FACTORS AFFECTING FARMERS' DECISIONS IN TRANSFER OF SIAM ORANGE LAND FUNCTIONS TO ARABICA COFFEE IN PARBULUAN DISTRICT, DAIRI REGENCY, NORTH SUMATRA PROVINCE

Juliana1, Suryadi2, Irada Sinta3

[1]Department of Agribusiness, Faculty of Agriculture, Malikussaleh University, North Aceh
Email: 1)juliana.180320069@mhs.unimal.ac.id2)Suryadi@unimal.ac.id 3)irada@unimal.ac.id

Abstract

The research was carried out in Parbuluan IV Village, Parbuluan District, Dairi Regency, North Sumatra Province from March 2022 to May 2022. The research method used was a survey method with a questionnaire as a tool. Sampling used the saturated sample method so that the number of samples obtained was 82 respondents. Data were analyzed using farm profit analysis and logistic regression analysis using SPSS software. The results showed that farming profits had a significant effect on farmers' decisions to change land functions and the variables of experience, age, education, land area, and fruit fly pests on Siamese oranges simultaneously had a significant effect on farmers' decisions in the conversion of Siamese orange land to Arabica coffee in Parbuluan District, Dairi Regency, North Sumatra Province. Variables of age, education,

Key words: Siamese orange, arabica coffee, influencing factors, land conversion decisions, farmers, spss.

1. INTRODUCTION

Indonesia is an agrarian country, land is a very important factor of production because it determines the welfare of the population of the country concerned. Land is land that has already been designated and generally has an owner (individual or institution) (Jayadinata, 2012). Meanwhile, according to Sugandhy (2011) land is the surface of the earth as a place for human activities to take place. The definition of land is divided into two aspects, namely based on physical geography and economic terms (Malingreau, 2012). Based on data from the Central Statistics Agency (BPS, 2020), the land area in Indonesia is around 204,520 million hectares and the agricultural area is 50,034 million hectares. The agricultural area is also divided into two groups, namely the area of agriculture in Java Island of 8,932 million hectares or (19. 40%) and the total agricultural area outside Java is 41,102 million hectares (80.60%). The agricultural area on the island of Sumatra is 5,405 million hectares which is divided into lowlands and highlands. According to Jamil (2015) lowland is a large expanse of land with a height level measured from sea level is up to 200 mdpl, while plants suitable for planting in the lowlands are coconut trees, lowland rice, mango, banana, rambutan, guava, and others. -other. While the highlands are plains that are located at an altitude above 200 meters above sea level, with a temperature of 23˚C-28˚C and a humid climate, and this highland is suitable for planting crops such as strawberries, potatoes, lettuce, tea, coffee, broccoli, wartel, cabbage, oranges, etc. 405 million Ha which is divided into lowlands and highlands. According to Jamil (2015) lowland is a large expanse of land with a height level measured from sea level is up to 200 mdpl, while plants suitable for planting in the lowlands are coconut trees, lowland rice, mango, banana, rambutan, guava, and others. -other. While the highlands are plains that are located at an altitude above 200 meters above sea level, with a temperature of 23˚C-28˚C and a humid climate, and this highland is suitable for planting crops such as strawberries, potatoes, lettuce, tea, coffee, broccoli, wartel, cabbage, oranges, etc. 405 million Ha which is divided into lowlands and highlands. According to Jamil (2015) lowland is a large expanse of land with a height level measured from sea level is up to 200 mdpl, while plants suitable for planting in the lowlands are coconut trees, lowland rice, mango, banana, rambutan, guava, and

FACTORS AFFECTING FARMERS' DECISIONS IN TRANSFER OF SIAM ORANGE LAND FUNCTIONS TO ARABICA COFFEE IN PARBULUAN DISTRICT, DAIRI REGENCY, NORTH SUMATRA PROVINCE

Juliana, Suryadi, Irada Sinta

others. -other. While the highlands are plains that are located at an altitude above 200 meters above sea level, with a temperature of 23˚C-28˚C and a humid climate, and this highland is suitable for planting crops such as strawberries, potatoes, lettuce, tea, coffee, broccoli, wartel, cabbage, oranges, etc. as for plants that are suitable for planting in the lowlands, namely coconut trees, rice fields, mangoes, bananas, rambutan, guava, and others. While the highlands are plains that are located at an altitude above 200 meters above sea level, with a temperature of 23˚C-28˚C and a humid climate, and this highland is suitable for planting crops such as strawberries, potatoes, lettuce, tea, coffee, broccoli, wartel, cabbage, oranges, etc. as for plants that are suitable for planting in the lowlands, namely coconut trees, rice fields, mangoes, bananas, rambutan, guava, and others. While the highlands are plains that are located at an altitude above 200 meters above sea level, with a temperature of 23˚C-28˚C and a humid climate, and this highland is suitable for planting crops such as strawberries, potatoes, lettuce, tea, coffee, broccoli, wartel, cabbage, oranges, etc.

Dairi Regency is one of 33 regencies/cities in North Sumatra Province. Dairi Regency is one of the areas located in the highlands and consists of 15 sub-districts (BPS, 2022). One of the sub-districts in Dairi Regency is Parbuluan District. This sub-district has an area of 235.40 km2 and is located at an altitude of 700-1100 m above sea level, and consists of 11 villages. This highland area is planted with many crops such as potatoes, broccoli, chili, cabbage, and arabica coffee by local residents, but in general the people of Parbuluan District cultivate Siamese citrus plants.

Siamese orange is a plant that requires loose and fertile soil or contains a lot of oxygen and organic matter in its growth (Deptan, 2011). Siamese citrus is suitable for cultivation in Parbuluan District because it is in accordance with the climatic conditions and soil conditions of the commodity, but in the last three years there has been a fruit fly pest on Siamese oranges, thus making many Siamese orange farmers in Parbuluan District to change land functions, namely to arabica coffee grounds. The transition from Siamese citrus to Arabica coffee is due to the fast harvesting period of Arabica coffee and easy maintenance compared to Siamese citrus.

2. LITERATURE REVIEW

The conversion of agricultural land into other forms of use cannot be separated from the overall economic situation. Decisions are a way for humans to choose choices among randomly available options in order to achieve the goals to be achieved (Hanson, 2012). In other words, a decision can be made only if several alternatives are selected. Farming analysis is an applied science that learns about using resources effectively and efficiently in an agricultural activity in order to obtain optimal results with minimal costs. The way to analyze a farm is by knowing the costs incurred and the income to be received and knowing how much profit will be obtained in doing the farming. Farming analysis is an applied science that learns about using resources effectively and efficiently in an agricultural activity in order to obtain optimal results with minimal costs. The way to analyze a farm is by knowing the costs incurred and the income to be received and knowing how much profit will be obtained in doing the farming. Coffee is one type of plantation plant that has long been cultivated and has a fairly high economic value. Arabica coffee plants are suitable to be developed in areas with an altitude between 800- 1500 m above sea level and with an average temperature of 15-24ºC. Binary logistic regression is a mathematical model approach that is used to analyze the relationship between several factors and a dichotomous (binary) variable. In logistic regression, if the response variable consists of two categories, for example, $Y = 1$ means that the results obtained are "successful" and $Y = 0$ indicates the results obtained are "failed", then the logistic regression uses binary logistic regression.

Ginting (2017), with the title of research on factors that influence the conversion of citrus fields into coffee fields in Suka Village, Tiga Panah District, Karo Regency. The data analysis method used in this study is the logistic regression method. The results showed that there was a

decrease in the area of citrus from 2010 - 2017 by 83.14% and production by 73.69% where in the same period there was an increase in coffee area by 47.14% and production by 50.18%. Internal variable factors are education level, farming experience, and the number of dependents of farmers have a significant effect on the conversion of citrus fields, while the age of farmers and land area have no significant effect. External factors variable the amount of citrus plant productivity,

3. RESEARCH METHOD

PThis research was conducted in Parbuluan IV Village, Parbuluan District, Dairi Regency, North Sumatra Province. Determination of the location of the study was carried out purposively or with a specific purpose (deliberately) because this area experienced a shift from Siamese orange land to Arabica coffee. The number of samples in this study were 82 farmers. For more details can be seen in the following table.

Table 1. Distribution of Farmers' Decisions in Converting Land

Decision	Decision To Convert	
	Total (person)	Percentage (%)
Land Transfer	46	56
No Land Transfer	36	44
Amount	**82 people**	**100**

The type of data used in this research is quantitative data. Sources of data collected in this study include primary data and secondary data. The method used in analyzing the data is the method of analysis of farm profits and the method of binomial logistic regression analysis or binary logit.

1. Analysis of Farming Profits

Production cost

$$TC = TFC + TVC$$

Information :

TC = Total Production Cost

TFC = Fixed Cost

TVC = Variable Cost

Reception

$$TR = P . Q$$

Information :

TR = Total Revenue (total revenue)

P = Price (price)

Q = Quantity (number of goods)

Farming profits

$$= TR\text{-}TC\pi$$

Information :

π = Farming profit

TR = Total revenue

TC = Total cost

R/C ratio

$$\text{R/C ratio} = \frac{TR}{TC}$$

Information :

TR = Total revenue (Rp)

TC = Total cost (Rp)

2. Binary Logistic or Binary Logistic Regression Analysis

$$Y = () = 0 + 1X1 + 2X2 + 3X3 + 4X4 + 5D + \frac{\pi}{1-\pi}$$

Information :

Y   = (1 = farmer's decision to change land function,

FACTORS AFFECTING FARMERS' DECISIONS IN TRANSFER OF SIAM ORANGE LAND FUNCTIONS TO ARABICA COFFEE IN PARBULUAN DISTRICT, DAIRI REGENCY, NORTH SUMATRA PROVINCE
Juliana, Suryadi, Irada Sinta

0 = farmer's decision not to change land function)

β_0 = Constant

β_1-β_5 = Coefficient of each variable

ε = Error term

X_1 = Farming experience (years)

X_2 = Age (years)

X_3 = Education level (years)

X_4 = Area of Siamese orange and Arabica coffee (Ha)

D = Fruit fly pests on oranges

D = 1, the occurrence of fruit fly pests on citrus

D = 0, there is no fruit fly pest in citrus

4. RESULTS AND DISCUSSION

Farmer Characteristics

Age

Table 2. Age Level of Siamese Orange Farmers in Parbuluan IV Village, Parbuluan District

Age Level (Years)	Amount Farmer (Person)	Percentage (%)	Farmer's Decision	
			Land Transfer	No Land Transfer
0-40	19	23.1	6	13
41-62	63	76.9	40	23
Total	**82**	**100**	**46**	**36**

Based on the observations of the 82 respondents used in this study, both from farmers who did land conversion or not, there were 100% of farmers included in the productive age category because there were no farmers who were more than 62 years old. Based on the level of productive age, farmers have a relatively high ability to carry out Siamese citrus farming activities optimally.

Education

Table 3 . Education Level of Siamese Orange Farmers in Parbuluan IV Village, Parbuluan District

Farmer Education	Number of Farmers (Persons)	Percentage (%)	Farmer's Decision	
			Land Transfer	No Land Transfer
Not completed in primary school	11	13.4	2	9
SD	9	10.9	3	6
JUNIOR HIGH SCHOOL	23	28.1	11	12
SENIOR HIGH SCHOOL	34	41.5	25	9
S1	5	6.1	5	0
Total	**82**	**100**	**46**	**36**

Based on the results of the study, it can be seen that the majority of respondent farmers in the research location are high school graduates as many as 34 people or 41.5% of which there are 25 people who carry out land conversion and 9 people who do not. The group with the lowest level of education is S1 as many as 5 people or 6.1% where there are 5 people who carry out land conversion and 0 people do not change land functions. It can be concluded that the education taken by Siamese orange farmers who change land functions is quite high so that they can calculate the costs incurred and the revenues obtained and this generally greatly affects the activities and decisions made in farming in Parbuluan IV Village, Parbuluan District, Dairi Regency.

Experience

Table 4 .The Experience of Siamese Orange Farmers in Parbuluan IV Village, Parbuluan District

Experience (Years)	Number of Farmers (Persons)	Percentage (%)	Farmer's Decision	
			Land Transfer	No Land Transfer
5 - 15	46	56	26	20
16 - 25	18	22	10	8
>26	18	22	10	8
Total	**82**	**100**	**46**	**36**

Based on the results of the study, it can be seen that most of the experience of farmers doing Siam orange farming activities ranged from 5-15 years as many as 46 people where farmers who carried out land conversion were 26 people and farmers who did not do land conversion were 20 people, then the level of experience others are between 16-25 years old and≥26 years old with 18 farmers each.

Land area

Table 5.Siam Orange Farmer's land area in Parbuluan IV Village, Parbuluan District

Land Area (Ha)	Number of Farmers (Persons)	Percentage (%)	Farmer's Decision	
			Land Transfer	No Land Transfer
< 0.5	34	41.5	18	16
0.5-1	44	53.6	26	18
> 1	4	4.9	2	2
Total	**82**	**100**	**46**	**36**

Based on the results of the study, it can be seen that only a small proportion of farmers who own land over 1 ha are 4 people, of which 2 people do land conversion and not land conversion, while most of the farmers who own land 0 ,5-1 Ha as many as 44 people or 53.6% and the rest are farmers who own land<0.5 Ha as many as 34 people or 41.5%.

Table 6. Average Cost and Production of Siamese Orange and Arabica Coffee Farming in the Village Parbuluan IV Parbuluan District

Type of Farm	Average Total cost (Rp/Ha/Year)	Average Production (Rp/Ha/Year)
Arabica coffee	23,075,993	2297
Siamese orange	21,350,149	5481
Difference	**1,725,844**	**3.184**

As for the costs incurred by farmers in conducting Arabica coffee farming, the total costs incurred are Rp23,075,993 per year, while farming Siamese oranges with an average total cost of Rp. 21,350,149 per year with the difference between the average total costs incurred by farming Siamese oranges and Arabica coffee of Rp. 1,725,844 per year. Temporaryaverage production of2297 kg per year, while Siamese orange farming with an average production of 5481 kg per year with an average production difference of 3,184 kg per year.

Farming Revenues and Profits

Table 7 . Average Revenue and Profit of Siam Orange and Arabica Coffee Farming in Parbuluan IV Village, Parbuluan District

Type of Farm	Average Reception (Rp/Ha/Year)	Average Profit (Rp//Ha/Year)
Arabica coffee	59,734,162	36,658,168
Siamese orange	32,884,302	11534.152
Difference	**26,849,860**	**25,124,016**

FACTORS AFFECTING FARMERS' DECISIONS IN TRANSFER OF SIAM ORANGE LAND FUNCTIONS TO ARABICA COFFEE IN PARBULUAN DISTRICT, DAIRI REGENCY, NORTH SUMATRA PROVINCE

Juliana, Suryadi, Irada Sinta

Based on the results of the study, it can be seen that the acceptance of Arabica coffee farming produces an average income of Rp. 59,734,162per year, while Siamese citrus farming of 0.51 produces an average income of Rp32,884,302per year with an average difference of Rp. 26,849,860. Meanwhile, farming profits are the difference between the costs incurred in farming activities and the total revenue earned by the farming. The profit obtained by Arabica coffee farming is 0.47 Ha, obtaining an average profit of Rp36,658,168 per year, while the Siamese orange farming of 0.51 Ha gets an average profit of Rp11534.152 per year with the difference in the average profit earned of Rp 25,124,016.

R/C Ratio

Table 8 . Results of R/C Ratio Analysis of Arabica Coffee and Siam Orange Farming in the Village Parbuluan IV Parbuluan District

Type of Farm	Average Reception (Rp/Ha/Year)	Average Total cost (Rp/Ha/Year)	R/C Ratio
Arabica coffee	59,734,162	23,075,993	2.6
Siamese orange	32,884,302	21,350,149	1.5

The income obtained by farmers and the total costs incurred in carrying out Siamese citrus farming activities were analyzed using R/C ratio analysis to determine the feasibility of farming carried out. Based on the results of the study, it can be seen that the average acceptance of Arabica coffee farming is Rp. 59,734,162per year and the average total cost incurred is Rp. 23,075,993 per year, from the total revenue generated and the total cost incurred, it can be analyzed that the ratio of revenue to production costs incurred is 2.6 so that the R/C ratio value is 2.6> 1, meaning that Arabica coffee farming carried out by Arabica coffee farmers is feasible and provides benefits for farmers. While the results of the analysis of the R/C ratio of Siamese oranges based on the results of the study that the average revenue of Siamese citrus farming was Rp 32,884,302and the average production cost incurred is Rp. 21,350,149, so it can be seen that the ratio of revenue to production costs incurred by Siamese orange farming is 1.5, the R/C ratio value is 1.5> 1, it means that Siamese citrus farming that is cultivated by farmers in Parbuluan IV Village, Parbuluan District is feasible and provides benefits for farmers.

G Test (Chisquare)/ Overall Test

G test or overall test/significant test of the model (overall test). Significant test to determine the effect of all independent variables on the dependent variable (bound) in the model, then tested by the likelihood test. The results of the G test analysis can be seen in Table 13 below.

Table 13. Omnibus Test Of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	56,218	5	.000
	Block	56,218	5	.000
	Model	56,218	5	.000

Based on the results of the study indicate that the chi-square value is56,218with a degree of freedom 5 and a significance value of 0.000 (0.05) which indicates that the independent variables (experience, age, education, land area, and fruit fly pests on Siamese oranges) simultaneously affect the dependent variable (farmer's decision).

Partial TEST

Table 9 . Wald test

		B	SE	Wald	Sig.	Exp(B)
Step 1a	Experience	.050	.040	1,598	.206	1.051
	Age	.099	.043	5,281	.022	1.105

Education	.427	.113	14,237	.000	1,533
Land area	.072	1.083	.004	.947	1.074
Fruit Pest	1.354	.588	5.305	.021	3.875
Constant	9.968	2,729	13,341	.001	.001

Experience (X1)

The experience variable (X1) has no significant effect on farmers' decisions as indicated by a significance value of 0.206 > (0.05). Experience has a positive coefficient value of 0.050 which means that the higher the level of experience of the farmer, the higher the probability of land conversion. Based on the odds ratio of the experience variable, which is 1.051, which means that farmers with 1 year of experience are higher, it is estimated that they have 1.051 times more chance of land conversion than farmers with less than 1 year of experience. Because farmers who have high experience have broader knowledge of their farming than farmers with lower experience and higher experience tend to be more responsive to existing innovations.

Based on the results of the study showed that the experience ranged from 5-15 years as many as 46 people where farmers who did land transfers as many as 26 people and farmers who did not change land as many as 20 people, then the level of experience of some others ranged from 16-25 years and > 26 year with the same number of farmers as many as 18 people. So it can be seen that all levels of experience tend to change land. The results of this study are in line with the results of research obtained (Pangaribuan, 2021) which says that the level of experience has no significant effect on farmers' decisions to convert orange fields to coffee fields.

Age (X2)

The age variable (X2) has a significant effect on farmers' decisions as indicated by a significance value of 0.0022 < (0.05). The age variable has a positive coefficient of 0.099 which means that the older the farmer, the higher the probability of land conversion. The value of the age odd ratio (X2) of 1.105 means that farmers with a 1 year increase in age are estimated to be 1,105 times more likely to change land than farmers with a 1 year lower age. The results of this study are in line with (Ginting, 2017) which says that age has a significant effect on farmers' decisions in changing the function of citrus fields to coffee fields.

Education (X3)

The education variable (X3) has a significant effect on farmers' decisions as indicated by a significance value of 0.000 < (0.05). The lowest education owned by respondents of land conversion in the research location is 2 years or it can be said that they did not finish elementary school and the highest education is 16 years or bachelor with an average education of 11 years of land conversion respondents. Meanwhile, the lowest education owned by respondents did not change land at the research location, which was 0 years or it could be said that they did not take formal education and the highest education was 12 years or high school with an average education of respondents who did not change land, which was 7 years. Therefore, the higher the education of farmers, the better the decisions made by farmers on land use decisions.

The education variable (X3) has a positive coefficient on farmers' decisions with the odd ratio value of education (X3) of 1,533, which means that if education increases, the decision of farmers to change land functions will also increase by 1,533 times. The results of this study are in line with the results of research obtained (Ginting, 2017) which says that the level of education has a significant effect on farmers' decisions in changing the function of citrus fields to coffee fields.

Land Area (X4)

The variable area of land (X4) has no significant effect on farmers' decisions as indicated by a significance value of 0.947 > (0.05). The land area variable (X4) has a positive coefficient of

FACTORS AFFECTING FARMERS' DECISIONS IN TRANSFER OF SIAM ORANGE LAND FUNCTIONS TO ARABICA COFFEE IN PARBULUAN DISTRICT, DAIRI REGENCY, NORTH SUMATRA PROVINCE
Juliana, Suryadi, Irada Sinta

0.072 which means that the more land area (X4) increases, the probability of land conversion increases. The odd ratio value of land area (X4) is 1,074 which means that the opportunity for farmers to change land functions is 1,074 units compared to farmers who do not change land functions if the land area increases by 1 unit. Based on the results of the study showed that the ratio of the average area of Arabica coffee 0.47 Ha was not much different from the average Siamese orange land area of 0.51 Ha so that it can be seen that .

Pests of Fruit Flies on Siamese Oranges (D)

The fruit fly pest variable on Siamese oranges (D) has a significant effect on farmers' decisions, indicated by a significance value of $0.021 < (0.05)$. The fruit fly pest variable has a positive relationship to farmers' decisions with an odd ratio value of 3,874 which means that if the farmer with fruit fly pests is 1 unit higher, it is estimated that the opportunity to transfer land is 3,874 times more likely than farmers with fruit fly pests 1 unit lower. Because based on the results of the study in Appendix 6, it shows that 58.7% of farmers who carry out land conversion are affected by fruit fly pests while 41.3% are not affected by fruit fly pests. Meanwhile, farmers who did not change the function of the land were 27.8% affected by fruit fly pests and 72.2% were not affected by fruit fly pests.

5. CONCLUSIONS AND SUGGESTIONS
Conclusion
1. Based on the feasibility analysis of farming, that there is a very significant difference in profits between Siamese citrus farming which is 1.5 and Arabica coffee 2.6.
2. Simultaneously the factors or variables of experience, age, education, land area, and fruit fly pests on Siamese oranges affect farmers' decisions in changing the function of Siamese orange land to Arabica coffee in Parbuluan District, Dairi Regency, North Sumatra Province.
3. Partially, the factors or variables that have a significant effect on farmers' decisions in carrying out land conversion are age, education level, fruit fly pests on Siamese oranges. Factors or variables that do not have a significant effect on farmers' decisions in carrying out land conversion are experience and land area in Parbuluan District, Dairi Regency, North Sumatra Province.

Suggestion
1. For farmers, it is hoped that the use of farm production costs can be more efficient in order to maintain the cultivation of Siamese orange and Arabica coffee.
2. For further researchers, hopefully there will be other researchers who are interested in conducting research into the financial feasibility analysis of Arabica coffee farming in the same location, or conducting research on factors that influence farmers' decisions in the conversion of Siamese orange land into other commodities, considering that in that location there are still few researchers who conduct research.
3. For the government, it is hoped that it can provide assistance for fruit fly pests that attack Siamese citrus plants, making it easier for farmers to cultivate and reduce production costs of Siamese citrus farming.

BIBLIOGRAPHY

Hosmer, DW and Lemeshow, S. 1989. Applied Logistic Regression. John Wiley and Sons. New York.

Ilham, N. 2009. Developments And Factors Affecting Coffee Land Conversion And Economic Impact. Quoted from htt://ejournal.unund.ac.id.

Irawan, B. 2013. Conversion of Rice Fields, Potential Impacts and Determinants. Center for Socio-Economic Research and Development. Bogor.

Johara T. Jayadinata. 2012. Land Use in Urban and Regional Rural Planning. Bandung: ITB Publisher.

Lestari, T. 2009. Impact of Agricultural Land Conversion for Farmers' Living Standards. Colloquium Papers. Ministry of Communication Science and Community Development April 21, 2009. Bogor Agricultural University.

Luckita. 2017. Factors Affecting the Conversion of Coffee Land to Orange Land in Pegagan Julu V Village, Sumbul District, Dairi Regency Thesis. Airlangga University. Dairi.

Malingreau, JP 2012. Urban Land Use for Image Interpretation for Inventory and Analysis, Yogyakarta: PJ Image Interpretation Education Center and Integrated Survey UGM BAKO-SURTANAL.

Manullang. 2019. Factors Affecting the Decision to Transfer Siamese Oranges (Citrus Sinensis) to Arabica Coffee (Coffee Arabica) in Central Kuta Village, Siempat Nempu Hulu District, Dairi Regency. Thesis. Asahan University. Dairi.

Marzuki, S. 2008., Land Conflicts in Indonesia. Indigenous Rights Workshop. Lombok. West Nusa Tenggara.