

Community-Based Disaster Management in Yogyakarta City: Risk Analysis, Local Capacity, and Community Resilience Strategies

* ¹Usriya Fara Nabila and ²Moh. Ja'far Sodiq Maksun

¹Faculty of Social and Political Sciences, Universitas Gadjah Mada

²Universitas KH. A. Wahab Hasbullah, Indonesia

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ABSTRAK

ABSTRAK: Studi ini menganalisis implementasi manajemen bencana berbasis komunitas (CBDM) di Kota Yogyakarta sebagai strategi untuk memperkuat ketahanan komunitas terhadap risiko banjir dan gempa bumi. Penelitian ini menggunakan pendekatan deskriptif kualitatif melalui tinjauan pustaka dan analisis data sekunder yang diambil dari dokumen resmi, data statistik, dan penilaian risiko bencana regional. Temuan menunjukkan bahwa risiko bencana dipengaruhi oleh kepadatan penduduk, sistem drainase yang lemah, dan kesadaran masyarakat yang rendah terhadap mitigasi. Namun, masyarakat Yogyakarta memiliki modal sosial dan budaya yang kuat—seperti gotong royong (kerja sama timbal balik), tepo seliro (empati), dan ilmu titen (pengetahuan observasi lokal)—yang dapat diintegrasikan dengan teknologi modern. Pelajaran dari Jepang dan Filipina menyoroti pentingnya partisipasi masyarakat dan dukungan kelembagaan dalam pengurangan risiko bencana. Studi ini merekomendasikan penguatan lembaga masyarakat, perluasan pendidikan bencana, dan pengintegrasian kearifan lokal ke dalam sistem mitigasi untuk mewujudkan model manajemen bencana berbasis komunitas yang tangguh.

Kata kunci: manajemen bencana, masyarakat, ketahanan masyarakat, Yogyakarta, kearifan lokal

ABSTRACT

This study analyzes the implementation of community-based disaster management (CBDM) in Yogyakarta City as a strategy to strengthen community resilience against flood and earthquake risks. The research employs a qualitative descriptive approach through literature review and secondary data analysis drawn from official documents, statistical data, and regional disaster risk assessments. The findings reveal that disaster risks are influenced by population density, weak drainage systems, and low public awareness of mitigation. However, Yogyakarta's communities possess strong social and cultural capital—such as *gotong royong* (cooperation), *tepo seliro* (empathy), and *ilmu titen* (local observational knowledge)—which can be integrated with modern technology. Lessons from Japan and the Philippines highlight the importance of community participation and institutional support in disaster risk reduction. This study recommends strengthening community institutions, expanding disaster education, and integrating local wisdom into mitigation systems to realize a resilient, community-based disaster management model.

Keywords: disaster management, community, community resilience, Yogyakarta, local wisdom.

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*AuthorCorrespondent:

Email: 1usriyafaranab@gmail.com, 2jafarsodiq@unwaha.ac.id

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INTRODUCTION

Disasters are both natural and social phenomena that cannot be entirely avoided, yet their impacts can be mitigated through careful planning and active community involvement at every stage of management. As an archipelagic nation located at the convergence of three major tectonic plates—Eurasian, Indo-Australian, and Pacific—Indonesia faces a high level of disaster risk. This geological and geographical condition places Indonesia within the *Ring of Fire*, making it highly susceptible to earthquakes, volcanic eruptions, floods, landslides, and tsunamis. Therefore, disaster risk reduction (DRR) strategies should not rest solely on the central government but must also become integral to local development agendas, particularly within vulnerable communities.

Yogyakarta City is one of the regions in Java Island with high vulnerability to multiple natural hazards. Its proximity to Mount Merapi exposes it to volcanic eruptions, while its geological structure renders it susceptible to seismic shocks. According to data from the National Disaster Management Agency (BNPB), Yogyakarta has experienced several major disasters with significant impacts on social, economic, and infrastructural aspects. The most notable events include the 2016 floods affecting several districts and the 6.3 magnitude earthquake in 2006, which caused thousands of casualties and extensive structural damage. These disasters underscore the urgent need for community preparedness in dealing with sudden emergencies.

In this context, a **community-based disaster management (CBDM)** approach becomes crucial. Communities should not be treated merely as passive recipients of aid but as active agents in mitigation, preparedness, response, and recovery. According to Law No. 24 of 2007 on Disaster Management, risk reduction efforts must involve all levels of society in a planned, integrated, and sustainable manner. Local participation in risk identification, hazard mapping, and the development of community action plans is essential to build local resilience. Hence, this study aims to analyze the forms of vulnerability, risk, and community capacity in Yogyakarta City to strengthen social resilience through a sustainable participatory approach.

RESEARCH METHOD

This study adopts a **qualitative descriptive** approach to gain a deep understanding of the dynamics of disaster risk and the role of local communities in disaster management within Yogyakarta City. The qualitative approach allows a comprehensive analysis of the relationships among social, cultural, and environmental factors that influence community resilience. The descriptive method presents data and phenomena factually while interpreting their meanings without manipulating research variables. The research process emphasizes contextual analysis, interpretation, and empirical understanding based on official documents and relevant literature.

Data were collected through literature study and secondary data analysis from credible sources, including:

1. Population data from the Yogyakarta City Statistics Agency (BPS) 2021–2025;
2. Yogyakarta City Disaster Risk Assessment Document 2022–2026 published by BPBD;
3. Yogyakarta City Regional Regulation No. 11 of 2017 concerning the Regional Medium-Term Development Plan (RPJMD);
4. BNPB's Indonesian Disaster Data and Information (DIBI) 2022; and

5. Online news reports from *Harian Jogja* and *Detik.com* covering the 2016 floods and 2006 earthquake.

Data analysis was conducted using **content analysis** and **thematic comparison** to identify relationships among hazard types, social vulnerability, and community capacity in mitigation and disaster response.

RESULTS

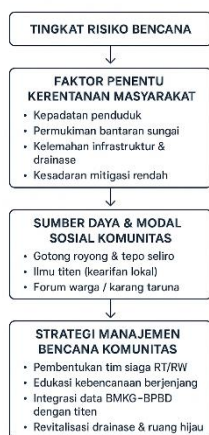
Yogyakarta City, covering an area of approximately 32.50 km², exhibits complex spatial and social characteristics that simultaneously heighten exposure to hydrometeorological and geological hazards. Its lowland topography (0–2% slope) and dense settlements along riverbanks increase the likelihood of inundation during extreme rainfall, while proximity to Mount Merapi and regional seismic sources amplifies exposure to volcanic and seismic threats.

Empirical evidence highlights two dominant hazards: floods along the Winongo River (2016) and a major earthquake (2006), both of which had broad socio-economic impacts. The 2016 flood revealed issues of urban drainage failure, limited infiltration zones, and inadequate local early warning systems—all exacerbating community exposure. Meanwhile, the 2006 earthquake underscored structural vulnerability and long-term psychosocial impacts.

The findings align with the **Pressure and Release (PAR)** model proposed by Blaikie, Cannon, Davis, and Wisner in *At Risk*, emphasizing that disasters result not merely from natural hazards but from the intersection of these hazards with social vulnerabilities shaped by structural pressures such as poverty, spatial planning, and weak regulation.

In this framework, **resilience** and **community resilience** theories (Pelling, 2011) provide useful lenses to interpret Yogyakarta’s adaptive capacity—not only in physical terms but also in social, institutional, and economic dimensions that enable communities to respond, learn, and rebuild after disruptions. Yogyakarta’s *gotong royong*, neighborhood deliberation forums, and *ilmu titen* embody adaptive social capital that can strengthen preparedness and recovery efforts.

Model Integratif Manajemen Bencana Berbasis Komunitas di Kota Yogyakarta



Local practices such as *ilmu titen* (environmental sign observation) and *rembug warga* (community discussion forums) can enhance local early warning systems if integrated with meteorological data and official alerts from BMKG/BPBD. The **co-production of knowledge** between local wisdom and scientific information improves both legitimacy and compliance during evacuation and emergency actions.

International experiences demonstrate that community-based programs face sustainability challenges. The Philippines’ *Barangay Disaster Action Teams*, supported by the Philippine Red Cross, have proven effective when backed by continuous training, institutional commitment, and adequate resources. Similarly, lessons from Japan’s Kobe earthquake (1995) show that despite advanced infrastructure, local neighborhood participation remains critical for early rescue and recovery. Regular simulations, community evacuation plans, and local supply storage

significantly enhance urban resilience.

Institutionally, the **Sendai Framework for Disaster Risk Reduction (2015–2030)** promotes four priorities consistent with these local recommendations: understanding risk, strengthening governance, investing in mitigation, and enhancing preparedness to “build back better.” Implementing these priorities at the city level requires translating principles into actions—such as integrating participatory risk maps into spatial planning, allocating funds for green infrastructure, and establishing accessible risk communication mechanisms.

Table 1. Summary of Findings: Community-Based Disaster Management in Yogyakarta City

Aspect	Main Findings	Analysis / Implications
Regional Context	Yogyakarta covers 32.50 km ² , lowland topography (0–2%), and high population density.	Increases flood exposure and amplifies disaster impact due to limited green space.
Dominant Hazards	Floods (Winongo River, 2016) and earthquakes (Bantul, 2006).	Both events highlight poor drainage systems and low community preparedness.
Social Vulnerability	Dense settlements, poverty, low mitigation awareness.	Social factors exacerbate disaster impacts (PAR theory: Wisner et al., <i>At Risk</i>).
Community Capacity	<i>Gotong royong</i> , <i>tepo seliro</i> , and <i>ilmu titen</i> as social capital.	Local wisdom serves as a natural early warning and enhances solidarity.
Theoretical Approach	Community Resilience (Pelling, 2011) and CBDM (Maskrey, 1999).	Resilience measured by adaptive capacity, not merely survival ability.
International Lessons	Philippines: Barangay Teams effective with training/institutional support. Japan: Community participation vital for earthquake preparedness.	Yogyakarta can adapt these models to strengthen local disaster preparedness.
Global Framework	Sendai Framework (2015–2030).	“Build back better” principles should guide local DRR policies and RPJMD.
Strengthening Strategies	(1) RT/RW Disaster Teams (2) Tiered Disaster Education (3) Hybrid EWS (4) Drainage & Green Space	Integrates social, technical, and institutional aspects for

Aspect	Main Findings	Analysis / Implications
Policy Recommendation	<p>Revitalization</p> <p>Integrate participatory risk assessments into RPJMD and spatial plans.</p>	<p>sustainable local resilience.</p> <p>Evidence-based policies and community networks are essential for DRR.</p>

Overall, transforming Yogyakarta into a disaster-resilient city requires combining physical infrastructure improvements (e.g., drainage, earthquake-resistant structures) with investments in social and institutional capital. Lessons from the Philippines and Japan show that CBDRM success depends on continuous training, institutional legitimacy, recognition of local knowledge, and stable funding. For Yogyakarta, concrete recommendations include integrating participatory risk maps into city planning (RPJMD), establishing and funding RT/RW disaster teams, tiered disaster education programs, and piloting a hybrid early warning system along the Winongo River.

CONCLUSION

This research confirms that community-based disaster management is a vital strategy for strengthening urban community resilience, particularly in Yogyakarta City, which is highly vulnerable to floods and earthquakes. Structural factors such as high population density, limited green space, and poor drainage remain major challenges.

Nevertheless, Yogyakarta’s strong social and cultural capital—*gotong royong*, *tepo seliro*, and *ilmu titen*—constitutes a solid foundation for resilience. Integrating local wisdom with modern scientific approaches aligns with CBDM principles that view communities as active agents across all disaster management phases: mitigation, preparedness, response, and recovery.

Moreover, enhancing community capacity extends beyond technical measures; it also involves strengthening social institutions. Citizen forums, youth organizations (*karang taruna*), and religious groups can serve as collective learning hubs and coordination centers for local mitigation efforts. Collaboration among local government, BPBD, educational institutions, and communities is essential to establish a resilient, adaptive, and sustainable disaster management system.

Recommendations

1. **Strengthen community institutional capacity.** Local government should facilitate the formation and training of neighborhood-level disaster preparedness teams (RT/RW).
2. **Integrate local wisdom with modern technology.** Traditional knowledge (*ilmu titen*) should be incorporated into community-based early warning systems.
3. **Promote continuous disaster education.** Disaster literacy programs should be embedded in schools, youth organizations, and community forums.
4. **Revitalize environmental infrastructure.** Improve drainage systems, expand infiltration zones, and promote community-based waste management.
5. **Encourage cross-sector collaboration.** Foster partnerships between local

government, academia, civil society, and private sectors to ensure sustainable resilience programs.

6. **Implement evidence-based policy.** Incorporate participatory risk maps into regional planning documents such as RPJMD and spatial plans (RTRW).

Through these strategies, Yogyakarta can become a model of community-driven disaster resilience—rooted not only in physical strength but also in the enduring power of social solidarity and cultural wisdom.

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