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# Determinants and Profitability of Small-Scale Red Chili Production in Konawe District of Southeast Sulawesi

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***Abstract:***
***Background****: This study aims to (1) determine the factors that affect red chili production, and (2) Assess the profitability of red chili farming.*
***Materials and Methods****: The study was conducted in Wonggeduku Subdistrict in Konawe District of Southeast Sulawesi from August to October 2019. Respondents consisted of 67 red chili farmers selected from the population of 85 farmers using simple random sampling method. The data were obtained through questionnaire-based interviews and observation. The data were analyzed using Cobb Douglas production functions and cost and returns analysis.*
***Results****: Land size, seeds, fertilizer, pesticide, and the number of labors jointly had a significant and positive effect on red chili production. Partially, the production factors of land area, seeds, fertilizer and labor had a positive and significant effect on the level of production. The use of pesticides had no significant effect on the level of production; The annual net returns of the red chili farming, on average, was Rp42,632,440 per hectare, with R/C ratio being 2.92. .*
***Conclusion:*** *Production factors of land size, seeds, fertilizer, pesticide, and the number of labors jointly had a significant and positive effect on red chili production. Partially, they also had significant and positive effect on the production, except for the use of pesticide. Red chili farming is profitable and financially feasible.*
***Key Word****: Analysis; Factors; Production; Red Chili; Sulawesi*

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## I. Introduction

Indonesia is an agrarian country where agricultural development has a strategic position with activities based on food crops and horticulture. In addition to involving labor in terms of production, food crops and horticulture subsectors produce foods that are essential for human life, including staple foods. From business point of view, the economic activities based on food crops and horticulture are the largest business activity and widespread throughout Indonesia.

The role of agribusiness, especially in the field of horticulture, has developed quite rapidly, both in the production, processing industries, and in marketing. The horticulture subsector really needs to be developed by the government to increase its contributions in the agriculture sector, and to support government efforts to increase farmers' incomes, increase employment opportunities, reduce imports, and conserve natural resources[1]. Besides, increased horticultural production can improve food and nutrition security, especially for the poor. Poor households are more likely to have low food security as they face difficulty in meeting the four aspects of food security, namely, availability, accessibility, utilization, and stability[2,3] (Saediman et al., 2019; Zani et al., 2019).

Red chili is a very important vegetable crop, considering its function to add flavor to the food consumed by most Indonesian. In Southeast Sulawesi province, red chili often triggers inflation at certain times, because its price can suddenly increase. The increase in these prices is related to the fact that the chili production in the province cannot meet the high demand for chili, so the province has to obtain supply from other regions outside the province to meet the demand. With its variety of uses, red chili is considered as one of the essential commodities with high economic value. Besides being used as cooking spices at the household level, red chili is also used as an ingredient in various food and beverage processing industries, as well as in the manufacture of medicines and cosmetics[4] (Mariyono, 2016).

Among the three kinds of fresh chilies popularly consumed in Indonesia, red chili contributed to 50 percent of the total chili consumption[5,6] (Prastowo et al., 2008; Web and Kosasih, 2011). The demand for red chili consumption tends to increase due to the population growth, increased income[4] (Mariyono, 2016), and the increase in the types of processed products using chili as one of their ingredients. However, due to low

production, farmers have not utilized that market potential. In Konawe District, despite its status as one of the production centers of red chilies in the province, the local production still cannot fulfill the demand.

Table 1 shows the trend in the harvested area, production and productivity of red chili in Konawe District. The area of land used for red chili farming from 2013 to 2015 fluctuated, but being constant during 2016 and 2017. The amount of production and productivity level of red chili from 2013 to 2017 shows a fluctuating trend.

Table 1. Trend in harvested area, production, and productivity of red chili in Konawe District

| No | Year | Harvested Area (ha) | Production (quintal) | Productivity (quintal/ha) |
|---|---|---|---|---|
| 1 | 2013 | 123 | 7,575 | 61,60 |
| 2 | 2014 | 149 | 4,716 | 31,65 |
| 3 | 2015 | 108 | 4,921 | 45,60 |
| 4 | 2016 | 136 | 3,087 | 22,70 |
| 5 | 2017 | 136 | 2,412 | 21,27 |
| Mean | | 130.4 | 4,542 | 36.56 |

Source: BPS Konawe[7]

There are some factors that can affect the sustainability of crop production of red chili such as natural resource, human resources, capital and also technology, as well as benefits and feasibility of the work performed. The production factors are closely related to the scale of production obtained. The ability of farmers in combining the production factors (input) effectively and efficiently is an important factor in increasing the production. Andayani[8] stated that the red chili farmers in carrying out farming still performed it based on their interests and experience, as well as the use of production factors which was not in accordance as it suggested and recommended.

Based on these descriptions, it is interesting to study how farming inputs influence in affecting the production of red chili and how the level of profit and feasibility financially reveals farming red chili in the Wonggeduku Sub-district in Konawe .

## II. Material And Methods

The study was carried out in Duriasi and Tetemoha villages, Wonggeduku Sub-district, Konawe District from August to October in 2019. The number of respondents was 67 persons selected randomly from the population of 85 red chili farmers. The data were obtained through observation and interviews based on questionnaires. The data were analyzed using descriptive analysis and Cobb-Douglass production function with the following equation:

$Y = b0\ X_1^{b1}.\ X_2^{b2}.\ X_3^{b3}.\ X_4^{b4}.\ X_5^{b5}.\mu$

To simplify the calculation, the equation is then changed in the form of a linear equation as follows:

$\ln Y = b_0 + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 . + \ln \mu$

Where:

Y = production of red chili (kg/ha)
$b_0$ = constant
$b_1 \ldots b_5$ = regression coefficient of variable $X_1 \ldots X_5$
$X_1$ = land size (ha)
$X_2$ = the amount of seeds (gr/ha)
$X_3$ = the amount of fertilizer (kg/ha)
$X_4$ = the amount of pesticides (liters/ha)
$X_5$ = number of Labor (man-day/ha)
u = error term

Furthermore, cost and returns analysis[9,10] (Saediman et al., 2015; Saediman et al., 2019) was used to assess the profitability of red chili farming using the following equation:

$$\pi = TR - TC$$

Where:

$\pi$ = Net Revenue
TR = Total Revenue
TC = Total Cost

## III. Results and Discussion

### 3.1 Analysis of Production Function of Red Chili Farming

Cobb-Douglass production function was used to identify factors affecting the production of red chili. Based on the results of the analysis presented in Table 2, the regression equation was obtained as follows:

$$\ln Y = 5{,}624 + 0{,}828 \ln X_1 + 0{,}863 \ln X_2 + 0{,}068 \ln X_3 + 0{,}001 \ln X_4 + 0{,}017 \ln X_5 + \ln e$$

Then the linear equation was changed in the form of nonlinear equations with the Cobb-Douglass production function model:

$$Y = 176{,}238\ X_1^{0{,}828}.\ X_2^{0{,}863}.\ X_3^{+0{,}068}.\ X_4^{0{,}001}.\ X_5^{0{,}017}.\ E$$

**Table 2** Regression Results of Production Function of Red Chili in Wonggeduku Sub-district, Konawe District in 2019

| No. | Variables | Regression Coefficient (b) | t-count | Sig |
|---|---|---|---|---|
| 1. | (Constant) | 5.624 | | |
| 2. | Land size ($X_1$) | 0.828 | 16.475 | $0.000^{**}$ |
| 3. | Seed ($X_2$) | 0.863 | 12.480 | $0.000^{**}$ |
| 4. | Fertilizer ($X_3$) | 0.068 | 3.742 | $0.008^{**}$ |
| 5. | Pesticide ($X_4$) | 0.001 | 0.073 | $0.674^{ns}$ |
| 6. | Labor ($X_5$) | 0.017 | 0.320 | $0.006^{**}$ |
| 7. | R Square | 0,874 | | |
| 8. | F Count | 284,164 | | 0,000 |

Note: ** = significant at 95% ($\alpha = 0.05$ )
ns = no significant at 95% ($\alpha = 0.05$)

Based on the results of data analysis, F ratio was significant at $\alpha = 0.05$. The significance value was less than 0.05, which indicated that all production factors consisting of land area ($X_1$), seeds ($X_2$), fertilizer ($X_3$), pesticides ($X_4$) and labor ($X_5$) simultaneously had a significant effect on the production of red chili (Y). The coefficient of determination ($R^2$) was 0.874, which indicated that 87.4% variation in farm production of red chili were explained by the independent variables in the model, whereas the remaining 12.6% was due to variables beyond the model.

The T-test was carried out by comparing the significance value of each independent variable ($X_i$) with $\alpha = 0.05$. If the significance of t-value is smaller than 0.05, the independent variable (Xi) individually had significant effect on the production of red chili. Conversely, if the significance of t-value is greater than 0.05, individually the independent variable (Xi) does not significantly affect the production. The following is explanation of the effect of each independent variable individually on the production of red chili (Y):

**a. The effect of land size ($X_1$) on the production of red chili (Y)**

The results of analysis showed that the significance value of land size was 0.000 < 0.05. It indicated that land area had significantly effect on the production of red chili. The regression coefficient ($b_1$) is 0.828, indicating that an increase of 1 percent of land area would increase the production by 0.828 percent. Conversely, the decrease in land area by 1 percent would reduce the production of red chili by 0.828 percent, with the assumption that other variables were held constant (ceteris paribus). Land area is very important in the production process. Small land area certainly leads to less efficient result of the farming compared to farming carried out in the larger land area. This is in accordance with the opinion of Soekartawi et al.[11] which stated that the condition of land is very influential on the production of agricultural products in terms of land size and soil fertility.

**b. The effect of seed ($X_2$) on the production of red chili (Y)**

The results of the analysis showed that the significance of the seed was 0.000 < 0.05. It indicated that the seed had significantly affected the production of red chili. Seed as a production factor significantly affects production because the use of superior seeds increases the quality and quantity of production. The regression coefficient was 0.863, indicating that an increase in the use of seed by 1 percent would increase the production by 0.863 percent. Vice versa, the decrease in the use of seeds by 1 percent would reduce the production by 0.863 percent, with the assumption that other variables were fixed (ceteris paribus). Seed is considered to be good if it has several characteristics in terms of genetic, physical, and physiological quality.

**c. The effect of fertilizer ($X_3$) on the production of red chili (Y)**

Based on the results of the analysis, it revealed that the significance of fertilizer was 0.008 < 0.05. It indicated that fertilizer variable had a significant and positive effect on the production of red chili. The regression coefficient was 0.068, meaning that an increase of fertilizer use by 1 percent would increase the production by 0.068 percent. On the contrary, a decrease in the use of fertilizers by 1 percent would reduce the production by 0.068 percent, assuming other variables being unchanged (ceteris paribus). Nutrient

content in NPK fertilizer includes nitrogen, phosphorus, and potassium as macro nutrients needed by red chili plants. NPK fertilizer is easily soluble in water so that nutrients can be immediately absorbed and used by plants to yield optimum production. The use of fertilizer on time and in the right amount is very beneficial for the growth of red chili. However, the improper use in the type and amount of fertilizer will have impact on the quality of yields of red chili plants, contributing to the degradation of soil fertility and threatening the survival of microorganisms.

**d. The effect of pesticide ($X_4$) on the production of red chili (Y)**

Based on the results of the analysis, it showed that the significance of pesticides was 0.674 > 0.05. It indicated that the pesticide had no significant effect on the production of red chili. Pesticides have important roles in maintaining the level of production. Red chili is very vulnerable toward pests and diseases, so the use of pesticides is very helpful. However, inappropriate and excessive use of pesticides will have negative impacts on the environment, health, and production.

**e. The effect of labor ($X_5$) on the production of red chili (Y)**

Based on the results of the analysis, it revealed that the significance of labor was 0.006 < 0.05. It indicated that labor had a significant effect on red chili production. The regression coefficient was 0.017, indicating that an increase in the number of labor by 1 percent would increase the production of red chili at 0.017 percent. Conversely, a decrease in labor by 1 percent would decrease the production of red chili at 0.017 percent, with the presumption that other variables were fixed (ceteris paribus). The use of productive and skilled labor would have an impact on increasing the production of red chili .

### 3.2 Profitability of Red Chili Farming

**a) Profit Analysis of Red Chili Farming**

Table 3 shows the results of cost and returns analysis of red chili farming. The total revenue from red chili farming was Rp42,632,440 per ha per year and the total cost was Rp14,590,800 per ha per year. The net returns was Rp28,041,640 per ha per year, or Rp2,336,803 per ha per month. Based on the results of analysis, it can be stated that red chili farming activities carried out by the respondent farmers in Wonggeduku District, Konawe Regency is profitable. Thus it is expected that the red chili farming is able to contribute greatly to the farmer's income.

.**Table 3.** Net returns from red chili farming

| No. | Items | Total (Rp/ha/year) |
|---|---|---|
| 1. | Total Revenue (TR) | 42,632,440 |
| 2. | Total Cost (TC) | 14,590,800 |
| | Net returns (1-2) | 28,041,640 |

**b) Financial Feasibility Analysis of Red Chili Farming**

In this analysis, revenue and the costs incurred by the respondent farmers were divided by taking into account the R/C calculations. The R/C was 2.92 > 1, which indicated that the farming red chili carried by farmers in the Sub-district Wonggeduku was financial feasible.

## IV. Conclusion

Production factors of land area, seeds, fertilizers, pesticides and labor jointly had positive and significant effects on the production of red chili. Partially the land area, seeds , fertilizer and labor had a positive and significant effect on the production, while the pesticide had no significant effect on the production of red chili. The red chili farming in Wonggeduku Sub-district, Konawe District is profitable and financially feasible. The use of pesticide should be in accordance with the recommendation from extension officers to maintain and increase the production and at the same time prevent the emergence of negative impacts on the environment, human health, and crop production.

## References

[1]. Saediman H, Prioritizing commodities in Southeast Sulawesi Province of Indonesia using AHP based Borda Count Method. Asian Social Science, 2015, 11(15): 171-179.
[2]. Saediman H, Aisa S, Zani M, Limi MA, Yusria WO. Food security status of households in a cassava growing village in Southeast Sulawesi, Indonesia. Journal of Agricultural Extension, 2019, 23(1): 199-209.
[3]. Zani M, Saediman H, Abdullah S, Daud L, Yunus L. Determinants of Household Food Expenditure in a Cassava Growing Village in Southeast Sulawesi. *Academic Journal of Interdisciplinary Studies*, 2019, 8(3): 302–310.
[4]. Mariyono J, Integrated disease management for chili farming in Brebes and Magelang, Central Java: Social economic impacts. Jurnal Sosial Ekonomi dan Kebijakan Pertanian, 2016, 5(2): 114-124
[5]. Prastowo NJ, Yanuarti T, Depari Y, Effect of distribution to commodity price and its implication on inflation. 2008 (http://www.bi.go.id/web/id/publikasi/jurnal+Ekonomi.)

[6]. Webb AJ, Kosasih IA, Analysis of Price Volatility in the Indonesia Fresh Chili Market. Paper presented to the Annual Meeting of the International Agricultural Trade Research Consortium, December 11~13, 2011, Tampa, FL, USA.
[7]. BPS Konawe, Kabupaten Konawe dalam Angka, 2018, BPS Konawe, Unaaha
[8]. Andayani SA, Faktor-Faktor Yang Mempengaruhi Produksi Cabai merah Merah. Mimbar Agribisnis, 2016, 1(3): 261-26
[9]. Saediman H, Amini A., Basiru R, Nafiu LO, Profitability and value addition in cassava processing in buton district of Southeast Sulawesi Province, Indonesia. *Journal of Sustainable Development*, 2015, 8(1): 226-234
[10]. Saediman H, Mustika, Nalefo L, Tufaila M, Zani M, Cost And Return Analysis Of Rice Farming And Brick Making In South Konawe District Of Southeast Sulawesi. *International Journal of Scientific & Technology Research*, 2019, 8(1): 835–838.
[11]. Soekartawi, Prinsip Dasar Ekonomi Pertanian: Teori dan Aplikasinya. 2002, PT. Raja Grafindo Persada, Jakarta
[12]. Soekartawi, Teori Ekonomi Produksi Dengan Pokok Bahasan Analisis Fungsi Cobb-Douglas. Jakarta : PT. Raja Grafindo Persada, 2003

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