

Policy Brief

# Strengthening Resilient Infrastructure Post-2025 Greater Jakarta Flood: A Way Forward

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## Summary

The detrimental consequences of the severe flooding that affected Greater Jakarta in March 2025 underscore the critical necessity to establish resilient infrastructure. Achieving urban resilient infrastructure requires a comprehensive approach, encompassing both technical aspects and improvements to governance and infrastructure development policies. Therefore, this policy brief aims to analyse existing issues and provide strategic recommendations for addressing the persistent flooding in the Greater Jakarta area, with particular emphasis on prioritising resilient infrastructure development.

## Introduction

The severity of the 2025 Greater Jakarta flood left a significant impact on approximately 100,000 residents and various public facilities, such as schools, hospitals, and bridges (Alam et al., 2025). According to the National Disaster Management Agency (Badan Nasional Penanggulangan Bencana/BNPB), flood-related damages resulted in losses totalling IDR 1.69 trillion, of which the infrastructure sector accounted for IDR 155 billion. Bekasi City suffered the most significant losses, amounting to IDR 878.6 billion, followed by Bekasi Regency, which incurred losses of IDR 680

billion. In Bekasi, the flooding disrupted public services by causing delays in train operations, damage to school buildings, postponement of examinations, and power outages at the Regional Public Hospital of Bekasi, thereby affecting medical services and patient care. Furthermore, the flooding caused damage to several roads and bridges, including the Kemang Pratama Bridge in Bekasi City, the bridge in Haji Muhi Street of South Jakarta, Saleh Danasasmita Road in Bogor City, and Jatiwangi Road in Bekasi Regency. In Bogor Regency, eight bridges suffered damage, including those on Hankam Street, one on Tugu

Selatan, and Cijulang Street. These disruptions impeded residents' ability to commute, access essential services, and receive timely assistance within the affected areas.

While past major floods in Greater Jakarta, such as those in 2007, 2013, 2015, and 2020, were associated with extreme rainfall events, including the 377 mm recorded in a single day during the 2020 flood at Halim Perdanakusuma (Aditiya, 2025), the 2025 flood exhibited a different pattern. Despite a lower recorded rainfall intensity of 230 mm at Katulampa Dam (BMKG, 2025), severe inundation still occurred, indicating a decline in the effectiveness of flood control infrastructure. Given the recurring flood and their consequences, the establishment of resilient infrastructure is imperative for achieving urban resilience in Greater Jakarta. Resilient infrastructure is defined as the capacity of infrastructure systems to absorb, adapt to, and recover from disruptive events, minimising their magnitude and duration (CDRI, 2023). This includes flood-resistant roads, adaptive drainage networks, and climate-resilient buildings designed to minimise damage and ensure continuity during extreme events. Beyond mitigating direct impacts, resilient infrastructure also mitigates indirect consequences, such as economic disruptions stemming from supply chain failures, environmental degradation, and cascading infrastructure failures.

### **Lack of Resilience Integration and Absence of Standards in Infrastructure Planning**

Many spatial planning documents have yet to integrate the aspect of resilient infrastructure, particularly in relation to spatial structure. Resilient infrastructure and flood mitigation policies have not been adequately incorporated into spatial regulations at both regional and metropolitan scales, as exemplified by the Bekasi City Spatial Plan and Presidential Regulation No. 6 of 2020 on the Jabodetabekpunjur Urban Area Spatial Plan. This lack of integration has hindered the effectiveness of sustainability interventions (Yuanita & Sagala, 2025). The situation is further compounded by weak spatial planning

enforcement, with land use often deviating from official zoning regulations, resulting in uncontrolled development within high-risk flood-prone areas. This issue was also discovered in the Puncak area by the Governor of West Java, highlighting the weak enforcement of spatial planning regulations in the area and its surroundings, which has led to massive land conversion. Moreover, the absence of clear standards and performance indicators, inconsistent definitions and terminology across institutions, and limited public participation in the planning process further undermine efforts to foster resilient and inclusive infrastructure development.

### **Fragmented Coordination and Data Management Among Stakeholders**

The fragmented coordination of data management and flood interventions within the Greater Jakarta area arises from the complex cross-jurisdictional dynamics between upstream (Bogor) and downstream (Bekasi City) municipalities. While some cooperation exists—such as the Jakarta-Bogor flood mitigation initiative through tree planting in the upstream area of the Ciliwung River and reservoir projects in 2014, as well as Bogor's climate resilience strategy employing eco-drainage and infiltration ponds—these initiatives are uneven and lack a comprehensive, overarching authority to ensure long-term management. Moreover, existing activities remain isolated and unsystematic, failing to adequately synchronise and account for downstream needs, which are significantly affected by flooding. Sectoral parochialism and ineffective agglomeration bodies, including the Project Management Office (PMO) and the Development Cooperation Agency (*Badan Kerja Sama Pembangunan/BKSP*) Jabodetabekjur, hinder the development of integrated and data-driven spatial planning and funding mechanisms that incorporate climate and disaster risks across the region. To effectively manage flooding from upstream to downstream, there is an urgent need for a robust and legally empowered cross-regional and cross-sectoral coordination mechanism. This mechanism should foster collaboration among

local governments, align climate resilient infrastructure development with the local context, and pool resources to ensure that flood mitigation efforts in Bogor can reduce the impact of flooding in Bekasi and the broader Greater Jakarta region.

### Limited Budget Allocation for Climate-Resilient Infrastructure Projects

Aside from unclear standards, disaster- and climate-resilient infrastructure development continues to face challenges, primarily due to limited budgetary allocations and insufficient investments in mitigation measures. The Bekasi floods of March 4, 2025, resulted in estimated infrastructure damage (including embankments, roads, and bridges) in eight sub-districts of Bekasi City is estimated to reach IDR 69 billion, as calculated by the Bekasi City Water Resources Office (*Dinas Bina Marga Sumber Daya Air/DBMSDA*). This calculated loss exceeds the allocation of Unexpected Expenditure (*Belanja Tidak Terduga/BTT*) in the Bekasi City Regional Revenue and Expenditure Budget (*Anggaran Pendapatan dan Belanja Daerah/APBD*), which amounted to only IDR 65.3 billion (approximately USD 4 million). On top of that, the drastic reduction in the national infrastructure budget has severely constrained the government's ability to maintain and construct infrastructure that meets increasingly stringent resilience standards. Furthermore, current policies have not effectively mobilised sufficient private investment for resilience and adaptation, leaving critical infrastructure projects underfunded and vulnerable to climate-related risks.

### Current Awareness and Capacities for Resilient Infrastructure

The 2025 Greater Jakarta flood demonstrates the gaps in local capacity to achieve infrastructure resilience, with weak awareness and technical governance challenges hindering effective implementation. The fragmentation of existing guidelines and the absence of dedicated protocols resulted in many local stakeholders lacking the expertise to integrate resilience standards into infrastructure planning, contributing to failures in

critical infrastructure such as drainage networks and embankments. On the other hand, local government agencies continue to encounter challenges in implementing resilient infrastructure due to data scarcity, insufficient budgetary resources, a shortage of human resource capacity, and difficulties in engaging vulnerable groups in disaster resilience initiatives. At the community level, while initiatives such as the Disaster Resilience Village (*Desa Tangguh Bencana/Destana*) exist, the village apparatus remains the primary actor, often overlooking community involvement in disaster-prone areas, leading to insufficient preparedness. Capacity building for relevant policymakers, spanning national to local levels, and for those exposed to hazards is crucial and should be enhanced through an inclusive and participatory approach. This enhancement should encompass all stages, from the planning to the implementation of resilient infrastructure, as well as community-based maintenance of critical infrastructure and adaptation efforts.

### Recommendations

- **Mainstream Resilient Infrastructure Policies**
  - Promote resilient infrastructure in Greater Jakarta as a crucial component of climate change adaptation through its metropolitan area spatial planning, Ciliwung-Cisadane River Basin Water Resources Management Plan, and other relevant policies. This also needs to be aligned with the National Medium-Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional/RPJMN*) and the National Adaptation Plan (*NAP*). This includes prioritising flood-resistant infrastructure, such as elevated roadways, adaptive drainage networks, and green infrastructure, to mitigate urban flooding risks.
  - Incorporate resilience into local planning by embedding resilience indicators into the sectoral targets for infrastructure under local government authority in the *RPJMN*

and setting climate resilience criteria in local budgets.

- Integration of upstream and downstream interventions with watershed-based management framework through Nature-based Solutions (NbS) that rely on Blue-Green Infrastructure, a hybrid approach that combines the utilisation of blue (water bodies) and green (vegetation) spaces, e.g. prioritisation of reforestation in Bogor and implementing urban park and forest and permeable pavements in Bekasi City.
- **Enforce Resilience Standards for Infrastructure Projects**
  - Mandate climate risk assessment for new infrastructure projects in Greater Jakarta to evaluate how environmental and climate risks may affect infrastructure. This strategy ensures that large or complex infrastructure developments incorporate climate risk considerations and disaster mitigation measures from the outset.
  - Enact stricter standards that mandate flood-resistant designs, including elevated building foundations, flood vents to reduce structural pressure, permeable pavements to improve drainage and water absorption, and reinforced drainage systems to prevent urban inundation across Greater Jakarta.
- **Strengthen Inter-Institutional Coordination and Consolidate Data**
  - A proactive approach is required, involving multi-stakeholder collaboration between local and regional governments across Greater Jakarta to plan, implement, and manage resilient infrastructure development effectively.
  - Develop a collaborative, open-access climate risk assessment platform for Greater Jakarta that combines localised flood hazard data, asset vulnerability, and resilience measure effectiveness, enabling governments, urban planners, and investors to assess and quantify risks, prioritise

infrastructure investments, and plan adaptive strategies.

- **Diversify and Expand Financing for Resilient Infrastructure**
  - Increase the involvement of the private sector in resilient infrastructure funding as there are still funding gaps in climate funding in cities around the world by leveraging innovative financial mechanisms such as Public-Private Partnerships (PPPs), green bonds, and co-financing mechanisms. Existing regulations regarding LVC (Presidential Regulation No. 79 of 2024) can be integrated with resilient infrastructure concepts.
  - Collaborate with businesses to assess sector-specific risks and financing mechanisms in Greater Jakarta, embedding resilience targets into regional and local climate action plans (*Rencana Aksi Daerah-Adaptasi Perubahan Iklim/RAD-API*) with a similar approach to emissions reduction plans.
  - Attract private-sector investment by establishing clear co-benefits of resilient infrastructures and developing bankable adaptation project pipelines aligned with the region's infrastructure priorities.
- **Integrate Resilient Infrastructure into Spatial and Urban Planning**
  - Integrating the concept of resilient infrastructure into spatial planning, especially into the spatial structure of national (*Rencana Tata Ruang Wilayah Nasional/RTRWN*) and subnational (e.g. *Rencana Tata Ruang Wilayah* (RTRW) and *Rencana Detail Tata Ruang* (RDTR) Bekasi City) planning documents. One of the efforts that can be made is by integrating infrastructure resilience policies in the existing Ciliwung-Cisadane River Basin and spatial planning policies, namely Presidential Regulation No. 60 of 2020 concerning the Jabodetabek-Punjur Urban Area Spatial Plan and Minister of Agrarian and Spatial Planning Regulation No. 11 of



2021 concerning Procedures for Preparation, Review, Revision, and Issuance of Approval of the Substance of Spatial Planning Plans for Provinces, Regencies, Cities, and Detailed Spatial Planning Plans.

- Adopting resilient zoning and building codes by introducing zoning incentives and updating building codes to account for climate risks.
  - Promoting nature-based solutions (NbS) by adopting an integrated watershed management approach that combines green infrastructure solutions upstream with traditional flood control measures to enhance infrastructure resilience against flooding.
  - Strengthening the process of spatial utilisation and control to support existing resilient infrastructure.
- **Improve Awareness and Capacity among Stakeholders**
    - Develop comprehensive guidelines for national and subnational governments to integrate hydrometeorological data and climate projections into infrastructure planning, ensuring climate resilience and adaptive decision-making.
    - Implement capacity-building programmes that actively engage policymakers in the Greater Jakarta area and affected communities in participatory planning, implementation, and maintenance of resilient infrastructure and adaptation efforts. Emphasizing the importance of integrated flood management to ensure solutions are not partial but collectively more effective.

## Further Readings

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