Jurma : Jurnal Program Mahasiswa Kreatif
Universitas Ibn Khaldun Bogor, Indonesia
Vol. 9, No. 1, Juni 2025, pp. 84~88
ISSN: 2615-8019, DOI: 10.32832/pkm
http://pkm.uika-bogor.ac.id/index.php/pkm-p

Analysis of Community Behaviors Towards Flood Disasters Before, Immediately, and After Floods on the Bagan Deli Coast

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Article Info

Article history:

Received month dd, 2024
Revised month dd, 2024
Accepted October 22, 2024

Keywords:

Action
Flood Diaster

ABSTRACT

Indonesia is a country that is prone to disasters, both natural and non-natural. A disaster is an event that threatens and disrupts people's lives and livelihoods. Floods are overflowing water that rivers cannot accommodate. Floods are also a disaster because they disrupt community activities. Bagan Deli sub-district, which is located in Belawan, has a relatively high risk of flood disasters. Therefore, efforts need to be made to determine community actions before, immediately and after the flood disaster. This is related to flood disaster preparedness in Bagan Deli sub-district, therefore it is necessary to know the community's actions or community preparedness for flood disasters so that later it can be assessed that Bagan Deli sub-district is ready for flood disasters.

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INTRODUCTION

Indonesia is located on the Pacific Ring of Fire, or the Pacific Ring of Fire has great potential for natural resources. Being located in a cluster of volcanoes and a meeting point on a number of land plates makes Indonesia vulnerable to natural disasters. Indonesia is located in an area vulnerable to various natural disasters. Almost all types of natural disasters occur in Indonesia. Disasters can happen at any time without predicting the right time. This can make our society always try to behave in a disaster response manner (Hildayanto, 2020).

Natural disasters are disasters caused by various natural or man-made events, including tsunamis, floods, hurricanes, earthquakes, landslides, volcanic eruptions and drought (RI Law No. 24 of 2007). Floods are seasonal disasters that occur when water capacity overflows from existing waves and then steals the surrounding area. Floods are natural disasters that are often more dangerous, socially, economically and humanitarianly. Flooding is an event or condition where land or plains sink due to rising water levels (RI Law No. 24 of 2007).

The increasing incidence of disasters is a challenge to increase community preparedness, especially in disaster-prone areas such as Asia Pacific such as Indonesia. Indonesia's geographic location, which is at the meeting point of three of the world's main tectonic plates, has resulted in Indonesia being a territorial region that is very vulnerable to natural disasters. The country's equatorial location also causes Indonesia to have unique climatic conditions with equally long rainy and dry seasons. Global climate conditions influence the

ISSN: 2615-8019

climate in Indonesia, so that the change from the dry season to the rainy season can trigger flood disasters (Adriani et al., 2022).

A flood disaster is a disaster that causes health problems, both during and after the disaster occurs. Health problems occur in various residential areas and in public places that are affected by flooding. Floods carry dirt such as rubbish, sewer water or septic tanks. This condition causes disease germs to easily reproduce. Floods can also cause massive outbreaks of infectious diseases and increase the potential for disease transmission. The risk of an infectious disease epidemic outbreak is proportional to population density and movement. Wet conditions are also uncomfortable for the body so it can reduce body condition and resistance to stress due to limited access to clothing, food and shelter (Adriani et al., 2022).

The main factors that can result in disasters causing large casualties and losses are a lack of understanding of the characteristics of hazards, attitudes or behavior that result in a decrease in natural resources, lack of early warning information which results in unpreparedness, and helplessness or inability to face disasters. Preparedness is grouped into four parameters, namely knowledge and attitudes, emergency planning, warning systems and resource mobilization (Firmansyah & Rasni, 2014).

Based on Indonesian disaster data released by BNPB, the number of floods in Indonesia in 2017 was 979 times and in 2018 871 times. In 2017, the number of victims was 162 people, 106 people were injured, 2,518,378 people were injured, 3,371 houses were seriously damaged. The death toll from floods in 2018 was the highest among other disasters, with 36 people killed, 243 injured, 470,461 killed and 946 houses seriously damaged (BNPB, 2019).

Bagan Deli sub-district, located in Belawan, has an area of around 230 hectares and consists of fifteen neighborhoods. The population is 15,987 people and has 3356 family cards. A natural phenomenon that often occurs in this area is tidal floods. As a result of the rise in sea level, tidal water reached the residential areas of Bagan Deli Village, resulting in tidal flooding. The tide reaches an average height of 2 to 2.5 meters above sea level. Every day, tides are made at the inland water level up to ± 70 cm. This has a negative impact on indicators of better quality of life in settlements (Utari, 2023).

Rob floods or sea water rising to land occurred on Sunday, September 22 2024 and submerged hundreds of houses in two sub-districts on the Belawan Coast. Continuous flooding, known as tidal flooding, has submerged hundreds of houses in two sub-districts in Pesisir Belawan, Medan Belawan and Medan Marelan, North Sumatra. This natural phenomenon has disrupted economic activities in North Sumatra through the Port of Belawan. Since the last five days, tidal floods have reached a height of 50 centimeters. This happens twice a day, at 23.30 at night and at 12.00 noon, and recedes again at 15.00 WIB. Apart from submerging residential areas, rising sea water causes tidal floods that reach roads, which sometimes cause roads to become blocked and asphalt to collapse. The worst tidal flood occurred in Ujung Tanjung, Bagan Deli Village in Belawan.

METHOD

This research uses quantitative research, namely by finding out what actions the community took before, immediately and after the tidal flood occurred. Correlation test method to see the behavior of respondents before, during and after the flood disaster. The data collection technique in this research was carried out through questionnaires. This research was conducted in Medan Belawan District, Bagan Deli Village. Of the 15 areas of Bagan Deli Subdistrict, there are 2 areas that were seriously affected by tidal flooding. This research was conducted on November 22 2024. The number of respondents was 40 people, 1 of whom was the Secretary of Bagan Deli Belawan Subdistrict and 29 others were local residents who were affected by the tidal flood.

RESULTS

Table 1. Average behavior of respondents before the flood occurred

Variabel	Mean	SD	Median	Min	Max	N
Score before	4,33	1,141	4,00	2	7	40

Table 1 shows that the average community behavior before the flood occurred was 4.33, the standard deviation was 1.141, the lowest value was 2, and the highest value was 7. Before the flood occurred, people still lacked knowledge about the signs that a flood would occur.

Table 2. Average behavior of respondents when the flood occurred

Variabel	Mean	SD	Median	Min	Max	N
Instant Score	7,93	0,797	8,00	6,93	9	40

Table 2 shows that the average community behavior when a flood occurs is 7.93, the standard deviation is 0.797, the lowest value is 6.93, and the highest value is 9. When a flood occurs, community behavior begins

to improve, indicating an increase in behavior to take appropriate action. must be carried out when flooding occurs in the area.

Table 3. Average behavior of respondents after the flood

Variabel	Mean	SD	Median	Min	Max	N
Score After	9,57	0,549	10,00	8	10	40

Table 3 shows that the average community behavior after the flood was 9.57, the standard deviation was 0.549, the lowest value was 8, and the highest value was 10. After the flood, the community's behavior, knowledge and actions increased to become very good, if a flood disaster occurred. The public can know what behavior and actions they should take before the flood, immediately after the flood, and after the flood.

Table 4. Analysis of Community Behavior towards Flood Disasters Before, Immediately and After the Flood

Variabel	n	r	p Value
Before, moment and after	40	0,144	0,375

In table 4 above, it can be seen that the strength of the relationship (r) is 0.144, meaning that people's behavior towards flood disasters before, immediately and after the flood occurs has a very weak and negative correlation. In the statistical test results, a p value of 0.375 or > 0.05 was obtained, meaning that there was no difference in the average behavior of the community towards flood disasters before, immediately and after the flood occurre.

DISCUSSION

The results of the research show that the behavior of the Bagan Deli Village community towards the tidal flood disaster is different at each stage (before, immediately and after the flood). The average community behavior before the flood had a low score (4.33), which reflects a lack of knowledge and readiness in recognizing the early signs of flooding. This can be caused by a lack of education about disaster mitigation and a lack of access to early warning information (Sopacua & Salakay, 2020).

When floods occur, people's behavior shows a significant increase (average score 7.93). This shows that people are starting to take appropriate actions, such as evacuating, protecting property, and trying to minimize the impact of disasters. This increase reflects situational awareness during a disaster, although there are still limitations in the actions taken (Arief et al., 2023).

After the flood, people's behavior showed a significant improvement with an average score reaching 9.57. This reflects increased public awareness and understanding regarding post-flood actions, such as cleaning the environment, mitigating health risks, and adapting post-disaster activities. However, this increase is more reactive than preventive, indicating the need for increased preventive measures before disasters occur (Arief et al., 2023).

Statistical analysis shows that the correlation between people's behavior before, immediately and after the flood is very weak (r = 0.144) with a p value = 0.375 (> 0.05), indicating that there is no significant relationship between the three phases. This shows that people's knowledge and preparedness before the flood does not directly influence their actions during and after the flood (Parassa et al., 2024).

The results of this research are in line with research conducted by (Muh Rifaldy et al., 2022) that floods not only take up time and energy, but their possessions are often lost in the water. Apart from that, in several places, residents are forced to choose to put their rice fields to sleep because their crops always fail due to flooding. The impact experienced by residents living in flood areas, finally took the initiative to adapt to mitigate the risks posed by flooding could be minimized. (Yatnikasari et al., 2020).

Raising the foundations of houses, building flood warning alarms (Early Warning Systems), simple embankments, evacuation platforms, are some examples of the behavior of people who are becoming increasingly aware of the conditions in which they live. This is because people affected by flooding in the Limboto watershed consider the incident of increasing water volume to the point of submerging people's houses as a monthly and annual event whose presence can be guaranteed. For them, flooding has become a ritual, where when the signs of its appearance (flooding) are visible, equipment to deal with flooding will immediately be prepared. For example; water pump, mop, used cloth, mop soap, shovel, wheelbarrow or artco, boards for making a simple stage, and ropes for hanging various household furniture. This situation is not good news, because for the affected residents, this is just an anticipatory step so that the impact of the flood can be slightly reduced (Happy et al., 2022a).

ISSN: 2615-8019

Overall, the results of this research highlight the need to increase public knowledge regarding the early signs of flooding, the importance of education about disaster mitigation, and strengthening early warning systems. It is hoped that this effort can increase community preparedness as a whole, both before, during and after a disaster, in order to reduce the risks and impacts caused by tidal floods in the Bagan Deli Village area (Happy et al., 2022b).

This research is also supported by research conducted by (Neli Husniawati and Tri Mulia Herawati., 2023). When someone wants to change behavior or adopt new behavior, they must also have other supporting factors such as sufficient motivation and knowledge. When someone has a supportive environment but lacks inner encouragement to do it, this behavior will not change (Monalia & Noorratri, 2024).

The results of this research indicate that the role of individuals in active society does not necessarily influence flood disaster preparedness behavior. The research results for the knowledge variable state that respondents with a good level of knowledge are more dominant than respondents with a poor level of knowledge. This research concludes that a person's good knowledge will have a good impact on their behavior, one of which is carrying out flood disaster preparedness (Hardani & Rumi, 2023).

Knowledge is the main factor that is key to preparedness. The knowledge they have can usually influence attitudes and concern to be ready and alert in facing disasters, especially for those who live in places that are vulnerable to disasters. Indicators of individual or household knowledge and attitudes are the basic knowledge that individuals have including about disasters, their causes, how to prevent symptoms and what to do when a flood occurs. Individuals or communities who have better knowledge regarding disasters that occur tend to have more preparedness than people with minimal knowledge (Ardiandari, 2022).

The research above is also supported by research conducted by (Eka B. Z. Pamekas et al., 2019). In relation to a person's behavior, Wohlwill said that each person has a certain level of adaptation (adaptation level) to certain stimuli or environmental conditions. There are 3 categories that serve as benchmarks for the relationship between environment and behavior, namely physical stimulus, social stimulus, and movement. Each of these three stimuli contains three more dimensions, namely intensity, diversity and pattern. Each dimension will be discussed from the existing stimulus categories for environments I, II, V, and VI which are included in the riverbank area. The pattern dimension is a score of 3 (high) where they understand the early warning system if a flood occurs, but their residence (house) is still in poor condition or destroyed. When a flood occurs, people often gather in the same place to save themselves from the flood (Hardani & Rumi, 2023).

CONCLUSION

The results of the research show that the behavior of the Bagan Deli Village community towards the tidal flood disaster has increased in the immediate and post-flood phases. However, the level of knowledge and preparedness before flooding is still low. The correlation between behavior before, immediately and after the flood shows a very weak and insignificant relationship. Therefore, efforts are needed to improve education, early warning systems and disaster response training to strengthen community preparedness in facing tidal flood disasters in the future. The behavior, knowledge and preparedness of the community in facing floods shows that of all the informants there are still those who do not know about floods and do not know what preparations or steps to take before the flood, during the flood and after the flood. The need for further research by providing interventions in the form of training and education regarding community preparedness in facing floods, in this case disaster simulations so that the impacts can be minimized.

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