Mind the Gap: Bridging Disaster Contingency Policy with Community Awareness through TEWS Education in Padang City Elementary Schools

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Abstract

This article examines the implementation of disaster contingency policies and community awareness of the Tsunami Early Warning System (TEWS) in Padang City, a highly disaster-prone area. The findings are synthesized from two studies: analyzing the implementation of the 2017 Padang City Contingency Plan (Renkon 2017) by the Regional Disaster Management Agency (BPBD), and assessing elementary school students' perceptions of TEWS. For the analysis of Renkon 2017 implementation, a descriptive qualitative approach was used, guided by George C. Edward III's policy implementation theory, which includes variables of communication, resources, implementers' disposition, and bureaucratic structure. Data were collected through in-depth interviews, observation, and document studies. Meanwhile, to assess students' perceptions of TEWS, a descriptive quantitative approach was applied using secondary data from questionnaires distributed to 69 sixth-grade students at SD Pertiwi 2 in Padang City, selected using purposive sampling. Data were analyzed using descriptive statistics such as frequency distribution and percentages. The overall design of this article is a comparative analysis to identify the connection between the two phenomena. Although no longer formally relevant, Renkon 2017 remains the main reference for BPBD, yet faces implementation barriers in terms of communication, resource allocation, implementers' attitudes, and bureaucratic structure. Most students understand the importance of TEWS (97%) and have general knowledge of it (85.51%), but about 37% are unaware of the existence of TEWS near their school. This gap indicates implementation obstacles within BPBD in raising public awareness. Updating the contingency plan and strengthening institutional capacity are crucial for effective emergency response, accompanied by enhanced TEWS education through the active role of schools and disaster management agencies.

Keywords: Disaster Mitigation, Contingency Plan, Implementation, Tsunami Early Warning System, Student Perception, Disaster Preparedness, Community Preparedness.

Abstract

Artikel ini mengkaji implementasi antara kebijakan kontinjensi bencana dan kesadaran masyarakat terhadap Sistem Peringatan Dini Tsunami (TEWS) di Kota Padang, wilayah yang sangat rentan bencana. Temuan disintesis dari dua studi yaitu menganalisis pelaksanaan Rencana Kontinjensi Kota Padang 2017 (Renkon 2017) oleh BPBD, dan menilai persepsi siswa sekolah dasar terhadap TEWS. Untuk analisis implementasi Renkon 2017, digunakan pendekatan kualitatif deskriptif yang berpedoman pada teori implementasi kebijakan George C. Edward III, mencakup variabel komunikasi, sumber daya, disposisi pelaksana, dan struktur birokrasi. Pengumpulan data dilakukan melalui wawancara mendalam, observasi, dan studi dokumentasi. Sementara itu, untuk menilai persepsi siswa terhadap TEWS, digunakan pendekatan kuantitatif deskriptif dengan memanfaatkan data sekunder dari kuesioner yang didistribusikan kepada 69 siswa kelas enam di SD Pertiwi 2 Kota Padang, yang dipilih menggunakan teknik purposive sampling. Data dianalisis menggunakan statistik deskriptif seperti distribusi frekuensi dan persentase. Desain keseluruhan artikel ini adalah analisis komparatif untuk mengidentifikasi keterhubungan antara kedua fenomena tersebut. Meskipun sudah tidak relevan secara formal, Renkon 2017 masih menjadi panduan utama BPBD, namun menghadapi hambatan implementasi dalam hal komunikasi, alokasi sumber daya, sikap pelaksana, dan struktur birokrasi. Sebagian besar siswa memahami pentingnya TEWS (97%) dan memiliki

pengetahuan umum (85,51%), sekitar 37% belum mengetahui keberadaan TEWS di sekitar sekolah mereka. Kesenjangan ini menunjukkan hambatan implementasi di BPBD dalam peningkatan kesadaran masyarakat. Pembaruan rencana kontinjensi dan penguatan kapasitas institusional sangat penting untuk respons darurat yang efektif, disertai peningkatan edukasi TEWS melalui peran aktif sekolah dan lembaga kebencanaan.

Keywords: Mitigasi Bencana, Rencana Kontinjensi, Implementasi, Sistem Peringatan Dini Tsunami, Persepsi Siswa, Kesiapsiagaan Bencana, Kesiapsiagaan Masyarakat.

INTRODUCTION

a. Background and Context of Padang City's Vulnerability

Padang City, situated on the strategic west coast of Sumatra, faces a high vulnerability to natural disasters, particularly earthquakes and tsunamis, due to its location within the subduction zone between the Indo-Australian and Eurasian plates. This geological positioning necessitates robust disaster preparedness and mitigation strategies (Rahmadhani Z et al., 2023; Syailendra et al., 2022).

The city's consistent exposure to natural hazards is reflected in its standing within the Indonesian Disaster Risk Index (IRBI), where it consistently falls into the high-risk category. For instance, in 2023, Padang was ranked 65th out of 514 cities and districts across Indonesia (Badan Nasional Penanggulangan Bencana, 2024). Historically, significant events such as the major earthquake in 2009 have demonstrated severe impacts on the city's infrastructure, economy, and human lives, serving as a critical turning point for disaster management in the region.

Beyond seismic activities, Padang City frequently experiences various other disasters, including floods, landslides, and felt earthquakes. Data from the Padang City Disaster Management Agency (BPBD) indicates a notable increase in the number of disaster incidents from 2021 to 2024. During this period, fallen trees were the most common type of incident, followed by felt earthquakes, floods, and landslides, highlighting a recurring pattern of diverse disaster occurrences annually.

b. Importance of Disaster Preparedness and Contingency Planning

Effective disaster management necessitates thorough and mature planning to address potential future emergencies. In Indonesia, this requirement is formalized by Government Regulation No. 21 of 2008 concerning Disaster Management, which stipulates that emergency preparedness plans should include the development of contingency plans. These contingency plans are crucial documents designed to anticipate various worst-case disaster scenarios, estimate the necessary resource requirements, and establish clear decision-making mechanisms essential for emergency situations.

Responding to this mandate and its inherent vulnerability, the Padang City Disaster Management Agency (BPBD) developed the 2017 Padang City Contingency Plan (Renkon 2017). This document serves as a primary operational guideline specifically tailored for confronting potential floods, flash floods, and tsunamis in the city. The Renkon 2017 is structured by adopting principles from the Emergency Response Command System (SKPDB), as outlined in the Head of BNPB Regulation No. 3 of 2016. The SKPDB itself is designed to ensure a disaster emergency response that is swift, precise, integrated, and well-coordinated, adhering to the foundational principles of "One Command, One System, and One Coordination" (Badan Nasional Penanggulangan Bencana, 2016).

c. Critical Role of Early Warning Systems (TEWS) and Education

The Tsunami Early Warning System (TEWS) plays a critical role in disaster risk mitigation by providing early warnings, which are essential for reducing casualties during

tsunami events. This system is composed of a network of sensors, buoys, and sirens designed to issue early alerts and minimize the impact of tsunamis.

Schools are vital in fostering awareness and preparing younger generations for potential disaster situations (Ayub et al., 2019). Research indicates that early disaster education, including training related to TEWS, significantly improves a community's capacity to respond effectively to natural hazards. By introducing TEWS and other preparedness concepts at the school level, a foundational understanding is built, which can lead to enhanced safety outcomes during emergencies and ultimately contribute to community-wide resilience (Ayub et al., 2019; Rahayu et al., 2020).

d. *Existing Research and Identified Gaps*

Previous research in disaster management commonly emphasizes the importance of coordination, command systems, and the effectiveness of implementation at the regional level. These studies highlight the significance of organizational structure, resource availability, and effective communication for successful emergency response. For example, studies have analyzed the implementation of Head of BNPB Regulation No. 3 of 2016 concerning the Emergency Response Command System, identifying challenges such as weak inter-cluster coordination, limited resources, and insufficient understanding of command structures among implementers. Research has also explored policy implementation during specific disaster events, noting that success depends not only on planning documents but also on social and cultural factors.

A significant body of research indicates that the effective implementation of policies, including those for disaster management, relies on four key variables: communication, resources, the disposition or attitude of implementers, and bureaucratic structure. Communication is crucial for clear and consistent instructions from policymakers to field implementers, especially in emergency situations. Adequate resources, including trained human resources, sufficient budgets, equipment, technology, and time, are vital for overcoming implementation barriers. The disposition of implementers, encompassing their commitment, motivation, honesty, integrity, and adherence to standard operating procedures (SOPs), directly impacts optimal policy execution. Finally, a clear bureaucratic structure with defined task divisions and standardized procedures is necessary to prevent delays and ensure coordinated action.

However, specific research focusing on the implementation of contingency plans as operational guidelines within emergency response systems remains relatively limited. This gap extends to understanding how effectively the Tsunami Early Warning System (TEWS) information is disseminated within schools and how well students comprehend its functions. Despite the crucial role of TEWS in disaster risk mitigation, providing early warnings to reduce casualties during tsunamis, there is a need to further investigate how this information is conveyed and understood among younger generations . While students generally perceive TEWS as important for safety, studies in Padang City have shown a discrepancy between general knowledge of TEWS and awareness of its physical installations near schools, indicating a need for enhanced local education by schools and relevant agencies (Septa et al., 2023).

e. *Purpose and Scientific Merit of the Study*

This article is designed to achieve two primary objectives. Firstly, it aims to analyze the implementation of the 2017 Padang City Contingency Plan (Renkon 2017) within the emergency response command system carried out by the Padang City Disaster Management Agency (BPBD), and to identify the various challenges encountered during its execution. The motivation for this analysis stems from the continued reliance on the Renkon 2017 document as the main operational reference until 2025, despite it formally exceeding its validity period and no longer aligning with current disaster risk dynamics.

Secondly, the study seeks to explore the perceptions of elementary school students regarding the Tsunami Early Warning System (TEWS) in tsunami-prone areas of Padang City. This includes assessing their general knowledge about TEWS, their understanding of its importance for safety, and their awareness of the physical TEWS installations located near their schools.

The scientific merit of this study lies in its unique approach to bridging the analysis of an outdated, yet actively utilized, local disaster contingency policy (Renkon 2017) with empirical data on community awareness, specifically focusing on TEWS awareness among elementary school students. By doing so, the article highlights a critical "gap" between formal disaster planning and grassroots preparedness in a high-risk urban setting like Padang City. While a significant majority of students understand TEWS and its importance, there is a notable discrepancy in their awareness of local TEWS installations, indicating a need for enhanced local education. This dual focus allows for a comprehensive understanding of how policy implementation challenges intersect with community preparedness deficiencies, offering insights for more effective disaster education programs and policy updates.

METHODOLOGY

a. Research Approach and Design

The first component, which focuses on the implementation of the 2017 Padang City Contingency Plan (Renkon 2017) by the Padang City Disaster Management Agency (BPBD), utilizes a qualitative descriptive approach. This approach was selected to gain an in-depth understanding of how Renkon 2017 is put into practice, the challenges encountered during its execution, and the efforts undertaken to improve coordination and emergency response effectiveness. Qualitative research, in this context, aims to understand and interpret the meanings derived from human experiences related to social phenomena or implemented policies, rather than focusing on quantitative measurement. The descriptive nature of this method allows for a systematic portrayal of the implementation process, its constraints, and the dynamics of coordination in applying Renkon 2017 as an operational guide for emergency response, particularly aligning with the principles of the Emergency Response Command System. It aims to describe the implementation empirically, analyze constraints and obstacles, and interpret strategies for improving the Renkon 2017's effectiveness.

The second research component examines elementary school students' perceptions of the Tsunami Early Warning System (TEWS). This part of the study adopts a quantitative descriptive approach. It is important to note that the data for this component is secondary data, derived from the article titled "Perception of Elementary School Students on the Tsunami Early Warning System (TEWS) in High-Risk Tsunami Zones in Padang City" by Affifa Syah Raudhatul Jannah and Eka Juliafad (2025). This quantitative descriptive design is suitable for systematically collecting and analyzing numerical data, providing a structured summary of students' knowledge levels, attitudes, and awareness concerning TEWS. It offers insights into how widespread knowledge and perceptions about TEWS are among students, without seeking to establish causality, ultimately highlighting educational needs related to TEWS and disaster preparedness within schools (Arikunto, 1998; Sugiyono, 2022). The study gathered data from 69 sixth-grade students at SD Pertiwi 2 in Padang City using a structured questionnaire that measured their general knowledge of TEWS, their perception of its importance, and their awareness of local TEWS installations.

The overall design for this article is a comparative analysis. This design facilitates the systematic collection and analysis of data from both the qualitative component (Renkon 2017 implementation) and the quantitative component (TEWS awareness among students) to identify connections and implications. By drawing on insights from both sources, the study aims to highlight the critical "gap" between formal disaster planning and grassroots preparedness in a high-risk urban setting like Padang City.

b. Research Conditions and Assumptions

The research is conducted under specific conditions and assumptions to provide a comprehensive understanding of disaster preparedness in Padang City.

Firstly, a key research condition is that Padang City is categorized as a high-risk tsunami zone, necessitating robust disaster preparedness. Located on the west coast of Sumatra within a subduction zone between the Indo-Australian and Eurasian plates, Padang faces a high threat of natural disasters, particularly earthquakes and tsunamis. The Indonesian Disaster Risk Index (IRBI) consistently places Padang City in the high-risk category, ranking it 65th out of 514 districts/cities in Indonesia in 2023 (Badan Nasional Penanggulangan Bencana, 2024). Data from the Padang City Disaster Management Agency (BPBD) also indicates a rising trend in disaster incidents from 2021 to 2024, including felt earthquakes, floods, and landslides, highlighting the city's high potential for and recurring experience with disasters. This high-risk environment underscores the critical need for effective disaster preparedness and mitigation strategies, including community education on systems like the Tsunami Early Warning System (TEWS).

Secondly, the qualitative component operates under George C. Edward III's policy implementation theory, which includes communication, resources, disposition, and bureaucratic structure as key variables. This qualitative descriptive approach is employed to gain an in-depth understanding of the implementation of the 2017 Padang City Contingency Plan (Renkon 2017) by the BPBD Kota Padang. Edward III's theory is particularly suitable for analyzing policy implementation that involves multiple stakeholders, such as disaster management. The research specifically focuses on how communication processes, the availability and management of resources, the attitudes and commitment (disposition) of implementers, and the clarity and functionality of the bureaucratic structure influence the effectiveness of Renkon 2017's implementation (Edwards III, 1980).

Thirdly, the quantitative component assumes that sixth-grade students possess the cognitive maturity to understand disaster-related concepts (Ayub et al., 2019). This assumption guided the purposive sampling method used in the study on elementary school students' perceptions of TEWS. Sixth-grade students were chosen because they are considered to have a higher cognitive ability compared to younger students, making them more capable of understanding complex disaster preparedness concepts. This age group is also transitioning to middle school, further supporting their readiness to grasp such topics.

Finally, a significant condition affecting the research is that Renkon 2017, despite its formal expiration, continues to be the main operational reference for BPBD Padang. Although the 2017 Padang City Contingency Plan has formally exceeded its five-year validity period and is no longer contextually relevant to current disaster risk dynamics, it remains the primary operational reference until 2025. This continued use is evidenced by preparedness drills carried out as late as December 2024, which still utilized Renkon 2017 as the main guideline. While much of the document's content, such as disaster scenarios and resource projections, is no longer relevant, its command structure is still deemed applicable and actively used in various emergency situations after 2017. This situation highlights a fundamental obstacle in the implementation of the emergency response command system, as current disaster risks and urban planning have undergone significant changes.

c. Data Collection Procedures and Instruments

a) For Renkon 2017 Implementation (Qualitative Component):

For the qualitative component of the research, which focused on the implementation of the 2017 Padang City Contingency Plan (Renkon 2017) by BPBD Kota Padang, data collection involved a comprehensive approach utilizing three primary techniques: in-depth interviews, non-direct observation through documentation, and extensive documentation review. In-depth interviews were conducted with selected key personnel at BPBD Kota Padang to gather broad, detailed, and specific information about policy aspects, field implementation,

challenges, and efforts to enhance emergency response effectiveness according to Renkon 2017's structure and mechanisms. These interviews were structured and semi-structured, guided by an interview guide based on George C. Edward III's policy implementation theory, covering communication, resources, disposition, and bureaucratic structure. Non-direct observation was performed by reviewing visual and narrative documentation related to Renkon 2017's implementation, aiming to understand the emergency response based on the contingency plan's command structure, coordination practices, implementer preparedness, and resource utilization as recorded in BPBD's activity reports and visual documentation. This technique served to complement and verify the interview data, offering a more holistic understanding of field implementation. Lastly, documentation review involved collecting and studying relevant written documents to obtain secondary data that reinforced primary interview data and clarified policies and procedures in disaster management implementation, tracing the connection between formal documents and actual practices.

Informants for the qualitative component were chosen through purposive sampling, deliberately selecting individuals with specific knowledge, experience, and direct involvement in the Emergency Response Command System (SKPDB) implementation at BPBD Kota Padang. The selection was based on job positions, main duties, functions, and direct involvement in disaster management operations referencing Renkon 2017. Key informants included the Head of BPBD Kota Padang, Heads of the Emergency & Logistics, Prevention & Preparedness, and Rehabilitation & Reconstruction Divisions, the Secretary, and Junior Disaster Analysts, as well as the Coordinator of the Rapid Assessment Team, Commander of the Emergency Response Post, and Cluster Coordinators (Logistics, Health, SAR). To ensure data validity and objectivity, triangulation was performed by comparing and confirming information from these main informants with data from additional BPBD staff, specifically an Analis Mitigasi Bencana and an Operator Pusat Pengendalian Operasi Penanggulangan Bencana (Pusdalops PB).

The documents reviewed for this component included the 2017 Padang City Contingency Plan (Renkon 2017), the Padang City Emergency Response Plan (RPKB), Peraturan Kepala BNPB Nomor 3 Tahun 2016 concerning the Emergency Response Command System, Standard Operational Procedures (SOPs) for emergency response, reports of emergency response operations, and simulation exercise reports. This comprehensive review aimed to provide robust support for analyzing Renkon 2017's implementation.

b) *For Student Perception of TEWS (Quantitative Component)*

For the quantitative component, the study utilized secondary data from an article which collected from 69 sixth-grade students at SD Pertiwi 2 in Padang City, a high-risk tsunami zone. These participants were selected using a purposive sampling technique, chosen for their cognitive maturity and readiness to understand disaster-related concepts.

The primary data collection instrument was a structured questionnaire comprising 26 items, with responses rated on a 4-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree". The questionnaire was designed to measure students' general knowledge of the Tsunami Early Warning System (TEWS), their perception of TEWS's importance for disaster mitigation, and their awareness of TEWS installations located near their school.

d. **Data Analysis**

For the qualitative component of the Renkon 2017 implementation, data analysis adhered to the framework developed by Miles and Huberman. This involved three key stages: data

reduction, data display, utilizing narratives, matrices, and charts, and conclusion drawing and verification through source triangulation to ensure the credibility of findings.

In the quantitative component, which assessed student perceptions of TEWS, data were processed using SPSS software. Descriptive statistical methods, such as frequency distributions and percentage calculations, were employed to succinctly summarize the survey responses.

e. Hardware and Software

To analyze the quantitative data concerning student perceptions of the TEWS (Tsunami Early Warning System), the research utilized SPSS (Statistical Package for the Social Sciences) software as the primary tool for data processing and interpretation. This well-established statistical software facilitated the efficient handling and organization of survey responses. Specifically, the study employed descriptive statistical techniques, including the calculation of frequency distributions and percentage values, to systematically summarize the patterns and trends within the dataset. These statistical outputs provided a clear and concise overview of students' responses, enabling researchers to interpret the general attitudes and perceptions toward the TEWS initiative with greater precision and clarity.

RESULTS AND DISCUSSION
a. Renkon 2017 Implementation: Challenges and Efforts at BPBD Padang

The findings and discussion of this study delve into the multifaceted implementation of the 2017 Padang City Contingency Plan (Renkon 2017) within the Emergency Response Command System at the Padang City Disaster Management Agency (BPBD Kota Padang). This analysis is framed by George C. Edward III's policy implementation theory, examining communication, resources, disposition of implementers, and bureaucratic structure. The study reveals that while the Renkon 2017 continues to be a primary operational reference, its effectiveness is significantly challenged by its outdated nature and gaps across these four critical variables.

a) Outdated Document and its Impact

A fundamental finding is that the Renkon 2017, despite formally having exceeded its validity period, still serves as the main operational reference for BPBD Kota Padang until 2025. This continued reliance is problematic because the document is no longer contextually relevant to the current dynamics of disaster risk, resource needs, and updated scenarios in Padang City. Although the document details worst-case scenarios for floods, flash floods, and tsunamis, along with projected resource requirements and affected areas, its contents are largely outdated. Consequently, only a specific component of the document—the command structure—is actively utilized and deemed relevant for current operations. Relying on an outdated document compromises the accuracy of response scenarios and undermines the legitimacy and effectiveness of the command structure. The Renkon must be urgently updated to address evolving risks and remain a relevant foundation for operations.

b) Communication Gaps

Communication within the emergency response command system at BPBD Kota Padang, though functioning, is not entirely optimal. Formal communication channels, particularly through the Operations Control Center (Pusdalops), act as a crucial link between the command center and field teams during emergencies. However, technical information is not consistently understood across all external agencies (OPDs) and partners. This inconsistency in understanding, coupled with a lack of uniform comprehension of instructions, often leads to response delays and confusion in the field. For instance, despite simulations, not all parties fully grasp the command lines and authority boundaries within the Renkon.

Furthermore, challenges in validating data from the field and delays in information delivery impede effective decision-making and operational execution.

A significant facilitator of communication is the dual role of the Head of BPBD, who also serves as the Regional Secretary. This dual position provides strong vertical communication legitimacy, transforming requests to other regional government agencies into "orders to be carried out". Beyond formal channels, informal coordination mechanisms, such as routine "coffee mornings" and joint simulations, significantly help to mitigate the rigidities of formal communication. These informal interactions foster better relationships and a more fluid coordination environment when a crisis occurs.

c) *Resource Limitations*

The implementation of the emergency response command system, based on Renkon 2017, faces substantial resource limitations. The allocated budget from the Belanja Tidak Terduga (BTT) for recovery and general operational needs is often insufficient, with potential disaster losses vastly exceeding the available local fiscal capacity. For example, estimated losses from floods, flash floods, and tsunamis range from hundreds of billions to over a trillion Rupiah, far beyond local fiscal capacity. Moreover, bureaucratic procedures for fund disbursement, while intended for accountability, hinder rapid response during emergencies.

There is also a limited number of skilled and competent personnel, and the process of regeneration and continuous training is not optimal. Many personnel, even within BPBD, do not fully understand the Renkon document and its procedures. Logistical support and facilities are inadequate, leading to a strong reliance on the provincial/national BPBD and third-party aid, including CSR, BAZNAS, and humanitarian organizations, to cover the gaps. This reliance is evident in recent flood events where local resources were insufficient, requiring external assistance for basic needs and evacuation.

Table 1. Personnel and Field Roles of Agencies

No.	Agency/Unit	Number of Personnel	Role in the Field
1	BPBD Padang	69	Main coordination and operations
2	Basarnas	40	Evacuation and victim search
3	Social Services	30	Public kitchen and logistics distribution
4	TNI Battalion 133/Satria Tama	601	Logistics support and evacuation
5	PMI	15	Ambulance and first aid
6	Tagana West Sumatra	36	Public kitchen and rescue operations
7	Civil Service Police Unit	80	Security and data collection
8	TRC Semen Padang	11	

Source: Flood Data, March 7, 2024 – Padang City BPBD

d) *Disposition of Implementers*

In the implementation of disaster contingency policies, the disposition of implementers, encompassing their attitudes, commitment, and motivation, significantly influences overall effectiveness. Findings from the study indicate that a notable level of commitment and responsibility exists among some staff members of the Padang City Disaster Management Agency (BPBD), particularly within the Pusdalops (Operation Control Center) and other technical roles. These individuals often demonstrate initiative and flexibility, adapting to rapidly changing conditions and making quick decisions in the field, which is crucial for bridging the gap between written procedures and real-world emergencies. The Pusdalops operator, for instance, affirmed that staff understand their duties due to regular training and the inherent nature of their roles, actively monitoring information, making priorities, and coordinating subsequent steps.

However, this positive disposition is not uniformly distributed and faces considerable challenges. Motivation among implementers is often impacted by high workloads and a lack of formal incentives, both financial and non-financial, as well as insufficient recognition for their efforts. This situation can lead to a decrease in morale and active participation, especially from non-structural personnel or technical implementers whose roles are critical on the ground. A significant hurdle also comes from "ego sektoral," where various agencies prioritize their internal authority and procedures over cross-sectoral collaboration, hindering a shared understanding of roles within the command system. This manifests as a lack of comprehensive understanding among non-BPBD sectors, and even within BPBD itself, regarding the Renkon 2017 document and its technical application. Overlapping duties and a "lack of ability and understanding among personnel" in comprehending and executing established procedures further complicate the implementation. Consequently, while a general institutional commitment to the command system exists, individual implementers' commitment varies, necessitating consistent capacity building, regular simulations, and internal socialization to foster a more uniform positive attitude and substantive understanding across all involved parties.

e) *Bureaucratic Structure*

The bureaucratic structure serves as the fundamental framework for public policy implementation, particularly critical in disaster management which necessitates rapid, coordinated responses under high-pressure situations. In Padang City, a formal command structure for disaster response is in place, explicitly drawing its principles from Peraturan Kepala BNPB Nomor 3 Tahun 2016 (Perka BNPB No. 3 Tahun 2016). This system clearly defines roles for the Commander (KODAL), the Command Post (POSKO), and supporting clusters, forming the primary operational reference for emergency response since 2017. The ex-officio position of the Head of BPBD as the Regional Secretary enhances vertical coordination, ensuring that directives to other Regional Government Agencies (OPDs) carry direct authority, thereby aiding implementation.

Despite the existence of this formal framework, the effectiveness of Standard Operational Procedures (SOPs) poses a significant challenge. SOPs, detailed in the Rencana Kedaruratan Penanggulangan Bencana (RPKB) Kota Padang Tahun 2023, are not consistently updated to reflect current conditions, technological advancements, or specific disaster types. This creates a notable gap between prescribed formal procedures and the practical realities observed in the field. A key issue is that a substantial number of personnel, particularly from non-BPBD sectors, do not fully grasp the contents or technical application of the Renkon document, which impacts the effective utilization of these SOPs.

Furthermore, cross-sectoral involvement, including that of the Indonesian National Armed Forces (TNI), Indonesian National Police (Polri), and non-governmental organizations (NGOs), often appears fragmented rather than seamlessly integrated into the command system. This fragmentation stems from issues like "ego sektoral," where various agencies prioritize their internal mandates and procedures, leading to overlapping responsibilities and an insufficient shared understanding of their roles within the broader command system. Consequently, effective coordination frequently depends on the BPBD's proactive initiative or established informal relationships, such as routine "coffee morning" meetings, which foster better communication and collaboration outside formal bureaucratic channels.

Nonetheless, even with these structural and coordination hurdles, BPBD Kota Padang actively activates its Command Post (Posko) and operational units during emergencies, adapting their functions to real-time conditions. The Operations Control Center (Pusdalops) operator confirms that the command structure and clusters outlined in Renkon 2017 remain the primary reference for Pusdalops operations. Key operational functions, analogous to the T1-T9 units, are mobilized during emergencies, encompassing tasks from rapid assessment to logistics distribution, indicating an adaptive approach to disaster response even when formal classifications are not strictly maintained. Despite various challenges, this commitment ensures that the core elements of the emergency response system are activated and adjusted to the unfolding situation. The study highlights that while the command structure portion of Renkon 2017 remains actively utilized, the broader document's contextual relevance has diminished over time, underscoring the urgent need for its periodic update to maintain an effective disaster management system.

b. *Student Perception of TEWS: Awareness and Preparedness at SD Pertiwi 2*

At SD Pertiwi 2 in Padang City, student perceptions of the Tsunami Early Warning System (TEWS) highlight both strengths and critical gaps in preparedness. The study focused on 69 sixth-grade students from SD Pertiwi 2, who were selected using purposive sampling due to their cognitive maturity and readiness to understand disaster-related concepts, as they are transitioning to middle school. The sample consisted of 34 male students and 35 female students. In terms of age, 25 students were 11 years old, 40 students were 12 years old, and 4 students were 13 years old.

A significant majority of these students, 85.51%, possess general knowledge of TEWS and its purpose, aligning with research on the effectiveness of early disaster education. Furthermore, an overwhelming 97% of students acknowledge that TEWS is crucial for safety during a tsunami, indicating a strong understanding of its life-saving role in disaster preparedness.

Table 2. Summary of Student Responses by Indicator

No.	Indicator	Agree (%)	Disagree (%)
1	General Knowledge of TEWS	85.51	14.49
2	Importance of TEWS for Safety	97	3
3	Awareness of Local TEWS Installations	63	37

Source: Jannah & Juliafad (2024), "Perception of Elementary School Students on the Tsunami Early Warning System (TEWS) in High-Risk Tsunami Zones in Padang City"

However, a concerning gap exists in their practical awareness, as 37% of students are unaware of the TEWS installation located near their school at the BPBD office, which is crucial for effective evacuation during emergencies. Nevertheless, students demonstrate a proactive attitude toward disaster preparedness, with 88% expressing a desire for more disaster simulations and preparedness drills (Syah Raudhatul Jannah & Juliafad, 2025). This indicates a clear need for enhanced local education about TEWS, especially concerning physical installations and consistent, hands-on preparedness efforts by schools and local disaster management agencies like BPBD.

c. *Discussion: Bridging the Policy-Awareness Gap*

The findings reveal a critical "gap" between the formal existence and implementation challenges of disaster contingency policies, specifically the Rencana Kontinjensi (Renkon) Kota Padang Tahun 2017, and the actual level of community awareness, particularly concerning the practical aspects of the Tsunami Early Warning System (TEWS). While policy documents for disaster response exist, and a high majority of students (85.51%) conceptually understand TEWS and its purpose, there is a concerning lack of direct knowledge among students regarding the awareness of local TEWS installations, with only 63% being aware of the TEWS installation near their school. This discrepancy reflects a breakdown in information dissemination from the policy level to the community, highlighting a need for enhanced local education about TEWS.

The continued use of the outdated Renkon 2017 as the main operational reference until 2025 significantly impacts policy relevance. The document's scenarios, resource estimations, and communication strategies are no longer considered relevant to Padang's evolving disaster risk dynamics, as confirmed by implementers. This outdated guidance likely impairs the BPBD's ability to provide timely, accurate, and contextually relevant information for community awareness, including specific TEWS locations.

Furthermore, the qualitative findings on communication inconsistencies among implementers, such as uneven understanding across various Regional Government Agencies (OPDs) and internal BPBD staff, directly correlate with the low student awareness of local TEWS installations. If the coordinating body, BPBD, struggles with internal and inter-agency communication regarding operational specifics, including overlapping duties and a lack of technical understanding, it becomes inherently challenging to effectively disseminate precise, localized information to the public, including schools.

Lastly, the limited financial and human resources faced by BPBD can restrict the frequency and comprehensiveness of public education campaigns, including TEWS drills and broader awareness programs in schools. Implementers note challenges such as insufficient budget for recovery efforts and a lack of skilled personnel. This aligns with the students' proactive desire for more disaster simulations and preparedness drills, with 88% expressing this need, suggesting that current educational outreach efforts are insufficient and hindered by these resource constraints.

CONCLUSION

This study successfully analyzed the implementation of the 2017 Padang City Contingency Plan (Renkon 2017) and assessed elementary students' perceptions of the Tsunami Early Warning System (TEWS) in Padang City. It was found that while Renkon 2017's command structure is still utilized, its implementation faces significant challenges across communication, resources, implementer disposition, and bureaucratic structure, primarily due to the document's outdated nature and lack of comprehensive understanding across agencies. Concurrently, while students largely understand the general concept and importance of TEWS, a significant gap remains in their awareness of local TEWS installations near their school.

The research highlights that the operational and systemic challenges within the BPBD's contingency policy implementation directly contribute to and reflect the observed gaps in community-level awareness of critical safety systems like TEWS. Therefore, to effectively bridge this gap, it is crucial that the Padang City Government, through BPBD, prioritize updating the Renkon to reflect current risks and needs. Simultaneously, there is an urgent need to enhance the capacity of human resources, improve resource allocation, strengthen cross-sectoral coordination, and provide formal incentives for implementers. This research also aimed to explore the perceptions of elementary school students regarding the Tsunami Early Warning System (TEWS) in tsunami-prone areas of Padang City, specifically assessing their general knowledge about TEWS, their understanding of its importance for safety, and their awareness of the physical TEWS installations located near their schools.

Finally, consistent and targeted TEWS education, incorporating regular drills and increased visibility of warning installations, must be integrated into school curricula and broader community preparedness programs, ensuring that disaster policies translate into tangible community resilience and safety.

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