Effectiveness Ratio Of Psychology Of Disaster Victims Of Natural Pre-Disaster Management Policies In The Implementation Of Early Warning In Banten

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ABSTRACT

This research focuses on analyzing the effectiveness of natural pre-disaster management policies in implementing early warning in Banten. This study method uses qualitative research methods, and this type of investigate is case study research. This data processing technique is to use a spiral model. The results of this study found that five aspects are quite important, namely first, in the definition aspect, it is known that the problems and causes of policy problems that occur related to early warning are limited communication equipment infrastructure, while the Banten region is a disaster-prone area. Second, in the prediction aspect, it is known that the policy formulation team is BMKG, Ministry of Transportation, KKP, PEMDA, BNPB/BPBD, TNI/POLRI, and Public Broadcasting Institutions. Third, on the Prescription aspect, it is known that the forms of policies that are stipulated regarding early warning, namely Law no. 24 of 2007, Law no. 31 of 2009, Government Regulation Number 93 of 2019, Deputy Instruction of 2015, and Governor Decree Number 36 of 2022. Fourth, in the Description aspect, it is known that each stakeholder has carried out their duties according to the SOP. Resources and services related to early warning have been delivered to the community. Fifth, in the evaluation aspect, it is known that achieving the goals of the self-warning policy has reduced disaster risk and minimized disaster victims. The basis for assessing the achievement of this policy objective is an increase in public awareness of early warning information.

Keywords: Effectiveness, Policy, Early Warning, Pre-Disaster Management, Natural Disasters.

A. INTRODUCTION

The territory of the single state of the Republic of Indonesia has a geological, geographical and hydrological site and a description of the

residents that is susceptible to disasters produced by natural reasons that often cause human wounded, ecological harm, property harm, and psychological impacts that can impede national development. Amri explains in detail in Indonesia's disaster risk book that Indonesia is an interesting region from a geology perspective. Tectonic activity on the islands from Sumatra in Indonesia to Papua has created many volcanoes. With so many regional volcanoes in Indonesia, many active faults cause earthquakes. Practical examples are the four-arch and back-arch areas, which include the Barisan Hills, the south coast of Java and the north coast of Papua, the east coast of Sumatra, the north coast of Java, and the south coast of Papua (Basuki et al., 2022).

According to the Organization of Meteorology, Climate and Geophysics (BMKG), there were 8,264 earthquakes in 2020. Most earthquakes that occurred had a magnitude less than magnitude 5 which occurred 8,020 times, while earthquakes with a strength of more than magnitude 5 occurred 244 times. In March 2020, the most earthquakes occurred, 965 times or 11.7% of the total earthquakes in 2020. Areas frequently affected by earthquakes include Aceh, Bali-Lombok-Sumbawa-Sumba, Central Sulawesi-Gorontalo, North Maluku, and Serang (Console et al., 2022).

Based on data from the research center for the expertise body of the DPR RI secretariat general, Arifa explained that at the beginning of 2021, Indonesia had been hit by many natural disasters. 185 disasters occurred in Indonesia from 1 to 21 January 2021. These natural disasters include floods, landslides, tornadoes, tidal surges, and volcanic eruptions. Hydrometeorological disasters such as floods, landslides, and tornadoes tend to prioritize natural disasters caused by extreme weather and environmental damage. According to BNPB, 127 floods, 30 landslides and 21 tornadoes occurred in different parts of the country. Other disaster events have been recorded as 5 tidal surges and 2 earthquakes. From a number of events, although floods are the most common, earthquakes cause the greatest casualties. The death toll in the earthquake was 91, 41 in landslides and 34 in floods, and those affected by floods were missing, eight and three were affected by the earthquake. Among the injured, there is still a possibility of extensive damage from the earthquake. BNPB injured 1,172 people in earthquakes, 26 in landslides, seven in tornadoes and five in floods. (Rofiah et al., 2021).

Niken explained that in 2018 in Banten Province, there was a disaster that affected 2 regencies, namely Pandeglang and Serang. Another province that intersects its affected areas, namely Lampung province. The total death toll was 437 people, 14,059 people were wounded, 16 were missing, and 33,721 were displaced. Damaged buildings accounted for 2,752 houses and 92 inns or stalls. As many as 510 boats and ships of transportation, 147 vehicles, and two dock and shelter facilities were also damaged. Pandeglang is the worst area. The

distance between Mount Anak Krakatau and Pandeglang Regency is about 65 km. Pandeglang is the region with the most deaths, namely 296. Most are tourist visitors. Other victims were 7,656 people injured, 8 people missing, and 20,726 displaced (Antarsih et al., 2021).

In 2019, Banten also experienced an earthquake that impacted many victims. Acting Head of Information Data Center and Public Relations of the National Disaster Mitigation Agency (BNPB) Agus Wibowo revealed that the 7.4 Richter scale earthquake was updated to 6.9 on the Richter scale in Southwest Banten resulted in 1 death and 113 houses being damaged. The Banten provincial government also released the number of victims due to the tsunami disaster in the Anyer area, with 176 dead, 509 injured, and 30 missing. Based on statistical data in more detail, in the period 2019-2020 in the Banten region, especially in Walantaka, Takakan, Serang, City of Serang, Kasemen, Curug, and Cipocok Jaya, there were 124 floods, 22 fires, 222 typhoons, and landslides as many as 10 cases of disaster (Idriyani, 2021).

Nurjanah explained that 3 (three) causes disasters, namely (1) natural causes (natural disasters) due to natural phenomena and without human intervention; (2) non-natural causes (non-natural disasters), namely not due to natural phenomena and also not due to human activity; and (3) social/human factors (man-made disasters) that are entirely the result of human activity, for example, horizontal conflict, vertical conflict, and terrorism. In this case, it can be said that the causes of disasters consist of several aspects that must be monitored. (Ding et al., 2020).

People are encouraged to remain vigilant due to the influence of natural disasters. Regarding hydrometeorological disasters, BNPB urges the public to pay attention to weather forecasts, which have been informed by the Meteorological, Climate and Geophysics Agency (BMKG), as the peak of the rainy season can occur until February 2021. Families need to be prepared for this potential danger. Natural disasters are disasters produced by any incident or sequence of events began by nature, with earthquakes, tsunamis, volcanic eruptions, floods, droughts, hurricanes, and landslides (Fakhruddin et al., 2020).

Considering the occurrence of natural disasters and its impact on people at risk of being affected, ideally, the government has an appropriate policy to deal with them through coordinated action among stakeholders. In general, according to Law of the Republic of Indonesia Number 24 of 2007 on disaster management, the objectives of disaster management include: (1) to protect the people from the threat of disasters; (2) Coordinate existing laws and regulations; (3) Ensure the implementation of disaster management in a planned, coordinated, coordinated and coordinated manner; (4) an assessment of local culture; (5) To build public and private partnerships and partnerships; (6) Encourage the spirit of cooperation, solidarity and generosity; (7) To

establish peace in the life of society, nation and state. (Kitazawa & Hale, 2021).

Regulations for disaster management are broken down into seven fundamental affirmations in disaster management, which function as (1) Become the basis and umbrella of law; (2) Oriented/paradigm of disaster danger decrease; (3) Support the mainstreaming of disaster danger decrease including its financing; (4) Promote local autonomy; (5) Determine the status and level of disaster situation; (6) Having a strong disaster management agency, and; (7) Explain the rights and obligations of the community (McNamara, 2021).

The law highlights the importance of disaster management in a planned, coordinated, coordinated and coordinated manner by building public and private partnerships and partnerships. Disaster management policies in the 2015-2019 RPJMN are implemented through 3 (three) strategies, namely 1) internalizing disaster management in regional development, 2) reducing community vulnerability to disasters, and 3) increasing the capacity of regional governments and communities. Each region has a different disaster potential. The existing facts related to disaster management are that it is not optimal due to a lack of integration between stakeholders, disaster management is still carried out locally, the potential of each region is not connected and does not complement each other (each region has its handling procedures) (Mashi et al., 2019).

Based on the consequences of a preliminary research through interviews with officers related to disaster management with HN, RTH, and IQL in February 2021, it can be seen that the current conditions in handling disasters in various parts of the archipelago, the government is very stuttering. This means that from disaster to disaster, classic excuses such as a lack of equipment and facilities to meet the needs of disaster victims are always raised, for example in the case of a flood, the government always makes excuses for a shortage of rubber boats, a lack of supply for refugees, a lack of backup generators, and various other obstacles. Issues in the arena of disaster managing in regions, in particular, have not yet become a priority issue in Regional Medium Term Development Plan (RPJMD) documents related to the disaster sector. Potential disaster threats are generally only explained and described in terms of geographical and regional demographic aspects. This disaster threat has not been raised as a strategic regional development issue, nor has it been included as a strategic issue in the technocratic draft of the RPJMD, it has not become the political vision/mission of a regional head candidate (Ponte et al., 2019).

The Banten Province Regional Disaster Mitigation Agency explained in detail that water flooding had become an annual disaster for several regions in Indonesia, especially areas in the lowlands. This flood prevention includes 3 things: pre-flood, during, and post-flood

prevention. Before the flood, it is necessary to hold a meeting between residents to discuss the causes of the flood and evaluate flood disasters that have occurred before. After evaluation, it is necessary to plan for dealing with flooding that will occur. In addition, residents need to create an early warning system, conduct training on how to save themselves, and prepare evacuation sites before a flood occurs. Meanwhile, there must be good coordination with the SAR team, PMI, and government when a flood occurs to search and rescue flood victims. It is also necessary to collect data on victims and logistical data and protect settlements that their inhabitants have abandoned due to flooding. Furthermore, what is included in post-flood countermeasures is analyzing the damage that has occurred, rebuilding infrastructure, and asking for support from other institutions to help post-flood victims (Jevrejeva et al., 2020).

Earthquakes are also natural disasters that often occur in certain areas and have a huge impact. BPBD has a basic appeal for people who live in areas that frequently experience earthquakes, and it is better to know how to deal with earthquakes, both before when they occur and after an earthquake disaster. Before an earthquake occurs, people need to know evacuation routes or emergency exits that can be used to save themselves. In addition, it must be ensured that gas pipes and drains are properly sealed. Heavy objects should also be placed in a stable and safe place. Then when the first tremors occur, try to stay calm. If you are in a building, look for an emergency exit to save yourself or take cover under a sturdy table. If you are outside a building, immediately find a field, don't take cover under a tree or a bridge, and try to be in a sitting position. Next, after an earthquake, immediately go to the nearest health post to get treatment if you are injured. After that, seek information from the radio or television. Make emergency tents in the yard if strong aftershocks are still possible (Hall et al., 2022).

Landslide disasters often occur in the rainy season, especially in hilly areas with slopes. Several ways to prevent landslides include not clearing agricultural land on steep slopes, not building houses under cliffs, not cutting trees on slopes, making terracing, and educating the public about the causes and consequences of landslides. When a landslide occurs, several actions need to be taken, namely staying away from and saving yourself from the area, helping the SAR team to the location, helping residents who the landslide has hit, and reporting any facilities damaged by the landslide. After the landslide has ended, searching for victims and repairing damaged infrastructure is necessary (Feng et al., 2022).

Indonesia is a nation with many active volcanoes. For this reason, it is essential to instrument an appropriate volcanic eruption disaster management system to reduce the number of damage and damage caused by disasters. An active volcano usually shows signs

before it explodes. Volcano monitoring officials must continue to monitor volcanic signs and update volcanic status to inform residents living at the foot of the mountain. When the volcano is about to erupt, residents living within a certain radius should be evacuated to safer areas. When residents see Lava moving towards the settlement, they must immediately defend themselves and cannot return until authorities declare the area safe. Residents must protect themselves from volcanic ash by wearing masks and protective glasses (Pribadi et al., 2021).

Based on the types of natural disasters in various regions in Indonesia, the Banten region is an interesting area to pay kindness to in terms of natural disaster managing. Soleman explained that based on the results of the flood hazard mapping, it covered an area of 88,082.99 ha, an area prone to earthquakes of 344,126.59 ha, and an area prone to landslides of 3,015.90 ha. Meanwhile, the areas experiencing multi-prone disasters cover 55.45% of the total area of Banten Province (934,826.73 ha), which is 518,361.42 ha. Husein provided information that based on the results of a flood vulnerability analysis, Banten Province is a province with a high potential for disasters because the region is often flooded during the rainy season and has historically faced a major tsunami caused by the explosion of Mount Krakatau in 1883 (Supian & Mamat, 2022).

Of the various kinds of natural disaster efforts that have occurred in the Banten Region, to run effectively, it is necessary to carry out integrated disaster management among stakeholders through effective policies. To deal with natural disasters in Banten, the parties involved include BNPB, BMKG, National Search and Rescue Agency, TNI, POLRI, and the community. Policies in disaster management specifically have been regulated in Banten Province Regional Regulation Number 1 of 2015 about the application of disaster managing. The Perda explains that in regional regulations, the Regional Disaster Management Agency for the Province of Banten is a regional apparatus that was formed in the framework of carrying out the duties and Functions of disaster management. Disaster management is a series of implementation exertions that include the establishment of development policies, disaster deterrence actions, emergency answer, and rehabilitation of disaster risk (Virtriana et al., 2023).

In general, disaster management implementation can be divided into three phases, namely pre-disaster, disaster time, and post-disaster. This study specifically discusses disaster management at the pre-disaster stage, since the pre-disaster phase is essential to reduce the risk of impending disasters. Implementation of disaster management at the pre-disaster level includes disaster management planning, disaster risk reduction, prevention, integration into development plans, disaster risk analysis requirements, spatial planning implementation, education and training, and disaster

management technical quality requirements. In situations of potential disasters, including preparedness, early warning, and disaster mitigation (Oktari et al., 2020).

Following the results of the preliminary study, based on the interviews, there are employees in fields related to potential disaster situations in the Banten area. At present, the Banten region needs to focus on pre-disaster management for situations where there is a potential disaster because several potential disasters will occur in Banten. Some potential disasters in Banten are floods, flash floods, extreme weather, landslides, drought, earthquakes, tsunamis, and extreme waves. Thus, research must focus on natural disaster management at the pre-disaster stage in potential disaster situations, including preparedness, early warning, and disaster mitigation (Rachmawati et al., 2022).

As stipulated in Law Number 24 of 2007, In a condition where a disaster is likely to occur, the first implementation of disaster management is preparedness, which in this case is conducted through a number of activities, namely (1) preparing and testing an emergency disaster management plan; (2) Organize, install, and test early warning systems; (3) the provision and preparation of supply products to meet basic needs; (4) organizing, consulting, training, and drilling related to the emergency response process; (5) Prepare evacuation sites; (6) Compile accurate information, compile information, and update disaster emergency response procedures; and (7) the provision and preparation of materials, products, and equipment for the restoration of infrastructure and facilities (Maulida, 2020).

Second is implementing disaster management in a situation with a potential for disaster, namely early warning. Early warning is carried out to take quick and appropriate actions to decrease the danger of being hit by a disaster and prepare emergency response actions. Self-warning systems are operated through a variety of activities, such as monitoring disaster signs, analyzing the results of monitoring disaster symptoms, making decisions by authorities, disseminating information about disaster alerts, and taking action by the community (Merz et al., 2020).

Third, implementation of disaster management in the event of a potential disaster, i.e. mitigation. Mitigation measures are taken to reduce the disaster risk of the people living in disaster-prone areas. Mitigation is carried out through a variety of activities, such as spatial planning, development systems, infrastructure development, building planning, and the implementation of both traditional and modern education, counseling, and training (Rana et al., 2021).

Ristrini explained that in disaster management preparedness policies, it could be interpreted that preparedness is an important stage

in disaster management, Which both governments must expect private and community elements in the form of creating regulations, preparing programs, funding, and developing a network of disaster preparedness institutions or organizations. In technological implementation, preparation is a continuous and integrated process that arises from a variety of risk reduction activities and sources. (Chan et al., 2020).

Sutanto explained that early warning is an activity that gives a sign or hint of a disaster at the first and earliest opportunity. This early warning is needed for residents who live in disaster-prone areas so that they have the opportunity to save themselves. Next, it is explained the effectiveness of the early warning system, that the goal is how vigilance and anticipation of handling problems due to emergencies and disasters can be carried out properly. For example, evacuation can take place effectively if needed through rescue actions. Evacuation can be considered the end of implementing the Early Warning System (Shah et al., 2022).

Triana explained that mitigation could be categorized into two based on cultural and structural approaches. Structural mitigation is an effort to minimize disasters by constructing various physical infrastructures and using a technological approach, while non-structural is through laws and regulations, training, and others. Cultural mitigation is that disaster control and prevention can be carried out with the culture and traditions of the local community and the local wisdom of the community. In disaster mitigation, some terms constitute a level in a disaster mitigation plan: disaster threats include unexpected disasters, predictable and observed disasters, and vulnerability as the identity of disaster conditions (Sultana & Tan, 2021).

Policies regarding pre-disaster management, including preparedness, early warning and mitigation activities in the Banten Region, have been generally regulated in Law Number 24 of 2007 and specifically in Presidential Regulation Number 87 of 2020 and Regional Regulation Number 1 of 2015. In its implementation, Pre-natural disaster management policies in Banten still need to be studied in more depth to achieve goals or their effectiveness. The pre-disaster management stage is very important to know its effectiveness in improving activities that are still not running well or have not been carried out effectively. With an effective policy, it is possible to reduce the disaster risk experienced by the community so that it can reduce the losses of the community affected by the disaster, both in terms of material and non-material (Meilani & Hardjosoekarto, 2020).

Based on existing data related to the forms of policies regarding pre-disaster management in implementing early warning, it is known that there are several parties involved and integrated. Based on the guidelines for tsunami early warning services based on Law Number 31 of 2009, As an example of the case in tsunami early warning

communication, the parties involved in this matter are BMKG, National and local TV/radio media, BNPB, BPBD, TNI, POLRI, cellular service providers, managers of hotels and tourist attractions as well as the community at risk (Sufri et al., 2020).

The effectiveness of pre-disaster management policies in implementing early warning involving various parties is very vulnerable to ineffective, even though each party has its duties and functions in pre-disaster management. However, each party also has main duties and functions in their respective agencies, so in the implementation of this policy, it really needs to be studied again to determine its effectiveness. Marlan explained that when implementing pre-disaster management policies, the government sometimes pays little attention to it, but after the disaster occurs, the government pays attention. This was considered too late because anticipation during pre-disaster activities was not carried out optimally. In line with that, Cristo explained that policies play an important role, so they must be implemented effectively in disaster management. It is very important to anticipate a potential disaster situation before it occurs. Regional regulations that regulate disaster management and the formation of BPBDs that are integrated with other parties need to be carried out effectively in the form of coordination through communication and bureaucratic structures. Both of these affect the success of disaster management (Rana et al., 2021).

Public policy, in this case, related to pre-disaster management in the implementation of early warning so far is at a fairly weak point because it focuses too much on implementing an activity or program without paying attention to prevention which has enormous benefits for the community at large. A very important phenomenon related to natural disasters where management at the pre-disaster stage is still focused on the implementation of programs and activities of a government agency unit at the implementation stage without regard to the actual performance of the agency. In terms of serving the community, one of the most important is the pre-disaster stage in implementing early warning. Thus, research on the effectiveness of pre-disaster management policies in implementing early warning is very important. This research will focus on the effectiveness of early warning pre-disaster management and produce a recommendation for effective natural disaster pre-disaster management policies.

B. LITERATURE REVIEW

1. Public Policy

Dunn formulates public policy as follows: Public policy is a guideline that contains values and rules that have the authority to support government actions within its jurisdiction. Public policy is everything done or not done by the government, why a policy should be performed, and the

benefits of ordinary life should be considered holistically so that the policy has great benefits for its citizens and does not have a small impact and does not cause particularly adverse problems. Still, some will benefit, and they will lose, and that's where the government has to be smart in setting a policy (Rahman et al., 2020).

Making public policy is complicated because it involves many processes and variables that must be studied. Therefore, some political experts interested in studying public policy divide the process of preparing public policy into several stages. The purpose of this section is to make it easier for us to study public policy. However, some experts may divide these stages differently (Castelo-Bronco et al., 2019). According to William Dunn, the stages of public policy are as follows:

a) Agenda preparation stage

At this stage, elected and appointed officials put things on the public agenda. Previously, the issue competed to be included in the policy agenda in the first place. In the end, a number of issues entered the policy agenda of policymakers. At this stage, perhaps a problem is not touched at all, when other issues are set at the center of the discussion, or there are problems that are postponed for a long time for certain reasons (Lim & Young, 2021).

b) Policy formulation stage

At this stage, issues that enter the policy agenda are discussed by policymakers. Problems were defined to find the best solution to the problem. The solution to the problem comes from a variety of options or policy options (policy options/policy options). In policymaking, each option competes to be selected as a problem-solving principle. At this stage, each actor will compete and try to solve the best problems (Bindman et al., 2019).

c) Policy adoption stage

At this stage, among the many alternative policies offered by policymakers, ultimately, one of these alternative principles is adopted with the support of a majority of the legislature and consensus among the directors of institutions or court decisions (Ripoll Servent, 2019).

d) Policy implementation stage

At this stage, a policy program will only become a record of the elite if the program is not implemented, namely administered by administrative agencies or lower-level government agencies. The administrative units that have been taken implement policies that combine financial and human resources. In this implementation phase, different interests will compete with each other. Implementation of some policies has the

support of implementers, but implementers may oppose others (Adam & Fazekas, 2021).

e) Policy evaluation stage

At this stage, implemented policies will be evaluated or evaluated to show how much desired impact the policies created have achieved, i.e. addressing the issues facing the community. Therefore, criteria or criteria are set, which is the basis for evaluating whether implemented public policy has achieved the desired effect or goal (Jufri et al., 2019).

William Dunn explains in detail that policy analysis is the application of different research methods conducted by an individual or team of policy analysts to process more complex and relevant data for further use to acquire different data and help them become more structured so that it is easier to formulate and select the different alternative policies used to solve them. Politics. The problem will be recommended to policymakers (Schweinsberg et al., 2021). Steps in policy analysis include:

a) Definitions produce information about situations that lead to policy problems.
b) Prediction provides information about the relative value or utility of the future consequences of implementing alternative policies, including doing nothing.
c) Provides information about prescription values or problems.
d) The description produces information about the present and past consequences of implementing alternative policies.
e) Providing information about the quality or utility of assessment, problem solving, or mitigation outcomes (Minutti-Meza, 2021).

C. METHOD

In this study, the qualitative research method was descriptive and qualitative, which means that the process conducted in this study was reasonable and natural without manipulation, where everything followed the terms of the research site neutrally. According to Dunn, the policy analysis approach combines five general approaches, namely: (1) producing information about the definition, i.e., situations that cause policy problems; (2) provide information about the relative value or utility of future outcomes from the implementation of alternative policies, including predictions, i.e., doing nothing; (3) provide information about prescriptions, namely standards or problems; (4) the production of information about the details, i.e., the present and past consequences of the implementation of alternative policies; and (5) provide information about the quality or usefulness of the assessment, namely troubleshooting or mitigating outcomes.

D. RESULTS AND DISCUSSION

In this study, the effectiveness of pre-disaster management, especially regarding early warning, is measured in more detail through aspects. These aspects are aspects of the definition that gather information about the terms that lead to policy problems; The direction of prediction seeks information regarding the future consequences of the implementation of alternative policies; regarding the prescription aspect, the relative value or use of future outcomes, and a problem solving; The narrative aspect is to seek information about the present and past consequences of the implementation of alternative policies; and the evaluation aspect regarding the quality or usefulness of the results or problem solving.

1. Definition

a) Problems and causes of policy problems that occur are related to early warning

From the research data, it is known that the problems faced before the regulations on early warning were issued were limitations in the communication equipment infrastructure so that the BMKG's ability to analyze took > 2 hours, and BMKG at that time was limited to providing parameter information and only making daily weather forecasts and not providing related information about early warning. Limited modes of communication meant that information on the earthquake and tsunami disaster could not be conveyed quickly to the public, resulting in many victims. This happened. On 26 December 2006, the Aceh tsunami occurred, which caused a tectonic earthquake that occurred off the west coast of Aceh with very many victims, approximately 237,448 people died in Aceh. Many victims of the Aceh Tsunami were due to the lack of early warning information that was conveyed to the community quickly. Before Law No. 24 of 2007 and Law No. 31 of 2009, BMKG only makes daily weather forecasts and does not provide relevant information about early warning.

This is confirmed by Astuti and Sudaryono's research that Indonesia still has major problems as a highly vulnerable country to natural disasters, such as low disaster management performance, low attention to disaster mitigation, and a still weak role of schools in introducing disaster mitigation education.

In Max Dilley's research, Veronica Francesca Grasso explains that disaster risk management, especially climate-related risk management, has become the main agenda of international policy. Reducing hazard-related damage and damage relies heavily on scientific input. Science, in turn, relies on data — in this case, 1) risk-related data about hazards, exposures, and vulnerabilities, and 2) data about related harms and consequences.

b) Basic decision-makers focus on problems

The government and the regional government are responsible for the implementation of disaster management. The government's responsibilities in disaster management include a) disaster risk reduction; (b) to protect communities from the effects of disasters; (c) ensure the just rights of communities and refugees affected by disasters and to adhere to minimum service standards; d. Recovery from the effects of disasters; (e) adequate allocation of disaster management budget in the state revenue and expenditure budget; f) Disaster management budget allocation in the form of ready-to-use funds; and g. integration of disaster risk reduction with authentic and reliable archive/document maintenance and development programs related to disaster threat and impact.

Nugroho's research also emphasizes that natural disaster management is necessary to reduce the impact of disasters on natural disaster management. In general, natural disaster management can be divided into three categories namely disaster prevention, disaster time management, and post-disaster management.

c) Public Perception

From the research data, BMKG integrates intensely with the Ministry of Transportation by coordinating with the Director General of Sea Transportation or related parties in making regulations. Stakeholders provide information media (display monitors) in information services, and BMKG fills in the content with information. Stakeholders routinely hold safety training and BMKG as resource persons for these activities.

The Banten Province Social Service and PURR Office held a coordination meeting, and the integration process ensured that it was regulated in clear terminology. Likewise, the Banten Province SAR Agency conducted joint discussions in one program of activities in its integration process.

d) The actors involved and their interests

From the research data, BMKG has a role in the policy formulation process, and each agency in the policy formulation process provides input or technology proposals. KL/IP provides input suggestions and considerations as well as the duties of each KL/IP. Banten Province Regional Apparatus Organizations (OPD, Social Services, PUPR Services) have a role in disaster management and their respective duties and functions. Likewise, the TNI and Polri function as disaster management. The KSB, which was formed by the social service, focused more on empowering the community, meanwhile, Destana was formed based on PERKA BNPB, where the community made an early warning system to the community after receiving this information.

According to the PUPR office in Banton Province, policy issues and their solutions, such as repairing damaged infrastructure and immediate

repairs, will be incorporated into the policy to support the community's socio-economic activities to restore the socio-economic status of people affected by disasters. Meanwhile, according to the Banten regional government, social services related to policy problems and their solutions, which will then be incorporated into policy, will turn disaster management into 5 components: food supply, clothing, evacuation shelter, and social risk management of vulnerable groups.

2. Prediction

a) Policy formulation team

From research data related to the formulation of early warning policies where a team was formed in the formulation of early warning policies but did not issue a Decree (SK) for the team that was formed. Those involved in the formulation of the early warning policy are BMKG, Ministry of Transportation, KKP, PEMDA, BNPB/BPBD, TNI/POLRI, and Public Broadcasting Institutions are involved as the early warning policy formulation team.

b) An ongoing public forum

From the research data, it is explained that the BMKG does not directly involve the general public in preparing early warning policies, but in formulating policies, it takes into account the community's needs, which so far have often been conveyed in activities carried out by the BMKG. As for the activities in the form of fisherman weather service schools, safety training, etc., and BNPB and LIPPI as stakeholders who will be involved in community empowerment. In line with BPBD Banten Province, formulating policies does not involve the general public, but the results of these policies are disseminated to the public.

According to RRI Banten, those involved as a team formulating the early warning policy were all agencies related to disasters: BMKG, BNPB, BPBD, Volcanology, SAR, artists, and the RRI Board of Management, as well as volunteers. According to informants from the community, the community was not involved in formulating early warning policies or had never been involved in a forum discussing early warning regulations.

c) Stakeholder engagement

From research data related to directives to the public regarding the understanding of the policy plan, BMKG does not make directives to the public, but other institutions or agencies such as BNPB and BPBD will carry out directives to the community. BMKG, in formulating policies, does not involve the community directly, however, the implementation of fisherman field schools is a form of BMKG communication with the community, and BMKG knows the need for the types of information

services needed by the community. BPBD Banten also emphasized that the community is not involved in policy formulation, but the policy results will be socialized to the community. The community also stated that they had never received an invitation regarding the formulation of early warning policy regulations.

d) Predict changes that occur through early warning policies

Based on the 2012 BNPB Community-Based Early Warning System Guidelines, it is stated that a disaster early warning system is a very important component in efforts to reduce disaster risk. With early warning of a disaster, the community can respond appropriately to avoid and avoid casualties and minimize the impact of the disaster. For the early warning system to work effectively, it requires the active participation of people living in vulnerable areas, facilitating public awareness and community readiness activities, and promoting reliable alerts. The warning must reach everyone who is in danger.

e) What impacts will occur with the implementation of early warning policies

With the program simultaneously, people will get used to facing real disasters so that they can reduce disaster risk. According to RRI Banten, related Based on theoretical assumptions, if the kentongan program is carried out simultaneously, what will happen is that people's awareness will increase to reduce disaster risk

Based on the 2012 BNPB Tsunami Disaster Risk Reduction Master Plan, the high or low number of victims of earthquakes and tsunamis highly depends on the community's readiness to respond to hazard events. Awareness, preparedness, and education are key to building community capacity to respond to threats. Many activities have been carried out by various parties to build community preparedness but are felt to be inadequate, and this can be seen from the reaction and behavior of the community on the incident of 11 April 2012. This sociocultural evaluation examines aspects of (1) Community Response to Earthquake and Tsunami Hazards; (2) Community and Media Responses to Tsunami Early Warning; and (3) Community Actions in Evacuating.

3. Prescription

a) Established forms of dealing with early warning

From research data on regulations that were formed during the process of preparing tsunami early warning policies, namely Law No. 24 of 2007 concerning Disaster Management (BNPB), Law No. 31 of 2009 concerning the delivery of information on Meteorology, Climatology, and Geophysics; Presidential Regulation No. 93 of 2019 aims at earthquake data systems and tsunami primary warnings, 2015 sub-guidelines on national digital forecasting, changes to standard operational procedures for extreme weather early warning passed in

December 2019, and impact-based forecasts. Meanwhile, from the Banten Provincial Social Service, Governor Decree No. 36 of 2022 concerning raffle and protection clusters.

b) Parties involved in the legitimacy process

Research data related to those involved in the early warning policy legitimacy process are BMKG, Ministry of Transportation, KKP, Regional Government, BNPB/Bpbd, TNI/Polri, and Public Broadcasting Institutions. According to the Social Services involved in establishing the Governor Decree, namely BPBD, Health Service, PRKP, Public Works Service, PUPR, Community Institutions (MBMC, PMI, Red Crescent), Volunteers, Higher Education Forum for disaster danger lessening.

Meanwhile, according to the PUPR Office of Banten Province, those involved in PPB activities are the Finance Section. From the Banten Province Search and Rescue Agency, those involved in this activity were the BPBD, RAPPI, ORARI, TNI, POLRI, BMKG, and other disaster agencies collaborating in conducting disaster management drills/training. Starting from the existence of early warning information and how to evacuate. According to RRI Banten, those involved in kentongan activities are all disaster-related agencies: BMKG, BNPB, BPBD, Volcanology, SAR, artists, and the RRI Board of Management, as well as volunteers. Dompet Duafa, ACT team, and other community organizations.

c) Risks that can arise through legitimized early warning policies

From research data, the consequences or risks faced by BMKG after the ratification of Presidential Decree No. 93 of 2019 are that BMKG is required to be faster in the process of analysis and delivery of information. Criticism from the public if early warnings are delivered inappropriately (late or not). With the existence of an interface instance, the delivery of information is tiered/gradual, and it will take a longer time. Delays in response to handling by interface agencies/stakeholders will lead to criticism as if BMKG is slow in providing information. Therefore, BMKG must continue to improve service quality.

Presidential Regulation No. 93 of 2019 emphasizes the strengthening and development of earthquake information systems and early warning interpretation of tsunamis; As described in Article 6, the dissemination and dissemination of information regarding tectonic earthquakes and early tsunami warnings is carried out by non-ministerial government agencies that conduct government activities in the fields of meteorology, climatology, and geophysics (BMKG). This is also emphasized in Perka BMKG No.09 of 2010, where BMKG must respond quickly if it is known natural disasters on land and at sea, air or sea transportation accidents, and extreme weather on land and at sea. The quick response is made in the form of a report submitted via a short message service

d) Division of responsibility for each early warning policy process

Based on the research results, the role of agencies in extreme weather early warning, namely BMKG as stakeholders and interface agencies provide threat information; BNPB and BPBD carry out Risk Management; Regional Governments make Local Government TNI/POLRI Vulnerabilities; BPPB and BPBD carry out mitigation, and Public Broadcasting Institutions carry out Interface Agencies.

The role of the BPBD Banten as an interface agency and as a stakeholder and the PUPR Office of Banten Province plays a role as the implementer of Disaster Management in reconstruction and rehabilitation activities and supports the implementation of PB by helping to provide disaster management equipment.

In disaster management, the social services organization is part of the organization as a disaster management organization throughout all disaster cycles (pre-disaster, during and after disasters; pre-disaster: mitigation activities; during and after disasters; during disasters and post-disaster: distribution and evacuation measures). While the role of other stakeholders (TNI, Polari SAR) is to receive early warning information from the BMKG, wait for coordination from the BBPD, and require action, evacuation, search, and assistance when declaring a disaster. However, if a disaster occurs that does not require searching, they are ready to support disaster management activities by supporting all SAR tools and equipment and publishing an interface agency/early warning information.

4. Description

a) Conformity between the actions of program administrators, staff, and other actors with established standards and procedures

Based on the research results, the BMKG has carried out a tsunami early warning according to procedures and SOPs where the BMKG service tasks have been audited by the BPK agency (performance audit on extreme weather early warning services, where the results of the audit showed that overall keep on track, which means the forecaster has worked according to the main duties and SOPs.

According to BPBD Banten, it was explained that the tsunami early warning had been running according to procedures or SOPs. From the PUPR Office of the Province of Banten relating to disaster management, it has proceeded according to procedures, namely, Although the PUPR Office of the Banten Province did not form a disaster management implementation task force team, disaster management activities were still carried out properly following the availability of equipment and budget. According to the Banten Regional Government Social Service, the disaster management had proceeded according to procedures even though the internal SOP had not been legalized.

b) Resources and services intended for specific target groups have reached them

Based on research results, according to a BMKG leader, tsunami early warning information can be conveyed properly to the community, namely by having various modes of technology in the delivery of dissemination, it can be ensured that tsunami all levels of society can receive early warning information, even internationally. However, there were several cases where an area where a disaster occurred did not receive information because communication was cut off. Only a few modes can be reached, such as ORARI. However, the use of these communication modes is limited only by some circles of society. BMKG can also provide information directly to the public. So that it can be ensured that extreme weather early warning information can be received by all levels of society and even internationally. Early warning information has become a basic need for the community and stakeholders. People often ask for weather information and sea conditions before carrying out activities. So with this, the BMKG can ensure that high-wave early warning information has been conveyed to the public and stakeholders.

c) Social and economic changes that occur after the implementation of several public policies from time to time

Based on the research results related to social impacts and economic impacts on the community after early warning information, namely the social impacts that occur after the BMKG conducts extreme weather early warning information, namely: the more intensively BMKG provides information, the higher public awareness of hydrometeorological disasters. Communities can prepare themselves before extreme weather disasters so that material losses can be reduced. With the currently available dissemination mode/with adequate technological speed, the public can receive dissemination information directly from the BMKG. The public will easily criticize if there is a delay or inappropriate information.

Communities are more aware of information dissemination. Tourist destination businesses also cooperate with BMKG to quickly get information from BMKG (MOU) to provide tourists with comfort and security. Communities are increasingly concerned with high-wave early warning information and sea weather information. Increasing concern for safety, so the risk of accidents is reduced. Economically, high-wave early warning information is useful in reducing operational shipping costs (fuel and logistics). This is because when the sea waves are high if the ship keeps sailing, the engine cannot be turned off until it continues its journey after the weather improves). Communities can determine when it is safe to travel by sea.

d) Conformity between programs in policies with the results of implementing activities and the outputs and impacts resulting from early warning policies.

According to the outcomes of the output data generated from the early warning policy, according to MBKG, early warning information regarding tsunami warning or early warning of extreme weather in each sub-district if an earthquake occurs that meets the criteria for a potential tsunami in less than 5 minutes. That is information about the occurrence of extreme weather at a certain time. And will always be updated if this potential is still ongoing. Currently, the IBF (impact-based forecast) system is being developed, namely weather information based on the impact of risk. Where extreme weather early warning is followed by information on what risks will occur with these weather conditions.

According to BPBD Banten Province, the outputs generated from early warning policies are forwarding disaster early warning information, forming disaster-responsive community institutions (Destana or disaster-responsive villages and disaster-ready villages), SOPs for preparedness in the occasion of a disaster and the community is more aware or concerned with disaster early warning information. Villages that have a potential for disaster are prepared when facing a disaster event so that they can recover quickly.

The PUPR office in Banten province explained that the resulting output was an infrastructure improvement. Meanwhile, the Banten Regional Government Social Service produced output with the Formation of Tagana and Accelerating the socio-economic recovery of people affected by the disaster. The same thing was expressed by the Banten Province SAR Agency, where the output produced was concern and resilience in dealing with disasters.

5. Evaluation

a) To what extent have early warning policy objectives been achieved in solving policy problems

From the results of research data regarding the real actions that the BMKG has taken after the formation of the tsunami early warning regulations, the BMKG provides extreme weather early warning information per sub-district where extreme weather information will occur a certain time. And will always be updated if this potential is still ongoing. The IBF (impact-based forecast) system is being developed, namely weather information based on risk impact. Where extreme weather early warning is followed by information on what risks will occur with these weather conditions.

Public concern for safety in shipping. Community satisfaction with information services from the BMKG when viewed from a good index of community satisfaction with the survey results.

According to Banten BPBD about the practical steps that BPBD has taken since the formation of regulations regarding the provision of early warning, BPBD sends all early warning evidence received from

BMKG to all OPDs and the community. Coordinate with central, provincial, and district/city governments.

According to the PUPR Office of the Banten Province regarding what real actions have been taken by the PUPR Office of the Banten Province in achieving the objectives, namely carrying out maintenance activities, carrying out rehabilitation and reconstruction activities, supporting the provision of disaster management equipment in coordination with BPBD and other agencies. From the Banten Regional Government Social Service relating to the real actions that the social services have taken after the formation of Kep Gub regulation number 36 of 2022, namely for district/city scale disasters, the social services only provide assistance, but for provincial scale disasters, the social services perform their function as a coordinator.

b) Basic values in the achievement of early warning policy implementation

From the research data results, the reference used by BMKG as a measure of success in conveying early warning information is benchmarked: (1) Community concern. This can be seen by the increasing number and variety of community questions submitted to BMKG. This shows that the information on extreme weather early warnings that are intensively conveyed impact public awareness of extreme weather early warning information. (2) Disaster risk reduction. At present, no one has calculated in detail and precisely the number of victims before/after extreme weather early warning information, but if you use the assumption that the number of hydrometeorological disasters from year to year is increasing, the number of victims should also be increasing. But that's not the case (the numbers still need to be tested).

c) Things that need to be fixed when re-formulation of policy problems

From the results of research data, according to BMKG, there are still obstacles or policies that need to be improved, namely regarding the slow response of local governments in sounding sirens. It would be more effective and reduce time in the dissemination stages if the authority was given to the BMKG. However, this should not have come from the BMKG plan but the legal system. Because it will be very difficult if BMKG stands alone. However, BMKG will be very capable if it gets the task. A policy will continue to develop following developments in the strategic environment. One example: When BMKG built a computerized DF infrastructure in 2012. At that time, the infrastructure was built only to provide weather forecasting services for 480 districts throughout Indonesia, but after running for 2 years, the demand for services increased per district with the same infrastructure.

According to BPBD Banten Province, some obstacles must be fixed, namely the maintenance of BMKG early warning equipment must be coordinated with the local PEMDA. According to the PUPR Office of

Banten Province, the problem or policy that needs to be corrected is that the PUPR Office of Banten Province has not yet formed a disaster management implementation task force. According to the Head of the Banten Regional Government Social Service, the obstacles or policies that need to be corrected are regarding coordination with the BPBD, even though it is getting better due to a very fast position rotation policy that coordination information is often lost. According to the Banten Regional Police, the constraints or policies that need to be improved are coordination between agencies that need to be improved. According to the SAR Agency for Banten Province, the constraints or policies that need to be improved concern the environment.

d) Actions that need to be taken when legitimizing early warning policies

From the results of the research data, what is related to the new policy is that the BMKG must continue to update the policy. There will always be gaps between the services provided and people's expectations. BMKG's task is to continue to bring these gaps closer. There needs to be a policy derivative from each K/L/IP for the Perpres legitimation, and it needs to be further elaborated by updating the SOP.

According to BPBD Banten Province, it should be implemented when the BMKG issues an early warning regarding a map of disaster-prone zones. It must be stated in local regulations. For example, it is prohibited to build buildings around disaster-prone areas. However, this regulation must be comprehensive to all regions of Indonesia so that there is no inequality.

From the research results, the Lebak Regency BPBD does not yet have a PERDA regarding the implementation of disaster management, even though the SOP is already running. If the PERDA is drafted, it can force the OPD to work harmoniously with the BPBD. While from the PUPR Office of Banten Province, it is necessary to form a task force team for implementing disaster management per Ministerial Decree no 1176 of 2019. From the Banten Regional Government Social Service, there is a need for a PerGub as a derivative of Perda. According to the Polda, there is a need for an SOP for conveying early warning information at the Polda Banten.

e) New policy forms to further enhance the achievement of early warning objectives

Based on the research data results related to a revised policy form to further improve the achievement of early warning objectives. According to the BMKG, this is related to the dissemination method, (1) with the existence of public demands regarding ready-to-use information; (2) when a disaster occurs, early warning is related to the speed of time; and (3) information disclosure. So the character of BMKG is not only incomplete to providing hazard evidence but can also act as an interface agency. Meanwhile, according to (DYN) there is a new policy form to

improve further the achievement of early warning objectives, namely the need for policy derivatives from each K/L/IP to legitimize the presidential regulation. It needs to be further elaborated by updating SOPs.

Based on the research results relating to the revised policy to further improve the achievement of early warning objectives, according to the BPBD Banten, the PUPR Office of Banten Province and the Social Service of the Banten Regional Government stated that it did not need to be revised. At the same time, the SAR of Banten Province stated that it needed to be revised regarding illegal mining, and excessive exploitation of natural resources (dredging of hills/mountains) needed to be reduced to maintain the natural balance. So natural disasters don't happen often.

E. CONCLUSION

The Effectiveness of the Natural Pre-Disaster Management Policy in implementing Early Warning in Banten can be seen from 5 aspects. In the definition aspect, it is known that the problems and causes of policy problems related to early warning are limited communication equipment infrastructure, while the Banten region is a disaster-prone area. Measures used to assess the level of problem include community danger knowledge, danger monitoring and alert facilities, promotion and communication, and answer competences assessments. BMKG, BPBD, BASARNAS, POLDA, Media, TNI, and the community are stakeholders. Alternative solutions and their evaluation as a policy, namely through synergy between stakeholders in disseminating information and conducting early warning pre-disaster management. Public perception in policy formulation is used as one of the bases for determining policy issues. In problem formulation, each stakeholder works according to their respective focus, but it is still conducted in an integrated manner. In the Prediction aspect, it is known that the policy formulation team is BMKG, Ministry of Transportation, KKP, PEMDA, BNPB/BPBD, TNI/POLRI, and Public Broadcasting Institutions. There are no public forums or direct community involvement in preparing early warning policies. Prediction of changes that occur through early warning policies, namely disaster information, will be conveyed to the public appropriately and quickly. The impact of the early warning policy is that it can reduce disaster victims and losses caused by disasters. In the Prescription aspect, it is known that the forms of policies stipulated related to early warning, namely Law no. 24 of 2007, Law no. 31 of 2009, Government Regulation Number 93 of 2019, Deputy Instruction of 2015, and Governor Decree Number 36 of 2022. Parties involved in the legitimacy process are BMKG, Ministry of Transportation, KKP, Pemda, BNPB/BPBD, TNI/Polri, and Public Broadcasting Institutions. The risk that arises through legitimized early warning policies is that the community still has no community

satisfaction due to delays in handling between stakeholders because there is not yet a strong synergy between stakeholders. The division of responsibilities for each early warning policy process needs to be reaffirmed. In the Description aspect, it is known that each stakeholder has carried out their duties according to the SOP. Resources and services related to early warning have been delivered to the community. With the existence of an early warning policy, social and economic changes have occurred, namely that people have become more aware and alert to disasters. Victims and material losses can be minimized by anticipating disasters through early warning. In implementing the policy, the program has produced output and impact as expected. Finally, in the evaluation aspect, it is known that achieving the goals of the self-warning policy has reduced disaster risk and minimized disaster victims. The basis for assessing the achievement of this policy objective is an increase in public awareness of early warning information. The community responds quickly to go to a safer place when a disaster is about to occur. The speed of synergy between stakeholders needs to be improved regarding this policy to accelerate the response of each related party according to their role. Policy legitimacy needs to be integrated with the SOP that applies to each stakeholder. In general, policy revisions do not need to be carried out, and it's just that egrating each stakeholder according to the role set out in the SOP.

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