

# Analysis of Vegetable Farming Diversification Patterns in Nagori Purbasari, Tapian Dolok District, Simalungun Regency

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**Abstract:** The objectives of this research are (1) To find out the amount of production costs. (2) To determine the amount of production, revenue and income from vegetable farming, the diversification pattern of spinach, kale and mustard greens in Nagori Purbasari, Tapian Dolok District, Simalungun Regency. The sampling technique used was a purposive sampling technique using the Slovin formula to find a sample size of 15 farmers. The data analysis method uses (1) production cost analysis and (2) farming analysis to calculate income and R/C ratio (farming feasibility). Research Results (1) The average production costs incurred by respondent farmers in this study was IDR 2,112,657 per farm. Where the highest costs are incurred for the use of labor production facilities. (2) The average income value is Rp. 1,312,257 per farmer in one month, with an R/C value of 1.6, which means that every farmer who spends Rp. 1 will get Rp. 1.6. Where the meaning of the R/C value = 1.6 is that the farming pattern of vegetable crop diversification of respondent farmers in Nagori Purbasari, Tapian Dolok District, Simalungun Regency is in a profitable condition but not yet suitable for development.

**Keywords:** Vegetable Farming, Diversification Patterns, Simalungun.

## I. Introduction

Indonesia is known as an agrarian country, which means it relies on the agricultural sector as a pillar of development and as a source of livelihood for its population. The agricultural sector forms a very large proportion of the country's GDP, provides employment opportunities, and serves as a source of income for the community. This then makes the agricultural sector a potential market for domestic products, whether for production or consumption, especially products derived from horticultural plants (Khairad, 2020). The agricultural sector is also the sector that absorbs the most labor. The current development of agriculture is expected to become a mainstay sector that can quickly generate and increase community income, open up more job opportunities, and support the development of a good agribusiness system, which will inevitably increase farmers' income. The quality of the agricultural marketing system greatly determines the high or low income of farmers. Marketing systems are one of the important components for farming enterprises; farmers need to allocate marketing costs as efficiently as possible and achieve significant profits. Marketing institutions are business entities or individuals that conduct marketing, distribute services and commodities from producers to end consumers, and have relationships with business entities or individuals. Agricultural marketing institutions in delivering agricultural commodities from producers are interconnected, forming a marketing network (Siadari & Hardianto, 2019).

Various efforts have been made to improve the livelihoods of the community, especially farmers, including expanding job opportunities. To support the goals of integrated agricultural development, efforts are being made to increase the production of food and horticultural agriculture. To enhance natural resources related to production improvement, the development of farming enterprises is a beneficial alternative, including increasing regional and farmer incomes in particular, as well as preserving natural sustainability (Tohir, 1983).

This can be demonstrated by several phenomena, including the relatively short lifespan of vegetable plants, which allows for quick yields, the ease of cultivation using only simple technology, and the rapid absorption of vegetable production by the market because it is an indispensable component of the family menu. That is why farmers are more inclined to choose cultivating vegetable crops as a strategy for survival (Hamid et al., 2013). Diversification or agricultural diversification is an effort to replace or improve the yield of a single type of crop (Monoculture) towards agriculture that involves multiple types of crops (Multiculture) (Dadi, 2021). Diversification can be divided into vertical diversification aimed at increasing added value through processing and improving product quality, while horizontal diversification is diversification carried out to increase production by planting various types of crops (Mutiarasari et al., 2022).

One of the objectives of the diversification program is to increase farmers' income by optimally utilizing natural resources to achieve the highest possible income. This can be achieved through the implementation of an appropriate farming system that must be adjusted to the resource potential possessed by the farmers (Fadilla et al., 2022).

The development of horticultural commodity production in North Sumatra Province is diverse and fluctuating. This shows that the agricultural sector is still one of the contributors to the income of North Sumatra Province. Horticultural commodities, especially vegetables, play a significant role as they are still widely cultivated both on a large scale and at the household level by farmers in North Sumatra. Nagori Purbasari is one of the vegetable-producing nagoris in the Tapian Dolok sub-district of Simalungun

Regency. Most vegetable farmers make this their primary livelihood, while others treat it as a side business (Tampubolon et al., 2024).

In running vegetable farming in Nagori Purbasari, Tapian Dolok District, Simalungun Regency, farmers are faced with several limitations such as limited land, capital, knowledge, and other resources. Where this greatly affects farmers in how to manage inputs as optimally as possible to achieve maximum results. Vegetable farming in Nagori Purbasari, Tapian Dolok District, Simalungun Regency, uses a diversification pattern, which involves planting more than one type of vegetable crop in a single plot of land. For farmers, diversification is an effort to optimize input use, especially the use of agricultural land, to increase production.

With the decreasing agricultural land, production can be increased by optimizing the use of production inputs, which include land, seeds, labor, fertilizers, and 8 pesticides. This research aims to examine the optimization of input usage in diversified planting patterns to increase the income received by farmers from various crop variations (Batubara & Mustika Pane, 2023).

Vegetables are a type of farming that has many risks and obstacles, resulting in suboptimal income for farmers. Therefore, farmers in Nagori Purbasari need to diversify their farming activities by managing the combination of vegetable types they cultivate. With an optimal combination, the goal of achieving maximum agricultural business profits can be attained. Based on this, the formulation of the problem in this research is:

How much is the production cost of vegetable farming with a diversification pattern of spinach, water spinach, and mustard greens in Nagori Purbasari, Tapian Dolok District, Simalungun Regency?

How large are the production, revenue, and income of vegetable farming with a diversified planting pattern of spinach, water spinach, and mustard greens in Nagori Purbasari, Tapian Dolok District, Simalungun Regency?

In relation to the background and problem formulation above, the objective of this research is:

To determine the production costs of vegetable farming with a diversification pattern of spinach, water spinach, and mustard greens in Nagori Purbasari, Tapian Dolok District, Simalungun Regency.

What is the level of production, revenue, and income from vegetable farming with a diversification pattern of spinach, water spinach, and mustard greens in Nagori Purbasari, Tapian Dolok District, Simalungun Regency?

## **II. Research Method**

### **Place and Time of the research**

The determination of the research area was conducted purposively. This research will be conducted in Nagori Purbasari, Tapian Dolok District, Simalungun Regency. The selection of the location was done intentionally based on the consideration that the area is a production region for vegetable crops supplying the Pematangsiantar City and Simalungun Regency areas. The research was conducted in October – November 2023.

### **Population, Sample, and Sample Size**

Population is a collection of data that share the same characteristics and become the overall object in research (Soekartawi, 1995). In this study, the population referred to is the number of vegetable farming practitioners who use diversification patterns, with a total population of 50 people in this research.

A sample is a portion of the population that serves as the source of data in the research. Where this method uses criteria that have already been selected by the researcher. With the limitations of the researcher's capabilities, the number of samples to be taken will use the Slovin formula with a margin of error of 15%.

N

$$n = \frac{N}{1 + N(e)^2}$$

Explanation:

n = Sample Size

N = Population Size

E = Margin of error

$$n = \frac{32}{1+50(15\%)^2} = \frac{32}{1+50(0.0225)} = \frac{32}{1+1,125} = \frac{32}{2,125} = 15 \text{ orang}$$

### **Data Collection Methods**

The collected data consists of primary data and secondary data. Primary Data. Primary data is obtained from direct interviews with respondent farmers using a prepared list of questions or questionnaires.

Secondary Data Secondary data were obtained from the Central Statistics Agency of Simalungun Regency, the Plantation Office of Simalungun Regency, and related agencies, literature, and other sources related to this research. The secondary data collected includes the state of the region, the state of the population, and agricultural production.

### Data Analysis Method

To determine the characteristics of farmers, descriptive analysis was used, which includes (age, gender, education, business experience, and number of family dependents). The collected data is then tabulated and analyzed quantitatively, both in terms of average amounts and in percentage form.

To answer the problem formulation, we use farm analysis by calculating production costs, receipts, and farm income. Farm analysis can be calculated using the following formula:

Total cost (TC) is the sum of all costs, namely fixed costs and variable costs incurred to produce output. The production cost of the farm is calculated using the following formula:

$$TC = FC + VC$$

Explanation:

TC= Total Cost (Rp)

FC = Fixed Costs (Rp)

VC = Variable Cost (Rp)

The equipment used in farming is not fully consumed within one year, so the allocation of equipment costs is done by calculating the depreciation of the equipment. According to (Prawirokusumo, 1990), depreciation is the allocation of the cost of fixed assets to expenses over their useful life in a systematic and rational manner. The depreciation calculation in this study is conducted using the straight-line method, which is formulated as follows:

$$D = (NB .NS)/UE$$

Explanation:

D: Depreciation cost of production equipment (Rp/unit/year)

NB: Purchase price of the equipment (Rp/unit)

NS: Residual value 20% of the purchase price (Rp/unit/year)

UE: Economic Life of the Equipment (years)

$$Pd = TR - TC$$

Explanation:

Pd = Net farm income (Rp)

TR = Total farm income (Rp)

TC = Total farming costs (Rp)

(Suratiah. K, 2015) gross income or revenue (TR) can be calculated using the following formula:

$$TR = Y . Py$$

Explanation:

TR = Gross income / farm income (Rp)

Y = Quantity of production (Kg)

Py = Production price (Rp / Kg)

### III. Results and Discussion

Based on the objectives of this research to determine the income results of respondent farmers in implementing vegetable crop diversification patterns, namely the commodities of spinach, water spinach, and mustard greens. The results and discussion regarding the analysis of the respondent farmers' farming activities are as follows:

#### Production Costs

The analysis of production costs in this study includes the costs of vegetable seeds, fertilizers, pesticides, and labor costs used during the research period, which is one month. The details are as follows:

Table 1. Production Costs of Farming Respondents:

| No | Type of Production Cost | Unit | Quantity |
|----|-------------------------|------|----------|
| 1  | Total Seed Cost         | (Rp) | 410,200  |
| 2  | Total Fertilizer Cost   | (Rp) | 418,950  |
| 3  | Total Pesticide Cost    | (Rp) | 289,633  |

|   |                       |           |
|---|-----------------------|-----------|
| 4 | Total Labor Cost (Rp) | 993,874   |
|   | Total                 | 2,112,657 |

Source: Primary Data Processed, Year 2023

The average production cost incurred by the respondent farmers in this study is Rp.2,112,657 per farm. Where the highest costs are incurred for the use of labor production facilities.

Table 2. Respondent Agricultural Business Analysis

| No | Business Analysis | Unit     | Quantity  |
|----|-------------------|----------|-----------|
| 1  | Production Cost   | (Rp)     | 2,112,657 |
| 2  | Revenue           | (Rp)     | 3.424.914 |
| 3  | Revenue           | (Rp)     | 1,312,257 |
| 4  |                   | R/C (Rp) | 1.6       |

Source: Processed Primary Data, Year 2023

In the agricultural analysis of this study, the average income value is Rp.1,312,257 per farm per month, with an R/C value of 1.6, meaning that for every Rp.1 spent by the farmer, they will receive Rp.1.6. The R/C value of 1.6 indicates that the vegetable diversification farming pattern of the respondent farmers in Nagori Purbasari, Tapian Dolok District, Simalungun Regency, is profitable but not yet feasible for further development.

#### IV. Conclusion

According to the research results, the conclusions that can be drawn are as follows: The average production cost incurred by the respondent farmers in this study is Rp.2,112,657 per farm. The highest cost is incurred for the use of labor production facilities.

The average income value is Rp.1,312,257 per farm in one month, with an R/C value of 1.6, which means that for every Rp.1 spent by the farmer, they will receive Rp.1.6. This R/C value of 1.6 indicates that the vegetable diversification farming pattern of the respondent farmers in Nagori Purbasari, Tapian Dolok District, Simalungun Regency is profitable but not yet feasible for further development.

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