

## COMMUNITY CONDITIONS AFTER THE FLASH FLOOD DISASTER IN THE NAGARI BATAHAN BARAT RIVER BASIN, PASAMAN BARAT REGENCY

Vivi Fatimah Uzzahra<sup>1</sup>, Erna Juita<sup>2</sup>, Elvi Zuriyani<sup>3\*</sup>

<sup>1</sup>Geography Education, PGRI University of West Sumatra, Padang, Indonesia.

<sup>2</sup>Geography Education, PGRI University of West Sumatra, Padang, Indonesia.

<sup>3</sup>Geography Education, PGRI University of West Sumatra, Padang, Indonesia.

\*Correspondent Email: [elvizuriyani@upgrisba.ac.id](mailto:elvizuriyani@upgrisba.ac.id)

Received 2023-07-28 | Revision 2023-11-23 | Accepted 2023-12-30  
Geography Study Program, Lambung Mangkurat University

**Abstract:** Flash floods are inundations caused by runoff out of river channels because river discharge suddenly increases beyond the capacity of river flows. It occurs quickly and hits residential areas with low relief, in river valleys and basins, and usually brings discharge in the flow. As a result of high rainfall for 3 to 4 days, has caused many physical and social losses, including 255 houses being flooded. This research is classified as a mixed methods research type. The sampling technique was taken using a proportional random sampling technique to collect information for this research using a snowball sampling technique. For analysis of questionnaire data, it is measured using a Likert scale. The results of this research include that the residential conditions of the people of Nagari Batahan Barat were clean before the flash flood occurred, after the flash floods were not clean, the condition of the livelihood of Nagari Batahan Barat people, in general, was gardening and/or farming, the condition of the plantations and agriculture of Nagari Batahan Barat people, Pasaman Barat Regency before the flash flood occurred, and the condition of the community's plantations and agriculture after the flash flood was not good.

**Keywords:** flash floods; residential settlements; livelihoods; plantations and agriculture

### INTRODUCTION

Indonesia is a tropical country, and the level of vulnerability to various natural disaster threats is very high. Disasters such as; (1) flood; (2) landslides, and (3) land degradation often occur with high frequency in countries with tropical climates, especially Indonesia. It is due to Indonesia's geographical location which has a distinctive maritime continental climate and weather system. Although there are regular, seasonal changes, such as the alternation of the rainy and dry seasons, tropical disturbances often cause extreme weather that triggers natural disasters (Hermon 2012).

Floods are the result of rainfall that experiences processes in land systems, causing water to overflow and become excessive. Floods, as a natural phenomenon, have had a significant impact, especially in terms of material losses. Floods occur when river flow discharges relatively exceed normal due to continuous rain upstream or in a certain location, so that the river flow is unable to accommodate it, causing waterlogging in the surrounding area (Pramono, et al: 2009).

Floods are a disaster that often gets attention because of their scheduled arrival every year. Furthermore, many floods are

also caused by human activities, so they should be avoided more easily. Ironically, every year it gets worse because of the lack of concern for nature and the environment. Floods occur when rainwater drips directly onto the ground and flows to lower areas. Usually, plants can break down rainwater into small droplets which then seep into the soil (Nugrahajati, 2012 in Ikhsan, 2017).

Flooding is a disaster that is often faced in everyday life, both in the surrounding environment and in different places. The impact of flooding is very significant, including damage to the economy of an area, stopping human activities, harming property, spreading disease, and even causing loss of life, both in the surrounding environment and in different locations (Yulandari & Ulni, 2022).

Based on the Law of the Republic of Indonesia number 4 of 2007 concerning Disaster Management, a disaster is defined as a series of events that endanger and disrupt people's lives and livelihoods, caused by natural and/or non-natural factors, as well as human factors, which result in human casualties, environmental damage, property loss, and psychological impacts.

Floods, according to the Indonesian Disaster Information Data (DIBI), are the type of disaster that occurs most frequently and tend to increase in recent years. Paimin, et al (2009), define flooding as an event of river water flow that is relatively greater than usual or normal, caused by continuous rainfall upstream or at a certain location, so, it cannot be accommodated by the existing river channel, causing water to overflow, and inundate the surrounding area (Nefilinda et al., 2020).

The impact of high rainfall in Batahan District for 3 to 4 days includes significant physical and social losses. A total of 255 houses were flooded, in Jorong Air Napal 93 houses were submerged, 3 houses were badly damaged, 2 meters of a water tunnel was seriously damaged, and 30 hectares of residents' agricultural land was also submerged, and 1 bridge was washed away.

In Jorong Kampung Baru, it was recorded that 2 houses were seriously damaged, 12 houses were flooded, and 55 hectares of agricultural land was inundated, with several house yards experiencing damage due to landslides. Meanwhile, in Jorong Taming Batahan, the impact included 150 houses and 25 hectares of rice fields being flooded. It is important to note that in January 2023, floods submerged around 180 houses in Jorong Taming Batahan and several houses in Jorong Air Napal. This situation shows the ongoing serious impact of flooding conditions in the region.

## LITERATURE REVIEW

### Flash floods

Flash floods are a type of flood that occurs in low-surface areas due to continuous rainfall. Flash floods are sudden because a lot of water collects in a location. The main cause of flash floods is a rapid increase in the volume of water in a particular area so that the soil cannot absorb the water quickly enough. Flash floods can be identified as large floods that appear suddenly, overflow, inundate, and flow rapidly. It often carried materials such as wood and others. This incident occurred suddenly in a low-lying residential area due to continuous rainfall.

### **Livelihood**

Livelihood refers to the work or a person's effort undertaken to obtain results to fulfill their life. There are two types of livelihood, main and side livelihood. Main livelihood is a type of business that is carried out continuously and routinely by someone because of their expertise, and functions as the main source of income. Meanwhile, side livelihoods are a type of business that is carried out on an irregular basis, can change, and functions as additional income (Seokanto, 2009).

### **Settlement**

Settlements are usually known as housing. The origins of the word "settlement" come from the English language, namely "housing," which refers to housing, as well as from the term "human settlement," which means settlement. Settlement refers to the concept of a house or collection of houses together with environmental infrastructure and facilities. Housing emphasizes physical aspects or inanimate objects, namely humans. Therefore, housing and settlement cannot be separated and have a close relationship, complementing each other.

### **Plantation**

According to Syechalad (2009:5), plantations are an agricultural business that is considered an economic activity with a focus on crops that are managed individually. Meanwhile, Firdaus (2012:4) defines plantations as all activities that include the management of certain plants on land or other growing media in a suitable ecosystem. Moreover, this activity also includes processing and marketing products, and services produced by these plants, by utilizing science and technology, capital, and management.

### **Agriculture**

In general, agriculture refers to human activities that include farming, animal husbandry, fishing, and forestry. In Indonesia, the majority of the population, around 50%, depends on their livelihood in the agricultural sector, the development of this sector is considered very important. Aarsten (1953) defines agriculture as the use of human activities to obtain results from plants and/or animals. This process involves deliberate human efforts to optimize all the potential provided by nature to develop the growth of plants and/or animals.

## **RESEARCH METHODS**

This research uses mixed research methods. The sampling technique was carried out using a proportional random sampling technique. For taking informants, this research used a snowball sampling technique. The sample for this study consisted of communities affected by flash floods.

The main key informant was the Pasaman Barat Regional Disaster Management Agency (BPBD) while supporting informants involved the Wali Nagari Batahan Barat Office and communities affected by flash floods. Data analysis from the questionnaire was carried out using a Likert scale.

The mixed method approach allows this research to combine quantitative data from questionnaires with qualitative data from interviews, thereby providing a more comprehensive understanding of the impact of flash floods on society and the response of related institutions.

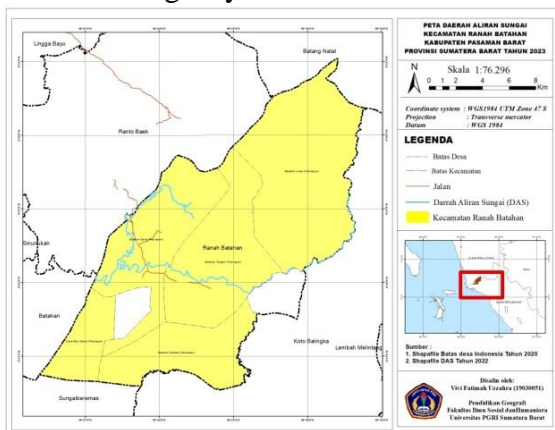
## **RESULTS AND DISCUSSION**

### **General Description of the Research Area**



Nagari Batahan Barat is the most remote area in West Sumatra, specifically in Pasaman Barat Regency. Astronomically, Nagari Batahan Barat is located at the coordinates 00°33' - 00°19' North Latitude and 99°19'-99°35' East Longitude. Administratively, Nagari Batahan Barat, Ranah Batahan sub-district has territorial boundaries, namely to the north it borders North Sumatra province, to the south by Sungai Baremas sub-district, to the west by Sungai Baremas sub-district and North Sumatra province, to the east by Sungai Baremas sub-district.

**Figure 1.** Map of the River Basin, Ranah Batahan District, Pasaman Barat Regency



**Residential conditions**

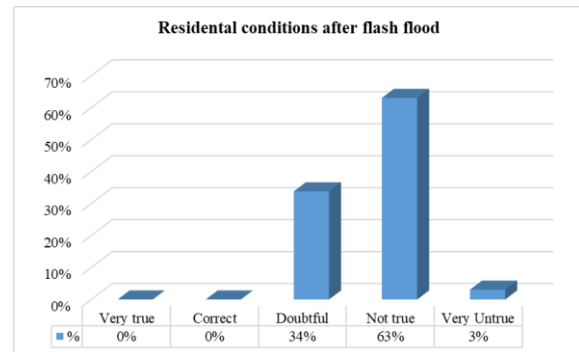
**Table 1.** Residential areas of Ranah Batahan District, Pasaman Barat Regency after flash floods

	Settlement	F	%
1	Very true	0	0
2	Correct	0	0
3	Doubtful	44	33.84
4	Not true	82	63.07
5	Very Untrue	4	3.07
	Amount	130	100

From the table above it can be seen that after the flash flood occurred in the

community of Ranah Batahan District, 130 respondents gave the following responses: 44 respondents (33.84%) said they were doubtful, 82 respondents (63.07%) said it was not true and 4 respondents (3.07%) stated that it was very untrue.

**Figure 2.** Residential conditions after flash floods



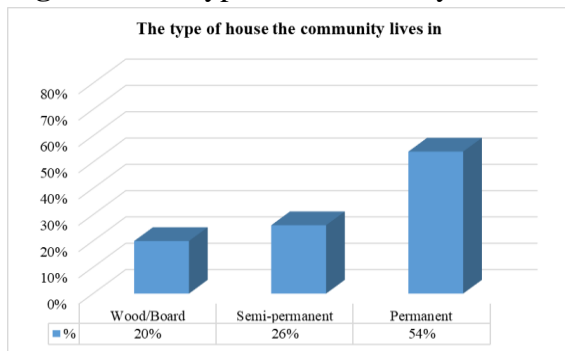
From the table and graph above, it can be seen that the condition of residential areas suitable for use after flash floods in Ranah Batahan District is not correct (63.07%).

**Table 2.** Frequency distribution of types of houses occupied by the people of Ranah Batahan District, Pasaman Barat Regency

No.	Settlement	F	%
1	Wood/Board	26	20
2	Semi-permanent	34	26.15
3	Permanent	70	53.84
	Amount	130	100

From the table above it can be seen that the types of houses occupied by people in Ranah Batahan District, Pasaman Barat Regency, 130 respondents gave the following responses: 26 respondents (20%) stated that their houses were wooden/board, 34 respondents (26.15%) stated that their houses were semi-permanent, and 70 respondents (53.84%) stated that their house was permanent.

**Figure 3.** The types of community houses



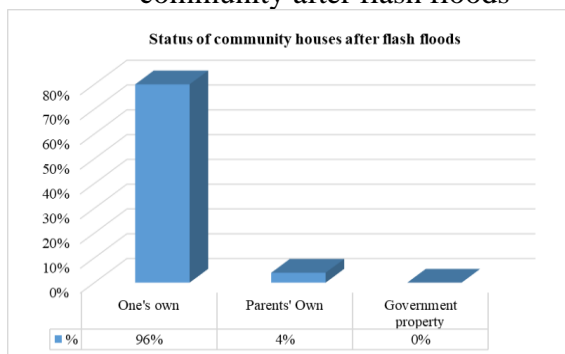
From the table and graph above, it can be concluded that the type of house occupied by people in Ranah Batahan District, Pasaman Barat Regency is permanent (53.84%).

**Table 3.** Status of community houses after flash floods

No.	Settlement	F	%
1	One's own	125	96.15
2	Parents' Own	5	3.84
3	Government property	0	0
Amount		130	100

From the table above, it can be seen that the status of houses occupied by the community after the flash flood occurred in Ranah Batahan Batahan District, West Pasaman Regency. 130 respondents gave the following responses: 125 respondents (96.15%) said they owned it and 5 respondents (3.84%) stated that it belonged to the parents.

**Figure 4.** Status of houses occupied by the community after flash floods



Looking at the table and graph above, it can be concluded that the status of the houses occupied by the community after the flash flood occurred in Ranah Batahan District, Pasaman Barat Regency, was their own (96.15%).

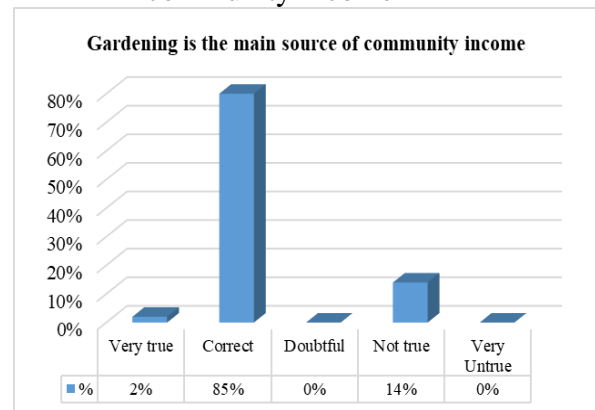
**Livelihood conditions**

**Table 4.** Frequency distribution of gardening as the main source of income for people in Ranah Batahan District, Pasaman Barat Regency

No.	Settlement	F	%
1	Very true	2	1.53
2	Correct	110	84.61
3	Doubtful	0	0
4	Not true	18	13.84
5	Very Untrue	0	0
Amount		130	100

From the table above, it can be seen that gardening is the main source of income for the people in Ranah Batahan District, Pasaman Barat Regency. 130 respondents gave the following responses: 2 respondents (1.53%) said it was very true, 110 said it (84.61%) said it was true and 18 respondents (13.84%) said it was not true.

**Figure 5.** Gardening is the main source of community income



So, looking at the table and graph above, it can be concluded that gardening as

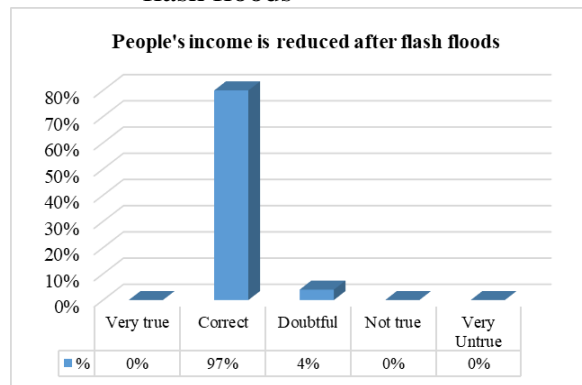
the main source of income for people in Ranah Batahan District, Pasaman Barat Regency is correct (84.61%).

**Table 5.** People's Income Reduced After Flash Floods

No.	Settlement	F	%
1	Very true	0	0
2	Correct	126	96.93
3	Doubtful	4	3.07
4	Not true	0	0
5	Very Untrue	0	0
Amount		130	100

From the table above it can be seen that people's income decreased after flash floods in Ranah Batahan Batahan District, Pasaman Barat Regency. 130 respondents gave the following responses: 126 respondents (96.93%) said it was true and 4 respondents (3.07%) said they were doubtful.

**Figure 6.** People's income is reduced after flash floods



So, looking at the table and graph above, it can be concluded that people's income decreased after the flash flood in Ranah Batahan District, West Pasaman Regency, correct (96.93%).

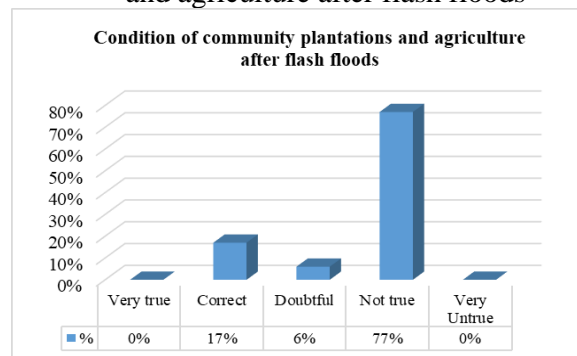
**Plantation and Agricultural Conditions**

**Table 6.** Condition of community plantations and agriculture after flash floods

No.	Settlement	F	%
1	Very true	0	0
2	Correct	22	16.93
3	Doubtful	8	6.15
4	Not true	100	76.92
5	Very Untrue	0	0
Amount		130	100

From the table above it can be seen that the condition of community plantations and agriculture after the flash flood occurred in Ranah Batahan Batahan District, Pasaman Barat Regency. 130 respondents gave the following responses: 22 respondents (16.92%) said it was not true, 8 respondents (6.15%) expressed doubt and 100 respondents (76.92%) said it was not true.

**Figure 7.** Condition of community plantations and agriculture after flash floods



So, looking at the table and graph above, it can be concluded that the existence of community plantations and agriculture after the flash flood in Ranah Batahan District, Pasaman Barat Regency is not true (76.92%).

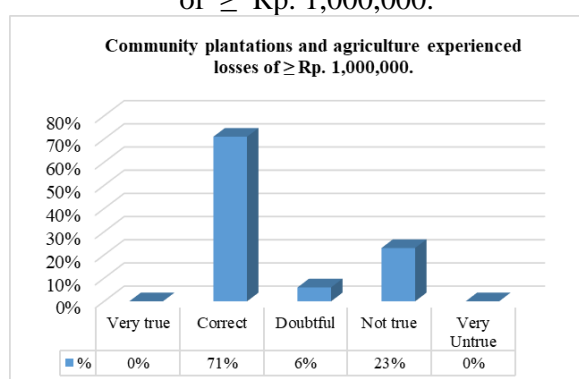
**Table 7.** Community plantations and agriculture experienced losses of  $\geq$  Rp. 1,000,000.

No.	Settlement	F	%
1	Very true	0	0
2	Correct	92	70.77
3	Doubtful	8	6.15
4	Not true	30	23.08
5	Very Untrue	0	0
Amount		130	100



From the table above it can be seen that the condition of plantations and agricultural communities experienced losses after  $\geq$  Rp. 1,000,000 in Pasaman Barat District 130 respondents gave the following responses: 92 respondents (70.77%) said it was true, 8 respondents (6.15%) said they were doubtful and 30 respondents (23.08%) said it was not true.

**Figure 8.** Community plantations and agriculture experienced losses of  $\geq$  Rp. 1,000,000.



So, looking at the table and graph above, it can be concluded that the condition of plantations and agriculture in the community experienced losses of  $\geq$  Rp. 1,000,000 in Ranah Batahan District, West Pasaman Regency is correct (70.77%).

## CONCLUSION

The condition of the residential area of Nagari Batahan Barat, Pasaman Barat Regency was clean, the residential area of Nagari Batahan Barat, Pasaman Barat Regency was suitable for habitation before the flash flood, and after the flash flood, the residential area was not suitable for use. Community facilities and infrastructure before the flash flood occurred were good, and after the flash flood, the community facilities and infrastructure were not good. The houses occupied by the community

before the flash flood occurred were habitable, and after the flash flood, the houses occupied by the community became uninhabitable. The type of house occupied is permanent. The status of the house occupied before and after the flash flood is their own.

Farming is the main occupation of people's livelihoods in Ranah Batahan District, Pasaman Barat Regency. The majority of people in Nagari Batahan Barat have plantation and agricultural land. People still feel inadequate with the income they currently earn.

The condition of the community's plantations and agriculture before the flash flood occurred was good, and after the flash flood, the condition of the community's plantations and agriculture was not good. Community plantations and agriculture suffered losses. The condition of plantations and agriculture in the community experienced losses of  $\geq$  Rp. 1,000,000.

## REFERENCE

- Agricultural Economics. Jakarta: Development.
- Arikunto, Suharsimi. 2006. Research Procedures. Jakarta : Rineka Cipta.
- Bakaruddin, 2012. Introduction to Urban Village Geography. Padang: UNP Press.
- Firdayanti, S. (2014). Study of the Causes of Flooding in Residential Areas, Sungai Sapih Village, Kuranji District, Padang City. STKIP PGRI West Sumatra.
- Ilmi, Bahrul, Nasruddin Nasruddin, Rosalina Kumalawati, and Selamat Riadi. "Penanganan Banjir Pada Permukiman Padat Penduduk Sepanjang Sub DAS Martapura Kabupaten Banjar Provinsi Kalimantan Selatan." *Jurnal*

- Geografika (Geografi Lingkungan Lahan Basah)* 3, no. 2 (2022): 92-101.
- Juliani, N. (2018). Analysis of Rainfall as a Factor Causing Flood Disasters in Padang City. STKIP PGRI West Sumatra.
- Law, No.4 of 1992 Articles 1 and 3. Concerning Settlements.
- Law, No.8 of 2004. Concerning Plantations.
- Law, No.19 of 2013. Concerning the Definition of Agriculture.
- Nasruddin, Muhammad Efendi. "Pengembangan Kawasan Rawa Gambut Berbasis Ecoedutourism di Hutan Lindung Liang Anggang." In *Prosiding Seminar Nasional Lingkungan Lahan Basah*, vol. 7, no. 2. 2022.
- Nefilinda, Suryani, AI, Riyanto, S., & Zuriyani, E. (2020). Socialization of Flood Disaster Mitigation through Tree Planting in Kenagarian Sungai Durian, Padang Pariaman Regency. *Abdi Human*, 1–8. <https://doi.org/10.29303/abdiinsani.v7i1.301>
- Ramadhan, Dwi, and Siti Dahlia. "Analysis of The Level of Vulnerability to Landslide Disaster in Pamijahan District of Bogor Regency." *Jurnal Geografika (Geografi Lingkungan Lahan Basah)* 4, no. 1 (2023): 67-77.
- Risva, MM (2017). Community Conditions After the Flash Flood Disaster in the Batang Sumpur Nagari Lansek Kadok River Basin, Pasaman Regency. STKIP PGRI West Sumatra.
- Rahmi, A. (2015). Socioeconomic Life of Fish Cage Farmers After Flash Floods in Pauh District, Padang City. Padang: STKIP PGRI West Sumatra.
- Soekanto, S. (2010). *Sociology An Introduction*. Jakarta : Rajawali Press.
- Sugiyono, 2008. *Educational Methods*. Bandung: Alfabeta.
- Sugiyono, 2014. *Quantitative Qualitative Research Methods and R & D*. Bandung: Alfabeta.
- Suripin. (2003). *Sustainable City Drainage System*. Yogyakarta: Andi Publisher.
- Syechalad, N.M. (2009). *Plantations in Socio-Economic Studies*. Banda Aceh: PENA Foundation.
- Weliati. (2016). *Socioeconomic Changes in the Community After the Flash Flood Disaster at Gampong Nagari Kambang Barat Market, Lengayang District, Pesisir Selatan Regency*. Padang: STKIP PGRI West Sumatra.
- Yulandari, DFEJ, & Ulmi, A. zella P. (2022). Analysis of Flash Flood Disaster Vulnerability In South Solok. *Multidisciplinary Journal of Science*, 1(1), 23–33.