

## Conference Paper

# The Effectiveness of the Sustainable Natural Disaster Management Program in North Kalimantan Province

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**Abstract.**

Natural disaster management programs aim to reduce risks, protect the community, and minimize the impact of natural disasters in the area. The purpose of this research is to describe and analyze the effectiveness of sustainable natural disaster management programs in the North Kalimantan Province. The effectiveness of this program is very important for achieving the goals that have been previously set.. A qualitative approach was used in this study. Data collection techniques were conducted through in-depth interviews with key informants who played a role in natural disaster management programs, observation of stakeholder activities, and documentation studies. The research data sources consist of primary and secondary data. Data analysis techniques included data collection, data reduction, data presentation, and drawing conclusions. Results show that North Kalimantan Province's natural disaster management program has been running effectively on the dimensions of achieving goals, where the budget allocated follows the existing realization. As for integration in program implementation, it is not well established because of the lack of rehearsals for disaster management as well as adaptation to implementation, which is difficult due to topographical conditions that are still difficult to reach.

**Keywords:** program effectiveness, sustainable disaster management

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## 1. Introduction

Natural disasters are a combination of natural hazards and vulnerabilities that risk communities that are unable to overcome the adversities that result from them Wisner et al. [1] Natural disasters pose significant threats to communities and to sustainable development. In recent years, the province of North Kalimantan in Indonesia has witnessed an increasing frequency and intensity of natural disasters including floods, landslides, and forest fires. In response to these challenges, the implementation of a sustainable natural disaster management programme was initiated in the region. This study aims to assess the effectiveness of this program in enhancing disaster resilience, reducing vulnerabilities, and promoting sustainable development in North Kalimantan Province.

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In 2021, the Regional Disaster Management Agency for North Kalimantan Province recorded 50 natural disaster events in North Kalimantan Province. The highest frequency of disaster events occurred in Tarakan City, followed by Nunukan Regency. The dominant types of natural disaster are floods and landslides. Based on BPS data, the frequency of the number of villages experiencing flooding has also increased every year; in 2019, with 51 villages, 22 villages in 2020, and 122 villages in 2021. In 2022, it was also recorded that floods in the province of North Kalimantan submerged 6,103 houses, which had an impact on 58,499 residents who had to evacuate.

Disaster management involves actions aimed at reducing human and material losses caused by natural disasters through mitigation, preparation, response, and recovery efforts Alexander [2]. A sustainable natural disaster management program aims to reduce vulnerability and increase community and environmental resilience to disaster. This goal can be achieved through a series of proactive steps including risk mitigation, good preparation, fast and efficient response, and post-disaster recovery. This emphasizes the importance of community engagement, environmental conservation, and long-term resilience building.

Effectiveness of sustainable natural disaster management programs is an important concern in the modern era. Natural disasters such as earthquakes, floods, landslides, droughts, and tropical storms can have devastating impacts and threaten human life, the environment, and the economy of an area. Therefore, governments and society need to develop effective and sustainable disaster management programs. This study is urgently conducted considering climate change, and the exploitation of natural resources is at risk and triggers natural disasters. Evaluating the effectiveness of natural disaster programs will encourage local governments and stakeholders to improve their performance. The leading sector in the field of disaster management at the regional level is the Regional Disaster Management Agency (BPBD).

Effectiveness refers to the principle that alternatives promote the achievement of a valued outcome from an action. Effectiveness, which is synonymous with technical rationality, is often measured in units of products, services, or their monetary value Dunn [3]. Steers [4] argued that effectiveness is the range of efforts of a program as a system with certain resources and means to meet its goals and objectives without paralyzing the means and resources and without putting undue pressure on its implementation. Steers revealed that there are three dimensions in assessing effectiveness: (1) achieving goals, namely, the overall effort made in achieving goals that are assessed by a process both for the process of achieving the parts and the process in the sense of its periodization.

(2) Integration, namely an assessment of the ability of an organization to procure socialization, increasing approval and agreement, and communication between members of community groups and various other organizations regarding specific values. Kahn et al. [5] have found that high conflict or ambiguity creates problems for both individuals and organizations. (3) Adaptation, namely how self-adjustment is carried out in aligning individuals with everything that changes the surrounding environment.

This article presents an evaluation of the effectiveness of a sustainable natural disaster management program in the North Kalimantan Province. It analyzes the achievement goals, integration, and adaptation. The findings shed light on the strengths, limitations, and potential areas for improvement in sustainable natural disaster management programs. Furthermore, this study aims to contribute to a broader understanding of sustainable disaster management practices, particularly in developing regions. By examining the case of North Kalimantan Province, we can draw lessons and insights that may be applicable to similar regions that face similar challenges worldwide.

## 2. Methods

This study uses qualitative research methods so that the type of data used is descriptive Moleong, [6] The qualitative research method is used to understand the phenomena experienced by research subjects, in this case, the effectiveness of the sustainable natural disaster management program in North Kalimantan Province. The source of the data in this study was divided into two types: primary and secondary. Primary data were obtained through in-depth interviews with officials and staff of the Regional Disaster Management Agency (BPBD), Non-Government Organizations, and the Community. Secondary data were obtained through observation of the activities of the North Kalimantan Regional Disaster Management Agency (BPBD) in managing a sustainable natural disaster, and documentation was obtained through the collection of related documents, reports, and regulations of natural disasters in North Kalimantan. This study uses an interactive model from Miles and Huberman [7] as a data analysis technique, which is conducted in four stages: Data Condensation, Data Display, and Conclusion.

## 3. Results and Discussion

Natural disasters in North Kalimantan are frequent occurrences, given their fragile geographical and climatic conditions. The National Disaster Management Agency (BPBD)

categorizes floods, fires, landslides, and extreme weather as natural disasters that often occur in the North Kalimantan area, as shown in the following table:

TABLE 1: North Kalimantan Natural Disaster.

No	year	Flood	Fire	Landslide	Extreme weather
	2019	5	14	1	1
	2020	3	19	2	6
	2021	16	8	32	3

Source: North Kalimantan Province in Figures, 2023

Based on the table above, North Kalimantan often experiences flooding due to high rainfall intensity and river overflow. Floods often cause large pools of water in urban and rural areas, damage infrastructure, disrupt transportation, and threaten residents' safety. Floods can also cause long-term impacts such as economic losses and health problems. The mountainous areas of North Kalimantan are also prone to landslides, particularly during the intense rainy season. Uncontrolled logging activities and inappropriate land use changes can increase the risk of landslides. Landslides can destroy settlements, damage infrastructure, and cause fatality and injury. In addition, when a drought occurs, forest fires often occur due to natural factors such as dry weather and lightning, but they are also often caused by human activities such as land clearing using fire. Forest fires can cause ecosystem damage and air pollution, and threaten public health. To deal with and reduce the impact of these natural disasters, it is necessary to carry out effective and sustainable disaster management efforts in the North Kalimantan province.

Disaster management at the regional level is a task of the Regional Disaster Management Agency (BPBD) of North Kalimantan Province, which has three programs: the Prevention and Preparedness Program, which was carried out during the pre-disaster period. Second, Emergency and Logistics are carried out during disaster emergency response, including during the recovery transition. Third, rehabilitation and reconstruction programs were carried out in the post-disaster period.

However, because of the vast geographical area of North Kalimantan province and the topographical conditions that are still very difficult to reach, some areas are still classified as 3T (Levelmost, Frontier, Outermost), which can only be reached by air and river transportation access, making program implementation difficult, as well as equipment mobility. In addition, the limitations of trained Human Resources (HR) owing to the rapid mutation process resulted in trained HR being replaced with HR who had to start understanding from the beginning.

The results of research on regional disaster management programs in North Kalimantan Province were analyzed using the effectiveness approach proposed by Steers [4], with three effectiveness indicators: goal attainment, integration, and adaptation.

### 3.1. Achievement of Objectives

The disaster management program in North Kalimantan Province consists of prevention and preparedness, emergency and logistics programs, rehabilitation, and reconstruction. The Prevention and Preparedness Program is implemented to provide information and education on disaster mitigation or the pre-disaster phase.

An emergency and logistics program is implemented to provide emergency services during a disaster emergency response, including during the recovery transition. Meanwhile, a rehabilitation and reconstruction program is implemented to carry out rehabilitation and reconstruction during the post-disaster period.

Socialization regarding the sustainable natural disaster management program in North Kalimantan Province was also conducted through the Communication, Information, and Education (IEC) program. This activity also covered pre-disaster, emergency response, and post-disaster phases. The activities carried out were thematic, according to the disaster trends. The achievement of the program objectives in 2022 can be seen through budget allocation and realization, as shown in the following table:

The table above shows the allocation and realization of disaster management programs in North Kalimantan Province in 2022. The effectiveness of all programs still needs to be improved. This is because not all of the program budget is used, so there is still some remaining unused budget. Indicators of the effectiveness of government programs include the realization of the budget used; as a result, these programs have not been implemented effectively.

Stakeholders in the implementation of the Self-Help Housing Stimulant Assistance (BSPS) program are always guided by technical guidelines issued by the Ministry of Public Works and Public Housing (PUPR). Thus, whatever activities are performed, the stages always refer to these guidelines. In addition, stakeholders supporting the implementation of the BSPS/BSRS program always provide assistance to the facilitator, both at the time of verification until the implementation of the distribution of assistance and implementation of home rehabilitation.

TABLE 2: Budget Allocation and Relization of the North Kalimantan Province Disaster Management Program in 2022.

No	Programs/Activities	Allocation	Realization		The remain- ing budget	Efficiency (%)
			Finance	%		
1.	Disaster Prevention and Preparedness Services	570,849,001	468,833,003	82,13	102,016,000	17,87
	Preparation of Disaster Management Plan	500,849,001	399,428,151	79,75	101,420,850	20,25
	Province Post Disaster Management	70,000,000	69,404,850	99,15	595,150	0,85
2.	Disaster Victim Rescue and Evaluation Services	603,612,102	465,683,824	77,15	137,928,278	22,85
	Quick Response to Disaster Emergency Management	75,000,000	74,980,600	99,97	137,928,278	22,85
	Rapid Response to Epidemic Non-Natural Disasters/Disease Outbreaks	528,612,102	390,703,224	73,91	137,908,878	26,09
	<b>TOTAL</b>	<b>1,174,461,103</b>	<b>934,516,825</b>	<b>79,57</b>	<b>239,944,278</b>	<b>20,43</b>

Source: North Kalimantan Provincial Disaster Management Agency, 2022

### 3.2. Integration

To be effective, the system must also integrate the individual into the social system through defined roles with clear role expectations, so that role conflict and role ambiguity will be low for the individual. In the North Kalimantan Province disaster management plan (RPB) document, the disaster management program involves multiple actors or a pentahelix consisting of the Government, Private, Community, Academics, and Mass Media.

To support disaster management, the government creates programs that involve the community and builds disaster-resilient villages (Destana) in several villages. It is essential to involve experts, stakeholders, and local communities to ensure effective and sustainable solutions throughout the planning and implementation process. However, the implementation of this program has not been successful. The socialization process of contingency plans in North Kalimantan has not been implemented, and there is a lack of rehearsals on disaster management. The lack of rehearsals or practice drills in disaster management can be a significant challenge when implementing effective solutions. Rehearsals play a crucial role in disaster preparedness and response by helping identify gaps, test response plans, and build capacity. The government should also implement advanced information and warning systems to alert travelers and authorities about

potential natural disasters. This can include real-time weather monitoring, early warning systems, and effective communication channels for disseminating information to the public.

### 3.3. Adaptation

In the implementation of the natural disaster management program in the province of North Kalimantan, there are several obstacles considering that geographically the Province of North Kalimantan is very broad, and the span of control is very far in some areas, for example, in the Krayan area, which can only be reached by air transportation. Of course, this kind of thing is not felt to be optimal by the community. Various situations and conditions result in challenges in disaster management. Vulnerability factors and resource availability determine the success of a disaster management.

## 4. Conclusion

Based on the results of the research, the North Kalimantan Provincial Natural Disaster Management Program has been running effectively on the dimensions of achieving goals, where the allocated budget follows the existing realization. As for integration in program implementation, it is not well established because of the lack of rehearsals for disaster management as well as adaptation to implementation, which is difficult due to topographical conditions that are still very difficult to reach. To overcome this problem, the government should conduct community-based drills and exercises to educate and involve the public in disaster preparedness. These can include evacuation drills, public information campaigns, and outreach programs to ensure that individuals and communities are well informed and ready to respond. The government must also build transportation routes that can connect various regions, particularly in areas that are difficult to reach. Develop a multimodal transportation system that includes roads, railways, waterways, and air transportation. This diversification can provide alternative routes and modes of transportation for natural disasters. This research is expected to be a recommendation for the North Kalimantan government, especially the Regional Disaster Management Agency (BPBD). The researcher hopes that further research will be conducted using a different approach to assess the effectiveness of the sustainable natural disaster management program in North Kalimantan Province.

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