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# Analysis of Factors Affecting Coffee Plantation Business Production in Bukik Barisan, Lima Puluh Kota

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**Abstract**

This research aims to analyze the factors that influence robusta coffee production in Bukik Barisan District, Limapuluh Kota Regency. The selection of research locations was carried out purposively with the consideration that Bukik Barisan District is one of the coffee cultivation centers in Limapuluh Kota Regency. The type of research or analysis used in this research is quantitative explanatory, namely a research method, which aims to analyze the influence of one variable on another. The data analysis method used is the multiple linear regression method. The independent variables observed, namely land area, labor, fertilizer, and pesticides, together have a significant effect on Robusta coffee production in Bukik Barisan District. The factor that most influences robusta coffee production is the land area variable.

***Keywords:*** production factors; robusta coffee; regression.

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## 1. Introduction

Plantation is one of the potential agricultural subsectors. The plantation subsector has plant characteristics that can be grouped into two, namely annual plants and annual plants. Annual plants are plants that require a long time to produce. Usually the production period of annual crops reaches decades and can be harvested more than once. Examples of annual plants include: coconut, oil palm, rubber, cocoa, cloves, coffee, pepper, nutmeg, candlenuts, cinnamon, vanilla, tea, kapok, and so on. Meanwhile, annual plants are plants that can only be harvested once with a life cycle of once a year. Examples of annual plants include sugar cane, citronella, patchouli and tobacco [1].

One of Indonesia's plantation products which is a national superior commodity and has competitiveness in the international market is coffee. The important role of coffee in the Indonesian economy includes, among others, as a source of foreign exchange earnings, providing employment opportunities, and as a source of income for coffee planters and other economic actors involved in processing and marketing [2].

West Sumatra Province is a fertile area for agriculture. The agricultural sector dominates the economy of West Sumatra and most of the population works in the agricultural sector. The food crop agriculture sector is a source of food security in West Sumatra and developments in recent years have shown that the plantation sector has emerged as a leading sector to enter the export market and generate foreign exchange [3].

According to the West Sumatera Food Crops and Horticulture Department, the area of coffee plantations in West Sumatra Province reaches 15,444 hectares with a production of 13,770 tons per year. In this land area, West Sumatra coffee is dominated by Robusta coffee compared to Arabica coffee. Based on 2022 data, the area of Arabica coffee land is 3,240 hectares with a production of 2,680 tons. Meanwhile, for Robusta coffee, the land area is 12,204 with production of 11,090 tons. Coffee plantations in West Sumatra are spread across a number of districts and cities, namely Solok Regency, Tanah Datar, Limapuluh Kota, South Solok, Pasaman and Padang City.

One of the areas in Limapuluh Kota Regency that cultivates robusta coffee is Bukik Barisan District. This area has great potential for coffee development at 696 meters above sea level with good fertility. In 2020, Bukik Barisan District will become the largest producer of robusta coffee in Limapuluh Kota Regency. However, productivity is smaller compared to other sub-districts such as Mungka District.

Bukik Barisan District as a center for robusta coffee production in Limapuluh Kota Regency must be increasingly productive and efficient in producing coffee every period. One way to increase production is to increase the efficiency of the production factors used. The production factors in question are land area, plant age, labor, and fertilizer. Land area and labor factors play an important role in supporting the success of coffee production. Land area and capital are very important means of production. Appropriate and efficient use of capital will result in high production. In addition, the labor production factor together with other production factors, if used optimally and efficiently, will be able to increase production optimally. Any productive and proportional use of labor can almost always increase production.

According to Sukirno 2003 [4] the production function shows the nature of the relationship between production factors and the level of production produced. The factors of production are known as inputs and the amount of production is known as output. Production factors or inputs are absolutely necessary to produce production. In this production, a farmer is required to be able to combine several production factors so that they can produce optimal production.

## II. Implementation Method

This research was conducted on farmers who cultivate robusta coffee plants in Bukik Barisan District. The selection of research locations was carried out purposively with the consideration that Bukik Barisan District is one of the coffee cultivation centers in Limapuluh Kota Regency. Data collection was carried out in September-October 2023. The type of research or analysis used in this research is quantitative explanatory, namely a research method, that aims to analyze the influence of one variable on another. According to Sugiyono [5], explanatory research is research that explains causal relationships between variables that influence the hypothesis. The main reason for choosing this type of explanatory research is to be able to explain and determine the influence of the independent variable on the dependent variable.

The data used in this research are primary and secondary data. Primary data is data obtained from direct observation from the source (farmers) or facts obtained in the field. Primary data was obtained from interviews with a number of farmers, informants and entrepreneurs who were directly involved in coffee farming activities and coffee commodity development using an open-ended, structured questionnaire. Secondary data was collected from various literature, research documents at agricultural, plantation agencies, the Central Statistics Agency, the Limapuluh Kota Regency Plantation Service and other related agencies.

The data analysis method used is the Multiple Linear Regression method.

$$Y = \alpha + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + e$$

Where,

AND : Coffee Production (Kg/month)

a : Constant

b1...b4 : Regression Coefficient

X1 : Land area (Ha)

X2 : Workforce (HOK/month)

X3 : Fertilizer (Kg/month)

X4 : Pesticides (Kg/month)

It is : Residual value

## III. Results And Discussion

### *3.1 Characteristics of Respondents*

**Table1:** Characteristics of Respondent

| No. | Respondent Characteristics | Rate |
|---|---|---|
| 1 | Farmer age (years) | 56 |
| 2 | Level of education | SD |
| 3 | Coffee farming experience | 26 |

Based on Table 1 above, you can see the characteristics of respondents based on age, level of education and experience in coffee farming. The age of the respondent farmers in the research area is of productive age. Where according to the Regulation of the Minister of Manpower of the Republic of Indonesia Number 10 of 2021 concerning the Strategic Plan of the Ministry of Manpower for 2020-2024, productive age is between 15 and 64 years old. With these conditions, it is hoped that farmers can optimally manage their farming in order to increase production.

The level of education is an important factor in increasing agricultural production. Education usually influences the way farmers think about carrying out their farming activities. This is in line with the results of Parman's research which shows that education has a significant effect on modern agricultural productivity. The emergence of public schools provides benefits for farmers to know and adapt when there are new innovations in the agricultural sector.

The experience of the respondent farmers in coffee farming in the research area is quite long, namely 26 years. Farmers' experience is also very helpful and supports their ability to adopt technology in their farming business. As an assumption, the higher the level of experience gained, the broader the farmer's mindset will be. So the low level of experience of a farmer is one of the obstacles to developing the agricultural sector. The high level of experience of farmers can also support efforts to manage agricultural land that does not damage the surrounding ecosystem [6]

### *3.2 Analysis of Factors Affecting Coffee Production*

Based on the results of data analysis, the regression coefficient values for each production factor are obtained in Table 2. The production function equation is written as follows:

$$LnY = 52.393 + 0.073\ LnX1 + 7.198\ LnX2 - 0.062\ LnX3 + 0.851\ LnX4$$

The results show that the data tested does not contain multicollinearity because the VIF values of all the estimator variables are less than 10. The VIF values of X1 to Gujarati [7] stated that the multicollinearity test

can be seen from the output collinearity statistics. If the VIF < 10 then there is no multicorrelation. Based on the results of the heteroscedasticity test, it shows that all independent variables do not have heteroscedasticity, because the values of X1 to Based on the results of the autocorrelation test, it shows that the data tested does not have autocorrelation, because the Durbin-Watson value is 1.050 and is between -2<DW<2 [8].

**Table 2:** Results of Analysis of Factors Affecting Production

| **Variable** | **Regression Coefficients** | **T** | **Sig.** |
|---|---|---|---|
| constant | 52,393 | 0,109 | 0,915 |
| Land Area (X1) | 0,073 | 7,465 | 0,001 |
| Workforce (X2) | 7,198 | 0,091 | 0,929 |
| Fertilizer (X3) | -0,062 | -0,183 | 0,857 |
| Pesticides (X4) | 0,851 | 0,435 | 0,670 |
| Adjusted R Square | | | 0,780 |
| F count | | | 0,000 |

The effect of using Robusta coffee production factors on the amount of Robusta coffee production in Bukik Barisan District, Limapuluh Kota Regency can be determined through the adjusted R square value, F test and t test in Table 2 which are explained as follows:

a. Based on the adjusted R Square value of 0.780, it shows that the large percentage of variation in robusta coffee farming production that can be explained by variations in the independent variables, namely land area, labor, fertilizer and pesticides, is 78%, while the remaining 22% is explained by other variables. outside research.
b. Based on the F test analysis, it can be seen that the significance value is 0.000. This value is significant because $p < 0.05$, so H0 is rejected and H1 is accepted. This shows that the observed independent variables, namely land area, labor, fertilizer and pesticides, together have a significant effect on Robusta coffee production in Bukik Barisan District.
c. Based on the t test analysis, it can be seen that partially land area has a significant effect ($p>0.05$) on Robusta coffee production. Meanwhile, the variables of labor, fertilizer and pesticides do not have a significant effect on Robusta coffee production ($p>0.05$) .

Based on the t test calculations, it can be seen that the partial test results for each independent variable (land area, labor, fertilizer and pesticides) are partial for the dependent variable. Robusta coffee farming production in Bukik Barisan District can be analyzed as follows:The land area variable (X1) obtained a coefficient value of 0.073 and a significant value of 0.001, this value indicates that the significant value is smaller than the level of significance ($\alpha = 0.05$). So, this is in accordance with the hypothesis which states that land area has a positive effect on robusta coffee farming production in Bukik Barisan District.Based on the research results, it is known that labor partially has a significant effect on Robusta coffee production. The multiple regression coefficient obtained is 0.091, meaning that every 1% increase in labor will increase production by 0.091%. This means that increasing the number of workers will increase Robusta coffee production in Bukik Barisan District. This is in

accordance with the opinion of [8] who states that the use of labor must be in accordance with the needs of a farming activity in order to obtain continuously increasing production. This also agrees with the opinion of Risnandewi [9] who stated that increasing the number of workers will increase the amount of Robusta coffee production.Partial use of pesticides has a real influence on robusta coffee production. The multiple regression coefficient obtained was 0.435, meaning that every 1% addition of pesticides would increase production by 0.435%. The effect of pesticide use on coffee production in the study area did not have a significant effect. This is caused by several things, including (1) farmers are not wise in using pesticides, (2) limited capital in providing pesticides for their farming and (3) not all respondent farmers use pesticides in their coffee farming. The type of pesticide used by farmers in the research area is a type of insecticide that plays a role in controlling pests on coffee. Farmers prefer to control pests manually, so they still use a little pesticide.

## IV. Conclusion

Based on the results and discussion, it can be concluded that the independent variables observed, namely land area, labor, fertilizer and pesticides, together have a significant effect on Robusta coffee production in Bukik Barisan District. The factor that most influences robusta coffee production is the land area variable. For further research activities, factors that have no influence do not need to be considered for better management.

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