

Impact of Post-Disaster Rehabilitation Activities On Farmer Economic And Social Conditions Around The Sinabung Mountain

Sari Anggarawati¹, Yunus Arifien², Dyah Budibruri Wibaningwati³

^{1,2,3}Universitas Nusa Bangsa, Jl. K.H.Sholeh Iskandar Km.4, Bogor 16166, Indonesia

E-mail: sari@unb.ac.id, yunus@unb.ac.id

ABSTRACT

The disaster in Karo District due to the eruption of Mount Sinabung on September 15, 2013 has claimed lives, damage to homes, agricultural land and property. This affected the economic and social conditions of affected farmers, so the government intervened to improve these conditions through a rehabilitation and reconstruction program. The purpose of this study is to compare the economic and social conditions of the community before and after the eruption of Mount Sinabung due to rehabilitation and reconstruction activities and examine community participation in recovery activities. The analytical method uses the non-parametric Wilcoxon Signed Rank Test, with two related samples namely the measurement of conditions before the disaster and after the post-disaster rehabilitation-reconstruction are not mutually free. The results show that the land owned by respondents after the disaster was reduced, but land tenure by respondents increased because they rented land elsewhere. The types and number of livestock have decreased such as buffalos and chickens, but cattle have increased due to the aid in purchasing cattle. Money capital has increased because of the provision of financial assistance from the private sector or government. The number of kiosks and sales turnover increased with the change of the area around the disaster into a tourist destination. Likewise, farm family income has increased with the new arable land in Siosar which is planted with vegetables in addition to the results of coffee on the old land that is ready to harvest. Resilience of respondent faces disaster and willingness to rise from disaster in the category of vulnerable and increasing. Work ethic in the high category increases, but in the medium category it actually decreases. The dependency of aid from the government in the high category increases, but in the low category it decreases.

Keywords: farmers, economic, social, disaster, participation

1. INTRODUCTION

Disasters are events that threaten and disrupt people's lives, where macro disasters will create vulnerability in the form of loss of productive human resources, loss of work, property, disruption of health, declining production due to damage to a number of infrastructure, weakening social relations and increasing poverty (Eneyew & Bekele, 2012). This will affect the decline in output and labor productivity in various sectors, which in turn will impact on the decline in income received by households and the possibility of changing the level of welfare of the people in the affected areas. While environmental damage caused can be in the form of damage to landscapes that are difficult to recover in a short time, will affect social, economic and political life (Hidayati, 2012).

In Micro, the earthquake will affect the livelihood and welfare of a household, such as changes in asset ownership, access and activities that support the sustainability of their livelihoods, economic sustainability, environment and sustainability, where if economic conditions are not yet sustainable, social conditions are not yet sustainable, and institutional conditions unsustainable, the level of livelihood is also not sustainable (Noviani & Wijayanti, n.d.).

In some cases, the post-disaster recovery efforts from the government and private sector are more focused on physical recovery, while the socio-economic improvement of disaster victims is neglected (Beckman, 2006). This is due to the physical impact can be seen clearly, the amount of losses can be calculated and can be recovered in a relatively short time, while the socioeconomic impacts are not visible, it is difficult to measure the magnitude of the impact but can cause a slump in the long term (Shah, 2008). This will certainly affect the welfare and sustainability of the lives of disaster victims.

Studied the Modeling of the Restoration of Communities in the Surakarta Flood Disaster Prone Areas, finding that there is a close relationship between recovery power and asset, knowledge and duration of the disaster. optimization of the acceleration of the recovery of disaster-affected households can be done by strengthening asset ownership, improving community capacity and reducing the threat and duration of the disaster (Noviani & Wijayanti, n.d.).

The welfare of households affected by tandikek disasters has experienced a significant decline in the emergency response phase. This is indicated by the increasing number of respondents in the low income group and decreasing the number of respondents who have a high income. In that phase, the level of income inequality is in the medium category (Ali, 2014). After recovery, all welfare indicators start to increase until the condition is in the same position as before the disaster and income inequality has returned to the low category. Nevertheless there has been a change in position in the income group, where the number of high and low income respondents has decreased, while the number of middle income respondents has increased. This means that the disaster has changed the level of income and the level of welfare of respondents (Sosmiarti, Karimi, Noer, & Taifur, 2017).

For various vulnerabilities faced by post-disaster households that might affect their level of welfare, various efforts will emerge as a strategy to survive and restore post-disaster conditions. In general, at the beginning of a crisis due to disaster, survival strategies and restoring livelihoods will depend on the amount of assets, access, capacity and activities of each individual / household (Suwartana & Anggarawati, 2018).

Based on the Indonesian Disaster Data and Information (DIBI, BNPB 2016), the disaster events in Karo District in the last 10 years (2005 - 2015) occurred 14 times. These disasters

include: Volcanic Eruption 6 times, Flood 3 times, landslide 3 times, Flood and Landslide 1 time, and Transportation Accident 1 time. Among the catastrophic events that had the greatest impact and are still being felt by the community is the Sinabung Volcano Eruption in Karo District.

The impact of the catastrophic events in Karo District over the past 10 years was fatalities and massive displacement, as well as damage to homes and agricultural land. The disaster in Karo District killed 34 people, 412 were injured, 22 suffered, and 79,349 were displaced due to the eruption of the Mt. Sinabung volcano and floods. Facilities damaged by the disaster in the form of 60 houses were slightly damaged. The damaged agricultural land area of 528 hectares, as a result of flooding damaged land area of 505 hectares, and as a result of floods and landslides as large as 23 hectares of damaged land.

The relocation of Sinabung refugees was originally planned in Siosar Village using an APL area of another 250 hectares. This 250 hectare land is sufficient to accommodate residents of phase I relocation (370 households) and phase II (1,683 households). Besides housing, it also needs the availability of land for agriculture. This relocation is in the production forest area in Siosar, District of Brand, Karo Regency, North Sumatra Province. About 17 km from the city of Kabanjahe, the capital of Karo Regency.

The objectives to be achieved in the study are as follows:

1. Comparing the economic and social conditions of the community before and after the disaster of the eruption of Mount Sinabung.
2. Analyzing the results of rehabilitation and reconstruction of economic and social conditions.
3. Knowing community participation in the recovery program.

2. METHODOLOGY

Time and Place of Research

This research was conducted around the Mount Sinabung Karo District, the location selection was carried out deliberately in the areas of villages affected by the volcano disaster. The study was conducted in the period October 2018 - March 2019.

Data and Data Types

Research data are grouped into three, namely: 1). Subject data in the form of opinions, attitudes, experiences or characteristics of a person / group of people; 2) Physical data in the form of objects or physical objects, in the form of land, buildings, livestock, vehicles, and kiosks; 3). Documentary data in the form of: journals, letters, minutes of meetings, memos or activity reports.

Types of data in the form of qualitative and quantitative data. Qualitative data such as gender, type of work, employment status, community motivation, and so on. Quantitative data such as land area, number of livestock, total capital, total assets and others.

Population and Sample

The population in this study is the community affected by the Mount Sinabung disaster in Karo District. Sampling was carried out using Stratified Random Sampling techniques based on location and livelihoods where the people affected by the disaster, while determining the number of respondents carried out proportionally. By using the Slovin formula, the number of respondents was 150 respondents.

Analysis Method

Subjective respondent behavior is measured using a Likert Scale, ranked: 1). Frequent (Weight 3); 2). Sometimes (Weight 2); 3). Never (Weight 1). Furthermore the instrument (questionnaire) was tested for validity and reliability.

Data analysis uses the non-parametric Wilcoxon signed rank test to analyze paired data and the data are not normally distributed. Data is processed using the SPSS 21 for Windows program to illustrate the different socioeconomic conditions of farm households before the disaster (2009) and after the disaster (2018). The basis for the decision to accept or reject H_0 in the Wilcoxon signed rank test is as follows:

H_0 is rejected if the probability value < 0.05 means that there are significant differences in socioeconomic conditions before and after a disaster.

H_0 is accepted if the probability value > 0.05 means that there are insignificant differences in socioeconomic conditions before and after the stock split.

4. RESULTS AND DISCUSSION

Characteristics of Respondents

Based on the graph below, the gender of male respondents is greater at 56%, while female respondents are at 44%. A comparison graph of the number of respondents by sex can be seen in Graph 1. Based on the age group, the dominant respondents were in the 40-54 year age group totaling 36.4%, respondents aged 24-39 were 34.7%, 18% were 55-64 years and over 65 years were 11.2%.

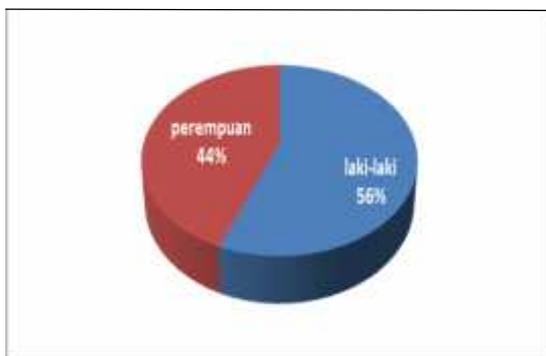


Figure 1. Number of male and female respondents (%)

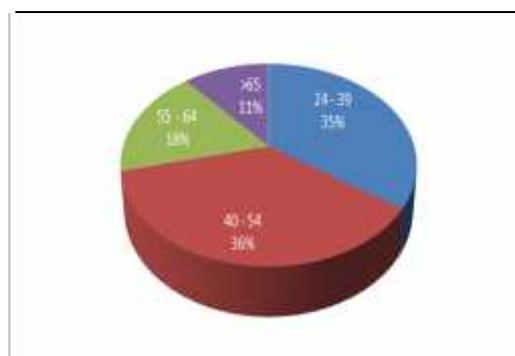


Figure 2. Number of Respondents by Age Group (%)

Based on the level of education, the most dominant respondents were D3 (38%), and at least S1 and / or S2 graduates (10%), graduated from high school by 24%, graduated from junior high school 16%, graduated from elementary school 10%, and those who did not complete elementary school 2%. The spirit of learning of Siosar children who are far from the city center is very enthusiastic, they are willing to walk if there is no city transportation.

Most of the respondents were farmers (78%), farm laborers 6%, entrepreneurs 6%, traders 2.0%, craftsmen 1% and others 7%. The main commodity is coffee. others are vegetables (carrots, potatoes, beans, cauliflower, cabbage, broccoli, chili, tomatoes), and oranges also durian.

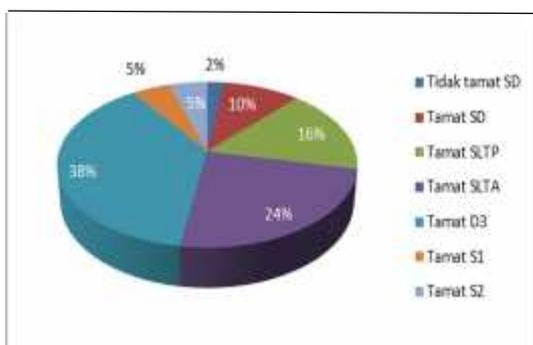


Figure 3. Number of Respondents by Education (%)

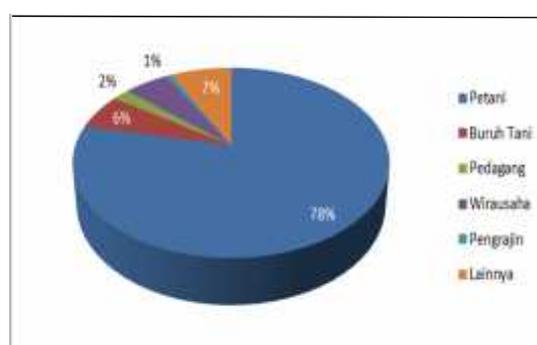


Figure 4. Number of Respondents by Type of Work (%)

Livestock and Land Ownership

Types of livestock raised by cattle, buffalos, goats, pigs, ducks and chickens. Type and number of livestock has decreased. There are no more respondents who have cows above 10 and chickens above 100, even farmers no longer have buffalo, goats and ducks besides pigs. The decline in the number of livestock occurred because respondents could not save their livestock when a disaster occurred and after the disaster was unable to maintain it because they did not have a stable and pasture, many farmers sold their cattle at very cheap prices.

Table 1. Ownership of Livestock and Land

No.	Livestock	Category (bad consequence)	Before (%)	After (%)	Land	Category (bad consequence)	Before (%)	After(%)
1.	Cow	< 3	83,3	94,4	Rice Field	< 0,5	14,3	42,9
		3 - 10	5,6	5,6		0,5 - 1	42,9	14,3
		10 - 20	11,2	0,0		1 - 2	28,6	42,9
2.	Buffalo	<3	60	0,0	Garden	2 - 5	14,3	0,0
		3 -10	40	0,0		< 1	25	50
3.	Goat	< 3	13,3	0,0	Moor	1 - 2	50	50
		3 - 10	33,3	0,0		2 - 5	25	0,0
		10 - 20	13,4	0,0		< 1	46,1	90,4
		>20	40,0	0,0		1 - 2	35,4	8,9
4.	Pig	< 3	0,0	0,0		2 - 5	17,2	0,7
		3 - 10	100	100		>5	1,0	0,0
5.	Chicken	< 10	125	87,4				
		10 - 20	6,3	3,1				
		20 - 50	40,7	6,3				
		50 - 100	28,2	3,1				
6.	Duck	>100	12,6	0,0				
		< 10	0,0	0,0				
		10 - 20	50,0	0,0				
		50 - 100	50,0	0,0				

Data Source: Processed from Primary Data from Field Survey Results, 2019

Paddy fields, gardens and dry fields, is a capital for farmers to carry out their activities. No more respondents have fields and gardens above 2 Ha, and fields above 5 Ha, the area of land owned ranges from fields below 0.5 Ha, gardens under 2 Ha and fields below 1 Ha. There was a decrease in the area of land ownership, but there was also an increase in the area of land tenure among some respondents who rented land for farming in addition to abandoned coffee plantations that could still be harvested.

Business Ownership and Family Income

Business ownership is realized in the form of money capital, kiosks and business turnover that is run consistently. Capital money that many respondents have below Rp. 5,000,000, - the size of the kiosk is not more than 20 m² and the sales turnover is not more than Rp. 20,000,000. Kiosk size of less than 20 m² increased from 49.9% to 85.7%, because many respondents opened kiosks in front of their homes. In terms of turnover, the average range of Rp. 5,000,000 - Rp. 10,000,000 has increased because after the disaster occurred, the area around the disaster became a tourist destination, so many tourists visited the location around the disaster. Money capital and the size of the kiosks have decreased, but turnover has increased and the condition of the kiosks has also been more permanent than before the disaster.



Table 2. Amount of Business Capital and Respondents' Revenues

No.	Type of capital	Category (1.000)	Before (%)	After (%)
1.	Capital Money (Rp)	< 5.000.	7,1	57,1
		5.000 – 10.000	35,5	7,1
		10.000 – 20.000	14,3	7,1
		20.000 – 50.000	21,3	7,1
		50.000 – 100.000	7,1	7,1
		>100.000	14,3	7,1
2.	Stall size	< 20 m ²	49,9	85,7
		20 – 50 m ²	35,6	7,1
		>50 m ²	14,5	7,1
3.	Stall conditions	Permanen	30,8	46,2
		Semi Permanen	61,5	30,8
		Non Permanen	7,7	23,1
4.	Turnover	< 5.000.	9,5	38,1
		5.000 – 10.000	81	23,9
		10.000 – 20.000	9,6	38,2
		20.000 – 50.000	0,0	0,0
		50.000 – 100.000	0,0	0,0
		>100.000	0,0	0,0
5.	Farm Income	< 5.000.	9,5	0,0
		5.000 – 10.000	81	80,9
		10.000 – 20.000	9,6	19,1
		20.000 – 50.000	0,0	0,0
		50.000 – 100.000	0,0	0,0
		>100.000	0,0	0,0

Data Source: Processed from Primary Data from Field Survey Results, 2019

Family income from farming for the range of Rp 10,000,000.00 to Rp 20,000,000.00 has increased from 9.6% to 19.1%. The income increased because some of the respondents still had arable land in the old place planted with coffee or vegetables and fruit that could still be harvested. At the time of abandonment (catastrophic events) the plant is approaching harvest, so after a major disaster the coffee plant is ready for harvest. In addition, respondents also rented land in other places far from the disaster location to plant coffee or other crops. Conditions can be seen in the following table.

The difference test analysis results also showed a significant increase in income with a value below 0.05, meaning that there was an increase in income after the disaster. Full results can be seen in Table 3.

Table 3. Analysis of Difference in Income Tests from Respondents' Garden Results

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pdpt Kebun	Equal variances assumed	31,821	,000	4,086	163	,000	54780395,093	13407087,556	28306429,909	81254360,276
	Equal variances not assumed			4,061	81,186	,000	54780395,093	13488903,824	27942640,556	81618149,629

Data Source: Processed from Primary Data from Field Survey Results, 2019

Socio-Cultural Aspects

Respondents' resilience in the face of disaster experienced a decline from the usual until the tough fell to become vulnerable, although the tough ones still numbered 58.3%. Eruption Mt. Sinabung which continues to make some people begin to despair. The willingness to recover from disasters at a moderate level has increased from before the disaster by 17.9% and after the disaster 25.8%, this increase came from a decline at a high level from 80.8% to 64.9%. The willingness to rise after a disaster needs to be motivated to immediately rise from the disaster experienced.

Table 4. Socio-Cultural Aspects of Respondents in Facing Disaster Impacts

No.	Aspect	Category	Before (%)	Now (%)
1.	Toughness in facing disaster	Susceptible	2,6	25,2
		Ordinary	35,1	16,6
		Tough	62,3	58,3
2.	The will to rise	Low	1,3	9,3
		Medium	17,9	25,8
		High	80,8	64,9
3.	Work ethic	Low	3,3	9,3
		Medium	29,1	19,2
		High	67,5	70,9
4.	Dependence on government assistance	Low	62,7	15,3
		Medium	23,3	23,3
		High	14,0	61,3
5.	Attitudes towards recovery due to disaster	Low	0,0	0,0
		Medium	0,0	14,1
		High	0,0	85,9

Data Source: Processed from Primary Data from Field Survey Results, 2019

The work ethic at a high level has increased compared to before the disaster, showing that respondents still have the enthusiasm to keep working. While respondents at the moderate level experienced a decline to a low level, they experienced the desperation to be able to rise to face this disaster. Dependence on government assistance is very high, additions coming from levels did not depend much before the disaster became dependent on government assistance. Attitudes toward recovery from disaster conditions are very high, the willingness to recover is the capital to rise and improve life as before. In full can be seen in the following table 4.

Participation in the Implementation of Recovery

The recovery carried out by the government for the victims of the Mount Sinabung disaster in helping their lives consisted of skills training, Educational assistance, and agricultural facility assistance as presented in Table 5.

Table 5. Number of Respondents Following Recovery Efforts

No.	Aspect	Category	Before (%)	Now (%)
1.	Skills training	1. Agriculture	8,7	69,7
		2. Motorcycle service	0,3	0,3
		3. Furniture	0,3	0,5
		4. Food	0,3	0,3
		5. Entrepreneurship	0,3	2,7
		6. No help	89,3	26,5
2.	Educational assistance	1. Uniforms and stationery	0,8	66,1
		2. Educational scholarship (KPI)	0,8	9,3
		3. Textbooks	0,3	1,1
		4. Uniforms and scholarship	0,3	1,6
		5. Uniforms and books	0,5	2,2
		6. No help	74,3	19,1
3.	Agricultural assistance	1. Seeds	4,4	68,3
		2. Fertilizer	2,5	16,7
		3. PPL	0,3	0,3
		4. Agricultural land	0,3	0,5
		5. The other	0,3	0,8
		6. No help	92,2	13,4
4.	Kewirausahaan	1. No help	100	100

Data Source: Processed from Primary Data from Field Survey Results, 2019

The implementation of recovery was seen from the aspect of skills training, the participation of victims to attend skills training was quite high for the development of skills in agriculture, which was gained from training after the disaster which had increased from 8.7% which initially received agricultural training increased to 69.7%. The training is given in agriculture and is in accordance with the work of respondents who are mostly farmers. The types of training that have been provided include processing potatoes into chips. Besides that, they were also given training to plant straw mushrooms. Whereas the training training that respondents are interested in is training in the field of entrepreneurship.

Almost all assistance in the field of education has increased, especially for uniforms and stationery, which initially only 0.8% of respondents received assistance before the disaster to 66.1% after the disaster. Other assistance in the form of education scholarships only (KPI), textbooks only, uniforms and scholarships, uniforms and books. But there were still those who did not receive any kind of education assistance in the form of 19.1%.

In addition to education, assistance for agriculture has also increased for the procurement of seedlings, from 4.4% before the disaster to 68.3% after the disaster. Seedling assistance from the government has been provided such as potato seed assistance given to respondents in Siosar. Other assistance in the form of fertilizer also increased from before the disaster 2.5% to 16.7% after the disaster.

5. CONCLUSION

The conclusions from the results of the post-disaster economic recovery study are as follows: The number of cattle and chickens has decreased, even farmers no longer have buffalo, goats and ducks that only live pigs. Agricultural land has experienced a decline in land owned such as fields below 0.5 Ha, gardens under 2 Ha and fields below 1 Ha. Money capital and kiosk size have decreased, but turnover has increased and many kiosk conditions have also been permanent compared to before the disaster, although there are also kiosks that have actually declined from semi-permanent to non-permanent.

Family income from farming for the range of Rp 10,000,000.00 to Rp 20,000,000.00 has increased from 9.6% to 19.1%. The income increased because some of the respondents still had arable land in the old place planted with coffee or vegetables and fruit that could still be harvested. Respondents' resilience in dealing with disaster experienced a decline from the initial level of ordinary to tough down to become vulnerable.

The work ethic of respondents is high after a disaster, but at a moderate level it has decreased to a low level. Respondents' dependence on government assistance is very high, attitudes towards recovery from disaster conditions are very high at 85.9%.

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