ANALYSIS THE EFFECT OF PRODUCTION FACTORS AND INCOME OF SHALLOT FARMING AT DESA SUMLILI, KECAMATAN KUPANG BARAT, KABUPATEN KUPANG. (Analisis Pengaruh Penggunaan Faktor Produksi Terhadap Pendapatan Usaha Tanah Bawang Di Desa Sumlili Kecamatan Kupang Barat Kabupaten Kupang)

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ABSTRACT

This study aims to analyze the effect of the use of production factors on shallot production and shallot farming income in Sumlili Village, West Kupang District, Kupang Regency. The sampling technique was done by simple randomization which amounted to 38 respondents. The method used in this research is quantitative, with primary data obtained through direct interviews with respondent farmers and secondary data collected from the Central Bureau of Statistics and related agencies. This study analyzed five variables, namely land area, seeds, fertilizers, pesticides, and labor, using multiple linear regression analysis with Cobb-Douglas production function, as well as classical assumption tests and income analysis. The results showed that three production factors, namely land area, seeds, and fertilizers, had a significant effect on shallot production, while pesticides and labor had no significant effect. Simultaneously, the five variables have a significant influence on shallot production in Sumlili Village with a contribution of 80.7%, while the rest is influenced by other variables not studied. Based on income analysis, the average shallot production per farmer in Sumlili Village is 1,296 kg, with productivity per hectare reaching 5,130 kg and total production of 49,250 kg from 38 respondents, with a selling price in the season of Rp.15,000 per kilogram so that the amount of revenue per farmer is Rp.19,440,789. and the amount of revenue per hectare is Rp.76,953,125 with total production costs per farmer of Rp.6,061,197 and total costs per hectare of Rp.23,992,240 so that the average income per farmer is Rp.13,279,592 while the average income per hectare is Rp.52,960,885.

Keywords: production factors, red onion farming, income.

INTRODUCTION

Agriculture, particularly shallot farming, plays a vital role in Indonesia's economy, enhancing farmers' incomes and meeting the population's demand for vegetables and fruit. Shallots have multiple benefits—not only as a cooking ingredient but also as a high-value processed product—serving both household needs and boosting farmer income.

According to BPS (Statistics Indonesia) 2023, East Java leads Indonesia's shallot production with 484,669 tons, while East Nusa Tenggara (NTT) ranks 12th with 11,409 tons. As one of the top 20 shallot-producing regions, NTT has the potential to increase its output, which would in turn help improve farmers' livelihoods—especially in areas such as Kupang Regency.

BPS data shows that shallot production in Kupang Regency has fluctuated between 2021 and 2023. In 2021, production reached 21,196 quintals, declined to 17,309 quintals in 2022, and then surged to 45,540 quintals in 2023. This increase was largely driven by key producing areas, such as Kupang Barat Subdistrict.

Similarly, shallot production in Kupang Barat Subdistrict showed notable fluctuation. In 2021, production totaled 2,520 quintals, dropped sharply to 190 quintals in 2022, and then rose again to 1,470 quintals in 2023. This production instability reflects challenges faced in key shallot-producing areas such as Sumlili Village.

In Sumlili Village, shallot production data also reveals inconsistency: 102.760 tons in 2021, a decrease to 98.152 tons in 2022, followed by a rise to 105.131 tons in 2023. Although the village shows production potential, the output trend is unstable, highlighting ongoing problems faced by local farmers.

The challenges encountered by shallot farmers in Sumlili Village include labor shortages—leading to delayed harvesting—and a lack of agricultural knowledge, especially regarding inefficient pesticide use. This is primarily attributed to low education levels among farmers, which results in waste and suboptimal production management.

DATA ANALYSIS METHOD

Data Analysis Method Used in This Study:

1. Multiple Linear Regression

   To test the hypothesis, the study uses multiple linear regression analysis based on the Cobb-Douglas production function with the following formula:

$Y = a\ X1^{b1}\ X2^{b2}\ X3^{b3} X4^{b4}\ X5^{b5}\ e$…….

Y = Shallot Production
a = Intercept
b_1–b_5 = Regression Coefficients
X_1 = Land Area
X_2 = Seeds
X_3 = Pesticides
X_4 = Fertilizers
X_5 = Labor
e = Error Term

2. Classical Assumption Test
   1. Normality Test
   2. Multicollinearity Test
   3. Heteroscedasticity Test
   4. F test
   5. t test

3. Income Analysis

   According to Soekartawi (2002), farm income can be formulated as follows:

I = TR – TC

I = Income (Rp)
TR = Total Revenue (Rp)
TC = Total Cost (Rp)

RESULT AND DISCUSSION

General Overview of the Research Location

Sumlili Village is one of the 10 villages and 2 urban subdistricts located within Kupang Barat Subdistrict, Kupang Regency, covering an area of 140.4 km². The village population is spread across five hamlets, with the majority of residents working as farmers.

Geographically, Sumlili Village lies in Kupang Barat Subdistrict, about 5 km from the subdistrict capital and 56 km from the capital of Kupang Regency. The village borders Oematnunu and Lifuleo Villages to the west, Nekamese Subdistrict to the east, the Rote Strait to the south, and Batakte and Oenesu urban subdistricts to the north.

The total population of Sumlili Village is 2,044 people, distributed across five hamlets. Hamlet II has the highest population, with 625 residents, while Hamlet IV has the lowest, with 191 residents. Hamlet I follows with 583 people, Hamlet V with 337, and Hamlet III with 308 residents.

Respondent Characteristics

The respondents in this study are shallot farmers from Sumlili Village. Their characteristics were observed based on age, education level, farming experience, and number of dependents.

Age

The dominant age group among farmers is 45–54 years (16 farmers) and 40–49 years (9 farmers), making up 57% of the sample. The remaining 43% are either under 30 or over 49 years old.

Education Level

- Primary school graduates (SD): 23 respondents (60.5%)
- Junior high school graduates (SMP): 5 respondents (13.2%)
- Senior high school graduates (SMA): 10 respondents (26.3%)

Farming Experience

The majority of respondent farmers have more than 10 years of farming experience (57.9% or 22 respondents). The average experience is 11.03 years, with a standard deviation of 3.82, indicating that most are well-experienced.

Household Dependents

Most respondents have four or fewer dependents (60.5% or 23 people). The fewest are in the category of more than six dependents (2.7% or 1 respondent). The average number of dependents is 3.92, with a standard deviation of 2.22.

Land Size

The most common landholding size is 0.2–0.29 hectares (55.2% or 21 respondents), while the smallest group owns 0.1–0.19 hectares (18.5% or 7 respondents). The average land size is 0.25 hectares, with a standard deviation of 0.07.

Classical Assumption Test

1. Normality Test

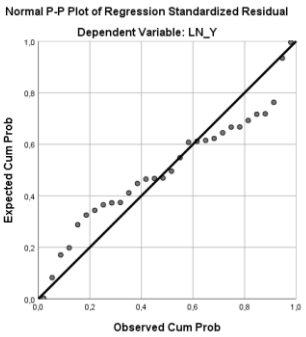

Figure 1. Normality Test

The research results show that the data points on the graph are scattered around and follow the direction of the diagonal line. This indicates a normal distribution pattern, meaning the normality assumption is fulfilled and the model is appropriate to be used in analyzing the influence of production factor use and shallot farming income.

2. Multicollinearity Test

The research results show that all five variables have VIF values < 10 or tolerance values > 0.1. Therefore, it can be concluded that there is no multicollinearity in the model used in this study.

3. Heteroscedasticity Test

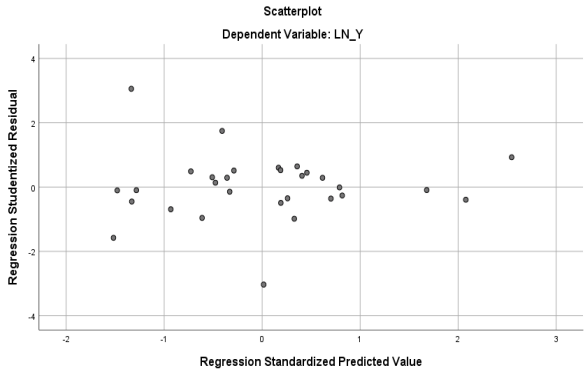

Figure 2. Heteroscedasticity Test

The research results show that, as seen in the diagram above, the model does not exhibit signs of heteroscedasticity, as there is no clear pattern in the scatterplot. The points are relatively well-distributed both above and below the zero line on the Y-axis.

Allocation of Production Factor Use on Shallot Production

Multiple Linear Regression Analysis

The results of the multiple linear regression analysis using the Cobb-Douglas production function are as follows:

Y = 2,811 X10,281 X20,687 X30,270 X40,032 X50,024

These results are transformed into natural logarithmic form (Ln), resulting in the following equation:

Y = 2,811 + 0,281 + 0,687 + 0,270 + 0,032 + 0,024

Hypothesis Testing Analysis

1. **F-Test (Simultaneous Test)**

   The estimation results show that the F-statistic (25.326) > F-table (2.51), with a significance level of 0.000 < α 0.05. Therefore, H_0 is rejected and H_1 is accepted. This indicates that the production factors—land area, seeds, fertilizer, pesticides, and labor—simultaneously have a significant effect on shallot production in Sumlili Village.

This finding aligns with Afrianika et al. (2020), who found that collectively, factors such as land area, labor, seed quantity, fertilizer, and pesticides significantly influence shallot production.

2. T-Test (Partial Test)

a. **Effect of Land Area on Shallot Production**

Partially, land area has a positive and significant effect on shallot production, with a t-statistic (3.886) > t-table (2.03693) and a significance of 0.001 < 0.05. A regression coefficient of 0.281 indicates that a 1% increase in land area increases shallot production by 0.281 kg, assuming other variables are constant.

b. **Effect of Seeds on Shallot Production**

Seed use has a positive and significant effect, with a t-statistic (12.350) > t-table (2.03693) and a significance of 0.000 < 0.05. The coefficient of 0.687 means a 1% increase in seed quantity boosts production by 0.687 kg. This is consistent with Safrina et al. (2022), who found that seeds significantly affect production with a coefficient of 0.425.

c. **Effect of Fertilizer on Shallot Production**

Fertilizer also shows a positive and significant effect: t-statistic (5.186) > t-table (2.03693) and significance of 0.002 < 0.05. The regression coefficient is 0.270, meaning that a 1% increase in fertilizer use increases production by 0.270 kg. This aligns with Rijal et al. (2016), whose study showed a regression coefficient of 1.169.

d. **Effect of Pesticides on Shallot Production**

The pesticide variable has a regression coefficient of 0.032, suggesting that a 1% increase in pesticide use may increase production by 0.032 kg. However, with a t-statistic (1.036) < t-table (2.03693) and significance of

0.310 > 0.05, the effect is not statistically significant. This supports findings by Awami et al. (2018), who also found no significant impact of pesticides on shallot production.

e. **Effect of Labor on Shallot Production**

Labor has a coefficient of 0.024, indicating that a 1% increase in labor use may increase production by 0.024 kg. However, with a t-statistic (0.543) < t-table (2.03693) and significance of 0.592 > 0.05, labor does not have a significant effect on shallot production. These results align with Afrianika et al. (2020) and Awami et al. (2018), who also found no significant labor influence.

3. **Coefficient of Determination (R^2)**

The adjusted R^2 value obtained using SPSS is 0.807, meaning the regression model explains 80.7% of the variation in shallot production through the independent variables (land area, seeds, fertilizer, pesticides, and labor). The remaining 19.3% is influenced by other factors outside the model. This is also supported by Taebenu et al. (2021), who emphasized the significant effect of land area on rice production in Kupang Tengah District.

Shallot Production, Costs, Revenue, and Income in Sumlili Village

a. Production

Total production from 38 respondents was 49,250 kg. The average productivity per farmer was 1,296 kg, and average productivity per hectare was 5,130 kg/ha.

b. Production Cost

The average total cost per farmer during the production process was IDR 6,061,197, while the average total cost per hectare was IDR 23,992,240.

c. Revenue

Revenue is the total value received by farmers over a given period, whether the produce is sold or not. Revenue is calculated by multiplying total production by selling price. The average revenue per farmer in Sumlili was IDR 19,440,789, and average revenue per hectare was IDR 76,953,125.

d. Income

Based on the analysis, the average income per shallot farmer during one planting season was IDR 13,379,592, and the average income per hectare was IDR 52,960,885.

CONCLUSION

Shallot farming in *Sumlili Village* is an agricultural activity involving several key stages—from land preparation, planting, fertilizing, and crop maintenance to harvesting. Farmers in this village typically cultivate shallots on plots averaging 0.25 hectares, with planting beds measuring 40 meters in length and 2 meters in width, using local seed varieties.

Fertilization is done using Urea and TSP fertilizers, applied at various stages of crop growth. Maintenance includes weeding and pesticide spraying. The harvesting process requires substantial labor, and the harvested shallots are sold both in local markets and outside the village. The average yield per farmer reaches 1,296 kilograms, making shallot farming a key source of income for the local community.

Among the five production factor variables examined in this study, three—land area, seeds, and fertilizer—have a significant impact on shallot production in Sumlili Village. However, when considered simultaneously, all five variables (land area, seeds, fertilizer, pesticides, and labor) have a significant effect, collectively explaining 80.7% of the variation in shallot production. The remaining 19.3% is influenced by variables not included in the model.

The average productivity per farmer in Sumlili Village is 1,296 kg, while average productivity per hectare is 5,130 kg/ha. The total production from 38 respondents was 76,950 kg. The average income per farmer was IDR 13,379,592, and the average income per hectare was IDR 52,960,885.

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