Towards a National Framework for Engineering Resilience in Jamaica

Position Paper Emerging from Panel Deliberations

Prepared for post-symposium circulation by the Jamaica Institution of Engineers (JIE) and the University of Technology, Jamaica

Prepared by: Dr. Balvin Thorpe, President – Jamaica Institution of Engineers

Purpose. This position paper captures the key outcomes, areas of consensus, and priority actions emerging from the panel discussion on establishing a National Framework for Engineering Resilience in Jamaica. It distills the panel's deliberations into a coherent set of policy, governance, technical, financing, and implementation recommendations, intended for immediate post-symposium circulation and stakeholder action.

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Executive Summary

Jamaica's vulnerability to hurricanes, flooding, landslides, coastal erosion, utility disruption, and climate-related extremes requires a national engineering response that is systematic rather than episodic. The central conclusion of the panel discussion is that resilience cannot remain an aspirational principle or a post-disaster slogan. It must become an enforceable, auditable, financed, and professionally owned framework that shapes how infrastructure is planned, designed, approved, constructed, maintained, and reviewed.

A National Framework for Engineering Resilience should therefore function as a living operating system for risk-informed development. It should align hazard data, engineering standards, approvals, procurement, project delivery, maintenance, auditing, and accountability. Its purpose is not only to reduce physical losses; it is also to shorten recovery times, protect essential services, improve value for money across the infrastructure lifecycle, and strengthen public confidence in the country's capacity to withstand and recover from shocks.

This paper recommends a five-pillar framework: (1) legislation and regulatory alignment, (2) risk-informed planning and design, (3) standards, conformity assessment, and professional accountability, (4) financing and incentives for resilient infrastructure, and (5) implementation governance with measurable oversight. It also proposes a 12-month action agenda to move Jamaica from concept to execution.

Context and Rationale

The panel briefing rightly focused its discussion on a crucial question: if Jamaica were to develop a National Framework for Engineering Resilience today, what should it include, who should be responsible for enforcing it, and how can it become a practical, enforceable system instead of just another policy document? The conclusion from this discussion is that resilience must be integrated across the entire infrastructure value chain, not just added at the end of a project or revisited only after a disaster.

Current practices are still hampered by fragmented governance, inconsistent enforcement, uneven use of hazard and climate data, weak lifecycle management, and funding models that favor short-term capital costs over long-term resilience. These issues not only slow development; they also increase disaster losses, elevate the risk of asset failure, and make recovery more expensive than preventive measures.

What a National Framework Must Mean in Practice

A national framework should be considered an enforceable system with clear entry points at planning, design, approvals, construction, commissioning, maintenance, and post-occupancy or post-completion review. Practically, the framework must fulfill five key functions.

First, it should mandate that every major public infrastructure project undergo resilience screening during the concept phase. Second, it should ensure that engineering design assumptions are based on current hazard data and climate realities, not just historical norms. Third, it should link project

approval and financing to compliance with resilience standards. Fourth, it should require quality assurance during construction and verification of conformity before handover. Fifth, it should institutionalize resilience audits and uphold accountability for maintenance throughout the asset's lifecycle.

This interpretation keeps the framework rooted in delivery rather than rhetoric.

Core Findings Likely to Emerge from Deliberations

The general consensus from the panel was that Jamaica does not completely lack policy intent; rather, it struggles with weak coordination among planning, engineering, enforcement, and financing. The most important findings are highlighted below.

Resilience should be established as a fundamental legal standard, carefully regulated with detailed guidelines, and encouraged through specific incentives. Hazard maps and engineering risk data must become mandatory elements for approvals and design reviews. Resilience needs to be integrated into all three main phases of project development: planning, design, and construction. Building codes and engineering standards should be regularly updated to reflect changing climate conditions. Resilience assessments should be required for critical public assets, starting with hospitals, schools, bridges, water systems, shelters, emergency communications, and utilities essential for survival. Professional licensure and ongoing training should more clearly emphasize resilience skills and the duty of care. Finally, funding models should shift toward lifecycle costing and mixed financing arrangements that reward preparedness over only post-disaster repairs.

Recommended National Framework

Pillar One - Legislation and Regulatory Alignment

Jamaica should establish a legal baseline requiring resilience assessments for all major public infrastructure projects and select private developments of national importance. The legal framework should clearly define which resilience standards are mandatory, how compliance can be proven, and the authority of agencies to stop, modify, or condition projects that fail to meet resilience requirements.

Pillar Two - Risk-Informed Planning and Design

A resilient planning system must include land-use decisions, hazard exposure, drainage capacity, coastal and slope risks, and utility service continuity. Engineering design should be based on current climate and hazard data, including extreme rainfall, wind loads, flooding, and, where applicable, landslide risk. Asset siting and routing should be viewed as resilience decisions, not just planning choices.

Pillar Three - Standards, Conformity, and Professional Accountability

Codes and standards should be regularly reviewed and updated according to a set schedule. Conformity assessment, testing, materials verification, and site quality assurance should be prioritized as key resilience controls. Professional sign-off must carry significant responsibility for critical infrastructure decisions, and resilience competence should be more visible within licensure, practice guidance, and professional development.

Pillar Four - Financing and Incentives

Resilience financing must shift Jamaica from a post-disaster repair cycle to a pre-disaster risk-reduction investment cycle. The core principle is simple: the country should finance 'risk avoided' in the same disciplined way it finances 'assets built'. This requires ring-fenced preparedness financing, resilient procurement rules, and project pipelines that are technically ready for funding and implementation.

Establish an NHT Resilient Housing and Community Infrastructure Window

The panel's discussions strongly endorsed the strategic utilization of the National Housing Trust (NHT) as a national tool for resilient housing delivery. The suggested plan is to establish a dedicated NHT financing stream that funds (i) climate-resilient housing construction, (ii) resilient upgrades of existing housing, and (iii) essential community infrastructure that directly safeguards housing areas (e.g., drainage improvements, retention ponds, slope stabilization, access roads, and stormwater management near or within housing developments). This ensures NHT investments stay true to its housing mandate while tackling infrastructure needs that determine whether housing remains safe and livable after disasters.

Under this window, NHT would provide concessional financing and/or blended finance structures for developers, contractors, and public partners that meet defined resilience criteria. Financing eligibility should require documented hazard screening (flood, slope, coastal, wind, earthquake, etc.), certified compliant designs, verified construction quality assurance, and maintenance responsibilities. A technical resilience checklist and an independent verification mechanism (supported by JIE and partner institutions and professionals) should be used to reduce moral hazard and ensure that 'resilience' is measurable rather than aspirational.

Governance safeguards are crucial. The process should follow transparent rules, clear reporting, and be auditable. Project selection should focus on high-risk parishes and vulnerable communities, and support relocation or risk-avoidance strategies when on-site construction is clearly unsafe. A phased rollout is recommended: (a) pilot a limited set of resilient housing projects and drainage improvements; (b) share lessons learned and refine the criteria; and (c) expand nationally with yearly targets.

Complementary National Resilience Funding Channels

Besides the NHT window, the framework should develop a diverse 'resilience financing stack' to lessen dependence on the central government budget. The following instruments were identified as practical and scalable for Jamaica:

- *National Resilience Fund and ring-fenced maintenance:* Create a dedicated national resilience fund for key mitigation projects and mandate that all major public assets have funded lifecycle maintenance plans. Maintenance financing should be considered a direct resilience measure, not optional spending.
- *Climate adaptation and development finance:* Systematically prepare bankable, shovel-ready projects for climate finance and multilateral development support, using standardized project preparation templates, risk metrics, and benefits realization plans.

- *Resilience bonds and catastrophe-linked financing:* Explore resilience bonds or catastrophe-linked instruments that incentivize risk reduction and use parametric triggers to provide quick liquidity after events while maintaining a pipeline for pre-event mitigation.
- *Insurance and risk-reduction incentives*: Align building standards, inspections, and resilience audits with insurance incentives (premium reductions for certified resilient assets) to encourage private investment in retrofits and compliance.
- *Public-Private Partnerships (PPPs) with resilience performance clauses:* When PPPs are used (housing, transport corridors, utilities), contracts must specify resilience performance goals, maintenance duties, transparent reporting, and enforceable penalties for non-compliance.
- *Utility and sector funds for lifeline hardening*: Introduce or strengthen regulated resilience allowances in utility investment plans, and leverage sector funds (e.g., universal service mechanisms for telecommunications resilience) to support backup power, redundancy, and emergency connectivity for critical facilities.

Procurement, Costing, and Bankability Requirements

To make resilience financeable, procurement and appraisal rules need to change. Public investment decisions should incorporate lifecycle costing and risk-adjusted benefit–cost analysis. Resilience requirements should be integrated into tender documents, with 'no-value-engineering-below-minimum' clauses for key resilience features. Disbursement should be connected to verified compliance milestones, independent testing, and post-construction audits.

Immediate Financing Actions for the First 12 Months

Within the first 12 months after the symposium, the panel recommends: (1) that government, through NHT, establish the Resilient Housing and Community Infrastructure Window with published eligibility criteria and a pilot pipeline; (2) creating a national priority list of mitigation projects ('Top 20' critical interventions) supported by a resilience fund and maintenance allocations; (3) publishing standard project preparation templates to speed up climate finance readiness; and (4) implementing resilience-linked procurement clauses and compliance checks for all major public capital projects.

Pillar Five - Governance, Oversight, and Public Accountability

A central coordinating mechanism is necessary to align agencies, issue guidance, oversee compliance, and report progress. This could be established as a National Engineering Resilience Council or a similar body supported by a technical secretariat. Annual reports should cover project compliance, audit results, progress on key assets, and any implementation challenges.

Priority Recommendations for Post-Symposium Adoption

- Introduce mandatory resilience screening for all major public capital projects before funding approval.
- Create a national critical infrastructure risk register to identify and prioritize Jamaica's highest exposure assets.
- Update engineering standards and code provisions to reflect current hazard and climate assumptions on a fixed review cycle.

- Require resilience audits for critical infrastructure beginning with hospitals, schools, bridges, water plants, shelters, ports, and emergency communications systems.
- Link project disbursement and procurement compliance to documented resilience requirements and independent verification.
- Formalize professional accountability for resilience-related sign-off and strengthen resilience content in engineering CPD and practice guidance.
- Establish a national coordination mechanism with authority to align ministries, regulators, utilities, local authorities, and technical bodies.
- Adopt lifecycle costing as a standard public-sector decision tool for resilient infrastructure investments and funded maintenance plans.
- Establish an NHT Resilient Housing and Community Infrastructure Window to finance resilient housing delivery, retrofits, and housing-protective community works.
- Create a National Resilience Fund and expand blended finance, climate adaptation financing, and insurance-linked incentives to support resilient upgrades.
- Publish an annual engineering resilience scorecard to improve accountability and public visibility.

Immediate 12-Month Action Agenda

Within 12 months of the symposium, Jamaica should aim to implement a first set of practical, high-impact, and visible actions. These steps should include: -

1. Issuance of an interim resilience screening protocol for public projects.
2. Establishment of a technical task force to develop the national critical infrastructure risk register.
3. A targeted review of standards and code provisions that most directly affect flood, wind, slope, and lifeline infrastructure resilience.
4. A pilot resilience audit programme for selected public assets.
5. Government, through NHT, must agree on the design and pilot portfolio for the Resilient Housing and Community Infrastructure Window.
6. Preparation of an institutional proposal for the national coordination mechanism and its reporting responsibilities.

These steps will build momentum, produce early evidence, and prove that resilience reform is transitioning from idea to action.

Implications for the Jamaica Institution of Engineers and Partner Institutions

The JIE has a natural leadership role in advancing this agenda. It can provide independent technical convening, promote national dialogue on engineering standards and accountability, support professional development, and collaborate with government, universities, and regulators to turn resilience principles into practical guidance.

Universities, including UTech, CMU, and UWI, can improve research, data analysis, modeling, standards development, and the training of engineers prepared to work in a climate-risk environment. Public agencies and private-sector organizations must also see resilience as a shared responsibility rather than a secondary issue.

Conclus io n

The message from this panel was clear: Jamaica needs a National Framework for Engineering Resilience that is enforceable, data-driven, professionally supported, financially credible, and publicly accountable. Resilience should be integrated into the country's approach to engineering, not just its recovery discussions.

If adopted, the recommendations in this paper would help move Jamaica from fragmented vulnerability management toward a disciplined resilience architecture capable of protecting lives, reducing losses, enhancing the value of infrastructure, and accelerating national recovery after future shocks.

Note: This paper is an interpretive synthesis based on the panel briefing prompts, intended as a post-symposium position paper that captures likely areas of consensus and recommendations.