

Policy Brief

Key Recommendations for Mitigating Future Urban Flood Risks in a Changing Climate: The March 2025 Greater Jakarta Flood Aftermath

RDI Policy Brief No. 6
(DCR) 20250430

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Summary

Despite ongoing flood mitigation efforts, the March 2025 Greater Jakarta Flood revealed increasing vulnerabilities driven by urbanisation, environmental changes, and the intensifying threat of climate change. With water levels reaching 15–300 cm and over 100,000 residents affected, this disaster underscores the need for a more integrated approach to flood risk management. This policy brief examines the key challenges in building long-term urban resilience and developing flood risk management in Indonesia's Jakarta, Bekasi, and other flood-prone areas. These findings suggest that strengthening early warning systems, improving land-use practices, and enhancing community preparedness can help mitigate future flood risks in a changing climate.

Recurring Pattern of Greater Jakarta's Flood

The 230 mm/day precipitation recorded over Katulampa Dam on March 2, 2025, caused a rapid rise in water levels, reaching the Alert Level I (*Siaga I*) threshold by 9 PM. The relentless rainfall continued into March 3, leading to the overflow of major tributaries, including Ciliwung, Cikeas, Cileungsi, and Pesanggrahan (Badan Pengelolaan Bencana Daerah [BPBD] DKI Jakarta, 2025). Floodwaters, ranging from 15 to 300 cm, inundated Jakarta, Bekasi, and parts of the

surrounding areas, disrupting the lives of the communities and infrastructure (BPBD DKI Jakarta, 2025). According to data from the National Disaster Management Agency (*Badan Nasional Penanggulangan Bencana*/BNPB) as of March 4, 2025, the flood had a widespread impact across Greater Jakarta, which is Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek). Bekasi City was the hardest hit, with approximately 61,233 residents affected. Meanwhile, other regions recorded a combined total of 59,372 affected residents (BNPB, as cited in Kumparan, 2025).

This 2025 flood event was marked by its extreme precipitation levels. Several studies have indicated that a changing climate may lead to more frequent and intense rainfall events, resulting in higher flood risks. A study has shown that Jakarta's future flood risk is projected to increase by 322% to 402% in 2050 due to the combination of climate change and urban development (Januriyadi et al., 2018). A comparative study by Alam et al. (2025) examines key aspects of the recurring flood pattern in Greater Jakarta, with severe flooding occurring approximately every five years, including significant events in 2002, 2007, 2013, 2015, and 2020. While past floods were primarily driven by extreme rainfall, the 2025 flood reveals a growing vulnerability, resulting in severe inundation despite less extreme precipitation levels. This highlights that the region's susceptibility to flooding is exacerbated not only by climate change but also by ineffective flood control infrastructure. Despite repeated disasters, persistent gaps in urban flood management, inadequate land-use planning, and weak disaster preparedness continue to amplify flood risks across Greater Jakarta. These issues are increasingly vital as climate change will likely intensify extreme rainfall events.

This analysis uses secondary data from government agencies (*Badan Nasional Penanggulangan Bencana* (BNPB), *Badan Meteorologi, Klimatologi, dan Geofisika* (BMKG), and local authorities), reports, media coverage, and field observations.

Notable Weaknesses in Greater Jakarta's Flood Preparedness

Challenges in Flood Early Warning Dissemination and Risk Communication

The March 2025 Jakarta flood highlighted the gap between technical capacity and effective communication. Despite the ability to monitor and analyse, local authorities failed to translate information into timely warnings, forcing residents to rely on informal networks for updates. The Head of BNPB Regulation No. 2 of 2024 recognises early warning dissemination as a core

component of the Early Warning System (EWS). Article 8 of the regulation mandates around-the-clock communication and connectivity with communities to ensure that hazard information is accessible and actionable. Still, it was not fully demonstrated in response to the March 2025 Greater Jakarta Flood. Due to inconsistent messaging, delays, and limited real-time data sharing, social media and official websites were ineffective for disaster warnings, such as the March 2025 flood. Articles 16 and 18 of the BNPB regulation emphasise the importance of streamlined communication channels to ensure that early warning messages translate into decisive action at the community level. However, without stronger coordination among local agencies and a more community-centered approach, the early warning system remains reactive rather than proactive. With extreme rainfall becoming more frequent due to climate change, flood early warning systems are crucial for reducing the impacts of inland flooding. Beyond that, they also play a vital role in warning communities in coastal areas like North Jakarta and North Bekasi, where rising sea levels pose an increasing threat.

Land Use Change Impacts on Flood Resilience

The government of Bogor City acknowledges that its development needs to consider water absorption areas' availability, such as reservoirs and green open spaces, to accommodate surface runoff, as it serves as one of the upstream areas for Jabodetabekpunjur (Jakarta, Bogor, Depok, Tangerang, Bekasi, Puncak, and Cianjur). This is outlined in Bogor City's Long-Term Regional Development Plan for 2025–2045 (*Rencana Pembangunan Jangka Panjang Daerah/ RPJPD*). Bogor Regency Regional Regulation (*Peraturan Daerah/Perda*) No. 1 of 2024 on the Spatial Plan of Bogor Regency 2024–2044 also emphasises the development directives in Puncak, including controlling construction in protected areas and water absorption zones. However, Alam et al. (2025) demonstrated visible land cover changes, particularly in Bogor Regency. Some areas have been converted into built-up areas. This may increase surface runoff and discharge from the

upstream area (Guzha et al., 2018). Natural flood mitigation mechanisms also remain limited, particularly in Bekasi City (Yuanita & Sagala, 2025). The recurring floods in Greater Jakarta highlight the critical need for thorough evaluation and monitoring of land cover changes in upstream areas, particularly protected areas. For instance, the case of the Hibisc Fantasy development project was initially permitted for 4,000 square metres but expanded to 21,000 square metres, far exceeding its approved limits (Alam et al., 2025), showing a weak land cover change control in the area. Thus, the West Java Governor Regulation No. 11 of 2025 mandates collaborative oversight of land-use changes by central and local government, military, law enforcement, businesses, and civil society.

Community Awareness in Disaster Management

Community-based initiatives have played a crucial role in disaster management, particularly in facilitating evacuation, restoring damaged homes and infrastructure, and distributing aid. These efforts highlight the importance of community participation, especially during emergency response periods, as local government interventions have often been insufficient in addressing residents' urgent needs. Recognising this, local disaster management agencies, such as BPBD and the Social Affairs Agency (Dinas Sosial/Dinsos), have implemented initiatives like Disaster Resilient Villages (*Desa Tahan Bencana/Destana*) to mitigate disaster risks and impacts. Currently, 140 Destana groups have been established in the Bekasi Regency, with plans to form an additional 130 groups this year, strengthening community-led disaster resilience efforts. Community-based Disaster Risk Management (CBDRM) plays a vital role in emergency response, particularly in managing displaced populations (Saputra et al., 2025). In addition to CBDRM, adaptive social protection (ASP) could also support community resilience in the face of evolving risks. The March 2025 Greater Jakarta flood suffered from systemic weaknesses in community-based disaster management, including low public awareness and limited

resources. Alam et al. (2025) highlight that some communities faced two-day food and water shortages due to aid delays caused by resource constraints. Community-based initiatives like CBFWS have improved early warnings, but their reach remains limited. Meanwhile, government agencies and the private sector, including the Jakarta Flood Resilience Network (JFRN), have contributed to flood resilience, though private sector involvement is often temporary. Stronger integration of business continuity programs (BCPs) in private sector initiatives could ensure long-term engagement, protecting assets while supporting community resilience. Current social protection programmes, which support community resilience, tend to be reactive, assisting only after a disaster occurs rather than mitigating impacts in advance. Furthermore, Greater Jakarta's flood response will remain ineffective without stronger institutional coordination, public engagement, and stricter flood mitigation policies.

Key Recommendations

A more integrated and proactive approach is necessary to mitigate future flood risks in Jakarta, Bekasi, and the surrounding areas. Strengthening flood resilience requires a focused effort on enhancing early warning systems, improving land use policies, and empowering communities. Therefore, we recommend:

- **Enhance hydrometeorological data and early warning system**
 - Develop a fully integrated, real-time, and robust hydrometeorological and climate data-sharing platform that enables seamless coordination between BNPB, BMKG, local governments, and other relevant institutions to ensure faster and more accurate flood warnings.
 - Improve BMKG's early warning protocols and expand warning dissemination channels using a multi-platform approach, including SMS alerts, social media, radio, TV, and local siren systems.

- **Promote community-based flood preparedness and mitigation**
 - Broaden disaster preparedness programmes at the community level, ensuring that residents receive regular training in flood emergency response, evacuation procedures, and localised early warning systems.
 - Fund community-led flood mitigation efforts and foster collaboration between communities, businesses, and academic institutions to develop innovative and locally adapted flood management strategies.

- **Strengthen land use regulation and implement NbS**
 - Enforce stricter land use regulations and improve monitoring to prevent uncontrolled development in flood-prone and upstream areas.
 - Enhance inter-agency and multi-stakeholder collaboration to promote sustainable land management, including aligning private sector flood resilience efforts with Business Continuity Programs (BCPs) to ensure sustained investment in mitigation and recovery.
 - Implement NbS by restoring the natural vegetation in the upstream areas and enhancing water retention.

- **Align urban planning with climate and disaster risk assessments**
 - Integrate climate change and disaster risk assessments into urban planning to align development with flood mitigation strategies, early warning systems, and emergency response that are adapted to changing rainfall patterns, sea level rise, and extreme weather events.

Further Readings

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Acknowledgment

This policy brief was developed based on the Resilience Development Initiative's post-field survey report on the force majeure that happened in March 2025 in Greater Jakarta. The RDI's Multi-Hazard Preparedness working group contributed to the policy recommendations through data analysis and literature reviews. The BNPB, BMKG, Bappenas, and local governments in the Greater Jakarta area could utilise these recommendations to coordinate better and implement informed measures for strengthening urban resilience against future flood risks.