purposive sampling based on predetermined criteria. This method was used because not all farmers in the research area had the experience and involvement required for the focus of the study. The selected respondents were active mustard farmers who had cultivated mustard greens for at least two years. Farmers meeting these criteria were considered able to provide accurate and representative information regarding production, costs, income, and socioeconomic conditions. Based on these criteria, 33 farmers were selected as research respondents.

### *Types and Methods of Data Collection*

The study used both primary and secondary data. Primary data were collected through field observation, direct interviews with respondents using a structured questionnaire, and documentation. The questionnaire covered farmer characteristics, land area, production costs, production volume, selling price, income from mustard farming, income from non-mustard farming, and other socioeconomic information. Secondary data were obtained from relevant institutions and literature to support the analysis and discussion.

### *Data Analysis*

Farm income was calculated by subtracting total production cost from total revenue using the following formula:  $\pi = TR - TC$ ,  $\pi$  where is total income (Rp per production cycle), TR is total revenue (Rp per production cycle), and TC is total production cost (Rp per production cycle). This analysis was used to determine the net income obtained from mustard farming during one harvest cycle.

The contribution of mustard farming income to total household income was calculated using the formula

$$KP = \frac{X}{Y} \times 100\%,$$

where KP is the contribution of mustard farming income, X is income from mustard farming, and Y is total household farming income. Contribution was categorized as low when the value ranged from 0 to 33.3%, moderate when it ranged from 33.3 to 66.6%, and high when it exceeded 66.6% of total household income.

The influence of socioeconomic factors on mustard farming income was analyzed using multiple linear regression with the following model:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + e$$

In the model, Y represents income, a is the constant,  $b_1$ - $b_6$  are regression coefficients,  $X_1$  is age,  $X_2$  is education,  $X_3$  is farming experience,  $X_4$  is number of family dependents,  $X_5$  is land area,  $X_6$  is capital, and e is the error term. Hypothesis testing was conducted using the t-test for partial effects and the F-test for simultaneous effects. Prior to regression analysis, classical assumption tests were performed, including normality, heteroscedasticity, and multicollinearity tests. Normality was assessed using the Kolmogorov-Smirnov test and normal probability plot, heteroscedasticity was tested using the Glejser test, and multicollinearity was evaluated based on tolerance and variance inflation factor (VIF) values. The model was considered to meet the assumptions when residuals were normally distributed, heteroscedasticity was absent, and no multicollinearity occurred among independent variables.

## RESULTS AND DISCUSSION

### *Farmer Characteristics*

Farmer characteristics provide an overview of the respondents in Kampung Enam Village. The characteristics observed in this study included age, education, land area, farming experience, number of family dependents, and capital. These variables were selected because they may influence farming decisions, input use, production scale, and ultimately farm income.

**Table 1.** Characteristics of mustard farmers in Kampung Enam Village

| No. | Farmer characteristic       | Unit           | Range           | Mean    |
|-----|-----------------------------|----------------|-----------------|---------|
| 1   | Age                         | years          | 24-60           | 41.76   |
| 2   | Education                   | years          | 0-12            | 6.45    |
| 3   | Land area                   | m <sup>2</sup> | 180-10,000      | 1,341   |
| 4   | Farming experience          | years          | 3-45            | 15.42   |
| 5   | Number of family dependents | persons        | 2-8             | 4.85    |
| 6   | Capital                     | Rp             | 100,000-500,000 | 154,545 |

Source: Primary data processed, 2024.

The average age of farmers was 41.76 years, with an age range of 24 to 60 years. This indicates that most respondents were in a productive age group and were physically able to manage vegetable farming activities. The average education level was 6.45 years, showing that the majority of respondents had completed elementary-level education. Although formal education was relatively low, farmers had substantial farming experience, with an average of 15.42 years. This experience may help farmers manage cultivation practices based on local knowledge and repeated production cycles. The average land area was 1,341 m<sup>2</sup>, while the average capital used was Rp 154,545 per

education, land area, farming experience, number of family dependents, and capital. These variables were selected because they may influence farming decisions, input use, production scale, and ultimately farm income.

production cycle. These figures indicate that mustard farming in the study area was generally conducted at a smallholder scale.

### *Farm Cost, Revenue, and Income*

Mustard farming income was calculated as the difference between total revenue and total production cost during one harvest cycle. The production costs consisted of fixed costs and variable costs. Fixed costs included depreciation of tools such as machetes, hoes, sickles, sprayers, and water pumps, while variable costs included seeds, fertilizer, and pesticides.

**Table 2.** Average costs, revenue, and household income of mustard farmers

| Component                        | Description     | Average (Rp)     |
|----------------------------------|-----------------|------------------|
| A. Fixed costs                   |                 |                  |
| 1                                | Machte          | 1,925            |
| 2                                | Hoe             | 1,917            |
| 3                                | Sickle          | 1,586            |
| 4                                | Sprayer         | 5,580            |
| 5                                | Water pump      | 20,938           |
| <b>Total fixed cost</b>          |                 | <b>31,946</b>    |
| B. Variable costs                |                 |                  |
| 1                                | Seed cost       | 53,545           |
| 2                                | Fertilizer cost | 64,152           |
| 3                                | Pesticide cost  | 10,800           |
| <b>Total variable cost</b>       |                 | <b>128,497</b>   |
| C. Total production cost         |                 | 160,443          |
| D. Total production              |                 | 83               |
| E. Average selling price         |                 | 6,788            |
| F. Total revenue                 |                 | 563,404          |
| G. Mustard farming income        |                 | 402,961          |
| C. Non-mustard income            |                 |                  |
| 1                                | Water spinach   | 220,961          |
| 2                                | Spinach         | 203,958          |
| 3                                | Basil           | 100,000          |
| 4                                | Celery          | 517,000          |
| <b>Total non-mustard income</b>  |                 | <b>1,041,919</b> |
| <b>I. Total household income</b> |                 | <b>1,444,880</b> |

Source: Primary data processed, 2024. Monetary values are presented in Indonesian rupiah per production cycle unless otherwise stated.

Table 2 shows that average total production cost was Rp 160,443, consisting of fixed costs of Rp 31,946 and variable costs of Rp 128,497. Average total production was 83 units, with an average selling price of Rp 6,788, resulting in total revenue of Rp 563,404. Therefore, average net income from mustard farming was Rp 402,961 per production cycle. This income indicates that mustard farming generated a positive return, although

the amount remained relatively limited compared with total household income. According to farm management theory, farm income represents the difference between total revenue and total cost within a production period and can be used as an indicator of the economic feasibility of the farm [9]. Similarly, farming income is influenced not only by production volume and selling

price, but also by the efficient use of production factors such as land, labor, and capital [10].

In addition to mustard farming, farmers also obtained income from other vegetable commodities, including water spinach, spinach, basil, and celery. The total non-mustard income reached Rp 1,041,919, while total household income was Rp 1,444,880. These results show that mustard farming was part of a diversified vegetable farming system rather than the only income source. Income diversification is important because it

can reduce the risk of income instability when production or prices of a single commodity fluctuate.

### ***Contribution of Mustard Farming Income***

The contribution analysis was used to determine the role of mustard farming income in total household income. This analysis is important because positive farm income does not always indicate that the commodity is the main source of livelihood.

**Table 3.** Average contribution of mustard farming income to household income

| Mustard farming income (Rp) | Total household income (Rp) | Contribution of mustard farming income to total household income |
|-----------------------------|-----------------------------|------------------------------------------------------------------|
| 402,961                     | 1,444,829                   | 29%                                                              |

Source: Primary data processed, 2024.

The contribution of mustard greens farming income to total household income was 29%. Based on the classification used in this study, this value is included in the low contribution category because it ranges from 0 to 33.3%. These results indicate that mustard greens farming in Kampung Enam Village has not become the main source of income for farming households. Instead, it functions as a supplementary income source in a broader vegetable farming system. This finding differs from the research of Galingging et al. [11], who reported that mustard greens farming income made a large contribution to household expenditure in Karang Ambun

Village, Berau Regency with a contribution value reaching 131%. The difference between the two findings may be related to variations in production scale, market access, selling prices, household expenditure structure, and the availability of other sources of income.

### ***Classical Assumption Tests***

Before estimating the regression model, classical assumption tests were performed to ensure that the model met the requirements for multiple linear regression. The tests included normality, multicollinearity, and heteroscedasticity tests.

**Table 4.** Normality test results using the one-sample Kolmogorov-Smirnov test

| Parameter                          | Unstandardized residual |
|------------------------------------|-------------------------|
| N                                  | 33                      |
| Mean                               | 0.000000                |
| Std. deviation                     | 166,829.1670            |
| Most extreme difference - absolute | 0.117                   |
| Most extreme difference - positive | 0.117                   |
| Most extreme difference - negative | -0.072                  |
| Test statistic                     | 0.117                   |
| Asymp. Sig. (2-tailed)             | 0.200                   |

Source: Primary data processed with SPSS 26, 2024. The residuals are normally distributed because  $p > 0.05$ .

**Table 5.** Multicollinearity test results

| Variable           | Tolerance | VIF   | Conclusion           |
|--------------------|-----------|-------|----------------------|
| Age                | 0.673     | 1.485 | No multicollinearity |
| Education          | 0.777     | 1.287 | No multicollinearity |
| Farming experience | 0.622     | 1.607 | No multicollinearity |
| Family dependents  | 0.712     | 1.404 | No multicollinearity |
| Land area          | 0.458     | 2.185 | No multicollinearity |
| Capital            | 0.410     | 2.436 | No multicollinearity |

Source: Primary data processed with SPSS 26, 2024.

**Table 6.** Heteroscedasticity test results using the Glejser test

| No. | Variable           | Sig.  | Conclusion            |
|-----|--------------------|-------|-----------------------|
| 1   | Age                | 0.952 | No heteroscedasticity |
| 2   | Education          | 0.173 | No heteroscedasticity |
| 3   | Farming experience | 0.266 | No heteroscedasticity |
| 4   | Family dependents  | 0.678 | No heteroscedasticity |
| 5   | Land area          | 0.848 | No heteroscedasticity |
| 6   | Capital            | 0.391 | No heteroscedasticity |

Source: Primary data processed with SPSS 26, 2024.

The Kolmogorov-Smirnov normality test produced an Asymp. Sig. value of 0.200, which is greater than 0.05. This indicates that the residuals were normally

distributed. The multicollinearity test showed that all tolerance values were greater than 0.10 and all VIF values were below 10, indicating that multicollinearity

did not occur among the independent variables. The Glejser test also showed that all significance values were greater than 0.05, meaning that heteroscedasticity was not detected in the regression model. Therefore, the regression model was considered suitable for further analysis.

### **Regression Analysis of Socioeconomic Factors**

Multiple linear regression was used to evaluate the influence of age, education, farming experience, number of family dependents, land area, and capital on mustard farming income. The regression results are presented in Table 7.

**Table 7.** Multiple linear regression results

| Variable           | Coefficient (b) | Sig.  |
|--------------------|-----------------|-------|
| Constant           | -10,735.924     | 0.948 |
| Age                | -211.581        | 0.941 |
| Education          | 41,794.374      | 0.082 |
| Farming experience | -72.945         | 0.978 |
| Family dependents  | -15,986.866     | 0.352 |
| Land area          | -12.296         | 0.492 |
| Capital            | 2.851           | 0.000 |

Source: Primary data processed with SPSS 26, 2024.

**Table 8.** Coefficient of determination (R<sup>2</sup>)

| Model | R     | R Square | Adjusted R Square |
|-------|-------|----------|-------------------|
| 1     | 0.855 | 0.731    | 0.669             |

Source: Primary data processed with SPSS 26, 2024.

**Table 9.** F-test results

| Model | Source     | F      | Sig.  |
|-------|------------|--------|-------|
| 1     | Regression | 11.775 | 0.000 |
| 1     | Residual   |        |       |
| 1     | Total      |        |       |

Source: Primary data processed with SPSS 26, 2024.

**Table 10.** Partial t-test results

| No. | Variable           | t      | Sig.  |
|-----|--------------------|--------|-------|
| 1   | Age                | -0.075 | 0.941 |
| 2   | Education          | 1.807  | 0.082 |
| 3   | Farming experience | -0.028 | 0.978 |
| 4   | Family dependents  | -0.947 | 0.352 |
| 5   | Land area          | -0.696 | 0.492 |
| 6   | Capital            | 6.005  | 0.000 |

Source: Primary data processed with SPSS 26, 2024.

Based on Table 7, the estimated regression equation was  $Y = -10,735.924 - 211.581X_1 + 41,794.374X_2 - 72.945X_3 - 15,986.866X_4 - 12.296X_5 + 2.851X_6 + e$

The coefficient of determination (R<sup>2</sup>) was 0.731, indicating that age, education, farming experience, family dependents, land area, and capital explained 73.1% of the variation in mustard farming income. The remaining 26.9% was explained by other variables not included in the model, such as production technology, input prices, selling price fluctuations, labor availability, pest and disease pressure, and market access.

The F-test showed a significance value of 0.000, which is lower than 0.05. This means that the independent variables simultaneously had a significant effect on mustard farming income. However, the partial t-test showed that only capital had a significant effect on income, with a coefficient of 2.851 and a significance value of 0.000. This positive coefficient indicates that an increase in capital was associated with an increase in mustard farming income. In practical terms, sufficient capital enables farmers to purchase better production inputs, apply fertilizers and pesticides on time, use equipment more effectively, and manage cultivation activities more intensively.

The other socioeconomic variables, namely age, education, farming experience, number of family dependents, and land area, did not have a statistically significant effect on income. This does not mean that these variables are unimportant, but rather that under the observed conditions their effects were not strong enough to explain differences in income after capital was included in the model. For example, farmers with longer experience may still face limited income if they lack capital to purchase inputs. Similarly, larger land area may not increase income when input use, production management, or market access are not optimal.

Overall, the results suggest that efforts to improve mustard farming income in Kampung Enam Village should prioritize access to productive capital. Such support may include farmer credit, input assistance, cooperative strengthening, and financial management training. However, because mustard farming contributes only 29% to total household income, income diversification should also be maintained. Strengthening other vegetable commodities and improving market linkages may help farmers reduce risk and increase household economic resilience.

## CONCLUSION

Mustard farming in Kampung Enam Village, East Tarakan District, generated average net income of Rp 402,961 per production cycle, indicating that the farm provided profit although at a relatively limited scale. The contribution of mustard farming income to total household income was 29%, which is classified as low. This means that mustard farming has not yet become the main source of livelihood for farmers and is still complemented by income from other vegetable farming activities. The regression analysis showed that among the socioeconomic factors studied, only capital had a positive and significant effect on mustard farming income. This finding confirms that capital availability is a key factor in improving mustard farming performance and income in the research area. Therefore, improving farmers' access to capital, strengthening input support, and maintaining income diversification are recommended to increase household economic resilience.

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## REFERENCES

- [1] I Komang Agus Rai Nugraha, & Karmini, N. L. (2020). Analysis of factors affecting green mustard farmers' income in Nyanggelan Village, Klungkung Regency. *E-Jurnal EP Unud*, 9(12), 2734-2761. [in Indonesian]
- [2] Khaidir, M., Hasibuan, S., & Ridwan, L. (2018). Growth and production response of kailan mustard plants. *Journal Bernas Agricultural Research*, 14(2), 69-76. [in Indonesian]  
<https://doi.org/10.23960/ja.v23i2.8089>
- [3] Naibaho, T. T. (2016). The effect of farmer socioeconomic factors on mustard farming production. *Jurnal Ilmiah Program Studi Agribisnis Fakultas Pertanian Universitas Sumatera Utara*, 1-16. [in Indonesian]
- [4] Putra, R., Hidayat, K., & Lestari, E. (2021). The role of social capital in increasing horticultural farmers' income. *Jurnal Penyuluhan*, 17(1), 75-86. [in Indonesian]
- [5] Rahmawati, D., & Anwar, S. (2023). Analysis of factors affecting vegetable farmers' income in urban areas. *Jurnal Ekonomi Pertanian dan Agribisnis*, 7(3), 412-425. [in Indonesian]
- [6] Sari, M., & Fariyanti, A. (2020). Access to finance and its effect on smallholder farmers' income. *Jurnal Ekonomi Pertanian dan Agribisnis*, 4(2), 233-245. [in Indonesian]
- [7] Usboko, A. M., & Fallo, Y. M. (2016). Socioeconomic factors affecting mustard vegetable farming production in Mitra Timor Farmer Group. *Agrimor*, 1(03), 60-62. [in Indonesian]  
<https://doi.org/10.32938/ag.v1i03.263>
- [8] Wulandari, S., Prasmatiwati, F., & Ismono, H. (2019). Technical efficiency and factors affecting vegetable farmers' income. *Jurnal Ilmu-Ilmu Agribisnis*, 7(4), 389-397. [in Indonesian]
- [9] Suratiyah, K. (2015). *Farm management science*. Penebar Swadaya. [in Indonesian]
- [10] Sockartawi. (2016). *Farm business analysis*. UI Press. [in Indonesian]
- [11] Galingging, H., Efendi, M., & Widiastuti, L. (2022). Analysis of selling prices and the contribution of mustard farming to farmers' household expenditures in Karang Ambun Village, Tanjung Redeb District, Berau Regency. *GPH-International Journal of Agriculture and Research*.