








## Analysis of the Effectiveness and Efficiency of Tsunami Disaster Contingency Planning Policies in the Province of West Sumatra, Indonesia

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### ABSTRACT

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The Province of West Sumatra has a high threat of tsunami disaster risk. From the description of this situation, an appropriate and relevant contingency plan is needed to be used effectively when a disaster occurs. This research explains the evaluation of the Province of West Sumatra's tsunami contingency planning policy based on effectiveness and efficiency. The approach used was descriptive qualitative with purposive sampling to determine informants. Meanwhile, the data analysis technique uses the triangulation method. The research results show that in terms of effectiveness, the West Sumatra tsunami contingency plan is doubtful about its preparedness for dealing with this disaster. This is because the necessary steps have not been reviewed to adapt to the threats and resource requirements required. In the efficiency aspect of the West Sumatra tsunami contingency plan policy, the interventions to achieve the objectives have not been implemented optimally. The significance of this research is that it provides an overview of the results of a substantive analysis of policy effectiveness and efficiency, showing the importance of contingency plans that are updated with the latest conditions, both in terms of analyzing resources and disaster impacts and policies that bind stakeholders in handling Tsunami disaster risks. Theoretically, it is to produce an evaluation of public policies related to disaster management.

## 1. INTRODUCTION

System development begins with mapping disaster threats and analyzing disaster risks in the community. Based on this analysis, community disaster management capacity and institutions are built. One of the things that the Regional Government does in terms of disaster management is to prepare a contingency plan - one Contingency Plan document for one type of disaster. West Sumatra already had a Tsunami Contingency Plan document in 2012. Until now, there has not been a tsunami disaster, but the Contingency Plan document should still be used as a basis for action plans and operations when a tsunami disaster occurs in West Sumatra.

The government has given a mandate to Regional Governments through Minister of Home Affairs Regulation 101/2018 concerning Basic Service Technical Standards on Minimum Service Standards for District/City Regional Disaster Affairs. It was explained that the contingency plan is one of the mandatory affairs of the Regional Government in the Minimum Service Standards (SPM) and is a prerequisite for other activities in the event of a disaster, both at the Disaster Prevention & Preparedness and Disaster Victim Rescue & Evacuation stages. The National Disaster Management Agency (BNPB), as the primary sector in matters of national disasters, recently issued a version 5.0 Contingency

Planning guidance document.

One of the differences can be seen in the follow-up stage of the contingency plan, where version 5.0 in the follow-up stage emphasizes testing resources for the contingency plan & knowledge management to ensure operations can be carried out, while the previous version only emphasized meeting the resource needs of the field/sector. Apart from that, in this latest version, the contingency plan has an updating principle, which is constantly revised periodically to align with threats, population & impact estimates.

The Contingency Plan document describes disaster risk analysis, scenario development, determining sectoral policies and targets, gaps between needs and resources, and setting up response mechanisms, both systems and references. His activities. The scenario described in the Contingency Plan document follows the worst situation in 2012: The tsunami disaster that occurred on Monday at 10 am, starting with an 8.8 SR earthquake with an epicenter 150 km southwest of Padang City. The impact is estimated to be damage to facilities. Infrastructure in the Mentawai Islands and the west coast of mainland West Sumatra and the number of victims in the city of Padang, which has a high population density.

The West Sumatra tsunami Contingency Plan policy document had not been touched by content and substance updates relevant to the situation and conditions developing at

that time. In the regulations, the plan data in the Contingency Plan document is agreed to be updated every year, and the Contingency Plan document as a whole is valid for three (3) years. The contingency plan will be reviewed if a tsunami disaster does not occur during the specified time.

In a situation like this, it can be seen that the existing Contingency Plan documents have not been updated, especially in terms of coordination between the community and the government in dealing with the tsunami disaster. Apart from updating and renewing, the government must also be more active in socializing the contents of the Contingency Plan document to the public regarding the technicalities and best ways to deal with tsunami disaster situations. So that the community is better prepared and there is no panic during evacuation. Departing from the situation above, this research will discuss the evaluation of policy content in the tsunami contingency planning for the Province of West Sumatra 2012. This policy content evaluation will lead to the updating and updating stage of the Contingency Plan document to analyze the readiness of the Contingency Plan document in facing the tsunami disaster in the current situation.

Several previous studies have discussed disaster management and focused on contingency planning. Like researches [1-7] discuss contingency plans as a reference for operational plans and action plans in the event of a disaster. These studies also examine the preparedness of the government and society to face disasters. Meanwhile, researches [8, 9] focus on disaster management systems models, which differs from research [10], which analyzed problems in preparing contingency plans.

Meanwhile, this research does not focus on studying the contingency plan as a technical reference for activities or operational plans in dealing with disasters, but rather the contingency plan as a public policy document. Referring to the research [10], it does not discuss the process of preparing the contingency plan. Instead, it focuses on updating and sustaining the contingency plan and finding a suitable contingency plan model for Handling the Tsunami Disaster in the Province of West Sumatra.

The difference between this research and previous research can be seen in the focus of the research, namely evaluating Contingency Plan documents at the policy content stage or before policy implementation, especially at the contingency plan updating and testing stage, as well as finding the suitable contingency plan model in handling the tsunami disaster in Province of West Sumatra. The results of this research are used as recommendations for updating regional government documents related to the Province of West Sumatra Tsunami Contingency Plan.

## 1.1 Study of literature

### Public policy evaluation

In this research, the public policy evaluation concept is explained by Dunn [11], which is relevant to research needs, especially those that focus on tsunami contingency planning policies in West Sumatra. With the policy evaluation descriptors proposed by Dunn, the West Sumatra tsunami contingency plan policy can be presented more optimally and provide a more comprehensive picture of the policy itself. Evaluation concerns the production of information about the value or benefits of a policy. Evaluation offers valid and reliable information regarding the policies contained in the program.

Public policy evaluation is grouped into three, namely: a.

Administrative evaluation, which concerns the evaluation of the administrative side budget, efficiency, and costs of the policy process within the government, which relates to 1) effort evaluation, which assesses the input side of the program developed by the policy; 2) performance evaluation, which assesses the output of the program developed by the policy; 3) adequacy of performance evaluation or effectiveness evaluation, which assesses whether the program is carried out as stated; 4) efficiency evaluation, which assesses program costs and provides an assessment of the effectiveness of these costs; 5) process evaluations, which assess the methods used by the organization to implement the program. b. Judicial evaluation, namely evaluation relating to issues of legal validity where policies are implemented, including possible violations of the constitution, legal system, ethics, state administrative regulations, and even human rights. c. Political evaluation assesses how political constituents accept implemented public policies [12, 13]. Based on the explanation above, this article focuses on two evaluation policy descriptors: effectiveness and efficiency in analyzing tsunami contingency plans in the Province of West Sumatra.

## 1.2 Relevant research

The pre-disaster stage studies focus on disaster risk reduction contingency plans, which are technically used as a reference for preparedness activities when a disaster occurs. In contrast to this research, it does not focus on the study of contingency plans as a technical reference for activities but instead on contingency plans as public policy documents. This research will evaluate policies for updating the tsunami contingency plan in the Province of West Sumatra. However, in the existing regulations, the contingency plan policy, which has not been used for three years, is then updated again to suit the current conditions in which the contingency plan is implemented.

Sarwar et al. [8] explained that implementing the disaster management system (DMS) has proven to be an essential way to reduce risk. DMS can minimize and sometimes eliminate risks through technical methods, management, or operational solutions (risk management efforts). Although, it is almost impossible to eliminate all risks. An effective DMS in contingency planning, implementation, and testing is critical to reducing system and service availability risks [9]. Their research found a disaster communication model in community-based disaster risk management through the Sinabung Eruption Contingency Plan, Karo Regency, North Sumatra Province. This disaster communication model was built based on community and disaster risk management through the study [3]. His research results explain that organizations and communities in Asia will recover from catastrophic seismic events only if continuity of activities and professional emergency management can learn from each other. This research looks at the state of preparation, mitigation, response, and recovery (emergency management phase) and analyzes the risk and impact of earthquakes in Asia.

Explained in their research results that the current preparedness for an influenza pandemic is from an infection control perspective [4]. There are gaps in the provision of emergency planning committees, emergency plan testing, air isolation of facilities, stockpiling of personal protective equipment (PPE) and health supplies, and organizational/incentive schemes for health workers to continue working during the pandemic. This study assessed hospital preparedness in the Republic of Ireland for an

influenza pandemic from an infection control perspective. In his research results, Belford [2] explains that contingency planning that has been designed correctly in advance can prevent inferior performance in disaster management.

The research conducted by Inkinen et al. [5] shows that contingency planning is positively and significantly related to social sustainability. Contingency planning includes identifying contingencies, developing a contingency planning policy statement, identifying preventive controls and protective systems for an emergency, and developing a contingency planning strategy. Planning also includes adequate allocation of resources to be used in case of emergency. Findings in article by Mabaso and Manyena [7] show that: (1) There is a wide gap between theory and practice in contingency planning, (2) Response activities rarely reflect projected scenarios, and (3) Resources are inadequate for effective contingency planning.

Lestari et al. [1] explains that risk analysis is needed to overcome disasters. This analysis was carried out to ensure the readiness of local governments in Indonesia by preparing disaster contingency plans. Furthermore, Alhadi et al. [10] focused on analyzing problems related to preparing disaster contingency plans in Padang City, and the government can formulate appropriate resource allocation needs in dealing with disasters.

Arinaldi [6] explains that local governments in Indonesia have made disaster management (and preparedness) an integral part of regional development priorities, which has implications for the provincial government's obligation to provide support. However, local governments have never carried out joint exercises involving stakeholders at the district/city level for contingency planning. Training and dress rehearsals are carried out by local governments only within the scope of stakeholders at the provincial level.

Results in the research by Subiyakto [14] show that the Contingency Plan document contains various guidelines and technical steps taken by stakeholders in anticipating natural disasters. The action plan guidelines are supported by techniques that are easy to learn so that anyone can carry out the stages of the process of predicting natural disasters. Implementing the natural disaster risk reduction contingency plan in Cilacap Regency received support from implementers, the environment, resources, and disposition.

## 2. METHODOLOGY

### 2.1 Research approach

The research approach used in this research is a descriptive qualitative research approach, which is seen from the data obtained during the research, where this research describes the ways of life, points of view, or emotional expressions of the members of the community being studied related to a symptom that is being investigated. It is in their lives. Therefore, this research uses subjective data, which is the perspective of the perpetrators studied (informants), without any reduction or addition. The qualitative methods are research procedures that produce descriptive data in the form of written or spoken words from people and observable behavior. "Qualitative research requires guidance in preparing substantive theories based on data [15]".

### 2.2 Data collection technique

Data sources in qualitative research are words and actions; the rest is additional data such as documents and others, including written data sources, voice recordings, photos, and statistical data [15]. Several techniques were used to collect data, including interviews. Observation or observation and literature study.

### 2.3 Informant selection techniques

To obtain primary data in this research, researchers determined people or informants who were considered knowledgeable and trustworthy to be critical informants relevant to the research topic. This is done by assuming that the selected informant is responsible, has authority, and actively implements the West Sumatra disaster management policy.

Apart from that, the informants also come from parties directly involved (stakeholders) with this policy, so it is hoped that they can provide an objective picture of the problem of community preparedness in facing the threat of earthquake and tsunami disasters. The key informants in this research can be seen in Table 1.

**Table 1.** Key research informants

No	Informant	Reasons for Selection of Informants
1.	Head of Logistics and Emergency Division of BPBD of West Sumatra (Government Apparatus)	A person who is one of the leaders at BPBD of West Sumatra who has duties and functions in formulating and implementing disaster management policies. We hope to get information about the West Sumatra tsunami contingency plan policy.
2.	Head of BPBD of West Sumatra Preparedness Section (Government Apparatus)	Personnel who have duties and functions in policy planning, including disaster management. We hope that we will receive information about the evaluation of the West Sumatra tsunami contingency plan policy.
3.	Chair of the West Sumatra Disaster Risk Reduction Forum (Community Organization)	Leader of the Official Disaster Forum based on relevant regulations and is part of formulating and implementing various disaster risk reduction policies. We hope to get much information on the role of government and society in preparing to face the tsunami disaster.
4.	Founder-leader of the Tsunami Alert Community (Non-Governmental Organization)	NGO leaders who are part of the advocacy, formulation, and implementation of various disaster risk reduction policies. We hope to get much information on the role of government and society in preparing to face the tsunami disaster.
5.	Disaster Risk Reduction Professional (Practitioners)	A person who is part of the formulation and implementation of various disaster risk reduction policies. It is hoped that you will get much information from the strategic, tactical, and technical aspects of disaster management, especially the West Sumatra tsunami contingency plan policy.
6.	Researcher on Disaster Management Policy and Management (Expert)	A person who has expertise and expertise based on research results in the field of disaster risk management. We hope to receive information from an academic perspective regarding the West Sumatra tsunami contingency plan policy.

## 2.4 Data analysis technique

After the research data is collected, the next step is categorizing or grouping the data, which is carried out simultaneously with data reduction. Meanwhile, the validity of the data collected was carried out using triangulation techniques. The term triangulation was first used; Denzin stated that, "...the term triangulation is a term borrowed from navigation and military and strategic, to argue for the combination of methodology in the study of the same phenomenon [16]". Triangulation was based on the assumption that any bias is inherent when used, in conjunction with other data resources, investigators, and methods" and is carried out continuously until the data is saturated [16].

## 3. RESULTS AND DISCUSSIONS

Based on data from the 2021-2025 West Sumatra Disaster Management Plan Document, it is explained that the geographical location of West Sumatra is in the collision area of the Indo-Australian plate and the Eurasian plate with hilly, mountainous topography with a slope above 10% and high rainfall. This condition makes most of the West Sumatra region vulnerable to earthquakes, floods, landslides, tsunamis, droughts, and other disasters. The disasters that have hit West Sumatra so far have caused casualties, loss and damage to infrastructure, crop failure, obstruction of production processes, and so on. This condition slows economic growth, increases community welfare, and reduces regional competitiveness. Therefore, efforts to minimize losses due to disasters and reduce the frequency of disasters have become one of the development priorities of the West Sumatra Provincial Government. In the Province of West Sumatra Regional Development Planning Plan for 2016-2021, the issue of disaster management is included in Mission 5, goal 3, namely "Improving the Culture and Behavior of Disaster

Responding Community," priority 10, namely "Environmental Preservation and Disaster Management."

In the 2021-2025 West Sumatra Disaster Management Plan Policy Document related to priority disasters, it is stated that the limited resources possessed by the Province of West Sumatra result in the regional government having to determine the priority level for implementing disaster management. The priority of action options is determined based on the agreed disaster priority level by considering the level of risk and vulnerability or tendency for the disaster to occur. This tool and approach are expected to provide disaster threat options that are priorities for mitigation in the loci selected based on objective standards. The results of combining these parameters are priority disasters that must be addressed quickly in the Province of West Sumatra. These priority disasters need to be handled comprehensively and immediately. Therefore, all approaches and action options, including Prevention, Mitigation, and Preparedness, need to be carried out to overcome the risk of this disaster.

**Table 2.** Potential tsunami hazard extent in the Province of West Sumatra

Regency/City	Level of Risk	
	Area (ha)	Level
Mentawai	41,233	High risk
Pesisir Selatan	16,699	High risk
Padang Pariaman	3,206	High risk
Agam	4,100	High risk
Pasaman Barat	9,019	High risk
Padang	3,317	High risk
Pariaman	843	High risk
<b>Total</b>	<b>78,417</b>	<b>High risk</b>

Based on the Province of West Sumatra disaster risk assessment document, it is explained that the potential danger of a tsunami disaster per district/city in the Province of West Sumatra can be seen in the Table 2.

**Table 3.** Potential population exposed to tsunami disaster in Province of West Sumatra

Regency/City	Exposed Population (Persons)				Level
	Number of People Exposed	Vulnerable Groups			
		Vulnerable Age Group	Poor People	Disabled Residents	
Mentawai	30,118	4,837	5,012	119	Intermediate
Pesisir Selatan	80,208	12,722	17,065	726	High
Padang Pariaman	30,424	5,340	6,708	346	High
Agam	18,471	3,324	3,786	110	High
Pasaman Barat	28,186	4,530	5,482	128	Low
Padang	129,898	16,678	17,148	149	High
Pariaman	20,069	3,188	3,206	120	High
<b>Sumatera Barat</b>	<b>337,374</b>	<b>50,619</b>	<b>58,407</b>	<b>1,698</b>	<b>High</b>

**Table 4.** Potential losses from tsunami disasters in the Province of West Sumatra

Regency/City	Losses (Billions of Rupiah)			Level	Environmental Damage (ha)	
	Physical Loss	Economic Loss	Total Loss		Area	Level
Mentawai	431.2	85.4	516.5	High	9,075	High
Pesisir Selatan	289.8	211.2	501.0	High	2,781	High
Padang Pariaman	116.8	6.6	123.4	High	-	Low
Agam	44.0	14.3	58.3	High	528	High
Pasaman Barat	319.2	17.9	337.2	Intermediate	2,263	High
Padang	2,776.1	4.9	2,781.0	High	115	Intermediate
Pariaman	64.8	0.0	64.8	Intermediate	-	Low
<b>Sumatera Barat</b>	<b>4,042.0</b>	<b>340.4</b>	<b>4,382.4</b>	<b>High</b>	<b>14.61</b>	<b>High</b>

Based on the Tables 3 and 4, it can be seen that the total area of tsunami hazard in the Province of West Sumatra is 78,417 ha, which is in the high class. Determination of the hazard class for the Province of West Sumatra is based on the maximum/highest hazard class per district/city. The potential for residents exposed to the tsunami disaster per district/city in the Province of West Sumatra can be seen in the Table 3.

The table above shows that the potential population exposed to the tsunami disaster in the Province of West Sumatra is 337,374 people who are in the high class. Padang City is the area with the largest population exposed to the tsunami disaster in the Province of West Sumatra, namely 129,898 people, while Agam Regency is the area with the most minor population exposed to the tsunami disaster, 18,471 people. Furthermore, potential losses (rupiah and environmental) for the tsunami disaster in the Province of West Sumatra can be seen in the Table 4.

The table above shows the potential losses from the tsunami disaster in the Province of West Sumatra. The total rupiah loss (physical and economic) was 4.382 trillion, which was in the high class. Meanwhile, the damaged environment totaled 14,761 ha, in the high class.

Floods, flash floods, earthquakes, tsunamis, and volcanic eruptions are priorities for handling in the Province of West Sumatra. This is because these types of disasters have a high potential risk with an increasing trend in occurrence. Non-priority disasters in the West Sumatra Provincial Government are extreme waves and abrasion, forest and land fires, drought, and landslides. Action options using a preparedness approach are not needed for non-priority disasters in the Province of West Sumatra. Meanwhile, for extreme weather disasters, epidemics and disease outbreaks, and technological failures, the handling is focused on the district/city government or other stakeholders outside the West Sumatra Provincial Government.

By regulation, it is an obligation of the Regional Government following Minister of Home Affairs Regulation Number 101 of 2018 concerning Basic Service Technical Standards in Minimum Service Standards for Sub-Regional Disaster Affairs, which must have a minimum of three disaster management policy documents, namely: Disaster Risk Study, Disaster Management Plan, and Disaster Contingency Plans. The contingency plan prioritizes priority and urgent disasters. The priority and urgent disaster in the West Sumatra region is the tsunami, which is recommended in the West Sumatra Disaster Risk Study and Disaster Management Plan.

In the framework of implementing disaster management based on Law Number 24 of 2007 concerning Disaster Management, the definition of a disaster is an event or series of events that threatens and disrupts the life and livelihood of the community caused, either by natural factors and non-natural factors or human factors, resulting in the incidence of human casualties, environmental damage, property loss, and psychological impacts. The definition of disaster, as explained above, contains three fundamental aspects, namely:

1. The occurrence of threatening and destructive events or disturbances. It can be a single event or a series of events;
2. The event or disturbance threatens the life, livelihood, and function of society;
3. These events or disturbances result in casualties and exceed the community's ability to cope with their resources.

Based on this definition, as a matter that concerns the lives of many people, implementing disaster management is something that must be done, and it is the government's

responsibility to ensure the lives and livelihoods of the community as a whole. In situations where a disaster does not occur, disaster management activities are focused on disaster prevention and mitigation efforts to reduce the impact of disasters in the long term. When a potential disaster is detected, efforts are aimed at preparedness to anticipate disasters through organization and appropriate and effective steps to ensure the availability of resources and the capacity to use these resources if a disaster occurs. Meanwhile, emergency response includes efforts made during a crisis, emergency operations, and early recovery. The emergency response phase ends when the disaster emergency status is revoked based on applicable regulations. The rehabilitation stage includes restoring infrastructure and disaster events' social, cultural, economic, and environmental impacts.

The disaster risk reduction framework is based on managing disaster management efforts with an emphasis on factors that reduce risk in a planned, coordinated, integrated, and comprehensive manner before a disaster occurs. Therefore, disaster risk reduction efforts are focused on implementing comprehensive disaster management through interventions on hazard, vulnerability, and capacity factors.

Based on the above, various policies are needed to ensure the readiness of the disaster management system to work optimally, both before, during, and after a disaster occurs. One is a disaster contingency planning policy as part of a disaster risk reduction policy. In the disaster management system, especially in the scope of preparedness policies, various planning forms can be applied to emergencies. Hierarchically, the strata of preparedness planning to deal with disaster emergencies consists of disaster emergency management plan (RPKB), contingency plans, disaster emergency operations plans, and daily action/action plans. Furthermore, based on the Guidelines for Preparing Contingency Plans 5.0 stipulated by BNPP, this contingency plan policy has the following functions:

1. Contingency planning is carried out to help coordinate institutions, organizations, and individuals to provide a fast and effective response.
2. Contingency planning ensures the capabilities of available resources and creates mechanisms for rapid decision-making that can shorten disaster response and, most importantly, save lives.
3. Contingency planning is an effort to unite commitment among the parties involved to act in a coordinated way before an emergency occurs.
4. Contingency planning creates concrete plans and continues until an emergency occurs. It can be continued if the danger is no longer threatening.
5. Contingency planning to mobilize resources effectively when emergency response occurs.

**Table 5.** Recapitulation of needs

No	Field	Unit	Need (IDR)
1.	Secretariat	Rp.	74,530,125,055
2.	Search and rescue	Rp.	82,146,780,000
3.	Health	Rp.	58,604,350,000
4.	Transportation, information, and communication	Rp.	165,185,810,000
5.	Repair and restoration of infrastructure	Rp.	389,342,996,000
6.	Logistics, receiving, and distribution of aid	Rp.	1,956,223,245,000
<b>Amount</b>			<b>2,726,033,306,055</b>

Based on the West Sumatra Tsunami Contingency Plan document, if a tsunami disaster occurs with an 8.8 SR earthquake scenario, as explained in the previous scenario chapter, then the recap of funds or budget required for emergency management of the Province of West Sumatra tsunami disaster is IDR. 2,726,033,306,055 (two trillion seven hundred twenty-six billion thirty-three million three hundred six thousand six hundred and fifty-five rupiah). A complete recapitulation of the needs for tsunami disaster management in West Sumatra can be seen in the Table 5.

### 3.1 Effectiveness of the tsunami disaster contingency plan policy for the Province of West Sumatra

In Law of the Republic of Indonesia Number 24 of 2007 concerning Disaster Management, Article 4 states that disaster management aims to:

1. Protecting the community from the threat of disaster;
2. Harmonize existing laws and regulations;
3. Ensure the implementation of disaster management in a planned, integrated, coordinated, and comprehensive manner;
4. Appreciate local culture;
5. Building public and private participation and partnerships;
6. Encouraging the spirit of cooperation, solidarity, and generosity, as well as;
7. Creating peace in the life of society, nation, and state.

For the reasons above, the West Sumatra Provincial Government should prepare a response plan that can be used and understood as a guide by all policymakers and stakeholders. A critical aspect of disaster management is a Contingency Plan document that is agreed upon by all relevant agencies/departments/institutions.

Meanwhile, the effectiveness referred to in this research is the achievement of the intended results following the objectives of the tsunami contingency planning policy in West Sumatra, namely focusing on the future planning process in conditions of uncertainty, where scenarios and objectives are approved and managerial and technical actions are determined. The system for responding to incidents is designed to be able to prevent, or better overcome, the tsunami disaster emergency that will be faced. The purpose of the contingency planning policy following West Sumatra Governor Regulation Number 27 of 2018 is to provide an “operational basis, strategy and guideline in handling tsunami disaster emergencies and as a basis for mobilizing resources from all stakeholders involved in disaster emergency management”. The tsunami contingency plan prepared aims to deal with the worst risks. Of course, it is hoped that this Contingency Plan document will provide guidelines for West Sumatra that ensure the availability of the procedures and resources needed and can be used as a guideline for emergency disaster management.

The West Sumatra Tsunami Contingency Plan document explains that “this Contingency Planning document is the basis for the region to prepare the resources needed in the event of a tsunami disaster. For this reason, in this contingency plan, an inventory of resources has been made that can be mobilized, as well as gaps that still need to be resolved. The worst-case scenario must be the basis for preparing Contingency Planning documents, including the tsunami disaster risk. The content of the West Sumatra tsunami contingency plan that has been prepared is considered adequate if it represents the worst scenario in a disaster that the government and society may face. The worst scenario has been determined based on a disaster

risk study designed by experts, so its rationality should be scientifically justified.

Based on the explanation above, the West Sumatra tsunami plan document is categorized as effective because it was prepared based on the worst-case scenario from the disaster risk study. Meanwhile, the available disaster risk studies are based on scientific studies by experts. However, based on research findings, the current West Sumatra tsunami contingency plan policy is ineffective because it has not been tested or simulated to ensure its readiness during a disaster emergency. There has never been a serious and structured review, so its effectiveness cannot be accurately known. “The last update was carried out in 2018, which was carried out in a rush at the end of the fiscal year. It did not involve interested parties such as vertical agencies, provincial regional organizations, community groups/organizations, academics, and disaster activists.”

Compliance with regulations requiring the existence of Contingency Plan documents for priority and urgent disasters has been fulfilled following Minister of Home Affairs Regulation 108 concerning Minimum Disaster Service Standards. But is it effective in dealing with the worst risk of a possible tsunami disaster? This cannot be described in detail because a comprehensive field test of the document has never been carried out through various rehearsal activities. In addition, this Contingency Plan document has not been updated for quite a long time since it was prepared in 2012; only once in 2018 was an adjustment made, while now, in 2024, there has been no review process.

Following the provisions explained in the BNPB Guidelines for Preparing Contingency Plans, contingency planning needs to be reviewed for periodic updates at least once every 3 years or by considering changes in disaster risk factors (hazards/threats, vulnerability, and capacity). In the BNPB Guidelines for Preparing Contingency Plans, it is explained that this testing process is carried out through preparedness exercises to (1) test the operability of planning and resource mobility, (2) build awareness of the role of the parties in handling emergencies, and (3) build knowledge and skills in handling emergencies. Preparedness training is carried out through organizing:

1. Basic training, namely activities in discussions, seminars, and workshops to build and strengthen the parties' understanding of contingency planning and the division of roles and tasks in handling disaster emergencies. A resource person or instructor guides this activity.
2. Simulations, namely training test activities to improve skills in specific fields or activities in emergency management, such as Coordination Meeting Simulations, room rehearsals, public kitchen simulations, SAR simulations, etc. The facilitator guides this activity.
3. System test, namely testing activities for operability and suitability of planning through post rehearsals/post tests and field rehearsals/field tests. This activity is carried out by presenting an evaluator to assess the operability of the functions.

According to regulations, contingency plans must be reviewed to see their readiness when used as operational plans for disaster management. The review process can be carried out after a post or field test/rehearsal that simulates worst-case scenario conditions when a disaster occurs. The contingency plan review process must be carried out periodically for at least three years after the document is legalized through a gubernatorial regulation. Because there may be dynamics in

determining the worst-case scenario for resource needs and location conditions of vulnerability to disasters, this review also ensures understanding, preparedness, and alertness of institutions and human resources in disaster management. Because this process has not been carried out regularly and comprehensively, it can be said that effectiveness indicators cannot be assessed, especially for the last 5 years. Before the review process, the stage is testing existing contingency plans. If a tsunami occurs in the current conditions, whether we like it or not, this tsunami contingency plan will be used, depending on the astuteness of the emergency response command.

The BNPB Guidelines for Preparing Contingency Plans 5.0 explains that contingency planning is prepared by considering event scenarios, the intensity of the risks posed, and the ability of regional resources to handle emergencies. For this reason, contingency planning needs to ensure how each mandate holder's roles, functions, and authority are distributed. The mandate holders are the central, provincial, district, and village governments. The function and role of contingency planning can be divided into at least two (2): handling implementers and supporters/companions. By ensuring the roles and functions of each level of government, it is hoped that there will be no overlap in handling emergencies for the same incident.

Based on the policy document for the West Sumatra Disaster Management Plan 2021-2025, it is explained that the emergency disaster management framework is based on organizing disaster management efforts with an emphasis on factors reducing the number of losses and victims as well as handling refugees in a planned, coordinated, integrated and comprehensive manner when a disaster occurs.

Thus, the optimal implementation of emergency management depends on practical actions to overcome the crisis and emergency response period. During times of crisis, the community's independent response needs to be developed to increase the chances of survival in the event of a disaster. Meanwhile, a mechanism and procedure are necessary for disaster emergency response operations to create unity of action in handling disaster emergencies. The targets of disaster emergency response operations are arranged based on priorities that are standard in handling disaster emergencies, namely:

1. Safety of lives for both victims/affected communities and officers carrying out operations;
2. Stability of emergencies so that exposure to disasters does not spread and victims do not increase, as well as the implementation of anticipating derivative disasters;
3. Maintenance of property and assets for public facilities or affected community assets.

Furthermore, for the availability of required resources, it is necessary to carry out projections and assessments as stated in the Regulation of the Head of BNPB Number 7 of 2008 concerning Fulfillment of Basic Needs, namely that the projected needs aim to estimate the amount/intensity of resource needs for both personnel and equipment in the context of implementing appropriate emergency response. Minimum standards that have become standard provisions or are mutually agreed upon. Meanwhile, the resource assessment aims to determine the availability of resources in the region, both equipment and personnel from each relevant sector/institution/institution, which can be mobilized if an emergency, according to the scenario, actually occurs.

Based on data from BPBD of West Sumatra in 2018, a review process was carried out, and a contingency plan test

was carried out in 2023 with TTX (Table Top Exercise) and CPX (Command Post Exercise) in 2021 in the situation where the world is experiencing the COVID 19 Pandemic. After testing the Plan Tsunami contingencies through TTX and CPX, we found that they have not been followed up through a review process. The absence of an AAR process by the government, in this case, the BPBD of West Sumatra, means that improving and updating contingency plans is not a priority. In 2018, a short review was carried out. Still, it did not involve relevant stakeholders, so the process of internalizing the substance of the contingency plan became work that was not carried out. In my opinion, this is not yet effective because the purpose of the contingency plan itself is so that each institution involved understands its respective duties and functions institutionally, and this has not been achieved optimally.

The process of internalizing the contingency plan policy has not been carried out, so this document aims to ensure that all interested parties understand and can manage disaster emergencies, which has not been achieved. To see the effectiveness of this contingency plan, it is necessary to conduct regular tests and reviews and involve all interested parties in a profound and in-depth manner. Specifically for the West Sumatra contingency plan, it is appropriate to review because it was carried out last in 2018. This is needed to identify and correct deficiencies or gaps between needs compared to the situation and to increase understanding of the institutions and human resources involved during the test and review process because they are involved.

Regarding the capacity of government institutions, as stated in the 2021-2025 West Sumatra Disaster Management Plan Document, it is explained that the West Sumatra Provincial Government has quite good preparedness capacity. Several contingency plans for priority disasters have been prepared, although not all of them have been tested in the form of preparedness exercises. However, disaster management policies and institutions within the West Sumatra Provincial Government still need to be strengthened, especially in improving the institutional capacity of the BPBD of West Sumatra to support the optimization of the Disaster Management Plan Document. The current BPBD of West Sumatra's organizational structure focuses on the implementing element, while the BPBD of West Sumatra's directing element has not yet been formed. The BPBD of West Sumatra steering element is necessary to balance technical and political commitment in implementing disaster management in the Province of West Sumatra.

Conceptually and substantively based on research findings, contingency plan policy documents must continue to be socialized and tested periodically by authorized stakeholders so that the level of preparedness when a disaster emergency occurs can be relied upon. However, to do this requires the institution's commitment, leadership, and staff, including allocating resources and budget for implementation. This is a classic problem but remains the key to moving this policy forward, whether we like it or not.

From the explanation above, it can be explained that BPBD of West Sumatra, as the leading sector in disaster management, understands that to achieve the effectiveness of the tsunami contingency plan policy, it is necessary to carry out an internalization and testing process followed by a review process to update the policy document. The issue of limited budget and resources is the main obstacle, in addition to doubts regarding the institutional commitment of regional governments to the importance of tsunami contingency plans

as part of disaster management policies.

About this stakeholder commitment, BNPB RI Guidelines for Preparing Contingency Plans 5.0. they explained that it is necessary to ensure that the commitment of the parties to handle emergencies is realized in a formal agreement. The commitments built and agreed upon include: First, commitment to roles, duties, and responsibilities in the field and emergency management activities. Second, commitment to resource mobilization to reduce and eliminate gaps in projected resource needs. The principal resources that are the object of commitment include quantity and quality.

In the Attachment to the Governor of West Sumatra Regulation Number 27 of 2018 concerning Contingency Plans, Early Warning Systems, and Emergency Management for the Tsunami Disaster in the Province of West Sumatra, contingency planning is not focused on the amount of budget required by the region but instead on the commitment of all related elements to agree to work under one command (based on Regulation of the Head of the National Disaster Management Agency No. 10 of 2008 concerning Guidelines for Disaster Emergency Response Command) and coordinate with each other so that emergency management targets can be achieved effectively, efficiently and integrated.

As explained in the 2021-2025 West Sumatra Disaster Management Plan Document, disaster management is a cross-sector issue whose implementation is under the responsibility of BPBD. Therefore, implementing disaster management requires coordination, harmonization, synchronization, and synergy between institutions related to disaster management. Aspects of disaster management need to be integrated into the performance assessment indicators of the relevant organization.

### **3.2 Efficiency of West Sumatra tsunami contingency plan policy**

Conceptually, what is meant by efficiency is accuracy in the use of resources, time, and costs in updating the West Sumatra tsunami contingency plan. This context can be seen first from the involvement of relevant stakeholders in updating the Contingency Plan document and second from the resources used in testing and reviewing the policy document. In preparing the West Sumatra Contingency Plan document, all interested parties must be involved, including the BPBD of West Sumatra as disaster management coordinator plus regional apparatus organizations, vertical agencies, non-governmental organizations/institutions, academics, activists, and disaster activists/practitioners/volunteers. This includes the testing and review process, which must be carried out periodically. For this reason, BPBD of West Sumatra, as the leading sector, proposes a program for preparing, testing, and reviewing these documents for the leadership and Legislative Institutions because they are the ones who decide.

However, not all proposed programs could be fulfilled along the way, including one for testing and reviewing the West Sumatra tsunami contingency plan, which should have been updated and adjusted to current conditions. Even though 2018 we reviewed the Tsunami Contingency Plan document prepared in 2012, the implementation was too close to the end of the year, so it did not involve many related parties.

From the information presented above, it can be explained that the West Sumatra tsunami contingency plan has not been reviewed for a long time and was last implemented in 2018. The absence of relevant budget and resource allocations is a

limitation faced by the BPBD of West Sumatra in updating disaster policy documents, one of which is the tsunami contingency plan. Based on research findings, the Regional Government has not seriously considered that this tsunami contingency plan policy document needs to be tested and reviewed regularly, especially since it was last carried out in 2018, and even then, it did not involve all interested parties.

Allocation of budget resources is the main reason, and we assume the government sees this vital policy as not yet urgent. This is a form of government support for disaster management if they are serious about handling this public affair. With the Tsunami Contingency Plan document not yet being updated, it can be said that we are playing around with this disaster, and many of the relevant institutions do not understand their duties, let alone have the capacity to handle disasters. This is inefficient because existing resources are not used for priority things such as testing and reviewing Contingency Plan documents. There must be a process of internalizing the substance of this document to the BPBD of West Sumatra and related local government agencies, as well as other institutions included in the contingency plan policy. This internalization process has not been carried out, let alone implemented; it has not even been read and understood, so its effectiveness is doubtful. This should indeed be the task of BPBD of West Sumatra as a coordinating institution and leading sector in disaster management.

The government does not seem to have responded seriously that testing and reviewing contingency plans is essential to ensure these documents are ready for use. Budget allocations and resources owned by regional governments have not been used efficiently to support this policy. In terms of content and substance, it must be immediately improved because there may be updated resources and needs that must be met, as well as internalizing contingency plans that must be applied to stakeholders and authorized institutions.

The Tsunami Contingency Plan document that has been prepared has not been a priority for updating due to the lack of commitment from the government, which considers this policy document to be less critical. The allocation of resources owned by BPBD of West Sumatra and other institutions is inefficient because they are not used to conduct regular testing and review processes following the latest developments. In Indonesia, there are still no operational contingency plans; only documents are created and stored. It can be said that government agencies involved in disaster management and other stakeholders are not ready to implement these contingency plans into operational plans when responding to disaster emergencies. Even the contingency plan is not yet fully prepared to be converted into an operational plan when a disaster occurs. What often happens when a disaster occurs is that everything starts from zero again without looking at the substance of the policy.

From the findings above, it can be explained that the commitment and support from the government to allocate resources and time to improve the West Sumatra Tsunami Contingency Plan document was not carried out efficiently. Furthermore, stakeholders have not been involved in synergizing, compiling, and testing the document as part of the internalization process. Further explain that the BPBD of West Sumatra has proposed to the leadership to be able to prioritize work programs and budgets to carry out tests and reviews of mandatory documents for disaster management policies, including disaster risk studies, disaster management plans, and disaster contingency plans periodically, especially those that



are more than two years from the time of previous ratification in the form of a gubernatorial regulation. BPBD of West Sumatra has proposed that the program and budget be used yearly to conduct tests and review mandatory disaster management policy documents. However, it has not received the green light from the leadership because it may not be considered a priority.

A regional preparedness system must be developed, especially for rapid on-set and large-scale disasters. This is done to anticipate the possibility of more fatalities when a disaster occurs. Development of a regional preparedness system includes, among other things, preparing contingency plans, building an early warning system, and improving evacuation systems and capacity. Developing a regional preparedness system requires strengthening the disaster emergency management system through a Disaster Emergency Management Plan (RPKB) and a Contingency Plan, which are general regional procedures for implementing disaster emergency response operations.

### 3.3 Discussions

#### 3.3.1 Analysis of the effectiveness of tsunami contingency planning policies

Let's look at the effectiveness of the West Sumatra tsunami contingency plan as part of a policy evaluation. We can see whether the policy objectives have been achieved optimally or not. See the tsunami contingency plan scenarios to represent the worst conditions if a disaster occurs. Based on research findings on the tsunami contingency plan for the Province of West Sumatra, it can be explained that the worst-case scenario used for formulating the policy is based on research results from experts in the Disaster Risk Study as one of the mandatory policy documents. However, the existing provisions state that the disaster management policy document must be updated periodically within three years through a review process, including a Disaster Risk Study, which is the basis for preparing the Contingency Plan. In fact, from 2018 until now, there has been no review process on the policy document.

Based on Dunn's theory [11], policy evaluation must achieve effectiveness in achieving its objectives so that achieving contingency planning policy objectives based on contingency planning [10], namely describing the worst scenario according to current conditions, has not been defined well. Effective contingency planning requires a clear delegation of responsibilities and Training for all parties involved. This ensures everyone knows their duties and functions and is always ready to act optimally when a disaster occurs. It can be understood that an effective disaster contingency plan is a structured approach designed to ensure an institution can respond optimally to a disaster or emergency. So, the West Sumatra Provincial Government must pay attention to preparations for potential risks and disruption to operations when a disaster occurs to minimize damage and ensure the continuity of public services. Conceptually, several components for creating an effective disaster contingency plan [17-19] are as follows:

- a) Risk analysis: The first step in creating an effective emergency plan is to carry out a thorough risk assessment [20-22]. This is something that the Government has not done regularly in the documents disaster risk analysis policies, disaster management

plans and periodic disaster contingency plans in accordance with applicable regulations.

- b) Collaboration and communication: Contingency planning should be a collaborative effort involving all parts of the organization. This includes making decisions about how to manage human and other resources, how to coordinate internally and with external stakeholders, and what communication procedures should be implemented [23-25]. This has also not been done by the West Sumatra Provincial Government as the leading sector, by collaborating and communicating internally and externally with stakeholders periodically in the process of reviewing tsunami Contingency Plan documents. Apart from that, synergy with the district/city government has not gone well in preparing the West Sumatra Tsunami Contingency Plan document.
- c) Continuous planning and testing: Contingency planning is a continuous process. Plans must be tested and updated regularly to ensure their relevance and effectiveness [26-28]. This is especially important in rapidly changing situations where plans may need to be updated more frequently. At this point, the West Sumatra Tsunami Contingency Plan document has not been updated in accordance with the dynamics that occur so that its effectiveness is doubtful when a disaster occurs.

Further explained that an effective contingency plan is how the plan can organize the steps needed to reduce the possibility of an emergency that the stakeholders cannot manage [29]. Based on the explanation above, the tsunami contingency plan prepared by the West Sumatra Provincial Government and stakeholders is intended to prepare for the management of disaster emergency conditions. Still, the policy document is doubtful about its readiness to manage this risk. This is because the necessary steps have not been reviewed to adapt to the threats and resource requirements required.

#### 3.3.2 Analysis of the efficiency of tsunami contingency planning policies

The efficiency in question is how existing resources can be used as optimally as possible in reducing disaster risk. Explains that efficiency is related to accuracy in using resources, time, and costs in updating policies. Public policy efficiency refers to government interventions' effectiveness and productivity in achieving desired results. This is an essential concept in public administration and policy analysis, as it helps evaluate policies' impact on society. Efficiency can be measured in various ways, including the cost-effectiveness of a policy, its ability to achieve desired results, and its impact on community welfare [30-32].

In the policies of the West Sumatra Provincial Government, especially in the tsunami contingency plan, the interventions carried out to achieve the expected results have not been implemented optimally. This is because existing resources have not been recorded and managed well. This is proven based on research findings; in the last review process carried out in 2018, not all stakeholders were involved due to limited time and budget, so the obligation to collect data and manage resources for use during a disaster emergency has not been carried out correctly and accurately. Further explanation regarding policy efficiency [12, 32-34] can be explained as follows:

- a) Cost reduction: Contingency plans as a policy must be

designed to achieve its objectives with the use of the least resources rather than optimizing the benefits obtained [35-37].

- b) Targeted interventions: Contingency planning policies must address the highest disaster risks, namely tsunamis, by ensuring that resources are used where they are most needed [38-40]. This can help maximize the impact of policies on the public.
- c) Sustainability: Contingency planning policies must be sustainable, meaning that the policy can be implemented and to ensure the effectiveness of the policy in the long term [23, 41, 42].
- d) Transparency and accountability: There must be a mechanism to ensure transparency and accountability in contingency planning policies [43-45].
- e) Inclusivity: Contingency planning policies must be inclusive, ensuring that they benefit the public without being discriminatory [46-48].

In the West Sumatra tsunami contingency plan policy, of the five efficiency descriptors above, 4 descriptors do not meet the expected criteria based on analysis of research findings, namely cost reduction, intervention, sustainability, transparency, and accountability. Meanwhile, the descriptor of inclusivity has generally been achieved because the West Sumatra tsunami contingency plan policy is intended to be helpful for the public.

#### 4. CONCLUSIONS

Based on the results of the research and discussion, the research related to the evaluation of the West Sumatra tsunami contingency plan policy can be concluded as follows: In terms of effectiveness, the West Sumatra tsunami contingency plan has doubts about its preparedness for disaster management. This is because the necessary steps have not been reviewed to adapt to the threats and resource requirements required. In the efficiency aspect of the West Sumatra tsunami contingency plan policy, the interventions to achieve the objectives have not been implemented optimally. This is because existing resources have not been recorded and managed well. Not all stakeholders have been involved due to limited time and budget, so the obligation to collect data and manage resources for disaster emergency response needs has not been carried out correctly and accurately.

The following conclusion from this research is substantive that contingency planning policies are oriented towards ensuring effective disaster management in the future. However, this policy needs to be evaluated comprehensively and carried out through a testing process through various schemes. Next, it must be followed up by a review process to ensure the readiness of contingency plans when a disaster occurs.

Theoretically, the conclusions of this research provide an overview of the results of policy evaluation, especially in disaster management, using public policy evaluation concepts and indicators/descriptors as tools for the analysis of research findings. Furthermore, it is hoped that the results of this research can become a form of research-based policy recommendation to relevant stakeholders to improve and update policies to suit current needs and dynamics.

Furthermore, contingency plans are carried out to help coordinate institutions, organizations, and individuals to provide a fast and effective response. Contingency planning also ensures the capacity of available resources and creates

mechanisms for rapid decision-making that can shorten disaster response and save lives. Therefore, a contingency planning policy requires a periodic review or updating process to suit current conditions. The evaluation carried out in this research assesses that the current Contingency Plan documents no longer represent current conditions.

Based on the research findings and discussion and conclusions above, the following recommendations can be given: First, the West Sumatra Provincial Government, through the Regional Disaster Management Agency as the leading sector, is advised to carry out a tsunami contingency plan test process followed by a review process following the provisions applicable to update documents to be relevant to risks, threats, availability, and resource needs. Second, the test and review process as an evaluation method to ensure the feasibility and readiness of the West Sumatra tsunami contingency plan must involve all interested parties in disaster management, including community involvement and participation. Third, it is recommended that the tsunami contingency plan policy be prepared in stages from the districts/cities within the Province of West Sumatra so that there is efficiency and effectiveness in the use of resources and to avoid overlapping management and utilization of these resources. Fourth, commitment is needed from regional leaders, both at the regional head level and the leadership level, to prioritize programs and budgets for disaster risk reduction activities, one of which is by regularly conducting tests/exercises/simulations, especially on tsunami contingency plans, to ensure readiness to face the worst possible scenario.

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