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# THE ROLE OF DISASTER MITIGATION FACILITIES IN INCREASING COMMUNITY PREPAREDNESS IN KANANGA VILLAGE, BIMA REGENCY

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***Abstract***

*This study aims to analyze the role of disaster mitigation facilities in improving community preparedness in Kananga Village, Bolo District, Bima Regency. A qualitative approach was employed by collecting data through in-depth interviews, field observations, and documentation involving village officials, community members, disaster volunteers, and related institutions. Data were analyzed using a SWOT framework to identify strengths, weaknesses, opportunities, and threats affecting the effectiveness of disaster mitigation. The results indicate that disaster mitigation facilities, both structural (such as embankments, drainage systems, evacuation routes, and assembly points) and non-structural (such as early warning systems, disaster education, and community-based volunteers), play a significant role in enhancing community preparedness. However, several challenges remain, including limited infrastructure capacity, lack of human resources and technical equipment, insufficient spatial mapping, and environmental issues caused by human behavior. Opportunities such as government support, technological advancement, and increasing public awareness can be utilized to strengthen disaster mitigation efforts. The study recommends strategies including infrastructure improvement, capacity building through training and education, development of GIS-based spatial mapping, and strengthening collaboration among stakeholders. These strategies are expected to create a more resilient community and reduce disaster risks sustainably.*

*Key words: disaster mitigation, community preparedness, SWOT analysis, spatial planning*

**Abstrak**

Penelitian ini bertujuan untuk mengkaji peran fasilitas mitigasi bencana dalam meningkatkan kesiapsiagaan masyarakat di Desa Kananga, Kecamatan Bolo, Kabupaten Bima. Pendekatan yang digunakan adalah kualitatif dengan pengumpulan data melalui wawancara mendalam, observasi lapangan, dan studi dokumentasi yang melibatkan perangkat desa, masyarakat, relawan kebencanaan, serta instansi terkait. Analisis data dilakukan menggunakan pendekatan SWOT untuk mengidentifikasi kekuatan, kelemahan, peluang, dan ancaman yang memengaruhi efektivitas mitigasi bencana. Hasil penelitian menunjukkan bahwa fasilitas mitigasi bencana, baik yang bersifat struktural seperti tanggul, drainase, jalur evakuasi, dan titik kumpul, maupun non-struktural seperti sistem peringatan dini, edukasi kebencanaan, dan keberadaan relawan, memiliki peran penting dalam meningkatkan kesiapsiagaan masyarakat. Namun, masih terdapat berbagai kendala seperti keterbatasan kapasitas infrastruktur, kurangnya

sumber daya manusia dan peralatan teknis, belum optimalnya pemetaan spasial, serta faktor lingkungan akibat perilaku masyarakat. Peluang seperti dukungan pemerintah, perkembangan teknologi, dan meningkatnya kesadaran masyarakat dapat dimanfaatkan untuk memperkuat mitigasi bencana. Strategi yang direkomendasikan meliputi peningkatan kualitas infrastruktur, penguatan kapasitas masyarakat melalui pelatihan, pengembangan pemetaan berbasis GIS, serta peningkatan kolaborasi antar pemangku kepentingan. Dengan demikian, upaya ini diharapkan mampu menciptakan masyarakat yang tangguh terhadap bencana serta mengurangi risiko secara berkelanjutan.

Kata kunci: mitigasi bencana, kesiapsiagaan masyarakat, analisis SWOT, pengembangan wilayah

## A. Introduction

Disaster mitigation constitutes a fundamental component of disaster risk reduction efforts, aimed at minimizing adverse impacts on human life, the environment, and infrastructure[1]. From the perspective of disaster geography, mitigation extends beyond emergency response measures to encompass preventive actions, including the development of physical infrastructure and the continuous enhancement of community capacity[2]. Disaster mitigation facilities both structural, such as levees, drainage systems, evacuation routes, and assembly points, and non-structural, such as early warning systems, disaster education, and the establishment of volunteer groups play a strategic role in strengthening community preparedness in facing disaster events[3]. Accordingly, the availability and adequacy of mitigation facilities serve as key indicators in fostering disaster-resilient communities.

Community preparedness represents a critical dimension of disaster risk reduction, reflecting the capacity of individuals and communities to respond effectively and promptly to potential hazards [4]. Within the context of regional development, preparedness is influenced not only by knowledge and experience but also by the availability of supporting infrastructure that facilitates evacuation and rescue processes. Therefore, the relationship between disaster mitigation facilities and community preparedness is inherently interdependent, as the presence of such facilities enhances response effectiveness while simultaneously reducing regional vulnerability [5].

[1] Lukman Arif, 'Mitigasi Bencana Gempa Di Kota Surabaya (Kajian Tentang Upaya Antisipatif Pemerintah Kota Surabaya Dalam Mengurangi Resiko Bencana)', *Dinamika Governance: Jurnal Ilmu Administrasi Negara*, 10.1 (2020).

[2] Himawan Putranta and others, *Modul Edukasi Mitigasi Bencana* (UIN Sunan Kalijaga Yogyakarta, 2024).

[3] Burhan Zahadi and Hasan Zakki, 'Strategi Antisipasi Bencana Alam Untuk Meningkatkan Kesiapsiagaan Masyarakat', *Journal of Community Development and Empowerment*, 2.1 (2026), 26–30.

[4] Dinda Ariyani and others, 'EFEKTIVITAS SIMULASI EVAKUASI DALAM MITIGASI RISIKO GEMPA DAN TSUNAMI: ANALISIS PARTISIPASI MASYARAKAT DAN KESIAPSIAGAAN BPBD KOTA PADANG TAHUN 2025', *JMA*, 3.12 (2025).

[5] ULFIAN ULFIAN, 'Pengaruh Kapasitas Kelembagaan Badan Penanggulangan Bencana Daerah Provinsi Sulawesi Barat Terhadap Pengurangan Resiko Bencana= THE INFLUENCE OF INSTITUTIONAL CAPACITY OF THE REGIONAL DISASTER MANAGEMENT AGENCY OF WEST SULAWESI PROVINCE ON DISASTER RISK REDUCTION' (Universitas Hasanuddin, 2025).

A growing body of research demonstrates that adequate mitigation facilities significantly improve community preparedness. Previous studies indicate that structural infrastructure, such as levees and drainage systems, plays a crucial role in reducing flood risks, while the provision of evacuation routes and assembly points accelerates rescue operations. Furthermore, non-structural approaches including disaster education and evacuation simulations have proven effective in enhancing public awareness and understanding of disaster risks[6]. These findings underscore that the integration of structural and non-structural mitigation strategies represents the most effective approach to disaster risk reduction.

Other studies highlight the importance of institutional roles and community participation in ensuring the success of disaster mitigation initiatives. Community involvement in socialization programs, training activities, and the formation of disaster volunteer groups, such as *Taruna Siaga Bencana* (Tagana), is a key factor in strengthening community capacity[7]. Nevertheless, several challenges persist, including limited human resources, inadequate facility support, and the suboptimal utilization of technological and spatial data in mitigation planning. These constraints indicate that, despite ongoing mitigation efforts, significant challenges remain.

In the context of the study area, Kananga Village, located in Bolo Subdistrict, Bima Regency, is categorized as a highly vulnerable area to hydrometeorological hazards, particularly floods and fires[8]. Field observations reveal that disaster mitigation facilities in this area are available in both physical and non-physical forms[9]. However, their effectiveness is constrained by several factors, including limited infrastructure capacity, insufficient detailed spatial mapping, and a lack of human resources and technical equipment. Additionally, environmental conditions and community behavior further influence the level of disaster risk in the area.

Based on these findings, it is evident that the role of disaster mitigation facilities in enhancing community preparedness in Kananga Village requires a more comprehensive examination, particularly in identifying internal and external factors affecting their effectiveness. Most previous studies have focused on mitigation aspects in a fragmented manner either on infrastructure or community capacity thus lacking an integrated strategic analytical approach. Therefore, this study offers a novel contribution by employing a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis to comprehensively assess the role of disaster mitigation facilities in improving community preparedness in Kananga Village. This research aims to identify key

[6] Ariyani and others.

[7] Shalsa Priscillia, 'Strategi Organisasi Taruna Siaga Bencana (TAGANA) Sumatera Barat Dalam Tahap Tanggap Darurat Bencana Banjir Lahar Dingin Di Kabupaten Tanah Datar' (Universitas Andalas, 2025).

[8] Misbach Baenaqly Zidny, 'KESIAPSIAGAAN MASYARAKAT MENGHADAPI BENCANA BANJIR DI DESA AMBARAWA TIMUR KECAMATAN AMBARAWA KABUPATEN PRINGSEWU TAHUN 2024', 2025.

[9] Indah Murti and Yusuf Hariyoko, 'Analisis Swot (Strengths, Weaknesses, Opportunities And Threats) Pada Peningkatan Pelayanan Transportasi Umum Di Surabaya', *PRAJA Observer: Jurnal Penelitian Administrasi Publik (e-ISSN: 2797-0469)*, 4.06 (2024), 63–74.

strengths, weaknesses, opportunities, and threats in disaster mitigation management and to formulate effective and sustainable strategies tailored to regional characteristics[10].

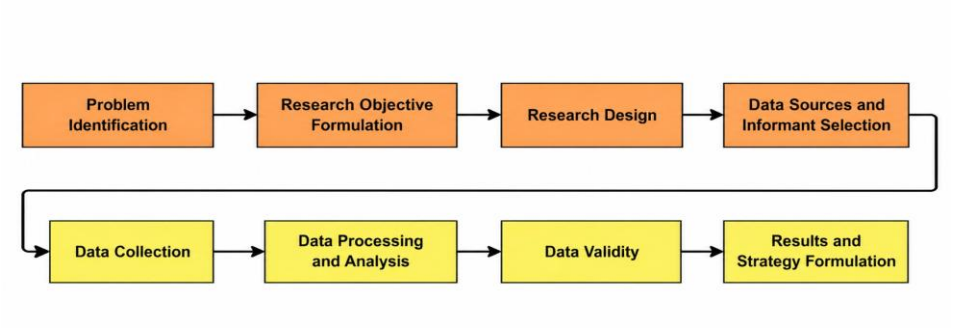
Accordingly, the objectives of this study are to analyze the role of disaster mitigation facilities in enhancing community preparedness in Kananga Village by identifying the influencing factors of strengths, weaknesses, opportunities, and threats. In addition, this study seeks to formulate effective, integrated, and sustainable mitigation strategies based on regional characteristics to support the development of disaster-resilient communities.

## B. Research Methods

This study employs a qualitative approach aimed at obtaining an in-depth understanding of the role of disaster mitigation facilities in enhancing community preparedness in Kananga Village, Bolo Subdistrict, Bima Regency. This approach is selected for its capacity to explore social phenomena contextually, based on the experiences, perceptions, and interactions of communities directly involved in disaster mitigation activities at the local level. From the perspective of geography and regional development, qualitative methods are considered particularly effective for examining complex spatial and social dynamics, especially in disaster-related contexts.The research process begins with the formulation of research focus and questions, systematically developed in alignment with the study objectives. These include identifying the role of mitigation facilities, analyzing supporting and inhibiting factors affecting community preparedness, and formulating region-based mitigation strengthening strategies. The research questions are designed in an open-ended manner to enable in-depth and comprehensive data exploration.

Data collection is conducted through in-depth interviews, field observations, and document analysis. Interviews are carried out with key informants selected using purposive sampling, based on their level of involvement, knowledge, and experience in disaster mitigation activities. The informants include village officials, affected community members, disaster volunteers such as Taruna Siaga Bencana (Tagana), and relevant institutions, including the Regional Disaster Management Agency (BPBD). Field observations are undertaken to assess the condition of mitigation facilities such as levees, drainage systems, evacuation routes, and assembly points and to observe community behavior in responding to disaster risks. Meanwhile, document analysis is used to complement primary data through reports, village archives, and disaster-related documents.

[10] Rara Agni Damayanti and Uliana Ria Sembiring, 'STRATEGI PENANGGULANGAN BENCANA BANJIR DI KOTA LUBUKLINGGAU PROVINSI SUMATERA SELATAN OLEH DINAS PEMADAM KEBAKARAN DAN PENANGGULANGAN BENCANA' (Institut Pemerintahan Dalam Negeri, 2025).




Data analysis in this study employs a SWOT (Strengths, Weaknesses, Opportunities, Threats) framework to identify internal and external factors influencing the effectiveness of disaster mitigation facilities in enhancing community preparedness[11]. Strengths and weaknesses are categorized as internal factors originating within Kananga Village, whereas opportunities and threats are considered external factors, including government policies, technological advancements, environmental conditions, and climate change. Subsequently, data interpretation is conducted by linking empirical findings from interviews and observations with theoretical frameworks and previous studies, resulting in descriptive, analytical, and contextual insights. The SWOT analysis results are then utilized as a basis for formulating effective, adaptive, and sustainable disaster mitigation strategies. The final stage involves drawing conclusions and developing strategic recommendations that may serve as references for village authorities, communities, and stakeholders in enhancing preparedness through the optimization of disaster mitigation facilities in Kananga Village.

## C. Result and Discussion

Based on the results of interviews conducted with the community of Kananga Village, it was found that the presence of disaster mitigation facilities has contributed to improving community preparedness, although not yet optimally. Facilities such as levees, drainage systems, evacuation routes, and assembly points are available and have been utilized by the community in responding to flood disasters, which frequently occur due to the area's hydrometeorological conditions.

However, field findings indicate that the effectiveness of these facilities is still influenced by various factors, including limited infrastructure capacity, insufficient spatial data support, and prevailing social conditions within the community. Several respondents noted that although levees and drainage systems help reduce flood impacts, overflow still frequently occurs during periods of heavy rainfall. Furthermore, most community members are already aware of evacuation routes and assembly points, indicating an improvement in awareness and preparedness.

From an institutional perspective, mitigation efforts remain predominantly focused on the emergency response phase rather than on preventive measures. On the other hand,

[11] Muhammad Daniyal and others, 'Pengaruh Sosialisasi Dan Simulasi Terhadap Kesiapsiagaan Dalam Menghadapi Bencana Alam Gempa Bumi Pada Masyarakat Desa Keurisi Meunasah Lueng Jangka Buya Pidie Jaya', *GALENICAL: Jurnal Kedokteran Dan Kesehatan Mahasiswa Malikussaleh*, 2.5 (2023), 88.

community participation in disaster socialization programs and simulation activities reflects a significant potential for strengthening community-based capacity.

Based on these findings, an analysis of internal and external factors was conducted using the SWOT approach, as presented in the following table.

| IFAS / EFAS | **Strength** | **Weakness** |
|---|---|---|
| | 1. Availability of mitigation facilities (embankments, drainage, evacuation routes, assembly points)<br>2. Public awareness of disaster preparedness<br>3. The existence of disaster volunteers (Tagana)<br>4. Disaster socialization and simulation activities | 1. Kapasitas tanggul dan drainase belum memadai<br>2. Keterbatasan SDM dan peralatan teknis<br>3. Fokus kelembagaan masih pada tanggap darurat<br>4. Belum tersedia pemetaan spasial yang detail |
| | **Opportunities** | **Threats** |
| | 1. Dukungan program pemerintah (BPBD)<br>2. Perkembangan teknologi geospasial (GIS dan early warning system)<br>3. Meningkatnya partisipasi masyarakat<br>4. Program desa tangguh bencana. | 1. Tingginya curah hujan dan risiko banjir<br>2. Kerusakan lingkungan (sampah, deforestasi)<br>3. Perilaku masyarakat yang kurang peduli lingkungan<br>4. Keterbatasan kapasitas kelembagaan |

Source: Processed from interview data, 2026

### 1. Strengths Analysis in Disaster Mitigation in Kananga Village

The geographical condition of Kananga Village, which is highly prone to hydrometeorological hazards particularly flooding has encouraged the development of various facility-based mitigation efforts that serve as key strengths in enhancing community preparedness. From a disaster geography perspective, the existence of mitigation infrastructure such as levees, drainage systems, evacuation routes, and assembly points represents structural mitigation aimed at reducing regional vulnerability.

These facilities function not only as physical protection measures but also as essential support systems for community mobility during emergency situations. The presence of levees and drainage systems reflects efforts to regulate water flow and minimize flood occurrences. Although not yet fully optimal, these infrastructures have contributed positively to reducing water inundation in certain areas. This is supported by interview findings indicating that “levees and drainage help reduce flooding, although overflow

still occurs during heavy rainfall" (M), suggesting that while functional, these infrastructures require capacity enhancement [12].

Moreover, the availability of designated evacuation routes and assembly points constitutes a critical strength in improving community preparedness. In emergency situations, clearly defined evacuation access enables communities to move quickly to safer locations. This is reflected in statements from respondents noting that "the community is already aware of evacuation routes and safe locations during floods" (W), indicating increased awareness supported by mitigation facilities [13].

In addition, non-structural mitigation efforts also represent significant strengths. Socialization programs, disaster simulations, and the presence of volunteer groups such as Taruna Siaga Bencana (Tagana) demonstrate strengthened social capacity within the community. As expressed by one respondent, "we often participate in socialization activities and already know what actions to take during disasters" (T). Therefore, the primary strength of Kananga Village lies in the integration of physical infrastructure and social capacity, which collectively enhances overall preparedness [14].

## 2. Weaknesses Analysis in Disaster Mitigation in Kananga Village

Despite these strengths, disaster mitigation management in Kananga Village still faces several weaknesses that affect its overall effectiveness. A primary limitation is the insufficient capacity of mitigation infrastructure, which has not yet adapted to the increasing intensity of disaster events. During periods of heavy rainfall, levees and drainage systems often fail to accommodate water discharge, resulting in flooding in residential areas.

This is supported by interview findings stating that "during heavy rainfall, water still enters houses because the drainage system cannot accommodate it" (W), indicating that while infrastructure exists, its capacity remains inadequate to cope with environmental pressures.

Another weakness lies in the limited human resources and technical equipment available for disaster mitigation management. Interviews reveal that relevant institutions, such as BPBD, tend to focus more on emergency response rather than prevention and mitigation efforts. This imbalance is reflected in statements such as "most handling efforts are carried out during disasters, while preventive measures remain limited" (P), indicating an imbalance in disaster management practices [15].

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[12] PUTRI RAHMATIKA AZZAHRA, 'DAMPAK PENGELOLAAN SISTEM DRAINASE TERHADAP BENCANA BANJIR PADA MASYARAKAT DI KOTA BANDAR LAMPUNG (Studi Dinas Pekerjaan Umum Kota Bandar Lampung)' (UIN Raden Intan Lampung, 2025).

[13] Catur Septiawan, 'Penguatan Peran Pengembangan Masyarakat Dalam Mitigasi Dan Adaptasi Terhadap Bencana Alam: Pengabdian', *Jurnal Pengabdian Masyarakat Dan Riset Pendidikan*, 4.4 (2026), 23641–51.

[14] MU'TAZ HAMID FARIS, 'Filantropi Dalam Mitigasi Bencana Oleh Ngo Mitra Bentala Dan Kelompok Desa Tangguh Bencana Di Desa Maja, Kecamatan Kalianda, Kabupaten Lampung Selatan', 2025.

[15] Rizal Ahmad Fadilla, 'Analisis Kinerja Aparatur Badan Penanggulangan Bencana Daerah Dalam Pelaksanaan Tanggap Darurat Bencana Di Kabupaten Bandung Barat' (IPDN Jatinangor, 2021).

Furthermore, the absence of detailed spatial mapping related to disaster vulnerability constitutes a critical limitation. In geographical studies, spatial data plays a crucial role in informing effective mitigation planning. Without accurate and comprehensive data, policy decisions tend to be reactive and less targeted [16].

Thus, the key weaknesses in disaster mitigation in Kananga Village lie in infrastructure limitations, institutional capacity constraints, and the lack of comprehensive spatial data supportnesses Analysis in Disaster Mitigation in Kananga Village

### 3. Weaknesses Analysis in Disaster Mitigation in Kananga Village

Despite these challenges, Kananga Village possesses significant opportunities to enhance the effectiveness of its disaster mitigation efforts. One major opportunity is the support provided by local government programs through BPBD, which can be leveraged to improve infrastructure capacity and strengthen institutional frameworks at the village level.

In addition, advancements in geospatial technologies such as Geographic Information Systems (GIS) and digital-based early warning systems offer opportunities to improve the accuracy of disaster risk mapping. This is supported by respondents' statements indicating that "with better early warning tools, the community could prepare more quickly" (M), highlighting the potential role of technology in disaster mitigation[17].

Another opportunity lies in the increasing level of community awareness regarding disaster preparedness. This is evident in the active participation of residents in socialization and simulation activities. Within a community-based approach, such participation is a critical factor in enhancing regional resilience to disasters[18].

Furthermore, the implementation of disaster-resilient village programs provides a strategic opportunity to strengthen both community capacity and institutional preparedness. By capitalizing on these opportunities, Kananga Village can develop a more integrated and sustainable disaster mitigation system.

### 4. Threats Analysis in Disaster Mitigation in Kananga Village

The primary threat faced by Kananga Village is the high intensity of hydrometeorological hazards influenced by climatic and environmental conditions. Heavy rainfall frequently causes river overflow and flooding, which cannot be fully controlled by existing infrastructure. This indicates that natural factors remain a dominant threat in disaster mitigation efforts.

In addition, environmental degradation resulting from human activities poses a significant threat. Practices such as improper waste disposal into rivers and deforestation in upstream areas exacerbate environmental conditions and increase flood

[16] Fadilla.

[17] Ria Monalisa Batubara and Erfan Wahyudi, 'MITIGASI KEBAKARAN HUTAN MELALUI ZONASI WILAYAH RAWAN KEBAKARAN BERBASIS SISTEM INFORMASI GEOGRAFIS DI KOTA PALANGKA RAYA' (Institut Pemerintahan Dalam Negeri, 2025).

[18] Septiawan.

risks. This is reinforced by statements from respondents noting that "some community members still dispose of waste into rivers, causing blockages in water flow" (T) [19].

Another critical threat is the limited institutional capacity to cope with increasing disaster risks. Without corresponding improvements in institutional capability, existing mitigation facilities may not function optimally in the long term.

Therefore, disaster mitigation threats in Kananga Village encompass interconnected natural, environmental, and social factors that collectively intensify disaster risks.

## 5. Formulation of Disaster Mitigation Strategies in Kananga Village

Based on the SWOT analysis, the following strategies are formulated:

| | **Strengths (S)** | **Weaknesses (W)** |
|---|---|---|
| Opportunities (O) | SO Strategy: Utilize mitigation facilities and community participation to support government programs and technological development in disaster management | WO Strategy: Enhance human resource capacity and spatial mapping through technological support and government programs |
| Threats (T) | ST Strategy: Optimize the function of mitigation facilities and community roles in addressing disaster risks and environmental degradation | WT Strategy: Improve infrastructure quality and institutional capacity to reduce disaster impacts |

Overall, the analysis indicates that disaster mitigation in Kananga Village is influenced by the interaction of physical, social, and institutional factors. The main strengths mitigation facilities and community participation serve as essential capital, while weaknesses in infrastructure and spatial data require immediate attention. Opportunities arising from government support and technological advancements can be leveraged to enhance mitigation effectiveness, while threats from natural and environmental factors must be addressed through integrated strategies [20].

Therefore, a comprehensive mitigation approach is required one that not only emphasizes physical development but also prioritizes community capacity building, technological utilization, and multi-stakeholder collaboration to achieve a disaster-resilient Kananga Village.

## Conclusion

Based on the findings of this study, disaster mitigation facilities in Kananga Village play a significant role in enhancing community preparedness through the provision of physical infrastructure such as levees, drainage systems, evacuation routes, and assembly points, as well as non-structural measures including early warning systems,

[19] Indah Purwoningsih and others, 'Analisis Komprehensif Faktor-Faktor Pemicu Banjir Dan Dampaknya Terhadap Ketahanan Sosial Ekonomi Masyarakat Di Wilayah Lampung', *Jurnal Kajian Hukum Dan Kebijakan Publik| E-ISSN: 3031-8882*, 2.2 (2025), 1303–8.

[20] FARIS.

disaster awareness programs, and the presence of volunteer groups such as *Taruna Siaga Bencana* (Tagana). These facilities have been shown to improve community understanding, awareness, and capacity to respond to disasters more effectively and promptly.

However, the effectiveness of disaster mitigation remains constrained by several challenges, including limited infrastructure capacity, insufficient human resources and technical equipment, suboptimal spatial mapping, and community behaviors that continue to contribute to increased disaster risk.

The SWOT analysis reveals that strengthening disaster mitigation in Kananga Village is influenced by internal factors namely the availability of mitigation facilities and the community's social capacity as well as external factors such as government policy support, technological advancements, and environmental conditions. Therefore, effective development strategies should prioritize improving the quality of mitigation infrastructure, strengthening human resource capacity through education and training, optimizing the use of geospatial technologies, and enhancing collaboration among government institutions, communities, and relevant stakeholders.

Accordingly, integrated and sustainable disaster mitigation efforts are expected to significantly improve community preparedness while reducing disaster risks and impacts in Kananga Village in a comprehensive manner.

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