

# Analysis of Coffee Farmers' Income and Its Relation to Regional Development

## (Case Study: Pematang Sidamanik District, Simalungun Regency)

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**Abstract:-** This study explores the impact of government policy, infrastructure development, and farmers' institutions on coffee farmers' income in Pematang Sidamanik Sub-district, Simalungun Regency. Through surveys, interviews, and questionnaires, the research reveals that infrastructure and farmers' institutions significantly influence income, both collectively and individually, while government policies surprisingly show no significant impact. The findings suggest that an increase in coffee production can positively contribute to regional development with supportive policies. Recommendations stress the importance of government commitment to effective program implementation, prioritizing agricultural infrastructure, nurturing farmers' institutions, and enhancing farmers' technological knowledge. Implementation of these suggestions is expected to foster more efficient development in the coffee farming sector in Pematang Sidamanik, improving farmers' well-being and positively contributing to overall regional progress.

**Keywords:-** Coffee, Sidamanik, Infrastructure, Income, Farmers.

### I. INTRODUCTION

Simalungun Regency is one of the regencies in North Sumatra Province, covering an area of approximately 438,660 hectares or 6.12% of the total area of North Sumatra. Geographically, it is located between 02°.36' - 03°.18' N latitude and 98°.32' - 99°.35' E longitude, situated at an elevation ranging from 20 to 1,400 meters above sea level. The topography of Simalungun Regency varies, with higher elevations in the Southwest, West, and Northwest, while lowlands are found in the North, East, and Southeast. The region has a moderate climate, with an average highest air temperature of 26.90°C, a lowest of 25.80°C in 2022, and an average monthly humidity of 83.7%.

Particularly in the Pematang Sidamanik sub-district of Simalungun Regency, there is a notable potential for exceptional coffee production. However, specific challenges persist, prompting research to explore the impacts of government policies, infrastructure, and farmers' institutions on coffee farmers' income in this area. The research also delves into the contribution of coffee farmers' income to the development of the region, providing a deeper

understanding of the economic dynamics of coffee farming in Simalungun Regency.

Previous studies related to "Analysis of Coffee Farmers' Income and Its Relationship to Regional Development in Simalungun Regency" include:

Rangkuti (2014) conducted a study titled "The influence of socio-economic factors on corn farmers' income," using multiple linear analysis. The results indicated a significant influence of land area and labor on corn farming income, while factors such as capital, farming experience, and the number of dependents did not significantly affect corn farming income.

Asrawati (2017) analyzed "Income analysis of clove farming in Telaga Village, Dampelas Sub-district, Donggala Regency." The results showed that clove farmers in Telaga Village received higher total revenues compared to the costs incurred, making clove farming economically viable.

Apriadi (2015) explored the "Analysis of the influence of capital, number of working days, land area, training, and technology on rice farmers' income in Gambira Sub-district, Banyuwangi Regency." The study found that these factors collectively and partially influenced rice farmers' income.

Thamrin (2012) investigated the "Effect of socio-economic factors on betel nut farmers' income," revealing a significant influence of factors such as capital, labor, experience, education, and age on betel nut farmers' income.

Olivi (2015) focused on the "Contribution of agroforestry to farmers' income in Sukoharjo 1 Village, Sukoharjo Sub-district, Pringsewu Regency." The study demonstrated a substantial contribution of agroforestry to farmers' income, with variables like age, land area, workforce, religion, slope of the land, and credit assistance significantly affecting income.

Kosmayanti (2017) explored the "Effect of capital and land area on oil palm farmers' income in Pengakatan Village, Pangkatan Sub-district, North Labuhan Batu Regency," using statistical analysis. The study found a significant simultaneous influence of capital and land area on oil palm farmers' income.

Sari (2018) investigated "Factors influencing coffee farmers' income in Bintang Sub-district, Central Aceh Regency (Case Study in Wakil Jalil Village)." The results indicated that land area, workforce, and production costs had a positive influence on income.

Building on the analyses and findings of previous research, this study aims to analyze how government policies, infrastructure, and farmers' institutions affect coffee farmers' income in Pematang Sidamanik Sub-district, Simalungun Regency. Secondly, the research aims to assess the extent to which the income of coffee farmers can drive regional development in the sub-district. Thus, the focus of this study is to provide a sharper understanding of the factors influencing the economic resilience of coffee farmers and their contribution to regional development.

Data analysis was carried out using multiple linear regression with the Ordinary Least Square (OLS) approach.

$$\ln Y = \beta_0 + \beta_1 \ln Z_1 + \beta_2 \ln Z_2 + \beta_3 \ln Z_3 + e$$

Where:

- Y = Coffee farmers' income (Scale 1-5)
- Z<sub>1</sub> = Government policies (Scale 1-5)
- Z<sub>2</sub> = Supporting Infrastructure (Scale 1-5)
- Z<sub>3</sub> = Farmers' Institution (Scale 1-5)
- β<sub>0</sub> = Constant
- β<sub>1</sub>, β<sub>2</sub>, β<sub>3</sub> = Regression Coefficients
- E = Standard error / disturbance term

## II. RESEARCH METHOD

This research was conducted in the Pematang Sidamanik Sub-district, Simalungun Regency, North Sumatra Province, in April 2023. The selection of the location was purposive, considering that Pematang Sidamanik Sub-district has significant potential in coffee farming that can contribute to the regional development of Simalungun Regency.

The types of data used in this research involved primary and secondary data. Primary data were obtained through field surveys and interviews using questionnaires, covering household characteristics of farmers, land area, production inputs, production costs, labor, production, land productivity, and farmers' income. Sampling was done through stratified sampling with a total of 30 samples.

Table 1 Research Variables on Income Towards Regional Development

Variable	Definition	Indicator	Measurement
Government Policies (Z <sub>1</sub> )	Directions or regulations aimed at increasing agricultural production through various methods, methods, or programs applied in the community.	Use of fertilizers/pesticides	Likert Scale (1-5)
Infrastructure (Z <sub>2</sub> )	Facilities and infrastructure that function as support for achieving optimum production from a crop, such as supporting village roads for the transportation of agricultural materials/products, including agricultural processing machines.	Road Condition	Likert Scale (1-5)
Farmers's Institution (Z <sub>2</sub> )	A place/organization where farmers gather to advance their agricultural fields, serving as a means of exchanging information, and knowledge among farmers.	Cooperatives	Likert Scale (1-5)
Income (Y)	Income obtained using all potential resources accompanied by the ability to minimize any risks that may reduce that income in a required time period.	Land Area Fertilizers Pesticides Labor Production	Likert Scale (1-5)

Data were processed using SPSS 13, and the results were presented descriptively. Towards the end of the study, an efficiency test was conducted to ensure the quality of the estimated regression model. The entire data processing process is expected to provide a comprehensive overview of the factors influencing the income of coffee farmers in the Pematang Sidamanik Sub-district, Simalungun Regency.

## III. RESULT

Data were processed using SPSS 13, and the results were presented descriptively. Towards the end of the study, an efficiency test was conducted to ensure the quality of the estimated regression model. The entire data processing process is expected to provide a comprehensive overview of the factors influencing the income of coffee farmers in the Pematang Sidamanik Sub-district, Simalungun Regency.

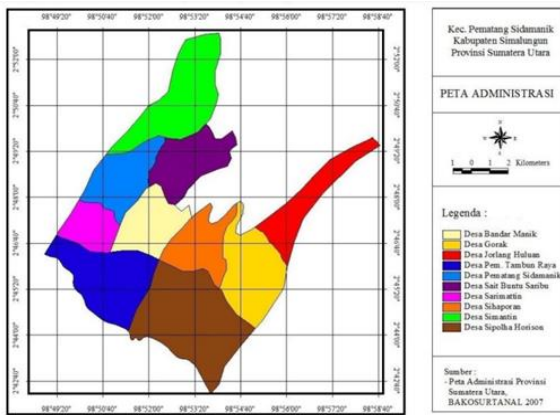


Fig 1 Administration Map of Pematang Sidamanik District

➤ *Demographic Situation of Pematang Sidamanik Sub-district*

Pematang Sidamanik Sub-district, established on January 16, 2003, is an Autonomous Region in Simalungun Regency, North Sumatra, according to Local Regulation No. 9 of 2002. As of mid-2022, the sub-district had a population of 19,716, with a growth rate of 22.7% per year. The distribution of the population among villages shows that Sait Buttu Saribu Village has the highest population, with 5,621 residents. The overall male-to-female population ratio is 50.22% to 49.78%.

Table 2 Population Distribution of Pematang Sidamanik Sub-district by Gender

Gender	Population	Percentage (%)
Male	9.901	50,22%
Female	9.815	49,78%
Total	19.716	100%

Source: Pematang Sidamanik District in figures 2023

Based on the overall ratio in Pematang Sidamanik Sub-district, the male population is slightly higher at 50.22% compared to the female population at 49.78%.

Table 3 Population Distribution of Pematang Sidamanik Sub-district by Age

Age (years)	Population	Percentage (%)
0-14	4.698	23,83
15-64	14.025	71,14
>65	1.611	8,17
Total	19.716	100%

Source: Pematang Sidamanik District in Figures 2023

As of mid-2022, Pematang Sidamanik Sub-district had a total population of 19,716, with a growth rate of 22.7% per year. Sait Buttu Saribu Village stood out with the highest population across seven hamlets. Generally, males make up the majority, reaching 50.22%. The majority of the productive population falls within the age group of 15 years and above, totaling 14,025 people (71.14%).

➤ *Characteristics of Respondent Farmers*

In this study, 30 coffee farmers in Pematang Sidamanik Sub-district participated as respondents. Generally, the majority of respondents are male (53%). Most farmers are aged between 41 and 60 years (90%), indicating that the majority of farmers are in the productive age group. Fifty percent of respondents have completed high school, while the remainder graduated from junior high school (27%) and elementary school (23%). The majority of family dependents are four people (43%).

The majority of respondents (90%) have more than 5 years of farming experience, indicating a relatively high level of experience in coffee farming. In terms of land area, the majority of farmers (50%) fall into Stratum I with a land area of less than 0.5 hectares. The majority of respondents (83%) own the land, indicating a tradition of farming inherited from previous generations.

Analyzing the characteristics of farmers, it can be concluded that the majority of coffee farmers in Pematang Sidamanik Sub-district are productive-aged males with a high school education. High farming experience suggests potential knowledge and skills acquired from extensive experience. Although most farmers have relatively small landholdings, the sustainability of coffee farming can be enhanced through a combination of traditional knowledge and new innovations.

➤ *Analysis of Regional Development Variables*

Emphasis on independent variables (Z1, Z2, Z3) provides a more specific overview of factors contributing to coffee farmers' income. First, regarding Government Policies (Z1), the majority of respondents show a positive influence from government policies, especially from the Local Government of Pematang Sidamanik. However, the perception that some policies still need improvement reflects awareness of certain weaknesses.

In the context of Supporting Infrastructure (Z2), the majority of respondents' positive responses indicate that infrastructure such as irrigation facilities, village roads, and agricultural processing machines is considered adequate. Nevertheless, the acknowledgment of the need for further

attention signals that there is room for improvement and further development in terms of supporting infrastructure.

Regarding Farmers' Institutions (Z3), the majority of respondents' positive responses to the role of institutions, such as farmer organizations, illustrate an understanding of the success of institutions in advancing agriculture and enhancing farmers' knowledge. Meanwhile, comments from some respondents stating the need for further attention to institutions provide specific insights into areas that require improvement or further development.

This discussion not only provides a clear picture of farmers' perceptions and views on key factors influencing their income but also demonstrates alignment with the research objectives and the established methodological framework. Thus, the results of this discussion are closely related to the relevance and correlation needed in the context of this research.

➤ *Statistical Result*

Table 4: Regression Results of Government Policies, Infrastructure, and Farmers' Institutions on Coffee Farmers' Income in Pematang Sidamanik Sub-district

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-6.636	2.622		-1.515	.142
Government policies (Z1)	.453	.379	.148	1.047	.305
Infrastructure (Z2)	.749	.235	.497	3.231	.003
Farmers' Institutions (Z3)	.082	.841	.345	2.272	.032

Equation based on table 4:

$$Y = -6,636 + 0,453Z_1 + 0,749Z_2 + 0,082Z_3$$

From the equation, it can be explained that the regression coefficient of Z1 (government policies) is positive, indicating that the influence of government policies is positively correlated with the increase in coffee farmers' income in Pematang Sidamanik Sub-district. Therefore, if government policies favor the interests of farmers, it will have a positive impact on increasing the income of coffee farmers in the sub-district.

The regression coefficient of Z2 (infrastructure) is positive, indicating that the influence of infrastructure is positively correlated with the increase in coffee farmers' income in Pematang Sidamanik Sub-district. Thus,

infrastructure has a positive impact on the income of coffee farmers in the sub-district. The development of infrastructure will support the high level of income for coffee farmers in Pematang Sidamanik Sub-district.

The regression coefficient of Z3 (farmers' institutions) is positive, indicating that the influence of farmers' institutions is positively correlated with the income of coffee farmers in Pematang Sidamanik Sub-district. Thus, farmers' institutions have a positive impact on the income of coffee farmers in the sub-district. The existence of farmers in farmer groups will facilitate coaching and community empowerment.

Table 5 Determination Test Result

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.708 <sup>a</sup>	.501	.443	3786301.121

The coefficient of determination (R2) of 0.501 in Table 5 indicates that 50.10% of the variability in coffee farmers' income can be explained by the variability in government policies (Z1), infrastructure (Z2), and farmers' institutions (Z3). This model can be considered good enough in explaining the observed phenomenon. Meanwhile, the remaining 49.90% can be influenced by other variables not included in this study.

Table 6: Simultaneous Test Results (ANOVA)

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	374	3	969.860	8.701	.000 <sup>b</sup>
Residual	372	26	6.045		
Total	746	29			

The simultaneous test results in Table 6 show that together, government policies, infrastructure, and farmers' institutions significantly influence the increase in coffee farmers' income in Pematang Sidamanik Sub-district.

Table 7: Partial Test Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-6.636	2.622		-1.515	.142
Government policies (Z1)	.453	.379	.148	1.047	.305
Infrastructure (Z2)	.749	.235	.497	3.231	.003
Farmers' Institutions (Z3)	.082	.841	.345	2.272	.032

Furthermore, the partial test in Table 7 explains that individually, infrastructure (Z2) and farmers' institutions (Z3) have a significant influence on the income of coffee farmers. Conversely, government policies (Z1) do not show a significant influence on the income of coffee farmers.

In conclusion, the development of the region in Pematang Sidamanik Sub-district, as outlined in the final section, is significantly influenced by the income of coffee farmers. Increased coffee production is expected to have a positive impact on economic growth, regional resource preservation, and poverty reduction. The government needs to maintain spatial planning regulations to prevent changes in the function of agricultural land, provide facilities and policies supporting coffee farming, and continue to promote agribusiness development to increase added value and employment opportunities in the region. The overall findings from this research reinforce the urgency of the roles of government policies, infrastructure, and farmers' institutions in supporting the growth of the agricultural sector and regional development.

#### IV. CONCLUSION

Supporting infrastructure and farmers' institutions, both collectively and individually, have proven to significantly influence the income of coffee farmers in Pematang Sidamanik Sub-district. Conversely, government policies do not have a significant impact on the income of coffee farmers. Increased coffee production in Pematang Sidamanik Sub-district is indicated to have a positive impact on regional development, especially if supported by the government's alignment with the aspirations and needs of farmers.

Ensuring the government's commitment to implementing regional development programs and policies, prioritizing the development of supporting infrastructure for the agricultural sector, nurturing institutions, improving the quality of human resources in farming, and providing continuous motivation and support to farmers are essential. This will enable them to keep up with relevant technological and informational advancements in the agricultural sector. By implementing these recommendations, it is anticipated that regional development, particularly in the coffee farming sector in Pematang Sidamanik Sub-district, can progress more effectively and provide maximum benefits to farmers and the local community.

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