Community of analysis mitigation and adaptation to the flood disaster overload of Lake Tempe, Wajo Regency

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Received August 22, 2022 | Accepted October 22, 2022 | Published January 04, 2023

ABSTRACT

In South Sulawesi, Wajo Regency is one of the areas prone to flooding during the rainy season. Floods that occur in the area cause inundation. The inundation that occurred was caused by the overflow of Lake Tempe. This research was conducted in Laelo Village, Tempe District, which is located around the Tempe Lake Coast. This location was chosen purposively with the consideration that the area has become a frequent flood in the western part of the kelurahan (the part near the lake). The village has a low contour in the west and high in the east. The research design is descriptive and qualitative which aims to describe the state or status of the phenomenon. The purpose of the research is to analyze the forms of adaptation and mitigation that will be carried out by communities in flood-affected areas. This research uses field surveys, in-depth interviews, making field notes, and documentation. The data collection method was carried out using purposive sampling because the desired sample in the study was only people living in the coastal area of the lake, namely in Laelo Village which was only affected by flooding, not the entire Laelo Village community. Data analysis techniques in qualitative descriptive research are carried out with interactive analysis in the form of cycles. Data analysis was carried out simultaneously with the implementation process of data collection. The results of interviews with the community show that they understand that flooding is an ordinary natural phenomenon which is an overflow of a lake, but they do not know why there is a flood. Some people who live on the shores of the lake feel that almost every year they are exposed to floods from the lake. Where the form of adaptation they do is to raise the pole of the house and prepare a boat that is moored under the house to be used as a means of transportation in the event of a flood. Several forms of mitigation that have been carried out are water hyacinth retaining embankments, and making taller bridges with concrete connecting roads from house to house. Information has been found regarding evacuation signs with the evacuation route installed, the mosque is used as a place to disseminate information related to the incident and development of the flood. It is better to form a disaster-resilient village in the area to create an area that is more prepared to face disasters.

Keywords: disaster mitigation; adaptation; purposive sampling; Lake Tempe.

INTRODUCTION

Flood disaster is an overflow of water that exceeds the normal water level so that it overflows from the riverbed which causes inundation on low land on the side of the river. Flood disasters cannot be prevented, but can be controlled by reducing the impact of losses due to the disaster, so it is necessary to prepare for handling quickly, precisely, and in an integrated manner. Generally, flooding is caused by rainfall that is high above normal, so that the water drainage system consisting of rivers and tributaries as well as artificial flood storage drainage systems are unable to accommodate the accumulation of rainwater so that it overflows (Nurjanah, R. Sugiharto, Dede Kuswana, Siswato BP , Adikoesoemo, 2011). One of the areas in Indonesia that is prone to flooding during the rainy season is Wajo Regency, South Sulawesi Province. Floods that occur in the area cause inundation. The inundation that occurred was caused by the overflow of Lake Tempe due to the Walanae river, Bila river, Belokka river, Batu-batu river and Lawo river which carried sediment from the upstream area and then emptied into Lake Tempe. Thus there is siltation at the bottom of the lake. The floods that occur almost every year cause material and non-material losses for the people, especially those in the area around Lake Tempe. The most vulnerable sub-districts are Tempe, Pammana, Sabbangparu, and Takkalalla (BMKG, 2014) because they are included in the sub-districts with a high rainfall list

pISSN 2302-4240
eISSN 2655-2086
Volume 12, Issue 1, February 2023, pp.144-149
DOI: http://dx.doi.org/10.32832/astonjadro.v12i1 http://ejournal.uika-bogor.ac.id/index.php/ASTONJADRO

(Ali and Trisutomo, 2017). . When a flood disaster occurs, community activities will be disrupted, it will also have an impact on property losses and even casualties (Hassani, 2014). In the disaster management system, the disaster management cycle consists of mitigation, preparedness, emergency response and recovery (Nurjannah et al. 2007; Priambodo 2009). To reduce or prevent the impact of floods, the most important efforts are disaster mitigation and preparedness. Disaster mitigation includes efforts to prevent and reduce disaster risk (Priambodo 2009). In disaster management, disaster mitigation plays a very vital role. Disaster mitigation itself consists of two categories, namely structural mitigation and non-structural mitigation. Structural mitigation is an effort to reduce disaster risk through physical development such as the construction of dams, embankments, etc. Non-structural mitigation is an effort to reduce disaster risk through non-physical activities such as disaster education, urban planning, etc. (Benson & Twigg 2007). Adaptation of the community in dealing with flood disasters is one of the interesting research topics if you look at the vulnerability and danger of flood disasters on the edge of the eradication flow. Adaptation actions to flood disasters can be in the form of actions taken to reduce the impact of disasters, both direct and indirect impacts. Adaptation efforts also aim to ensure that the resources needed to respond in disaster events can be used effectively during disasters and know how to use them (Astawa, 2019).

In Law Number 24 of 2007 article 1 (9) concerning Disaster Management and disaster mitigation, it is divided into two patterns, namely the pattern of structural mitigation and non-structural mitigation. In this structural mitigation, there are things that must be done through the improvement and construction of facilities and infrastructure such as the Early Warning System to predict an earthquake disaster. Then non-structural mitigation has the meaning of an effort to avoid disaster risk. In reducing the impact of this disaster, it can be done by means of legislation, increasing community resilience and overcoming disasters by conducting various trainings, as well as regional planning (Faturahman 2018). By looking at the problems and potential for flood disasters in Laelo Village, this study aims to analyze the forms of adaptation and mitigation that will be carried out by the community in flood-affected areas around Lake Tempe.

RESEARCH AND METHODS

Time and Location of Research Object

The time of the research took place from February 2022 to April 2022. This research was carried out in the Village / Subdistrict of Tempe District which is located around the Lake Tempe Coast, Wajo Regency, South Sulawesi Province, to be precise in Laelo Village (Figure 1).

Research design

Qualitative descriptive research aims to describe the state or status of the phenomenon. Descriptive research can be used to make predictions or for generalization purposes. In carrying out the research, the author uses field surveys, in-depth interviews, making field notes and documentation.

Figure 1. Research Location Map (source: inarisk.bnpb.go.id)

Data collection technique

The method of data collection is done by using purposive sampling. The purpose of using purposive sampling is because the desired sample in the study is only people living in the coastal area of Laelo Village which are only affected by flooding, not the entire Laelo Village community. Community criteria that meet the sample objectives are:

1. Coastal Community of Laelo Village, Tempe District, Wajo Regency, South Sulawesi.
2. Living in flooded areas and flood-prone areas in the Coastal area of Tempe District.

In this study, humans act as the main research instrument. Based on this, the data collection techniques used are:

a) Observation

Observation is an active process, because it does something and chooses what needs to be observed. Observation is a selective activity, that is, something that is a goal. In observation, two things are associated, namely information (what is happening) and context (things that have to do with the surroundings).

b) Interview

From the results of observations alone are not sufficient, it is necessary to be equipped with interviews. The data collected are verbal and non-verbal. Questions and answers are delivered fairly, politely, and straightforwardly. To find out the conditions and direct perceptions of certain people or informants, in-depth interviews were conducted. This type of interview is flexible and open, not strictly structured, not in a formal atmosphere and can be done repeatedly on the same informant (Sutopo, 1996:137). In this study, a selective sampling technique was used, by selecting the informants who were considered to be the most knowledgeable and the locations deemed necessary (representative). Therefore, it is possible that the choice of informants can develop according to the needs and stability of the researcher in obtaining data. In this study, it was determined that the informants who were interviewed were from the community around the Walanae river area.

c) Making Field Notes.

Field note-taking is a very important technique in qualitative research. Field notes are written notes about what is heard, seen, experienced, and thought in the context of data collection and reflection on qualitative research data, because qualitative research relies on observations and interviews, the position of notes is very important.

d) Use of Documents.

Document is any written material or film as a support in this qualitative research. As a data source, it can be used to test, interpret, and even predict.

Data Type

The type of data is divided into two, namely primary and secondary data. Primary data is data obtained from the original source or the first source (direct observation). This data must be sought through respondents (interviews), namely the people we make the object of research or the people we make as a means to obtain the information or data needed, besides that primary data can also be obtained from direct observations/observations in the field.

1. Primary data required include:

a. Land use/existing data

b. Flood characteristics include the return period (frequency of inundation), duration of inundation, and inundation depth and area of inundation

c. Factors that cause flooding

pISSN 2302-4240
eISSN 2655-2086
Volume 12, Issue 1, February 2023, pp.144-149
DOI: http://dx.doi.org/10.32832/astonjadro.v12i1 http://ejournal.uika-bogor.ac.id/index.php/ASTONJADRO

d. In-depth Interview is the process of obtaining information for research purposes by means of question and answer while face to face between the interviewer and the respondent or the person being interviewed, with or without using an interview guide in which the interviewer and informant are involved in life. relatively long social

2. Secondary data is data that already exists so that we only need to find and collect the data. The data is obtained or collected by visiting places or institutions related to the research. This secondary data can be in the form of literature, documents, and reports related to the research conducted. Secondary data needed include:

a. Data on basic physical aspects include: topography and slope, hydrology, rainfall conditions.

b. Data on total area of land use

c. Directional Map of Tempe District Spatial Designation

d. Maps that support research.

Data analysis

Data analysis techniques in qualitative descriptive research are carried out with interactive analysis in the form of cycles. Data analysis was carried out simultaneously with the implementation process of data collection. In this analysis model, the three components of the analysis are: data reduction, data presentation and drawing conclusions or verification, the activities are carried out in an interactive form with the data collection process as a cycle. In this study, the analysis process begins with a review of the data that has been collected from data collection activities. The data review was then continued with data reduction. Data reduction as the first component has actually been carried out since the beginning, namely since the preparation of the proposal, then continued at the time of data collection and closely interwoven with other analysis components, namely data presentation and conclusion drawing/verification until the research report writing process ends.

RESULTS AND DISCUSSION

Forms of community adaptation to flood disasters

There are two views regarding adaptation in disaster mitigation. some say that adaptation and mitigation are the same thing and some say that the two things are different. adaptation is basically hazard mitigation. it is argued by Mcbean (2005) that 'mitigation' in the climate change community means reducing emissions to reduce harm, a very different approach from climate change adaptation (which is basically hazard mitigation). The same thing was conveyed by Pielke in Mileti and Gailus (2005) that natural hazard mitigation will not succeed without considering factors such as climate change and community adaptation. ' and 'response' are often considered 'mitigation'. whereas adaptation generally refers to reformation, restructuring, and reorganization for the purpose of making phenomena suitable for new situations, contexts and needs, and from this perspective, adaptation has an evolutionary connotation. One form of community adaptation that is rooted in culture in the Wajo community, especially the Laelo area, is in the form of stilt houses which are often found along the Walanae River. The building materials for the pillars, floors and walls are made of wood, while the roof is made of thatch or zinc leaves. Vertically the floor of the house consists of under the house, the main floor, and the ceiling. These three parts can function optimally, both in normal and emergency conditions. Family activities during normal times take place on the main floor of the house. The floor height of the house is about 2.5 meters from the ground level. There is a ladder at the front of the house that connects the yard with the terrace (porch). Judging from the structure of the building, the stilt house built by the Laelo village community was modified so that it could be used for mitigation and adaptation to flood hazards that often occur in the area. The height of the house was built in accordance with the historical flood heights that have occurred in the area, so that the house is relatively safe if there is a flood at any time (Interview Data, 2022). In the event of a flood that is higher than usual, the ceiling of the house can also be used as an evacuation place. Flood events are very frequent occurrences in the Laelo area, therefore the local community has been able to carry out the process of adapting to flood hazards by using under the house as a place for preparedness. Almost all the houses on stilts in the research location tether their

boats under the pit, although they are not in a flooded state. The boat is used when a flood occurs as a means of transportation from home to a safe access place.

Structural mitigation in facing flood disasters

The government's structural mitigation in tackling disasters in Indonesia is urgently needed. With the development and development in the disaster resilience system, it is very much needed in areas that are prone to disasters. the implementation of structural mitigation is an urgency in government policy programs, especially local governments so that the needs and facilities in disaster mitigation are met (Bayuadi, Setyaningsih, and Winarto 2019). Structural mitigation is an effort made to minimize disasters that is carried out by constructing physical and technological facilities or infrastructure. The existence of this structural mitigation is to reduce vulnerability to disasters by means of technical engineering of disaster-resistant development so as to reduce disaster risk (Zakky 2020). These structural mitigation efforts can be grouped into 2 (two) groups, namely:

1. Naturally, such as planting green belts (mangroves or mangroves), strengthening sand dunes with vegetation and others.
2. Artificially, such as construction of wave retaining walls, construction of groynes and others.
3. Structural mitigation efforts by artificial means need to be carefully planned because they can result in long-term changes in wave patterns and characteristics that may lead to erosion in other places.

Non-Structural mitigation in facing flood disasters

Disaster events may not be completely eliminated, but the impact of these events can be reduced (Kiedrzynska, Kiedrzynski, & Zalewski, 2014). Along with the increase in the intensity and frequency of river flood disasters, structural mitigation alone is no longer enough to cope with flood disasters. Non-structural mitigation is one of the best plans for tackling river or lake flood disasters which have become a routine occurrence every year (Bissett Jr, Huston, & Navarre, 2018). The community as the most affected victims when the flood disaster strikes is an important object that must be increased its capacity (coping capacity) in dealing with the disaster. The community capacity building is part of non-structural mitigation efforts. Non-Structural Mitigation places more emphasis on community capacity building. This mitigation effort can be carried out through the dissemination of information, among others by: providing posters and leaflets to people who live in disaster-prone areas, regarding procedures for recognizing, preventing and handling disasters (Rahman A.Z., 2015). Several forms of non-structural mitigation that have been implemented at the research site are:

1) Information Provision

Provision of information that has been carried out by BPBD Kab. Wajo is by installing flood hazard posters and signs of flood-prone areas. This is intended so that every community is aware of the dangers of frequent flooding. Providing information in the form of posters or signs helps to raise awareness of the importance of disaster mitigation efforts. These posters and signs need to be reproduced and maintained so that the wider community, both those living in vulnerable settlements and those who are unable to consciously understand the dangers of flood disasters.

2) Socialization

Socialization has been actively carried out by BPBD Kab. Wajo in certain locations. Among them are in disaster-prone areas as well as in schools. This is intended to be able to provide early awareness to the community about the importance of disaster mitigation.

3) Creation of evacuation routes, early warning systems and disaster simulation

The determination of the evacuation route must coincide with the determination of temporary gathering points and evacuation points, with the aim that the flow of the evacuation process can take place effectively so that the potential for casualties can be minimized. Determination of evacuation routes, gathering points and evacuation points must go through a study in order to get a route with the closest distance and shortest travel time to reach a safe gathering point. In addition, socialization about evacuation routes must also be carried out to the community so that people know and

pISSN 2302-4240
eISSN 2655-2086
Volume 12, Issue 1, February 2023, pp.144-149
DOI: http://dx.doi.org/10.32832/astonjadro.v12i1 http://ejournal.uika-bogor.ac.id/index.php/ASTONJADRO

understand the function of these evacuation routes. Evacuation routes can be marked with directions to facilitate the evacuation process. The government can determine evacuation routes and gathering points by involving the community.

CONCLUSION

The form of adaptation they do is to raise the pole of the house, prepare a boat that is moored under the house to be used as a means of transportation in the event of a flood. Structural mitigation carried out by the community in the research area in the context of flood mitigation and adaptation is to build piles or embankments to withstand the overflow of Lake Tempe water, using bamboo as a support for house poles. Non-structural flood disaster mitigation planning around Lake Tempe is expected to be able to build a disaster-resilient community that has good resilience.

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