THE EFFECT OF FARMERS CHARACTERISTICS ON THE PRODUCTIVITY OF CHILI FARMING IN MOOLO VILLAGE, BATUKARA SUB DISTRICT, MUNA DISTRICT

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INTRODUCTION

Indonesia is an agrarian country, and the agricultural sector is very dominant because most of the Indonesian population makes a living as farmers. Agricultural development is aimed at constantly increasing agricultural production while at the same time increasing the income and business productivity of each farmer by raising capital and skills to increase human intervention (Welang et al., 2016).

Cayenne pepper is one of the horticultural crops as food, which is essential for the community's needs so that its production needs to be increased to meet national needs. Chili is the most preferred crop by farmers because it is considered profitable compared to other vegetable commodities. In addition, cayenne pepper farming does not require significant capital (Alif S.M, 2017). The chilli plant is a vegetable commodity that is quite strategic. Chili is also one of the plants that have a high price. In certain seasons the cost of cayenne pepper increases significantly. The need for cayenne pepper for a big city with a population of one million reaches 88,000 tons/year. Thus, horticultural agriculture should receive serious attention, especially regarding aspects of production and the development of its marketing system (BPS, 2019). The general obstacle to the decline in cayenne pepper production is the decrease in the area of chili cultivation because many have been converted into residential areas. In addition to the high land competition, chili productivity also tends to fluctuate (Rostini, 2011).

Southeast Sulawesi is one of the cayenne pepper-producing areas. Cayenne pepper production in Southeast Sulawesi in particular in 2016 amounted to 80,738 tons with a land area of 1,056 ha, while in 2017, Southeast Sulawesi chili production was 33,129 tons with a land area of 1,405 ha. In 2017, there was a decrease in the production of 47,609 tons. The reduction of cayenne pepper production in 2017 was caused by a reduction of the productivity of cayenne pepper by 23.58 tons per hectare compared to the cayenne pepper productivity in 2016 of 76.46 tons per hectare (BPS Sultra, 2019). One of the 3rd largest cayenne pepper-producing areas in Southeast Sulawesi is Muna District. The total production of cayenne pepper in Muna District is 3,627 tons with a land area of 114 hectares with a productivity of 31.82 tons/hectare (BPS Sultra, 2019). Batukara Sub District is one of...
the sub-districts located in the southern part of Muna District, consisting of 4 villages and one of the villages in Batukara Sub District that produces chili is Moolo Village with an area of 25.64 km² (36.95%) (BPS Kabupaten Muna, 2018).

Moolo Village is one of the villages in the Muna District area whose residents make a living as farmers. One of the farms cultivated in this village is cayenne pepper farming. There are around 180 farmers in this village. Currently, there are only 28 farmers who produce cayenne pepper, while 152 other farmers cultivate seasonal crops such as corn and annual crop farming. However, now, these 152 farmers have started to grow cayenne pepper and are not producing at this time. However, on the other hand, the productivity of cayenne pepper farming in Moolo Village is still relatively low. For the people of Moolo Village, the results of the cayenne pepper plants cultivated so far can meet the needs of farmers and their families even though the productivity produced is still low. (BPS, Muna 2019).

According to Damihartini & Jahi, (2005), agricultural development begins with the quality of farmers as the main actors, and quality farmers relate to characteristics such as age, education, experience, number of dependents, and land area. Based on the statement of the farmers of Moolo Village, the productivity of cayenne pepper in Moolo Village reaches 40 to 120 kg/hectare in one harvest. According to Rostini (2011), this productivity is still relatively low. Therefore, the researchers wanted to see whether the characteristics of farmers affect the productivity and income of cayenne pepper farming in Moolo Village. The characteristics of the farmers in question are age, education, farming experience, land area, and production. Based on the above background, this study aims to determine the effect of farmer characteristics on the productivity of chili farmers in Moolo Village, Batukara Sub District, Muna District.

MATERIALS AND METHODS

This research was conducted in Moolo Village, Batukara Sub District, Muna District, considering that Moolo Village is one of the areas whose livelihoods are in agriculture, one of which is cayenne pepper farming. This research was conducted from February to July 2020. The population in this study were all farmers who cultivate cayenne pepper in Moolo Village. The total population has produced as many as 28 cayenne pepper farmers, while the cayenne pepper farmers who have not grown production are 152 farmers. Determination of the sample in this research method using the census method takes the entire population of cayenne pepper farmers who are already producing. The variables in this study were: the characteristics of the respondents, including age, education, farming experience, land area, and production, as well as variable costs incurred, cayenne pepper farming productivity, and income.

Analysis of the data used to see the effect of farmer characteristics on the productivity of cayenne pepper used multiple linear regression data analysis to determine the income of cayenne pepper farmers in Moolo Village, Batukara Sub District, Muna District, income analysis was used. Multiple linear regression analysis models (multiple regression) with the following general form (Sugiyono, 2015)

\[ Y = a + b_1X_1 + b_2X_2 + \ldots + b_nX_n \]  
(1)

With the equation:

\[ Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X \]  
(2)

Information: \( Y = \) Productivity (kg/ha), \( a = \) Constant, \( b1-b5 = \) Farmer Characteristics, \( X_1 = \) Age (years), \( X_2 = \) Education level (years), \( X_3 = \) Farming experience (years), \( X_4 = \) Land area (Ha), \( X_5 = \) Production (Kg), \( X_6 = \) Cost of Seeds (IDR), \( X_7 = \) Fertilizer Cost (IDR), \( X_8 = \) Herbicide Cost (IDR), \( X_9 = \) Labor Cost (Working People's Day), \( e = \) Error

RESULTS AND DISCUSSION

Characteristics of Respondents

According to Damihartini & Jahi, (2005), characteristics are part of a person and are inherent in a person. Characteristics are an essential factor in carrying out farming activities because by knowing the characteristics of farmers, a general picture of the condition and background of farmers can be learned. The characteristics of the farmers in question include the farmer's age, the farmer's education, the farmer's experience, the area of arable land, and production (Kurniati, 2015). The characteristics or traits possessed by farmers are as follows in this study:

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Table 1. Age of respondent farmers in Moolo Village, 2019.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Amount</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-54</td>
<td>20</td>
<td>71.43</td>
</tr>
<tr>
<td>&gt;54</td>
<td>8</td>
<td>28.57</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not completed in primary school</td>
<td>11</td>
<td>39.29</td>
</tr>
<tr>
<td>Elementary school</td>
<td>2</td>
<td>7.14</td>
</tr>
<tr>
<td>High school graduate</td>
<td>6</td>
<td>21.43</td>
</tr>
<tr>
<td>finished high school</td>
<td>9</td>
<td>32.14</td>
</tr>
<tr>
<td>Farming Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inexperienced (&lt;5)</td>
<td>28</td>
<td>100</td>
</tr>
<tr>
<td>Land Area (Ha)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 0.5</td>
<td>2</td>
<td>7.14</td>
</tr>
<tr>
<td>0.5 – 2</td>
<td>26</td>
<td>92.86</td>
</tr>
</tbody>
</table>

Source: Primary Data Processed, 2020

A relatively younger age, in general, will be more dynamic in their actions, have muscular physical strength, and have the courage to make decisions to meet the needs of their family life. Meanwhile, older farmers have a lot of experience and practice and are careful in making decisions. Table 1 explains that the age of cayenne pepper farmers in Moolo Village classified as productive age is 20 farmers with a percentage of 71.43 percent and as many as 28.57 percent or 8 farmers are unproductive age. According to Antara & Effendy (2009), this age condition is classified as productive age. The age of the respondent has a direct effect on labor productivity. According to Antara & Effendy (2009), within certain limits, the older a person gets, the more productive the energy they have, and after a specific age limit, their productivity decreases. Based on the explanation above, it can be stated that the age range of farmers is 30-73 years or the average age of respondent farmers is 48 years.

Education is an important thing that farmers must own because education can shape the way farmers think in carrying out a farming activity and make decisions in introducing a technology. The education obtained by farmers is generally grouped into 2, namely formal education and non-formal education. Table 1 explains that the education level of cayenne pepper farmers in Moolo Village on average does not finish elementary school, this can be seen in the education level of farmers who did not finish elementary school as many as 11 people or 39.29 percent, two people graduated from elementary school or 7.14 percent, graduated from junior high school as many as six people or 21.43 percent and nine people graduated from high school or 32.14 percent, it can be stated that the education level of cayenne pepper farmers in Moolo Village is still deficient. The story of formal and non-formal education can influence farmers in the development of their farms, both in decision-making and the application of technology in increasing the productivity of their farms. According to Antara & Effendy, (2009), in general, the level of formal education of respondent farmers plays an essential role in increasing productivity, especially agricultural research centers introducing new technology.

Experience is an education that is not available in school. Experience is obtained from an event or event that has been experienced and is helpful for others to do better than before. According to Tuwo, (2011), experience is the best teacher for farmers. A farmer is experienced enough if he has been in his business for 5-10 years, while ten years and above are categorized as experienced, and less than five years are categorized as less professional. Table 1 explains that cayenne pepper farmers in Moolo Village have no experience in cayenne pepper farming where the experience level of under or < 5 years is 28 people or 100 percent. Experience in agriculture can affect the skills of farmers so that it will determine the success of their farming. Experience running a farm will provide good knowledge and skills, technical skills, and managerial skills that can improve the ability to run a farm (Dewi et al., 2017).

From the point of view of efficiency, the wider the area of land cultivated, the higher the production and units per hectare. Table 1 explains that the land acquired by cayenne pepper farmers with a land area of 0.5 to 2 hectares is 26 people or 92.86 percent. While the land area <0.5 hectares is two people or 7.14 percent, the average land cultivated is 0.84. This land area can be categorized in a reasonably large area (Tuwo, 2011).
Production is the amount produced by farmers in each harvest season and is expressed in units (Kg) either sold by farmers or consumed by farmers (Welang et al., 2016). The production produced by cayenne pepper farmers in Moolo Village can be seen in Table 2.

Table 2. Chili farming production in Moolo Village, 2019.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Land Area (Ha)</td>
<td>23.5</td>
</tr>
<tr>
<td>Total Production (Ton)</td>
<td>68,360</td>
</tr>
<tr>
<td>Production average (Ton)</td>
<td>2.441</td>
</tr>
</tbody>
</table>

Source: Primary Data Processed, 2020

Table 2 explains that the total production of cayenne pepper in Moolo Village in 2019 was 68,360 tons with a land area of 23.5 hectares. The show produced by cayenne pepper farmers in Moolo Village is categorized as low. This is because farmers in Moolo Village do not understand how to cultivate cayenne pepper, so farmers need to increase their knowledge in cayenne pepper farming.

Multiple Linear Regression Analysis

Based on the results of multiple linear regression analysis, it can be seen the results of the partial test (t-test), simultaneous test (F test), and determination test (R² test). More details can be seen in Table 3.

Table 3. Results of the partial test (t-test), simultaneous test (f-test), and coefficient of determination test (R²).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression Coefficient</th>
<th>Partial Test</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1118,867</td>
<td>1.663</td>
<td>.114</td>
</tr>
<tr>
<td>Age (X₁)</td>
<td>5.490</td>
<td>.531</td>
<td>.602</td>
</tr>
<tr>
<td>Education (X₂)</td>
<td>26,416</td>
<td>1.250</td>
<td>.227</td>
</tr>
<tr>
<td>Experience (X₃)</td>
<td>7.329</td>
<td>.029</td>
<td>.977</td>
</tr>
<tr>
<td>Land area (X₄)</td>
<td>-1257,239</td>
<td>-2.459</td>
<td>.024</td>
</tr>
<tr>
<td>Production (X₅)</td>
<td>.999</td>
<td>6.587</td>
<td>.000</td>
</tr>
<tr>
<td>Seed Cost (X₆)</td>
<td>.001</td>
<td>-1.945</td>
<td>.068</td>
</tr>
<tr>
<td>Fertilizer Cost (X₇)</td>
<td>.000</td>
<td>1.505</td>
<td>.150</td>
</tr>
<tr>
<td>Herbicide Cost (X₈)</td>
<td>.001</td>
<td>.871</td>
<td>.395</td>
</tr>
<tr>
<td>Labor costs (X₉)</td>
<td>-3.486E-5</td>
<td>-2.352</td>
<td>.030</td>
</tr>
<tr>
<td><strong>Simultaneous Test</strong></td>
<td><strong>10.065</strong></td>
<td><strong>.000</strong></td>
<td><strong>s</strong></td>
</tr>
<tr>
<td>Coefficient of Determination Test</td>
<td><strong>0.751</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>.913</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * = Significant, ns = Not Significant
Source: Primary Data Processed, 2020

Based on Table 3, the Adjusted R Square value is 0.751 or 75.1%. This shows that the independent variables Age (X₁), Education (X₂), Farming Experience (X₃), Land Area (X₄), Production (X₅), Seed Costs (X₆), Fertilizer Costs (X₇), Herbicide Costs (X₈) and Labor Costs (X₉) can explain the dependent variable Productivity (Y) of 75.1%. In comparison, the remaining 24.9% percent is influenced by other variables that are not included in this study. The F test was conducted to determine whether all independent variables combined to affect the dependent variable (productivity). From the value of the F test, it can be concluded that the independent variables together have a significant effect on the dependent variable. The T-test is used to see how much influence the independent variable partially or individually affects the dependent variable (productivity).

Based on the results of the partial test regression analysis above, it can be stated in the regression equation as follows:

\[ Y = 1118,867 + 5.490X₁ + 26,416X₂ + 7.329X₃ - 1257,239X₄ + 0.999X₅ + 0.001X₆ + 0.000X₇ + 0.001X₈ - 3.486E-5X₉ + e \]

The respondent farmer’s age variable (X₁) has a positive regression coefficient value of 5.490, meaning that every one-year addition of the age of the cayenne pepper farmer will increase the productivity value (Y) of 5.490. The multiple linear regression test results showed that the age variable
(X_i) had no significant effect on productivity (Y). The average age of respondent chili farmers is 48 years. According to Choiril et al. (2018), the working population aged 15-60 years is a potential population who can work to produce goods or services. Suratiyah, 2015 stated that the age of the farmer would affect his physical ability to work. The older the farmer, the lower his physical ability.

The education variable (X_3) of cayenne pepper farmers has a regression coefficient of 26.416, meaning that each additional value of the education variable (X_3) by one year will increase the value of Productivity (Y) by 26.416. The multiple linear regression test results showed that the education variable (X_3) had no significant effect on the productivity of cayenne pepper (Y). This is because the average education of respondent farmers in Moolo Village, Batukara Sub District, does not complete elementary school. According to Welang et al., (2016), the higher a person's education, the easier it will be to find information so that the more knowledge one has. On the other hand, a lack of education will hinder developing a person's attitude towards the newly introduced values.

The farming experience variable (X_3) has a regression coefficient value of 7,329, meaning that for every one-year addition to the experience variable value (X_3), the productivity value (Y) will increase by 7,329. The regression test results showed that the farming experience variable (X_3) had no significant effect on productivity (Y). The average experience of cayenne pepper farmers in Moolo Village is under five years. The farming experience variable has no significant impact because the cayenne pepper farmers in this village have no experience managing cayenne pepper plants. This condition is in line with research conducted by Herdiana, (2016), where the regression coefficient value on experience is negative. This condition is caused by farmers who are comfortable cultivating land so far, making farmers reluctant to adopt innovations that can increase income and production.

The variable area of land (X_4) has a regression coefficient value of -1257,239, meaning that for every additional 1 hectare of land area, it will reduce the weight of Productivity (Y) by -1257,239. The regression test results showed that land area (X_4) had a significant effect on productivity (Y). The average land area of cayenne pepper farmers in Moolo Village is 1 hectare. According to Choir. et.al. (2018) states that the location of agricultural land affects the scale of the business, ultimately affecting the efficiency or not of a farming business. This condition is in line with research conducted by Choiril et al., (2018); Atika et al., (2020), which states that the significant variable of land area on income indicates that increasing land area does not necessarily increase productivity.

The Production variable (X_5) has a regression coefficient value of 0.999, meaning that for each additional production value of 1 kg, it will increase the Productivity (Y) value of 0.999. The regression test results showed that Production (X_5) had a significant effect on Productivity (Y). The average production of cayenne pepper farmers in Moolo Village is 2,441 tons/hectare.

The Seed Cost Variable (X_6) has a regression coefficient value of -0.001, meaning that every additional seed price of IDR. 1 will reduce the Productivity (Y) value of 0.001. The regression test results showed that the cost of seeds (X_6) had a significant effect on productivity (Y). This condition is because the cost of sources issued by farmers is relatively low, where the average price of cayenne pepper seeds published is IDR. 186,607.14 ha/mt, or the cost of seeds posted by farmers per hectare is IDR. 222,340.43/ha. The sources used by farmers in Moolo village are local. In line with Fanani's research (2019), an increase in cayenne pepper production significantly affects the output of every 1% addition of seeds.

The fertilizer cost variable has a regression coefficient value of 0.000, meaning that there is no additional fertilizer cost of IDR every time. 0, then there is no increase in productivity. The average fertilizer cost incurred by farmers in Moolo Village is IDR. 1,256,785.71 ha/mt, or fertilizer costs incurred by farmers per hectare of IDR. 1,497,446.81/ha. Fertilizer costs have a positive regression coefficient, which means that fertilizer costs can increase productivity. Soekartawi, (1995) the use of fertilizers can determine the success of agricultural commodity production.

The herbicide cost variable has a regression coefficient value of 0.001, meaning that each additional herbicide cost is IDR. 1, which will increase productivity by 0.001. The average herbicide cost incurred by Moolo Village farmers is IDR. 237,428.57 ha/mt, or the cost of herbicides issued by farmers per hectare is IDR. 280,000.00/ha. Herbicide costs have a positive regression coefficient, meaning that herbicide costs can increase productivity.

The labor cost variable has a regression coefficient value of -3.486 which means that each additional value of the labor cost is IDR. 1, which will reduce productivity by 2,496. Labor cost variables have a significant effect on productivity. The average labor cost incurred by cayenne pepper farmers in Moolo Village is IDR. 10,996,429 ha/mt or labor costs incurred by farmers per hectare of IDR. 13,102.127.66/ha. This condition is because farmers need labor from outside the family. This situation is in line with research conducted by Choiril et al. (2018), where the multiple linear regression analysis performed shows a negative regression coefficient value. This condition is
because farmers need workers from outside the family. More workers from outside the family will increase costs. Farmers issue them to reduce productivity and income.

CONCLUSIONS AND SUGGESTION

Based on the results of multiple linear regression analysis, farmer characteristics Age ($X_1$), Education ($X_2$), Farming Experience ($X_3$), Land Area ($X_4$), Production ($X_5$), Seed Cost ($X_6$), Fertilizer Cost ($X_7$), Herbicide Cost ($X_8$) and Labor Costs ($X_9$), together (Test F) significantly affect the productivity of cayenne pepper. However, partially (T-test) or individually the variables that have a significant effect are the Land Area variable ($X_4$), Production variable ($X_5$), and Labor Cost variable ($X_9$), while the Age variable ($X_1$), Education ($X_3$), Farming experience ($X_3$), Seed Cost ($X_6$), Fertilizer Cost ($X_7$) and Herbicide Cost ($X_8$) had no significant effect on the productivity of cayenne pepper in Moolo Village, Batukara Sub District, Muna District. This condition can be interpreted that adding the variable value of land area, production and labor costs by 1% can increase productivity.

REFERENCES

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