This study aimed to determine what factors influence coffee production in Uluway Village, Mengkendek Sub District of Tana Toraja District. The research was conducted from March to May 2020 where these factors include land area, labor, fertilizers, and pesticides. This study aimed to determine what factors influence the people's coffee production in Uluway Village, Mengkendek Sub District of Tana Toraja District. The population of this study was all the farmers who cultivated coffee in Uluway Village, Mengkendek Sub District of Tana Toraja District. The sample of this study was 78 respondents who were determined by using the census method. The analytical method used is descriptive qualitative data analysis, the second data analysis using multiple linear regression analysis, and the third. The research results can be drawn from several conclusions, including the coffee farming processing techniques in Uluway Village, namely land preparation, planting, maintenance, harvesting, and postharvest. Factors that have a real effect include land area, fertilizers, and pesticides, while factors that do not affect coffee production are labor.

**Keywords**: coffee; production; Tana Toraja District

**INTRODUCTION**

Indonesia is the world's fourth-largest coffee producer after Brazil, Vietnam, and Colombia. Around 67% of total coffee production is exported, while the rest (33%) is for domestic needs. Coffee (Coffea sp) is one of the food agro-industry products favored by the community. This is because coffee has a distinctive aroma that is not shared by other beverage ingredients. The existence of coffee has become a part of everyday life both in Indonesia and abroad. Coffee is one of the traditional plantation commodities that has an important role in the Indonesian economy. The achievement of coffee productivity in Indonesia has only reached 700 kg/ha/year. This condition can still be increased to its potential, 1,200 kg/ha/yr (Santoso et al., 2015). Efforts that can be taken through the role of the government provide certainty of the availability of quality seeds and fertilizers in the field (Thamrin, 2014).

South Sulawesi is one of the agricultural areas in the plantation sector that produces cloves, cocoa, coffee, pepper, etc. Two types of coffee have been cultivated in South Sulawesi, namely Arabica and Robusta coffee. Most of the population in South Sulawesi are coffee connoisseurs, so farmers must be able to provide raw materials to be processed by industrial businesses to meet the needs of coffee connoisseurs. Tana Toraja District is a District in South Sulawesi Province that produces Toraja coffee which is one of the most popular coffee variants and has the best quality that Indonesia has.

The characteristics of the original Toraja coffee are very distinctive. Therefore this type of coffee can be the best coffee that Indonesia has. Toraja coffee has a taste after consumption that is not too bitter, so that it makes this coffee different from other Indonesian coffee variants. Not only that, but Toraja coffee also has a very distinctive and fragrant aroma even when we open the packaging.

The results of coffee plantations in Uluway Village are very varied. In 2017 coffee production was 209,643Kg while in 2018, coffee production increased by 269,200Kg but in 2019, coffee...
production dropped drastically to 134,100 kg (BPS, 2019). Seeing the various coffee production in Uluway Village, it is necessary to pay attention to what factors affect the production of coffee farming in Uluway Village, Mengkendek Sub District, Tana Toraja District so that farming production continues to increase.

MATERIALS AND METHODS

This research was conducted in Uluway Village, Mengkendek Sub District, Tana Toraja District from March to May 2020. The population in this study included the population was coffee farmers in this study as many as 346 respondents. To determine the sample in this study used the slovin formula (Rianse and Abdi, 2008) and obtained 78 respondents.

The variables in this study include production, land area, labor, fertilizers, pesticides. To find out the technical processing of coffee farming, it can be analyzed using descriptive analysis. Furthermore, multiple linear regression analysis was used. Multiple linear regression analysis was used to analyze coffee farming production factors in Uluway Village, Mengkendek Sub District, Tana Toraja District. Multiple linear regression analysis models can be formulated as follows (Maja and Sudibya, 2012).

\[ Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e \]

Information:
- \( Y \) = Production (Kg/Ha)
- \( X_1 \) = Land Area (Ha)
- \( X_2 \) = Labor (HOK)
- \( X_3 \) = Fertilizer (Kg)
- \( X_4 \) = Pesticide (L)
- \( a \) = Constant
- \( b \) = Regression coefficient
- \( e \) = error

RESULTS AND DISCUSSION

Respondent Identity

The identity of the respondents in the study consisted of age, education level, farming experience, number of dependents, and land area, as shown in Table 1

Table 1. Age condition of respondents in Uluway Village, Mengkendek Sub District, Tana Toraja District

<table>
<thead>
<tr>
<th>Description</th>
<th>Number</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 – 55 (Productive)</td>
<td>66</td>
<td>85</td>
</tr>
<tr>
<td>&gt;55 (Non-Productive)</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary School</td>
<td>22</td>
<td>23</td>
</tr>
<tr>
<td>Middle school</td>
<td>31</td>
<td>50</td>
</tr>
<tr>
<td>High school</td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td>Farming Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5</td>
<td>22</td>
<td>19</td>
</tr>
<tr>
<td>6-10</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>&gt;10</td>
<td>33</td>
<td>60</td>
</tr>
<tr>
<td>Number of Family Dependents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3 (small)</td>
<td>45</td>
<td>50</td>
</tr>
<tr>
<td>4-6 (medium)</td>
<td>30</td>
<td>45</td>
</tr>
<tr>
<td>&gt;6 (big)</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Cultivated Land Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;2 Ha</td>
<td>2</td>
<td>98</td>
</tr>
<tr>
<td>0.5 – 2 Ha</td>
<td>76</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 1 shows that the age condition of the respondents in Uluway Village is in the productive group with an age range of 15-55 years with a percentage of 85% where the more effective the age, the better it is expected to be in managing their farming. This means that the respondents’ physical
ability and thinking ability in Uluway Village is still productive, so the respondents' farming tips are very high. High production yields evidence of this.

Table 1 explains that the respondents in this study have an education level. Namely, most of them have a junior high school education (SLTP), with 31 respondents with a percentage of 50%. With a fairly good education, it is hoped that respondents will find it easier to accept and implement innovations that can improve their farming. From the description above, it can be concluded that the respondent's education is dominated by Junior High School (SMP) graduates, as many as 31 people or 50% of the total sample, so it can be concluded that the respondent farmers in Uluway Village already have the basic knowledge to develop their farming.

Table 1 shows that the farming experience of respondents in this study is at most >10 years, which can be categorized as experienced with 33 people or 60%, so it can be said that farmers in Uluway Village are experienced and have the knowledge to increase their farming production. It can be noted that the respondent farmers are experienced and can increase their farm production. The amount of experience in farming will affect the skills to maintain and manage the agriculture run by the respondent farmers. Experience in business will always bring change for farmers in Uluway Village in managing their farming.

Table 1 shows that the number of dependents in Uluway Village is at most 1-3 people and can be categorized in the number of dependents of small families with 45 people or 50%. From the table above, it can be concluded that as many as three respondent farmers have family dependents of more than six people, so when there are more and more dependents, their families will try to fulfill their needs, namely by doing coffee farming in the hope of getting greater profits to meet the needs of their families.

Table 1 states that the respondent's land area in Uluway Village is 0.5-2 Ha and can be categorized as a medium arable area of 77 people or 99%. This can be interpreted that farmers in Uluway Village are still classified as a medium group, assuming that cultivating an area of 0.5-2 Ha will get production results that can increase their income.

Classical Assumption Analysis and Regression Analysis

Classical assumptions in research consist of Multicollinearity Test, Autocorrelation Test, Heteroscedasticity Test, and regression analysis consists of F test and t-test

<table>
<thead>
<tr>
<th>Model</th>
<th>Regression Coefficient</th>
<th>t</th>
<th>Sig.</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>-710.540</td>
<td>5.782</td>
<td>0.000*</td>
<td>7.606</td>
</tr>
<tr>
<td>Land area</td>
<td>204.507</td>
<td>5.908</td>
<td>0.000*</td>
<td>6.530</td>
</tr>
<tr>
<td>Labor</td>
<td>0.148</td>
<td>0.636</td>
<td>0.527*</td>
<td>9.529</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>0.103</td>
<td>2.024</td>
<td>0.047*</td>
<td>6.530</td>
</tr>
<tr>
<td>Pesticide</td>
<td>0.240</td>
<td>0.478</td>
<td>0.000*</td>
<td>8.484</td>
</tr>
<tr>
<td>Durbin-Watson</td>
<td>1.745</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>659.161</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>0.986</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R Square</td>
<td>0.972</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted R Square</td>
<td>0.973</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Information: * = Significant. ns = Not Significant

Multicollinearity Test

The multicollinearity test aims to test whether in the regression model there is a correlation between the independent variables in a good regression model. There should be no correlation between independent variables or independent variables (Ghozali, 2008). The test method commonly used to determine the presence or absence of multicollinearity symptoms in a regression model is by looking at the Tolerance and VIF (variance inflation factor) values. The results of the multicollinearity test can be seen in Table 2. The results of the multicollinearity test can be seen that all independent variables have a tolerance value of more than 0.1 and a VIF of less than 10. This is in line with Ghozali’s research (2018) that a regression model that is free from multicollinearity symptoms has a value of Tolerance is more than 0.1, and the VIF value is less than 10. Thus, it can be said that the model does not have multicollinearity symptoms.
Autocorrelation Test

The autocorrelation test aims to test whether in the linear regression model there is a correlation between the confounding error in period t and the confounding error in period t-1 (previous). One way that can be used to detect the presence or absence of autocorrelation is to use the Durbin Watson (DW) test. The results of the autocorrelation test can be seen in Table 2. The autocorrelation test results show that the Durbin Watson (DW) value is 1.745 while the DW distribution table with α = 5%. n = 78 and k = 4 obtained the value of dL 1.5265. dU is 1.7415. 4-du obtained a value of 2.2585, so it can be seen as follows. 1.7415 < 1.745 < 2.2585. This is in line with Ghozali's research (2018) which states that the DW test of Du and Dl values can be obtained from Durbin Watson's statistical table, which depends on the number of variables. Suppose the Durbin Watson (DW) value is between dU and 4-du, du < d < 4-du, then the regression model is free from autocorrelation problems. This indicates that DW is between dU and 4 – dU. Thus the regression model is free from autocorrelation problems.

Heteroscedasticity Test

The heteroscedasticity test determines an inequality of variance from the residual of one observation to another in the regression model. A good regression model is the absence of heteroscedasticity. One way to detect the presence or absence of heteroscedasticity can be done by looking at the presence or absence of certain patterns on the scatterplot graph. The basis for making decisions from the graph analysis is a certain and regular pattern (wavy, widening, and then narrowing). Then it is indicated that there is a heteroscedasticity problem so that if a clear way is not found, namely the point spread, there is no heteroscedasticity problem (Ghozali, 2018). The results of the heteroscedasticity test can be seen in Figure 1.

![Scatterplot Graph](image)

**Figure 1.** The results of the heteroscedasticity test using the scatterplot graph method

Based on Figure 1, the results of the heteroscedasticity test using the Scatterplot graph method can be seen that the points have spread out and do not form a certain pattern that collects. It can be concluded that the regression model indicated that there was no heteroscedasticity problem.

Normality Test

The normality test aims to test whether the residual value of each variable is normally distributed or not. One way that can be used to detect the normality of the data is by analyzing the normal P-P plot graph. The way to see it is by looking at the spread of the information on the diagonal axis on the normal P-P Plot of regression residual as the basis for making decisions. Suppose the points spread around the line and follow the diagonal line. The residuals in the regression model are normally distributed. However, if the distribution of these points is away from the bar, then it is not normally distributed (Ghozali, 2018). The results of the normality test using the P-P Plot graph method can be seen in Figure 2.
Based on Figure 2, the normality test results using the P-P Plot normal graph method are known that the points are located around the line and follow the diagonal line. Thus, the residual data is said to be normally distributed.

The results of the classical assumption test can be concluded that all classical assumptions are met. Namely, there are no symptoms of multicollinearity, autocorrelation, heteroscedasticity, or normality. Therefore, the requirements to perform multiple linear regression analyses have been met. Multiple linear regression analysis was used to determine the relationship between independent variables, which include: land area (X1), labor (X2), fertilizer (X3), and pesticides (X4) on production (Y).

**F Test (Simultaneous Test)**

The F test is used to determine whether all independent variables (land area, labor, fertilizer, pesticides) included in the model or equation have a combined effect on the dependent variable (production). The results of the F test analysis can be seen in Table 2, which shows that the df value for the numerator is 4. df for the denominator is 73, so that the F table value is 2.50 while the calculated F value is 659.161. From these results, the estimated F value is 659.161>F table (2.50). In addition, the significance level also produces a value of 0.000 < a significance level of 0.05, so it can be concluded that the variables of land area, fertilizers, and pesticides together have a significant effect on production. It is known that the adjusted R² value is 0.972 while the R Square value is 0.973. This shows that 97.2% of coffee production in the study area can be explained by variables of land area, labor, fertilizers, and pesticides. In comparison, 12.8% is influenced by other variables not included in the regression model. This is in line with the research of Ambarita and Kartika (2015), which states that the coefficient of determination denoted by R² is an important measure in regression because by looking at R², we can see information about the good and bad of an estimated regression. The value of the coefficient of determination illustrates how the independent variable can explain much variation of the dependent variable by seeing that the R² value is 0.656. It can be shown that 65.60 percent of coffee production can be explained by the variables of land area, pesticides, labor, and fertilizers, while the remaining 34.40 is defined by variables not included in the regression model.

**t-test**

The t-test is used to see how much influence the independent variables (land area, labor, fertilizer, and pesticides) have individually or individually on the dependent variable (production). The results of the T-test analysis in Table 2 can explain the effect of each independent variable (X_i) partially (alone) on the land area (Y). Factors that affect production in Uluway Village, Mengkendek Sub District, Tana Toraja District are land area, fertilizers, and pesticides, while the factors that do not
affect productivity are labor. Based on the results of data analysis as presented in Table 4.8, the following regression equation is obtained:

\[ Y = \alpha + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + e_i \]

The constant of (-710,540) with a significant level of 0.000 means that if the area of land \((X_1)\), labor \((X_2)\), fertilizer \((X_3)\), pesticides \((X_4)\) the value is 0 then the production \((Y)\) value is (-710,540). This means that when \(X_1 X_2 X_3 X_4\) has a value of 0 it will reduce production by 710,540 Kg.

Factors Affecting Production

Land area

Factors that influence production in Uluway Village, Mengkendek Sub District, Tana Toraja District land area. Based on Table 4, it is known that the regression coefficient of the land area is 204,507, and the t-count value is 5.908 with a significance level of 0.000 while the t-table value is 3.198. This shows that the matter of \(t\) arithmetic \((5.908) > t\) table \((3.198)\) and a significance level of 0.000 which is < 0.05, so it can be said that the variable land area has a positive effect on coffee production in Uluway Village, Mengkendek Sub District, Tana Toraja District. The estimated regression coefficient of the land area is 204,507, which means that every 1 ha increase in the land area will cause the opportunity for coffee production to increase by 204,507 Kg.

Similar to Pamoriana's research (2013), which states that the coffee plantation area significantly affects coffee production, the wider the coffee plantation area, the more coffee production is obtained. Noferid's research (2016) states that land area is an important factor for increasing production. Suitable soil conditions make farmers process to land that already exists and has not been used for coffee cultivation. Meanwhile, Rusdiah (2008) stated that land in the agricultural sector has an important role in farm business and production processes. This is because the land has productivity in producing vegetable and animal materials, as raw materials for the manufacture of various goods, can absorb water, distribute rainwater to fill land water, and others.

Fertilizer

Based on Table 9, it is known that the fertilizer regression coefficient is 0.103, and the \(t\) value is 2.024 with a significance level of 0.047, while the \(t\) table is 1.990. This shows that the \(t\) arithmetic level is 2.024 > \(t\) table \((1.990)\), and the significance level is < 0.05, so it can be said that the fertilizer variable has a positive effect on coffee production in Uluway Village Mengkendek Sub District, Tana Toraja District. Fertilizer affects coffee production, and this can mean that when fertilizer is increased by 1 kg, it will increase the coffee production rate by 0.103%.

This is in line with research by Thamrin (2014), which states that fertilizers have a positive and significant effect on coffee production. It can be seen that coffee plants need fertilizer to grow and produce optimally. According to Muin (2017), fertilizer affects pepper production, where fertilizer itself functions as plant food. Fertilizer is a nutrient contained in each material which is usually a compliment to the nutrients in the soil.

Actions to maintain and increase soil fertility by adding and replenishing artificial nutrients are necessary so that crop production remains normal or increases. Adding these nutrients allows achieving a balance between the lost nutrients transported by harvesting, erosion, and another leaching. The act of returning/adding nutrients to the soil is called fertilization. The type of fertilizer used must be as needed so that the correct method of diagnosis is required so that the added nutrients are only required by plants and those that are lacking in the soil (Sugiyanta, 2011).

Pesticide

Based on Table 9, it is known that the regression coefficient of the pesticide variable is 0.240. The \(t\) count value \((7.969)\) with a significance level of 0.00, while the \(t\)-table value is 2.048. This shows that the \(t\) arithmetic value is 7.969 > \(t\) table \((3.198)\). The significance level is > 0.05, so it can be said that the pesticide variable has a significant effect on increasing coffee production in Uluway Village, Mengkendek Sub District, Tana Toraja District.

Ambarita (2015), in his research, stated that the use of pesticides could increase production because it can control the growth of pests. This aligns with Nainggolan's research (2018), which suggests that pesticides significantly affect farmers' income.
The conclusions that can be obtained from this study are the factors that significantly affect the production of coffee farming in Uluway Village, Mengkendek Sub District, Tana Toraja District, including land area ($X_1$) with a significant level of 0.00, fertilizer ($X_3$) with a substantial level of 0.047, and pesticides. ($X_4$) with a significant level of 0.00, different from the workforce ($X_2$) with a substantial level of 0.527, which has no significant effect on coffee production. Farmers are expected to pay more attention to labor variables. These variables have not affected the production of coffee farming, for the use of land area variables, fertilizers, and pesticides to be increased because these variables can increase coffee farming production.

**REFERENCES**


