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Flood countermeasure management in Bulak Banteng Surabaya

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Abstract
The rainy season in Indonesia occurs due to the west monsoon wind blowing from the Asian continent which carries a lot of water vapor to the Australian continent due to climate change, it causes high rainfall and can potentially cause floods. In addition, the phenomenon of garbage accumulation in the river and the failure of the drainage system are the reasons for flooding in metropolitan cities, especially in Surabaya. This study aims to determine the preparedness of the community, especially the people of Bulak Banteng Village, in facing floods during the rainy season. Data were collected using the Simple Random Sample (SRS) method with 30 correspondents randomly selected at the research location. The results showed that many people were aware of the causes of flooding and the signs and impacts caused by flooding. Therefore, some people have prepared themselves in case of flooding by raising the floor of their houses so that water does not enter the house. In the event of a flood, the community prefers to evacuate themselves to a relative's place that is not affected by flooding rather than going to the disaster evacuation site provided by the local government, this happens because of the lack of training or socialization of flood response in the community, resulting in the lack of flood disaster information obtained by the community.
Keywords: disaster evacuation; floods; simple random sample

1. Introduction

Geographically, Indonesia is located between two oceans, the Indian Ocean and the Pacific Ocean, as well as two continents, the Asian continent and the Australian Continent. Astronomically, Indonesia is located at 6˚ north latitude - 11˚ south latitude and 95˚ east longitude - 141˚ east longitude. this makes Indonesia located on the equator and has a tropical climate and has two seasons, namely the dry season and the rainy season. According to the Meteorology Climatology and Geophysics Agency, the average rainy season occurs from October to March and the dry season from April to September. These erratic changes in time occur due to changing global climate conditions. This can potentially threaten people's lives.

One of these threats is during the rainy season. The rainy season is the season of increased rainfall in an area permanently in a certain period of time that occurs in the tropics and subtropics. According to the Koppen-Geiger classification system, the month called the rainy season is characterized by an average rainfall of 60 millimeters or more. However, due to climate change that continues to change from year to year, there are changes in the intensity of the rainy season such as increasingly heavy rains that are often accompanied by thunderstorms and strong winds. The rainy season in Indonesia occurs due

to the west monsoon blowing from the Asian continent which carries a lot of water vapor to the Australian continent. However, along with climate change, the blowing water vapor becomes more abundant, thus increasing the natural disasters that occur in the rainy season. One of the disasters that often occurs in the rainy season is flooding.

Floods are a natural phenomenon, one of which is caused by high rainfall intensity, if there is excess moisture the water cannot be absorbed into the system (Santoso, 2019). Therefore, for areas that often experience flood disasters, especially in urban areas, namely by expanding green open areas and good drainage system.

Surabaya City is geographically located on the coast of Madura Strait. Surabaya City is the downstream of the Brantas River Watershed (DAS), which makes Surabaya prone to disasters when there is an overflow of the Brantas River in the rainy season, Surabaya city is also one of the metropolitan cities besides Jakarta. So, one of the phenomena of garbage accumulation in the river and the failure of the drainage system is the reason for flooding in metropolitan cities, especially in Surabaya. An example of an incident due to the failure of the drainage system occurred in the Bulak Banteng area where there was flooding due to overflow from the sea and a poor drainage system, which resulted in the main road and arterial road of Bulak Banteng being inundated by the flood. If this happens continuously, it can cause material and non-material damage to the community.

Flooding often occurs during the rainy season from September to November in the Bulak Banteng area, Kenjeran sub-district, Surabaya city. There are two factors that cause flooding, namely natural factors such as the topography of the area, the ebb and flow of the Bulak Banteng River, and others and human factors sourced in part to population growth and then followed by increased needs, housing, clean water facilities, and other community services (Sulaiman et al. 2020). Waste is defined as a consequence of every establishment of an industry or factory, but not all industries will produce waste. Waste containing chemical compounds when released into the environment will cause soil, river and air pollution. There are 2 types of waste, namely waste that is produced in conjunction with the industrial process and waste that is not produced directly before or after the production process. In some interviewers who were interviewed they said "technical handling from the government may be recent because this drainage has just been built and has not been long". But there are some residents who complain because their place is often flooded and there has been no handling from the government such as in dukuh bhineka no.8 whose drainage is not good enough. Technical actions from the government can be seen in the dredging or deepening of the riverbanks where excavators are seen ready to operate to dredge or deepen the river and pick up garbage that has crossed the river.

This research aims to determine the preparedness of the community, especially the people of Bulak Banteng Village, in facing floods in the rainy season. So that the impact of flood damage can be minimized in such a way that it does not interfere with activities and cause losses to the people of Surabaya city, especially Bulak Banteng Village.

2. Methods

This research uses a qualitative approach method that presents objective and impartial research results. This research was conducted in Bulak Banteng hamlet to see firsthand the conditions and natural conditions of the place, after which the distribution of questionnaires to residents with several questions which of course were relevant to what the respondents experienced. Questionnaires are instruments used in research or surveys to collect data systematically by asking a series of questions to respondents with the aim of obtaining and collecting information and opinions from individuals or groups who are the subject of qualitative questionnaire research focusing on the understanding, perceptions, or opinions of respondents (Fowler, 2013), especially in this case the flood disaster. Not only the distribution of questionnaires but in this study, interviews were also conducted with residents how related to the existence of flood disasters which every year must exist because the rainfall each year is different. In this research, no socialization was carried out due to limited time and money, only individually to residents.

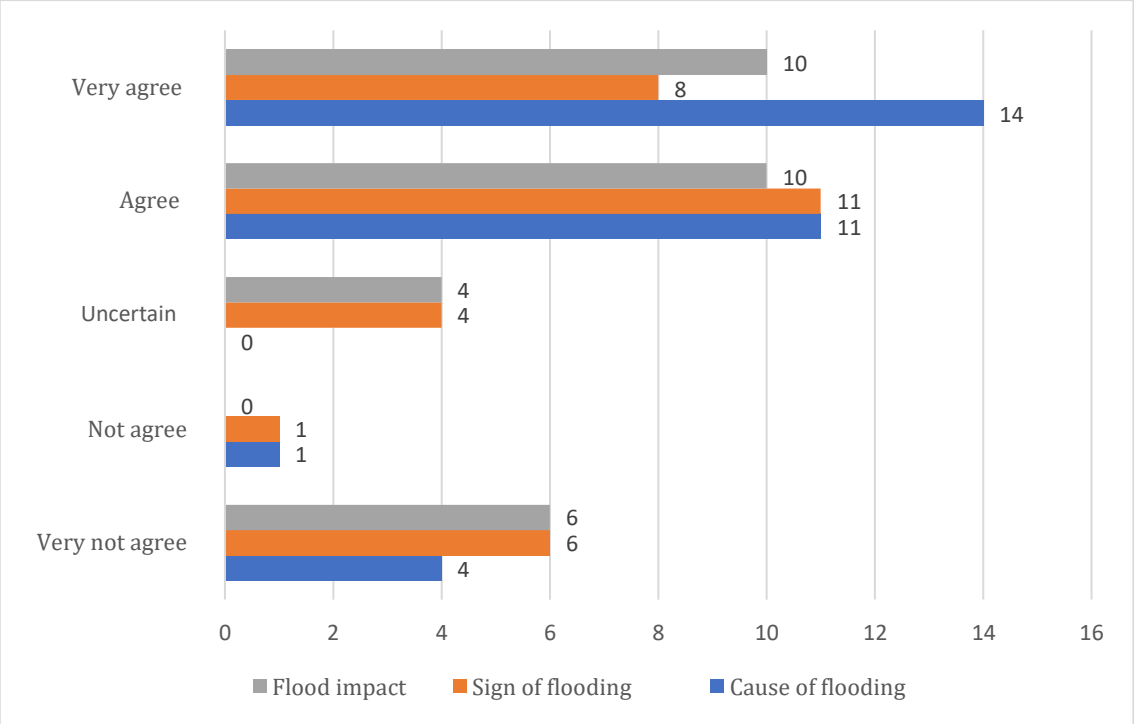
Data taken using a sample of 30 people randomly with the Simple Random Sample method (Levy and Lemeshow, 2013). Simple Random Sample (SRS) is a data collection method where each member of the population has the same opportunity to be selected as a sample. The purpose of SRS is to obtain a sample that represents the population as a whole. The advantage of using SRS is to provide results that can be estimated accurately and provide a fair opportunity for each individual in the population to be selected as a sample in order to reduce bias and allow more general conclusions about the population. the data taken is a random sample of residents who live and move in Bulak Banteng village, Surabaya. The data that has been taken is then presented in the form of a Bar Chart. Bar chart is a type of graph used to describe categorical data and compare the number or frequency associated with each category. Bar charts use horizontal or vertical bars that have a length or height proportional to the value of the data represented. Bar charts are used to present categorical data such as statistical data, survey results, or comparisons between multiple groups with the ease of displaying comparisons within a problem category (Tufte, 2001).

3. Results and Discussion

This research was conducted to analyze residents' understanding of flood disasters. Each data was grouped into 5 themes, namely: Knowledge and attitude preparedness during floods, policy preparedness during floods, emergency response plan preparedness, flood warning system preparedness, and resource mobilization preparedness during floods. The discussion of processed data is as below.

3.1. Knowledge and Attitude Preparedness in the Event of a Flood

Table 1. Knowledge of Flood



Source: Data Analysis, 2023

This category was asked to respondents with the aim of finding out their understanding of flooding, signs of flooding and their understanding of their environment in the event of a flood disaster. The results of the analysis above show that out of a sample of 30, 25 respondents knew the causes of flooding. This shows that the community is aware of flooding in their neighborhood. According to one of the interviewees, flooding is caused

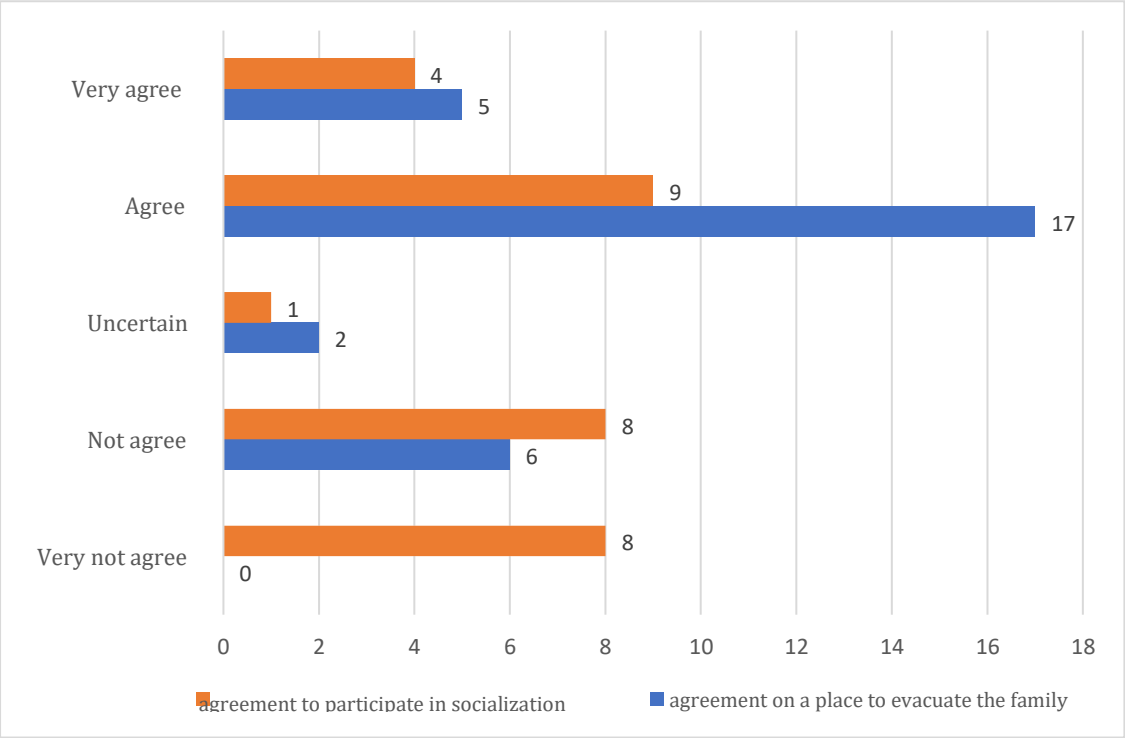
by garbage and siltation that occurs in tributaries, thus increasing the height of the water in the river so that it overflows into the houses of residents of Bulak Banteng urban village. The data above also shows that most of the people of Bulak Banteng urban village understand the signs of a flood disaster and the impact that will be received if there is a flood disaster in Bulak Banteng urban village, Surabaya.

Furthermore, the government's role is also needed in preparation for dealing with flood disasters. Wigati et al. (2017) explained that there is a strong relationship and interdependence between the government and the community in managing flood disasters. The value of dependence and mutual influence is 85.3%.

3.2. Policy Preparedness

This category was asked to respondents with the aim of finding out the preparedness of each family in dealing with flood disasters.

Table 2. Flood Disaster Policy Preparedness



Source: Data Analysis, 2023

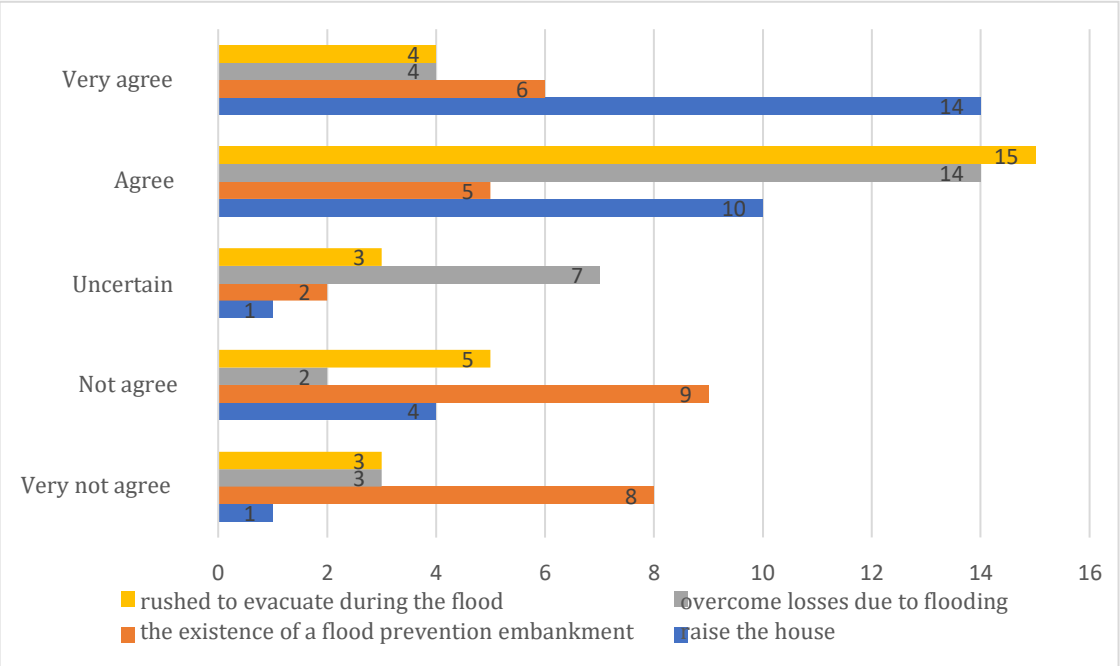
The data above shows that many residents have relatives who are not affected by floods, which can provide their place as an evacuation site when a flood disaster strikes the area where their relatives live. However, the local government still provides facilities in the form of flood evacuation sites at points that are not affected by floods to facilitate people who do not have a place to evacuate. The data above also shows that some residents are enthusiastic when there is socialization of flood disasters. However, some are unable to do so because they are busy working and doing activities. Wahyudi et al. (2019) said that leadership, employee behavior, work group behavior and external factors are the main factors that influence flood management.

3.3. Responsiveness of Flood Disaster Emergency Response Plans

This category was asked to respondents to find out what plans had been prepared by residents of Bulak Banteng urban village for flood disasters. The table below shows that there is community awareness by building houses higher than ground level. According to the documentation, the height of the house from the road surface is 50cm to 1 meter so that flooding does not enter the house.

The table also shows the need for a flood evacuation site and the readiness of the community to immediately rush when a flood occurs. According to one respondent, the emergency response plan readiness that can be done is: keeping important documents in one safe and easy-to-carry place, securing valuables that cannot possibly be taken to the 2nd floor or to a relative's place. Not installing sockets too close to the floor to prevent a short circuit during a flood disaster in the respondent's area, namely in Bulak Banteng urban village. Santoso (2019) revealed that flood disaster management directions can be carried out using the ecodrainage method; namely by building control ponds, rainwater drainage channels and rainwater storage tanks, raising the floors of residents' houses, and planting manila grass in their yards.

Table 3. Preparedness of Emergency Response Plan

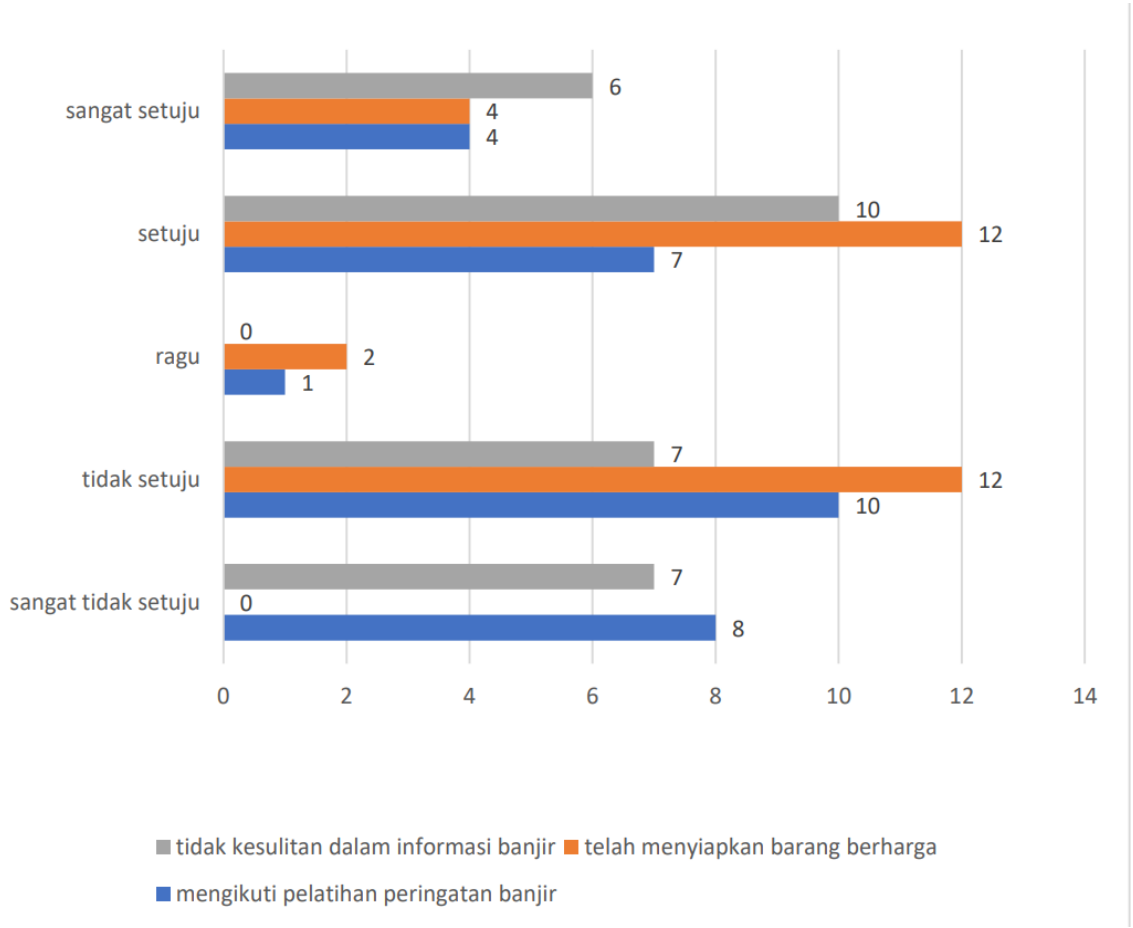


Source: Data Analysis, 2023

3.4. Responsiveness of the Disaster Warning System

This category was asked to determine the respondents' alertness regarding disaster warnings in the respondents' environment.

Table 4. Disaster Warning System Alertness



Source: Data Analysis, 2023

One respondent explained that there had been no training on flood disaster warnings. Most of them use social media and the internet to find out information related to flood disasters. However, the limited economy makes information through the internet more difficult to find.

4. Conclusions

After the research was conducted, it was found that many people were aware of the signs of flooding and its causes, this can be proven by some of them preparing for flood prevention including raising the floor of the house so that water does not enter the house during flooding, not installing electrical outlets near the floor, securing valuables in a safe place. The lack of socialization about flood management by the government has resulted in the community not having enough information about flood disasters. And in the event of a flood disaster, they prefer to evacuate themselves to the nearest relatives or family who are not affected by flooding rather than going to the disaster evacuation site provided by the government. However, local governments must still provide facilities in the form of flood evacuation sites at points that are not affected by floods to facilitate people who do not have a place to evacuate.

Conflicts of Interest

The authors declare no conflict of interest.

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