Analysis of Relationship Between Production Factors of Citra Water Apple Business in Hamlet II Paya Salit, Langkat District

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Abstract. The purpose of this study is to analyze the relationship between land area, fertilizer, insecticide, and labor to the production of citra water apple business in Hamlet II Paya Salit Langkat. This research type is descriptive research that is researcher describe condition of variable of cultivation business of citra water apple. Population in this research is all farmer of citra water apple that exist in Hamlet II Paya Salit. The analytical method used is Chi-Square analysis using SPSS 18.0 software. The results showed that there was a significant relationship between land area, fertilizer, insecticide and labor on the production of citra water apple business in Hamlet II Paya Salit Langkat District with the correlation of the relationship between the business area, fertilizer to the production of 91.4%, and the correlation of labor relations with production of 87.4% and the correlation of the insecticide relationship with the production of 52.9%.

Keywords: Citra water apple, Production Factor, Production.

1. Introduction
Farming is a process of combining production factors such as area, labor, fertilizer and insecticide to produce agricultural products. The success of farming depends on three elements such as seeds, fertilizer, and management. Management includes the management of seeding, fertilizing, pruning, and control of plant diseases. In addition, management in farming is inseparable from the socio-economic characteristics of farmers so that it will affect the results obtained later.

Hamlet II Paya Salit, Langkat District is an area where most of the people work as farmers. One of the agricultural commodities that is widely cultivated by the community is citra water apple. Citra water apple is one of the leading commodities in Langkat Regency. Citra water apple farming is much in demand by farmers as a livelihood which is a source of farmers’ income. The prospect of the farmer working on citra water apple farming can increase farmers’ income. The advantage of the citra water apple is that it has a large size weighing around 200 grams to 350 grams, having a sweet and fresh taste. In addition, the content of vitamin C is also very high which is good for health. This results in a
very high demand for citra water apple and has an expensive price compared to other types of water guava.

The total production of water apple in Langkat Regency in 2015 was 2,456 tons and increased in 2016 to 3,845 tons. Production of water apple which is quite high in Langkat Regency is not a guarantee that productivity is also high. Decrease in productivity is thought to result from the use of production factors that are not efficient at the level of cultivators of the citra water apple. In the people's farming business, farmers usually function as decision makers who try to make effective and efficient decisions in running and managing their farming. The socio-economic characteristics of farmers can influence farmers in making decisions that can benefit their farming. So that the socio-economic characteristics will affect the income obtained by farmers so that the relationship between the factors of production and the production of citra water apple should be identified.

The use of appropriate and efficient production factors influences the income of farmers in the citra water apple. If production increases, it can eventually increase farmers' income in the citra water apple. The relationship between land area, fertilizer, insecticide, and labor to the production of citra water apple business in Hamlet II Paya Salit Langkat District.

2. Research Methods

2.1. Location Selection
The study was conducted in Pulau Sembilan Hamlet II Paya Salit langkat District. The location selection in this study was conducted purposively because Hamlet II Paya Salit is a place for cultivating citra water apple which has the largest harvest and production area in Langkat District.

2.2. Data Collection
The method of data collection was conducted in a survey of 45 citra water apple farmers. The data used in this study include primary data and secondary data. Primary data was obtained through interviews and filling out questionnaires by respondents, which aimed to obtain information and input on constraints and efforts that must be made in developing the cultivation of citra water apple on the Hamlet II Paya Salit Langkat District. Secondary data was obtained from the Langkat District Agricultural Service and related institutions as well as the literature supporting the research.

2.3. Data Analysis Method

2.3.1. Production Function. To see the relationship between input and output production, it would require a form of production function. According to the production function is a mathematical relationship between input and output [1]. Whereas according to the production function is a physical relationship between input and production [2].

Presentation of production functions can be done in various ways, among others in the form of graphs, tables or in systematic equations. Systematically, the production function can be indicated by the equation:

\[ \hat{Y} = f(X_1, X_2, X_3, X_4, X_5) \]  

Description:
\[ \hat{Y} : \text{Production (output)} \]
\[ X_1 : \text{Area} \]
\[ X_2 : \text{Labor} \]
\[ X_3 : \text{Fertilizer} \]
\[ X_4 : \text{Insecticide} \]

The production function shows that the amount of production depends on the factors of production which are a function of the factors of production used in the production process. In conducting an agricultural business, a farmer will always try to allocate the inputs he has as efficiently as possible to be able to produce maximum output.
2.3.2. Chi-Square Analysis. Data were analyzed quantitatively using the SPSS 18.0 for Windows (Spread Sheet For Statistic) computer program with Chi-square analysis test model. Determining the significance of a value equal to the calculated value is estimated using Table C in the statistical table with \(db = k-1\) and set = 0.05. If the probability associated with the calculated value is greater than the Table value, then reject \(H_0\) and accept \(H_1\).

Chi Square analysis is a non parametric statistical analysis, used to test whether the frequency of observed data from a categorical variable corresponds to the frequency of expectations. Chi Square Test Formula:

\[
X^2 = \sum \frac{(f_0 - f_{ax})^2}{f_{ax}}
\]

Description:
\(X^2\) = Chi Squared
\(f_0\) = Frequency of Observation Results
\(f_{ax}\) = Expected frequency in the study population, by sharing the number of subjects in the sample and subject categories.

The Chi Square test results in the value of Asympyotic Significance (Asymp. Sig.) Which shows whether there is a relationship between the two factors studied, and then compared with the value (0.05). Benchmark decision making Based on the value of Asymp. Sig. is Asymp. Sig. smaller than value (0.05), then \(H_0\) is rejected.

The decision making criteria are:
\(H_0\) accepted if \(X^2 \leq X^2\)
\(H_1\) accepted if \(X^2 \geq X^2\)

3. Results And Discussion

3.1. Analysis of the Relationship between Production Factors and Production.
Production of citra water apple has a relationship with several factors such as the use of production facilities consisting of area, labor, fertilizer and insecticide. The citra water apple area can be planted with 200 trees per hectare. Fertilizers used by farmers are compost, urea and NPK. Using one compost, the use of urea and NPK is 2 grams. Insecticide is used to prevent loss of citra water apple flowers and fruit. In addition, it is also used to prevent white lice that cause stems to dwarf due to the presence of parasites that feed on plant nutrients. Labor used in the business of citra water apple are workers and family members. The results of the research processed using Chi-Square analysis using SPSS version 18.0 soft ware can be seen in table 1.

| Variable     | Chi-Square Value | Significant Value | Contingency Coefficient |
|--------------|------------------|-------------------|-------------------------|
| Area         | 267              | 0.000             | 0.914                   |
| Labor        | 162              | 0.000             | 0.874                   |
| Fertilizer   | 267              | 0.000             | 0.914                   |
| Insecticide  | 43               | 0.000             | 0.529                   |

Source: Primary (processed) data, 2018.

3.1.1. Relationship between Area and Production. Chi-Square test analysis showed an area of 267 by the significance value of 0.000. These results indicate that \(H_0\) is rejected and \(H_1\) is accepted because the significance value is smaller than \(\alpha\). It can be concluded that there is a real relationship between the area with the production of a citra water apple on the Hamlet II Paya Salit Langkat District. The strength of the relationship between the two variables can be done by looking at the value of the contingency coefficient [3]. The value of the contingency coefficient obtained in the study is 0.914. This shows that there is a closeness in the relationship between the area and the production of a citra water apple of 91.4%.
The results of the study are the same as the research of cashew nut [4] which states that cashew farming area has a positive effect on $a = 5\%$, meaning that farmers with large land will have the opportunity to adopt high technology. With increasing land area, the level of technology adoption by farmers will be higher. This is due to the wider farming land that will increase the number of plants that farmers can cultivate with the possibility of production which also increases. Expectations of benefits and revenues from an innovation are one of the determinants of technology adoption rates [5].

3.1.2. Relationship between Labor and Production. The Chi-Square labor analysis test showed a value of 162 with a significance of 0.000. These results indicate that H0 is rejected and H1 is accepted because the significance value is smaller than $a = 0.05$. It can be concluded that there is a real relationship between labor and the production of a citra water apple on the Hamlet II Paya Salit Langkat District. The strength of the relationship between the two variables can be done by looking at the value of the contingency coefficient [3]. The value of the contingency coefficient obtained in the study was 0.874. This shows that there is a closeness in the relationship between labor and the production of a citra water apple of 87.4%.

Labor is one of the factors that influence the quantity of products produced by a company. Product quality is influenced by labor because the higher the skills and expertise of labor, will produce better products [6]. The income obtained by a company is determined by the efficiency of labor use, because the more labor is used, the more expenditure will be spent [7]. Many citra water apple farmers use labor from family members. Because of using family members, farmers do not count labor as expenditure because they do not pay wages.

3.1.3. Relationship between Fertilizer and Production. The Chi-Square fertilizer analysis showed a value of 267 with a significance of 0.000. These results indicate that H0 is rejected and H1 is accepted because the significance value is smaller than $a = 0.05$. It can be concluded that there is a real relationship between fertilizer and the production of a citra water apple on the Hamlet II Paya Salit Langkat District. The strength of the relationship between two variables can be done by looking at the value of the contingency coefficient [3]. The value of the contingency coefficient obtained in the study is 0.914. This shows that there is a closeness between the relationship between fertilizer and citra water apple production of 91.4%.

Plant needs for nutrients greatly affect crop production. Nutrients absorbed by plants will be used in the process of growth and development as well as the process of forming food reserves. Nutrient intake in plants can be given through fertilization [8]. Fertilizers are one of the determining factors for increasing the production of citra water apple. There are several things that must be considered to increase production through fertilization, namely the type of fertilizer, fertilizer dosage, fertilization method, fertilization time, and fertilization intensity. The development and progress of fertilization technology and the occurrence of changes in nutrient status in the soil cause the fertilization process to be considered and refined [9]. Continuous fertilizer treatment includes the type of fertilizer used, the amount of fertilizer, the time of fertilizer application, and the method of fertilizer application which will result in optimal quality growth of the citra water apple. Provision of 200 gram NPK fertilizer (15:15:15) every 2 months for plants less than 2 years old will produce maximum production.

3.1.4. Relationship between Insecticide and Production. The insecticide Chi-Square analysis showed a value of 43 with a significance of 0.000. These results indicate that H0 is rejected and H1 is accepted because the significance value is smaller than $a = 0.05$. It can be concluded that there is a real relationship between insecticide and the production of a citra water apple on the Hamlet II Paya Salit Langkat District. The strength of the relationship between the two variables can be done by looking at the value of the contingency coefficient [3]. The value of contingency coefficient obtained in the study was 0.529. This shows that there is a closeness between the relationship between insecticide and the production of a citra water apple of 52.9%.

Pest and disease control that attacks citra water apple plants is only done when it has caused losses. The use of insecticide production factors is the most widely used method in controlling pests and diseases in plants [10]. The use of insecticides is the easiest and most effective way, with the use
of effective insecticides that will produce satisfactory results. The main pest water apple is young leaf rollers, white fleas, stem borer and the most common are fruit fly pests which can cause fruit damage. Fruit wrapping can be done to prevent pests other than using methyl eugenol and trapping fly trapping glue [11].

4. Conclusion
The area, fertilizer, insecticide, and labor used are significantly related to the production of citra water apple cultivation in Langkat Regency. The closeness of the relationship between area, fertilizer with production of 91.4%, and the closeness of the relationship between insecticides and production of 52.9% and the closeness of labor relations with production of 87.4%.

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