DETERMINANTS THAT INFLUENCE THE INCOME OF ARABICA COFFEE FARMING IN KERINCI REGENCY, JAMBI PROVINCE

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ABSTRACT

The research objectives are (1) to analyze the income and profitability of Arabica coffee farming and (2) to analyze the determinants that influence the income of Arabica coffee farming in Kerinci Regency, Jambi Province. The study was conducted in the district of Kerinci by selecting three districts, namely: Gunung VII District, Gunung Kerinci, and Kayu Aro District. The research period was eight calendar months. The research data was sourced from primary data and secondary data. There are 150 farmers for the research sample. Data study were analyzed descriptively and through a statistical test by using multiple regression test tool. Results of the study showed that the farming of Arabica coffee in Kerinci district is viable and profitable. Results of the analysis showed that Arabica coffee farm income isinfluenced by factors such as the experience of farmers, farming land area, the number of chemical fertilizers, pesticides number, and production costs, while farmers' age and the number of workers factor effect is not significant.

INTRODUCTION

Coffee is a plantation commodity that plays a vital role in the Indonesian economy. The commodity is estimated to be the primary source of income of not less than 1,84 million families, which mostly in habit rural areas in remote regions. Besides, as many as approximately one million families rely upon their income from the downstream industry and the coffee trade (Anonymous, 2014).

Based on data released by AEKI, the Indonesian coffee Industry and ExporterAssociation (2021), Indonesia is the fourth largest coffee producer in the world after Brazil, Vietnam and Colombia. The Central Statistics Agency (BPS) noted that coffee exports from Indonesia reached US $ 842.52 million with a volume of 380,173 tons in 2021. This number increased compared to the previous year which was valued at US $ 809.16 million with a volume of 375,555 tons. However, the export value of these commodities decreased again to US $ 809.16 million in 2020. Indonesia's coffee exports only increased again last year. Meanwhile, the most coffee exports to the United States were valued at US $ 194.76 million with a volume of 57,694 tons. After that there is Egypt with a value of US $ 89.08 million and a volume of 48,521 tons. Then, Indonesian coffee exports to Japan worth US $ 61.89 million with a volume of 25,136 tons. Meanwhile, coffee exports from within the country to Spain amounted to US $ 57.54 million with a volume of 33,041 tons.The exported coffee production was mostly derived from people's plantations (96,1 %), while 1,9 percent was from large estates and 2 percent from private plantations. The data shows that smallholder plantations dominate coffee production in Indonesia. High interest from importing countries has a positive impact on the growth rate of coffee production in Indonesia.

Arabica Coffee Plant (*Coffea arabica*) is one of the plantation crops which becomes the leading export product in Indonesia so that it is possible to be cultivated. Arabica coffee prices are higher than Robusta coffee because it has a distinctive taste. Arabica coffee prices for export quality currently range between US$ 3-4 per kg while the price of Robusta coffee ranges from US$ 1,4-2 per kg. According to some experts, Arabica coffee has technical advantages in terms of cultivation and farming and is in demand by international consumers.

Arabica coffee was first cultivated in Indonesia in 1696 and began to develop in Java, hence known by the name of Java coffee. Arabica coffee is then used as an export commodity. Arabica coffee plant experienced leaf rust disease caused by fungus *Hemileia vastarix* thus experiencing death and substantial losses in 1878 (Rahardjo and Pudji, 2012). After the evaluation was conducted, Arabica coffee plants are more suitable and adaptive planted in the highland area at an altitude>1000 m above sea level.

Kerinci Regency has an area of 380.850 Ha, consisting of 189.028 Ha of the area that can be utilized and the rest is the TNKS area. There is an area of147.408 ha which can be used for agricultural cultivation including Arabica coffee crop, while the other area of 41.620 hectares or 22,12 percent is used for non-agricultural (Kerinci Central Bureau of Statistics, 2018). The latest data indicates that the area of the coffee crop in Kerinci district is 6.772 ha, with production amount as much as 3.586 ton or production average of 533,47 kg/ha with the number of coffee farmers is as much as 7.665 households. The Arabica coffee plants cover an area of 1.309 ha or

19,33 percent of the total area of the coffee plantations (Forestry and Plantation Service Department of Kerinci Regency, 2017). **Research Objectives** are namely (1) analyzing level of revenue and profits of farmers in the business of arabica commodity and (2) analyzing the influence of factors of farmer's age, farmer's experience, land area, number of workers, number of fertilizer, number of pesticides, and the cost of production to the level of arabica coffee farming income.

RESEARCH METHODS

The study design was cross-sectional. The study was conducted in Kerinci Regency by selecting three districts, namely: Kayu Aro District, Gunung VII, and Siulak District. This research takes eight calendar months. The objects and variables of the research are Arabica coffee farm income and profits (total production, number of inputs, input prices and production prices), input costs (fixed costs, variable costs). Research data were sourced from primary data and secondary data. Primary data was collected by observation, direct interviews, in-depth interviews, and Focus Group Discussion (FGD), while secondary data were obtained from the related department/institutional reports, journals, and other reports relating to the management of Arabica coffee farming. Data collection methods through interviews were conducted in a structured way from selected research samples using a research instrument (questionnaire). Data collection through questionnaires means that data collection is done by way of giving a set of questions or a written statement to respondents to answer both open and closed questions. The number of respondents or the farmeranalysis unit wasas much as 150 farmers taken using simple random sampling. The respondents of this study are the owner farmers who work directly on Arabica coffee farming. The research data were analyzed descriptively and statistically-tested using Multiple Regression Test. The descriptive analysis formula used is the cost and income analysis approach through a nominal approach (Suratiyah, 2015). The formula for calculating the nominal approach is by way of:

Revenue – Total Cost $\quad$ = Income

Revenue $\quad$ = $P_y.Y$

$\quad P_y \quad$ = Production Price (Rp/kg)

$\quad Y \quad$ = Production Amount (kg)

Total Cost $\quad$ = Fixed Cost $\ +\ $ Variable Cost

$\quad$ (TC) $\quad$ = (FC) + (VC)

To answer the research objectives, the influence of farmers' age, farmer's experience, land area owned, number of workers, number of fertilizer, number of pesticides, and production costs to the income level of Arabica coffee farmers were tested using the Multiple Regression test with the following equation (Janie, 2012):

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + e$$

Description:

Y	= Arabica coffee farming income
X1	= Farmer's age
X2	= Farmer's experience
X3	= Land area
X4	= Number of workers
X5	= Number of chemical fertilizers
X6	= Number of pesticides
X7	= Production Cost
a	= intercept
e	= error

RESEARCH RESULTS AND DISCUSSION

Cost and Revenue Analysis

According to Soekartawi (2002), farming costs are classified into two categories, namely the fixed costs and variable costs. Fixed costs are defined as costs that are not exhausted in one-round of production; hence the amount is not dependent on the obtained production but depends on the amount of the production process. Farming costs of Arabica coffee areobtained from several fixed costs (agricultural tools) that are used during the production process, plus the variable costs (purchase of seeds, fertilizers, and pesticides), while the Arabica coffee farming income is obtained from the amount of primaryincome received by coffee farmers from Arabica coffee farming. Arabica coffee farming income is obtained from the difference between the revenue from Arabica coffee farming and the costs incurred by farmers. According to Hernanto (Suandi *et al.*, 2018), revenue is the result ofthe amount of output produced multiplied by the

output price. Farming revenue is derived from the sales value of products. Hence the revenue obtained can generate revenue. Farmer's income is revenue reduced by costs incurred in farming and marketing agricultural products (Mubyarto: Suandi *et al.*, 2018). The farm income can also be measured by calculating the difference in total revenue and total costs within one year or each cycle of farming production (Soekartawi, 2002). Arabica coffee farm income calculated in this study is the real income received by farmers in Arabica coffee farming for one year or 24 times harvesting.

Field data collection obtained an average of farming costs of Rp15.517.767,73 per year or a total of Rp1.293.147,31 per month with thenett income (gains) levelof Arabica coffee farming in the study area reached Rp44.897.494,46 per year, or Rp3.74.457,87 per month (Table 4.1). The level of income obtained by farmers in Arabica coffee farming in the study area is much higher compared to other studies, such as research conducted by Suhendra *et al.* (2012), Sairdama (2013), Amisan *et al.* (2017), Audry and Djuwendah (2018), and Guampe (2019). These findings are supported by the theory that farm receipts and revenues need to be considered so that agribusiness efforts can take place and develop in the future (Hernanto: Suandi *et al.*, 2013). According to Soeharjo and Patong, farmingrevenue and income are closely related to the goals of farmers or groups of farmers in managing the farming based on patterns, types, variations, and structure of farms developed (Hernanto: Suandi *et al.*, 2013).

A detailed analysis of Arabica coffee farming in the study area can be seen in Table 4.1. The results of the analysis show that the exploitation of Arabica coffee farming in the study area is very feasible to be undertaken in the various analysis. Based on Table 4.1, the value of R/C ratio >1 (3,89) which shows that the level of revenue is greater than the cost of managing Arabica coffee farming. That is, the operation of Arabica coffee farming in the research area is very feasible. R/C ratio obtained in the study is higher than the R/T ratio of other studies, namely 2,58 (Suseno *et al.*, 2015). According to Table 4.1, the value of π/C ratio of 28,9% indicates that the number is higher than the prevailing bank interest at this time (14%) so it can be said to be feasible. That is, the productivity of donated capital provides benefits because the ratio between profits is higher than the total costs incurred during the venture. Another feasibility analysis is the labor productivity value or the ratio between recruitment and labor allocation is Rp150.000. This value is much higher than the prevailing wages inthe research area that is Rp100.000. The BEP Receipts values acquired is Rp3.750.000 which is smaller than the value of Arabica coffee farming revenue. The findingmeans that the value of the investment in the management of Arabica coffee farming in the study area is smaller than the value of business revenues (feasible). Nett income value earned is equal to Rp44.897.494,46, where this value is far greater than the land rent in the study area in the planting season of 2018 (Rp3.500.000). The business of Arabica coffee farming is very profitable compared to other farming's value.

**Table 4.1: Analysis of Profits and Feasibility of Arabica Coffee
Farming in the Research Area, 2019**

No	Description	Value (Rp)
A	Revenue	
	Arabica Coffee Output	**60.415.262,19**
B	Production Input	
	Seeds	6.783.693,84
	Fertilizer	
	1. Urea	3.632.688,23
	2. SP-36	3.328.939,74
	3. Compost	0,00
	Drugs	
	1. Insecticide	414.702,16
	2. Herbicide	179.317,80
	Equipment Costs	
	Hoe	28.272,88
	Machete	34.396,01
	Handsprayer	133.710,48
	Peeling Machine	32.645,59
	Processing Machine	4.575,71
	Labor	
	In-Family	654.908,49
	Out-Family	289.916,81
	Total Costs	**15.517.767,73**
	Profit	44.897.494,46
	R/C (Revenue/Cost)	**4.03**
	π/C ratio	**28,9**
	Cat: Land rent per Ha/year	3.500.000,00
	Labor Productivity	150.000,00
	Labor Wages Minimum in the study area	100.000,00

Factors Affecting the Level of Arabica Coffee Farming Income

Based on Table 4.2, the value of R-Square (R^2) is 0,903, and the F value is 189,3 with a significance value of F 0,000, and this figure is much smaller than the 0,05 figure. That is, the model developed to analyze the effect of variables: farmers' age, farmers' experience, farmland area, number of workers, number of chemical fertilizer, number of pesticides, and production costs together resulted in a significant effect on the level of Arabica coffee farming income in the

study area which reached 90,3 percent, and other factors influenced only 9,7 percent. The finding indicates that the model used in the research is very valid. Independent variables such as farmer's age, farmer's experience, farming land area, number of employees, number of chemical fertilizers, number of pesticides, and production costs together significantly affect the level of Arabica coffee farming income in the study area. Arabica coffee farming income in the study area is partially influenced by the experience of farmers, farm area, number of chemical fertilizer, number of pesticides, and production costs. This study is in line with research conducted by Supriyadi *et al.* (2014), Istianah *et al.* (2015), Ginting *et al.* (2016) and Farmasari and Nasir (2018) which states that the income of coffee farming is partially influenced by factors of land and variable production costs. The results of this study are supported by the theory that farming is a way for farmers to combine various factors of production such as land, energy, capital as a basis for how farmers choose the type and size of farming branches in the form of plants or livestock to provide maximum and continuous results (Suratiyah, 2011).

Table 4.2 shows the analysis results of land area factors obtained through the Multiple Regression test having a regression coefficient of 1.744.315,9 and a calculated t value of 1,327 with a significance level of 0,042. That is, the land area has a significant and evident positive effect on increasing Arabica coffee income at an alpha level of 5%. These results indicate that each increase of one unit of the land area will be able to increase Arabica coffee farm income by 1.744.315,9. The result is ideal considering that the more land owned by farmers, the more coffee plants that can be planted so that the level of coffee production and income of farmers can increase. According to Gittinger (Suandi *et al.*, 2018), the land has an added value compared to other factors of production such as capital and labor, because land in the production process has a function and value as well as low in maintenance costs. Therefore, to increase production and farm income, farmers always try to increase the area of business land. This statement and findings are supported by Saria and Fitria's research (2018) which states that partially the land area variable has a positive and significant effect on the income of coffee farmers in the Vice Jalil Village, Bintang District, Central Aceh Regency.

According to Table 4.2, production costs factor hasa regression coefficient value of -0,9 and the value of t count equal to -7,556 with a significance level of 0,000. That is, production cost has an evident and significant negative influence in the reduction of Arabica coffee income level at the alpha rate of 1%. Each increase at a unit of production cost results in the decline of Arabica coffee farming income by 0,9. The research result is in contrast with the findings from Farmasari and Nasir (2018) which showed that the cost of production has a positive influence on the coffee farmers' income in Bener Meriah Regency. The finding indicates that theoretically, the development of Arabica coffee farming in the study area has reached the third phase (law of diminishing return) (Robert and Rubinfeld, 2013).

Another factor that affects the Arabica coffee farming income in the study area is the farmer's experience. The results of the analysis through the Multiple Regression test showed that the farmer's experience factorhas a regression coefficient value of 1.607.660, 3 and a calculated t value of 3,490 with a significance level of 0,001. The value means that the farmer's experience has a very significant and evident positive effect on Arabica coffee income increase at an alpha level of 1%. These results indicate that each increase in one unit of farmer's experience will be able to increase Arabica coffee farm income by 1.607.660,3. The finding isin line with Hernanto's opinion that farming experience is an essential capital for the success of farming economic activity (Hernanto: Suandi *et al.*, 2013).

Another equally important factor affecting the Arabica coffee farming income is the number of chemical fertilizer and pesticide factor. Analysis resultsshowed that the number of chemical fertilizers and the number of pesticides had a regression coefficient value of 3.994,7 and 4.835.100,5 respectively, the t count value was 3,341 and 21,082 respectively with a significance level of 0,001. That is, the number of chemical fertilizers and the number of pesticides has a very evident and significantpositive effect on increasing Arabica coffee income at an alpha level of 1%.

Table 4.2: Results of Multiple Regression Analysis of Factors Affecting Income level of Arabica Coffee Farming in Research Areas, 2019.

Variable	B	T	Sign
Intersept (a)	-10342005,2	-2,769	0,006
Farmer's Age (X1)	45685,8	1,198	0,233
Farmer's Experience (X2)	1607660,3	3,490**	0,001
Farming Land Area (X3)	1744315,9	1,327*	0,042
Number of Workers (X4)	-144650,3	-0,867	-0,387
Number of Chemical Fertilizer (X5)	3994,7	3,341**	0,001
Number of Pesticides (X6)	4835100,5	21,082**	0,000
Production Cost (X7)	-0,9	-7,556**	0,000
F-hit		*189,3*	
R²		*0,903*	

Fertilizing aims to add substances nutrients that plants need in the ground in order to obtain high yields, maintain the durability of plants, and improve production and quality results (Prastowo *et al.*, 2010). Fertilization, in general, should be correct in terms of dosage, type, and ways of administration as in other plants, but it also depends on the type of soil, climate, and the age of the plant. Fertilizers also useful to improve the condition and powering plants' resistance

toextreme environmental change such as drought and over-bearing, as well as maintaining high production stability (Anonymous, 2014).

Coffee plants need a variety of fertilizers for healthy growth. The staple fertilizer used is compost from processed cow dung, straw, and Trichoderma. Compost is used first after land preparation before planting so that the coffee plant can grow well. The average number ofcompost used by Arabica coffee farmers in the study area is 6000 kg per farmer per hectare. Compost fertilizer is necessary and adjusted to the soil organic matter content. Farmers also use chemical fertilizers namely SP36 fertilizer which aims as a source of nutrients in the form of phosphorus. This fertilizer is expected to be able to trigger better root growth so that plants can become more sturdy. The average SP36 fertilizer application by farmers is 786 kg. The use of urea fertilizer by farmers aims to make the plants' leaves greener, lush, and fresher. Urea fertilizer also accelerates plant growth. Plant conditions will be ata higher rate with a large number of tillers. Average use of urea fertilizer farmers reached 1000 kg (Anonymous, 2014).

Increasing the number of chemical fertilizers and the number of pesticides can elevate the income of Arabica coffee farming. Each increase of one unit of chemical fertilizer and pesticides will be able to increase the amount of production that in turn,increase the arabica coffee farming income. The finding is also supported by Thamrin's (2014) research which proves that the increase in Arabica coffee production is determined by input factors that affect production per land area, such as increasing the number ofurea fertilizer, ZA fertilizer, and increasing the number of pesticides. The results of this study are in line with the research of Artanto *et al.* (2018) that the pesticides had a very evidentand significant positive effect on the increase of composite *Tungkal* Liberica coffee farming income.

The success of Arabica coffee farming in the study area is supported by regular maintenance activities of pests and plant diseases according to the needs and age of the plant. This maintenance activity is carried out by administering appropriate medication, which is right on target, on the right type, time, and dosage to minimize the risk of crop failure. The Arabica coffee plant is given herbicide for weeding and given insecticides for pest eradication. The average dose used in themedication is 3 liters for herbicides and 4 liters for insecticides or according to the instructions for use that are on the packaging of the plant-medicine (Anonymous, 2014).

CONCLUSION

The average income of Arabica coffee farming in the study area is Rp24.222.060 for one year or Rp2.018.505 per month. Results of the analysis showed that Arabica coffee farming in the

research area is very viable with the R/C ratio>1 (3,89) and the value of π/C ratio = 28,9 percent which exceeds the currently prevailing bank interest rate (14%) (Worthy).

Results of the analysis showed that the joint of independent variables such as farmer's age, farmer's experience, land area, number of workers, number of chemical fertilizer, number of pesticides, and production costs factors significantly influence the level of Arabica coffee farming income in the study area, indicated by the value of R-Square (R^2) of 0,903 and F value of 189,3 with the F significance value of 0,000. The farmer's experience, farmland area, number of chemical fertilizers, and number of pesticide has a very evident and significant positive effectof increasing Arabica coffee farming income, while production cost factorhave apparentand significant adverse effect to the decline in Arabica coffee farming, but the farmer's age and the number of workers does not give significant effectto Arabica coffee farming income.

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