POLICY DESIGN ANALYSIS OF WEST SUMATRA PROVINCE TSUNAMI CONTINGENCY PLAN

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ABSTRACT
This paper describes the results of analyzing the policy design of the tsunami contingency plan in West Sumatra Province based on the concept of public policy and disaster management. The tsunami contingency plan has explained the details of the division of tasks between stakeholders and what facilities are owned and needed in the event of a tsunami. However, after ten years, the situation in West Sumatra has changed a lot, especially the new crowds that have formed in many coastal areas. The number of new tourism icons being built along the coast of West Sumatra has created busy spots that are always crowded with tourists, especially on weekends. This is one of the reasons that the existing West Sumatra province tsunami contingency plan needs to be revised. The method used in this research is descriptive qualitative. In general, the findings in official documents explain that the formulation of the policy design for the tsunami contingency plan in West Sumatra Province has been carried out based on relevant regulations, both West Sumatra BPBD as the leading sector and other institutions from the West Sumatra Provincial Government, vertical agencies, groups community and academics, and disaster activists. Aspects of agenda-setting and scenario preparation have been carried out if seen in the policy document. However, more in-depth research is needed regarding the policy design process for tsunami contingency planning documents in West Sumatra Province, especially in the aspect of actor involvement and factual analysis of resource needs gaps.

Keywords: *Policy design, Contingency, Disaster risk reduction*

1. INTRODUCTION

According to research conducted by various geologists from around the world who have observed the issue of earthquakes and tsunamis, it is estimated that the west coast of Sumatra Island is an area that is very prone to earthquakes followed by a tsunami that will hit the west coast of the island. Based on the measurement results of the Indonesia Disaster Risk Index (IRBI) 2020, West Sumatra Province has a high-risk class of disaster threats, with Tsunami being one of the highest threats. The earthquake and Tsunami reinforced this in Aceh and Nias, which claimed the lives of thousands of people. Earth Science researcher from the Indonesian Institute of Sciences (LIPI), Jan Sopaheluwakan, estimates that in 2030 - 2040 there will be a similar earthquake in Sumatra with almost the same scale. This is based on the record of the large earthquake cycle in Sumatra and the findings of the LIPI geological research center located on Siberut, Pagai, and Enggano islands. Seismic history shows that large earthquakes in Sumatra occurred in 1681, 1797, 1833, and 1904. For 200 years, there has been a large earthquake cycle in Sumatra. Analysis based on earthquake periods or historical reasons usually repeats every 200 years on the west coast of Sumatra. This is because, during this period, the two plates under the island of Sumatra hit each other, causing a large earthquake followed by a tsunami. One of the preparedness plans for disaster management is the contingency plan. This is as mandated in PP No. 21 of 2008 concerning the Implementation of Disaster Management in Article 17 paragraph 3, which states that preparing a contingency plan can complement a disaster emergency management plan. A contingency plan is planning under uncertain circumstances, where scenarios and objectives are agreed upon, executive and technical actions are determined, and a system for responding to events is developed to prevent, or better cope with, the emergency or situation at hand. The contingency Plan contains an overview of the worst scenario during a disaster. The contingency plan is

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prepared before a disaster occurs, and at the time of the disaster, the contingency plan will become an operation plan. Where in the operation plan, it is stated what steps will be taken by the government and stakeholders in dealing with a disaster.

West Sumatra has had a Tsunami Contingency Plan since 2012, which was updated in 2018. The worst-case scenario is Monday at 10.00 WIB. With the impact of the incident, namely the destruction of facilities and infrastructure in the Mentawai islands and the west coast of the mainland of West Sumatra and the number of victims in the city of Padang, which has a high population density. While the other scenarios discussed are:

1. Scenario when it happened: during the day on a holiday and all family members gathered at home (not scattered) or family members gathered in the exact location, assumed to be a mild scenario
2. The scenario when it happens at night and all family members gather at home is considered a moderate scenario

The tsunami contingency plan has clearly described the details of the division of tasks among stakeholders and what facilities are owned and needed in the event of a tsunami. However, after ten years, the situation in West Sumatra has changed a lot, especially the new crowds that have formed in many coastal areas. In addition, the number of new tourism icons that have been built along the coast of West Sumatra has created crowded points that are always crowded with tourists, especially on weekends. This is one of the reasons that the existing West Sumatra province tsunami contingency plan needs to be revised.

Based on the results of initial observations and studies of relevant documents, the authors found several problems, namely:

– Incomplete data is needed in the preparation of the contingency plan, such as the absence of an organizational command structure along with the description of the functions and tasks of the field.
– There is no division of action targets (emergency alert, emergency response, and emergency transition stages)
– There is no update of available and required logistics data for the present.

Preparing a policy document for a tsunami contingency plan was carried out in West Sumatra Province in 2012 and was revised in 2018 through West Sumatra Governor Regulation Number 27 of 2018 concerning the Contingency Plan, Early Warning Systems, and Tsunami Emergency Management in West Sumatra Province. In this article, the author analyzes the official policy documents that have been issued by the Regional Government of West Sumatra Province by using relevant concepts related to the preparation of contingency plans. Furthermore, this paper will focus on analyzing the Policy Document on the Tsunami Contingency Plan of West Sumatra Province (Case Study during the Covid-19 pandemic). Finally, this paper will recommend a contingency plan designed by the central and local governments that focus on the tsunami contingency plan for the province of West Sumatra.

2. LITERATURE REVIEW

2.1. Public policy

To study and solve the problems and objectives of this research, researchers will use the theoretical concepts contained in Public Policy Theory. However, there are many limitations or definitions of what public policy means in political science literature. Moreover, each of these definitions gives a different emphasis. This difference arises because each expert has a diverse background.

In dealing with various disasters that often occur in Indonesia, the government has issued policies to anticipate casualties due to these disasters. Public policies made by the government to address general problems have many meanings. One of the meanings of public policy, according to Wahab's view, is as follows [1]:

"First, public policy is more of an action that leads to a goal than a random or coincidental behavior or action. Second, the policy essentially consists of related and patterned actions that lead to certain goals carried out by government officials and are not independent decisions. Third, policies have to do with what the government has deliberately done in certain fields. Fourth, public policy may be positive; it may be negative.".

2.2. Contingency Plan

According to BNPB, a contingency is an event that can happen but doesn't necessarily happen. Because there is an element of uncertainty, a plan is needed to reduce the consequences that may occur. A contingency plan is an attempt to plan for an event that may occur but does not rule out the possibility that the event will not happen. On this basis, contingency planning is defined as follows:

"Contingency plan is the process of planning, under uncertain circumstances, in which scenarios and objectives are agreed upon, managerial and technical actions are determined, and systems for responding to

events are developed to prevent, or better cope with, the emergency or situation at hand." [2].

Meanwhile, UNHCR [3] states that the Contingency Plan is as follows:

A contingency plan is a management tool used to analyze the impact of potential crises so that adequate and appropriate arrangements are made in advance to respond in a timely, effective and proper way to the needs of affected populations. A contingency plan is a tool to anticipate and solve problems that typically arise during a humanitarian response.

From this definition, several important points can be drawn that a contingency plan is [2]:

1. carried out before an emergency as a planning process.
2. It is more of a process than producing a document.
3. It is a consensus-building process to agree on the scenario and objectives.
4. Is a readiness for emergency response by determining steps and handling systems to be taken before an emergency occurs.
5. includes preventive measures as well as limiting the possible consequences.

3. METHODS

The author uses a type of qualitative research with a descriptive approach. This study uses data collection techniques from analyzing relevant documents and literature. The data analysis technique uses triangulation to obtain relevant facts and data.

4. RESULTS AND DISCUSSIONS

4.1. Event Determination

Judging from the tsunami contingency plan policy document, the Province of West Sumatra has focused on the type of disaster and the timing of preparing scenario-based contingency plans prepared by experts. The chronological data can be seen in the following table:

Table 1. Chronology of Determination of Earthquake Disasters with Tsunami Potential in West Sumatra Province based on Expert Data

NO	Item	Description
1.	Time of the earthquake	Monday at 10.00 WIB
2.	Earthquake Strength	8.8 SR
3.	Depth	30 Km
4.	Distance	150 Km southwest of Padang city
5.	Tsunami wave 1	Reached the west of the Mentawai islands within 5 -10 minutes, a height of 10-15 meters above sea level.
6.	Continued tsunami waves	Reached the west coast of the mainland of West Sumatra at 20 minutes, a height of 8-10 meters above sea level.
7.	Tsunami inundation	2 – 3 Km on low land
8.	Duration of time	3-to 4 hours after the earthquake with three times of wave
9.	The impact of the incident	Damage to facilities and infrastructure in the Mentawai islands and the west coast of the mainland of West Sumatra and the number of victims in the city of Padang, which has a high population density

(Source: Tsunami Renkon Document - BPBD West Sumatra Province, 2018) [4]

Based on the table above, the chronology of determining the occurrence of an earthquake with the potential for a tsunami is compiled based on expert studies, which provide an overview that the disaster event is as follows:

"Based on the scenario of events from experts as shown in the table above, it can be seen that the Tsunami was triggered by an earthquake with a magnitude of 8.8 on the Richter Scale, with a depth of 30 km. The source of the earthquake (epicenter) is estimated to be about 150 km southwest of the city of Padang. However, it could be anywhere in the block section that stretches 50-200 km. The first tsunami wave is expected to reach the western coast of the Mentawai Islands about 5-10 minutes after the earthquake, with a height of 10-15 meters above sea level. Furthermore, in the 20th minute after the earthquake, tsunami waves began to hit the land area of the west coast of West Sumatra Province with a height of 8-10 meters above sea level. The slope will enter the mainland as far as 2-3 km in the lowlands and further in the watershed, while at higher elevations, it is less than that distance. Because the tsunami wave is not a single wave, according to expert modeling, three waves will hit within more than 3 hours after the earthquake (Simulated by experts - Kerry Sieh, Jamie McCaughey, and Danny Hilman - in the 2018 West Sumatra Province tsunami plan document)."

4.2. Scenario Development

The scenario development in the tsunami contingency plan document is based on the aspects affected by the disaster, namely, the population, critical facilities, public facilitation, and government. Further data on each element can be seen in the following sections:

1. The scenario of the affected population can be seen in the following table:

Table 2. The Impact of the Tsunami on the People of West Sumatra

No.	County/City	Threatened soul	Die		Is lost		Move away		Refugees	Keadaan Pengungsi						
										Minor injuries		Moderate Injuries		Serious Injuries		unattended
			(%)	Total	(%)	Total	(%)	Total	Total	(%)	Total	(%)	Total	(%)	Total	Total
1.	Kab. Pesisir Selatan	245.916	25	61479	10	24.592	1	2.459	157386	14	22034	10	15739	40	62954	56659
2.	Kota Padang	508.804	30	152641	10	50.880	1	5.088	300194	9	27017	10	30019	40	120078	123080
3.	Kab. Padang Pariaman	24.861	30	7458	10	2.486	1	249	14668	9	1320	10	1467	40	5867	6014
4.	Kota Pariaman	25.029	20	5006	10	2.503	1	250	17270	19	3281	10	1727	40	6908	5354
5.	Kab. Agam	20.644	30	6193	10	2.064	1	206	12180	9	1096	10	1218	40	4872	4994
6.	Kab. Pasaman Barat	78.782	30	23635	10	7.878	1	788	46481	9	4183	10	4648	40	18593	19057
7.	Kab. Mentawai	17.313	15	2597	10	1.731	1	173	12812	24	3075	10	1281	40	5125	3331
	Total	**921.349**		**259.009**		**92.135**		**9.213**	**560992**		**62007**		**56099**		224397	218488

(Source: Tsunami Contingency Plan Document - BPBD West Sumatra Province, 2018) [4]

2. The scenario of Affected Critical Facilities can be seen in the following table:

Table 3. Critical Facilities and Assets that are not working

No	Type of Damage	Threatened (%)	Damaged (%)		
			Mild	Medium	Severe
1.	Roads and bridges	20	10	10	80
2.	Electricity grid	40	5	10	85
3.	Clean water and sanitation network	35	80	10	10
4.	Fuel Depot	80	0	0	100

5.	Health service facilities	40	10	10	80
6.	Communication channels	20	5	10	85
7.	Airport	100	70	0	30
8.	Port	80	0	0	100

(Source: Tsunami Continency Plan Document - West Sumatra Provincial BPBD,2018) [4]

3. The scenario of Affected Public Facilities can be seen in the following table:

Table 4. Public Facilities Damaged and Not Functioning

No	Type of Damage	Threatened (%)	Damaged (%)		
			Mild	Medium	Heavy
1.	Government offices	45	10	20	70
2.	Traditional markets	85	5	10	85
3.	Schools	45	5	15	80

(Source: Tsunami Renkon Document - BPBD West Sumatra Province, 2018) [4]

4. The scenario of Affected Government Facilities can be seen in the following table:

Table 5. Government Dysfunction

No	**Type of Damage**	**Threatened (%)**	**Damaged (%)**		
			Light	**Medium**	**Heavy**
1.	Governor's Office	100	0	0	100
2.	Regent/Mayor's Office	40	15	20	65
3.	Service Offices within the Provincial Government and Regency/City Government Areas	40	20	25	55

(Source: Tsunami Renkon Document - BPBD West Sumatra Province, 2018) [4]

The scenario data of affected government facilities in the tsunami contingency plan document for the Province of West Sumatra is prepared based on the worst scenario assumption, which in practice will be tested when a disaster occurs.

4.3. Contingency Plan Policies and Strategies

As part of disaster management efforts, especially in emergencies, all affected aspects are based on determining events and developing scenarios. For example, in the tsunami contingency plan document for West Sumatra Province, the policies and strategies can be described as follow

Table 5. Plan Policies and Strategies

No	**Policy**	**Strategy**

1.	We are optimizing all regional resources and ensuring the fulfillment of the basic needs of victims and the protection of vulnerable groups in handling tsunami emergencies.	Make a memorandum of understanding with the private sector regarding the mobilization of resources needed in the event of a disaster. Such as the existence of unique gas stations for emergency responders, deployment of heavy equipment, and accompanied by written rules regarding service
		delivery Mobilizing all personnel forces, existing infrastructure facilities at the provincial, district/city governments, TNI/Polri, private sector, universities, PMI, and volunteers.
		Make a written agreement/consensus between SKPDs to turn the contingency plan into an operational plan in the event of a disaster
		Assign TRC to disaster locations quickly and accurately and report to related parties. Both for the provincial and central levels as well as for various parties who need to raise support for external assistance.
		Optimizing data and information management in terms of recording assistance received and issued (given) to victims.
		Prepare transportation facilities that can reach all disaster locations
		Request assistance from the international community when needed
		Optimizing the functions of main posts and field posts as aid delivery traffic to avoid duplication or neglect
		Providing security services to aid agencies so that they arrive safely at their destination (disaster location)
		Supervise and control, analyze and evaluate every emergency handling activity.
		Out of information or data must go through one door, namely from the main post.
		Prioritizing the elderly, pregnant women, children, and the community with special
2.	Coordinate activities (management of coordination) handling of disaster emergencies carried out by all relevant parties, both government institutions/agencies, private sector, and volunteers	Activate the emergency response command and control
		System Utilizing information and communication systems and management. Both at local, national, and international levels
		Volunteers deployed have expertise following emergency handling needs and have permits following applicable regulations

3.	Establish decentralization of authority to district/city areas only to meet needs based on their respective regional zones and assign special commands (each zone consists of 2-3 regencies/cities and is assisted by one neighboring area). However, it is still within the structure and command of the province that has been established	Dividing the districts/cities affected by the disaster based on zones identified based on the geographical conditions of the area (distance and area of the area)
		Forming a command that functions to facilitate government access in assisting/regional needs later

(Source: Tsunami Renkon Document - BPBD West Sumatra Province, 2018) [4]

From the table data above, in the 2018 West Sumatra Province tsunami Contingency Plan document, it can be explained that policies and strategies have been prepared to minimize impacts on aspects of scenario development and are based on determining event.

4.4. Cluster Planning

To overcome the impact of disasters if they occur, including a tsunami with a high level of risk in West Sumatra Province, cluster (sectoral) planning is needed. This sectoral planning is part of a tsunami contingency plan policy document that contains content in the form of targets and activities per cluster. For the tsunami contingency plan in West Sumatra Province, the cluster division can be seen in the following table:

Table 6. Management and Coordination Cluster Activities

NO	ACTIVITIES	ACCOUNTING	PJ	TIME IMPLEMENTATION
1.	Rapid review of	TNI,West Sumatra Regional Police, Satpol PP, Bappeda, Social Service, Health Service, Transportation and Communication and Information Office, Public Works Agency, PMI, PDAM, PLN	TNI	1-6 hours after the disaster occurred
2.	Establishment of the Main Command Post and Field Command Post for the	TNI, West Sumatra Regional Police, BPBD, Satpol PP, DPRD, Social Service, Health Service, Transportation and Communications and Information Service, RAPI, ORARI, Public Works Service, PMI, Indonesian Red Cross (PMI), PDAM ,	TNI-POLRI	1-24 after the disaster occurred
3.	Preparation plans and preparing operational personnel for		West Sumatra BPBD	1-24 after the disaster occurred
4.	Deployment and resources		West Sumatra BPBD	1-24 after the disaster occurred

5.	Coordinate the activities of each	PLN, General Bureau, Government Bureau, SAR, Sospora, P & K Service, PTN/PTS	West Sumatra BPBD	1-24 after the disaster occurred
6.	Provide Commander Response Emergency regarding changes in the operational		TNI	1x24 hours after the operation was carried out right/ walk. Following existing field facts
7.	Prepare a report on the implementation of emergency disaster, a comprehensive		West Sumatra BPBD	1x24 hours after the operation is carried out. Following existing field facts

(Source: Tsunami Renkon Document - BPBD West Sumatra Province, 2018) [4]

Based on the data above, it can be explained that in the tsunami contingency plan document for the Province of West Sumatra, the division of sectoral tasks is divided according to clusters according to the duties and functions as well as the institutional capacity of each institution involved. After the division of roles for each actor/actor, it will be followed up by determining the projected needs in carrying out that role. Based on the findings above, conceptually, a disaster contingency plan must be carried out based on the principles that have been used as the primary basis, namely:

a) Joint drafting process

The process of developing a contingency plan should involve all relevant stakeholders. A leading sector, of course, is the Regional Disaster Management Agency (BPBD) which has the primary task and function in disaster management. For example, in preparing the policy document for the tsunami contingency plan in West Sumatra, the BPBD of West Sumatra Province is the initiator and facilitator by involving several regional apparatus organizations, vertical agencies, and community groups as part of the Technical Team that provides input in the policy document. This can be seen in the section on the involvement of actors in the division of clusters and each institution's role.

However, further exploration is needed through further research through observation, interviews, or document studies to get an idea of the actors' involvement in the document's preparation. Because each actor/actor in the policy design usually accommodates these actors' institutional interests. Of course, policy actors are not single; they usually only focus on the government and involve many stakeholders. This is following what was conveyed by Sri Suwitri [5] and Taufik [6] that to be able to accommodate the value of interest; it is necessary to involve actors outside the government through networks. From a network perspective, the government no longer acts as a single actor (single actor), so the government is required to be able to build a network between actors in every public policy making. The actors in question can be individuals or institutions (organizations). The network approach in public policy has experienced rapid development with the growth of cluster and Quanto organizations due to the interaction between the government, the private sector, and the community.

b) Contingency plan for single hazard type (single hazard)

The contingency plan is designed to predict efforts for disaster management based on a single threat. It is expected to reduce the impact if it occurs because it is based on the worst-case scenario. The West Sumatra tsunami contingency plan policy document has focused on the threat with the highest level of impact, namely the Tsunami.

From the side of public policy, the preparation of policy documents for contingency plans can be analyzed to determine the agenda-setting in the design of public policies. The agenda-setting in preparing this contingency plan is based on a very crucial public issue to be addressed by the government through a policy. The above follows what Jones [7] and Maman [8] said: "An agenda is a term that is generally used to describe an issue that is considered by the public to be taking action." The explanation of the above definition has the same meaning as the policy plan, where the policy agenda is an activity carried out to make a problem into a public problem that aims to produce a policy. Therefore, it can be said that what is meant by agenda-setting is how to form public opinion on an issue so that the issue is considered an important issue for the wider community, including the government. The formation of public opinion will encourage the birth of public policy or the expected output of the person who designed the setting.

c) Contingency plans have scenarios.

In preparing a policy document, a disaster contingency plan including Tsunami should be prepared based on a scenario based on the prediction of the worst event by the relevant experts. In the context of the tsunami contingency plan document in the Province of West Sumatra, the analysis results from the expert on disaster and tsunami geology, Prof. Kierry Sieh and Danny Hilman N., are used as the basis for determining events and developing relevant scenarios. It is not uncommon to need scenarios to predict future events in a public policy design. In disaster management, especially natural disasters such as earthquakes and tsunamis, it is challenging to indicate when they will occur with certainty accurately. For this reason, developing a scenario based on determining events based on the worst scenario is necessary. This is following what was conveyed by Budiawan [9] that "a scenario is a consistent picture of various possibilities (circumstances) that can occur in the future."

5. CONCLUSION

Based on the findings and discussion above, it can be concluded that the Government of West Sumatra Province, in designing policies for tsunami contingency plans in general, has been based on existing regulations formally. Furthermore, from the aspect of creating public policy designs, the involvement of actors and the preparation of agenda-setting and scenario development has been carried out concerning the involvement and roles of actors per cluster, the existence of a plan for setting urgent and priority public issues, namely the threat of tsunami and scenario development to determine actions and activities and resource requirements needed to minimize the risk of a tsunami disaster. However, further research is required regarding designing a policy design document for a tsunami contingency plan in West Sumatra Province, especially regarding actor involvement and factual analysis of resource needs gaps.

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