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Analysis of Disaster Mitigation in Minimizing Disaster Risk in Manado City

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Abstract. *This study examines disaster mitigation efforts in minimizing disaster risk in Manado City and identifies the key challenges as well as the strategies implemented by the Regional Disaster Management Agency (BPBD: Badan Penanggulangan Bencana Daerah). Employing a qualitative descriptive approach, data were collected through interviews, direct observations, and document analysis, with the Head of BPBD serving as the primary informant. The analysis was conducted using Miles et al.'s (2014) interactive model, which consists of data condensation, data display, and conclusion drawing, thereby ensuring systematic interpretation of findings.The results indicate that disaster mitigation efforts in Manado consist of both passive and active strategies. Passive measures include strengthening institutional frameworks, enhancing governance capacity, integrating disaster management planning into regional development programs, and advancing education and research to support long-term disaster risk reduction. In contrast, active mitigation emphasizes community-based actions, such as the installation of disaster warning signs, the provision of basic disaster training for officials and volunteers, the establishment of temporary evacuation shelters, and the implementation of both structural interventions (e.g., drainage construction, flood control) and non-structural measures (e.g., socialization, counseling, and public campaigns). Despite these initiatives, several challenges persist. Limited public awareness, inadequate infrastructure and facilities, a shortage of skilled human resources, weak planning and socialization, complex disaster causes, and environmental vulnerabilities all reduce the overall effectiveness of disaster risk reduction efforts. To address these obstacles, BPBD Manado fosters collaboration with various stakeholders, including government institutions, academia, non-governmental organizations, and local community groups. Moreover, the agency emphasizes the use of disaster risk assessments and hazard mapping as evidence-based foundations for policy formulation and implementation.*

Keywords: *Disaster Mitigation; Risk Reduction, BPBD Manado; Community-Based Strategy; Disaster Management Challenges.*

1. INTRODUCTION

Disasters, whether natural or human-induced, severely impact humanity. Natural disasters, such as floods, landslides, tsunamis, earthquakes, and volcanic eruptions, arise from environmental disturbances (Randongkir et al., 2025). They constitute major disruptions causing extensive human, economic, and environmental losses that exceed local coping capacities, with origins ranging from natural to anthropogenic (UNISDR, 2009).

Indonesia continues to experience frequent natural disasters, including hurricanes, landslides, earthquakes, tsunamis, floods, and volcanic eruptions. Floods, often seasonal, occur when water overflows excessively, often triggered by increased rainfall and, in upland areas, landslides. Some floods originate from other locations, commonly referred to as shipment floods (Dwi Arisona & Mufidah, 2022; Hildayanto, 2020). In response to these threats, the Indonesian government plays a crucial role in establishing a national disaster management system, which integrates pre- and post-disaster activities into national development. Natural disasters are often considered *force majeure*, events beyond human control; hence, minimizing

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casualties requires disaster awareness and preparedness. Disaster risk reduction primarily focuses on vigilance and preparedness measures through mitigation efforts (Faturahman, 2018). According to Law No. 24 of 2007 on Disaster Management, mitigation comprises a series of efforts to reduce disaster risks through both physical development and enhanced public awareness and capacity to face disaster threats..

Pre-disaster activities are closely associated with disaster mitigation, which involves efforts to minimize the potential impacts of disasters. Mitigation encompasses both planning and implementing strategies to reduce risks, although these efforts have often been overlooked. This stage is crucial, as it ensures preparedness before a disaster occurs, thereby reducing the impacts experienced during and after the event. To support these efforts, the National Disaster Management Agency (BNPB) was established to focus on disaster management at the national level, while the Regional Disaster Management Agency (BPBD) operates to assist, reduce, and manage disaster risks within local regions.

The mitigation phase of disaster management is considered a cost-effective approach to minimizing community risks compared to measures such as evacuation, rehabilitation, and reconstruction (Faturahman, 2018). Disaster mitigation can be implemented through six key steps: (1) protecting lives, infrastructure, and the environment; (2) enhancing community awareness and participation; (3) improving disaster preparedness; (4) strengthening coordination and institutional capacity; (5) establishing a robust legal framework to support mitigation initiatives; and (6) promoting the sustainability of economic activities and improving community welfare through mitigation practices (Jokowinarno, 2011).

The process of minimizing the risk of losses that can be caused by disasters both materially and morally and reducing casualties needs to be mitigated periodically. When mitigation is carried out comprehensively and simultaneously, it can equip people in disaster-prone areas to recognize warning signs of a disaster. With the active role of the community in preventing disasters, it is necessary to have the ability of the community to be equipped with knowledge and skills in disaster management. To build a community capable of responding to emergencies involving disasters quickly, the sociogeography of disaster management is essential. This means that in addition to physical and technological preparation, disaster mitigation patterns must also be planned with the community in mind. (Hermon, 2015; Yanuarto et al., 2019).

Faturahman (2017) notes that disaster management has largely focused on addressing problems during disaster events and their immediate causes, while anticipatory mitigation efforts have not been fully optimized. This study is therefore significant as it examines the implementation of both physical and non-physical mitigation measures aimed at reducing disaster risk by lowering vulnerability and enhancing disaster response capacity through infrastructure development and strengthening the capabilities of both government and communities.

According to the 2024 Manado City Disaster Management Plan (RPB), the city has experienced several disaster events, primarily floods, which have posed significant risks to the community and infrastructure. There were floods in Manado City on January 21, 2024 and March 2, 2024 which had an impact on several areas, such as Singkil and Tumaiting sub-districts. The areas most prone to flooding are Komo Luar Village and Karame Village. In addition, the banks of the Tomohon River are also known to be prone to inundation. Some other areas that are prone to flash floods include the Elim – Malalayang Church Complex, the Lembah Sari – Winangun II Complex, and the Klabat – Ranotana Stadium Complex. Based on the results of the map overlay which is a flood-prone parameter, Manado City is dominated by areas with flood vulnerability classes, which covers an area of 6492.39 ha or around 44.05% of the area of Manado City. Furthermore, it is followed by areas with moderate flood vulnerability class levels of 5476.01 ha and areas that are very vulnerable to flooding, which is 2180.11 ha.

Based on the 2024 Manado City Regional Disaster Management Plan, the Manado City Disaster Resilience Index is still at level 3 out of 5 on a scale based on the Hyogo Frameworks for Actions (HFA) indicator. This means that Manado City has moderate disaster resilience, and still needs to be improved to reach higher levels.

Building on this context, the present study seeks to comprehensively describe and analyze disaster mitigation efforts aimed at reducing disaster risk in Manado City, as well as to identify the challenges encountered and the strategies implemented by the Regional Disaster Management Agency (BPBD) in executing these mitigation initiatives.

2. THEORETICAL STUDIES

According to the Asian Disaster Reduction Center (2003), as cited by Wijayanto (2012), disasters are severe societal disruptions that result in extensive losses affecting communities, materials, and the environment, with impacts that exceed human capacity to manage using available resources. Disasters are extraordinary events, whether caused by natural phenomena or human actions—including technological failures—that provoke significant responses from individuals, communities, and the environment.

Ramli (2010) defines disaster management as the study of disasters and all related aspects, particularly disaster risks and strategies to avoid them. It is described as a dynamic process encompassing core management functions, including planning, organizing, mobilizing resources, and supervising implementation.

Disaster management encompasses a comprehensive range of activities, including planning and handling efforts before, during, and after disaster events. These activities cover prevention, mitigation, preparedness, emergency response, and recovery measures. It is also recognized as a scientific discipline that examines disasters and their related aspects, with a particular focus on disaster risks and strategies to prevent or minimize such risks (Nurjanah et al., 2013).

According to Usiono et al. (2018), the primary objectives of disaster management are to reduce or eliminate potential losses and hazards, ensure that victims receive prompt and appropriate assistance, and facilitate rapid and efficient recovery. Disaster management is an ongoing process involving governments, private sectors, and civil society in preparing for and mitigating disaster impacts, responding effectively during events, and implementing recovery measures afterward. This continuous process is illustrated through the disaster management cycle, which outlines the sequential steps undertaken in each phase of disaster management.

According to Khambali, (2017) categorizes the disaster management cycle into 3 stages, including: a. Pre-disaster: Prevention involves a medium and more targeted level of preparedness. b. Disaster: When an incident or crisis occurs, responding to an emergency takes precedence over all other tasks. c. Post-disaster: The most important step after a disaster is recovery and reconstruction.

In addition, disaster management activities consist of the following (Khambali, 2017):

a. Prevention

   The goal of prevention is to prevent disasters by eliminating hazards where possible. Creating disaster warning posts and getting used to living orderly and disciplined are two examples of disaster prevention efforts.

b. Disaster Mitigation

   In addressing disaster threats, mitigation encompasses a range of actions aimed at reducing disaster impacts and lowering associated risks through physical infrastructure development, public awareness initiatives, and capacity building. Examples of such mitigation measures include community counseling programs and the establishment of disaster management teams.

c. Preparedness

   A series of measures taken to prepare for a disaster through planning and implementing reasonable and practical measures is known as preparedness. For example, creating command posts, contingency plans, preparing communication facilities, socializing disaster management regulations/guidelines, and preparing evacuation locations.

d. Early Warning

   The purpose of early warning is to give an indication that a disaster may be imminent. The provision of early warning must meet 4 conditions, including being official, immediate, firm, not confusing, and reaching the public

Disaster mitigation consists of a series of efforts designed to minimize disaster risks through both physical regional development and education that fosters awareness and the capacity to respond to potential hazards (Puturuhu, 2015). Nurjanah et al. (2013) similarly define mitigation as an effort to reduce risks associated with disasters when they occur, focusing on lessening the impacts of hazards to minimize resulting losses. According to Law No. 24 of 2007 on Disaster Management, mitigation activities include physical development, awareness programs, and capacity building aimed at addressing disaster threats. In practice, disaster mitigation involves implementing policies and regulations, applying sanctions and incentives, and promoting public understanding and awareness to effectively reduce disaster impacts.

According to the Head Regulation of BNPB No. 4 of 2008 on disaster management planning, mitigation efforts are categorized into active and passive measures. Passive mitigation activities include: (a) the formulation of laws and regulations; (b) mapping of disaster-prone areas and related issues; (c) development of guidelines, standards, and procedures; (d) production of informational materials such as brochures and posters; (e) assessment of disaster characteristics; (f) disaster risk analysis; (g) establishment of disaster task force organizations; and (h) strengthening community social structures.

Article 1(9) of Law No. 24 of 2007 on Disaster Management defines disaster mitigation as "efforts to reduce disaster risk through both physical development and increased awareness and capacity to address disaster threats." Based on this provision, disaster mitigation can be categorized into two forms: **(1) Structural mitigation**, which involves minimizing disaster impacts through the development of physical infrastructure and technological approaches, such as flood control channels, volcanic activity detection systems, earthquake-resistant buildings, and tsunami early warning systems; and **(2) Non-structural mitigation**, which focuses on reducing disaster impacts through non-physical measures, including policy frameworks, community education, and capacity-building initiatives.

Disaster mitigation refers to a series of measures aimed at reducing disaster risk (Irawan et al., 2022). Risk itself is understood as the likelihood of hazards occurring and the expected loss of life and property damage resulting from the interaction between hazards and vulnerabilities (Aprilyanto et al., 2021). Consequently, disaster mitigation is crucial for regions ranging from those with relatively low vulnerability to those facing high vulnerability. However, in many areas, disaster mitigation has yet to be treated as a development priority, as reflected in the vision and mission statements of development plans in disaster-prone regions. Considering disaster mitigation as an integral aspect of development implies its role as an evaluative policy process that can guide policy reformulation (Faturahman, 2017).

Disaster management is not solely the responsibility of the government but also requires the involvement of various stakeholders, including community organizations, private sector institutions, academia, and the mass media—collectively known as the *pentahelix* elements (BNPB, 2019). Within this framework, the government plays a pivotal role in enhancing public disaster preparedness. The government's efforts to improve community preparedness in dealing with disasters aim to anticipate exactly what to do when the disaster is really coming and can minimize the fall of victims. Mitigation to be carried out by local governments includes structural and non-structural mitigation (Carter, 2008).

3. RESEARCH METHODS

This study on disaster mitigation efforts to minimize disaster risk in Manado City employed a qualitative research design, specifically a descriptive qualitative approach. The descriptive method is used to examine the current status of a group, object, condition, system of thought, or a particular event (Nazir, 2011). Data collection techniques included interviews, observations, and documentation. Research informants comprised authorized officials, particularly the Head of the Manado City Regional Disaster Management Agency (BPBD). Data were analyzed using the interactive model developed by Miles et al. (2014), which consists of three main procedures: data condensation, data display, and conclusion drawing.

4. RESULTS AND DISCUSSION

Disaster Mitigation in Minimizing Disaster Risk in Manado City

Disaster management is a continuous process involving individuals, groups, and communities in managing various hazards and minimizing potential disaster impacts through mitigation efforts. Mitigation, as a key stage of disaster management, emphasizes preparedness and vigilance as cost-effective approaches compared to more resource-intensive measures such as evacuation, rehabilitation, and reconstruction. These efforts must be undertaken collectively through government initiatives as well as individually, both before and after disaster events. Recognizing the interconnection among the stages of disaster management highlights the importance of systematic management and evaluation to prevent hazards from escalating into disasters. Such assessments often focus on the earth's physical characteristics, commonly referred to as geo-risk analysis.

The objectives of disaster mitigation include: (1) reducing the impacts of disasters, particularly on human populations; (2) serving as a foundation and guideline for development planning; and (3) enhancing public knowledge and capacity to cope with and reduce disaster risks, thereby enabling communities to live and work safely. Key disaster mitigation activities involve: (1) identifying and monitoring disaster risks; (2) participatory disaster management planning; (3) fostering a culture of disaster awareness; (4) implementing physical and non-physical disaster management measures; (5) identifying sources of hazards and disaster threats; (6) monitoring natural resource management; (7) overseeing the use of advanced technologies; and (8) supervising spatial planning and environmental management practices.

The Manado City Government, through the Regional Disaster Management Agency (BPBD), collaborates and coordinates with relevant agencies to implement both active and passive disaster management measures as stipulated in BNPB Regulation No. 4 of 2008. The implementation of these two approaches is interdependent, as active mitigation efforts function effectively only when supported by passive mitigation, which serves as a guiding framework for executing active mitigation initiatives.

Passive Mitigation

Passive mitigation is an effort to reduce the risk and impact of disasters through the development of actions. Passive mitigation includes actions carried out by the Manado City BPBD such as the drafting of legislation, research or assessment of disaster risks, the creation of disaster-prone maps, the implementation of disaster SOPs, the formation of organizations or disaster task forces. These passive mitigation activities aim to overcome disasters to reduce risks and impacts.

The preparation of laws and regulations related to disasters in Manado City has been carried out, including Manado City Regional Regulation Number 1 of 2012. In general, the establishment of provisions and regulations concerning disasters and disaster risk reduction serves as the initial step taken by the Manado City Government in organizing disaster management. These efforts encompass a broad range of activities, including disaster mitigation, emergency response, and post-disaster rehabilitation.

The findings indicate that the implementation of passive disaster mitigation in Manado City has been carried out productively and collaboratively by the Regional Government and Regional Apparatus Work Units. Key achievements include strengthening the legal framework for disaster management, enhancing the capacity and accountability of disaster governance, integrating disaster management into development planning, improving mechanisms for disaster management implementation, fostering multi-stakeholder partnerships, and advancing disaster preparedness and emergency response systems.

Therefore, the effectiveness of disaster mitigation as part of disaster management efforts largely depends on the capacity of the Manado City Government, as the implementing body of local governance, to formulate and execute policies effectively.The existence of the FPRB (Disaster Risk Reduction Forum/*Forum Pengurangan Risiko Bencana*) is needed as a forum to help mobilize the resources needed in flood disaster management and is expected to provide input or recommendations to the Government to recognize disaster risk models in pre-disaster, during disasters and post-flood disasters. In addition, FPRB is an in-independent

forum that unites various elements including the business world, aka-demisi, community organizations, professional organizations, donor institutions, mass media, and disaster management volunteers and supports various disaster risk reduction efforts in the region and is a partner of the Manado City BPBD. In this case, BPBD facilitates activities such as flood disaster risk assessment or assessment of making disaster-prone maps for each potential disaster in Manad Cityo.

In the FPRB, there is also a study of the map of disaster-prone areas which is updated at least 1 year to every five years by taking into account the existing situation and conditions. The scope of disaster-prone area mapping studies includes assessments of hazard levels, vulnerability, and overall disaster risk. Each passive disaster mitigation activity requires well-structured guidelines to ensure its objectives are achieved. The primary goal of these efforts is to enable disaster management implementation that effectively minimizes disaster impacts and risks. The Manado City BPBD has guidelines as a basic reference in flood disaster management as stated in the Decree of the Head of the Manado City BPBD Agency concerning Disaster Management Service Standards of the Manado City BPBD. This Standard Operating Procedure (SOP) provides a structured and documented description of the agreed-upon steps among all implementing institutions, clearly outlining who is responsible for specific tasks, as well as when, where, and how these tasks are to be carried out.

The Manado City Regional Government, through the Regional Disaster Management Agency (BPBD) acting as coordinator, regulator, and program implementer, has adopted three disaster management strategies as part of its passive mitigation efforts, namely:

a) Strengthening Institutional Rules and Capacity

   This strategy focuses on revising and improving regulations that support the effective implementation of disaster management. It aligns with efforts to enhance institutional capacity in disaster risk reduction. In Manado City, these efforts are directed toward strengthening the legal framework for disaster management implementation and improving both the capacity and accountability of disaster governance.

b) Integrated Disaster Management Planning

   The strategy for integrated disaster management planning in Manado City emphasizes aligning the Disaster Management Plan (RPB) with the Regional Medium-Term Development Plan (RPJMD). This integration is further operationalized through the strategic plans and annual work plans of all Regional Apparatus Organizations (SKPD). The goal of achieving integrated disaster management planning is pursued through

programs such as mainstreaming disaster management into development processes and adapting disaster management implementation mechanisms.

c) Education and Research

This strategy aims to bring about long-term changes by promoting a paradigm shift toward more effective disaster risk reduction. Such a shift can be facilitated through the development of educational and awareness programs across formal, non-formal, and informal learning channels, as well as through diverse forms of information dissemination. The desired paradigm change is expected to establish disaster awareness as a societal trend and an integral part of modern lifestyles. Embedding this paradigm as a valued social norm will encourage the community to adopt and replicate proactive disaster risk reduction practices.

Active Mitigation

Active mitigation refers to efforts aimed at reducing disaster impacts and risks through activities involving direct community engagement. In Manado City, the Regional Disaster Management Agency (BPBD) implements active mitigation measures such as installing warning signs in disaster-prone areas, conducting basic flood disaster training for officials and residents, providing public awareness counseling, establishing temporary evacuation posts, and constructing protective infrastructure to prevent or lessen disaster impacts.

The installation of disaster warning signs in Manado City is specifically targeted at areas identified as having a high risk of flooding. BPBD collaborates and coordinates with stakeholders such as academics from universities, police agencies from the Police Task Force. From this, it is known that flood-prone in-formation boards have been installed and disaster warning signs have been installed such as evacuation route signs, gathering point signs..

Basic disaster training for officials and community members is also a key component of active mitigation. In this regard, the Manado City BPBD organizes disaster management training programs specifically designed for government officials and community volunteers. Various disaster management training materials were taught, starting from the concept of weather forecasting, how to use talking to HT (Handtalky), how to provide assistance based on damage to residents' homes and how to evacuate disaster victims. Then also disaster management simulation training led by Basarnas practiced how to evacuate victims from a water and then lift them onto boats to be brought ashore. Various evacuation techniques were used, such as using BPBD and Basarnas boats to help victims who drowned in the water and

needed medical help. Furthermore, there are photography techniques material for disaster reports and about water rescue or the water rescue process as well as material on increasing the capacity of volunteer human resources.

The output of this training for government apparatus can improve their ability, skills, creativity and professionalism in an effort to provide the best service to the people, especially the City of Manado so that the integration of the role of a strong government in disaster management is created. Meanwhile, for volunteers, it is to create disaster management volunteers who are professional, ready, alert and vigilant.

Every year, especially during the rainy season, there will definitely be disasters on a very large scale, in a short time this will cause complex problems that require good, integrated and integrated disaster management and disaster management by involving relevant stakeholders according to their roles. In this case, BPBD also creates a post for temporary shelter in the event of a disaster. This is in order to monitor and monitor disaster management in Manado City.

Then the Manado City Regional Government through the BPBD which acts as a coordinator, regulator and executor or implements programs to implement two disaster management strategies as an active mitigation step, namely:

a) Capacity Building and Community Participation.

   The strategy for enhancing community capacity and participation in Manado City emphasizes empowerment programs and the strengthening of partnership roles in disaster risk reduction. These initiatives aim to foster community self-reliance and active involvement in disaster management efforts.

b) Enhancing the Effectiveness of Disaster Emergency Management

   Efforts to improve the effectiveness of disaster emergency management focus on strengthening disaster preparedness, optimizing emergency response operations, and accelerating early recovery processes. These activities are carried out through the involvement of BPBD, supported by Bappeda, Dinsosnaker Kesbangpol, Dishubkominfo, BMKG, BPMPKB, PU, and Dinkes.

Obstacles faced and efforts made in carrying out Disaster Mitigation in Manado City

The main obstacles in disaster mitigation in Manado City include:

1) Lack of Public Awareness.

   Some people are not fully aware of the importance of disaster mitigation and have not actively participated with the government in disaster management.

2) Limited Facilities and Infrastructure.

   The lack of facilities and infrastructure for disaster mitigation, such as shelters, evacuation routes, and other supporting tools, is an obstacle to the effectiveness of mitigation.

3) Limited Human Resources

   The lack of professionals in the field of disasters, especially in flood and landslide disaster management, is an obstacle in planning and implementing effective mitigation.

4) Lack of Planning and Socialization.

   The lack of planning of evacuation routes and socialization about disaster-prone areas to the community causes people to not know where to evacuate and how to anticipate disasters.

5) Complex Causes of Disasters.

   Flooding in Manado is caused by various factors, such as river meandering, river siltation, lack of water catchment areas, and inadequate infrastructure, making mitigation more complex.

6) Environmental Factors.

   The geographical condition of Manado City, which is hilly and close to the sea, as well as climate change that affects rainfall, are also factors that hinder mitigation.

The Manado City Government, through the Regional Disaster Management Agency (BPBD), undertakes disaster mitigation efforts by publishing disaster risk assessment data, including threat assessments, vulnerability assessments, and capacity assessments. These assessments serve as key strategies for reducing disaster risks within the city and contribute to the development of disaster risk maps for each hazard-prone area. Such studies and maps provide a solid foundation for regional governments in formulating disaster management policies and serve as valuable references for communities in their risk reduction efforts. The disaster risk assessment process involves collaboration among BPBD, Bappeda, Dinsosnaker, Kesbangpol, Dishubkominfo, BMKG, BPMPKB, PU, Dinkes, and disaster-prone villages.

The Manado City BPBD implements strategies to enhance disaster awareness and stakeholder engagement through counseling and outreach programs. These initiatives include mapping disaster-prone areas to identify high-risk zones and providing public counseling to improve community understanding of disaster risks and appropriate response actions. In addition, BPBD Manado undertakes structural mitigation measures, such as drainage system construction, alongside non-structural efforts, including community socialization and training activities. Furthermore, BPBD coordinates with various stakeholders, including the central and regional governments, as well as non-governmental organizations (NGOs), to strengthen disaster risk reduction efforts.

5. CONCLUSION

Disaster mitigation efforts by the Manado City BPBD to reduce risks and impacts demonstrate that passive mitigation activities are implemented in an integrated and collaborative manner. It is evidenced by preventive measures in minimizing disaster risks and impacts, including the establishment of FPRB, the creation of flood risk maps, and SOPs for disaster management. Then in the focus of active mitigation, there are various sectoral and conditional efforts ranging from the creation of disaster-prone map information boards, disaster management training, the establishment of integrated emergency preparedness posts, and the provision of public kitchens for people affected by disasters. The Manado City Government, through BPBD acting as coordinator, regulator, and program implementer, applies three disaster management strategies as part of its passive mitigation efforts: (a) strengthening institutional frameworks and capacity, (b) integrating disaster management planning, and (c) advancing education and research. Additionally, BPBD implements two disaster management strategies as active mitigation measures, focusing on direct community engagement and practical interventions to reduce disaster risks, namely; a) Capacity Building and Community Participation and b) Increasing the Effectiveness of Disaster Emergency Management.

The main obstacles in disaster mitigation in Manado City include: Lack of Public Awareness, Limited Facilities and Infrastructure, Limited Human Resources, Lack of Planning and Socialization, Complex Disaster Causes and Environmental Factors. The Manado City Government, through the Regional Disaster Management Agency (BPBD), undertakes disaster mitigation efforts by publishing disaster risk assessment data, including threat, vulnerability, and capacity assessments. BPBD Manado carries out a strategy to increase disaster counseling to increase public awareness and related stakeholders. BPBD Manado maps disaster-prone

areas to identify zones most at risk of disaster impacts. The agency also implements structural mitigation measures, such as drainage system construction, and non-structural efforts, including community socialization and training programs.

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