ABSTRACT

In agricultural growth, the horticulture subsector holds a crucial place. However, one of the most common and productive challenges that farmers deal with is capital limits. Lack of financing is frequently cited as a barrier to addressing rising production costs and erratic commodities selling prices. Financing for factors of production becomes challenging as a result. This study aims to analyze the influence of farm production factors on the income of horticultural farmers in East Java. Data collection was conducted in two locations, namely Wonomulyo Village, Poncokusumo District, Malang Regency, and Pacet Village, Pacet District, Mojokerto Regency. These two locations were chosen purposefully because they are horticulturally producing centers in East Java with the most financial institutions, with a total of 160 respondents. Data collection methods can include interviews using a questionnaire tool. To fulfill the research objective, multiple regression analysis has been used. The land area variable has the most influence since income and land area interact in such a way that as land area is utilized, revenue rises accordingly. The data indicates that there is a positive significance between land area and income in East Java’s horticulture farms. Farmers need to seek to intensify horticulture to increase production on existing land with a farming venture. As well as the development of the agribusiness system through Cooperative Farming.

Keywords: agriculture input; microfinance; revenue; farm income

How to cite:


1. Introduction

Horticulture is one of the agricultural commodities that is able to provide a source of foreign exchange for the country and contribute to the overall prosperity of the community. Horticultural commodities that include fruits, vegetables, medicinal plants, and ornamental plants are one of the agricultural sub-sectors that are able to increase the source of income for farmers and drive the national agricultural economy (Khan et al., 2020). In addition to being an important contributor to agricultural gross domestic product, horticultural commodities also play a role in meeting the food and nutritional needs of the Indonesian people (Varlamov et al., 2020).

The horticulture subsector occupies a strategic position in agricultural development. The contribution of the horticulture subsector to agricultural development continues to increase, as reflected in several indicators of economic growth, such as Gross Domestic Product (GDP), export value, and employment (Alston & Pardey, 2016; Lloyd et al., 2019). The strategic role of the horticulture subsector can still be improved, considering the potential and prospects for its development are quite good. The market potential...
of horticultural commodities for both domestic and international markets is still very high (Szelag-Sikora et al., 2015; Villagran & Jaramillo Noreña, 2020).

The development of the agricultural sector is expected to increase the production of farmers and the income of rural communities, especially horticultural farmers. Income is one of the economic indicators; in other words, the direction of economic development is to try to increase people's income, followed by increased productivity among horticultural farmers. But on the other hand, there are still many obstacles for farmers in increasing the income of the farming community (Binta BA & Barbier, 2015; Kirillova et al., 2020).

Capital constraints are one of the most productive factors that farmers often face. Farmers’ access to capital sources is still very limited both in terms of access to informal credit and formal credit, especially for farmers who control narrow land which is the largest community in rural communities. Therefore, it is not uncommon to find that lack of funds is an obstacle in dealing with rising costs of production factors and uncertain commodity selling prices (Martin & Clapp, 2015; Ng’atigwa et al., 2020).

The problems faced by cabbage farmers include seasonal vegetables, usually consumed in fresh conditions, which will affect their income (Hardana et al., 2014; Hoagland et al., 2018). In addition, Current business financing in the agricultural sector is almost entirely interest based. Banks generally show a lack of interest in financing the agricultural sector, which is considered to be at high risk, either because of natural disturbances such as floods and droughts, attacks by pests and plant diseases, or fluctuations in output prices (Turner et al., 2013). This makes it difficult to obtain financing for factors of production.

The main objective of any business activity is to obtain the maximum possible income with optimal expenditure, so the use of factors of production is important to maximize (Xu & Lin, 2017; Yuli Arma Andika, 2021). So, this study aims to analyze the influence of farm production factors on the income of horticultural farmers in East Java. In connection with that, an in-depth study is needed. The study aims to analyze the influence of farm production factors on the income of horticultural farmers in East Java.

2. Theoretical Underpinning

2.1. Farm Production Factors

In general, the characteristics of farms in Indonesia are narrow land, relatively small capital, limited farmer knowledge, and a lack of dynamics, resulting in low farm income. Limited capital is often the cause of farmers not being able to buy technology (Beausang et al., 2017; Jankelova et al., 2017). So, farming activities are usually carried out using the technology owned by farmers. Factors that influence farming consist of internal and external factors. Internal factors include technology, input use, and farming techniques (Boysen et al., 2016; Chen et al., 2021).

Farm income is the result of multiplying the production by the selling price. Farming costs are all expenses used on a farm, and farm income is the difference between expenses and income in farming (Li & Yang, 2015). Income is strongly influenced by the amount of production sold by the farmers themselves, so the greater the amount of production, the higher the income obtained (Baihaki & Hanafi, 2020; Himmati, 2017). Based on previous research, farm revenue and variable selling prices have a statistically significant positive influence. The actual state of affairs demonstrates how market supply and demand shape horticulture prices. In the market, supply is the quantity of commodities supplied by farmers at a specific selling price level, while demand is the quantity of products wanted by middlemen at a certain purchasing price level. The equilibrium price is reached when supply and demand in the market coincide, and it is equal to the selling price that producers want and what customers want to pay (Ho et al., 2017).

Farm income can be divided into two categories: net farm income and gross farm income. Net farm income is the difference between gross farm income and total farm expenses. Total farm expenses are the value of all inputs used in the production process, excluding labor in the farmer's family (Pariasa & Hardana, 2023; Pratiwi et al., 2019). Meanwhile, gross farm income is the total value of farm production within a certain period of time, both sold and not sold (Hardana et al., 2019, 2021). This is supported by previous studies that Farm income is statistically significant and negatively influenced by variable production costs. The more production costs for farmers translate into less money made, and vice versa; if other factors are considered, the more money will be earned the less amount of costs farmers endure (Abdullah et al., 2019). On the other hand, farm income and the land area variable have a statistically significant positive influence. Income and land area are directly correlated. The number of products produced increases with the amount
of land used for farming. Horticultural farms will see an increase in receipts due to greater production, which will translate into higher income.

Previous studies related to microcredit have focused on the effectiveness of credit programs in poverty reduction as well as household and firm behavior, such as per capita consumption, labor supply, business performance, and evidence of program success. While the research to be conducted is specific to the agricultural subsector which is closely related to capital. The magnitude of this potential makes the behavior of farmers in this area quite representative of the behavior of farmers in Indonesia in general. While the horticultural crops sub-sector, especially vegetables, is the sub-sector with the second highest growth in sectoral contribution (to Indonesia’s GDP) after plantation crops (Chisasa & Makina, 2015; Stein et al., 2016).

2.2. Farmer Income

The purpose of farming is to produce products from crops, fisheries, and livestock. All products produced in farming will then be sold, which is a source of income for farmers. Farm income can be calculated by reducing the total output value, or revenue, by the total input value, or cost. Products produced in farming are in the form of main products and by-products (Hardana et al., 2014). For example, in rice farming, the main product produced is grain, which will then be sold or milled. By-products include straw that can be sold for animal feed, compost, or other industrial materials (Francini & Sebastiani, 2019; Mwinuka et al., 2022).

According to, there are several terms used to describe the size of farm income and profits, namely gross farm income, which is divided into cash and non-cash gross income. Gross farm income is a measure of the total acquisition of resources used in farming. Gross farm income is defined as the value of total farm products over a certain period of time, both sold and not sold. In interpreting gross income, all unsold components must be valued at market prices (Pearce et al., 2018). Gross cash income, or farm income, is the value of money received from farming in the form of objects. Gross non-cash income is non-monetary income such as crops consumed, used for seed or fodder, used for payments, stored in warehouses, and received as payments in kind (Lin & Fei, 2015; Narayan & Bhattacharya, 2019).

Net farm income is the difference between gross income and farm expenses to measure the rewards obtained by farmers as a result of the use of factors of production. Net farm income measures the rewards received by farm families from the use of production factors of labor, management, own capital or borrowed capital invested into the farm (Chandio et al., 2020). The performance of small farms is assessed by measuring the net farm income obtained from the deduction between net income and interest paid to borrowed capital, imputed costs, and depreciation (Boyabatli et al., 2017; Kurbatova et al., 2020).

3. Research Methods

3.1. Research Location

This type of research is a survey, because in this research a list of questions (questionnaires) was prepared which was submitted to respondents in the form of samples at two locations, namely: (a) Wonomulyo village, Ponokusumo sub-district, Malang district; and (b) Pacet village, Pacet sub-district, Mojokerto district. These two locations were chosen purposefully because they are horticulturally producing centers in East Java with the most financial institutions. The number of financial institutions, easy access to financial institutions, the variety of vegetable commodities, and the high potential for vegetable commodity development were the reasons for selecting the research locations.

3.2. Research Sample

The determination of the number of samples in this study was carried out using the Slovin formula on the total population in each location.

\[ n = \frac{N}{1 + Ne^2} \]  

Description:

\( n \) = Number of samples
\( N \) = Total population
\( e \) = Error rate

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According to the data needs of this study, the population was divided into three groups: (a) farmers who do not access credit; (b) farmers who access formal credit; and (c) farmers who access non-formal credit. Therefore, respondents were selected using proportional stratified sampling to obtain a balanced sample for each category of farmers.

a. Sampling in Wonomulyo Village (Malang District)
   The total population of horticultural farmer households in this area amounted to 307, with a proportion of 95 non-credit user farmers, 70 formal credit user farmers, and 142 non-formal credit user farmers. Using the Slovin formula at an error rate of 10%, a qualified sample size of 76 respondents was obtained.

b. Sampling in Pacet Village (Mojokerto District)
   The total population of horticultural farmer households in this area amounted to 530, with a proportion of 175 non-credit user farmers, 165 formal credit user farmers, and 191 non-formal credit user farmers. Using the Slovin formula at an error rate of 10%, a qualified sample size of 84 respondents was obtained.

3.3. Data Collection

Data collection methods can include interviews using a questionnaire tool. Questions in the questionnaire are asked openly. Structured interviews with questionnaire tools equipped with research notes. Characteristics of respondents, Fixed costs (equipment depreciation, land rent, land tax), variable costs (seeds, fertilizers, pesticides, labor, production, price, revenue, and income).

3.4. Data Analysis

Multiple regression analysis is used to answer the research objective of the influence of farm production factors on the income of horticultural farmers in East Java. The parallel linear analysis used in this study refers to the parallel used as follows:

\[ \ln Y = \ln b_0 + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + u^e \]

Where:
- \( \ln Y \) = Income
- \( \ln X_1 \) = Selling Price
- \( \ln X_2 \) = Production Cost
- \( \ln X_3 \) = Land Area
- \( \ln X_4 \) = Credit Access Decision
- \( b_0 \) = Production factor elasticity of \( X_1, \ldots, X_4 \)
- \( e \) = Natural numbers (2,718)
- \( u \) = Error

Before making an estimate of the double regression model, the data used must be assured that it is free of the classic assumptions for multicolinearity, heterogeneity, and autocorrelation (Irawan Yogyadipratama & Prasetyo, 2018). This classical test can be said to be an econometric criterion to see whether the estimate meets the classical linear basis or not.

a. Normality Test

Normality tests are used to test whether in a regression model, dependent variables or both have normal or near normal distribution. If these assumptions are not met, either test F or test-t, and the estimated value of dependant variables becomes invalid. To approach normality on the regression model is by looking at the data spread (points) on the diagonal axis of the normal plot graph.

b. Multicolinearity test

Multicolinearity indicates that there is a perfect or certain linear relationship (correlation) between some or all of the variables that explain the regression model. To detect the absence of multicolinearity in the regressive model is by looking at the data spread (points) on the diagonal axis of the normal plot graph.

c. Heteroscedasticity test

The heteroskedasticity test is used to test whether in a regression model there are variance and residual inequalities from one observation to another. If the variance from the residual of one observation to the other is constant, then it is called homocedasthesis and if it is different then it’s called
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heterocedosthesis. As for the way to detect the existence or absence of heteroskedastisity Detection of the absence or existence of the heteroskedasticity can be done by seeing there are no specific patterns on the Scatterplot chart where the Y axis is the Y that has been predicted, and the X-axis is residual.

d. Autocorrelation Test

The autocorrelation test is one of the parts of the classic assumption test where a regression equation is said to have met the presumption that there is no auto-correlation using the Durbin Watson test. The purpose of the autocorrelation test is to find out whether in a linear regression model there is a correlation between the interference error and the previous error. As for the criticism of the test, if \( du < d < 4 – du \) then \( Ho \) is rejected which means there is no autocorrelation either positive or negative. To determine the accuracy of the regression model of the sample in assessing its actual value can be measured from its goodness of fit.

A multiple linear regression analysis with dummy variables is a multiple linear regression analysis in which one or more independent variables are dummy variables. Other names for dummy variables include: dummy variable, binary variable (two numbers), dichotomous variable (variable that divides two), categorical variable, and qualitative variable. Generally in regression analysis, dummy variables use code number 1 for observations included in the category with code number 0 used for observations that are not included in the category. Regression models with dummy variables have the following characteristics:

1) Category values are 1 and 0, as in the example above, where code 0 for farmers who do not access credit and 1 for farmers who access credit.

2) If a qualitative variable has \( c \) categories, then the dummy variable is \( c-1 \).

3) The category, group, or classification that is assigned a value of 0 can be referred to as the base category or control group.

4) The coefficient on the dummy variable can be referred to as the differential intercept coefficient.

4. Results and Discussion

4.1. Classical Assumption Test Results

a. Normality Test

The normality test aims to determine whether the data population is normally distributed or not. In this study, the normality test was carried out by looking at the distribution of data on the histogram and P-plot. The data is said to be normally distributed if the histogram is bell-shaped and most of the bars or bars are under the curve. While on the P-plot, the data is said to be normal if the data distribution is still around the P-plot diagonal line. The results of the normality test analysis can be seen in Figures 1 and 2 below.

From the results seen in the histogram and the P-Plot curve, it can be said that the data distribution in this study is normally distributed. This is because the histogram is bell-shaped and most of the bars are under the curve, and on the P-Plot curve, it can be seen that the data spreads evenly and follows the direction of the diagonal line.

![Histogram](image)

**Figure 1. Histogram**
b. Multicollinearity Test
   The multicollinearity test aims to test whether the regression model is found to have a correlation between the independent variables or not. In this study, the multicollinearity test was carried out by looking at the Variance Inflation Factor (VIF) and Tolerance values in the regression model. If the tolerance value is > 0.10, then there is no multicollinearity. Judging from the VIF value, if the VIF value is 10, then there is no multicollinearity. The multicollinearity test results can be seen in Table 1.

Table 1. Multicollinearity Test Results

<table>
<thead>
<tr>
<th>Model</th>
<th>Collinearity Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tolerance</td>
</tr>
<tr>
<td>(Constant)</td>
<td>0.690</td>
</tr>
<tr>
<td>Selling Price</td>
<td>0.313</td>
</tr>
<tr>
<td>Production Cost</td>
<td>0.388</td>
</tr>
<tr>
<td>Land Area</td>
<td>0.921</td>
</tr>
<tr>
<td>Credit Access Decision</td>
<td></td>
</tr>
</tbody>
</table>

The multicollinearity test results can be seen in Table 1.

c. Heteroscedasticity Test
   The heteroscedasticity test is used to assess the presence of inequality of variance of the residuals for all observations in the regression model. Residual variants must be homoscedasticity or residual variants are identical and do not form a certain pattern. Testing the presence or absence of heteroscedasticity can be seen from the scatterplot graph. If the scatterplot graph pattern has random dots in the image, it means that it does not show any pattern so it can be concluded that there is no heteroscedasticity in the regression model used. The results of the heteroscedasticity test can be seen in Figure 3.

Figure 3. Scatterplot Graph of Test Results Heteroscedasticity
   Based on Figure 3, it can be seen that the scatterplot graph shows points that are scattered randomly and do not form a certain pattern, so it can be said that there is no heteroscedasticity in the multiple linear regression model used.
d. Autocorrelation Test

The autocorrelation test is a test to determine whether there is a correlation of variables in the regression model with changes in time. Autocorrelation testing can be seen from the Durbin-Watson (DW) value and then compared to the Durbin-Watson table. The results of the autocorrelation test can be seen in Table 2.

Table 2. Autocorrelation test results

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significance (α)</td>
<td>0.05</td>
</tr>
<tr>
<td>Amount of data (n)</td>
<td>86</td>
</tr>
<tr>
<td>Independent variable (k)</td>
<td>4</td>
</tr>
<tr>
<td>Durbin Watson Value (DW)</td>
<td>1.919</td>
</tr>
<tr>
<td>du ≤ DW ≤ (4 – du)</td>
<td></td>
</tr>
<tr>
<td>dL Value</td>
<td>1.5536</td>
</tr>
<tr>
<td>dU Value</td>
<td>1.7478</td>
</tr>
</tbody>
</table>

Based on Table 2, it is known that the Durbin-Watson value is 1.919 and is between the dU and (4-dU) values. This indicates that there is no autocorrelation in the data used in the study.

e. Test Coefficient of Determination (Adjusted R²)

This test aims to determine the proportion or percentage of the total variation of the independent variables used in the model can explain the dependent variable. An adjusted R² value close to zero indicates that the data does not fit the regression model very well. Conversely, if the adjusted R² value is close to one, it indicates that the data fits the regression model.

From the results of the coefficient of determination test analysis, it can be seen that the results in the adjusted R² column show a result of 0.849. This means that the independent variables consisting of selling prices, production costs, land area, and credit access decisions are able to explain the dependent variable, namely income, by 84.9%. While the remaining 15.1% is explained by other variables not included in the model.

f. F Test

The F test is used to determine whether the independent variables have a joint (simultaneous) effect on the dependent variable. If the significance value is 0.05, it can be said that the independent variable simultaneously has a significant effect on the dependent variable, and vice versa if the significance value is > 0.05, the independent variable does not simultaneously have a significant effect on the dependent variable. The results of the F test can be seen in Table 3.

Table 3. F Test Results

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Square</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>76,831</td>
<td>4</td>
<td>15,366</td>
<td>96,382</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>12,754</td>
<td>81</td>
<td>.159</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>89,585</td>
<td>85</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the table above, it is known that the significant value is 0.000 <0.05. From the results of the F test above, it can be concluded that the variables selling price, production costs, land area, and credit access decisions simultaneously have a significant effect on the farm business income variable.

g. T Test

The T test is used to determine whether the independent variable has an individual (partial) effect on the dependent variable. If the significance value is 0.05, then the independent variable has a partially significant effect on the dependent variable. Meanwhile, if the significance value is > 0.05, then the independent variable has no significant effect on the dependent variable. The t-test results can be seen in Table 4.

Based on Table 4, it is known that the significance value of the variables selling price, production costs, land area, and credit access decisions is 0.05, with the significance values of each variable being 0.010, 0.027, 0.001, and 0.015. This means that the independent variable has a partial effect on horticultural...
Based on the estimation of the effect of credit access on horticultural farm income, the resulting model is as follows: \[ Y = 28.998 + 5.483X1 - 5.197X2 + 4.317X3 + 1.058D1 \]

**Table 4. T-test Results**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td>28.998</td>
<td>7.169</td>
<td>4.045</td>
<td>0.030</td>
</tr>
<tr>
<td>Selling Price (X1)</td>
<td>5.483</td>
<td>0.346</td>
<td>0.804</td>
<td>5.827</td>
</tr>
<tr>
<td>Production Cost (X2)</td>
<td>-5.197</td>
<td>0.491</td>
<td>-0.798</td>
<td>-1.578</td>
</tr>
<tr>
<td>Land Area (X3)</td>
<td>4.317</td>
<td>0.105</td>
<td>0.204</td>
<td>3.009</td>
</tr>
<tr>
<td>Credit Access Decision (X4)</td>
<td>1.058</td>
<td>0.092</td>
<td>0.028</td>
<td>2.493</td>
</tr>
</tbody>
</table>

### 4.2. Discussion of Multiple Regression Analysis Results

**a. Selling Price**

The significant value of the selling price variable is 0.010 (<0.05). The decision taken is H0 rejected and H1 accepted, so that the selling price has a significant effect on farm income. The selling price variable has a coefficient value (B) of 5.483, which is positively related, meaning that every one unit increase in selling price (in thousands) will increase farm income by 5.483 (in thousands), assuming other independent variables are constant.

The results are in accordance with the research of Prayana & Yuliarmi (2020), variable selling price is positively related and statistically significant to farm income. The situation in the field shows that the formation of horticultural prices is determined by market demand and supply. Demand is the amount of goods desired by consumers (middlemen) in the market at a certain purchase price level, while supply is the amount of goods offered by producers (farmers) in the market at a certain selling price level. The meeting between market demand and supply forms an equilibrium price, where the price is the selling price desired by producers and in accordance with consumer demand. Rustamova et al (2021), explains that demand and supply simultaneously determine the equilibrium price and quantity of a good. The higher the agreed selling price, the higher the income received by farmers.

**b. Production Cost**

The significant value of the production cost variable is 0.027 (<0.05). The decision taken is H0 rejected and H1 accepted, so that production costs have a significant effect on farm income. The production cost variable has a coefficient value (B) of -5.197, which is negatively related, meaning that every one unit increase in production costs (in thousands) will reduce farm income by 5.197 (in thousands), assuming other independent variables are constant.

The results of this study are in accordance with Fernandez-Diaz & Morley (2019), which states that variable production costs are negatively related and statistically significant to farm income. The greater the production costs incurred by farmers, the smaller the amount of income earned, and vice versa; the smaller the costs incurred by farmers, the greater the amount of income that will be received if it is assumed that other variables are cateris paribus. Korolkova et al (2020) states that the available capital (cost) is directly related to the role of farmers as managers and farm workers in managing their farm businesses. If farmers as managers cannot provide or allocate funds appropriately, the use of production factors is not in accordance with the provisions that should be made, so that productivity is low, and income is also low. This means that an increase in production costs is negatively related to farm income (Polyanskaya et al., 2021).

**c. Land Area**

The significance value of the land area variable is 0.001 (<0.05). The decision taken is H0 rejected and H1 accepted, so that the land area has a significant effect on farm income. The land area variable has a coefficient value (B) of 4.317, which is positively related, meaning that everyone hectare increase in land area will increase farm income by 4.317 (in thousands), assuming other independent variables are constant.

The results of this study are in accordance with the research of Samygin et al (2023), which state that the land area variable is positively related and statistically significant to farm income. Income is directly proportional to land area. Hosseinzadeh et al (2022) states that the more land area used for farming, the
greater the production produced. With the increase in production, horticultural farm receipts will increase, which will be followed by increased income.

d. Credit Access Decision

The credit access variable is a dummy variable presented with categorical data in the form of 0 for farmers who do not access credit and 1 for farmers who access credit. The significant value of the credit access variable is 0.015 (<0.05). The decision taken is that H0 is rejected and H1 is accepted, so that credit access has a significant effect on farm income. The credit access variable has a coefficient value (B) of 1.058, which is positively related, meaning that the income of farmers who access credit is 1.508 (in thousands) greater than the income of farmers who do not access credit.

The results of this study are in accordance with the research of (Varlamov et al., 2020), which state that accessing credit has a significant positive impact on farm income. By accessing credit, farmers will obtain additional capital that can be used to purchase production inputs so that farming activities can run smoothly. A well-run farming business will affect productivity, which will then correlate with an increase in farm income (Mwinuka et al., 2022).

5. Conclusion

Independent variables consisting of selling prices, production costs, land area, and credit access decisions have a significant role in influencing horticultural farm income. The variable land area provides the greatest significance because the influence between land area and income is that the more land area used, the more income increases. The influence between land area and income shows that land area has a positive effect on horticultural farm income in East Java. In order to maximize productivity on currently available land, farmers should look to intensify horticulture. This can be achieved by using superior seedlings, irrigation, appropriate fertilization in terms of types, dosages, timing, and procedures, as well as suitable cultivating practices and pest eradication. Contributing to the growth of the agribusiness system via cooperative farming.

Credit authorsip contribution statement: Andrean Eka Hardana: Writing – original draft and Methodology. Imaniar Ilmi Pariasa: Supervision, Writing – review & editing.

Declaration of competing interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this manuscript.

Data sharing: The data supporting the findings of this study can be obtained upon request.

Acknowledgments: Acknowledgements may be given of those who have helped carry out the study.

Funding: no funding.

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