

Factors that Affect the Productivity of Palm Oil Plantations Self-Help Patterns in Jambi Province

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| Saidin Nainggolan^{1*} | Mirawati Yanita² | Manuel Leonardo³ |

^{1,2,3} Department of Agribusiness,
Faculty of Agriculture,
University of Jambi, Indonesia

*saidinnainggolan64@gmail.com

ABSTRACT

This study aims to analyze factors that affect the productivity of oil palm plantations in Jambi Province. This research was conducted in sentra palm oil production in Merangin Regency with the research locus of South Veil Subdistrict selected purposive. The data used consists of Primary Data that includes social factors, economic factors, behavior of the use of production inputs and productivity of oil palm plantations.. The sample size is 80 farmers. Sample withdrawal by Simple Random Sampling method Restoration of structural models factors that affect the productivity of oil palm plantations is used sem Partial Least Squaremodel. The results showed that social factors, economic factors and institutional access factors were in the moderate category. The productivity of oil palm plantations is relatively low. Manifest social factors, which have a very real effect is the age of farmers. Manifest market access and product prices have a very real effect on economic factors. Manifest access to fertilizer procurement and fertilizer prices has a very real effect on the behavior of the use of production inputs and moderation variables that have a significant effect on the productivity of oil palm plantations. Policies that need to be done to improve. Is the strengthening of economic factors in the field of product prices and market access, and upay6a strengthening the behavior of farmers in the use of production inputs, especially fertilizers by providing subsidy incentives.

KEYWORDS

oil palm plantation; productivity; socioeconomic; production input.

INTRODUCTION

Traditional farmers are characterized by a relatively small, dispersed, subsistence business scale, low adoption of new technologies and low palm oil plantation productivity. The emergence of traditional plantations occurs due to the influence of social factors, economic factors, institutional access and the lack of ability of farmers in the use of production inputs as recommended. This low garden productivity occurs due to the limited ability of farmers to utilize available economic capabilities. There is a very complex link between social factors and economic factors to productivity. Economic factors with willingness to use production inputs to productivity, social factors with moderation of the use of production inputs against the productivity of oil palm plantations.

Ardiansyah et al (2018) and Indrawati (2015) that socio-economic factors, and institutional access can be said to be determinants of farmers' performance, the commercialization of gardens is largely determined by the ability of farmers to utilize

economic resources. Differences in the ability to allocate economic resources will cause differences in terms of productivity achievement. This social factor determines the mindset of farmers in economic decision making so as to determine the success of increased productivity. Economic factors, especially product prices and access to sales, determine the scale of production that farmers will strive for and become determinants of the productivity of oil palm plantations. Institutional access factors to the procurement of production inputs, credit, and to cultivation technology are the defining variables in access to the availability of working capital, the availability of production inputs on time and the adoption of new technologies. The increase in the productivity of oil palm plantations is determined by the ease and ability by farmers to institutional access. The success of increasing the productivity of oil palm plantations is also determined by the ability of farmers in the allocation of the use of production inputs, and this factor is largely determined by social, economic and farmers' access to institutions. From this description, the purpose of the study is to examine the factors that affect the productivity of self-help oil palm plantations in Jambi Province.

RESEARCH METHODS

The subject of the study was a self-help patterned palm oil farmer in Jambi Province. The study was conducted from March to August 2021. The research was conducted by taking one district as a sample of the area, namely Merangin Regency with the focus of South Veil Subdistrict research. The location of this study was taken purposively with the consideration that the regency is a center of self-help oil palm plantations in Jambi Province. The number of maps, ni sawti in Merangin Regency there are as many as 33,465 farmers, and for South Tabi subdistrict there are as many as 14,680 farmers. The sample group drawn as respondents were farmers who had a plant age of 8-20 years. Determination of the number of samples using the slovin method. The sample size used as many as 80 farmers. The method of selecting samples is done by simple random sampling using random tables. The data analysis method uses the SEM-Partial least square approach. The structural model is used as follows.

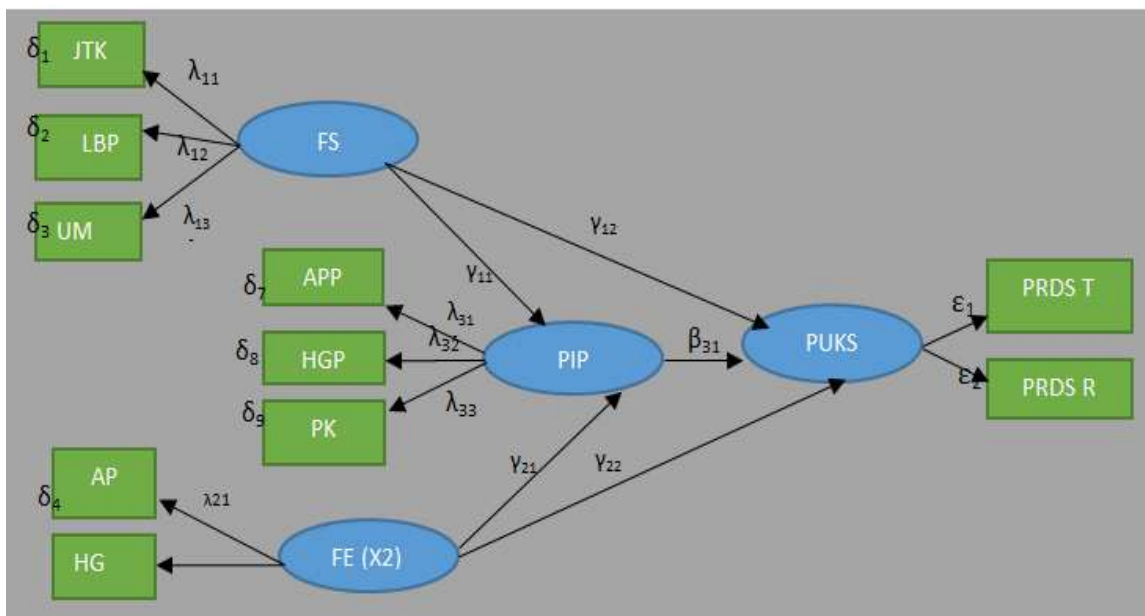


Figure 1. Research Structural Model Diagram

FS = Social Factors
JTK = Number of Family Dependents
LBP = Background of Farmer Origins
FE = Economic Factors
AP = Sales Access (Market)
HG = Product Price
UM = Age
TK = Labor
PIP = Use of Production Inputs
APP = Fertilizer Procurement Access
HGP = Fertilizer Price
PK = Chemical Fertilizer
PRDV = Palm Oil Plantation Productivity
PRDV R = Low Productivity
PRDV T = Productivity Tinggi

Criteria in analyzing the SEM - PLS model through stages are:

1. Model match test refers to Jaya and Sumertajaya (2008), Latan H (2012), Hair et al (2014) Gunarto (2018) and Nainggolan F V et al (2019) consisting of:

- Measurement Model(*Outer model*)
 - a. *Convergent validity*, the loading factor value of 0.5 to 0.6 is considered sufficient.
 - b. *Discriminant validity*, construct AVE value > 0.50 or *cross loading* value > 0.70 , it has been good in representing its latent (Jaya and Sumertajaya, 2008).
 - c. *Composite reliability* (ρ_c), *composite reliability* value 0.6 – 0.7 acceptable
- Structural Model(*Inner Model*)
The model has *predictive relevance* if the value of $Q^2 > 0$. $Value^{Q^2} = 1 - (1-R_1^2)(1-R_2^2) \dots (1-R_p^2)$. The R-square value is the dependent variable value in the equation model. The model will be better if the Q^2 value approaches 1

2. Hypothesis testing, if the p-value $\leq \alpha$ (0.05) can be said to be significant and vice versa.

RESULTS AND DISCUSSION

Description of Farmers, Oil Palm Plantations and Factors that Affect Productivity

Farmers are mostly of productive age. There are 77.5% of farmers are in the productive age of 26.5 - ≤ 60 years. Farmers are mostly formally educated at primary school level (61.35%) so it will affect decision-making patterns in oil palm plantations. Palm oil gardening experience is relatively high with an average of 18.4 years. This experience helps farmers in the allocation of the use of production inputs. The land area is ranging from 1.8-6.5 hectares per farmer with an average of 4.8 hectares per farmer. 96.5% of farmers are farmers who own the catalyst. The number of dependents of farming families averages 4--5 people so that *the dependency ratio* is relatively high.

Oil palm plantations are generally managed with the concept of integrated crop management. There are 78.2% of farmers following the PTT pattern and 21.8% of farmers do not follow the PTT pattern. PTT includes the use of superior varieties, 81.8% of farmers use mariohot superior seedlings and 18.2% of farmers use sucofindo seeds. The number of trees has 132-156 perhektar stems. Planting distance of 6x7 m with a pattern of the ranks

of the injang. Farmers fertilize in quantities and times not in accordance with the recommended dose. Fertilizers used are fertilizers (NPK) and liquid waste. NPK fertilizer used 250kg / ha for one application and liquid waste fertilizer 850 liters / ha. Dolomite 800 kg / ha, average age of plants with a 10-15 years. Productivity of 16.8 tons / ha per year.

Estimated Factors Affecting Productivity

The test results of the measurement model include (1) *Convergent Validity*: indicators of The Number of Family Dependents (JTK), Farmer Background (LBP), Age (UM), Sales Access (AP), Price (HG), Access to Fertilizer Procurement (APP), Fertilizer Price (APP), Fertilizer Price (HGP), Chemical Fertilizer (PK), Land Area (LL), and Productivity (PRDV) qualify valid because it has an *outer loading* value greater than 0.7 and AVE above 0.5; (2) *Discriminant Validity* is good because the AVE average value ≥ 0.5 ; and (3) *Composite validity* variables have qualified reliable. Structural models(*inner models*) have a high predictive *relevance* with $Q^2 + 0.941 > 0$ indicating that 94.1% of research data can be explained by structural models.

Variable Construct Test Results in Path Diagram

The variable value in the study was obtained from the algorithm processed results from PLS *software* judging from the R-squarevalue.

Table 1. Variable Construct Restoration Results in Path Diagram

	R Squared	R Square Adjusted
PIP	0,686	0,678
PRDV	0,812	0,804

Source: Smart PLS Processed Data Results Version 3,0,2020

Table 1 shows an *R-squared* (R^2) of ≥ 0.67 identifying that the model is categorized as good. *R-squared* results between 0.33 and 0.67 *R-squared* (R^2) results identified that the model was categorized as *moderate*. While the *R-squared* (R^2) result below 0.33 identified that the model was categorized as weak (Jayaand Sumertajaya,2014). These values will be easier to understand by looking at the path diagram. Adapun image of the path diagram can be seen Figure 1.

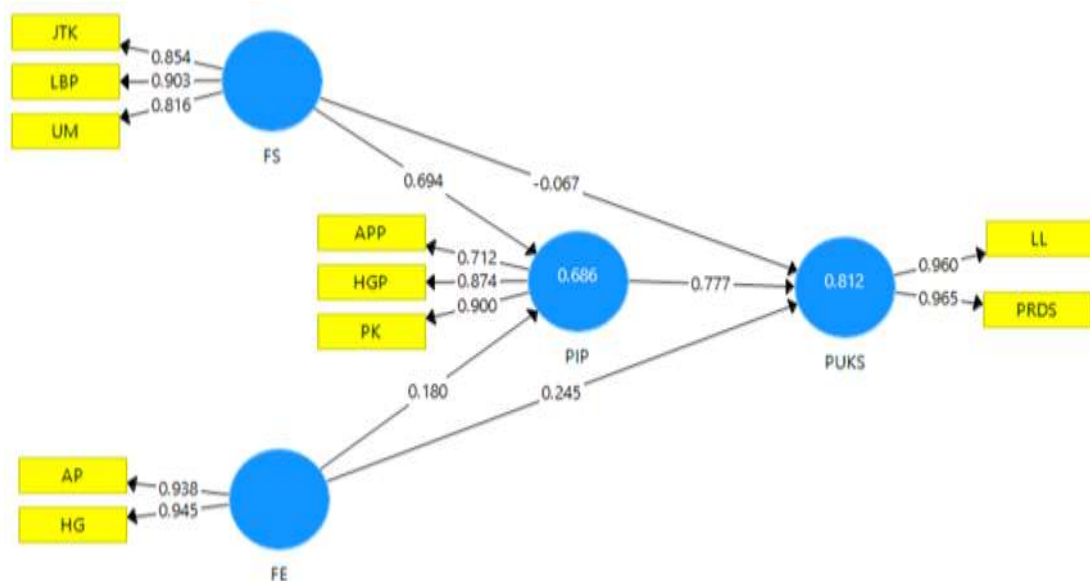


Figure 2. Diagram of the path of the results of the study

Based on the above equation, it can be known that social factors can be reflected by the use of production inputs of 0.694 and the productivity of palm oil farmers by -0.067. Economic factors can also be reflected by the development of production inputs of 0.180 and the productivity of palm oil farmers by 0.245.

Influence Analysis Between Variables

The coefficient of the path that is positive or negative with the calculation of $p\text{-value} < \alpha$ (0.5) means that the variable has a significant effect. The relationship between latent constructs can be seen table 2 below:

Table 2. Direct and Indirect Influence of Social and Economic Factors on Palm Oil Plantation Productivity in Research Areas, 2021

Relationships between Variables	Path Coefficient	Average sample	Standard Deviation	t-statistics	P Value
FS-> PIP	0,694	0,909	0,043	,902	0,000
FS -> PRDV	-0,067	-0,458	0,212	249	0,454
FE -> PIP	0,180	0,068	0,059	150	0,070
FE -> PRDV	0.245	0,326	0,086	787	0.001
PIP -> PRDV	0,777	1,037	0,206	008	0,000
Indirect Influence					
FS -> PIP -> PRDV	0,540	0,537	0,098	503	0,000
FE -pip > ->PRDV	0,140	0,138	0,072	,951	0,052

Table 2 shows that social actors directly have a positive and significant effect on the use of production inputs but negative and insignificant influence on the productivity of oil palm plantations and what is interpreted that directly every strengthening of social factor variables by 10% will strengthen the variable use of production inputs by 6.94%, but weaken the productivity variable. itas of 0.67%. Feconomic actors directly have a positive but insignificant effect on the use of production inputs, but have a positive and very significant effect on agricultural productivity.. The use of production inputs directly affects positively and significantly on agricultural productivity. This is in line with Efendy, Z. (2012), Alfayanti (2013), and Nainggolan et al (2019) that the potential for increased productivity is available by 27.27 - 48.44% with the allocation by the use of production inputs as recommended.

Analysis of Factors Affecting Between Variables

The construct variables (latent) in the study there are four, namely social factors, economic factors, the use of production inputs and productivity of oil palm plantations. The influence of the indicator on its latent variables can be seen in Table 3.

Table 3. Effect of Indicators on Latent Variables

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T-Statistics (O/STDE)	P-Value
JTK <- FS	0.854	0.856	0.030	28,,050	0,000
LBP <- FS	0.903	0.901	0.021	43,488	0,000
UM <- FS	0.816	0.815	0.039	20,845	0,000
AP <- FE	0.938	0.937	0.015	62,,843	0,000
HG <- FE	0.945	0.945	0,009	101,,310	0,000

APP <- PIP	0,712	0,705	0.071	1.048	0,000
HGP <- PIP	0.874	0,876	0.021	43,488	0,000
PK <- PIP	0,900	0,901	0.017	53,601	0,000
LL <- PRDV	0.965	0.965	0.006	167,212	0,000
PRDS <-PRDV	0,816	0,815	0.039	20,845	0,000

Table 3 shows that all *manifests* in the model have been able to reflect their latent constructs. **First**, the number of dependents of the family, the background of the origin of farmers and age together as *manifest* variables that are able to explain social factors. These variables are in line with the research of Thamrin *et al.*, (2012), Adiansyah *et al.* (2018), and Nainggolan *et al.* (2019) that the social factors of farmers determine the behavior of farmers in the face of productivity risks.

Second, access sales and prices together as *manifest* variables that are able to explain economic factor variables. Where the amount of sales access is 0.938 and the price is 0.945. Third, access to fertilizers, fertilizer prices, and chemical fertilizers together as *manifest* variables that are able to explain the variable use of production inputs. Where the magnitude of the coefficient of access to fertilizer sales is 0.712, fertilizer prices are 0.874 and chemical fertilizers are 0.900. This is in line with Ginting IE (2017), Anto (2017), and Nainggolan *et al.* (2019) that the availability of fertilizer, affordable prices and can be obtained at the time needed is a factor that determines the increase in the allocation of fertilizer use in oil palm plantations.

Fourth, land area and production together as *manifest* variables that are able to explain the variables of palm oil productivity. The amount of land area coefficient is 0.961, and production is 0.965. That is, every time there is a *strengthening of the manifest* land area and production as much as 10%, there will be a strengthening of palm oil productivity variables as much as 9.61%, and 9.65%.

CONCLUSION

Strengthening social factors directly through *manifest* variables (number of family dependents, background of farmer origin, and age) will reduce palm oil productivity and has no significant effect and any increase in social factors indirectly through variable moderation of procurement of production inputs through *manifest* variables (access to fertilizer procurement, fertilizer prices, and chemical fertilizers) will increase palm oil productivity and have a significant effect. Any increase in economic factors directly through *manifest* variables (access to sales and prices) will increase the productivity of oil palm plantations that have a significant effect and every increase in economic factors directly through variable moderation of the use of production inputs will increase the productivity of oil palm plantations insignificantly. Policies that need to be done to improve. Is the strengthening of economic factors in the field of product prices and market access, and upay6a strengthening the behavior of farmers in the use of production inputs, especially fertilizers by providing subsidy incentives.

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