



Evaluation of Flood and Landslide Management Program in Manado City

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Abstract. This study aims to analyze the Flood and Landslides Management Program in Manado City using a qualitative approach and data collection techniques through observation of areas affected by floods and landslides, semi-structured interviews with community leaders in areas affected by floods and landslides, program stakeholders, and documents in the form of programs on a macro scale, mezzo and micro. The results showed that: Manado City was classified as sloping plains with a slope of 0–8%; choppy classification with a slope of 8–15%; Classification of hilly waves with a slope of 15–40%; and classification mountainous with a slope of > 40%, has a topography that is dominated by sloping plains 78.51 percent, undulating land, 14.27 percent, undulating hilly plains 7.20 percent and 0.02 percent mountainous. The average rainfall ranged from 10 mm to 544 mm, and 33 villages were affected by floods and landslides. On a macro level, the Disaster Management program is regulated through Law no. 24 of 2007 and its implementation at the meso and micro levels by the National Regional Disaster Management Agency. The results showed that a). Regional BBDs have not continuously conducted socialization in areas prone to erosions and floods. b). Formation of Disaster Resilient Families Facilitators The Disaster Resilient Families have not worked seriously on an ongoing basis, c). The establishment of Disaster Preparedness Units/Pos for Disaster Hazard Map has not been communicated intensively, d). The establishment of Disaster Resilient Villages has not been prioritized for villages that are prone to flooding and erosions. e). Improvement of Human Resources through training and simulations is not yet community-based by taking into account the diversity of targets, f). Structural and intensive sustainable coordination has not been implemented with urban villages, religious social organizations, stakeholders, universities, and the private sector. For that it is recommended: a). Regional BPB continuously conducts socialization in areas prone to erosions and floods. b). Formation of Disaster Resilient Families Facilitators Disaster Resilient Families Work seriously on an ongoing basis, c). Establishment of Disaster Preparedness Units/Pos for Disaster Hazard Map is communicated intensively, d). The establishment of a Disaster-Resilient Urban Village is prioritized for villages that are prone to flooding and erosions. e). Improvement of Human Resources through community-based training and simulations by taking into account the diversity of targets, f). Structural and intensive continuous coordination, religious social organizations, stakeholders, universities and the private sector needs to be carried out effectively.

Keywords: evaluation of flood · landslide management

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1 Introduction

Nationally, policies governing disaster management are stipulated through Law Number 24 of 2007 where the government is responsible for protecting against disasters caused by natural and non-natural factors. In Manado City, the institution responsible for implementing the macro policy is the National Disaster Management Agency (BNPB) by doing; a. Socialization, b. establishment of Disaster Resilient Family Facilitator (KATANA) and Disaster Resilient Family Interpreter (JURRAGAN), c. Making evacuation routes and gathering points in the Coastal area with residents by the Regency/City BPBD, d. Establishment of Disaster Preparedness Units/Posts in Regency/City and make Disaster Hazard Map, e. establishment of Disaster-Resilient Villages/ Kelurahan to increase community capacity to face disasters, f. Improvement of Human Resources through training as well as improvement of supporting facilities and infrastructure for disaster management, g. Provincial and Regency/City BPBDs Coordinate with stakeholders related to preparation for the rainy season in early 2020, h. Implementation of Minimum Service Standards for Disaster Affairs in terms of providing disaster information services, providing disaster prevention and preparedness services, and providing rescue and evacuation services for disaster victims, i. The need for mapping disaster resource data to all stakeholders, j. Conducting Coordination Meetings for Preparedness and Strengthening of Disaster Management at the Provincial and Regency/ City levels in a sustainable manner [1].

Empirical facts show that every January there are floods and landslides and in January 2021, they will occur in the Districts of Malalayang, WWanna Sario, Paal Dua, Tikkala, Wenang, Tuminting, and Singkil, [2]. For details, see the image below (Fig. 1):



Fig. 1. Some Of The Houses Affected By The Flood.

Based on these empirical facts, it is necessary to conduct an assessment of the evaluation dimensions of natural disaster management programs in Manado City.

2 Research Methods

This study uses qualitative research to evaluate flood prevention programs in the city of Manado, with the technique of collecting observational data in highland areas where landslides and floods often occur, documents in the form of mесо and macmezzole policies, and semi-structured interviews with community members who become a victim of a natural disaster.

3 Results and Discussion

Manado City consists of 11 sub-districts and 87 sub-districts with a sloping plain classification with a slope of 0–8%; choppy classification with a slope of 8–15%; Classification of hilly waves with a slope of 15–40%; and mountainous classification with a slope of > 40%. Manado City has a topography of land which is dominated by sloping plains 78.51 percent, wavy land conditions, 14.27 percent and hallway,y plains 7.20 percent, and 0.02 Percent in mountainous terrain. Overall, 94.84 percent of the area of Manado City is located at an altitude of 0–240 above sea level. The average rainfall during 2019 ranged from 10 mm (September) to 544 mm (January). The climate ranges from 26.60C to 28.70C, with an area of 162.53 m² [3].

The Manado City Regional Disaster Management Agency (BPBD) noted that nine sub-districts and 33 urban villages in Manado City were affected by floods and landslides on Saturday (16/with the idea of ath toll of six people. The victim died due to a landslide at the Perkamil Neighborhood 5 location, in Paal, Neighborhood 6, 1 person died, and at Lorong Cempaka, Jalan Sea, West Malalayang Village, two victims were found. The districts affected by the disaster were Singkil (five villages), Tuminting (five villages), Bunaken (one village), Paal Dua (six villages) Tikalla (four villages), Wenang (two villages), Sario (three villages), Malalayang (four wards). The city of Manado consists of hilly plains of 7.20 percent and 0.02 percent of mountainous land. Overall, 94.84 percent of the area of Manado City is located at an altitude of 0–240 above sea level. The city of Manado only knows the rainy and dry seasons. Manado Meteorological Station, the average rainfall during 2019 ranged from 10 mm in September to 544 mm in January. On January 16, 2020, and January 2021, the Districts of Malalayang, Wanna Sario, Paal Dua, Pikkala, Wenang, Tumintin,g, and Singkil, in Manado City were hit by floods and landslides triggered by high-intensity rain where the water discharge overflowed, with puddles. Flood about 50 to 400 cm. These events often occur at the beginning of every year and this has happened for 10 years and has resulted in the destruction of houses, low-lying buildings that were hit by floods and landslides, the death of several community members who were washed away and buried by landslides, damaged road infrastructure facilities, and other impacts. Other impacts that are detrimental to both material and life. This repeated condition, if not taken seriously by both the government and the community, will cause economic losses and loss of human life.

1) Socialization

This program is an obligation of the Disaster Management Agency in the form of socialization to the community in highland areas that are prone to landslides, to avoid building houses in the area and not littering that covers the flow of water that pours out quite high in the rainy season. This program has not been effectively disseminated to the community by the relevant parties. Theoretically, communication between organizations involved in public policy, such as BNPB, districts, and social organizations is needed. Van Mater and Van Horn emphasized that communication between organizations about program goals and objectives is a factor that must be considered because problems in society are difficult to solve by one institution alone [4]. Edward III also stated that the consistency of communication of accuracy and accuracy of program information to the community and implementers about the goals and objectives needs to be carried out intensively so that the program is achieved according to its objectives [5]. Cooperation between BPBN, community leaders, and communities living in the highlands and on the riverbed can help achieve the BPBN program in the city of Manado so that the impact of floods and landslides in Manado City can be minimized.

2) Formation of Disaster Resilient Family Facilitator (KATANA) and Disaster Resilient Family Interpreter (JURRAGAN)

This program is a program that excels in efforts to overcome floods and landslides, in the sense of forming a disaster-resilient family. However, several indications show that this program has not been running as intended because the community has returned to the old habit of not responding to government programs in disaster management efforts. The diversity of the target or community heads needs to be considered as suggested by Mazmanian and Sabatier where it is necessary to classify the program implementation process where independent aspects concerning the ease or difficulty of a problem are controlled because of the diversity of the behavior of the target group. The behavior of the target group sometimes does not respond or react to the stimulus or stimulation from the Manado City BPBN in realizing the program. No matter how good a program is if it is not responded to positively by the target community, then the program will not work as intended and targeted. The program is achieved if the behavior of the target group responds positively to the Manado City BPBN program. The diversity of behavior of the target group involved in the implementation of the BPBN program affects the success of government programs.

3) Establishment of Disaster Preparedness Units/Pos in Cities and make Disaster Hazard Map

Mazmanian and Sabatier grouped three variables that affect the achievement of program goals and objectives, namely: (1) characteristics of the problem, (2) program characteristics (3) environmental characteristics cs [5]. Implementation of the Establishment of Disaster Preparedness Units/Posts in Districts/Cities as well as making Disaster Hazard Maps experienced technical difficulties in program implementation where BPBD experienced technical preference for implementing due to weaknesses in coordination with program-related parties where the behavioral aspects of the program targets did not fully support the implementation of the program.. Uniting views between related parties is difficult if this institution is not equipped with adequate authority.

4) Establishment of Disaster Resilitor to increase community capacity to deal with disasters

Implementing communication, namely the BNPBD about the program's goals and objectives, needs to be conveyed to every community where the population lives in the highlands and riverbanks. The establishment of the Disaster Resilient Village in order to increase the capacity of the community to deal with disasters is not only a slogan during a disaster but is a sustainable activity. There is a need for consistent communication of the accuracy and accuracy of clear and firm program information to disaster-prone communities regarding the program's goals and objectives. The form of communication that needs to be carried out by the Manado City BNPB, seeks to apply the communication offered conceptually and needs to be used as a recommendation for program implementation. The socio-economic conditions of the community in disaster-prone sub-districts sometimes do not support the implementation of the Regional BNPB program. Van Metter and Van Horn argue that the social and economic conditions of the community around the policy are very important to consider to assess the extent to which the community encourages the success of public policy [6]. The social and economic conditions that exist in the community are one of the factors for the implementation of a policy well because of the implementation of the program for the establishment of the Disaster Resilient Village in order to increase the capacity of the community to deal with disasters.

5) Improvement of Human Resources through trainings and simulations as well as improvement of facilities and infrastructure to support disaster management

In dealing with disasters and climate change, towards a disaster-resilient city it is necessary to conduct training in the form of simulations for natural disaster volunteers and it is necessary to strengthen volunteers and Community Self-Help Agency in Disaster Risk Reduction at the community-based village level. Diversity of target behavior in human resources participating in training and simulations as well as improving facilities and infrastructure to support disaster management. Participants in improving community training or disaster volunteers in Manado City need serious attention from the Regional BBD because people affected by floods and landslides have diversity in terms of education level, economic level, health level and level of concern. The challenges of disaster management faced by the people of Manado City will continue to occur due to geographical conditions in disaster-prone areas, especially the condition of Manado City experiencing population growth, as a consequence of Manado City as the center of government, education and economic activity. People from various backgrounds need to be empowered and involved in disaster management efforts. Disaster management volunteers are urgently needed, because disaster management requires collaboration between the government, socio-religious and community organizations and volunteers. It is hoped that through properly designed training activities can increase the knowledge and capacity of volunteers so that they become agents of natural disasters and landslides. Socio-cultural and economic conditions need to be considered in this training, and it is necessary to coordinate with related agencies and parties.

6) Coordination with Stakeholders

In dealing with disasters and climate change, in order for Manado City to be disaster-resilient, it is necessary to coordinate between the Regional BPD and the religious social organizations and stakeholders, namely universities and the private sector, which are also included in the availability of funding sources. Specific agencies need to identify potential vulnerabilities in disaster risk assessments. Coordination with the settlement development working group with the Regional Disaster Management Agency for natural disaster volunteers, non-governmental organizations and sub-district levels in the context of creating a disaster-resilient city.

4 Conclusion

The results of this study indicate that the city of Manado with the clarification of sloping land, the slope of 0–8%; choppy with a slope of 8–15%; hilly waves with a slope of 15–40%; mountainous terrain with a slope of > 40%, with the topography of the land being dominated by sloping plains 78.51 percent, undulating land conditions, 14.27 percent and rolling hilly plains 7.20 percent and 0.02 percent in mountainous terrain. Overall, 94.84 percent of the area of Manado City is located at an altitude of 0–240 above sea level. The average rainfall during 2019 ranged from 10 mm (September) to 544 mm (January). The climate ranges from 26.60C to 28.70C, with an area of 162.53 m². The Manado City Regional BPD noted that 33 sub-districts were affected by floods and landslides, including the Districts of Malalayang, Singkil, Tuminting Bunaken Paal Dua, Tikala, Wenang.

In evaluating flood and landslide disaster management programs, both macro, meso and micro programs, it is recommended that; The Manado City Regional BPD noted that 33 sub-districts were affected by floods and landslides, including the Districts of Malalayang, Singkil, Tuminting Bunaken Paal Dua, Tikala, Wenang. In evaluating flood and landslide disaster management programs, both macro, meso and micro programs, it is recommended that: 1) Regional BPDs are required to carry out ongoing socialization to all communities, communities in highland areas prone to landslides, to avoid building houses in landslide and flood prone areas, not to throw garbage in watersheds. 2) Formation of Facilitator for Disaster Resilient Families Disaster Resilient Families need to be seriously formed for the benefit of natural disaster management in a sustainable manner by taking into account the diversity of community behavior in terms of educational, socio-cultural and economic diversity. 3) The establishment of a Disaster Preparedness Unit/Post in the City and a Disaster Hazard Map are communicated so that the community tries to avoid settlements in disaster-prone locations. 4) The establishment of a Disaster-Resilient Urban Village needs to be prioritized for villages that are prone to flooding and landslides, based on the results of the identification of competent institutions for this purpose. 5) Improvement of Human Resources through trainings and simulations as well as improvement of facilities and infrastructure supporting disaster management needs to be carried out for community-based natural disaster volunteers by taking into account the diversity of educational and socio-cultural backgrounds. 6) Coordination with important stakeholders is carried out between regional BPD, urban villages, religious social organizations, stakeholders, universities and the private sector.

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