Infrastructure Governance and Urban Flood Resilience: A Policy Perspective on Ghana's Built Environment Crisis

By Prof. F.K. Bondinuba

The Ministry of the Interior has issued an emergency directive that has become grimly familiar to Accra residents: *"Stay home if you have not yet left home."* While this is undoubtedly the correct call to preserve human life during an active emergency, these directives fundamentally double as institutional confessions. They are stark, real-time evidence that our built environment continues to fail the people it was designed to shelter and support.

This is not a climate or weather problem; it is a systemic governance and engineering failure. Ghana has experienced major, catastrophic flooding events repeatedly over the past three decades. The June 2015 Odaw basin disaster alone claimed approximately 150 lives and inflicted an estimated economic loss of $114 million (Erman *et al.* 2018). Macroeconomic modelling by the World Bank (2020) projects that $3.2 billion in economic assets, equivalent to 4.45% of Ghana's GDP, are at immediate risk of flooding in the Greater Accra Region alone. Without urgent structural intervention, this exposure is expected to quadruple by 2050. Furthermore, macro-fiscal assessments indicate that flood-related losses within Accra drain approximately $200 million annually from the economy, representing a persistent 0.5% drag on national GDP (Ministry of Finance 2022).

The Expanding Flood Map of Accra

Today, Accra's flood vulnerability map has expanded far beyond historically low-lying, flood-prone neighbourhoods. As detailed by Chris K. (2026), what once affected highly localised catchments like Odawna, Alajo, and Agbogbloshie now routinely submerges critical, high-value commercial corridors. Madina, Legon, the Airport-to-Tetteh Quarshie axis, and Kaneshie are regularly paralysed by heavy downpours.

Every major economic hub that grinds to a halt due to predictable flash flooding represents a compounded macroeconomic shock. This includes the direct loss of trading capital for informal vendors, severely disrupted corporate supply chains, heavily damaged public infrastructure, and the counterproductive diversion of scarce public resources from long-term development expenditure to short-term emergency relief. We cannot build a resilient, forward-thinking economy on a fragile, waterlogged infrastructure base. The transition from reactive crisis management to proactive, climate-resilient infrastructure governance is both an economic and a moral imperative.

To achieve this, our built environment framework must evolve across three evidence-based policy priorities:

1. Institutionalise Sustainable Urban Drainage Systems as a Planning Standard

Our cities must stop fighting water and start designing with it. Sustainable Urban Drainage Systems (SuDS) mimic natural, pre-development hydrological processes, encouraging localised infiltration, reducing peak surface runoff velocity, and storing stormwater close to its source.

Mandating SuDS integration in all new urban developments requires embedding permeable surfaces (such as interlocking concrete pavers and engineered gravel sub-bases) into car parks, walkways, and public squares to facilitate groundwater recharge. As noted by Ngong Deng *et al.* (2024), deploying decentralised green infrastructure—including rain gardens, bioswales, retention basins, and restored urban wetlands naturally buffers stormwater before it ever enters overloaded municipal grey drainage networks.

Ghana's own regional experience at Sekondi-Takoradi offers a compelling financial case for this paradigm shift. A full economic valuation of that city's hybrid infrastructure plan, which combines engineered drainage with nature-based interventions like wetland restoration and green corridors, found that every single dollar invested generates between USD $3.26 and USD $13.53 in total returns, boasting a projected internal rate of return (IRR) of 76.85% (Strömgård and Niño 2025). The largest share of these benefits stems directly from avoided flood damages, estimated at USD $747 million over a 26-year horizon. This is

not green idealism; it is fiscally responsible urban infrastructure policy (Bondinuba and Stephens, 2018). Municipal Assemblies and Physical Planning Departments must embed these SuDS requirements directly into local planning schemes, city-wide structure plans, and development control guidelines. Urban drainage must be managed as a high-performing macroeconomic asset, not a hidden maintenance afterthought.

2. Enforce Strict, Climate-Responsive Building Codes and Floodplain Governance

Construction governance must be treated as non-negotiable. Ghana's legal and regulatory frameworks, including the Ghana Building Code GS 1207:2018 (GSA 2018), the Land Use and Spatial Planning Act, 2016 (Act 925) (Republic of Ghana 2016), and the zoning bye-laws of metropolitan assemblies, explicitly prohibit development within verified waterways, floodplains, and wetland buffer zones. The enforcement gap, not the legislative gap, is the true crisis (Ziga-Abortta 2025; Hedidor, 2016).

Research confirms this institutional mismatch plainly. Plange *et al.* (2025) found that while 85% of built environment stakeholders in Ghana are fully aware of climate-resilient infrastructure concepts, a mere 16% believe current projects adequately integrate these measures, with weak policy enforcement cited as the primary barrier. Urban planning experts have consequently described Accra's physical planning regime as practically non-existent on the ground, with building codes routinely violated, a situation frequently exacerbated by the direct complicity or administrative negligence of regulatory authorities (Ziga-Abortta 2025; Bondinuba, 2018). The result is a major capital city built atop a drainage system that can no longer function as designed.

To close this execution gap, the following interventions must be prioritised:

- ***Sustained Development Control:*** Immediate enforcement of stop-work orders and demolition notices against structures encroaching on watercourses, insulated from political interference and backed by coordinated, inter-agency enforcement between Municipal Assemblies, the Land Use and Spatial Planning Authority (LUSPA), and the Environmental Protection Agency (EPA).
- ***Mandatory Flood Risk Assessments:*** Requiring comprehensive flood vulnerability modelling for all major public and private infrastructure projects, strictly aligning with the technical operational frameworks of the Ghana Hydrological Authority (Republic of Ghana 2022).
- ***Source Control Regulations:*** Mandating integrated rainwater harvesting systems for all new commercial and multi-family residential developments to capture precipitation at the source, drastically reducing the immediate volumetric load on municipal drains.
- ***Climate-Responsive Design Standards:*** Revising local engineering drainage design return periods to absorb the increased intensity and frequency of extreme weather events projected by the IPCC for the West African sub-region.

Mainstreaming these disaster risk metrics into local land-use management is not merely a practical necessity; as a signatory to the *Sendai Framework for Disaster Risk Reduction 2015–2030*, Ghana has a binding treaty obligation to align domestic construction governance with these commitments (UNISDR 2015).

3. Transition from Reactive Dredging to Predictive, Digitised Drainage Asset Management

Modern urban resilience requires that drainage networks be managed through integrated, predictive frameworks that synthesise seasonal weather modelling with real-time land-use data (Logah *et al.* 2023). Relying on post-flood desilting is a costly, reactive posture that addresses the visible symptoms of clogging while leaving the structural causes completely intact.

Transitioning to a digitised, scheduled maintenance framework requires several immediate operational shifts:

- ***Pre-Season Operational Scheduling:*** Executing desilting and channel clearance across major drainage catchments *before* the onset of rains, guided by hydraulic modelling and forecasts from the Ghana Meteorological Agency (GMet), rather than deploying emergency cleanup crews after communities have already flooded.
- ***Digitised Asset Registers:*** Establishing a spatial GIS-mapped inventory of all drains, culverts, and stormwater channels to track precise asset condition ratings, schedule preventative inspection intervals, and allocate dedicated lifecycle maintenance budgets.
- ***Solid Waste Infrastructure Integration:*** Recognising that Ghana generates approximately 1 million tonnes of plastic waste annually, of which only 5% to 10% is currently recycled,

municipalities must address the reality that plastic accumulation in drainage channels is a primary, preventable driver of catastrophic channel blockages.

- ***Participatory Governance:*** Developing community-based monitoring partnerships. The empirical evidence proves that institutional flood management succeeds when it actively bridges the gap between formal municipal assemblies and informal, localised neighbourhood governance actors (Ziga-Abortta 2025).

The full operationalisation, capitalisation, and enforcement of the autonomous Ghana Hydrological Authority (GHA) provides the necessary institutional architecture for this macro-level transition. Under the *Ghana Hydrological Authority Act, 2022 (Act 1084)*, the authority is legally empowered to centralise hydraulic modelling, standardise drainage metrics, and coordinate essential inter-district planning (Republic of Ghana 2022). Crucially, the legislative activation and pooling of resources into the National Hydrology Fund serves as the financial bedrock required to permanently move our municipalities away from ad hoc emergency funding toward sustained structural investment.

The Bottom Line

Emergency stay-at-home orders are a temporary bandage applied to a deep, structural wound. They are necessary to save lives during a storm, but they must never be normalised as a standard tool of governance. Transforming Ghana's built environment requires unwavering political will, adequately resourced regulatory institutions, and an uncompromising approach to enforcing existing spatial laws. The economics of the crisis are completely unambiguous: the cost of proactive engineering and enforcement is a tiny fraction of the cost of perpetual, cyclical disaster recovery. The human cost of inaction, measured in lives lost, productive capital destroyed, and communities condemned to cyclical poverty, simply cannot be quantified.

It is time to stop managing the chaos of floods and start governing the long-term resilience of our cities.

About the Author

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