Analysis of Factors Affecting Farmer Revenues in the Horticulture Agriculture Sector in Pematang Silimakuta District of Simalungun Regency: Case Study on Chili Farmer Income

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Abstract: This study aims to determine the factors of land area, input costs, labor and farmer's experience affecting the income of farmers in the horticulture sector in the District of Pematang Silimakuta, Simalungun Regency. This study uses primary data by interview method using questionnaires and secondary data obtained from the Central Statistics Agency (CSA) of Simalungun Regency. The tools used to process the data are Eviews 9. The sample used in this study consisted of 80 farmers in Pematang Silimakuta District, Simalungun Regency. The data analysis technique in this study uses OLS (methodOrdinary Least Square), classic assumption test and statistical test. The results showed that: 1) labor has a significant effect on the income of chili farmers; 2) land area, input costs and farmer experience have no effect but are significant to the income of chili farmers; 3) the results of OLS estimates show the coefficient of determination (R2) by 55%, this means that any increase in each variable 1% then it will affect the income of farmers. Chili is a horticultural plant that has potential in the District of Pematang Silimakuta, Simalungun Regency which can increase farmers income.

1 INTRODUCTION

The development of an identical agricultural sector with national economic development, the agricultural sector is not identical to the Ministry of Agriculture, but identical to the agribusiness system is the broad meaning possessed by three (3) RI Ministries, namely the Ministry of Agriculture, the Ministry of Maritime Affairs and Fisheries, and the Ministry of Forestry. The Agriculture Sector in the calculation of Gross Domestic Product (GDP) is supported by five (5) subsectors, namely the Food Crops and Horticulture sub-sector, Plantation subsector, Livestock subsector, and Forestry sub-sector. In accordance with the mandate of the 1994-2004 Constitution of the Republic of Indonesia as a *grand* strategy for Indonesia's economic development in a holistic manner, is agribusiness *led development*. Horticulture plants have a very important position in people's lives and the country's economy. In people's lives, their role as a source of nutrition. Whereas in the economy it has a high economic value seen from the resources on increasing foreign exchange (Sigar, 2001).

Agricultural development in Simalungun has an important and strategic role in national and regional development. The role of the agricultural sector is not only for food security, but also contributes significantly to employment opportunities, sources of income and the regional economy. In this regard, the results of development in the agricultural sector can be seen in the table below:

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Table 1: Harvest Area of Vegetable Plants by District and Vegetable Types in 2015 Simalungun

District of District	2015 Harvest Area of Vegetable Plants (Ha)									
	Red Onion	Chili	Potatoes	Cabbage	Eggplant	Tomato	Chinese Cabbage	Beans	Bean Long	Beans Red Beans
Kabupaten Simalungun	183	1855	2672	3466	364	1077	1539	438	370	54
Silimakuta	0	427	738	1146	33	168	132	29	0	0
Pamatang Silimakuta	85	304	473	781	26	217	438	40	0	0
Purba	2	507	1430	1506	50	512	886	301	0	0
Haranggaol Horison	40	10	0	0	0	17	0	0	0	0
Dolok Pardamean	19	59	1	4	13	57	21	14	23	24
Sidamanik	0	0	0	0	0	0	0	0	0	0
Pamatang Sidamanik	6	41	0	0	24	21	0	12	17	27
Gursang Sipangan Bolon	4	50	11	0	8	35	1	0	2	1
Tanah Jawa	0	0	0	0	6	0	0	0	8	0
Hatondahan	0	0	0	0	0	0	0	0	0	0
Dolok Panribuan	0	7	0	0	12	0	0	0	9	0
Jorlang Hataran	0	0	0	0	0	0	0	0	0	0
Panei	0	7	0	0	0	0	1	0	8	0
Panombeian Panei	0	52	0	0	4	16	0	1	112	0
Raya	2	17	0	10	17	16	2	7	7	0
Dolok Silou	25	83	19	19	34	23	9	30	17	0
Silou Kahean	0	0	0	0	0	0	0	0	0	0
Raya Kahean	0	0	0	0	5	0	0	0	9	0
Tapian Dolok	0	0	0	0	0	0	19	0	0	0
Dolok Batu Nanggar	0	0	0	0	0	0	0	0	18	0
Siantar	0	0	0	0	1	0	6	0	7	0
Gunung Malela	0	54	0	0	28	0	0	4	31	0
Gunung Maligas	0	6	0	0	11	0	12	0	13	0
Hutabayu Raja	0	0	0	0	0	0	0	0	0	0
Jawa Maraja Bah Jambi	0	10	0	0	29	0	0	0	19	0
Pamatang Bandar	0	96	0	0	25	0	0	0	28	0
Bandar Huluan	0	125	0	0	10	0	0	0	29	0
Bandar	0	0	0	0	13	0	12	0	13	2
Bandar Masilam	0	0	0	0	0	0	0	0	0	0
Bosar Maligas	0	0	0	0	0	0	0	0	0	0
Ujung Padang	0	0	0	0	4	0	0	0	0	0

Source: Central Statistics Agency (CSA) of Simalungun Regency, 2015

Table 2: Production of Vegetable Crops and Vegetables According to the District at Simalungun 2015

The District	2015 Vegetable Crops Production (Ha)									
	Onion	Pepper	Potato	Cabbage	Eggplant	Tomato	Chinese Cabbage	Bean	Beans Long	Red Beans
Kabupaten Simalungun	2167	27013	45615	78463	2580	15724	20068	6597	5531	97
Silimakuta	0	6219	12621	24465	249	2453	1729	437	0	0
Pamatang Silimakuta	967	4427	8089	18197	184	3168	5738	602	0	0
Purba	26	7384	24457	35090	355	7475	11607	4536	0	0
Haranggaol Horison	512	146	0	0	0	248	0	0	0	0
Dolok Pardamean	239	859	17	93	107	759	270	210	344	29
Sidamanik	0	0	0	0	0	0	0	0	0	0
Pamatang Sidamanik	77	597	0	0	170	307	0	180	254	32
Gursang Sipangan Bolon	51	728	106	0	57	511	13	0	30	12
Tanah Jawa	0	0	0	0	42	0	0	0	119	0
Hatondahan	0	0	0	0	0	0	0	0	0	0
Dolok Panribuan	0	101	0	0	85	0	0	0	134	0
Jorlang Hataran	0	0	0	0	0	0	0	0	0	0
Panei	0	101	0	0	42	0	1	0	119	0
Panombeian Panei	0	757	0	0	28	233	0	15	1677	0
Raya	26	248	0	176	120	234	2	105	104	0
Dolok Silou	269	1208	325	442	241	336	117	452	254	0
Silou Kahean	0	0	0	0	0	0	0	0	0	0
Raya Kahean	0	0	0	0	57	0	0	0	134	0
Tapian Dolok	0	0	0	0	0	0	232	0	0	0
Dolok Batu Nanggar	0	0	0	0	0	0	0	0	269	0
Siantar	0	0	0	0	7	0	67	0	104	0
Gunung Malela	0	787	0	0	184	0	0	60	464	0
Gunung Maligas	0	87	0	0	78	0	149	0	194	0
Hutabayu Raja	0	0	0	0	0	0	0	0	0	0
Jawa Maraja Bah Jambi	0	146	0	0	206	0	0	0	284	0
Pamatang Bandar	0	1398	0	0	177	0	0	0	419	0
Bandar Huluan	0	1820	0	0	71	0	0	0	434	0
Bandar	0	0	0	0	92	0	143	0	194	24
Bandar Masilam	0	0	0	0	0	0	0	0	0	0
Bosar Maligas	0	0	0	0	0	0	0	0	0	0
Ujung Padang	0	0	0	0	28	0	0	0	0	0

Source: Central Statistics Agency (CSA) of Simalungun Regency, 2015

Vegetable horticulture plants are potential horticultural plants in Simalungun District during 2015 production reached 211,562 tons. Especially in Pematang Silimakuta sub-district is one of the central production areas with the production of superior cabbage/cabbage with an area of 18,197 ha, potatoes with an area of 8089 ha and chillies covering 4427 hectares.

The production of superior commodities in the Pematang Silimakuta sub-district such as cabbage/cabbage, potatoes and chilli which are included in the vegetable category is also expected to be able to contribute significantly to efforts to increase horticultural products. Looking at the economic value of cultural commodities, then if developed in a commercial farming system can increase farmers income.

2 THEORY FRAMEWORK

According to Rostow (Suryana, 2000) economic growth is the transformation of a traditional society into a modern society, through stages: traditional societies, preconditions for take off, maturity stage, and high consumption society. While the economic base theory states that the main determinant of economic growth in a region is directly related to the demand for goods and services from outside the region (Arsyad, 1999). Or it can also be said that the base sector is able to encourage regional economic growth (Tarigan, 2007).

Production is an activity to increase benefits by combining the factors of production of capital, labor, technology, *managerial skills*. Production is an effort to increase benefits by changing forms, moving places, and saving (Soeharno, 2007).

Farming income is the difference between revenue and all costs in increasing income, so farmers must try to increase production in order to obtain an increase in income by maximizing production factors, especially labor, which is one of the factors that greatly influence family farming (Soekartawi, 1995).

3 METHODOLOGY

This study was carried out in the Agropolitan Area of upland vegetable farming in Simalungun District especially in Pematang Silimakuta District. When the research was conducted in August 2017 to completion. The purpose of this study was to determine land factors, input costs, labor and farmer's experience affecting the income of chili farmers in the horticultural agriculture sector in the District of Pematang Silimakuta, Simalungun Regency. The types of data collected are primary data obtained directly from respondents who have been determined in this case sourced from chili farmers, and secondary data sourced from the Central Statistics Agency (CSA) of Simalungun Regency.

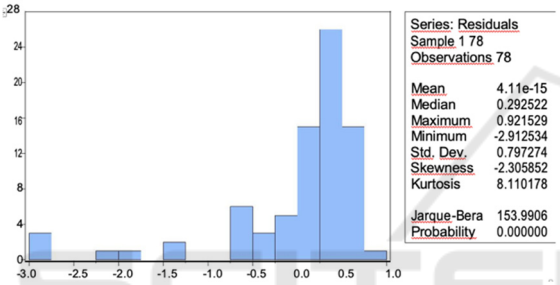
To answer the problems in this study, several analytical methods are used, as follow :

a. OLS (*Ordinary Least Square*) method is used to determine the magnitude of the change effect of an *independent* variable on thevariable *dependent*.

b. The classic assumption test is used to detect the presence or absence of normality, heteroscedasticity, autocorrelation, and multicollinearity in terms of estimation because if there is a deviation from the classic assumption, the t test and F test previously performed are *invalid* and can statistically confuse the conclusions obtained.
c. Statistical Tests are used to plan, collect, analyze, interpret data. This statistical test consists of R2test, F-test, and t-test.

4 RESULTS AND DISCUSSION

The normality test aims to test whether in a regression model, the dependent variable, the independent variable, or both have a normal distribution or not.



Source: Data Processed with Eviews 9

Figure 1: Normality Test Results

Based on the results of the normality test in the figure above, it is obtained that thevalue probabilityof Jarque-Bera is 0.000000 < α = 0.05. Thus it can be concluded that the data from the variables in this study are not normally distributed.

Furthermore, heteroscedasticity tests are conducted to test whether there is a regression model where there is an inequality of residual variance from one observation to another.

Table 3.:Heteroskedasticity Results

Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.63896	Prob. F(4,73)	0.6364
Obs*R-Squared	2.638556	Prob. Chi-Squared(4)	0.6200
Scaled explained SS	8.216243	Prob. Chi-Squared(4)	0.0840

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/03/18 Time: 10:30
Sample: 1 78
Included observations: 78

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.606070	15.54285	-0.296347	0.7678
LOG(LL)	-0.437131	0.820399	-0.532827	0.5958
LOG(BI)	0.286583	1.025085	0.279570	0.7806
LOG(TK)	0.698359	0.981456	0.711554	0.4790
LOG(PLP)	-0.732841	1.119139	-0.654826	0.5146
R-Squared	0.033828	Mean dependent var		0.627497
Adjusted R-Squared	-0.019113	S.D. dependent var		1.684045
S.E. of regression	1.700062	Akaike info criterion		3.961163
Sum squared resid	210.9855	Schwarz criterion		4.112234
Log likelihood	-149.4853	Hannan-Quinn criter.		4.021639
F-statistic	0.638969	Durbin-Watson stat		0.585137
Prob(F-statistic)	0.636377			

Based on the results of heteroscedasticity tests in the table above, shows that the Probability F-Statistics value amounting to 0.636377 > α = 0.05. This means that there are no symptoms of heteroscedasticity in this research model.
Then the multicollinearity test is used to test whether there is a relationship between the independent variables in the model.

Table 4: Multicollinearity Test Results

Variabel	LL	BI	TK	PLP
LL	1.000000	0.627506	0.441643	0.063612
BI	0.627506	1.000000	0.839598	-0.032929
TK	0.441643	0.839598	1.000000	-0.039281
PLP	0.063612	-0.032929	-0.032929	1.000000

Source: Data Processed with Eviews 9

Based on the table above, it can be seen that there is no relationship between independent variables with values greater than 0.9 or each independent variable R2 <0.9. So it can be concluded that the variable data in this research model does not have multicollinearity.

The results of the regression analysis of the estimation model with themodel Ordinary Least Square (OLS)used in this study can be seen in the table below:

Table 5: Results of the OLS Method Estimation (Ordinary Least Square)

Dependent Variable: LOG(PP)
Method: Least Squares
Date: 05/03/18 Time: 09:41
Sample (adjusted): 1 78
Included observations: 78 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	36.22375	7.486131	4.838781	0.0000
LOG(LL)	0.180627	0.395141	0.457121	0.6489
LOG(BI)	-1.982256	0.493727	-4.014884	0.0001
LOG(TK)	2.798248	0.472713	5.919549	0.0000
LOG(PLP)	0.565002	0.539027	1.048189	0.2980
R-squared	0.550012	Mean dependent var		14.01010
Adjusted R-squared	0.525355	S.D. dependent var		1.188522
S.E. of regression	0.818826	Akaike info criterion		2.500065
Sum squared resid	48.94474	Schwarz criterion		2.651136
Log likelihood	-94.50255	Hannan-Quinn criter.		2.560542
F-statistic	22.30664	Durbin-Watson stat		0.695670
Prob(F-statistic)	0.000000			

Source: Data Processed with Eviews 9

Based on the estimation results as shown in the table above a constant value is obtained (a) 36,22375; b_1 in the amount of 0.180627; b_2 of -1,982256; b_3 of b2.798248 and$_4$ 0.565002 for in order to obtain the regression equation:

$$\text{Log PP} = \text{Log a} + b_1 \text{ Log LL} + b_2 \text{ Log BI} + b_3 \text{ Log TK} + b_4 \text{ PLP Log} + e$$

$$\text{Log PP} = \text{Log } 36{,}22375 + b_1 \text{ Log } 0{,}180627 + b_2 \text{ Log } -1{,}982256 + b_3 \text{ Log } 2{,}798248 + b_4 \text{ Log } 0.565002 + e$$

Where the variable land area, input costs, labor and farmer experience have a significant influence on the variable income of chili farmers in Pematang Silimakuta District, Simalungun Regency.

Based on the results of the estimation of the research model with the OLS model, the R^2 value is 0.55, which means that 55% of the independent variables namely land area, input costs, labor experience and farmers can explain the dependent variable, farmers income, while the remaining 45% is explained by others outside the model.

The results of the partial significance test (t-test), as follow :

a. Land Area

Based on the results of partial significance test (t-test) obtained t-statistic value of 0.457 where the probability level is 0.6489, it can be concluded that the land area variable has no effect but significant to farmers income. The area of vegetable land owned by farmers is a factor in showing the size of the production produced. If the farmer's land area is large enough, then the economic opportunity to increase production and income will be greater (Soekartawi et al., 2002). The status of the land in this research area is generally self-owned land. Based on the results of the study indicate that the chili area cultivated by farmers is quite varied. The largest land area of farmers is 1 Ha. While the average land area of farmers in the study area is 0.2 Ha. This means that the potential of farmers land area is still low due to the large land area of farmers under one hectare. This shows that agriculture in the research area is still a subsystem scale. The agricultural produce is only enough to support the daily needs of the farmer's household.

b. Input Cost

Based on the results of the partial significance test (t-test) obtained a t-statistic value of -4,014 where the probability level is 0,0001, it can be concluded that the input cost variable does not have an effect but is significant on farmer income. The input costs used by farmers have varying costs. The most cost of input chili is between Rp. 2,000,000 up to Rp. 4,000,000 per planting season per year. The chili input costs in the study area are highest, namely Rp. 13,700,000 per planting season per year with a land area of 1 ha, while the lowest cost of chili input is Rp. 1,120,000 per planting season per year with a land area of 0.8 ha.

c. Labor

Based on the results of the partial significance test (t-test) obtained a t-statistic value of 5.919 where the probability level is 0.0000, it can be concluded that the labor variable has a significant effect on farmer income. Most of the workforce in this study are labor in the family. The types of work carried out by farmers in this study are land cultivation, planting, fertilizing, maintenance and harvesting. Based on the results of the study, the average number of farm workers is 20 people per day. The highest number of farmer workers is 50 people per day with a land area of 1 ha and the smallest number of workers is 4 people per day with a land area of 0.08 hectares. There were 5 respondent farmers who did not use wage labor in their farming activities, namely farmers who used labor in the family.

d. Farmer Experience

Based on the results of the partial significance test (t-test) obtained a t-statistic value of 1.048, it can be concluded that the farmer's experience variable does not have an effect but is significant on farmer's income. The duration of farming or farmer's experience is not based on the age of the farmer because someone who has been cultivating for a long time is very careful in absorbing new technology offered from outside, whereas farmers with relatively little experience tend to more easily absorb new technology and try the new technology more quickly. the farm they manage. Thus, farming experience will reflect a person's behavior in his farming activities (Soekartawi, 1995). Based on the results of the study, the average experience of farmers was 6 years with the age of the oldest farmers, namely 58 years old with the level of elementary education and the age of the youngest farmers, namely 25 years old with the level of elementary education. The experience of most farmers is 10 years with the age of the oldest farmers, namely 61 years old with the level of junior high school education and the youngest age of farmers, namely 31 years old with junior high school education.

The results of the estimation of the overall significance test (F-test) are known that the results of the F-statistic estimation are 22.30664 at the level of $\alpha = 0.05$, which means simultaneously all the independent variables in this research model are land area, input costs, labor and experience farmers have a significant influence on the dependent variable, namely the income of chili farmers in the District of Pematang Silimakuta, Simalungun Regency.

5 CONCLUSION, IMPLICATION AND LIMITATION

Based on various tests and data analysis, from this study several conclusions can be obtained, as follow:

1. Partially (t-test) there is one variable that directly affects the income of chilli farmers, namely labor used in farming production activities. While the other three variables is land area, input costs and farmer experience have no effect but are significant to the income of chili farmers. While overall (F-test) it is known that all independent variables is land area, input costs, labor and farmer experience have a significant influence on the dependent variable, is the income of chilli farmers in Pematang Silimakuta District, Simalungun Regency.
2. OLS estimation results indicate that the regression coefficient is positive that there is at variable land, labor, and the experience of farmers, while the value of the regression coefficient is negative contained in variable input costs, where the value of the coefficient of determination (R2) equal to 55%. This means that every increase in each variable 1%, it will affect the income of farmers.

Suggestions that can be given based on the results of this study are :

1. To increase the income of chili farmers, the government or the private sector must direct farmers in terms of marketing the harvests obtained, as well as how to use technology in the field of marketing both in quality and quantity. So that the income obtained by chili farmers has increased.
2. The chili farmers to obtain a sufficient level of income for living needs should form and participate in farmer groups that can assist in the marketing of crops and exchange of knowledge and information among chili farmers.
3. For the next researcher, it is expected to be able to develop the research that I have done to see other factors that influence the income of chili farmers.

REFERENCES

Arsyad, Lincolin. (1999). *Introduction to Regional Economic Planning and Development*. Yogyakarta: BPFE.

Sigar, Patricia Mega. (2001). *Analysis of Income of Apple Tomato Farming in Kunyangan Village, Tombatu District*. Essay. Faculty of Agriculture, Usrat Manado.

Soeharno. (2007). *Microeconomic theory*. Yogyakarta: Andi Offset.

Soekartawi. (1995). *Analysis of Farming*. Jakarta: University of Indonesia.

Soekartawi. (2002). *Principles of Agricultural Economics. Theory and Application*. Jakarta: Raja Grafindo Persada.

Suryana, (2000). *Development Economics: Problems and Approaches*. First edition. Jakarta: Salemba Empat.

Tarigan, Robinson. (2007). *Regional Economics, Theory and Application*. Fourth print. Jakarta: PT. Earth Literacy.