



The Impact of Flooding on The Economy of The Community in Rantau Panjang Village, Kumpe District, Muaro Jambi Regency

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ABSTRACT

This research aims to analyze the condition of people who failed to harvest due to flooding and to analyze the impact of flooding on the community's economy in Rantau Panjang Village, Kumpeh District, Muaro Jambi Regency. The analysis method uses quantitative descriptive analysis. The sampling technique used was purposive sampling. The research sample was 77 respondents from 340 populations, with the determination of the sample size based on the Slovin formula. The analysis technique uses descriptive analysis and simple linear regression. The results of this research show that the condition of the community is prone to flooding when the harvest fails in Rantau Panjang Village, Kumpeh District, Muaro Jambi Regency, experiencing large losses. Flooding negatively and significantly affects the community's economy in Rantau Panjang Village, Kumpeh District, Muaro Jambi Regency.

Keywords: *Crop failure, flood impact, income, prone to flooding*

INTRODUCTION

Disasters are catastrophes that occur due to natural phenomena linked to Law No. 24 of 2007 concerning disasters, namely events or series of events that threaten and disrupt people's lives and livelihoods caused by both natural and non-natural factors as well as human factors, resulting in human casualties, environmental damage, property loss, and psychological impacts. Natural disasters cause physical injury and loss of life and impact the community's economy. On a specific scale, disasters can paralyze the economy by destroying infrastructure, disrupting communication networks, causing disease outbreaks, crop failures, etc. Natural disasters that cause physical damage and direct loss of life can result in a decline in regional economic performance (Ella & Syihab, 2015).

Even though flood disasters pose a relatively lower risk than volcanic eruptions, earthquakes, or tsunamis, they have a relatively higher frequency. Based on this, if flood disasters accumulate, they could cause losses equal to those of the three disasters (Kodoatie & Sugiyanto, 2012). The threat of flooding is also increasingly affecting rice fields, which is one of the impacts of climate change on the agricultural sector, coupled with a large amount of illegal logging in the forest's upper reaches. This event caused a reduction in the harvest area and a significant decrease in rice production. Floods harm regional economic development. Therefore, mitigation activities should be promoted to reduce this impact (Isa 2016).

In Muaro Jambi Regency, natural disasters often occur in various areas, including Kumpeh District. One of the villages with a high risk of natural disasters is Rantau Panjang Village. This village has four Hamlets with potential disasters caused by geological phenomena and climate. The area affected by flooding in Rantau Panjang Village is around 226 Ha, consisting of Hamlets I covering an area of 10 Ha or 4.42 percent, Hamlets II covering an area of 130 Ha or 57.52 percent, Hamlets III covering an area

of 54 Ha or 23.89 percent, and Hamlets IV covering an area of 32 Ha or 14.16 percent. The impact of floods that continue to occur every year in Rantau Panjang village causes enormous losses, which can reach approximately 15 million/ha of the community's agricultural products.

Due to the flood in Rantau Panjang Village, a considerable portion of the land, specifically 550 hectares of the total area, was designated for agricultural use. As a result, most of the village residents are engaged in farming, producing corn (20 families) and rice (320 families), and the agricultural sector significantly influences the regional economy, with lowland rice being more dominant. Flood disasters in rice fields are one of the impacts of management that does not pay attention to environmental sustainability aspects (Suripin, 2014). The lack of proper drainage channels on the agricultural land has led to flooding in the village. The water supply from the Batanghari River is not well controlled, further exacerbating the problem. The community still relies on traditional methods and lacks modern agricultural technology.

A pre-survey conducted in Rantau Panjang Village found that flooding is a persistent issue affecting the local community annually. The farmers have suffered significant losses due to floods, leading to planting and harvest failures, and reducing market value. According to research, floods have a damaging impact on the economy. For instance, Izevbuwa's study in 2015 revealed that flood victims suffered up to a 79% loss of income, while government compensation only covered 13% of the total loss—additionally, floods harm infrastructure (Mwape, 2009). Natural disasters, as mentioned by Hochrainer-Stigler in 2009, are expected to disrupt economic activities in the short term due to the direct and indirect damages they cause.

Determining the economic value of natural resource management and environmental impact is crucial for policy-making and economic analysis of agricultural activities. The effect of an activity can be either direct or indirect, and it can be categorized as primary or secondary. Primary impacts arise from the main objectives of actions or policies, whether in the form of costs or benefits. Without assigning a value to the currency, it becomes difficult to determine the feasibility of an activity or policy (Adisasmita, 2013). Soeparmoko (2008) highlights the critical reasons for conducting environmental assessments. These include the need to inform macroeconomic policies and decisions on allocating production factors for efficiency at the micro level. A precise assessment of the physical benefits and effects and their interrelationships must be made to evaluate a project's benefits and impacts. This is crucial because the resulting impacts directly affect both productivity and environmental quality.

The recent floods in Rantau Panjang Village have caused significant economic losses. The flooding has affected both public infrastructure and household equipment. Despite the large budgets allocated by the central and regional governments, the problem has not been fully resolved. While the existing budget can cover repairs and physical development of public facilities, it fails to consider the economic losses suffered by the community (Asdak, 2014). Although there have been reports of community economic losses, they are based on global estimates and brief monitoring, which only consider visible assessments of the level of community welfare in the affected areas. Economic loss estimation uncertainties affect flood prevention measures and local government decisions. Recurring costs from the provincial government in response to floods lead to an upward trend. Based on this description, the author is interested in further research on the impact of flooding on the community's economy in Rantau Panjang Village, Kumpe District, Muaro Jambi Regency.

MATERIALS AND METHODS

Analyzing the impact of flooding on the community's economy in Rantau Panjang Village, Kumpeh District, Muaro Jambi Regency, a simple linear regression analysis was used in this research to see the influence of the independent variable or X_1 , namely the impact of flooding and a dependent variable or Y (community's economy), (Sugiyono 2017). Also, the regression model that is used is:

$$Y = \alpha + \beta X + \varepsilon$$

with:

- Y = Community's economy due to floods
X = Flood Impact (0 = No impact, 1 = there is impact)
 α = Constanta
 β = Regression coefficient
 ϵ = Interrupts variable (error therm)

Hypothesis testing statistical f test

The purpose of this test is to determine if all the independent variables included in the model have a joint influence on the dependent variable (Ghozali, 2012). If the calculated F-value is greater than the F-table value, the null hypothesis (H_0) is rejected, indicating that the independent variables do have a joint influence on the dependent variable.

Statistical t-test hypothesis testing

The t-test is used to determine whether the independent variable has a significant effect on the dependent variable. These steps are followed in a t-test according to Ghozali (2012).

Coefficient of determination

The coefficient of determination measures how well the model can explain variations in the dependent variable. Its values range from zero to one. A low R^2 value indicates that the independent variables have a limited ability to explain variations in the dependent variable (Ghozali, 2012).

RESULTS AND DISCUSSIONS

The condition of the community is prone to flooding during crop failure in Rantau Panjang Village, Kumpeh District, Muaro Jambi Regency

This study focuses on the impact of failed harvests on flood-prone communities in Rantau Panjang Village, Kumpeh District, Muaro Jambi Regency. The research area was selected based on two factors - the population's economic status and geographical location. Most of the land in the area is used for food crops, particularly lowland rice and corn, covering about 2,570 ha. As a result, the majority of the local population works as farmers, and the agricultural sector significantly influences the area's economic conditions. The research area is located downstream of the Batanghari River, with a relatively flat to almost flat slope, ranging from 0-2%. Because of this, the area is prone to flooding from the river, including agricultural land.

Based on interviews with residents, the area has been prone to annual flooding, with major instances occurring in 1955, 1993, 2006, 2016, and 2020. These recurring floods have caused crop failures, leading to significant losses for farmers in Rantau Panjang Village. Rice fields are particularly vulnerable to flooding, and this has had a direct impact on the economic condition of the village. Isa et al. (2015) described that the frequency and duration of floods influence the magnitude of the risk of flooding. The following is a comparison of farmers' income before and after the flood, which is attached in Figure 1.

The data from Figure 1 shows that the people of Rantau Panjang are severely impacted by flooding. This is especially true for farmers, with most of the 77 respondents being rice farmers and some being corn farmers. Out of the respondents, 49 farmers were affected by the flood, which led to a failed harvest. This resulted in losses that exceeded the farmers' business capital spent on production. In particular, two farmers, Mr. Ardiansya and Mrs. Diah, experienced a 100% loss after flood water inundated their rice fields and damaged their rice plants. The remaining 28 respondents were unaffected, having already completed their harvest before the flood. The graph indicates that flooding severely affects farmers in Rantau Panjang Village.

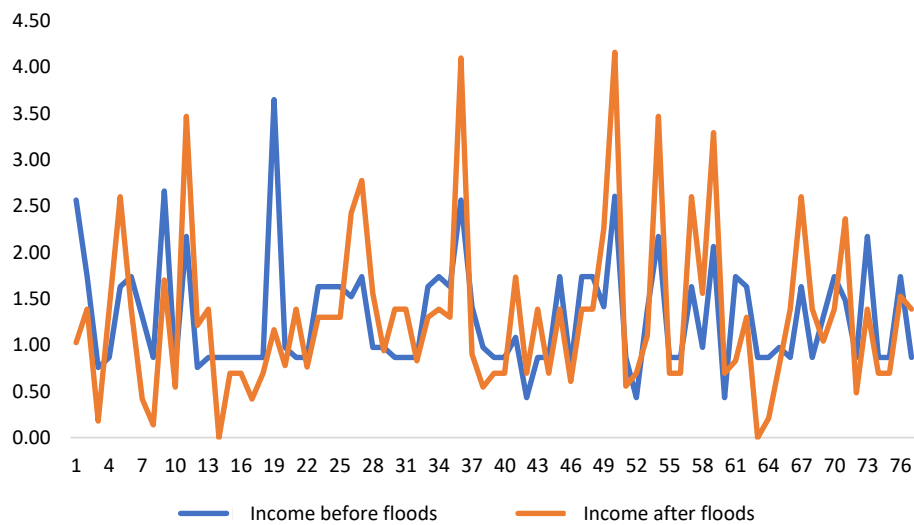


Figure 1. Comparison of people's income

The impact of flooding on the community's economy

Based on Table 1, the research results show that the regression equation is as follows:

$$EKM = 6428571.429 - 3623928.571 DB$$

Tabel 1. Results of simple regression linear on flood impact

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6428571.429	412320.224		15.591	.000
	Floods impact	-3623928.571	516870.754	-.629	-7.011	.000

a. Dependent variable: community economy impacted by floods

Source: Primary data, 2023

Based on the regression equation, the constant coefficient value is 6428571.429. This means that if the community's economy remains unchanged after being affected by the flood, the community's income would be IDR 6,428,571.429. On the other hand, the regression coefficient value for the flood impact variable is 3623928.571. This indicates that if a flood occurs, people's income will decrease to IDR 3,623,928,571.

Table 2. Statistical T-test on floods impact

Variable	t Statistics	Sig	t Table	α	Note
Floods impact	-7.011	0,000	2.045	0,05	Significant

Source: Primary data, 2023

Based on the findings presented in Table 2, the partial results suggest that the impact of floods on the economy of the Rantau Panjang community has a significant value of 0.000, which is less than 0.05. The calculated t-value of -7.011 is greater than the t-table value of 2.045. Therefore, the null

hypothesis (H0) is rejected while the alternate hypothesis (H1) is accepted. This implies that the flood impact variable has a negative and significantly affected the community's economy in Rantau Panjang Village, Kumpeh District, Muaro Jambi Regency, with a significance level of 0.05 percent.

According to Table 3, the residual determination of 0.596 indicates that the flood impact has a 59.60 percent influence on the economy of Rantau Panjang Village in Kumpeh District, Muaro Jambi Regency. Meanwhile, other variables beyond the research are responsible for the remaining 40.40 percent.

Table 3. Coefficient of determination

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.629 ^a	.596	.588	2181793.54464

a. Predictors: (Constant), Floods impact

Source: Primary data, 2023

The village of Rantau Panjang, located in the Kumpeh District of Muaro Jambi Regency, has been severely affected by high-magnitude flooding. Rantau Panjang Village, Kumpeh District, and Muaro Jambi Regency have seen crop failures in the aftermath of floods. The floodwaters have impacted the entire village area, which has caused high inundation depths in some areas and affected only a small area in others. The village is situated near a river basin, the primary flooding source. However, not all parts of the village have been affected by the floodwaters, as some areas have larger areas and higher ground levels. Prior to the floods, Rantau Panjang Village, Kumpeh District, and Muaro Jambi Regency used to harvest crops three times a year, and this helped to improve the local economy. However, after the floods, economic activities have taken a negative turn. Flood causes damage to life and property, leads to displacement, and adversely affects income, expenditure, employment, and psychological well-being (Mananta & Das, 2017). The region's vulnerability level strongly correlates with the amount of rice production (Chen & Villori, 2019). The disruption of activities has resulted in a decrease in the frequency of routine agricultural activities. This has led to a decrease in income levels and work activity.

CONCLUSION

The community in Rantau Panjang Village, Kumpeh District, Muaro Jambi Regency, faces the risk of flooding when the harvest fails. This leads to significant losses that have a negative impact on the local economy. It is important to consider the economic feasibility of building flood prevention infrastructure to mitigate this.

The economic value of community losses and repair of public facilities after a flood should also be factored in. Additionally, the Muaro Jambi District government needs to confirm the status of rivers and water catchment areas to reduce the chance of flooding from a conservation perspective. Farmers are advised to participate in agricultural insurance to manage the risks in the sector. This funding mechanism helps share the burden of farming risks and protects farmers from uncertainties. Agricultural insurance boosts production and safeguards farmers from business uncertainty in the agricultural sector.

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