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Community-Based Disaster Preparedness for Risk Reduction in Pancanegara Village, Banten Province

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Abstrak

Desa Pancanegara di Provinsi Banten rawan banjir dan tanah longsor akibat aktivitas penambangan pasir, dinamika aliran sungai, dan keberadaan waduk. Inisiatif pengabdian masyarakat ini bertujuan untuk meningkatkan kesiapsiagaan bencana dengan memanfaatkan strategi pengurangan risiko bencana berbasis masyarakat. Program ini dilaksanakan melalui pendekatan partisipatif, seperti pelatihan kesadaran bencana, penilaian risiko partisipatif, pembentukan Kelompok Kerja Bencana Masyarakat (POKJA), latihan simulasi bencana, dan penyusunan rencana aksi. Program KUKERTA Universitas Islam Negeri Sultan Maulana Hasanuddin Banten berkolaborasi dengan Badan Zakat Nasional Republik Indonesia untuk melaksanakan kegiatan tersebut. Hasil penelitian menunjukkan peningkatan kesadaran masyarakat, koordinasi kelembagaan, dan kapasitas respons bencana praktis, terutama dalam hal perencanaan evakuasi dan metode peringatan dini. Kesiapsiagaan bencana terintegrasi ke dalam rutinitas masyarakat sehari-hari, menunjukkan potensi pengurangan risiko jangka panjang. Program ini menekankan nilai hubungan universitas-masyarakat dalam mengimplementasikan ketahanan lokal di daerah pedesaan rawan bencana.

Kata Kunci: *Kesiapsiagaan Bencana Berbasis Komunitas, Pengurangan Risiko Bencana, Banjir dan Tanah Longsor, Pendekatan Partisipatif, Ketahanan Pedesaan.*

Abstract

Pancanegara Village in Banten Province is prone to floods and landslides as a result of sand mining activities, river flow dynamics, and the presence of water reservoirs. This community service initiative aims to improve disaster preparedness by utilizing a community-based disaster risk reduction strategy. The program was carried out through participatory approaches, such as disaster awareness training, participatory risk assessment, the formation of a Community Disaster Working Group (POKJA), catastrophe simulation exercises, and action plan formulation. The Sultan Maulana Hasanuddin State Islamic University of Banten's KUKERTA program collaborated with the Republic of Indonesia's National Zakat Agency to carry out the activities. The findings suggest increased community awareness, institutional coordination, and practical disaster response capacity, notably in terms of evacuation planning and early warning methods. Disaster preparedness is integrated into ordinary community routines, demonstrating the potential for long-term risk reduction. This program emphasizes the value of university-community relationships in implementing local resilience in disaster-prone rural areas.

Kata Kunci: *Community-Based Disaster Preparedness, Disaster Risk Reduction, Flood And Landslide, Participatory Approach, Rural Resilience.*

INTRODUCTION

Indonesia's geographical complexity and tropical climate render it vulnerable to a wide range of natural hazards, including floods and landslides. These hazards disproportionately affect rural areas, where environmental degradation, limited access to disaster education, and insufficient institutional capacity frequently exacerbate vulnerabilities (Arifin et al., 2021). In this national setting, proactive disaster risk reduction measures that incorporate local engagement have been widely emphasized in worldwide research on community-based disaster preparedness.

Pancanegara Village in Serang Regency, Banten Province, is an example of a rural settlement exposed to multiple layers of catastrophe risk. The community is located downstream from the Sindangheula Reservoir and is crossed by the Ci Banten River, which exposes it to potential flash floods during heavy rains. Furthermore, continued sand mining along riverbanks contributes to riverbank destabilization and increased sedimentation, increasing flood and landslide risk (International Journal of Disaster Risk Reduction). Community risk variables like these are consistent with studies from other Indonesian locales, where hydrological hazards and land-use constraints considerably increase disaster susceptibility at the village level (Usman et al., 2023).

Despite the increased risk, many rural Indonesian communities are still underprepared for disasters. Disaster risk understanding, early warning awareness, and coordinated response capacities are frequently lacking, restricting local agency in crisis situations. This pattern is congruent with empirical research, which shows that community-institutional interaction and participatory planning greatly increase preparedness outcomes (Bali, 2022). Similarly, thorough studies show that interventions that combine education, drills, and stakeholder participation are very effective at improving disaster preparedness at the community level (Chasanah, 2024).

To address these issues in Pancanegara Village, this community service effort took a multifaceted strategy. Methods included disaster awareness socialization among local inhabitants, the formation of community-based working groups in charge of localized risk communication and response coordination, and the facilitation of disaster simulation exercises to improve practical preparedness. These activities were carried out by the Sultan Maulana Hasanuddin State Islamic University of Banten's Kuliah Kerja Nyata (KUKERTA) program, in conjunction with the Republic of Indonesia's National Zakat Agency, to create entrenched and ongoing engagement with local stakeholders. The approach is consistent with best practices in community-based disaster risk reduction, which stress knowledge co-production and local capacity building as ways to strengthen resilience (Gómez, 2024).

Previous community-oriented disaster interventions in Indonesia have shown that participatory education and preparedness training improves local resilience. Community forums and training programs, for example, have been demonstrated to boost disaster awareness and resource mobilization capacity in rural areas, thereby bridging the gap between formal disaster preparation and grassroots readiness (Kusumawati, 2021). However, precise documentation of such interventions in riverine and mining-affected areas is sparse, emphasizing the significance of focused service initiatives like the one currently underway.

The primary goal of this community service activity is to improve disaster preparedness and risk reduction in Pancanegara Village by raising community awareness, forming functional disaster working groups, and improving practical response skills through participatory education and simulation exercises. This effort seeks to contribute to long-term resilience in a multi-hazard rural environment by encouraging local ownership of disaster risk reduction activities.

METHOD

Study Area

This community-based disaster preparedness program took place in Pancanegara Village, Serang Regency, Banten Province, Indonesia. The village is geographically defined by its proximity to the Ci Banten River and located downstream of the Sindangheula Reservoir. Furthermore, sand mining activities occur within and around the community, which contributes to riverbank instability, sedimentation, and land degradation. These natural characteristics increase the village's vulnerability to hydrometeorological risks, including floods and landslides, especially during periods of heavy rain.

Program Design

The program took a community-based disaster risk reduction (CBDRR) strategy, which emphasized participatory learning, local capacity building, and experiential practice. The activities were planned as part of Sultan Maulana Hasanuddin State Islamic University of Banten's Kuliah Kerja Nyata (KUKERTA) program, which was carried out in partnership with the Republic of Indonesia's National Zakat Agency. The program was implemented in an organized manner and included educational, organizational, and practical components to improve community readiness.

Participants

Pancanegara Village inhabitants participated, as did community leaders, youth groups, women's groups, and village administrators. Participants were chosen in collaboration with village administration to guarantee widespread community participation and representation of disaster-affected groups. Community participation was optional and focused on informed engagement throughout the program's operations.

Disaster Preparedness Training and Socialization

The initial step of the program included disaster preparedness training and socialization workshops for neighborhood members. These sessions covered key disaster risk concepts such as hazard identification, susceptibility, capacity, and risk reduction techniques for floods and landslides. Local risk factors such as sand mining, river overflow, and reservoir-related hazards received special consideration. The training was presented using interactive lectures, group discussions, and visual learning resources to encourage active participation and contextual comprehension.

Formation of Community Working Groups

Following the training sessions, community-based disaster working groups were formed to help enhance local institutional capacity. These groups were made up of selected community members who displayed dedication and leadership during the training process. The working groups were responsible for disaster preparedness planning, providing risk information, arranging evacuation protocols, and assisting vulnerable individuals during calamities. These groups were formed with the goal of ensuring that disaster preparedness initiatives would continue beyond the program's expiration.

Disaster Simulation Exercises

The training concluded with disaster simulation exercises to improve practical preparation. The simulations were created to recreate flood and landslide situations that are relevant to Pancanegara Village. Participants experienced emergency response methods such as early warning communication, evacuation routes, coordination of assembly points, and community member role distribution. The simulations gave hands-on experience and allowed participants to use what they learned during training in a controlled but realistic environment.

Data Collection and Evaluation

The program was evaluated using qualitative observational methods. Data were acquired by directly observing participant engagement during training sessions, working group activities, and simulation exercises. Participants and community leaders provided informal input on perceived gains in disaster awareness, readiness, and response confidence. These observations were utilized to assess the program's success and indicate potential areas for future development.

Ethical Considerations

All activities were carried out with the agreement and support of village authorities. Participants were informed of the program's aims and procedures prior to participating. Throughout the implementation process, the program stressed inclusivity, safety, and adherence to local knowledge and community norms.

Figure 1. Methodological framework of the community-based disaster preparedness program implemented in Pancanegara Village, Banten Province.

RESULTS AND DISCUSSION

Pre-Assistance Phase: Preparation, Consolidation, and Initial Risk Assessment

The pre-assistance phase emphasized institutional readiness and community ownership as essential components of long-term catastrophe preparedness. Early coordination with village authorities and community leaders helped to match program objectives with local concerns, increasing stakeholder commitment and governance legitimacy (Bonfanti et al., 2023), (Ryan et al., 2020).

Table 1. Disaster History Matrix of Pancanegara Village, Serang Regency, Banten Province.

Year	Disaster Event	Frequency	Impact	Total
2020	Flood and Landslide	1 combined event	River overflow accompanied by minor landslides, damage to houses and local infrastructure	High
2021	Flood	1 event	Prolonged inundation of low-lying areas, reduced agricultural productivity	Moderate

2022	Flood	2 event	Recurrent flooding affecting settlements and public facilities	High
2023	Flood and Landslide	1 combined event	Significant flooding and localized landslides linked to extreme rainfall and environmental degradation	High
2024	Flood	1 event	Localized flooding with limited physical damage but high community disruption	Low-Moderate

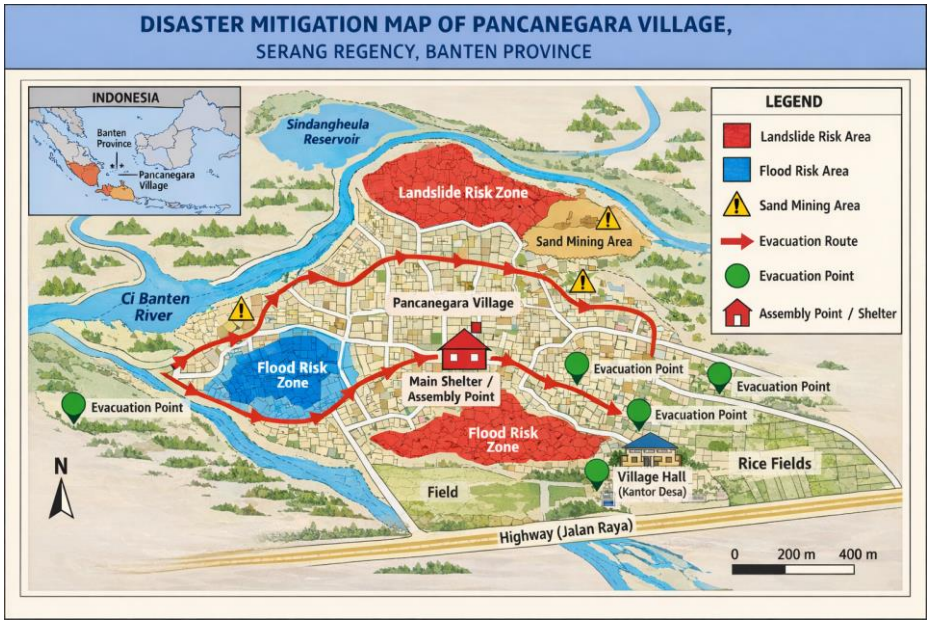

Figure 2. Disaster mitigation map of Pancanegara Village, Banten Province.

The catastrophe history matrix (Table 1) shows a recurring pattern of flood-related disasters, which become more severe when they coincide with landslides. This tendency emphasizes the combined effects of hydrological and geomorphological processes, particularly in areas influenced by river dynamics and land-use changes. Figure 2 depicts the regional distribution of hazards, which emphasizes the importance of location-specific mitigation tactics over generalized disaster response measures.

At the start of the program, participants completed a participatory self-assessment to identify local dangers, vulnerabilities, and current capacity. Community members actively highlighted flood and landslide threats connected with sand mining activities, the Ci Banten River, and the village's downstream position in relation to the Sindangheula Reservoir. This participatory assessment improved local risk perception and allowed for the identification of context-specific vulnerabilities, demonstrating the importance of community knowledge in disaster risk analysis.

The choice of Pancanegara Village as the intervention location over an urban setting was a strategic decision based on catastrophe risk reduction theory. Rural villages are smaller and more cohesive community units than cities,

allowing for more targeted, intense, and participatory disaster preparedness measures. In hazard-prone rural areas, social networks are often stronger and governance structures more localized, making it easier to conduct community-based programs like participatory risk assessment, institutional strengthening, and simulation-based learning.

Furthermore, rural livelihoods in Pancanegara rely heavily on climate-sensitive sectors like rice fields and small-scale agriculture, which are directly vulnerable to flood and landslide threats. Floods frequently cause crop failure, loss of arable land, and long-term revenue disruption, increasing socioeconomic vulnerability beyond the immediate physical harm. These qualities make rural communities ideal for—and desperately in need of—community-based disaster preparedness programs that combine livelihood preservation and risk reduction techniques.

This phase resulted in the development of a Kelompok Kerja (POKJA), which represented a wide range of community elements such as village leaders, youth, women, and local volunteers. The Kelompok Kerja (POKJA) was established to promote participatory decision-making by bringing together representatives from village administrations, youth groups, women's organizations, and local volunteers. This system increased social capital and collective preparedness capabilities, particularly in terms of coordinating evacuation, early warning distribution, and community mobilization. Previous research has shown that inclusive community participation increases social capital and improves collective catastrophe response capacity (Mello et al., 2021).

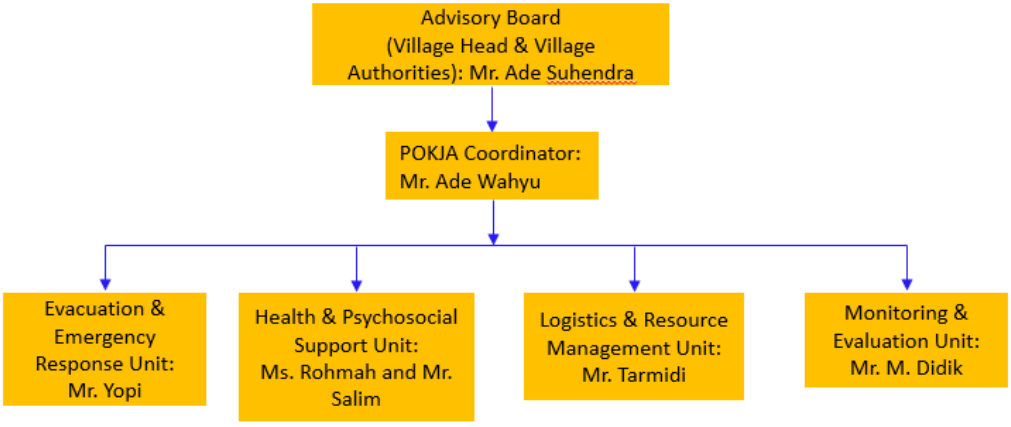

Figure 3. POKJA Organizational Structure in Pancanegara Village, Banten Province.

Assistance Phase: KATANA Socialization, Risk Assessment, and Simulation

During the support phase, disaster preparedness actions were carried out through systematic socialization of the Kampung Tanggap Bencana (KATANA) concept. KATANA socialization greatly enhanced disaster literacy by allowing community members to understand disaster risk as a combination of hazard, susceptibility, and capability. Increased understanding of flood and landslide triggers, particularly those associated with environmental degradation, led to increased proactive preparedness behavior during simulations. Other community-

based preparedness programs in Southeast Asia have found comparable advances in disaster literacy (Lerman Ginzburg et al., 2023).

The POKJA's institutional structure boosted local disaster governance. Clear duty allocation within the working group improved coordination in preparedness planning, early warning distribution, and evacuation management. This finding is consistent with worldwide research demonstrating that community-level organizational structures improve preparedness effectiveness and reduce response delays during catastrophes (BAZNAS2021).

Participatory disaster risk assessment and community action plans were significant outcomes of the aid phase. Community members cooperatively selected critical dangers and created feasible mitigation and preparedness activities. The generated danger and evacuation maps offered spatially clear information for safe evacuation routes and assembly places. Participatory mapping is widely recognized as a useful approach for turning technical risk understanding into meaningful community planning (Ozkan et al., 2021).

The implementation of a community-based early warning system, as well as role allocation, increased preparedness capability. Residents developed a realistic awareness of warning indicators, communication processes, and reaction duties. These findings were corroborated by disaster simulation exercises in which participants practiced flood and landslide response scenarios. Simulation results showed measurable increases in coordination efficiency, evacuation speed, and role clarity compared to pre-intervention settings. More importantly, simulations served as experiential learning platforms, enabling participants to internalize response methods and discover operational deficiencies, which were then corrected during evaluation sessions. Simulation-based training has been found to greatly increase disaster response abilities and confidence among community members.

Post-Assistance Phase: Monitoring, Evaluation, and Sustainability

The post-assistance phase focused on monitoring and evaluating program implementation as well as the community's catastrophe action plans. Observational evaluation and community comments revealed ongoing POKJA engagement and boosted community members' confidence in disaster risk management. The monitoring process identified enhanced preparedness indicators such as risk awareness, evacuation readiness, and collaborative decision-making capacity (Goyal, 2022).

The evaluation of the action plans revealed that the community was able to independently examine and adjust preparedness tactics based on simulation results. This adaptive learning approach is critical for disaster resilience because it allows for continual improvement of preparedness tactics based on real-time input and community experience. Integrating catastrophe preparedness into ordinary community behaviors improves long-term risk reduction capacity. Furthermore, incorporating disaster preparedness into everyday community activities indicates

possible long-term benefits in disaster mitigation (Lin & Lee, 2023), (Ravazzoli et al., 2025).

This rural-focused approach is consistent with current disaster risk reduction literature, which emphasizes that preparedness interventions in small-scale, livelihood-dependent communities produce better behavioral change, institutional ownership, and resilience outcomes than large, heterogeneous urban environments.

Overall, the findings show that a community-based disaster preparedness approach that incorporates participatory risk assessment, institutional improvement via POKJA, and simulation-based learning improves disaster readiness in flood and landslide prone rural areas. This study adds empirical data to the catastrophe risk reduction literature by demonstrating how university-community collaborations can operationalize local resilience in high-risk settings. The community-based approach implemented through the KUKERTA program of Sultan Maulana Hasanuddin State Islamic University of Banten, in collaboration with the National Zakat Agency of the Republic of Indonesia, effectively improved disaster preparedness in Pancanegara Village. The findings complement previous evidence that participatory disaster education, institutional strengthening through community working groups, and experiential learning through simulations all contribute to long-term catastrophe risk reduction in rural, hazard-prone locations.

CONCLUSION

This community-based disaster preparedness program demonstrates how participatory and institutionally based interventions can greatly improve disaster risk reduction capability in flood and landslide-prone rural areas. Early institutional coordination, participatory risk assessment, and the formation of a functioning Community-Based Disaster Working Group (POKJA) helped to build local governance, social capital, and collective preparedness in Pancanegara Village, Banten Province.

The findings show that including disaster literacy through KATANA socialization, spatial risk mapping, and simulation-based learning significantly increases community awareness, evacuation readiness, and coordination efficiency. Disaster simulations, in particular, were important experiential learning methods, allowing community members to internalize response processes, define roles, and uncover operational deficiencies that might be filled through adaptive action planning. These data demonstrate that readiness involves a combination of knowledge acquisition, frequent practice, institutional support, and community ownership.

Furthermore, post-assistance monitoring and evaluation demonstrated that incorporating disaster preparedness measures into ordinary community routines improves the long-term viability of risk-reduction programs. The community's ability to autonomously analyze and improve action plans highlights

the importance of adaptive learning in fostering long-term resilience. Overall, this study provides empirical evidence that university-community partnerships, when aligned with community-based disaster risk reduction principles, can operationalize local resilience and make a significant contribution to disaster preparedness in multi-hazard rural settings.

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