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Analysis of factors affecting income of organic curly red chili (*Capsicum annum* L.) in Gedangan Village, Cepogo District, Boyolali Regency

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Analysis of factors affecting income of organic curly red chili (*Capsicum annum* L.) in Gedangan Village, Cepogo District, Boyolali Regency

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Abstract. This study aimed to analyze factors affecting income of organic curly red chili farming in Cepogo District, Boyolali Regency. The samples in this study were selected using random sampling method. Results shows the average cost per hectare in total cost, income earn by farmer after sales, and income received per farm are Rp. 5,637,058; Rp. 110,050,711; and Rp. 105,914,352, respectively. The factors affecting chili production are land area, seeds, liquid organic fertilizer, labor costs, and pesticides. To get better chili production, a good preparation to handling weather and climate changes is needed. In here, those two factors seem to have great impact on the spread of pest and disease as evidenced by high cost of organic pesticides and liquid organic fertilizers.

1. Introduction

Organic farming is an agricultural cultivation technique that relies on natural ingredients without the use of synthetic chemicals. The main goal of organic farming is to provide agricultural products, especially food that is safe for health of producers and consumers and does not damage to the environment [1]. A healthy lifestyle has been institutionalized internationally, which requires guarantees that agricultural products must be safe for consumption (food safety attributes), have high nutritional content (nutritional attributes), and be environmentally friendly (eco-labeling attributes) [2]. Consumer preferences like this, cause the demand for world organic agricultural products to increase rapidly [3].

Curly red chili is popular type of chili because this agricultural products is a part of culinary food culture in Indonesian people [4]. This shows the potential of red chili to be cultivated by Indonesian farmers. In 2002, 2005, and 2008 the trend of chili consumption of Indonesian people is increased from 1.42 to 1.51, then to 1.54 kg/year [5]. In addition, in the view of chili cultivation area, there was also an increase such as in 2007 the chili plantation area was 20.3 % of the total vegetable growing area, then increased in 2008 by 20.6 %.

Problems with curly red chili farming in Gedangan Village is plant productivity which need to be improved. Although the geographical conditions of Gedangan Village is very supportive to the growth of curly red chili, but farmers are does not have any intention to increase the chili productivity. This is because the increase of chili productivity is not only affected by fertile soil conditions [6], but need to involve many factors such as high-yielding varieties, balanced use of fertilizers and pesticides, and proper post-harvest handling [7].

The non-optimal productivity is thought to be the factor affected to the amount of income of curly red chili farming [8]. Therefore, to see the impact of the non-optimal productivity, it is necessary to analyze the income of curly red chili farmers in Gedangan Village, to know which extent of curly red chili farming activities provide benefits for the farmers. Gedangan Village was one of the areas that produce organic curly red chili, although it is developed compared to the other areas. To the date, the harvested area, production, and productivity of organic curly red chili in the Utomo Jayan Farmer's Group in Gedangan Village, Cepogo District, Boyolali Regency were lower than all over areas that produce organic chili. For that, this study aimed to analysis the related factor regarding that chili productivity.

2. Methods
In this study, the data were analyzed using descriptive-analytical method, in the following parameters :

Farming Income
     Revenue = TR – TC
     TR = Py . Y
     TC = VC + FC
Description :
TR = Total Revenue (Rp) ; TC = Total Cost (Rp) ; Py = Price per unit of production (Rp) ; Y = Total Production (Rp) ; VC = Variable cost (Rp) ; FC = Fixed costs (Rp)

Total revenue (TR)
     TR = Y . Py
     Y = Production (kg)
     Py = Price received (Rp/kg)

Total Expenditure (TC)
     TC = FC + VC
     FC = Fixed Cost (Rp)

   To determine the influence of the use of factors who affect income, using the model of the functions of production Cobb Douglass. The Cobb-Douglass function forms the equation can be written as follows:

$$Y = X_1^{b1} . X_2^{b2} . X_3^{b3} . X_4^{b4} . X_5^{b5} . X_6^{b6} . e$$

Description :
Y = Income (Kg) ; X1 = land area (Ha) ; X2 = Seedling (kg) ; X3 = Liquid Organic Fertilizer (L) ; X4 = Fertilizer (kg) ; X5 = Pesticide (L) ; X6 = Labour (day hour) ; e= Error

3. Results and discussion

3.1. Farming income of organic curly red chili
The average income per farm was Rp. 18,708,621.00 or Rp. 106,298,982.95 per hectare and the average expenditure per farm is Rp. 1,287,517 or Rp. 7,315,437.5 per hectare. Revenue is the difference between receipts and total expenses or total costs. The average income received by farmers per farm is Rp. 17,735,866 or Rp. 100,771,965.91 per hectare.

3.2. Analysis of factors that affect income of farm chili red curly organic
The variable analyzed in this study is sumarized in Table 1. The significany level was set at 0.05 and 0.01. The value less than both level was considered as significant.

Table 1. Dependent variable: curly red chili income

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	15.759	3.206		4.915	0.000
ln_x1	0.542	0.161	0.523	3.376	0.003
ln_x2	0.452	0.146	0.400	3.098	0.005
ln_x3	-0.336	0.283	-0.169	-1.185	0.248
ln_x4	-0.196	0.186	-0.111	-1.051	0.304
ln_x5	0.031	0.216	0.020	0.141	0.889
ln_x6	0.136	0.190	0.110	0.715	0.482

Based on the results of the t-test in the Coefficients table above, it shows that:

3.2.1. Land area (X1). The results of the t-test analysis shows that the land area factor has a t-value (3.376) with a significance of $0.003 < 0.01$ and 0.05 meaning that the land area has a significant effect on income. The regression coefficient value is positive at 0.542, this mean that every 1% increase in the area of land used will increase the amount of income by 0.542%. Assuming other variables are considered constant. According to the results of the research that has been done, the land area is enough to affect production results because the larger the land area, the more plant population it is possible to increase the amount of production and vice versa if the land area is small, the number of plants is getting smaller. This result is in agreement with the previous study reported by Mubyarto, that land as one of the factors of production that has a significant contribution to farming [9], and the best land for chili cultivation was land with good technical irrigation [10].

3.2.2. Seeds (X2). The results of the t-test analysis show that the seed factor has a t-count value (3.098) with a significance of $0.05 > 0.01$ and 0.05, meaning that the seed has a significant effect on income. The regression coefficient value is positive at 0.452, meaning that every 1% increase in the seeds used will increase the total income by 0.452 %. Assuming other variables are considered constant. Explaining seeds has a significant effect on the income of curly red chili farmers in Gedangan Village The use of seeds released by farmers depends on the area of land owned by each curly red chili farmer himself [11]. The cost of seeds has a significant effect on the income of curly red chili farmers.

3.2.3. Liquid organic fertilizer (X3). The results of the t-test analysis show that the liquid organic fertilizer factor has a t-value (-1.185) with a significance of $0.248 > 0.01$ and 0.05, meaning that liquid organic fertilizer has no significant effect on income. The regression coefficient value is negative at -0.336, meaning that every 1% increase in liquid organic fertilizer used will decrease the total income by -0.336%. Assuming other variables are considered constant. Stating that the cost of manure has no significant effect on the income of curly red chili farmers. So the use of suitable liquid organic fertilizers can provide better productivity and increase farmers' income [12]. According to Priantoro [13] who said that some problems in the cultivation of curly red chilies in dry land that cause low production, apart from abiotic and biotic factors, also because cultivation is still traditional, using low yield potential, low plant population, and the use of organic fertilizers. suboptimal liquid.

3.2.4. Manure (X4). The results of the t-test analysis show that the manure factor has a t-count value (-1.051) with a significance of $0.304 > 0.01$ and 0.05, meaning that manure has no significant effect on income. The regression coefficient value is negative at -0.196, meaning that for every 1% increase in the pesticide used, the total income will decrease by -0.196 %. Assuming other variables are considered constant. Stating that the cost of manure has no significant effect on the income of curly red chili farmers. Manure contains fewer nutrients than artificial fertilizers [14]. According to

Priantoro [13] who said that several problems in the cultivation of curly red chili in dryland caused low production.

3.2.5. Pesticide (X5). The results of the t-test analysis show that the pesticide factor has a t-count value (0.141) with a significance of 0.889 > 0.01 and 0.05, meaning that pesticides have no significant effect on income. The regression coefficient value is positive at 0.031, meaning that every 1% increase in pesticides used will increase the total income by 0.031 %. Assuming other variables are considered constant, explaining about pesticides has no significant effect on the income of curly red chili in Gedangan village. According to farmers in Gedangan village, this is because the weeds are not too high until harvest time, so they are not made into a pest nest or a breeding ground for pests [15]. So the use of pesticides by farmers is rarely done in one growing season and the cost of pesticides issued by farmers is not large, therefore the cost of pesticides has no significant effect on income.

3.2.6. Labor (X6). The results of the t-test analysis show that the labor factor has a t-count (715) with a significance of 0.482 > 0.01 and 0.05, meaning that labor has no significant effect on income. The regression coefficient value is positive at 0.136, meaning that every 1% increase in the workforce used will increase the amount of income by 0.136%. Explaining that labor costs have no significant effect on the income of curly red chili farmers. Curly red chili farmers do not pay attention to the growing season when curly red chili production will decrease, but farmers use the same amount of labor as the previous planting season which is higher in production, and every time they carry out the production process the farmers will incur labor costs while the curly red chili production is different. with the previous season's production. So that labor costs have no significant effect on the income of curly red chili farmers.

4. Conclusion

Based on the study it can be concluded that the average total cost per farm is Rp. 1,287,517 or Rp. 7,315,437.5 per hectare. Revenue is the difference between receipts and total expenses or total costs. The average income received by farmers per farm is Rp. 17,735,866 or Rp. 100,771,965.91 per hectare. The production factors have a significant effect on income are land area and seeds. Production factors that have no significant effect on income are liquid organic fertilizer, manure, pesticides, and labor.

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