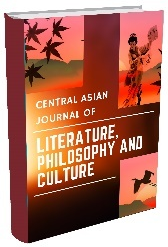

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Community Adaptation Strategy to Flood in Padang City, Case Study: Tabing Banda Gadang

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Abstract: The Padang City is the capital of the province of West Sumatra, as an urban area, the Padang City still has problems with environmental disasters such as floods. To reduce the adverse effects of adaptation strategies it is very important to plan future mitigation actions that can be investigated at the local level. Therefore, to find out the flood adaptation strategy in Padang City at the community level, the study was conducted in a flood-prone area of Padang City, namely Tabing Banda Gadang. The results of the study indicate that various adaptation strategies have been practiced by the local community, generally accepted adaptation practices where adaptation is taken at the household level prevailing at the time of the interview, this strategy includes the reuse of materials or equipment that are not damaged, the results of the interview found that only some small communities adapt by increasing the number of floors. Reducing and changing flood vulnerability is part of the main responsibility between government and society. Sometimes local governments and communities do not always understand the local situation, there is an urgent need to be able to provide a more efficient disaster response.

Keywords: adaptation, community, flood

Introduction

The World Bank estimates that 70% of the population will live in urban areas[1], including the city of Padang. The Padang City area is identical to other coastal areas which have a high diversity of

land use and population density [2]. Along with population growth, it turns out that there are ecological problems in the city [3-5]. One of the ecological problems of cities in Indonesia is the flood disaster. Flood disaster is ranked first of all disaster categories in Indonesia, Padang City is one of the cities at risk of flooding. Therefore, the flood disaster not only results in physical damage to houses and public infrastructure, but also disrupts social and economic activities of the community.

Socio-economic plays an important role in people's behavior towards flooding. Natural disasters in an area have direct implications for the people in the area [6]. Community participation to reduce and avoid disaster risk is important by increasing community awareness and capacity. Response is the beginning of an adaptation strategy by the community resulting from an understanding of natural disasters that occur. Community understanding is in the form of knowledge of perceptions that are actualized in attitudes and or actions in dealing with disasters [7]. The result of community attitudes and or actions in dealing with disasters is an adaptation strategy which means adjustments made as a result of environmental threats. Adaptation is one way to achieve human survival. Community adaptation strategies to disasters are adjustments made as a result of environmental threats [8-10].

To reduce the adverse effects of floods in the future, it is very important to conduct various studies of flood mitigation strategies contained in adaptation measures, these strategies can be explored from a local perspective on the affected communities. To describe the community's adaptation strategy to flooding, this research is based on the community's experience in dealing with flood situations that have occurred in Tabing Banda Gadang Village. This study focuses on household adaptation steps in relation to environmental threats related to flood events in Padang City.

METHODS

Fig 1 shows the study area in Tabing Banda Gadang, Padang City, West Sumatra Province. This area is located in the Batang Kuranji river basin. Flash floods tend to be a recurring type of hazard that occurs in this area. This area is at the bend of the river. Changes in land use, especially residential development, have changed the natural formations in the Tabing area of Banda Gadang, residential development was originally a back swamp that functioned as agricultural land which was converted into a residential area, this was caused by the ease of access to activity centers (such as work, school, etc.) markets, hospitals and tsunami evacuation sites) and relatively flat topography and store a lot of water directly add to the attractiveness of the location for residential development. Flash floods are caused by rapid runoff originating from the upstream of the Bukit Barisan in the east. The topography of this area is relatively flat and some of the houses are located on former rivers.

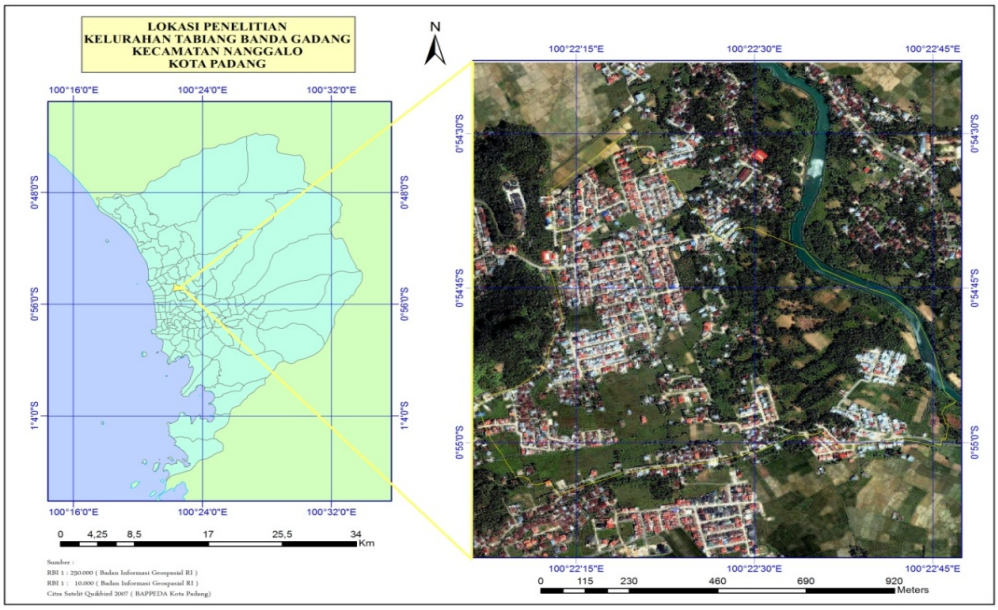

Fig 1. Research location

To find out community perceptions and adaptation to flooding, in-depth interviews and observations were conducted in flood-prone areas in the Study Area. In this study, generally using interviews and observations of the study area. Observations were made to determine the social and environmental conditions of the research area. Community perceptions of the factors causing higher flood vulnerability can provide a broader analysis view, because there are conditions in each location that can result in higher vulnerability to flooding. This study uses a qualitative assessment method consisting of household interviews, physical observations, participatory mapping. Household interviews were conducted with flood victims to identify adaptation strategies carried out by affected households with a total of 46 respondents. The interview was also to see the perceptions of the affected households as the basis for the community in implementing adaptation strategies to the dangerous environment that were applied in their lives. Schematically the design of the pin is described as follows (Fig 2):

Fig 2 Research stages

FINDINGS

Perceived Causes of Flooding

We suspect that there may be more than one cause of flooding based on people's perceptions to rank the most contributing to flooding that hit the research area according to the contribution of the most significant causes according to community responses. Fig 3 shows the causes of flooding according to the community perception of the study area. As many as 100% of respondents identified believe heavy rain or high rainfall is the main cause of flooding in the area. The duration of rain is the main factor that drives floods that hit the study area where the recorded rainfall data reaches 145 millimeters, then another driving factor where as many as 47.83% of respondents believe that conditions are influenced by deforestation in the upstream area of the Kuranji River Basin.

High rainfall and exacerbated by logging in the upstream area of the Kuranji watershed causes the volume of water that passes through the Kuranji river to exceed the river's capacity limit which causes it to overflow

towards residential areas, this is believed by 43.83% of respondents who think that the river can no longer hold water where respondents stated that more than two hours of heavy rain water suddenly entered the residents' settlements, this condition may be exacerbated by the construction of housing on lower plains which was stated by 26.08% of respondents, one respondent commented "here the river used to flow". Some of the houses are located on the former river flow which is a location that has a lower elevation than other locations in the area. As many as 6.52% of respondents stated that surface runoff that entered the drainage around residents' houses when it rained heavily with backwater in the opposite direction due to the overflow of the river so that water from the drainage overflowed again flooding the house because it exceeded the capacity of the drainage, for 4.53% of respondents stated this condition is exacerbated by sediment or sedimentation at the bottom of the poor drainage channel around the house.

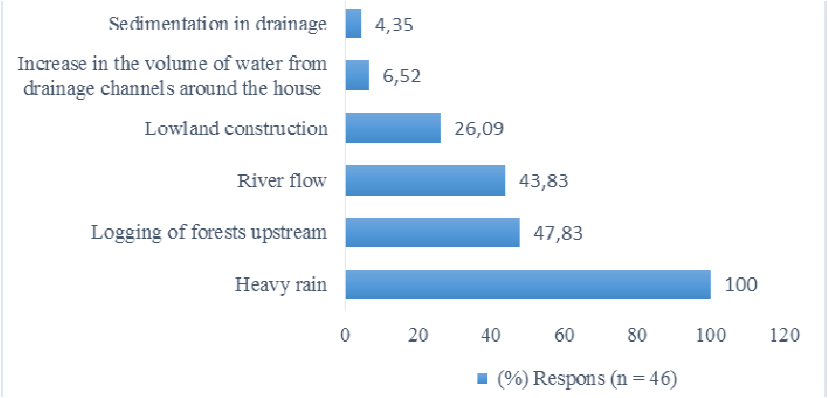

Fig 3. Causes of flooding according to community perception

Respondents' perceptions of property damage due to floods and daily activities

The moderate impact of flooding on the contents of the house is believed by some respondents (54.35%) and a large impact is believed by 13.22%. In addition to the impact on the contents of the house, respondents also stated that the flood had an impact on the structure of the building, however, for moderate and severe impacts, it was stated by 11.33% of respondents. During the field survey process it was found that their houses were affected from a flood depth of 5 cm to more than 100 cm (Fig 4). The identified flood impacts also include structural damage to residential units or residential buildings during the 2012 extreme flood event. The traces of the 2012 flood incident can be seen in the residential units found in the field, it appears that the wall components, which are marked by physical changes, peeling off and cracks on the wall surface as well as on the component parts of the floor, which are characterized by physical changes, peeling of the floor ceramic layer and cracks on the surface.

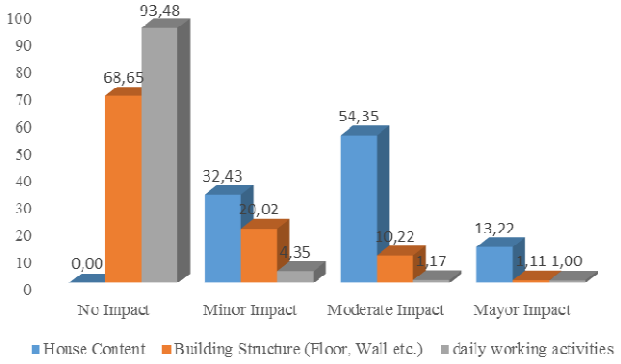

Fig 4. Property damage due to floods and daily activities

The full influence on economic activity was felt by 6.52% of respondents with the reason that it was impossible to work because they were busy with taking care of the household and property including cleaning the house, while the further reason was because they were worried about leaving their families feeling that the flood would hit again. This effect is mainly on people who live in lower areas and on former rivers.

Available household adaptation strategies to reduce flood impacts

People in the study area began to consider flooding as part of their lives, people at the household and community level began to develop measures to minimize the impact of flooding on their lives. Based on the flood experience in 2012 that had occurred in the research area, the community began to implement several strategies that they considered effective to be used to minimize losses or anticipate losses, several strategies carried out by the community to survive and reduce flood losses both physical and non-physical were identified during the field survey process . Some of the structural and non-structural adaptation measures identified during this research can be seen in Fig 5.

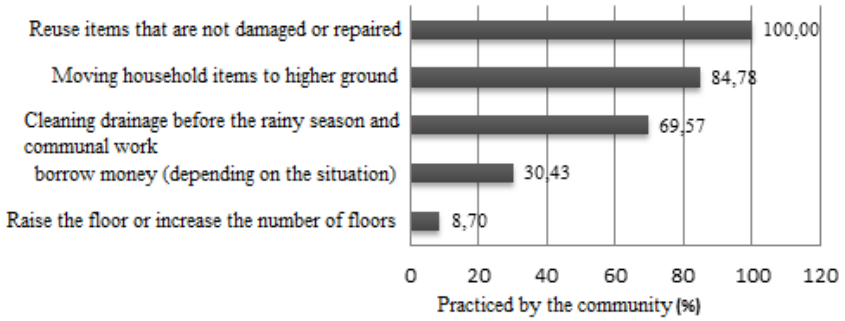

Fig 5. Some adaptation strategies that are practiced

Generally accepted adaptation practices where this adaptation was taken at the household level that prevailed at the time of this research, this strategy includes the reuse of non-destructive materials or equipment, especially wood and plastic, some building materials, and repair of items that remain useful, especially equipment. household. The highest adjustment lies in reusing materials, goods, repairing goods that are not damaged by flooding. All respondents revealed that this adjustment was mainly used for items that can be reused after cleaning, such as household appliances, especially tables and chairs, plastic mats, carpets, and also reuse kitchen utensils, where this method is used to reduce losses rather than having to buy back at a cost. the greater one.

On the other hand, making a storage area for several families has at least one table measuring 1x1 m^2 with a height of more than 1 m, made of wood for placing furniture, storing furniture from flooding. Elevating the location of items such as electronic equipment that can be damaged by water, is considered an option used to reduce losses if flooding recurs, such as one household where the pumping equipment is elevated more than 1 m. In addition, according to several residents interviewed, elevating the location of the power cable is a function of protecting family members, based on field observations, the elevated cable is an additional cable that is used such as to turn on television, fans or other electronic equipment from flooding. Furthermore, the implementation of adaptation actions to move goods to a higher place which is influenced by flood heights based on the experience of the July 2012 flood, as many as 84.7% of respondents interviewed chose this method to adjust to the flood conditions that had occurred, this was more influenced by the belief that this method This adaptation can prevent or reduce the breakdown of confidence in one's capacity to perform, measuring possible water levels based on experience. It could be because adaptation by elevating the location of household goods is relatively easy to implement, compared to structural changes, this method according to respondents is more practical and does not require too expensive costs. When viewed with variations in flood heights of 30-192 centimeters, this step is considered ineffective,

perhaps these adjustment steps are effective if the flood height in the house is lower where in these conditions water cannot hit electronic equipment and electrical cables.

In addition to the physical form of adaptation (structural), non-physical adaptation strategies (non-structural) were also identified through in-depth interviews where this strategy is not a form of protection against flooding, but rather this strategy is applied by the community before, during and after a disaster or flood event occurs. Is a form of communal work system called "mutual cooperation" work which is stated by 69.57% of respondents. This method is carried out in cleaning the environment together, such as cleaning drainage channels before entering the rainy season, cleaning mud material brought in during flood events. This kind of community participation appears spontaneously as a form of social concern among the community, without being attempted by the government. The impact of flooding can be considered as a positive starting point for developing strong social cohesion with the flood experience in the study area and rebuilding communities in areas that are prone to flooding. It can be seen that by developing elements of social networks (gotong royong) that emerged as a result of the incident. Social networks are one of the contributing factors in reducing the impact and have a positive impact on the ability of pre-flood adjustments and to adapt in the long term. Furthermore, borrowing money from neighbors, relatives and friends is a reciprocal relationship that exists in the respondent's social system which is stated as much as 30.43%. In particular, good relationships with others will provide a positive context for dealing with the post-flood crisis [11]. This positive context may be affected when individuals fail to repay debt loans. This strategy can be called a form of “informal insurance” without any collateral requirements and with lighter requirements than formal financial institutions.

In addition, the formation of residential redevelopment such as increasing the number of floors by 8.70%, where this method serves as self-protection and to reduce losses that are considered safe from the brunt of flooding because this element plays a role in developing adaptation strategies in reducing negative impacts. Damage and losses from this natural disaster encourage people to take action to minimize existing losses [12,13], one of which is by increasing the number of floors, besides that the basic function of increasing the level of the house or increasing the number of floors is to protect families and other valuables, and therefore effective when the water level is lower than the house level, especially in former river basin locations. The second floor is used to save property from flooding, with the second floor for household appliances and the evacuation of other personal belongings can be moved to a higher location and the second floor is also used for the protection of family members. On the other hand, the cost of increasing the number of floors is considered more expensive, only a few respondents have used this method, where this method is minimally carried out by respondents.

CONCLUSION

Elevating the location of items such as electronic equipment that can be damaged by water, is considered an option used to reduce losses if flooding recurs, such as in a household where water pumping equipment is elevated from the floor. In addition, according to several residents interviewed, elevating the position of the power cable is a function of protecting family members. The impact of flooding can be considered as a positive starting point for developing strong social cohesion with the flood experience in the study area and rebuilding communities living in flood-prone areas. one of the contributing factors in mitigating impacts and having a positive impact on the ability of pre-flood adjustments and to adapt in the long term. Reducing and modifying vulnerability to flooding is part of the responsibility between the government and the community, sometimes local conditions are often not always known by local governments and communities, plus governments and communities have various interests in their own communities.

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