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Profit Of Smallholder Palm Oil In Nagan Raya Andaceh Tamiang Aceh Province

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Abstract:*This study aims to identify and analyze the profit in smallholder farm palm oil in Nagan Raya and Aceh Tamiang Aceh Province.The data used in this study is the input-output data of smallholder palm oil, and other agricultural resources. The secondary data was obtained from the Central Statistics Agency, as well as from several research results and the annual report of the Department of Forestry and Plantation of Aceh Province, also other agencies associated with this research. The primary data of this research was obtained directly from the field, either through a verbal interview to the respondents as well as through questionares. An optimization linear programming technique with resources constraints was used in order to seek the optimal allocation solution to answer the problem which is the Output Unit Price Cobb-Douglass Profit Function Model. Then the model was analyzed using Cobb-Douglass Profits Function Model which are developed by the Cobb-Douglass. Regression estimation of profit or the aggregated profit of the palm oil plantations is affected by factors of land, number of plants, capital, fertilizer, medicine, labor, and experience, as well as the cost of each of these factors. All of these variables influence the profit of palm oil plantation and are sufficient to explain the variations in the profit. By looking at the sensitivity analysis, palm oil farmers need to carefully consider the factors influence profit, which includes land, number of plants, capital, fertilizer, medicine, labor, experience of smallholders (including the cost of resources). This study depart from previous study by exercising farmer experience variable. The latter variable is the most importance variable to contribute the amount of profit, which is the novelty of this research. Failure to use the limited input resourceseffeciently would make the profit has not been maximization. In this case, handle directly by the role of government is needed, especially to intervene in matters which are difficult to reach farmers, for example, the addition of business land, subsidized seeds and fertilizers, as well as improvement to farmers capabilityto manage agricultural resources more optimally through agriculture extension or improvement of experienced partner.*
Keywords: *palm oil, production function, profit*

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I. Introduction

Research Background

The economic crisis that hit Indonesia since 1998, has caused a decline in the national economy due to the negative growth in various economic sectors which have been the main contributors to national income. The agricultural sector, one of the economic sectors with a declining contribution to national income, was proven to be more able to withstand the economic crisis than other economic sectors. Investment in the agricultural sector is very expensive, plus the rate of return is sometimes so low that it is not interesting for the private sector. Therefore, the development of irrigation, agricultural extension and various forms of investment in the form of other subsidies must be carried out by the government. However, among the sub-sectors in the agricultural sector, the plantation sub-sector is the promising one because many plantation commodities, such as oil palm, cocoa, and rubber are the main foreign exchange contributors from the agricultural sector.

The large number of workers in the smallholder plantation for palm oil commodities will also affect the level of production. The result of the products can be used as a stimulus to increase labor productivity in this sector. If the production increases, the level of labor productivity in the smallholder plantation for palm oil commodities also increases. During the period of 1995 to 2016 it seems that the average area per farmer had increased, as well as the number of farmers who tried on smallholder oil palm commodity farming. However, this did not affect any rising number in the average productivity of tons per hectare.

The area of planting and production of smallholder palm oil in Nagan Raya Regency and Aceh Tamiang Regency is the largest area of planting and palm oil production in Aceh Province, but the productivity of tons per hectare has fluctuated (Aceh Forestry and Plantation Service, 2017). The least optimum usage of resources can be the cause of low income. Of course this is a problem with least optimum usage of resources in the smallholder oil palm farming business, that leads to least benefits to the farmer. With the optimum usage of

resources, it is expected that the level of profit gained will increase, which in turn can improve the standard of living of the peasant community who work in the agricultural sector, especially the smallholder plantation sub-sector for palm oil commodities.

II. Literature Study

2.1. Theoretical Study

In a production process, the relationship between production factors (input) and output in physical form is shown by the production function. The production function is an equation that includes the factors of production in such a way that for each combination of certain production factors there is only a certain number of results. The selection of good and correct production functions from the various production functions that exist is actually not an easy job. In agricultural production, one of the production functions that is often used for analytical tools is the Cobb-Douglas production function.

Soekartawi (2002) said, there are three main reasons why the Cobb-Douglas production function is more widely used by researchers:

a. The completion of the Cobb-Douglas function is relatively easier compared to other production functions, such as quadratic production functions.

b. The Line estimation results with the Cobb-Douglas function will produce a regression coefficient which also shows the amount of elasticity.

c. The amount of elasticity also shows the level of Return to Scale.

This production function shows a combination of factors needed to produce a particular unit of goods using certain technology. For example, to produce X that use two production factors, namely labor, land and capital goods. Based on the definition above, it can be explained that the production function is the sum of all inputs used in the production process so that the total output will increase in the intended period.

2.2. The Correlation Between Production Factors and Production Results

In discussing this aspect of production, the relationship role between factors of production (input) and the products (output) gets the main attention. The role of input can be seen not only in terms of its type or its availability in the right time, but it can also be viewed in terms of the efficiency of these production factors. These production factors can lead to a productivity gap (yield gap) between the supposed productivity and the real farmers' productivity.

Production theory in this case discusses the correlation between output and input or the correlation between production and production factors used in production activities. Production in farming not only focuses on taking the results, but also as a production business. In this case, farmers must be able to combine production factors to utilize various inputs to obtain optimal output.

2.3. Function of Demand and Supply Factors for Production

The demand for production factors is the same as the demand for goods, which is the correlation between the quantity of factors used and the price level. The factor demand function is a function that provides an optimal choice of input factors. The demand for production factors is the result of the derivation of the demand for the underlying product and the production function. The demand for item X represents the quantity of item X requested as a function of its own price (w) and the price of product (p). The input factor demand function can be obtained by the first derivation equal to zero from profit maximization. To clarify the demand for production factors, it can be obtained from the following equation (Beattie and Taylor, 1994: 120)

$\pi = p.q - w.X$, for $q = f(X1,...,Xn)$,

$\pi = p.\ F(X1,...,Xn) - w.X$

π = Profit

Q = Production, function of input factors $Q = f(X1,...,Xn)$

p = output price

w = input price

First-order conditions (FOC) : $\partial\pi/\partial X = 0$

$\partial\pi/\partial X = p.\ f\,'(X1,...,Xn) - w$

$0 = p.\ f\,'(X1,...,Xn) - w$, with $f\,'(X1,...,Xn) = MP$

$w = p.\ MP$

With the notation to solve the above equation, will be obtained.. :

$X^* = X^*(p,w)$

Whereas product supply is a function that gives the optimum choice of output which is the prices of the input factor (w), also known as bidding function. The function of product supply in the perfect competition market states that the quantity of upcoming products as a function of product prices. In addition, the quantity of products offered is also a function of factor prices. The function of offering companies that maximize profits can be derived from first-order condition to maximize profits. In other words, the product supply function can be

obtained from the derivation of the profit function, where the derivation of the supply function can be shown mathematically :

$\pi = p.Q - w.Q$

π = Profit

Q = Production, a function of input factors Q = f (x1,...,Xn)

p = output price

w = input price

First Order Conditions (FOC) : $\partial\pi / \partial Q = 0$

$\partial\pi / \partial Q = p - w\,'\,(Q)$

$0 = p - w\,'\,(Q)$

$p = w\,'\,(Q)$, di mana $w\,'\,(Q) = MC$

$p = MC$

$MR = MC$ (maximum profit terms)

$Q^* = w'/p$

Thus, the above equation can be denoted as follows:

$Q^* = Q^*(w1,...,wn, p)$

2.4. Hypothesis

Based on the theoretical studies and the framework above, the following hypotheses can be formulated:Allegedly the factors of land, number of plants, capital, fertilizer, medicine, labor, experience, and the price of each of these input factors (land prices, plant prices, capital prices, fertilizer prices, medicines prices, labor prices, and the price of experience) influences the benefits of smallholders.

III. Research Methods

3.1. Scope and Location of Research

The scope of this research is limited to smallholder oil palm commodity farming in Nagan Raya and Aceh Tamiang Districts in Aceh Province. The reason why we choose this scope is, palm oil is the most productive commodity, and one of the commodities produced by the plantation sub-sector which is the product of the plantation revitalization among twenty-three smallholder plantation commodities in Aceh Province.

3.2. Data Source.

The data used in this study is input-output data of smallholder oil palm commodity farming, and other agricultural resources. These data are secondary data derived from the Central Bureau of Statistics (BPS), and some research results and annual reports from the Provincial Forestry and Plantation Service of Aceh, also come from other agencies related to this research. Besides that, primary data will also be obtained directly from the observation site, either through direct interviews with respondents or through questionnaires.

3.3. Data Collection Technique

Determination of the sample is carried out by purposive sampling, where the researcher chooses a sample based on an assessment of several characteristics of the sample members that are adapted to the purpose of the study (Kuncoro, 2003: 119-120). Out of the sixteen regencies / cities with smallholder oil palm commodities, they will be divided into two regions; the West and the East. Nagan Raya Regency was chosen for the West region, while Aceh Tamiang District was chosen for the East region. Thus, the population in this study is farmers for palm oil commodities on smallholder plantations in Nagan Raya District and Aceh Tamiang in Aceh Province with total 18,337 people.Based on the population, sample collection was taken. The size of the sample size in this study is based on the Slovin formula (Sevilla et al, 1993, 161) : $n = \frac{N}{1+Ne^2}$

n = sample, N = number of population, e = desired critical value (accuracy limit) (percent leeway / inaccuracy due to population sampling error). With a population of 18,377 smallholder oil palm farmers and e (accuracy level) 10 percent, then the required sample size is 100 farmers. Furthermore, with 100 samples, it can be calculated how many respondents are proportionally taken from each district;

1. Nagan Raya District = 13.057/18.377x100 = 70
2. Aceh Tamiang District = 5.280/18.377x100 = 30

3.4. Data Analysis Model

The model used in this study to answer the problem is the Cobb-Douglass Output Price Unit model of the Profit Function and Translog Function. Then the model was analyzed using the production function model, which was adopted from Mandaka and Hutagaol (2005), and Sudjarmoko (2010). The Production function is:

$Y = f(X_1, X_2,.....,X_m ; Z_1, Z_2,.....,Z_n)$ ..... (1)

While the profit function:

$\Pi = p\, f(X_1, X_2,.....,X_m ; Z_1, Z_2,.....,Z_n) - \sum_{m} W_i X_i$ ..... (2)

i=1

Π : Profit

p : output price per unit

X_i : non-fixed input i(i = 1,2,.....,m)

Z_i : fixed input j (j = 1,2,.....,n)

W_i : non-fixed input price i

The maximum profit is achieved at the marginal production value equals to the input price. Mathematically it can be written as follows :

$$P \frac{\delta f(X_1, X_2, ...,X_m ; Z_1, Z_2, ...,Z_n)}{\delta X_i} = W_i \quad .....(3)$$

If equation (3) is normalized with the output price, the following equation will be obtained:

$$P \frac{\delta f(X_1, X_2, ...,X_m ; Z_1, Z_2, ...,Z_n)}{\delta X_i} = W_i^* \quad .....(4)$$

With Wi* = Wi / p = the price of the i input that is normalized with the output price. If equation (2) is normalized with the output price, the following equation will be obtained:

$$\Pi^* = \Pi / p = f(X_1, X_2, ...,X_m ; Z_1, Z_2, ...,Z_n) - \sum_{i=1}^{m} W_i^* X_i^* \quad ..... (5)$$

With Π^* is known as the UOP (Unit Output Price Profit Function). The optimal amount of Xi changer inputs that provide maximum benefits can be derived from equation (4);

$$\Pi^* = f(Z_1, Z_2, ...,Z_n ; W_1, W_2, ...,W_m) \quad .....(6)$$

Substituting equation (6) into equation (2) and we will get:

$$\Pi = p\, f(X_1, X_2, ...,X_m ; Z_1, Z_2, ...,Z_n) - \sum_{i=1}^{m} W_i^* X_i^* \quad ..... (7)$$

Due to X_i^* as a function of W_i^* and Z_i, equation (7) can be written as :

$$\Pi = p\, G^* (Z_1, Z_2, ...,Z_n ; W_1, W_2, ...,W_m) \quad .....(8)$$

Equation (8) is an profit function that provides the maximum value of profit for each output price, the not fixed Wi input price and the fixed input level Zi. If equation (8) is normalized with the output price, then we will have:

$$\Pi^* = \Pi / p = G^* (Z_1, Z_2, ...,Z_n ; W_1, W_2, ...,W_m) \quad .....(9)$$

Equation (9) is a profit function of UOP as a function of not fixed input prices that are normalized with output prices and fixed inputs.

The profit function specification used is the Cobb-Douglass profit function which is derived with the Cobb-Douglass production function. Through the process of declining from equation (1) to equation (9), the Cobb-Douglass gain function is obtained as follows :

$$\Pi^* = A^* + \sum_{i=1}^{7} \sum_{j=1}^{n} \alpha_i Z_{jj}^* + \sum_{i=1}^{7} \sum_{j=1}^{n} \beta_j W_{ij}^* \quad ..... (10)$$

A^* : intercept

Π^* : Farmer's profits (Rp)

Z_1 : land area (Ha)

Z_2 : number of plant (Batang)

Z_3 : capital (Rp)

Z_4 : fertilizer (Rp)

Z_5 : plant medicine (Rp)

Z_6 : workforce (number or worker)

Z_7 : experience (year)

W_1^* : land area price (Rp/ha)

W_2^* : plant price (Rp/batang)

W_3^* : capital price (Rp/ha)

W_4^* : fertilizer price (Rp/ha)

W_5^* : plant medicine (Rp/ha)

W_6^* : worker price (Rp/person)

W_7^* : experience price (Rp/year)

α_i : input coefficient

β_i : input price coefficient

IV. Results And Discussion

4.1. Characteristics of Oil Palm Farmers

The area of land cultivated by oil palm farmers is at least 2 ha and the broadest is 23 ha. The total land used by 100 farmers is 644 ha or on average, each farmer work for 6.44 ha. Every farmer grows an average of 874 palm trees. Although there are farmers who only cultivate 225 plants. Conversely, there are also oil palm farmers who cultivate up to 3300 plants. The exploitation of oil palm plants requires relatively large capital, some of the equipment used include tractors, pushcarts, machetes, posters, and other capital goods. At least farmers have to spend IDR 9,500,000 and there are farmers who need up to IDR 90,000,000. In addition to capital, fertilizer also requires considerable costs and is an important factor needed in the palm oil business. At least one oil palm farmer must pay Rp. 2,050,000. Even those who work on a larger scale can spend Rp. 25,500,000 to fertilize.

On average, palm oil farmers spend 743 thousand rupiah to buy medicines. Although it does not cost a lot, but if there is a pest attack, treatment can not be avoided. There are farmers who even spend Rp 2.7 million on medical expenses. The needs of oil palm workers depend on the area of land cultivated. They employ at least a worker, but there are also those who recruit workers up to 12 people. On average, each oil palm farmer employs 3 people to manage his business. The average experience of oil palm farmers are 7 years. At least they have been in the business for 4 years, but some of them have spent up to 19 years as oil palm farmers. Land is an absolute factor in the oil palm business, because without land it is impossible for oil palm plantations to run. On average, palm oil farmers pay around 2 million rupiah for a hectare of land. There are farmers who only pay Rp 1.2 million, but there are also farmers who spend up to Rp 2.9 million on one hectare of land. For one oil palm plant, each farmer pays different prices. The quality and age of different plant seeds cause the prices vary. The average price of palm oil for seedlings is Rp. 19,225. The cheapest price of one plant seedling is Rp. 12,000. While the price of the most expensive plants used by farmers is around Rp. 29,000. Palm oil farmers will also buy capital goods according to their financial capabilities. If the capital goods are expensive, they just rent it.

The capital costs incurred by palm oil farmers are at least Rp. 1 million. However, there are also farmers who spend up to Rp. 4.72 million. The age of business and the amount of business also determines the price of capital costs incurred by farmers. On average, each farmer pays Rp. 9,000 fertilizer for each oil palm crop per year. Depending on the age and condition of the plant, at least they spend almost Rp. 3,000 to fertilize the oil palm plant. There are also farmers who cultivate up to Rp. 15 thousand for each crop. The price of medicines for oil palm plants is relatively lower than prices for other management needs. Farmers only need to spend 400 rupiah per plant per year for the least amount. However, there are farmers who spend up to Rp1,200 for palm oil medicines because the plants need certain treatment, for example due to the attack of plant diseases / pests. On average, each plant needs medicine for Rp. 800 per year to make it healthy. A worker is paid at least Rp. 500,000 per month, even though the price of the highest worker reaches Rp. 3,725,000 depending on the skill of the worker and the capability to pay the oil palm farmers. On average, the price of a worker is Rp 1.82 million per month. Even though theoritical practices and procedures in gardening help in the process, it is the experience that determines the yield of the business. In this research observation, the average price of farmer's experience is around Rp. 25 million. But there are those who are still new to oil palm business, which is 4 years.

Table 1. Oil Palm Farmers by Group and Average Profit Yielded

No	Profit Group (Rp/tahun)	Profit average (Rp/tahun)	Number of farmer
1	<= 100000000	63595938	32
2	100000001-200000000	132467568	37
3	200000001-300000000	243460000	15
4	300000001-400000000	350442857	7
5	400000001+	489800000	9
Total		**174495700**	**100**

Source : Result Research

By dividing them into 5 (five) profit groups (profit up to Rp. 100 million, Rp. 101 million-Rp. 200 million, Rp. 201 million-Rp. 300 million, Rp. 301 million-Rp. 400 million, and more than Rp. 400 million), the results segmentation of the palm oil plantation business will clearly visible. The profit of oil palm plantations is dominated by profit groups of Rp 101-200 million rupiah. This group reaches 37 percent of all observations. More precisely, the average profit in this group is Rp 132 million per year. The next group with the lowest segment is the group with the profit of up to Rp 100 million, experienced by 32 percent of oil palm farmers. The average profit of the lowest palm oil farmers group is Rp. 64 million per year.

Thus, it means that almost 70 percent of the smallholder oil palm farmers in Nagan Raya and Aceh Tamiang Regencies only get Rp. 200 million per year. The majority group only controls 40 percent of the total profit of oil palm.The number of oil palm farmers with a profit group of Rp 201 million-Rp 300 million is 15 percent of the total observations. The average profit received each year reaches Rp 240 million. While 7 percent of farmers in the group of Rp. 301 million to Rp. 400 million get an average profit of Rp. 350 million per year. While the highest group, with profits above Rp 400 million, is managed by 9 percent of farmers. They get an average profit of up to Rp 490 million per year. Even though it is only less than 10 percent of the population, the overall profit they generate reaches more than 25 percent of the total profit of oil palm farmers observation.

Table 2. Characteristics of Variables According to the Profit Yielded Group

Variables	Profit group					
	<= 100000000	100000001-200000000	200000001-300000000	300000001-400000000	400000001+	Total
	Average	Average	Average	Average	Average	Average
Land (Z1)	2,44	4,78	9,13	12,43	18,33	6,44
Plants (Z2)	325	674	1237	1596	2484	874
Capital (Z3)	18453125	26108108	34000000	26428571	53222222	27305000
Fertilizer (Z4)	3392813	6249730	11160667	14964286	20444444	7959700
Plant medicine (Z5)	263875	570243	1089333	1478571	2003889	742680
Workforce (Z6)	1,88	2,59	3,80	5,57	6,78	3,13
experience (Z7)	5,47	6,16	7,60	11,71	11,56	7,03
Land price (W1)	2026948	1962081	2035011	1687111	1457457	1929114
Plants price (W2)	20858	18668	19831	16721	16646	19225
Capital price (W3)	2620104	2749578	1918542	1892949	1739356	2432607
Fertilizer price (W4)	9576	9350	9060	7660	7071	9055
Plant medicine price (W5)	869	849	719	700	644	807
Worker price (W6)	2497135	1935135	1173333	923367	763311	1824417
Experience price (W7)	12380172	23916782	37919389	34822952	44848503	24972745

Source : Result Research

The majority (70 percent) of oil palm farmers in both study areas have an average oil palm area of 3.7 ha. They get a profit between Rp 50 million and Rp 200 million per year. However, there are a small percentage (9 percent) of oil palm farmers who control an average of 18.33 ha of land or more than a quarter of the total oil palm plantations in this observation. The average profit earned by each farmer reaches Rp 490 million per year. The plants cultivated in oil palm plantations are very dependent on the area of available land, although there are differences in the techniques and variations in cultivation among farmers.

The majority of oil palm farmers plant an average of 512 stems. However, there are a small group of farmers who grow around 2484 stems within area of more than 18 ha. A small proportion of the largest smallholder groups hire around 6-7 workers. However, most groups of farmers in this study only need 2-3 workers. This amount in total covers 50 percent of workers in research observations. While 9 percent of the largest farmer groups only use 19 percent of the oil palm plantation workforce.On average, the oil palm plantation entrepreneurs in this observation has been doing their business for 7 years. The shortest experience in this business is 4 years and the longest is 19 years. There is a uniqueness in the experience variables, it turns out that the group of farmers with the biggest profit has less work experience than the lower group (profit group Rp. 301 million-Rp. 400 million). Even though it is just slight difference, this can be an early indication of the experience variable and its effect on the profit generated by oil palm farmers.If it is associated with experience price variables, there is a tendency that the longer experience a farmer has, the price of his experience will increase. This condition is understandable because the higher a person's skills and abilities in the field, the higher price will be paid. It will be a challenge where the ability of a palm oil farmer is high in a certain time, so he can get maximum profit, but not for long period of time.

4.2. The Regression Model Estimation of the Oil Palm Farmers' Profit

The profit of oil palm farmers in aggregate is influenced by land factor (Z1), number of plants (Z2), capital (Z3), fertilizer (Z4), plant medicine (Z5), labor (Z6), experience (Z7), and each price of these factors; price of land (W1), plant price (W2), capital price (W3), fertilizer price (W4), plant medicine price (W5), labor price (W6), and experience price (W7). F calculation value > F table (α; 14.85) (326.985> 1.83), so it pushes H0. Statistically, the benefits of oil palm farmers in aggregate are influenced by these factors. In the model estimation table shows that the coefficient of determination reaches 0.982. It means that in this model, oil palm farmers' profit is 98.2 percent determined by factors of land area (Z1), number of plants (Z2), capital (Z3),

fertilizer (Z4), plant medicine (Z5), labor (Z6), experience (Z7), as well as the each price of these factors; price of the land (W1), plant price (W2), capital price (W3), fertilizer price (W4), plant medicine price (W5), labor price (W6), and experience price (W7). While the other 1.8 percent is influenced by other variables that are not included in the model, such as environmental / social (security) factors.All variables that aggregately affect the profit of oil palm farmers, not all of them have a significant effect partially. The number of plants, capital, fertilizer, labor, and experience, as well as land prices, plant prices, and experience prices are influential variables with confidence levels above 95%. The land area and the price of the workers have a significant effect on the 90% confidence level. While the variables of medicines, capital prices, fertilizer prices, and prices of medicines independently do not have a significant effect on the oil palm farmers' profit.

Table 3. Estimated Results of Function of Profit

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1 (Constant)	26526035,541	34440331,113		,770	,443	
Land (Z1)	3845079,387	2138459,285	,144	1,798	,076	*
Plants (Z2)	57482,944	15598,678	,290	3,685	,000	***
Capital (Z3)	,611	,224	,063	2,724	,008	***
Fertilizer (Z4)	4,190	1,259	,175	3,328	,001	***
Plant medicine (Z5)	9,203	10,874	,040	,846	,400	
Workforce (Z6)	4378648,073	2172733,960	,062	2,015	,047	**
Experience (Z7)	6066729,942	1394369,190	,155	4,351	,000	***
Land price (W1)	-15,157	7,589	-,037	-1,997	,049	**
Plant price (W2)	-1607,097	717,175	-,038	-2,241	,028	**
Capital price (W3)	-,148	3,477	-,001	-,042	,966	
Fertilizer price (W4)	-14,130	1078,113	,000	-,013	,990	
Plant medicine price (W5)	-1883,327	13298,026	-,003	-,142	,888	
Worker Price (W6)	-6,044	3,598	-,039	-1,680	,097	*
Experience price (W7)	1,317	,376	,143	3,501	,001	***

a. Dependent Variable: profit i (∏)

b. Predictors: (Constant), Land (Z1), Plants (Z2), Capital (Z3), Fertilizer (Z4), Plant medicine (Z5), Workforce (Z6), Experience (Z7), Land price (W1), Plant price (W2), Capital price (W3), Fertilizer price (W4), Plant medicine price (W5),Worker price (W6), Experience price(W7)

*** sig. α=0,01	R^2 = 0,982 Adj R^2 = 0,979
** sig. α=0,05	F_{hitung} = 326,985
* sig. α=0,10	DW = 2,000

Source : Result Research

The area of land used has a large influence on the oil palm farmers' profit. If you add one unit (1 hectare), then the profit of oil palm farmers will increase by Rp. 3,845,079 assuming other variables remain. The number of plants cultivated will also determine the profit. The addition of one plant unit (one tree trunk) will increase the profit by Rp. 57,483 assuming the other variables do not change. The number of plants has the greatest confidence level after the experience variable, meaning that if the farmer adds 1 plant, 99% of the profit will increase by this number. Capital has a real influence on the profit. If oil palm farmer add input to capital by 1 unit, then the profits of oil palm farmers will increase by 0.611 units assuming the other variables remain the same. Suppose the farmers spend 10 million rupiah to increase capital, then 99% of the profits of farmers will rise 6 million rupiah.

A good fertilization will increase the profit as well, it is proven by the regression model, that the addition of 1 fertilizer unit will increase the profit by 4 units. This means that if the farmer allocates more than 1 rupiah of fertilizer, then the profit will increase by 4.19 rupiahs. The use of plant medicine is another important thing in the palm oil business, although partially, the variables of plant medicine have no real effect, but their role is quite important in maintaining the health of the plants. Suppose the significance is ignored, 1 rupiah for medicines will increase the profit by 9.20 rupiah. With a significance level of 5%, the use of 1 unit of labor will

increase the profit by Rp. 4,378,648 assuming other variables do not change.Another important factor is experience, because it turns out that experience variables are the main key in the oil palm plantation business. The more experience, of course it means the greater the ability and expertise in managing a business. Therefore, the value of experience will be higher or more expensive in line with the level of experience a farmer has. In the estimation model of oil palm farmers' profitability, the experience variable has the highest confidence level of 99 percent. The addition of 1 unit of experience will increase the profits of oil palm farmers by 6066729,942 units. Suppose palm oil farmer adds 1 year experience, it will have the potential to increase the profit as much as Rp. 6,066,730 assuming other variables remain. The experienced farmer in managing this business will use the resources more efficient and optimal.

In addition to the amount of input resources, the price of each component of the resource also influences the profits of oil palm farmers. Land prices, plant prices and other input prices will generally determine farmers' profits. The price of the input component is usually in line with its quality, as well as the characteristics of the component itself. Land prices for example, if a farmer buys 2 units of land, it would be different with a farmer who buys 10 or 20 units of land with the same land quality. However, there will be other factors that affect the price of the land, for example time. Partially, land prices negatively affect the oil palm farmers' profit. This means that if the land price rises by 1 unit, it will reduce profit by 15 units assuming the other variables do not change.

The price of a palm oil seedling also affects farmers' profits. Partially, increasing price of 1 unit of plants will reduce the profit by 1883 units, assuming other variables remain. Suppose the price of plant seeds rise 1 rupiah, it could potentially reduce the profit of farmers Rp.1,883 rupiah with a 95 percent confidence level. Prices of capital, fertilizer, and plant medicines partially have no real effect on the profits of farmers. Although these three variables can reduce farmers' profits, they do not statistically have significant effect on farmers' profits. Like the price of the previous input component, the price of the worker has a negative influence on the profit of the farmer. . With a confidence level of 90 percent, if the wage of workers increases by 1 unit, the profit of farmers is reduced by 6 units.Different uniqueness occurs in experience price variables, because only experience prices have a positive influence on farmers' profits with a 1% error rate. This condition affects the fact that if the experience price rises, it will be in line with the ability and expertise in managing the oil palm plantation business. Experience can increase farmers' profits higher than the price of the experience itself. In the estimation of the model above, an increase in experience price of 1 unit will be able to increase farmers' profits by 1.32 units.

V. Conclusions And Recommendations

5.1. Conclusion

The profit or benefits of oil palm plantation business in aggregate is influenced by land factor (Z1), number of plants (Z2), capital (Z3), fertilizer (Z4), plant medicine (Z5), labor (Z6), experience (Z7) and each price of these factors; the land price (W1), the price of the plant (W2), the price of capital (W3), the price of fertilizer (W4), the price of drugs (W5), the price of labor (W6), and the price of experience (W7). All of these variables are able to explain the variations that occur and influence the profit of oil palm by 98.2 percent, only 1.8 percent are influenced by other variables that are not included in the model.

Variables in the number of plants, capital, fertilizer, labor, and experience, as well as land prices, crop prices, and experience prices affect the profits of oil palm farmers with a confidence level above 95%. While the land area and the price of the workers have a significant effect on the 90% confidence level. On the other hand, the variables of plant medicines prices, capital prices, fertilizer prices do not partially affect the profit. Experience is a unique variable that plays a major role in the optimization of smallholder oil palm farming. The recommended work experience is 7 years with the optimal price for maximum profit. The existing profit function model so far has not included experience variables as factors that determine the value of production, but it is proven in the estimation of regression models, experience variable has a significant effect on the profit.

5.2. Suggestion

Palm oil commodities play a very strategic role because these commodities have quite good prospects as a source of foreign exchange, and also palm oil is the main raw material for cooking oil that is widely used throughout the world, so that the government is expected to continuously maintain the stability of palm oil prices and can improve the welfare of the community, especially farmers who manage the smallholder oil palm farming. For Local Governments, palm oil commodities play an important role as a source of Regional Original Income (PAD), as well as opening large employment opportunities for local communities around the location of oil palm plantations.

Smallholder oil palm farming commonly still use local's own land and the seeds are taken directly from large plantation companies. In managing the maintenance, usually family members are recruited as labor, using their own capital, palm oil production is still under optimal production and selling Fresh Fruit Bunches (FFB) to

hoarders, so the income derived from farming activities is low and ultimately the oil palm farmers' profit are also low. For this reason, it is expected that the relevant agency or officials and agricultural extension agents can provide counseling about cultivating the palm oil.

Experience variables are important factors found in this study and have a positive and significant effect on the profit of smallholder oil palm farming because the more experience a farmer has, the higher the expertise and ability in managing smallholder oil palm farming. As a consequence, the higher the experience, the more expensive the experience price issued by farmers. For this reason, the government must endeavor to provide training for smallholder oil palm farmers to increase their skills so that the costs incurred by farmers to improve their skills or expertise in the management of oil palm farming can be cheaper and more efficient so that smallholder oil palm farmers can optimize their efforts to obtain maximum profit.

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