COMMONWEALTH OF THE BAHAMAS

Conceptual Framework and Practical Methodology for Identifying and Addressing Underlying Disaster Risk Factors in The Bahamas

Developed through the IDB Technical Cooperation Project "Support Policy Reform in Comprehensive Disaster Risk Management (BH-T1096)

October 2025

DRM AUTHORITY | IDB

Executive Summary:

While The Bahamas continues to grapple with the impacts of climate change and disaster risk, the impacts of disaster events cannot solely be attributed to natural hazards. These impacts are also shaped by deep-seated societal conditions, some being evolving governance structures, patterns of informal urban growth, coastal development pressures and environmental degradation, institutional capacity challenges, and persistent social and economic disparities. Given the urgent need to address these underlying factors of disaster risk, the Government of The Bahamas (GoBH) given its agenda to adopt a proactive approach to disaster risk management and reduction, thought it critical to develop a conceptual framework and practical methodology for analysing the underlying risk factors for hazard impacts, including cascading and systemic risk, to be carried out post-disaster to enhance mitigation and recovery efforts, based on the Disaster Risk Management (DRM) Act, 2022. The framework calls for a shift away from hazard-centric approaches toward strategies that engage with the structural and historical forces that increase exposure and vulnerability, particularly among vulnerable communities.

This integrated guidance document provides both the conceptual foundation and the operational methodology for identifying and addressing the underlying disaster risk factors in The Bahamas. Developed in collaboration with the DRM Authority and aligned with the DRM Act, it combines two internationally recognised models: the Pressure and Release (PAR) model and the Forensic Investigations of Disasters (FORIN) methodology, to support risk-informed, participatory, and systemic disaster risk governance. At its core, the conceptual framework offers the analytical lens to understand how disaster risk is constructed and reproduced over time and underpins the Practical Methodology for Identifying and Addressing Underlying Risk Factors, developed alongside national stakeholders. The PAR model views disaster risk as the result of intersecting hazard events and progressive layers of vulnerability: from structural root causes to dynamic pressures and unsafe conditions. The FORIN methodology complements this approach by providing investigative tools to trace the historical, institutional, and systemic processes that shape risk. Together, they offer a comprehensive diagnostic framework to uncover how social, economic, environmental, and governance factors converge to create and amplify disaster risk.

The methodology then translates theory into action through a five-step process and participatory tools that facilitate local risk analysis, stakeholder engagement, and institutional learning. It is designed for use by a range of actors: from policymakers and planners to Family Island Administrators, civil society, and development partners. Specifically, the five steps are: (i) framing and scoping the assessment to define objectives, stakeholders, and context; (ii) understanding the disaster's "DNA" through descriptive analysis of hazards, exposure, and vulnerabilities; (iii) identifying root causes and dynamic pressures that shape systemic risk; (iv) translating findings into future-oriented strategies and action plans; and (v) establishing mechanisms for monitoring, learning, and adaptive management to ensure continuous improvement.

The guidance also contributes to the operationalisation of the National Disaster Risk Information System (NDRIS) by ensuring that the outputs generated through its application

- namely, the post-disaster analysis of underlying disaster risk factors and proposed measures - are consolidated within the NDRIS. This, in turn, will support stakeholders to integrate risk analysis into development processes and promote more inclusive, resilient, and risk-informed decision-making.

Ultimately, this guidance serves as a strategic and practical roadmap that spans the post-disaster recovery process through to the building of long-term resilience that is locally grounded, historically informed, and aligned with national and regional policy commitments. By uncovering the systemic drivers of disaster risk and equipping practitioners with the tools to address them, it aims to foster transformative action in the face of increasing climate and disaster-related challenges across the Bahamian archipelago.

Table of Contents

Executive Summary: 1
List of Acronoyms 4
1. Introduction 6
2. Methodological Approach for Conceptual Framework Development 9
3. The Bahamas' Conceptual Framework and Methodology 16
3.1. Dimensions of Risk Analysis 16
3.2. Overview of Risk Drivers in The Bahamas 17
3.3. Contextual Considerations for Implementation of the Methodology 19
3.4. Data Collection Tools and Techniques 22
3.5. Participatory Approaches Linking Data Collection Approach 23
3.6. Analytical Procedures and Steps 24
4. Application of PAR/FORIN in Practice 26
4.1. Indicative Timeline and Implementation Flow 31
5. Conclusion 36
6. References 37
7. Annexes 39
Annex 1: Shared Glossary of Terms 39
Annex 2: Template List of Root Causes, Dynamic Pressures, and Unsafe Conditions for PAR-Based Assessments 43
Annex 3: Underlying Risk Factor Assessment Tool 45
Annex 4: Island Risk Profile Tool 48
Annex 5: Risk Driver Prioritization Matrix Template 51
Annex 6: Stakeholder Mapping Matrix for Disaster Risk Assessment 53
Annex 7: Guide for FORIN Narrative Report 58
Annex 8: Template for Retrospective Longitudinal Analysis (RLA) of Disaster Risk 60
Annex 9: Description of outputs and Application Tools 64
Annex 10: Key Recommendations 68

List of Acronyms

BBB	Build Back Better.
CCA	Climate Change Adaptation.
CCRIF	Caribbean Catastrophe Risk Insurance Facility.
CDEMA	Caribbean Disaster Emergency Management Agency.
CEDIM	Centre for Disaster Management and Risk Reduction Technology.
ECLAC	Economic Commission for Latin America and the Caribbean.
Committee	Refers to the Inter-Ministerial Committee on Disaster Risk Management, a sub-Committee of the Cabinet in The Bahamas, established under the DRM Act.
DDRC	Detecting Disaster Root Causes Framework and Tool.
DRM	Disaster Risk Management.
DRR	Disaster Risk Reduction.
EWS	Early Warning System.
FDSB	FORIN Disaster Scenario Building.
FIA	A Family Island Administrator - appointed under section 37 of the Local Government Act in The Bahamas.
FORIN	Forensic Investigations of Disasters.
GAR	Global Assessment Report on Disaster Risk Reduction by the United Nations.
GFDRR	Global Facility for Disaster Reduction and Recovery.
GIS	Geographic Information System.
GNDR	Global Network of Civil Society Organizations for Disaster Reduction.
HFA	Hyogo Framework for Action.
ICSU	International Council for Science.
IFRC	International Federation of the Red Cross.
IGAD	Intergovernmental Authority on Development.
IPCC	The Intergovernmental Panel on Climate Change.
IRDR	Integrated Research on Disaster Risk.
LDC(s)	Less Developed Country(ies).
MCC	Management Committee of the Council of CDEMA.
MDC(s)	More Developed Country(ies).
NDRIS	National Disaster Risk Information System
NGO(s)	Non-Governmental Organisation(s).
PAR	Pressure and Release (Model/Framework).
PDRP	Post-Disaster Recovery Planning.
PERC	Post-Event Review Capability.
PGIS	Participatory Geographic Information Systems.
P-EWS	Participatory Early Warning Systems.
PRSP	Poverty Reduction Strategy Policy.
RADIUS	Risk Assessment Tools for Diagnosis of Urban Areas Against Seismic Disasters.
RLA	Retrospective Longitudinal Analysis.
SDG(s)	Sustainable Development Goal(s).
TAC	Technical Advisory Committee (of CDEMA).
UNDRR	United Nations Office for Disaster Risk Reduction.
UNEP	United Nations Environment Programme.

UNFCCC	United Nations Framework Convention on Climate Change.
UNISDR	United Nations Office for Disaster Risk Reduction (also referred to as United Nations International Strategy for Disaster Reduction in older sources).

1. Introduction

The Bahamas is highly vulnerable to natural hazards due to its geographical location, low-lying topography, and multi-island characteristics, which amplify its vulnerability to climate-related hazards such as hurricanes, storm surges, and coastal erosion. This vulnerability was made starkly evident in 2019, when Hurricane Dorian caused the worst disaster in the country's recorded history, with damages estimated at US$2.46 billion, economic losses at US$717 million, and additional costs of US$221 million, bringing the total to approximately US$3.4 billion (IDB and ECLAC, 2020). Dorian uncovered not only the country's geophysical exposure but also the deep social and institutional vulnerabilities that shape disaster risk in The Bahamas. In recognition of this, the Disaster Risk Management Act (2022) requires systematic analysis of underlying risk factors after disasters. These include the latent processes and conditions that increase exposure, create vulnerability, or weaken coping capacity.

To support this mandate, the Disaster Risk Management (DRM) Authority, with the support of the Inter-American Development Bank (IDB), has developed this conceptual framework and practical methodology for analysing the underlying disaster risk factors in The Bahamas. This includes identifying the latent processes and conditions that increase exposure, exacerbate vulnerability, or reduce the capacity of individuals and institutions to cope with disasters. The framework provides government institutions, Family Island Administrators, policymakers, researchers, and practitioners with a structured, evidence-based, and participatory tool to identify and address the root causes, dynamic pressures, and unsafe conditions that contribute to disaster risk across the archipelago.

The conceptual framework and practical methodology build upon two internationally recognized approaches: the Pressure and Release (PAR) model and the Forensic Investigations of Disasters (FORIN) methodology. The PAR model, first introduced by Blaikie et al. (1994, updated 2004), conceptualizes disasters as the outcome of intersecting hazards and vulnerabilities, rather than isolated natural events. It traces a "progression of vulnerability" from root causes (such as lack of access to resources or political marginalization), through dynamic pressures (such as urbanization or environmental degradation), to unsafe conditions (such as fragile livelihoods or weak infrastructure). The FORIN methodology, developed under the Integrated Research on Disaster Risk (IRDR) program, complements this framework by providing the investigative tools to uncover how long-standing governance, institutional, and policy dynamics create or sustain disaster risk. By applying retrospective and comparative analyses, FORIN identifies the structural drivers of vulnerability and loss, highlighting where systemic change is required.

This framework is particularly useful because it complements existing national assessments such as the Pacific Disaster Centre's National Disaster Preparedness Baseline Assessment (NDPBA), the IDB's Disaster Risk Profile, and the Index of Governance and Public Policy in Disaster Risk Management (iGOPP). While these tools provide critical data on hazards, exposure, vulnerability, and risk at macro level, this framework plays a complementary role by enabling ex post verification of whether those ex ante analyses hold true after actual

disaster events, and by identifying gaps revealed in practice and how they should be addressed and improved.

Together, these models provide both a diagnostic and investigative lens by tracing in the aftermath of disasters, how vulnerabilities have accumulated over time while examining how institutional, policy, and development dynamics sustain risk. This dual approach moves beyond hazard-centric interpretations of disasters by highlighting that risk is socially constructed, historically rooted, and deeply influenced by governance challenges, inequality, coastal development pressures, and socioeconomic exclusion. Integrating these approaches within the Bahamian context ensures that the methodology not only traces how risks accumulate but also investigates the institutional, policy, and social systems that allow them to persist. This combined lens provides a foundation for developing targeted strategies to reduce underlying risk factors and strengthen resilience at both national and local levels.

The DRM Authority will lead the ongoing refinement of this framework, working in coordination with other institutions of the Government of The Bahamas (GoBH), national, regional, and international agencies, and local stakeholders. This iterative process ensures that the framework reflects international best practices and is applicable to the Bahamian context, incorporates diverse perspectives, and is owned by national institutions. In this way, the methodology evolves through co-production of knowledge led by The Bahamas itself, strengthening both institutional buy-in and practical applicability. The process reflects a commitment to co-production of knowledge, institutional ownership, and contextual relevance.

This conceptual framework and practical methodology are intended for a wide range of users: for government planners and national policymakers, it provides a structured approach to implementing the DRM Act (2022), aligning with the Sendai Framework and guiding integration of risk considerations into planning and investment by policymakers; for Family Island Administrators and local governments, it offers a practical methodology to translate national policies into island-specific strategies that address local vulnerabilities; for researchers and technical experts, it establishes a conceptual and methodological foundation for comparative studies and multi-level data collection, and for communities and civil society organizations, it opens participatory entry points for co-producing knowledge, ensuring local perspectives and experiences inform resilience strategies. It supports the implementation of the DRM Act (2022), contributes to the establishment of the National Disaster Risk Information System (NDRIS), and guides risk-informed development planning across sectors. It promotes inclusive and participatory governance, ensuring that diverse voices, including those of women, youth, migrants, and other vulnerable groups, are integral to shaping resilience strategies.

Ultimately, this framework and methodology aim to support a paradigm shift in disaster risk governance in The Bahamas: from reactive crisis response to proactive, equity-focused, and systems-informed risk reduction. It establishes the analytical foundation for the practical steps outlined in the operationalization part and facilitates that future assessments and interventions are grounded in a deep, context-sensitive understanding of vulnerability and resilience.

2. Methodological Approach for Conceptual Framework Development

The conceptual framework was developed through an iterative process that included desk-based literature review, expert consultations, and field-based insights gathered through interviews and workshops with stakeholders across The Bahamas. This multi-source, multi-perspective approach ensures contextual relevance and analytical depth. The framework explicitly integrates two complementary models, the Pressure and Release (PAR) model and the Forensic Investigations of Disasters (FORIN) methodology, to examine the social construction of risk with a strong emphasis on governance, institutional memory, and local development patterns. Together, these models move beyond immediate hazard triggers to expose the long-term social, economic, and institutional conditions that shape vulnerability. By mapping the progression of risk and investigating its historical and systemic drivers, PAR and FORIN generate actionable insights for reducing underlying vulnerabilities and strengthening governance.

In developing this conceptual framework, it is essential to begin with the understanding that disaster risk is not solely the product of natural hazards, but rather the result of systemic vulnerabilities shaped by historical, political, economic, and human and social processes. Local development choices lie at the heart of how risks are constructed and concentrated, influencing who is protected and who remains vulnerable. Socio-economic development models shaped by both policy priorities and market forces often dictate outcomes. For instance, privileging tourism infrastructure over investments in affordable housing or basic services can exacerbate inequalities and leave marginalised populations disproportionately exposed. A second pillar of the framework concerns the management of the built environment. Land use planning and the enforcement of building standards are critical tools in shaping long-term resilience. The Disaster Risk Management Act (2022) introduces important requirements for integrating risk analysis into building permit processes and establishing risk benchmarks. Continued efforts to strengthen implementation, particularly in high-risk coastal and low-lying areas, will help ensure that land use regulation contributes effectively to reducing future exposure to hazards.

The framework also recognises that risk is experienced unevenly across society. Understanding and addressing the diverse capacities and vulnerabilities of communities is central to equitable disaster risk reduction. Disparities in access to services, differences in economic resilience, and varying levels of social cohesion all shape how groups prepare for, respond to, and recover from disasters. It is therefore critical that the perspectives and needs of groups such as women, persons with disabilities, youth, older persons, and migrants are meaningfully integrated into risk planning and policy, ensuring that disaster governance is both inclusive and responsive.

Finally, the framework highlights the importance of strengthening infrastructure systems while acknowledging their interdependence with broader development dynamics. The collapse of critical systems during Hurricane Dorian revealed the fragility of essential sectors like electricity, health, water, and transport, and the cascading effects of such failures. Building resilience in these systems is vital to maintaining continuity of services during crises.

Yet technical fixes alone are not sufficient. The Bahamas' ongoing effort to diversity its economy and reduce poverty are essential to addressing underlying structural vulnerabilities and underscore the need for a holistic approach that integrates resilient infrastructure with inclusive and sustainable development pathways.

- **Theoretical Background (PAR/FORIN)**

  ### The Pressure and Release (PAR) Model

  The PAR model (see Image 1) provides a foundational conceptual lens by illustrating how disasters occur at the intersection of hazard events and pre-existing societal vulnerabilities. It visualises disaster risk as a "crunch point" between two opposing forces: the progression of vulnerability and the occurrence of a natural hazard. The strength of the PAR model lies in its ability to map the chain of causation that turns natural hazards into disasters, emphasizing the need to address underlying structural factors, not just the physical event, to reduce disaster risk.

  The model identifies three layers of vulnerability that must be addressed to "release the pressure":

  - **Root Causes:** These are the most distant, widespread, and general processes within a society and the global economy, often profoundly bound up with cultural assumptions, ideologies, beliefs, and social relations. They can be spatially or temporally distant. Examples include unequal distribution of power and resources, institutional weakness, or development priorities by national administrations over time.

  - **Dynamic Pressures:** These processes channel the root causes into specific forms of unsafe conditions. They can include factors like rapid urbanisation, current wars, foreign debt, certain structural adjustment programs, export promotion, mining, hydropower development, environmental degradation, deforestation, lack of education and health systems, and epidemic disease.

  - **Unsafe Conditions:** These are the specific manifestations of a population's vulnerability in time and space, interacting with a hazard. Examples include living in hazardous locations, poor infrastructure, inability to afford safe buildings, lack of effective state protection (e.g., building codes), dangerous or precarious livelihoods, or minimal food entitlements

  The model also highlights Hazard Events, which are the physical triggers (e.g., a tropical storm, earthquake, drought) that, when it interacts with unsafe conditions, leads to a disaster.

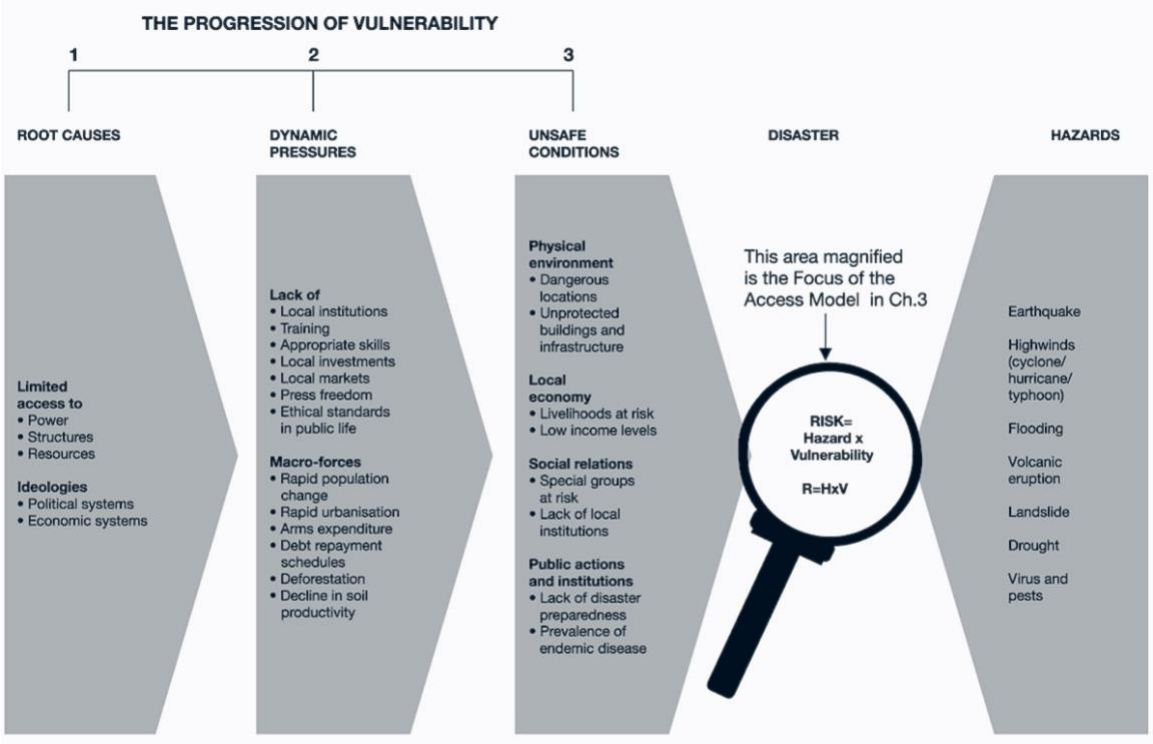

Image 1, source: Wisner, Blaikie, Cannon and Davis (2003). At Risk: natural hazards, people's vulnerability and disasters. Second edition.

The second half of the model is the "Release" phase (See Image 2). This is the process of reducing vulnerability by reversing the progression of it by addressing the systemic factors that make hazards destructive. It focuses on reversing the "progression of vulnerability", as pictured in Image 1, by targeting unsafe conditions, confronting dynamic pressures, and ultimately challenging the root causes that shape risk. While disaster risk management has traditionally emphasised physical infrastructure, the Release phase encourages a more holistic approach that includes strengthening social systems, such as education, public awareness, community networks, and governance structures, that enhance resilience. Therefore, to reduce disaster risk and "relieve the pressure," vulnerability must be reduced by addressing the entire chain of causation, from unsafe conditions back to root causes, not just the hazard itself or immediate unsafe conditions.

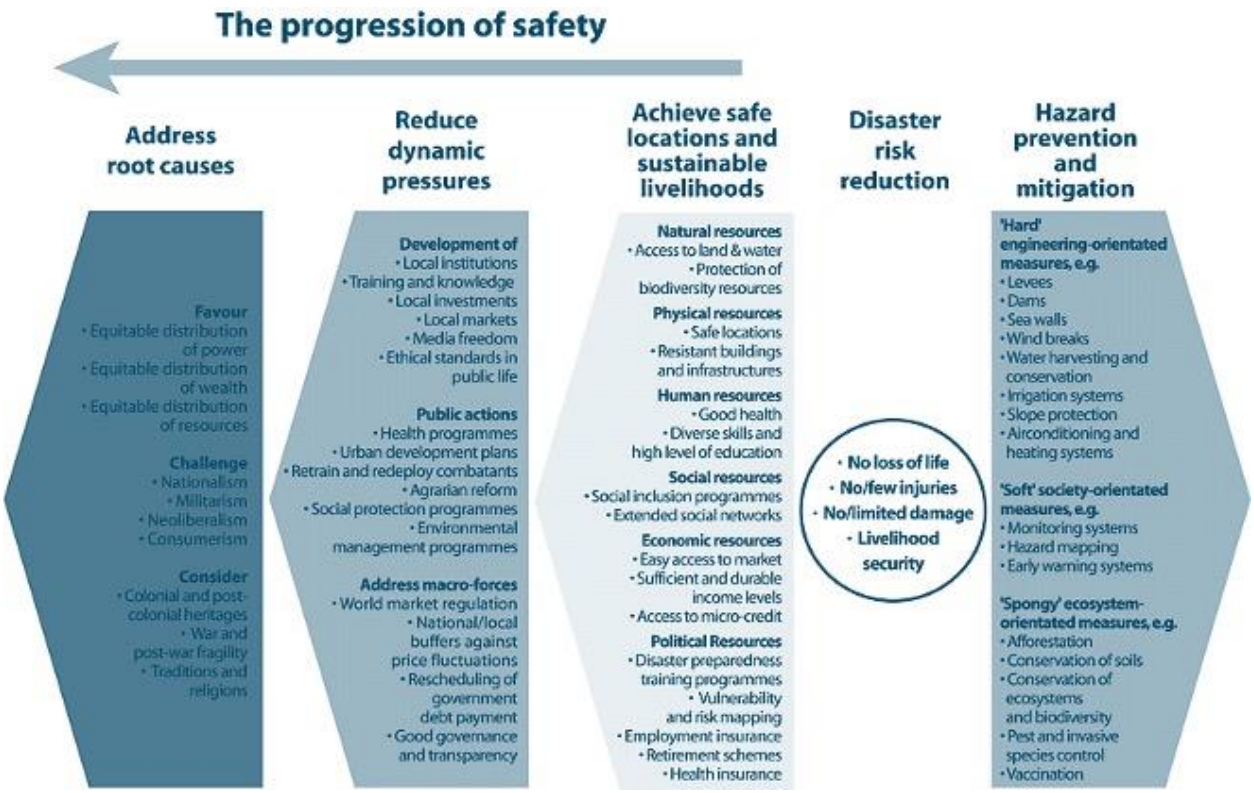

Image 2, source: Wisner, Blaikie, Cannon and Davis (2003). At Risk: natural hazards, people's vulnerability and disasters. Second edition.

This phase also recognises that public policy and governance at multiple levels, combined with community organisation, land use planning, environmental conservation, and equitable access to resources, can reduce hazard exposure vulnerabilities. These interventions can be active, such as reinforcing coastal protection infrastructure, or passive, like hazard mapping and biodiversity protection. Importantly, mitigation can also be direct (e.g., building safer housing) or indirect (e.g., improving resource access and social equity). In The Bahamas, this model provides a useful reference for post-disaster reflection, enabling structured discussions around the socio-environmental and economic factors that may have contributed to the scale of the disaster's impact.

The Forensic Investigations of Disasters (FORIN) Methodology

The FORIN methodology offers a systematic and investigative approach to uncovering how these risk conditions are produced and reproduced over time. Developed under the Integrated Research on Disaster Risk (IRDR) initiative, FORIN reframes disasters not as sudden, isolated accidental events but as outcomes of long-term societal processes. It aims to not assign blame, but to generate actionable insights for improving risk governance and policy and promote accountability and learning in disaster risk reduction through four primary research strategies that are often used collaboratively:

- **Retrospective Longitudinal Analysis (RLA):** Traces and reconstructs the historical development of processes that have led to past disasters, providing a narrative of risk construction.

- **FORIN Disaster Scenario Building (FDSB):** Creates and explores scenarios for known future hazards, assessing potential impacts based on root causes and driving forces to inform policy and practice.
- **Comparative Case Analysis:** Identifies and compares disaster impacts or contexts across different social settings to identify underlying causes, e.g., similar events in different places or different events in the same place.
- **Meta-analysis:** Systematically reviews existing literature to identify consistent findings, causal linkages, and effectiveness of interventions across diverse studies and synthesizes existing knowledge to distil cross-cutting lessons.

By combining the diagnostic structure of the Pressure and Release (PAR) model with the investigative rigor of the Forensic Investigations of Disasters (FORIN) methodology, this approach offers a dual analytical lens for understanding disaster risk. PAR helps to visualize how risk accumulates across spatial and temporal scales, mapping the progression of vulnerability from root causes through dynamic pressures to unsafe conditions. In parallel, FORIN enables a deeper investigation into the societal systems, institutional decisions, and power structures that construct and perpetuate this risk over time. In other words, PAR serves as a conceptual model to trace and explain the structural processes that generate risk in this framework, while FORIN functions as an applied investigative methodology that extracts lessons from concrete disaster cases. Taken together, the framework adopts a two-tiered approach: PAR identifies and maps the root causes and risk-generation mechanisms, and FORIN rigorously examines specific events to inform policy and institutional reforms.

This integration supports a critical shift toward proactive and systemic DRM governance by enabling the comprehensive review of lessons learned in the aftermath of disasters and their subsequent incorporation into DRM public policies. It encourages users to move beyond surface-level assessments of hazards or impacts and instead interrogate the underlying drivers of vulnerability. Such a comprehensive approach is particularly relevant in the context of The Bahamas, where disaster risk is shaped by entrenched spatial inequalities, historical development patterns, and the country's exposure to coastal and climate-related hazards. Together, PAR and FORIN provide the conceptual and methodological tools needed to uncover and address the root causes of risk in a meaningful and transformative way.

Alignment with National and Regional Policy Context and Global Best Practices

This section assesses the alignment of the proposed analytical framework with national, regional and global DRM policy contexts as an integral part of validating the methodology; In doing so, the conceptual framework and methodology are firmly grounded in The Bahamas' national legal architecture, regional strategies, and global best practices guiding disaster risk reduction (DRR). It is designed to support the implementation of the Disaster Risk Management Act (2022), support the operationalisation of the National Disaster Risk Information System (NDRIS), and contribute to the broader DRM global and regional frameworks or initiatives:

At the global level, the framework directly advances the priorities of the Sendai Framework, which emphasises four Priorities for Action: (1) understanding disaster risk; (2) strengthening disaster risk governance; (3) investing in DRR for resilience; and (4) enhancing preparedness for effective response and "Build Back Better" in recovery. This methodology strengthens Priority for Action1 of the Sendai Framework, by uncovering the root causes of vulnerability through structured causal analysis, addressing the systemic drivers of risk often overlooked in traditional hazard assessments. It also responds to Priority 2 by embedding lessons from forensic investigations into governance processes, thereby strengthening institutional memory and continuity. Priority 3 is supported through risk-informed decision-making tools like the Risk Driver Prioritization Matrix, which provide evidence for smarter investment in resilience. Finally, by applying PAR and FORIN methodologies post-disaster, the framework directly supports Priority 4 and the "Build Back Better" agenda, ensuring recovery is risk-informed and addresses the deeper vulnerabilities that make disasters so devastating.

The methodology also resonates with the general approach of the Integrated Research on Disaster Risk (IRDR) programme, which emphasizes that disasters are socially constructed outcomes shaped by historical, political, and economic processes. By shifting the focus from immediate impacts to underlying risk drivers, such as weak governance, socio-economic inequalities, and environmental degradation the Bahamian framework operationalizes this forensic lens.

At the regional level, the framework aligns with the Caribbean Midterm Review (2022) of the Sendai Framework, which Caribbean Disaster Emergency Management Agency (CDEMA) coordinated and published. This regional review process underscores the unique challenges faced by Small Island Developing States (SIDS) - including high exposure to climate-related hazards, limited land availability, dependence on tourism, and the disproportionate impacts of disasters on marginalized groups. By tailoring global methodologies (PAR and FORIN) to the Bahamian context, this framework supports the Caribbean's push for localised, evidence-based risk governance and contributes to the shared regional vision of resilience articulated by CDEMA and reflected in the Midterm Review.

The Midterm Review of the Sendai Framework in the Caribbean (2022) also noted several persistent challenges in the region, including weak integration of disaster risk into national development planning, limited systemic risk awareness, and insufficient coordination among institutions. This framework responds to those gaps by offering an integrated model that connects historical, institutional, social, economic, and environmental dimensions of risk and promotes a multi – level, multi – sectoral approach to risk analysis. Similarly, the IFRC's Legal and Policy Survey on Disaster Recovery in The Bahamas identified multiple shortcomings in the country's pre- and post-Dorian recovery mechanisms. These include weak local capacities, insufficient financial planning, and a lack of gender-sensitive and inclusive approaches. This methodology seeks to address those gaps by incorporating multi-dimensional risk assessments that capture governance dynamics, vulnerabilities of marginalized populations, and gaps in institutional memory, particularly at the Family Island level.

At the national level, this methodology directly supports the Disaster Risk Management Act (2022), which established the Disaster Risk Management (DRM) Authority as the central coordinating body for disaster governance in The Bahamas. The Act formalises a risk-informed, multi-sectoral, and integrated approach to disaster preparedness, risk reduction, response, and recovery. Crucially, Section 53(1) of the Act mandates the forensic analysis of disasters to inform planning and recovery, a legal requirement that this methodology fulfils. Further, Section 54 reinforces the need to develop Recovery Action Plans that integrate cross-cutting social, economic, environmental, and governance dimensions, core components embedded throughout this framework.

The Act also lays out foundational structures for implementation, such as the Disaster Emergency Fund and the Disaster Prevention Fund (Sections 70 and 71), which provide financial mechanisms to support both immediate response and long-term resilience-building. The methodology is well-suited to inform funding allocation decisions by highlighting underlying risk factors and identifying cost-effective, preventative interventions.

Additionally, the framework supports the operationalisation of the National Disaster Risk Information System (NDRIS) (Section 45), a platform mandated to collect, store, and analyse risk-related data. The underlying risk factors and lessons identified through this methodology in the aftermath of disasters will be registered and comprehensively managed within the NDRIS, enabling the dynamic tracking of underlying risk factors and contributing to inform DRR investments at both national and local levels.

This framework aligns with those priorities through its emphasis on participatory risk analysis, local capacity-building, and knowledge retention. Its application can be embedded into national training programs and help standardize analytical practices across DRM Authority divisions. Moreover, its co-learning model responds directly to the plan's call for inclusive governance and inter-agency coordination, critical gaps identified in stakeholder consultations, it also supports the plan's recommendation to strengthen local participation and coordination across sectors by fostering inclusive, transparent, and collaborative analysis of disaster risk.

Taken together, this framework situates The Bahamas within a multi-scalar policy ecosystem: it translates global and regional DRR commitments into nationally tailored, participatory methodologies, while simultaneously feeding local insights and lessons back into regional and global dialogues on disaster risk. By bridging these levels, it provides a coherent, context-sensitive approach that both strengthens The Bahamas' compliance with international DRR frameworks and equips its institutions and communities with the tools needed to build long-term resilience.

3. The Bahamas' Conceptual Framework and Methodology

This methodological approach is intended for application in the aftermath of disaster events. It offers a structured and participatory process for identifying and analysing the underlying risk factors unique to affected islands or communities.

Among the disaster-related post-event assessments relevant to this methodology is the Damage and Loss Assessment (DALA), developed by ECLAC and widely applied in the Caribbean. The DALA's purpose is to quantify the direct and indirect economic impacts of disasters on key sectors and to inform the financial requirements for recovery and reconstruction. While DALA implementation is encouraged to be led by the Government of The Bahamas, technical assistance from ECLAC can be requested when needed. Because DALA focuses primarily on the economic dimension of disaster impacts, this framework is designed to complement it by identifying and analysing the underlying social, institutional, and environmental drivers of risk that DALA does not capture. By going beyond the immediate physical and economic impacts captured in traditional Damage and Loss Assessments (DALA), the approach ensures that recovery and reconstruction efforts are grounded in a deeper understanding of the root causes and systemic drivers of vulnerability.

3.1. Dimensions of Risk Analysis

This framework adopts four interconnected dimensions for analysing disaster risk in The Bahamas: environmental, social, economic, and institutional. These dimensions are not isolated: they influence each other and often overlap in ways that intensify risk. Understanding their interconnections is essential for identifying the root causes of disaster risk and for designing integrated, context-sensitive risk reduction strategies.

The **environmental dimension** focuses on how natural systems and human activities shape exposure to hazards. In The Bahamas, environmental risks are closely tied to coastal development, land degradation, and climate-related threats such as hurricanes and sea-level rise. Poor land use practices, loss of mangroves, and the development of infrastructure in high-risk areas can increase vulnerability by disrupting natural buffers and placing communities in harm's way.

The **social dimension** examines how poverty, marginalisation, displacement, and informal housing contribute to disaster risk. Low-income families, migrants, and residents of informal settlements often face heightened exposure to hazards while having fewer resources to cope or recover. Addressing the needs of these populations is therefore not only critical for effective disaster recovery but also a matter of equity and human dignity. Expanding access to services, education, and decision-making processes strengthens their resilience and helps build a more inclusive society.

The **economic dimension** examines how livelihoods, economic structures, and development choices influence disaster risk. In The Bahamas, the heavy reliance on

tourism creates vulnerability to external shocks, such as global pandemics or hurricanes that disrupt travel. Many people work in informal or precarious jobs, with little protection or savings to cushion the impact of disasters. Unplanned urban growth and infrastructure development can also increase exposure, particularly when driven by short-term economic priorities over long-term sustainability.

The **institutional dimension** refers to the role of governance, policies, and organisational capacity in managing risk. Gaps in coordination, weak enforcement of regulations, and fragmented policies can all contribute to the accumulation of risk. Building on lessons from past disasters and investing in institutional capacity to implement risk reduction measures are crucial for addressing underlying vulnerabilities. Strengthening institutional memory, improving policy coherence, and fostering inclusive governance are therefore key to reducing long-term disaster risk.

3.2. Overview of Risk Drivers in The Bahamas

By quantitatively yet comprehensively analysing these four dimensions through these interrelated lenses, the framework encourages a shift from reactive response to proactive, systems-oriented disaster risk reduction, a new systemic approach to disaster risk reduction that addresses not just immediate hazards but the deeper structural factors that determine who is at risk and why.

Disaster risk in The Bahamas is shaped by a complex interplay of geographic, environmental, social, economic, and institutional factors. These risk drivers have evolved over decades and are further amplified by the impacts of climate change. Insights gathered through national and local consultations, stakeholder interviews, and field-based assessments confirm that vulnerability in The Bahamas is not merely the result of exposure to natural hazards, but a combination of these dimensions and factors. Below is an overview of some these risk drivers:

Geographic and Topographic Vulnerabilities

The Bahamas' unique geographic characteristics—its archipelagic structure, low-lying limestone geology foundation, and location within the Atlantic Hurricane belt — make it inherently vulnerable to the impact of hurricanes, tropical storms and related hazards including storm surges, coastal flooding, and sea-level rise. As an archipelago, its geographical variation also leads to diverse climatic hazards, where differences in island size, elevation, and proximity to the ocean create microclimates. This results in multi-hazard environments with different hazard profiles for each island, such as coastal erosion and flood affecting low-lying islands, and droughts or extreme heat impacting inland or higher-elevation areas on the islands. The limited availability of sufficiently elevated land for development outside of these hazard zones often forces communities to settle in hazard-prone coastal zones and low-lying areas, increasing exposure to natural hazards.

Economic and Institutional Structures

The Bahamian economy is highly dependent on tourism and offshore financial services, both industries significantly contributing to the country's GDP and employment, while creating spatial and sectoral imbalances in development and disaster exposure. This sectoral concentration, especially on specific islands, heightens sensitivity to external shocks, such as global economic crisis or climate-related disasters that disrupt travel and commerce. Fiscal constraints, stagnant growth, and rising debt further limit the government's capacity to invest in disaster risk reduction and recovery, along with competing national priorities and political agendas. Public investment decisions have historically prioritised tourism infrastructure and coastal development over resilience in housing, local governance, and social services.

Socio-Economic Inequalities and Colonial Legacies

Wealth concentration in urban centres, limited land tenure security on the Family Islands, and reliance on imported goods and labour exacerbate disparities in resilience across the archipelago. This uneven development leads to persistent poverty, especially in Family Islands, and reduces household and community capacity to prepare for and recover from disasters. These vulnerabilities are rooted in historical development patterns and colonial legacies, which have shaped land tenure, access to resources, and patterns of exclusion. The structural dependence on external aid and remittances also reinforces a reactive rather than preventative risk culture. Marginalised groups, including low-income families, migrants, and residents of informal settlements historically, face heightened exposure and limited coping capacity.

Land Use, Housing, and Infrastructure

Rapid coastal development and weak enforcement of zoning and building standards have exposed communities to storm surges and flooding. These development decisions often prioritise short-term economic returns over long-term resilience. Many settlements, especially informal ones, are located in low-lying or reclaimed coastal areas highly vulnerable to sea-level rise and hurricanes. Weak enforcement of building codes and the prevalence of informal construction practices often results in housing stock that is highly susceptible to hazard impacts, particularly hurricane and flood damage. Many homes which predate modern building standards, and incremental construction without regular inspections can further undermine structural integrity.

Environmental Degradation

Decades of coastal alteration, mangrove loss, sand mining, and poor waste management have reduced the country's natural buffers, exacerbating vulnerability to coastal erosion and storm impacts. Climate change compounds these risks by increasing the intensity of extreme events and accelerating coastal erosion. Deforestation and ecosystem decline reduce the country's natural resilience, while unregulated development in sensitive areas increases exposure.

Governance and Institutional Capacity

Gaps in governance, institutional memory, and inter-agency coordination can also undermine effective disaster risk management. Moreover, institutional fragmentation and limited decentralisation have constrained the effectiveness of disaster governance. The Family Island Administrators have limited authority and resources to implement local disaster plans. Persistently high turnover of public officials, especially within the Family Islands, weak documentation of institutional knowledge, and budgetary constraints undermine long-term planning, leading to loss of local knowledge and continuity in disaster preparedness and response. The systemic limitations in trained DRM experts and absence of standardised qualifications and career pathways for disaster professionals further constrains implementation and long-term capacity development.

Migration and Informal Settlements

Population shifts—both inter-island migration to economic hubs and undocumented immigration also contributes to the expansion of informal settlements. Many migrant and undocumented communities live in structurally unsafe housing with limited access to public services, increasing exposure to health and disaster risks. Post-disaster reconstruction efforts have often failed to address tenure regularisation or equitable access to recovery resources.

Unsafe Conditions and Coping Capacity

Communities across The Bahamas exhibit varying levels of preparedness and coping capacity. Unsafe conditions manifest in inadequate, or shortage of hurricane shelters, particularly in more remote areas, strained resources to support maintenance programs for infrastructure, and weak drainage systems. Reliance on schools and religious facilities as emergency shelters provides short-term intervention but may not provide a sustainable solution due to growing populations and limited capacity, lack of essential services, and disruption to education and community life. Limited access to healthcare, especially on outer islands, can also further reduce coping capacity and increase the risk of cascading impacts during disaster events.

Altogether, these conditions reveal that disaster risk in The Bahamas is both systemic and place specific. The underlying risk factors identified through the PAR and FORIN frameworks are not simply abstract analytical categories: they reflect the everyday realities experienced by vulnerable communities. The findings emphasise the need for integrated risk governance that moves beyond reactive responses toward a proactive and systemic approach. This includes strengthening institutional memory, promoting community participation, and embedding disaster risk considerations into long-term planning processes. By recognizing the social construction of risk and the institutional landscapes that shape it, the methodology supports a transition toward more equitable, informed, and resilient disaster risk management across The Bahamas.

3.3. Contextual Considerations for Implementation of the Methodology

While this methodology provides a structured and participatory framework for uncovering underlying disaster risk factors, several contextual considerations for implementation should be acknowledged. These conditions highlight where additional institutional capacity buildings, policy attention, and implementation plans are required to ensure effective implementation.

Governance and Institutional Dynamics as Core Drivers of Risk

The methodology recognises that governance and institutional dynamics are among key factors influencing disaster risk in The Bahamas. In this regard, a number of considerations were identified. First, the absence of consistent cycles for developing, implementing, reviewing, and incorporating lessons into subsequent development plans undermines the sustainable implementation of the methodology. In addition, institutional memory is weakened during governance transitions, and there remains a persistent gap between the governance mechanisms envisioned under the DRM Act and the practical realities, which complicates the full implementation of DRM mandates and timely responses.

To address these limitations, the methodology proposes several approaches. It emphasises the need to assess the stability of planning frameworks, the degree to which disaster risk reduction is systematically integrated into national development plans, and the continuity of institutional memory across governance transitions. The methodology also calls for an explicit consideration of the transition from NEMA and DRA to the DRM Authority, recognising that sustaining institutional knowledge is critical for effective long-term DRM governance. Furthermore, it incorporates an analysis of the DRM Authority's knowledge management practices and succession planning, as well as a review of the gap between the DRM Act's governance framework and its practical implementation, in order to identify measures that can strengthen alignment between mandates and operational realities.

Land Use Planning, Building Practices, and Environmental Vulnerabilities

A significant driver of increased vulnerability in The Bahamas has been identified as land use planning and development patterns directly shaped by government decisions on where construction is permitted or encouraged. In many Family Islands, as well as in New Providence, the limited availability of suitable land has often resulted in building in low-lying or swampy areas prone to coastal flooding. Given the country's inherent nature as a low-lying coastal community exposed to hurricanes, sea level rise, and storm surges, current zoning laws and infrastructure placement—such as roads constructed along the coast or across ponds that become impassable during high tides—further exacerbate disaster risk.

To address these vulnerabilities, the methodology emphasises the protection and restoration of natural protective barriers (e.g., native coastal vegetation such as mangroves) to reduce the risk of coastal erosion and sea level rise. It also highlights the importance of ensuring that homes are built to code through incremental construction and regular stage inspections, particularly in the Family Islands, to

reduce the prevalence of non-compliant buildings. The newly introduced and upgraded building code is expected to strengthen these efforts and contribute to long-term resilience.

Strengthening Local Governance, Community Participation, and Data Management

Interviews conducted during the development of this methodology revealed persistent weaknesses in local governance capacity within the Family Islands, which are often under-resourced. A key area for improvement is the limited integration of community participation and local knowledge into formal planning processes, leading to the loss of valuable historical data on flood zones, water drainage, and past disaster events. There are also significant disparities in institutional presence and resources across the islands, such as the absence of adequate hurricane shelters, ambulance services, or sufficient government personnel. Furthermore, coordination between agencies—including the DRM Authority, the Department of Social Services, the Ministry of Public Works and Family Island Affairs, and the Ministry of Environment and Natural Resources— is improving under the DRM Act, while further work is needed to fully enhance effective risk identification and analysis.

To address these limitations, the methodology adopts a bottom-up approach that emphasises strengthening local governance structures and supporting communities in developing their own plans. It underscores the importance of systematic community engagement, including initiatives to collect and preserve local knowledge to strengthen institutional memory. Tailored capacity-building and targeted resource allocation strategies are proposed to ensure equitable preparedness and response across islands with varying institutional capacities. The methodology also highlights the need for enhanced inter-agency coordination to reinforce risk identification and analysis. Finally, its operational value lies in post-disaster application at island and sub-island levels, where localized assessments of root causes, dynamic pressures, and unsafe conditions inform tailored risk reduction and recovery measures. These assessments also contribute to evolving the National Disaster Risk Information System (NDRIS) into a spatially and thematically disaggregated knowledge platform that supports equitable resource allocation, effective planning, and adaptive learning.

3.4. Data Collection Tools and Techniques

This guidance draws from the data collection strategies embedded within both the PAR model and the FORIN methodology, each of which provides robust tools for uncovering the underlying risk factors and systemic conditions that contribute to disasters. Examples and templates of these tools are provided in the Annexes, including Annex 2 (PAR-based Templates), Annex 4 (Island Risk Profile Tool), and Annex 5 (Risk Driver Prioritization Matrix).

PAR-Based Tools:

- **Interview Guides (Administrators, Community, Sectoral Agencies):** Used for semi-structured and unstructured interviews to collect personal, institutional, and experiential perspectives on root causes, dynamic pressures, and unsafe conditions.
- **PAR Causal Chain Diagrams:** Visual tools that help map the linkages between root causes, dynamic pressures, and unsafe conditions in specific local or national contexts. These diagrams are co-created with stakeholders to ensure shared understanding.
- **Community-Based Self-Study Tools:** Includes participatory mapping, seasonal calendars, disaster chronologies, and inventories that facilitate local analysis of exposure and vulnerability.
- **Existing Assessments Review:** Incorporates findings from past Vulnerability and Capacity Assessments, Hazard Assessments, and Needs Assessments to inform risk analysis under the PAR framework.

FORIN-Based Tools:

- **Retrospective Longitudinal Analysis (RLA):** A systematic process of tracing disaster impacts back in time to analyse how risk was constructed through historical, environmental, and policy shifts. This approach blends qualitative interviews, institutional reviews, and historical document analysis.
- **Risk Driver Prioritization Matrix:** A decision-support tool used to rank and assess the relative importance and tractability of various risk drivers. It integrates both PAR and FORIN findings to support planning.
- **Document Review and Institutional Analysis:** Examination of policies, legal frameworks, reports, and governance structures to identify organizational gaps and systemic failures.
- **Causal Mapping Techniques:** Includes causal loop diagrams to illustrate systemic risk and facilitate transdisciplinary dialogue. These are used in workshops to model feedback and interdependence across risk factors.

- **Geospatial Tools and Baseline Data:** Geographic Information Systems (GIS), socio-economic baseline data (disaggregated where possible), and spatial datasets support contextual understanding and triangulation.

Together, these tools support a layered, participatory, and evidence-based process to uncover how risk is created and reproduced over time and space. They ensure the analysis is both grounded in local realities and aligned with systemic drivers at national and regional levels.

3.5. Participatory Approaches Linking Data Collection Approach

Stakeholder engagement is a foundational pillar of both the Pressure and Release (PAR) model and the Forensic Investigations of Disasters (FORIN) methodology. These frameworks emphasise inclusive, participatory approaches to disaster risk analysis, encouraging co – learning and co – production of knowledge among diverse actors. By prioritising broad engagement from community members to policymakers; from technical experts to vulnerable groups; stakeholder processes help uncover the complex, multi-layered drivers of risk and foster shared ownership of solutions. This inclusive approach moves beyond traditional, top – down models of disaster governance to support collaborative, localized, and actionable responses. At the core of these tools is a commitment to inclusive and participatory research and decision-making. FORIN emphasizes transdisciplinary collaboration that brings together social scientists, engineers, public health professionals, environmental experts, and local communities to examine the systemic causes of disaster risk. This approach promotes co-designed, problem-focused research, ensuring that locally relevant knowledge and priorities inform both analysis and action. Similarly, the PAR model calls for the active involvement of community members in identifying their vulnerabilities, analysing risks, and envisioning paths to resilience. This emphasis on "co-action" and "co-creation" marks a shift from passive consultation to genuine partnership.

To guide such processes, the framework recommends minimum inclusion standards to ensure the participation of vulnerable groups often excluded from disaster risk governance. These include women, youth, persons with disabilities, displaced populations, low – income groups, resident of informal settlements, the elderly, and Indigenous communities. The PAR model, for example, highlights the need for gender – sensitive analysis, recognizing that men and women face different vulnerabilities and barriers in disaster contexts. Similarly, youth (starting from age 14) are identified as key contributors, particularly in addressing long-term social vulnerabilities such as unemployment. The Bahamian context further underscores the importance of including Haitian migrants and displaced persons, who often face legal, cultural, and economic exclusion. Inclusion must focus on the meaningful participation of these groups in shaping both analysis and outcomes.

Participatory Geographic Information Systems (PGIS) and community mapping are valuable tools to support inclusive engagement. The PAR model encourages

visualisation techniques, such as community mapping and hazard inventories, that allow people to spatially document their exposure, capacities, and vulnerabilities. GIS and PGIS approaches enable citizens to collaborate in generating environmental assessments and planning exercises, democratizing access to tools once limited to technical experts. Such practices support the production of localized knowledge, foster community ownership of data, and empower residents to participate in land use, settlement planning, and disaster preparedness.

Engagement continues beyond the research or mapping phases through validation workshops and local co – learning events, both PAR and FORIN advocate for iterative, reflective learning. PAR sessions often involve plenary discussions where community groups present their findings, reflect on patterns of vulnerability, and collectively propose solutions. FORIN's "Forensic Learning and Action" step brings together multiple stakeholders, including government, civil society, and the private sector, to critically review analyses, validate evidence, and co-design actionable strategies. In The Bahamas, this has included peer review of draft reports, written feedback from government agencies, and community validation events. These forums not only enhance the quality and legitimacy of the findings but also build capacity among participants to sustain engagement in risk governance.

3.6. Analytical Procedures and Steps

Understanding and addressing the root causes of disaster risk requires more than just a checklist, it demands a thoughtful, participatory process that unfolds in distinct but interrelated phases. The journey begins with framing and scoping the assessment, where teams define the focus of the work, which islands or communities are involved, what themes or sectors are most relevant, and who needs to be at the table. This is also the stage where stakeholder maps are drawn, historical timelines are reconstructed, and the groundwork is laid for inclusive and informed engagement.

With this foundation in place, the process moves into understanding the disaster's "DNA." Here, attention shifts to the specific characteristics of past or anticipated disasters: what hazards occurred, who and what was exposed, and how the impacts unfolded. This step leans heavily on participatory tools like mapping exercises and local storytelling to help communities articulate the unsafe conditions they live with daily, often invisible to outsiders.

The heart of the analysis lies in identifying root causes and dynamic pressures, using causal chain analysis, institutional reviews, and in-depth dialogue with stakeholders. The team explores the deeper drivers of risk: policies that were never implemented, historical patterns of exclusion, or governance gaps that allow vulnerabilities to persist. It is here that technical analysis meets lived experience, allowing for a more complete and more systemic picture of risk.

But looking backward is only part of the equation. The next phase, exploring future trends and enabling forensic learning, uses the insights gathered to look ahead. Scenario planning tools help teams imagine how climate change, demographic shifts,

or economic transformations might affect risk in the years to come. These projections aren't abstract exercises --they are directly linked to concrete action plans that outline what can be done now to reduce future harm.

Finally, the process ends in monitoring, learning, and adaptive management. Disaster risk is not static, and neither should be the strategies to cope with risk. This final step is about building feedback loops: systems to track changes in underlying risk drivers, to capture lessons learned, and to adjust policies and plans as new knowledge emerges. When institutional memory is updated and learning is embedded in everyday practice, disaster risk management becomes not just a response, but a living, evolving commitment to resilience.

4. Application of PAR/FORIN in Practice

This practical methodology outlines a participatory approach for diagnosing and addressing the systemic, structural, and historical conditions that contribute to disaster risk. It combines the descriptive and investigative power of the Pressure and Release (PAR) model and the Forensic Investigations of Disasters (FORIN) methodology.

Each step is both analytical and operational, enabling DRM actors to move from understanding disaster impacts to implementing solutions that address root causes and systemic failures. Its primary purpose is to identify and document the structural, institutional, and socio-economic factors, referred to as underlying risk factors, and provide outputs that feed directly into the National Disaster Risk Information System (NDRIS) and inform policy and planning aligned with the Disaster Risk Management Act (2022).

It requires strong institutional coordination, led by the Disaster Risk Management Authority, in collaboration with Family Island Administrators, sectoral agencies, and communities. It also depends on robust data-sharing protocols and localized training to build capacity in applying the tools.

Operationalising the methodology: Steps for Identifying Underlying Risk Factors

Step 1: Framing and Scoping the Assessment

Step 2: Understand the Disaster's "DNA" (Descriptive Analysis – Profiling)

Step 3: Identify Root Causes and Dynamic Pressures (Deepening the Analysis)

Step 4: Future Trends and Forensic Learning (Forward-Looking and Action-Oriented)

Step 5: Monitoring, Learning, and Adaptive Management

Step 1: Framing and Scoping the Assessment

This initial phase defines the geographic, institutional, and thematic focus of the exercise. The process begins with context mapping and scoping, where practitioners define the geographic or sectoral focus of the assessment, identify key institutional actors, and clarify objectives such as risk reduction or recovery planning. This phase also sets the historical and contextual foundation for analysis, including a timeline of major disaster events and systemic gaps.

At this stage, tools like stakeholder maps and scoping checklists help align the process with the PAR model's identification of root causes and dynamic pressures, and FORIN's emphasis **on defining past disaster timelines and systemic failures.**

Activities:

- Select assessment area (e.g., a Family Island or national sector)
- Mapping key stakeholders, mandates, and available data
- Clarify the scope of the assessment after a disaster (e.g., whether it is limited to recovery planning or to extend broader resilience building)

Tools[1]

- Stakeholder mapping matrix
- Institutional mandate map
- Scoping checklist

PAR and FORIN Alignment:

- Define historical context of disasters and systemic failures
- Identify the "root causes" and "dynamic pressures[2]" □ that have shaped vulnerability over time
- Identify possible "systemic failures" or missed interventions in past DRM efforts.

Step 2: Understand the Disaster's "DNA" (Descriptive Analysis – Profiling)

This step focuses on describing and contextualizing the loss and damage, providing a first level understanding of vulnerability and exposure. This aligns with the PAR model's "Unsafe Conditions" and "Hazard Event" aspects, and FORIN's focus on "descriptive analysis of hazard, exposure, unsafe conditions and subsequent patterns of damage, loss and impact".

Participants conduct a structured analysis of a specific disaster event in the aftermath, focusing on hazard characteristics, exposure, and social vulnerabilities, while highlighting immediate impacts and overlooked risk factors by using interviews, focus groups, and secondary data to build multi-dimensional island or sector profiles that inform the categorization of risk data, distinguishing root causes, dynamic pressures, and unsafe conditions.

Activities:

- Describe triggering hazard(s) and compounding factors
- Review hazard history and climate projections
- Conduct key informant interviews on exposure and vulnerability (administrators, DSS)

---

[1] Examples and templates of these tools are provided in the annexes, including Annex 6 (Stakeholder Mapping Matrix) and Annex 9 (Description of Outputs and Application Tools). While the document does not include a fully completed real case study with all forms filled out, the annexes are designed to provide practical, adaptable templates.

[2] See Annex 2: Template List of Root Causes, Dynamic Pressures, and Unsafe Conditions for PAR-Based Assessments.

- Engage community reps via focus groups or surveys

Tools[3]

- Island Risk Profile Template (can be found in Annex 4 in this document)
- Underlying Risk Factor Assessment Tool (Annex 3 in this document)
- Interview guides (local government, sectoral agencies, communities)
- Data dashboard (can be Excel – based or GIS – linked)
- Damage and loss reporting

PAR and FORIN Integration:

- Collect evidence of unsafe conditions, policy and institutional gaps, ecosystem degradation
- Mapping exposures and vulnerabilities using Participatory GIS (PGIS) with communities
- Apply retrospective analysis to trace past disaster development on each island:
- What failed? Why?
- Were there early warnings ignored?
- Were vulnerabilities known but unaddressed?

Step 3: Identify Root Causes and Dynamic Pressures (Deepening the Analysis)

This step moves beyond descriptive analysis to trace back the causal chain, aligning with the PAR model's "Root Causes" and "Dynamic Pressures," and FORIN's objective of understanding underlying, structural causes and risk drivers.

Here the analysis traces causal pathways from impacts to deeper, structural risk drivers. It includes participatory analysis of governance, environmental degradation, social inequities, and institutional gaps.

This third phase for the analysis of underlying risk factors synthesizes environmental, governance, and socioeconomic dimensions to uncover systemic vulnerabilities. Using diagnostic tools like risk factor matrices and community vulnerability scores, the analysis maps how institutional, social, and ecological processes contribute to disaster risk. Findings are organized using the PAR framework's causal chain and validated with FORIN methods such as timeline construction, institutional performance reviews, and triangulation of stakeholder insights.

Activities:

- Analyse causal relationships among governance, environmental, and socioeconomic factors

[3] Examples and templates of these tools are provided in the annexes, including Annex 4 (Island Risk Profile Tool), Annex 2 (Template Interview Guides), and Annex 9 (Description of Outputs and Application Tools).

- Examine local risk perception and response capacity, including the factors that enable or constrain effective action
- Analysis gaps in institutional coordination or enforcement and how these contribute to systemic disaster risk

Tools:[4]

- PAR causal chain template (refer to theoretical background section, Progression of Vulnerability diagram; see Annex 2 for illustrate lists of root causes and dynamic pressures)
- Risk factor matrix (See Annex 5)
- Community vulnerability scoring tool (See Annex 5, customizable per island)

PAR and FORIN Framework as a Diagnostic Tool:

- Create island-specific PAR diagrams that visualize how vulnerability builds up
- Identify risk construction pathways (how social/political decisions increased exposure)
- Include institutional performance reviews (e.g., were contingency plans implemented?)
- Cross-validate findings through triangulation of stakeholder views, timelines, and documentation
- Institutional and Policy Continuity, validate gaps in institutional coordination and assess resilience to changes is government structure.

Step 4: Future Trends and Forensic Learning (Forward-Looking and Action-Oriented)

Findings from the earlier phases are translated into actionable recommendations. A standardized, concise narrative report is prepared to inform the National Disaster Risk Information System and policy dialogue.

This step focuses on using insights from the past and present to inform future actions, a core aspect of FORIN's policy relevance and the "release" mechanism of PAR. These area options designed to be used on a need – to basis and customize It to each island context.

At this stage, a draft concise narrative report is prepared to synthesize the main findings, highlight both risk drivers and pathways to resilience, and provide evidence-based recommendations for DRM policy, land-use planning, infrastructure investments, and

[4] During the July 2005 Bahamas workshop, these tools were piloted through a simulated case study exercise. Participants worked in groups to identify and categorize root causes, dynamic pressures, and unsafe conditions using the PAR causal chain template (Annex 2), populated the risk factor matrix (Annex 5) with context-specific examples, and applied the community vulnerability scoring tool to assess differential capacities across islands. This mock exercise confirmed the relevance of the categories, helped practitioners translate abstract concepts into concrete diagnostic outputs, and validated their applicability to the Bahamian context.

recovery strategies. This draft narrative also supports the development of action plans and recovery programs, particularly for under-resourced and high-risk populations.

The draft narrative is disseminated to relevant national and local authorities, civil society, and academic institutions for review. It serves as the working basis for integration into the NDRIS, which will occur during Step 5 once monitoring data, after-action reviews, and stakeholder feedback are consolidated:

Activities:

- Validate findings in participatory sessions
- Prioritization criteria (impact, urgency, resource availability)
- Draft strategic local or national action plan
- Register standardized narrative report into the NDRIS for institutional learning and policy dialogue

Tools:

- Risk Driver Prioritization Matrix (can be found in Annex 5 of this document)
- Draft DRM Action Plan Template (aligned with DRM Act 2022)
- Budget estimation worksheet

PAR/FORIN Integration:

- Promotes evidence-based planning rooted in historical and systemic understanding
- Emphasizes stakeholder validation and inclusive learning

Step 5: Monitoring, Learning, and Adaptive Management

The monitoring, learning, and adaptation phase creates a feedback loop into the DRM process, for continuous improvement, defining indicators to track changes in underlying risk drivers and incorporating after – action reviews, and enables the update of national databases and policies based on forensic learning.

At this stage, the concise narrative report is finalized—integrating monitoring data, community and institutional feedback, and after-action reviews—and then formally registered in the NDRIS. In this way, the NDRIS record reflects both the analytical findings from Step 4 and the adaptive insights generated through ongoing learning, ensuring the report serves as a living tool for guiding future recovery planning and preparedness measures.

Activities:

- Define indicators to track progress on risk driver reduction
- Schedule regular review cycles (e.g., annually, post-event)
- Integrate findings into DRM Authority reporting
- Use community and institutional feedback to update priorities

Tools:

- Monitoring & Learning Tracker
- After-Action Review Template
- Community feedback mechanism (e.g., SMS, radio, town hall summaries)

PAR and FORIN Monitoring Loop:

- Monitor not just hazards and losses, but also underlying pressures (e.g., migration rates, budget allocations, ecosystem loss)
- Update risk assessments based on new forensic evidence after each major event
- Prepare [5] (ideally not exceeding 1000 words) outlining the disaster context, key vulnerabilities, recurring or emerging underlying risk factors, and priority recommendations for risk reduction.
- Consolidate the key insights, causal linkages, and identified underlying risk factors into a structured summary that can inform future policy, planning, and preparedness measures

4.1. Indicative Timeline and Implementation Flow

This indicative timeline outlines a phased approach to implementing the forensic risk analysis methodology in The Bahamas. It reflects a structured sequence of stakeholder engagement, data collection, analysis, planning, and integration into national systems. Emphasis is placed on participatory methods, equity – focused inclusion, and continuous learning to support a systemic shift in disaster risk governance. This timeline assumes activation of the methodology following a disaster event. It is designed to be implemented in the weeks and months after a disaster occurs, in order to identify, analyse, and address the underlying drivers of risk specific to the affected island or sector.

To clarify how the analytical steps described earlier align with implementation, the table below maps the five methodological steps onto the phased timeline. This cross-reference demonstrates how each step translates into concrete activities during post-disaster application, ensuring coherence between the conceptual framework and its operational rollout.

[5] A guide and template to support this process is provided in Annex 7 (Guide for FORIN Narrative Report).

Table 1. Alignment of Methodological Steps with Indicative Timeline

Methodological Step	Core Focus	Corresponding Implementation Phase	Time Line[6]	Practitioner Guidance
Step 1: Framing and Scoping the Assessment	Define geographic, thematic, and institutional scope; map stakeholders; clarify objectives; establish historical and contextual foundation.	Initial Scoping & Stakeholder Consultations	Weeks 1–2	Engage stakeholders early to establish trust, map institutional mandates, and co-define assessment goals (e.g., recovery planning, risk reduction). Use scoping checklists and stakeholder maps to capture responsibilities and set priorities.
Step 2: Understand the Disaster's "DNA" (Descriptive Analysis – Profiling)	Analyse hazard, exposure, and unsafe conditions; develop island/sector profiles using participatory and technical tools.	Data Collection & Profiling	Weeks 3–5	Gather qualitative and quantitative data (including PGIS, community mapping, and damage/loss reports). Build multi-dimensional profiles that connect hazard characteristics with social vulnerabilities and exposure patterns.
Step 3: Identify Root Causes and Dynamic Pressures (Deepening the Analysis)	Trace causal chains of vulnerability; assess governance, environmental, and socioeconomic factors; validate findings with stakeholders.	Causal Analysis & Validation	Weeks 6–9[7]	Use causal chain templates, risk factor matrices, and community scoring tools to map systemic vulnerabilities. Validate findings through workshops and cross-check with historical timelines and institutional reviews.
Step 4: Future Trends and Forensic Learning (Forward-Looking and Action-Oriented)	Translate findings into recommendations; develop action plans and policy products; prioritize interventions.	Reporting & Planning Sessions	Weeks 6–9	Facilitate participatory planning to turn findings into actionable strategies. Apply the Risk Driver Prioritization Matrix to rank interventions and co-develop draft DRM action plans with clear responsibilities and resource estimates.
Step 5: Monitoring, Learning, and Adaptive Management	Establish indicators, feedback loops, and adaptive management	NDRIS Integration & Follow-Up	Week 10+	Define indicators for tracking underlying risk factors, update risk assessments post-event, and ensure findings are

[6] The "Timeline" refers to elapsed time after a disaster event. While the steps are presented sequentially for clarity, in practice it may be more feasible to integrate several of the steps (e.g., Steps 1–5 or Steps 3-4) into tow or single intensive workshops within a shorter period, depending on context, resource availability, and urgency.

[7] In practical application, Step 3 can be conducted alongside Step 4 in a workshop format, allowing for more efficient integration of the analysis and validation processes.

	mechanisms; integrate into NDRIS.			uploaded into the NDRIS. Create feedback loops with communities and institutions to maintain learning over time.

Step 1: Framing and Scoping the Assessment: Initial scoping & stakeholder consultations (Week 1–2)

The implementation process begins with the definition of objectives and the establishment of inclusive stakeholder engagement mechanisms. The purpose is to foster a holistic and integrated approach to disaster risk management (DRM), engaging actors across sectors and levels of governance. During this stage:

- Stakeholder mapping and outreach activities identify and engage diverse groups, prioritizing the participation of vulnerable populations such as women, youth, persons with disabilities, migrants, and low-income communities in informal settlements.
- Minimum inclusion standards are applied to ensure these groups are not only represented but meaningfully involved, bringing insights from their lived experiences into the design and direction of the research.
- Semi-structured interviews and online surveys are conducted to gather preliminary insights and contextual information. The co-design of research questions is emphasized to reflect local priorities and perspectives.
- Building trust and transparency is key: early engagement focuses on establishing shared understanding among stakeholders from different sectors, with efforts made to bridge gaps between institutional and community knowledge systems.

Step 2: Understand the Disaster's "DNA" (Descriptive Analysis – Profiling): Data collection & profiling (Week 3–5)

This stage focuses on gathering comprehensive qualitative and quantitative data to construct a multi-dimensional risk profile. It includes:

- Document reviews and stakeholder interviews to assess institutional frameworks, disaster history, social and environmental conditions, and existing community initiatives.
- Collection of sex-disaggregated socioeconomic and environmental data to inform more inclusive and granular risk assessments.
- Use of Participatory GIS (PGIS), community mapping, and crowdsourced data to incorporate local knowledge into spatial analyses, particularly where traditional data sources are limited.

- Efforts go beyond cataloguing hazards to uncover underlying vulnerabilities, including those related to poverty, land tenure, informal housing, and degraded ecosystems.
- This phase also identifies examples of resilience, such as local coping strategies or effective institutional responses, to highlight factors that can be strengthened or replicated.

Step 3: Identify Root Causes and Dynamic Pressures (Deepening the Analysis): Causal analysis & validation (Week 6–9)

Building on collected data, this stage undertakes a deep causal analysis of disaster risk. The objective is to move beyond surface – level hazards and uncover systemic drivers of vulnerability:

- The PAR model and FORIN methodology guide the identification of root causes, dynamic pressures, and unsafe conditions.
- Visual tools such as causal maps and causal loop diagrams are used to explore complex interrelationships between social, economic, environmental, and institutional drivers of risk.
- The process actively links lived experiences with systemic analysis, bridging academic models and practical realities.
- Validation workshops are conducted with government officials, civil society actors, and community representatives to review findings, incorporate feedback, and co-develop actionable solutions.
- The analysis informs not only a historical understanding of past disasters but also prospective insights for scenario planning and risk reduction.

Step 4: Future Trends and Forensic Learning (Forward-Looking and Action-Oriented): Reporting & planning sessions (Week 6–9)

The findings are synthesized into a set of policy – relevant products and used to co – create forward – looking planning tools. In accordance with the DRM Act (2022), this analysis is not only archived in the NDRIS but constitutes a mandatory input to the formulation and implementation of each specific recovery plan following a disaster:

- Evidence – based recommendations are developed to inform DRM policy, land-use planning, infrastructure investments, and recovery strategies. These highlight both risk drivers and pathways to resilience.
- The process supports the development of action plans and recovery programs, particularly those that benefit under-resourced and high-risk populations.
- Paradigm shift messaging is embedded throughout, emphasizing that disasters are socially constructed and preventable, rather than “natural” or inevitable.

- Outputs are disseminated to relevant national and local authorities, civil society, and academic institutions. Web – based materials and summary briefs support broad accessibility.
- Policy integration is emphasized, with recommendations aligned to the DRM Act (2022), Sendai Framework priorities, and national development goals. The "Build Back Better" agenda is a central organizing principle for recovery planning.
- In line with the DRM Act (2022), these analyses are not only archived in the NDRIS but serve as mandatory, actionable inputs to guide the design and implementation of each specific recovery plan following a disaster.

Step 5: Monitoring, Learning, and Adaptive Management: NDRIS integration & follow-up (Week 10+)

The final stage ensures that the knowledge and tools generated are institutionalized and that learning continues over time:

- Key findings, analytical models, and stakeholder inputs are integrated into the National Disaster Risk Information System (NDRIS) as mandated by the DRM Act.
- Monitoring and evaluation frameworks are established to assess the effectiveness of risk reduction interventions and inform ongoing adaptation.
- Continued engagement with stakeholders supports capacity-building, particularly for young researchers, local authorities, and university programs.
- Mechanisms for systemic learning, including annual reporting, multi-stakeholder forums, and case-based reviews, ensure that lessons from past events shape future policy and practice.
- Public education and awareness campaigns are encouraged to strengthen risk literacy and build social demand for resilient recovery and development planning.
- Success stories from avoided disasters or proactive community efforts are documented and shared to promote peer learning and inspire action.

5. Conclusion

This conceptual framework and practical methodology provide The Bahamas with a structured and context-specific approach for identifying and addressing the underlying factors that shape disaster risk. By integrating the Pressure and Release (PAR) model with the Forensic Investigations of Disasters (FORIN) methodology, the framework moves beyond a descriptive account of hazards and impacts to examine the systemic, historical, and institutional drivers of vulnerability. This dual approach ensures that disaster risk is understood not merely as a product of natural events, but as a socially constructed condition shaped by governance, development choices, and environmental pressures.

The framework is firmly anchored in the legal and institutional reforms introduced through the Disaster Risk Management Act (2022), ensuring alignment with national mandates while also contributing to regional and global policy commitments such as the Sendai Framework for Disaster Risk Reduction (2015–2030). Its participatory and multi-scalar design provide practical means to operationalize the National Disaster Risk Information System (NDRIS), while also supporting capacity building at both the national and Family Island levels. In doing so, it creates a bridge between global best practices and the realities of a small island developing state (SIDS) highly exposed to climate-related and other hazards.

The methodology emphasizes not only analysis but also action. Outputs such as standardized Island Risk Factor Profiles, institutional and community risk maps, and a national database of underlying risk drivers are designed to be directly usable by decision-makers, practitioners, and communities. These products are not intended as new standalone plans; rather, they are tools to inform and strengthen recovery plans and DRM Plans as established under the DRM Act. By embedding the findings and recommendations into these existing instruments, the framework ensures that lessons from past disasters directly guide recovery processes, resource allocation, and long-term risk reduction.

At the same time, the methodology acknowledges its limitations. Resource constraints, institutional turnover, and uneven capacities across islands pose challenges to sustained application. However, the framework proposes constructive ways to mitigate these barriers, such as embedding training within national programs, leveraging the NDRIS to capture and retain local data, and adopting a bottom-up approach to strengthen community participation. These measures aim to create institutional continuity, preserve institutional memory, and promote inclusive engagement, ensuring that the methodology remains viable in the long term.

Ultimately, the framework positions The Bahamas to adopt a more forward-looking, evidence-based, and inclusive approach to disaster risk management. By institutionalizing systemic analysis and linking it to practical planning and policy tools, it lays the groundwork for building resilience that is not only structural but also social, economic, and institutional. The value of this framework lies in its adaptability: it can inform national policy while also being applied flexibly at the island and community levels. In this way, The Bahamas can strengthen its capacity to “build back better,” reduce systemic vulnerabilities, and safeguard its people, ecosystems, and economy in the face of future hazards.

6. References

Cepei. (n.d.). Bahamas: Vision 2040. Cepei.

Dougherty, K., Phillips, G. II, Chakalall, Y., & Hori, T. (2023). Building back better in the Caribbean: Insights from a regional assessment of post-disaster recovery. International Journal of Disaster Risk Reduction, 93, 103751. https://doi.org/10.1016/j.ijdrr.2023.103751

Ferreira, A. M., Marchezini, V., Mendes, T. S. G., Trejo-Rangel, M. A., & Iwama, A. Y. (2023). A systematic review of forensic approaches to disasters: Gaps and challenges. International Journal of Disaster Risk Science, 14, 722–735. https://doi.org/10.1007/s13753-023-00515-9

Fraser, A. (2023). Reflections from PEARL for an era of systemic risks, uncertain futures and complex governance. Jàmbá: Journal of Disaster Risk Studies, 15(1), a1485. https://doi.org/10.4102/jamba.v15i1.1485

Fraser, A., Paterson, S., & Pelling, M. (2016). Developing frameworks to understand disaster causation: From forensic disaster investigation to risk root cause analysis. Journal of Extreme Events, 3(2), 1650008. https://doi.org/10.1142/S2345737616500081

GEM Foundation. (2023). Global seismic risk profiles v2023.0.0: Bahamas profile. GEM Foundation.

Hai, V. M., & Smyth, I. (2012). The disaster crunch model: Guidelines for a gendered approach. Oxfam GB.

Hori, T., Chakalall, Y., Deopersad, C., Medina, R., Thomas, A., Losada, I., Gonzalez, M., Espejo, A., Aguirre-Ayerbe, I., & Diaz-Sima, P. (2020, February). Disaster risk profile for The Bahamas (IDB Technical Note No. IDB-TN-02018). Inter-American Development Bank. https://publications.iadb.org/en/disaster-risk-profile-bahamas

Integrated Research on Disaster Risk. (2011). Forensic investigations of disasters: The FORIN project (IRDR FORIN Publication No. 1). Integrated Research on Disaster Risk.

Kontro, M. (2022). The midterm review of the implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030 for the Caribbean. United Nations Office for Disaster Risk Reduction.

Maqueda Gassos, S., Cuestas Gómez, E., Monroy, M. C., Dyer, H., & King, J. (2023, May). Independent country program review: The Bahamas 2018–2022 (RE-579). Inter-American Development Bank, Office of Evaluation and Oversight. https://www.iadb.org/evaluation

McDermott, R., Fraser, A., Ensor, J., & Seddighi, H. (2022). The role of forensic investigation in systemic risk enquiry: Reflections from case studies of disasters in Istanbul, Kathmandu, Nairobi, and Quito. Progress in Disaster Science, 16, 100262. https://doi.org/10.1016/j.pdisas.2022.100262

United Nations Office for the Coordination of Humanitarian Affairs (OCHA). (2022, May). Country profile: The Bahamas. OCHA Regional Office for Latin America and the Caribbean.

Office of the United Nations Resident Coordinator for Jamaica, Bahamas, Bermuda, Turks and Caicos & Cayman Islands. (2020). United Nations common country analysis: The Bahamas. United Nations.

Oliver-Smith, A., Alcántara-Ayala, I., Burton, I., & Lavell, A. (2016). Forensic investigations of disasters (FORIN): A conceptual framework and guide to research (IRDR FORIN Publication No. 2). Integrated Research on Disaster Risk.

Oliver-Smith, A., Alcántara-Ayala, I., Burton, I., & Lavell, A. (2016). Forensic investigations of disasters (FORIN): Towards the understanding of root causes of disasters. International Science Council.

Pacific Disaster Center. (2021). National disaster preparedness baseline assessment: The Bahamas. Pacific Disaster Center.

Pacific Disaster Center. (2021). NDPBA island profiles: The Bahamas. https://www.pdc.org/wp-content/uploads/NDPBA-BHS-Island-Profiles-Merged.pdf

Government of The Bahamas. (2022, December 9). Disaster Risk Management Act, 2022. Official Gazette.

United Nations Office for Disaster Risk Reduction. (2024). Forensic insights for future resilience: Learning from past disasters (GAR Special Report 2024). United Nations Office for Disaster Risk Reduction. https://www.undrr.org/gar

Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). At risk: Natural hazards, people's vulnerability and disasters (2nd ed.). Routledge.

World Bank. (2021). The Bahamas. World Bank.

Yasir, A. (2009). The political economy of disaster vulnerability: A case study of Pakistan earthquake 2005 (MPRA Paper No. 20762). Munich Personal RePEc Archive. https://mpra.ub.uni-muenchen.de/20762/

7. Annexes

Annex 1: Shared Glossary of Terms

Relevant concepts from the Disaster Risk Management Act, 2022

"Administrator" means a Family Island Administrator appointed under section 37 of the Local Government Act (Ch.37);

"acceptable risk" means the level of potential disaster loss or impact within a period of time, which is considered admissible to determine the minimum safety requirements or demands, for protection and planning purposes, in the event of possible dangerous phenomena, and includes the social, economic and environmental consequences that a society assumes or tolerates where it considers an intervention for their reduction unnecessary, unfeasible, inopportune or impossible given the existing economic, social, political, cultural and technical context;

"Authority" means the Disaster Risk Management Authority established under section 26;

"climate change" means a change in the state of the climate that may be identified by changes in the mean value of its properties or by the variability of its properties, which persists over a long period of time, and is usually due to natural internal processes, external forcing or persistent anthropogenic changes in the composition of the atmosphere or in land use;

"Committee" means the Inter-Ministerial Committee on Disaster Risk Management established under section 22;

"critical infrastructure" consists of the physical structures, technical facilities and systems that are socially, economically or operationally essential to the functioning of a society or community, both in normal circumstances and in extreme circumstances, such as during and after a disaster;

"database" means an organized collection of information or structured data on – (a) the effects, damage or impacts of disasters that occurred, quantified by the size of the population and number of houses affected, the infrastructure damaged, the impact on economic activities and natural resources and the total amount of damage and loss; and (b) disaster risk;

"disaster" means a serious disruption of the normal functioning of a community or society due to natural hazards interacting with vulnerable social conditions, resulting in widespread adverse human, material and economic or environmental effects that require immediate response to meet essential human needs and to provide support to facilitate rehabilitation and recovery;

"disaster alert" means an alert declared by order of the Prime Minister under section 50 of the Act as a result of the imminent threat posed by a disaster which may be triggered by the occurrence of a hazard;

“disaster emergency” means a disaster declared by order of the Prime Minister under section 49 of the Act as a result of the occurrence of a disaster;

“disaster emergency measures” means a measure referred to in section 54 of the Act;

“disaster preparedness” means the process involved in planning, organizing and testing those procedures and protocols which govern the response of the Government and society, to a disaster, and which aim to ensure the adequate and timely care of people affected by a disaster and the rehabilitation and restoration of essential basic services, and the recovery of physical assets, natural capital and livelihoods in a resilient manner, to allow for the normalization of activities in the disaster zone;

“disaster response” means the immediate reaction to the occurrence of a disaster for the timely attention of the most urgent needs of the population affected by the disaster;

“disaster risk” means the likelihood of serious disruption of the normal functioning of a community or society due to a natural hazard interacting with vulnerable social conditions, resulting in widespread adverse human, material and economic or environmental effects that require immediate response to meet essential human needs, and support to facilitate rehabilitation and recovery;

“disaster risk management” means the management of activities before, during and after the occurrence of a disaster including those related to risk analysis, disaster risk reduction, disaster preparedness, financial protection, disaster response, rehabilitation and recovery;

“disaster risk reduction” means the process by which exposure, vulnerabilities, and risks are minimized, to avoid or limit the impact of a natural hazard;

“disaster zone” means the area designated as a disaster zone under section 55 of the Act;

“drill” means a practical exercise in which damages and injuries are staged in a hypothetical disaster, during which participants are required to use similar skills, knowledge, personnel and material resources with which they would attend a real disaster with similar facts, and which is recreated to demonstrate the management of operational actions used to respond to disaster;

“early warning system” means a system identified in section 18 of the Act;

“evacuation order” means an order made under section 56 of the Act which allows or the Prime Minister to order inhabitants to move out of an area identified in a disaster alert or disaster emergency declaration and to implement any measures referred to in section 56(2) of the Act;

“ex ante disaster risk management activities” means the disaster risk management activities which are planned and executed prior to the occurrence of a disaster and are aimed at analyzing disaster risk and avoiding or minimizing the impact of natural hazards on vulnerable populations, physical assets, natural capital and livelihoods, including activities related to risk analysis, disaster risk reduction, disaster preparedness and financial protection;

"ex post disaster risk management activities" means the disaster risk management activities which are implemented after a disaster has occurred to ensure the immediate provision of humanitarian assistance and the restoration of basic services, physical assets, natural capital and livelihoods, including activities related to disaster response, rehabilitation, and recovery;

"financial instrument" means a tool, whether publicly or privately owned, which is used to facilitate the transfer of financial resources between economic agents, which resources are to be used to finance the disaster risk analysis, disaster risk reduction, disaster preparedness, and the immediate response to, or rehabilitation and recovery from, a disaster;

"financial protection" means the use of financial instruments to facilitate access to economic resources, as required, to allow for the timely response to and rehabilitation and recovery from, a disaster, and includes – (a) risk retention instruments such as reserve funds, budget reallocation, contingent lines; and (b) risk transfer instruments such as insurance, catastrophic bonds;

"Government" means the Government of The Bahamas;

"hazard" or "threat" means the latent danger posed by the probable manifestation of a physical phenomenon of natural origin which, under certain conditions of exposure and vulnerability, may produce adverse effects on people, physical assets, economic activity and natural resources, and includes a natural hazard;

"information system" means an integrated set of components used for the collection, storage and processing of data, and for the provision of information, knowledge and digital products;

"natural hazard" means a geophysical hazard (earthquake, volcanic eruption, landslide, tsunami, seiche) and a hydro-meteorological hazard (tropical cyclone, flood, drought, extreme temperature, severe storm, hailstorm and tornado), or a combination thereof;

"recovery" means the process of re-establishing acceptable and sustainable living conditions after the occurrence of a disaster, through the – (a) restoration and reconstruction of infrastructure and any other physical asset, natural asset, good or service, after the occurrence of a disaster; and (b) restoration of livelihoods, under conditions of lower risk than those that existed before the disaster;

"rehabilitation" means the temporary restoration of vital services which were interrupted, damaged or destroyed as a result of a disaster;

"resilience" means the ability of a system and its components to anticipate, absorb, adapt to or recover from the effects of a hazard, in a timely and efficient manner, including by ensuring the preservation, restoration or enhancement of essential basic structures and functions of the system;

"risk analysis" means the process by which information about the – (a) origins, causes, scope, frequency and possible evolution of natural hazards; and (b) location, causes,

evolution, resistance and recovery capacity of socio-economic and natural elements, is obtained, and includes the analysis of potential consequences of a natural hazard and, in relation to a hydrometeorological hazard, the potential contribution of climate change to such consequences;

“simulation” means a desk exercise that recreates a hypothetical disaster situation in which participants make decisions based on the information they receive during the exercise;

“underlying risk factor” means a latent process or condition that influences the level of disaster risk by increasing levels of exposure and vulnerability or reducing the capacity to cope with a disaster and includes any compounding factor.

Annex 2: Template List of Root Causes, Dynamic Pressures, and Unsafe Conditions for PAR-Based Assessments

For use by the DRM Authority and Partners Adapted from PAR and FORIN Models.

This annex provides a reference list of typical Root Causes, Dynamic Pressures, and Unsafe Conditions to support practitioners applying the Pressure and Release (PAR) model. These categories are not exhaustive and should always be validated and adapted to the specific disaster, island, or community context. The list can be used during participatory exercises (e.g., workshops, focus groups, or scenario-based analyses) to prompt discussion and guide the identification of context-specific underlying risk factors.

How to Use This Annex

- During ex-post disaster assessments: Use as a checklist to guide workshops, stakeholder consultations, or participatory mapping sessions.
- For scenario-based exercises: Prompt participants to identify which root causes, dynamic pressures, and unsafe conditions were most relevant in the disaster being studied.
- For integration into the NDRIS: Categorize identified risk factors under these three headings to ensure comparability across islands and sectors.
- As a training aid: Support DRM Authority staff and Family Island Administrators in building familiarity with systemic risk concepts.

1. Root Causes

Fundamental and structural factors embedded in social, political, and economic systems that shape vulnerability.

- Limited access to power, structures, and resources.
- Ideologies, political and economic systems that marginalize groups.
- Dysfunction of the state (weak governance, rule of law, limited administrative capacity).
- Corruption, conflict, and privilege.
- Colonial legacies and persistent socio-economic inequalities.
- Gender bias and unequal representation in decision-making.
- Structural poverty and exclusion of marginalized groups.
- Contradictions or conflicting goals in development priorities.
- Misuse or appropriation of common resources.
- Weak or absent policy frameworks to counter risk-generating actions.

2. Dynamic Pressures

Processes and activities that translate root causes into more immediate vulnerabilities.

- Lack of local institutions (schools, hospitals, government agencies).
- Lack of training, technical skills, or awareness.
- Inadequate or inconsistent local investment.

- Inefficient land use planning and weak enforcement of regulations.
- Rapid population growth and unplanned urbanization.
- Debt burdens and structural adjustment pressures.
- Environmental degradation: deforestation, declining soil productivity, ecosystem loss.
- Epidemics, endemic diseases, or public health weaknesses.
- Violent conflicts, crime, or high levels of insecurity.
- Gender stereotypes limiting education and participation.
- Weak press freedom, restricted public debate, or lack of accountability in governance.
- Limited awareness of differential disaster impacts across groups (e.g., gender, youth, migrants).

3. Unsafe Conditions

Specific, localized manifestations of vulnerability that interact directly with hazards.

- Settlements in hazard-prone areas (coastal zones, floodplains, steep slopes).
- Poorly built housing, incremental construction without inspection, or non-compliance with building codes.
- Weak or absent infrastructure (drainage, electricity, water systems).
- Livelihoods highly exposed to hazards (e.g., fishing in unsafe vessels, informal tourism, subsistence farming).
- Lack of safe shelters, or shelters without adequate water and sanitation.
- Limited access to healthcare, insurance, or social protection mechanisms.
- Inadequate disaster preparedness and contingency planning.
- Food and livelihood insecurity, compounded by unemployment or indebtedness.
- Socially marginalized groups (elderly, disabled, migrants) with limited access to assistance.
- Environmental degradation reducing natural protection (e.g., mangrove loss, coral reef decline).
- Absence of community-level coping mechanisms (savings schemes, women's groups, contingency funds).

Annex 3: Underlying Risk Factor Assessment Tool

For use by the DRM Authority and Partners Adapted from PAR and FORIN Models.

Section 1: General Information

Location / Island	
Date of Assessment	
Interviewee(s) & Affiliation	
Event(s) being analysed (if any)	

Section 2: Pressure and Release (PAR) Analysis

A. Root Causes

Check all that apply and briefly describe:

- ☐ Limited land ownership or tenure security
- ☐ Unequal access to services (health, education, infrastructure)
- ☐ Policy legacy (e.g., coastal overdevelopment)
- ☐ Vulnerable or marginalized communities
- ☐ Environmental degradation or climate change related

Notes:

B. Dynamic Pressures

Check all that apply and explain briefly:

- ☐ Lack of infrastructure
- ☐ Lack of DRM education or outreach
- ☐ Unplanned urbanization or migration
- ☐ Limited budget allocation for local DRM
- ☐ Dependency on imports and fragile supply chains

Notes:

C. Unsafe Conditions

- ☐ Poor housing construction / materials
- ☐ Location in high-risk zones (e.g., floodplains, coasts)
- ☐ Limited evacuation infrastructure
- ☐ Weak local response capacity
- ☐ Inadequate early warning systems

Notes

Section 3: FORIN-Based Retrospective Analysis

A. Disaster Event Timeline

Date	Key Event	Institutional Response	Observed Gaps

B. Systemic Failures

- ☐ Risk information was known but ignored
- ☐ Institutional coordination failed
- ☐ Lack of enforcement or regulation
- ☐ Budget or resources unavailable at key time
- ☐ Delays in humanitarian or recovery response

Describe contributing factors:

Section 4: Risk Prioritization Matrix

Risk Factor	Severity(1-5)	Urgency(1-5)	Feasibility of Action(1-5)	Notes

Section 5: Recommendations

- Immediate action items:

- Medium/long-term interventions:

- Capacity-building needs:

Annex 4: Island Risk Profile Tool

Tool for the Analysis of Underlying Disaster Risk Factors

Adapted from PAR/FORIN Models

1: General Information

Island/Region:			
Assessment Date:			
Lead Institution/Team:			
Stakeholders Consulted:			
Population:		Main Economic Activities:	

2: Hazard and Climate Risk Overview

Historic Impacts:			
Major Events & Years:			
Current Primary Hazards:			
☐ Hurricanes	☐ Coastal Erosion	☐ Coastal Flooding	☐ Inland Flooding
☐ Sea Level Rise	☐ Drought	☐ Other:	

Project Climate/Hazard Trends:

3: Exposure and Physical Vulnerability

Critical Infrastructure at Risk:

- ☐ Ports
- ☐ Hospitals/Clinics
- ☐ Schools
- ☐ Roads
- ☐ Airports
- ☐ Other:

Housing:

- ☐ Informal
- ☐ Poor Construction Standards
- ☐ Coastal Locaiton
- ☐ Other:

Key Livelihood Exposure:

- ☐ Tourism-dependent
- ☐ Informal Economy
- ☐ Fisheries/Agriculture
- ☐ Other:

4: Underlying Risk Drivers (PAR Model)

A. Root Causes

- ☐ Weak land use enforcement
- ☐ Inequitable access to basic services
- ☐ Governance/institutional gaps
- ☐ Marginalization of specific groups
- ☐ Land tenure insecurity
- ☐ Inequity and exclusion
- ☐ Environmental degradation
- ☐ Other:

B. Dynamic Pressures

- ☐ Unregulated development
- ☐ Poor interagency coordination
- ☐ Lack of risk education
- ☐ Limited DRR training or funding
- ☐ Population displacement
- ☐ Budget/resource constraints
- ☐ Policy fragmentation
- ☐ Other:

C. Unsafe Condition

- ☐ Fragile livelihoods
- ☐ Inadequate shelters
- ☐ Lack/limited access to health/emergency services
- ☐ Location in hazard-prone areas
- ☐ Isolated populations
- ☐ Single access points
- ☐ Other:

5: FORIN Retrospective Analysis (if applicable)

Event Timeline (Date – Event – Institutional Response – Gaps):

Systemic Issues Observed:

- ☐ Ignored forecasts/risk data
- ☐ Coordination breakdown among agencies
- ☐ ☐ Budget constraints
- ☐ ☐ Overlapping mandates
- ☐ ☐ Turnover in public service leadership
- ☐ ☐ Other: _____
- ☐ Bureaucratic delay Airports
- ☐ Community exclusion
- ☐ Delayed response
- ☐ Weak enforcement of planning/building codes
- ☐ Gaps in early warning or risk communication

6: Institutional and Adaptive Capacity

Local DRM Committee:	☐ Yes ☐ No
Early Warning Coverage:	☐ Full ☐ Partial ☐ None
Evacuation Planning:	☐ Updated ☐ Outdated. ☐ Not available
Community Engegement in Planning:	☐ High ☐ Moderate. ☐ No
Critical System Redundancies (eg. Backup power, telecoms):	☐ Yes ☐ No

7: Summary and Recommendations

Top 3 Risk Drivers:

1.

2.

3.

Opportunities for Risk Reduction:

Priority Interventions:

Integration with National DRM and Development Plans:	☐ Yes ☐ No

Notes:

Annex 5: Risk Driver Prioritization Matrix Template

For use by the DRM Authority and Partners Adapted from PAR and FORIN Models.

A Risk Driver Prioritization Matrix, which is a decision-support tool used to rank and assess the relative importance and tractability of various risk drivers, integrating findings from the Pressure and Release (PAR) model and Forensic Investigations of Disasters (FORIN).

Instructions for Use:

1. **Identify Risk Drivers:** Populate the "Risk Driver" column by drawing from the "Progression of Vulnerability" in the PAR model (Root Causes, Dynamic Pressures, Unsafe Conditions) and the "Risk Drivers" identified through FORIN investigations.
2. **Assess Importance:** Evaluate how significant each driver is in contributing to disaster risk and losses, considering its systemic impact and role in making a disaster unique.
3. **Assess Tractability:** Determine how feasible it is to influence or change each driver through policy, practice, and resource allocation.
4. **Prioritize Actions:** Based on importance and tractability, assign a priority level for intervention and outline recommended actions.

Risk Driver (from PAR/FORIN Analysis)	Importance (High/Med/ Low)	Rationale for Importance	Tractability (High/Med/ Low)	Rationale for Tractability	Priority for Action (High/Med/ Low)	Recommended Actions & Notes for Implementation
I. ROOT CAUSES						
Limited Access to Power/Resources (e.g., political/economic marginalization)	(e.g., High)	This is a fundamental societal process influencing widespread vulnerability. It can cascade into multiple other risks.	(e.g., Low)	Often requires fundamental changes in development, which are beyond the direct mandate of DRM specialists.	(e.g., High)	Advocate for policy reforms addressing structural inequalities; support community empowerment programs; integrate DRR into broader development policies.
Dominant Economic/Political Ideologies (e.g., prioritizing profit over safety, short-term gain)	(e.g., High)	These ideologies can deeply embed risk into societal history and organization, perpetuating vulnerability. They drive many dynamic pressures.	(e.g., Low)	Changing deep-seated societal values and economic models is a long-term, complex process requiring transformational change and cultural shifts.	(e.g., High)	Promote awareness campaigns on social construction of risk; integrate DRR principles into economic planning and investment policies.
II. DYNAMIC PRESSURES / RISK DRIVERS						
Rapid Urbanization & Informal Settlements	(e.g., High)	Directly increases exposure in hazardous locations and strains existing infrastructure and services. A key "DNA strand" in many disasters.	(e.g., Medium)	Can be addressed through policy interventions like land-use planning and urban risk management, but requires significant political will and resources.	(e.g., High)	Implement and enforce comprehensive land-use plans and building codes; invest in resilient urban infrastructure and public services; develop urban risk management strategies.

Environmental Degradation (e.g., deforestation, ecosystem depletion)	(e.g., High)	Directly amplifies natural hazards (e.g., landslides, floods) and reduces natural protective buffers, contributing to vulnerability and loss.	(e.g., Medium)	Specific measures like environmental impact assessments (EIA) and reforestation can be implemented, but often face economic and political resistance.	(e.g., High)	Strengthen environmental protection laws and their enforcement; promote reforestation and ecosystem restoration; integrate natural risk analysis into development projects.
Poverty & Unequal Income Distribution	(e.g., High)	Directly translates into unsafe conditions (e.g., unsafe housing, dangerous livelihoods, minimal food entitlements) and reduced coping capacity for vulnerable groups.	(e.g., Medium)	Addressed through social safety nets, financial protection instruments, and livelihood diversification, which are achievable through policy.	(e.g., High)	Expand access to financial protection instruments (e.g., insurance); strengthen social safety nets; promote sustainable livelihood opportunities, especially for vulnerable groups.
Inadequate Disaster Risk Governance (e.g., weak legislation, poor enforcement, lack of coordination)	(e.g., High)	Directly affects the ability to implement DRR measures, leading to risk accumulation and ineffective response and recovery. Identified as a critical element by FORIN and PEARL.	(e.g., High)	Highly tractable through legislative reforms, institutional strengthening, clearer roles/responsibilities, and multi-stakeholder collaboration.	(e.g., High)	Enact and enforce comprehensive DRRM legislation; establish clear coordination protocols across government agencies, private sector, and NGOs; invest in capacity building for practitioners.
III. UNSAFFE CONDITIONS						
Living in Hazardous Locations (e.g., floodplains, steep slopes, coastal areas)	(e.g., High)	Direct cause of casualties and property loss during hazard events. A direct manifestation of underlying vulnerabilities.	(e.g., Medium)	Can be addressed through land-use restrictions, relocation programs, and early warning systems, but may face social/political resistance.	(e.g., High)	Implement risk-informed land-use zoning and restrictions; develop community-based early warning systems; consider managed retreat or relocation where risk is unacceptable.
Unsafe Building & Infrastructure Standards (e.g., lack of codes, poor enforcement)	(e.g., High)	Direct contributor to structural damage, injuries, and fatalities, as well as economic disruption.	(e.g., High)	Highly tractable through setting and enforcing building codes, retrofitting critical infrastructure, and ensuring quality construction.	(e.g., High)	Update and strictly enforce building codes; provide incentives for resilient construction; conduct risk analysis for critical infrastructure; train building control officers and promote safe building practices.

Annex 6: Stakeholder Mapping Matrix for Disaster Risk Assessment

For use by the DRM Authority and Partners Adapted from PAR and FORIN Models.

The purpose of this matrix is to systematically identify, categorize, and analyze the roles, interests, influence, and engagement of various stakeholders in disaster risk management (DRM) and forensic investigations of disasters (FORIN). This template aims to move towards more integrated, policy-relevant, and transdisciplinary approaches by uncovering underlying root causes and fostering a learning culture.

Instructions for Practitioners:

- Fill out each row for an identified stakeholder or stakeholder group.
- The "Key Responsibilities / Interests" column should detail their specific roles in DRM phases (risk analysis, reduction, preparedness, response, rehabilitation, recovery).
- The "Level of Influence / Impact" should reflect their ability to affect disaster outcomes or policy.
- "Current Engagement" describes their existing involvement, noting any gaps or limitations.
- "Desired Engagement (FORIN Ideal)" emphasizes how they should be involved to achieve effective, evidence-based, and inclusive DRR, particularly aligning with FORIN's transdisciplinary and root cause analysis goals.
- "Key Information to Gather / Share" specifies data, knowledge, or documents crucial for a comprehensive assessment.
- Use the "Notes / Context" column for specific details, historical context, challenges, or unique characteristics relevant to the stakeholder.

Stakeholder Group / Entity	Key Responsibilities / Interests (in DRM/FORIN Context)	Level of Influence / Impact (High/Medium/Low)	Current Engagement (How are they involved now?)	Desired Engagement (How should they be involved? / FORIN Ideal)	Key Information to Gather / Share	Notes / Context
I. GOVERNMENTAL BODIES						
National Government / Ministries (General)	Overall policy-making, strategic planning, legislation (e.g., Disaster Risk Management Act), resource allocation, national plans (NDRMP, NDEP), international coordination. Overall governance for DRR.	High	Formal reports, top-down directives, ad-hoc task forces.	Active participation in research co-design, evidence-based policy formulation, accountability, mainstreaming DRR into development.	Policy documents, budgetary allocations, legislative frameworks, national development plans, risk assessments, post-disaster reports.	Consider political will, conflicting priorities (e.g., economic growth vs. risk reduction).

Prime Minister	Declares disaster alerts/emergencies, designates disaster zones, issues evacuation orders, designates DRMA for response coordination, designates persons for rehabilitation/recovery.	Highest	Directives, declarations, executive orders.	Informed by comprehensive, evidence-based FORIN findings to promote long-term, risk-informed decision-making.	Disaster alert/emergency orders, designation orders.	Executive authority, central to national response.
Inter-Ministerial Committee on DRM	Advises PM on disaster zones, approves national plans, humanitarian assistance standards, coordination protocols. Recommends budget allocation, fosters collaboration among public bodies/Administrators, promotes DRR in public investment and financial protection. Evaluates Policy annually. Co-opts experts for advice.	High (strategic oversight, coordination, approval)	Committee meetings, formal approvals, recommendations.	Leverage FORIN insights for policy coherence, integrated DRR across sectors, and evidence-based resource allocation.	National plans, humanitarian standards, coordination protocols, budgetary recommendations, policy evaluations.	Important for cross-government coordination and high-level policy approval.
Disaster Risk Management Authority (DRM Authority)	Coordinates and monitors Policy implementation, advises PM/Cabinet/Committee on disaster risk. Prepares national plans/standards/protocols. Advises/assists local government/public bodies on all DRM phases. Establishes/maintains National Disaster Risk Information System, Early Warning System, Hazard Monitoring Systems. Conducts need assessments. Manages Disaster Emergency and Prevention Funds. Acts as liaison for international assistance.	Highest (central coordinating and implementing body)	Centralized coordination, technical advice, operational response, data collection/management.	Leadership in integrated, transdisciplinary research; fostering multi-stakeholder partnerships; promoting evidence-based policies; continuous learning; using FORIN to understand root causes for systemic risk reduction.	National Policy, plans, standards, protocols, risk analyses, information system data, early warning data, needs assessments, fund reports.	Core institution for national DRM, crucial for unifying efforts.
Minister of Finance	Prepares/implements Comprehensive Financial Strategy for DRM, establishes risk benchmark for NDRMP. Responsible for financial protection component. Manages Disaster Emergency and Prevention Funds. Reports annually on financial strategy.	High (financial allocation, strategy)	Financial planning, fund management, budget tagging.	Integrate DRR into financial strategies and investments for pre-disaster risk management, promoting risk transfer instruments and long-term resilience.	Comprehensive Financial Strategy, budget reports, fund audit reports, risk benchmarks.	Critical for resource mobilization and sustainable DRR financing.
Local Government / Administrators	Prepares/implements Local DRMP and DEP (with DRMA support/advice, in consultation with Consultative Committee). Conducts humanitarian needs assessments.	Medium-High (localized understanding, response, implementation)	Local plan preparation, direct response, localized data collection, needs assessments. Often face capacity and	Collaborative planning, active community engagement, incorporating local/Indigenous knowledge, continuous	Local plans (DRMP, DEP), needs assessments, risk analyses, hazard monitoring data, local	Essential for effective, context-specific DRR and communit

	Installs/operates/maintains early warning systems. Advises DRMA on early warnings. Coordinates local disaster response (unless capacity exceeded). Collaborates with DRMA in rehabilitation/recovery.		resource constraints.	learning, implementing recovery plans. Critical for mediation between local, national, and international actors for small/recurrent events.	economic/social data, community perspectives.	y-level resilience.
Public Bodies (Sector-specific)	Analyzes/manages disaster risks within their functions (e.g., infrastructure, health, environment, finance). Considers DRR in public investment project cycle. Assists Authority/Administrators in response/rehabilitation/recovery. Uses disaster risk budget tagger. Conducts inventory/risk analysis of critical infrastructure. Shares disaster/risk information. Adopts financial protection instruments.	Medium-High (critical for sector-specific DRR and data provision)	Prepares plans, liaison officers, data sharing, damage assessments, sector-specific operations. Often siloed in approach.	Integrated approach to DRR in their operations, consistent information sharing, budget tagging for risk management, adoption of financial protection instruments, collaboration with DRMA/Administrators.	Sector-specific risk analyses, DRMP/DEP, damage/loss assessments, hazard monitoring data, financial protection instruments.	Critical for implementing DRR across sectors and providing specialized data.
Disaster Risk Management Consultative Committee (Local)	Advises the Administrator on DRM for their area. Composed of District Council members.	Medium (advisory role at local level)	Consulted by Administrator for local plans.	Active consultation, representing local communities and district councils in DRM planning and decision-making.	Local priorities, community perspectives, District Council input.	Bridges local community needs with formal local government planning.
II. NON-GOVERNMENTAL & COMMUNITY						
Local Communities / Vulnerable Groups	Experience disaster impacts, possess local knowledge, develop coping strategies, grassroots action, participate in recovery, define acceptable risks. Includes women, children, the elderly, people with disabilities, LGBTQI+ people, migrants of Haitian origin, young men in marginalized communities, and family islanders.	High (as directly affected, possess vital local knowledge, and agency)	Victims of disaster, recipients of aid, informal self-help, local activism. Often marginalized, lack voice in formal processes.	Active participants in research co-design, decision-making, setting priorities; co-producers of knowledge; informing policy from bottom-up; building self-protection and social protection mechanisms. Meaningful inclusion is vital.	Local knowledge, traditional coping mechanisms, perceived risks, needs, priorities, vulnerabilities (sex-disaggregated socioeconomic data), capacities, preferences, values.	Vulnerability is socially constructed and disproportionately affects specific groups; their active engagement is critical for effective and equitable DRR.
NGOs / Voluntary Agencies /	Advocacy, relief, rehabilitation, community organizing,	Medium-High (bridge	Consultation, partnership in service delivery,	Strong, continuous, transdisciplinary	Needs, vulnerabilities, capacities,	Bridge gap between

Civil Society Organizations / CBOs	capacity building, action research, providing alternative perspectives, promoting DRR at grassroots level.	between communities and decision-makers, crucial for action and advocacy)	advocacy, publishing reports.	engagement; co-production of research, influencing policy, fostering "learning culture," challenging root causes. Promoting Indigenous climate leadership and low-emissions initiatives.	local solutions, advocacy positions, grassroots insights, gender-disaggregated data.	local communities and higher-level decision-makers. Potential for fragmented mandates.
Non-Governmental Consultation Council (National)	Appointed by the DRMA. Consists of individuals with DRM qualifications/experience, community-based organizations, non-profit organizations, corporations, and other private organizations specializing in DRM.	Medium (advisory and consultative to DRMA)	Authority requests its assistance when necessary.	Regular consultation, providing diverse expertise and stakeholder perspectives to inform national DRM strategies and actions, integrating civil society input at the national level.	Inputs on DRM policy, strategy, and operational effectiveness from varied perspectives.	Formal mechanism for multi-stakeholder input at the national level.
III. PRIVATE SECTOR						
Businesses / Corporations / Developers / Investors	Economic development, infrastructure construction, supply of materials/services, financial protection. Can contribute to risk creation (e.g., logging, construction, agriculture, mining, utilities) or reduction (e.g., cyclone-resistant structures, selective cutting).	High (economic drivers, infrastructure development, potential for systemic risk creation/reduction)	Profit-driven decisions, often focused on short-term gains, sometimes reactive to disasters. May or may not integrate DRR. Can provide raw materials and technical support, sometimes with tax incentives.	Integration of DRR into business models and investments, long-term resilience, pre-selected contractors/suppliers, innovative financial instruments, recognition of root causes. Strong partnerships with government and civil society.	Economic data, investment plans, construction standards, risk transfer instruments, supply chain information, contributions to vulnerability, best practices in DRR integration.	Often involved in "root causes" without recognizing it; need for incentives and regulatory frameworks to engage in DRR.
Financial Institutions (e.g., Insurance, Banks)	Provide financial protection instruments, promote prevention, offer innovative financing. Bahamas Development Bank integrates SDGs into lending strategy.	Medium-High (critical for risk transfer, investment in DRR)	Offering insurance, loans, sometimes reactive.	Development of risk financing strategies for pre-disaster risk management, integration of DRR into lending/investment strategies, promoting financial protection instruments and innovative financing.	Risk transfer instruments, disaster risk financing strategies, investment criteria.	Can incentivize DRR through financial mechanisms.

IV. ACADEMIA / RESEARCH / MEDIA						
Academics / Researchers / Experts (incl. National Technical/Scientific Entities)	Generating knowledge, conducting forensic investigations (FORIN), developing methodologies (critical cause analysis, meta-analysis, longitudinal analysis, scenarios of disasters), capacity building, informing policy, testing theories, identifying root causes and risk drivers. Providing technical/scientific data/advice.	Medium (as knowledge producers and policy advisors)	Disciplinary research, publications, conferences, advising committees, developing models, collecting data. Often fragmented, disciplinary-based.	Transdisciplinary, integrated research; co-design with stakeholders; use of diverse methods (RLA, FDSB, meta-analysis, causal mapping)	Research findings, methodological guidelines, educational materials, capacity building tools, root cause analyses, future scenarios, hazard/exposure/vulnerability data.	Crucial for generating the evidence base required for transformational change in DRM.
Media (including Social Media)	Disseminating information, shaping public perception, challenging misconceptions about disasters, fostering a paradigm shift.	Medium (influences public awareness and behavior)	Reporting on disasters, may perpetuate "natural disaster" narrative or focus on immediate impacts.	Effective communication of disaster causes, promoting a paradigm shift from "natural" to socially constructed disasters, informing policy and public awareness campaigns.	Key messages, public information, educational content related to DRR and root causes.	Influential in public discourse and perception of disaster risk.

Annex 7: Guide for FORIN Narrative Report

For use by the DRM Authority and Partners Adapted from PAR and FORIN Models.

(Concise Narrative Report – not exceeding 1,000 words)

This template allows practitioners to write a **short, coherent narrative** that follows the FORIN logic while staying actionable for policy and practice. The Forensic Investigations of Disasters (FORIN) framework includes the **FORIN narrative**, a reporting format designed to present findings in a concise and accessible way.

Rather than serving as a rigid, fill-in-the-blanks template, the FORIN narrative provides a structured guide for summarizing key insights, hypotheses, and broad outlines of processes that contribute to disaster risk. It is often used as a preliminary or complementary product to larger forensic studies, offering a holistic synthesis of available evidence without requiring the depth of a full investigation. As such, it is particularly useful as an initial step to frame historical and systemic drivers of vulnerability while highlighting areas for further inquiry.

1. **Disaster Context**
    - Event description: Brief overview of the disaster event (type, date, location, affected population, scale of losses).
    - Triggering hazard: Identify the hazard and compounding factors (e.g., hurricane intensity, rainfall, sea-level rise, cascading effects).
    - Immediate impacts: Key losses in terms of lives, infrastructure, economy, and environment.
2. **Historical and Longitudinal Analysis**
    - Origins of vulnerability: Trace the historical, political, and economic factors that shaped current vulnerabilities (e.g., settlement patterns, colonial legacies, sectoral development choices).
    - Progression of risk: Highlight how vulnerability and exposure accumulated over time (using both qualitative evidence such as oral histories, and quantitative indicators such as demographic or economic data).
    - Key turning points: Identify policies, events, or decisions that significantly altered risk trajectories.
3. **Diverse Perspectives**
    - Community voices: Summarize perspectives from affected communities (e.g., oral testimonies, participatory mapping, local narratives of past events).
    - Sectoral perspectives: Insights from different disciplines/sectors (social, economic, health, environmental, institutional).

- Equity dimensions: How different groups (women, youth, migrants, low-income households, elderly, persons with disabilities) experienced the disaster differently.

4. **Roles and Responsibilities of Actors/Institutions**

   - Key institutions: Which agencies, organizations, or actors influenced risk creation or reduction before the disaster?
   - Policy and governance factors: Highlight institutional strengths and gaps (e.g., enforcement of building codes, disaster planning, land-use regulation).
   - Accountability and opportunities: Where did institutional failures or successes occur? What systemic lessons can be drawn?

5. **Constructive Engagement and Risk Drivers**

   - Sensitive findings: Present risk drivers in a way that facilitates dialogue rather than blame (e.g., "gaps in enforcement capacity" instead of "agency failure").
   - Underlying risk factors: Summarize the root causes, dynamic pressures, and unsafe conditions using the PAR model structure.
   - Community-led solutions: Include positive practices or coping strategies that can be scaled or supported.

6. **Priority Recommendations**

   - Risk reduction actions: 3–5 concise recommendations based on findings, categorized as short-, medium-, and long-term.
   - Policy implications: Suggested changes or alignments with DRM Act (2022), NDRIS, or Sendai priorities.
   - Next steps: Indicate whether a fuller forensic investigation is needed to expand on identified gaps.

Annex 8: Template for Retrospective Longitudinal Analysis (RLA) of Disaster Risk

For use by the DRM Authority and Partners Adapted from PAR and FORIN Models.

Retrospective Longitudinal Analysis (RLA) is a practical research tool designed to trace disaster impacts backward in time in order to understand how risk was historically constructed through social, environmental, institutional, and policy decisions. Its purpose is to move beyond immediate loss-and-damage descriptions and demonstrate that disaster risks are socially produced rather than purely natural. Conducting an RLA begins by selecting a disaster event or sequence of events and defining the relevant timeframe and geographic scope.

The process combines qualitative interviews with community members, experts, and decision-makers; institutional reviews that examine how governance structures, planning, and policies influenced vulnerability; and historical document analysis, including development plans, hazard maps, policy frameworks, and loss-and-damage reports.

These sources are used to identify underlying risk factors—such as settlement patterns, weak building enforcement, or ecosystem degradation—and to trace causal pathways that link structural conditions to disaster outcomes. Findings are then synthesized into timelines, causal maps, or narratives that illustrate how root causes, dynamic pressures, and unsafe conditions accumulated over time. The final step is to translate these insights into actionable guidance for governance and planning, highlighting missed opportunities, potential alternatives, and recommendations that strengthen institutional memory and risk governance.

Template / Pilot Steps (Adapted from FORIN and GAR 2024)

This template outlines a structured approach for conducting an RLA, echoing the "Disaster Forensics Approach" and the "simplified questionnaire" presented in the GAR Special Report 2024 [GAR Special Report 2024, 447, 450].

Step 1: Understanding the Disaster DNA (Descriptive Analysis of Past Disasters)

- **Identify the specific disaster event(s) for analysis:** Focus on a past disaster or a series of recurrent events that highlight long-term risk construction
- **Immediate, Proximate Causes:** What were the direct triggers and immediate causes of the disaster or initiating natural events?
- **Past Record of Events:** What was the historical record of this particular type of event in the area?
- **Damage, Loss, and Impact Assessment:**
    - Qualitative and quantitative impacts (mortality, morbidity, economic damages, property losses, business disruption)

- Identification of "unsafe conditions": These are the specific contexts of vulnerability (e.g., unprotected buildings, dangerous livelihood occupations) where people are exposed to hazards.

- **Exposure Analysis:**
  - Who and what was exposed, and why?
  - How did past population growth and distribution contribute to exposure?
  - How were controls over exposure and construction in situ defined?
- **Vulnerability Assessment:**
  - Who was impacted, and why?
  - What were the pre-disaster differentiated expressions of livelihood and human vulnerability?
  - Was there a relationship between exposure to hazards and poverty levels, chronic risk factors (unemployment, poor health, etc.)?
  - How did environmental degradation and depletion of ecosystem services play a role?
- **Resilience Factors:**
  - What institutional and governance elements contributed to resilience?
  - What resource access pathways were available that facilitated an adequate response and recovery?

Step 2: Identifying Root Causes and Dynamic Pressures (The Progression of Vulnerability) This step moves from the descriptive analysis to understanding the underlying, deep-rooted causal factors. It involves shifting attention from just the disaster site to **multiple sites where policies and practices are developed.**

- **Root Causes:** These are often deeply embedded in societal history, structure, and organization, sometimes spanning centuries
  - What are the fundamental economic systems, power structures, ideologies, and political systems that limit access to resources and influence societal choices?
  - How did political, historical, and socio-economic considerations unique to the region play a role?
- **Dynamic Pressures:** These are processes and activities that translate the effects of root causes into unsafe conditions
  - **Population Growth and Distribution:** How did past population growth and distribution trends contribute to the disaster?
  - **Urban and Rural Land Use Patterns:** How did spatial and land-use organization evolve? Who were the actors/decision-makers, and did they consider risk?
  - **Environmental Degradation and Ecosystem Depletion:** What were the principal motivating factors and actors involved in environmental degradation (e.g., deforestation, overgrazing) that increased hazard impacts?

- **Poverty and Income Distribution:** How did the impacts of poverty and unequal income distribution play a role in increasing vulnerability?
- **Institutional/Governance Gaps:** Lack of local institutions, appropriate skills, local markets, press freedom, ethical standards, transparency, and accountability of government agencies

- **Policies and Measures:**
  - What strategies, laws, policies, or measures (e.g., building codes, land use planning) had been considered or implemented to prevent impacts or reduce consequences? Were they effective?
  - Were options rejected, or targets/standards reduced?

Step 3: Forensic Learning and Forward-Looking Insights This step integrates backward-looking historical analysis with forward-looking considerations to inform future risk reduction strategies

- **Multi-Stakeholder Discussion:** Facilitate discussions to review the analysis and co-create potential policy and practical actions. This requires transdisciplinary engagement with communities, policymakers, private sector, and academia

- **Connecting Past to Present/Future:** Analyse how historical drivers connect with contemporary manifestations of risk and how they might drive risk into the future.

- **Future Trends and Scenarios:** Predict potential future trends (e.g., urbanization, climate change impacts) based on identified "Disaster DNA" strands and historical trajectories. This can involve creating scenarios to inform government and civil society about specific risks.

- **Policy Recommendations:** Develop robust, evidence-based policy recommendations to reduce identified risks, enhance resilience, and avoid future disasters. This includes ensuring policies target underlying causes and vulnerabilities over multiple budget cycles.

- **Integration with Development:** Promote the permanent and organic integration of disaster risk reduction and control into development planning decision-making.

- **Accountability:** Formally embed responsibilities for Disaster Risk Reduction in legal frameworks to hold interests and forces that construct risk accountable.

When applying Retrospective Longitudinal Analysis (RLA), several considerations are essential to ensure its effectiveness: RLA adopts a holistic view, recognizing that disasters are not isolated events, but systemic processes embedded in societal history, structures, and human–environment relations. It also acknowledges complexity, emphasizing that causal factors rarely act in isolation but rather interact in combinations that are often non-linear.

Because of this depth, RLA can be time- and resource-intensive, requiring significant effort to capture the necessary detail; in such cases, a pilot may begin with a more modest study, such as a “FORIN narrative.” The approach is also iterative, with findings refined and

expanded as more data and perspectives are gathered. Importantly, while RLA seeks to examine accountability by tracing how risk was constructed, its purpose is not to assign blame but to generate understanding that can inform better disaster risk management and long-term resilience building.

Annex 9: Description of outputs and Application Tools

Having outlined the sequential phases of implementation, this following section turns to the tangible products generated through this process. These outputs work together to ensure the methodology doesn't end with analysis but directly feeds into recovery planning and longer-term disaster risk governance. In line with the DRM Act (2022), the outputs are not intended to create new stand-alone plans, but to provide prioritized recommendations and evidence that are integrated into existing DRM Plans (national, local, or sectoral). In this way, the methodology supports both immediate post-disaster recovery and the long – term goal of 'building back better', while also creating an institutional memory for each island or sector.

This participatory methodology is designed to be actionable, scalable, and tailored to the Bahamian context. They serve both technical and decision–making functions, enabling the DRM Authority and its partners to better understand, communicate, and address underlying risk. While the methodology may be adapted for risk planning in non-emergency settings, its primary application is envisioned in the aftermath of disaster events, to support post – disaster reviews, recovery planning, and long-term risk reduction.

Standardised Island Risk Factor Profiles

These are structured analytical products that consolidate the key findings from each assessed island or subregion. Designed to support localized planning and informed decision-making, each profile offers a synthesized overview of hazard exposure, including both historical events and projected future risks. Central to each profile is a mapping of underlying disaster risk factors, categorized using the Pressure and Release (PAR) model framework, identifying root causes, dynamic pressures, and unsafe conditions. This categorization is detailed down to the local level and includes sub-fields to capture the availability of resources and the degree of compliance with existing development and contingency plans.

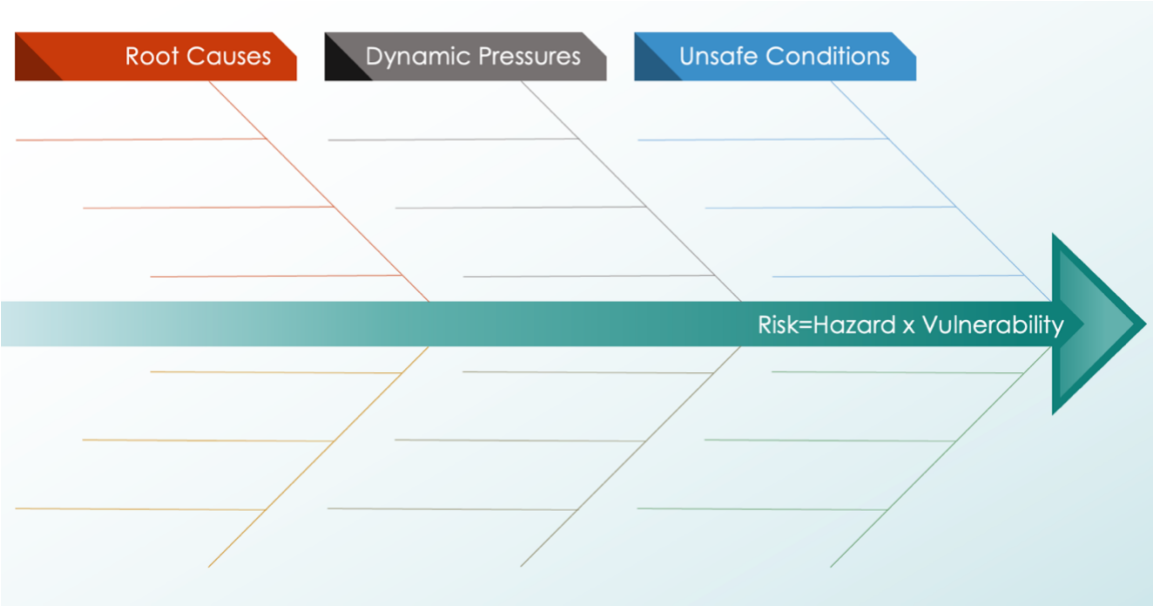

Image 3, Fishbone diagram for PAR assessments.

Each profile features a visual PAR diagram (see 'Progression of Vulnerability' in the Theoretical Background section) that can be operationalized as a fishbone diagram, enabling users to see how vulnerabilities accumulate and manifest within the specific island context. Additionally, the profiles integrate retrospective analyses from the Forensic Investigations of Disasters (FORIN) methodology, providing insights into how past disasters unfolded, what underlying factors contributed to impact severity, and where institutional or systemic failures occurred. These localized analyses culminate in tailored recommendations for addressing site-specific risk drivers. When compiled across islands or regions, these profiles serve as a comparative baseline for national and regional disaster risk reduction strategies, enhancing the coherence and effectiveness of risk-informed planning.

Institutional and community risk maps

Institutional and community risk maps are geospatial or schematic visualizations that illustrate how various risks are distributed across a given territory. These tools play a critical role in supporting decision – making related to land use planning, emergency preparedness, public investment, and community education. Each map typically integrates multiple layers of data, including physical hazards, such as flood zones, erosion-prone areas, or coastal exposure, alongside indicators of social vulnerability like population density, housing quality, and access to essential services. In addition, the maps capture information about institutional capacity, including the presence and reach of emergency services, early warning systems, and local disaster risk management (DRM) offices. They also highlight key infrastructure and ecosystem assets at risk, such as hospitals, schools, roads, wetlands, or mangroves. Together, these maps provide a comprehensive picture of risk landscapes, helping stakeholders identify priority areas for intervention, enhance preparedness, and foster inclusive and risk-informed development.

Institutional risk maps are typically produced by government agencies or technical experts and are mandated under instruments such as the Disaster Risk Management Act (2022), the National Disaster Risk Management Plan, and Local Plans. They rely heavily on scientific and technical data, including hazard models, damage and loss reporting, and the National Disaster Risk Information System (NDRIS), to capture macro-level drivers of risk. These maps emphasize governance, policy implementation, enforcement of building codes, and the protection of critical infrastructure such as hospitals, schools, and transport networks.

Community risk maps, on the other hand, are developed through participatory methods that draw directly on the lived experiences and knowledge of residents. Using tools like the Pressure and Release (PAR) model and Participatory Geographic Information Systems (PGIS), these maps capture local perceptions of hazards, unsafe conditions, and vulnerabilities that may not appear in official datasets. They emphasize lived vulnerability, coping strategies, and community cohesion, documenting how different groups, such as women, migrants, persons with disabilities, and the elderly, experience and respond to disaster risk. Community risk maps are bottom-up and people-centred, aiming to build resilience, empower participation

in decision-making, and provide a "reality check" for broader recovery and development plans.

The DRM Act (2022) requires local plans to be consistent with national frameworks, and tools like FORIN emphasize bridging technical data with local narratives. Combining institutional datasets (e.g., satellite imagery, hazard models, NDRIS baselines) with community-generated knowledge (e.g., participatory mapping, oral histories, disaster chronologies) creates a fuller, more actionable picture of risk. Ultimately, institutional and community risk maps should be used together: one offering a strategic, system-wide view, the other ensuring that policies are grounded in local realities and inclusive of diverse voices.

Targeted DRM action plans by island or sector

The outputs of this methodology are intended to directly inform the recovery process after each disaster, ensuring that lessons learned and risk factors identified are embedded in formal planning instruments established under the DRM Act. Rather than creating a new, separate plan, the analysis produces a set of prioritized recovery actions tailored to the specific risk contexts of individual islands or sectors. These actions, organized across short-, medium-, and long-term timelines, serve as localized inputs that are factored into existing DRM Plans (national, local, or sectoral).

Responsibilities for implementation are distributed among relevant stakeholders at local and national levels, while indicative budgets and potential funding sources are proposed to support feasibility. Monitoring indicators are also included to track progress, evaluate effectiveness, and guide necessary adjustments over time. By aligning these localized recommendations with the national DRM strategy and the Disaster Risk Management Act, the methodology ensures that recovery planning is not only responsive to the immediate disaster context but also contributes to long-term resilience and "building back better."

Database of underlying risk drivers to inform national planning

A centralised and structured database of underlying risk drivers, integrated into the **National Disaster Risk Information System (NDRIS)**[8], is a key tool to support evidence-based national planning and investment. This database compiles both qualitative and quantitative findings, categorizing risk drivers across multiple sectors such as the environment, housing, and governance. It also integrates historical disaster timelines, documented system failures, and gaps in emergency response identified through forensic (FORIN) analyses. Additionally, it tracks trends in vulnerability indicators (such as the expansion of informal settlements or coastal ecosystem degradation), enabling early identification of emerging risks.

[8] As mandated by the Disaster Risk Management Act (2022), the NDRIS serves as the national platform for collecting, storing, and processing disaster risk data. Integrating the database of underlying risk drivers into the NDRIS ensures compliance with this legal framework while strengthening its role as the central repository for systemic risk knowledge in The Bahamas.

By facilitating cross – island comparisons and supporting annual DRM reporting this database, housed within the NDRIS, provides a critical foundation for guiding future investments, particularly in areas such as climate-resilient public infrastructure, community – based preparedness programs, and early warning systems. To ensure effective use and sustainability, the methodology emphasizes strong institutional coordination. The Disaster Risk Management Authority should lead implementation, with active participation from Family Island Administrators, sectoral agencies, and civil society organizations. Institutional requirements include robust data-sharing protocols, integration with national early warning systems, and localized training to enhance technical capacity at all levels. This decentralized governance model supports locally informed decision-making and highlights the importance of community – level record – keeping and knowledge management. The approach also encourages youth engagement through disaster research internships and volunteer opportunities, fostering a culture of resilience and continuous learning across generations.

Annex 10: Key Recommendations

In order to effectively translate this conceptual framework into meaningful action, a series of practical steps are recommended for its integration across institutions, sectors, and levels of governance. These recommendations are designed to embed the framework into the daily operations of Disaster Risk Management (DRM) in The Bahamas, enhancing its long – term impact. They should be used in conjunction with the practical methodology and tools developed to support stakeholder implementation at national and subnational levels.

Operationalizing the framework in the ways outlined below will deepen risk understanding, strengthen cross –sectoral coordination, and lay the foundation for more equitable, resilient, and evidence–based disaster governance. These recommendations are intended as an operational roadmap to support both the adoption of the methodology within existing DRM systems and its practical application following specific disaster events.

Integrate the Framework into DRM Training Programs and Institutional Capacity Building

The principles, concepts, and tools presented in this framework should be incorporated into existing and future Disaster Risk Management (DRM) training programs at the national and local levels. This includes government ministries, local authorities, community organizations, and academic institutions. Training based on this framework can help build a shared language and understanding of disaster risk, strengthen institutional memory, and provide practitioners with the analytical tools needed to design effective risk reduction strategies. It will also help address challenges such as staff turnover and lack of institutional memory by embedding core analytical approaches into institutional knowledge systems.

Apply the Framework to Post-Disaster Reviews and Scenario Planning

The framework's retrospective and prospective lenses make it well-suited for both post-disaster evaluations and forward-looking scenario development. Following a disaster, it enables institutions to conduct forensic reviews that uncover the underlying drivers of risk and inform "Build Back Better" strategies. At the same time, its tools can be applied in planning exercises to anticipate how evolving conditions (such as climate change, urbanization, or economic shifts) may shape future risk landscapes. By combining these perspectives, the framework strengthens preparedness, mitigation, and recovery planning.

To maximize operational relevance, the methodology is applied in direct connection with post-disaster assessments, particularly the Damage and Loss Assessment (DALA). While DALA quantifies physical damages and economic losses, the forensic lens explains why these impacts occurred by identifying root causes, dynamic pressures, and unsafe conditions. This integration adds depth and strategic value, ensuring that assessments capture both the scale of losses and the systemic vulnerabilities behind them.

Integration is achieved by embedding the PAR and FORIN-based analysis within the DALA workflow. During the data collection phase, forensic questions are added to interviews, focus groups, and document reviews to capture perspectives on governance gaps, historical

settlement patterns, enforcement failures, and coping strategies. In the analysis phase, causal chains are mapped alongside quantitative impact data, allowing practitioners to link the severity of damages with systemic weaknesses such as poor construction practices, unregulated land use, or fragile livelihoods. In the reporting phase, DALA outputs are enriched with narrative explanations of underlying drivers and policy gaps, ensuring that results are not limited to figures but also tell the story of vulnerability and risk creation.

A critical component of this integration is how findings are structured for reporting and long-term use. Narrative reports [9]should follow the causal chain (Root Causes → Dynamic Pressures → Unsafe Conditions → Disaster Event), consistent with the PAR framework, and be framed around the four hypotheses of the FORIN approach: addressing accountability, integrating disciplinary perspectives, identifying diffuse responsibilities, and improving communication across institutions and communities. Crucially, these reports must reflect diverse perspectives, particularly from local populations, by combining qualitative data (interviews, testimonies, local histories) with quantitative evidence (damage statistics, economic losses).

Embed the Framework in the National Disaster Risk Information System (NDRIS)

The National Disaster Risk Information System (NDRIS), mandated by the DRM Act (2022), provides the institutional mechanism for embedding this framework into national disaster risk management. By integrating causal dimensions of risk, historical analyses, and stakeholder mappings as core modules, the NDRIS ensures that data collection, analysis, and visualization are aligned with the systemic understanding of risk proposed here.

Forensic analysis directly generates the content required by the Act: databases of underlying risk factors derived from root causes, dynamic pressures, and unsafe conditions. When systematically uploaded into the NDRIS alongside DALA impact data, these findings create a consolidated repository that supports cross–island comparisons, trend analysis, and scenario projections. For example, evidence on why buildings collapsed (e.g., code non-compliance or incremental construction weaknesses) can be tagged as risk drivers within the system, directly informing land-use planning, regulatory reform, and investment priorities.

This integration ensures that post-disaster assessments do more than quantify losses: they also produce actionable insights to guide recovery strategies, inform “Build Back Better” investments, and strengthen long-term risk governance. Embedding forensic analysis into both recovery processes and the national knowledge system builds a cycle of evidence–based learning that enhances resilience across disasters, places, and time.

[9] In Annex 7 there is a guide – tool for practitioners to follow and create the narrative report.