

insights in DRM

A Practitioner's Perspective on Disaster Risk Management in **Latin America & the Caribbean**

From Mountains to Valleys: An Alternative Approach to Emergency Evacuation Strategies in Haiti

“Working with academic institutions has been an enriching experience, and the time invested to deepen our understanding of evacuation systems has been well worth it. The National System for Disaster Risk Management (SNGRD) is now in a position to deploy innovative approaches that take into account the local culture in the development and construction of emergency shelters.”

—Yolène Valav Surena, Civil Protection Agency (DPC)

Challenge

Each time a hurricane or heavy rain strikes, the citizens of Haiti make choices on how to best protect their families, secure their belongings and manage the damages and losses often caused in the aftermath. This decision-making process provides a micro-level snapshot of disaster-preparedness, but it also reveals the ongoing and complex dialogues from institutions to individuals, and among municipal institutions and national agencies, namely the Civil Protection Agency (DPC). Their efforts focus on better understanding disaster risk in Haiti in order to develop and implement evacuation strategies that mitigate the impacts, and expedite the recovery of Haitians in the wake of a natural hazard event.

Haiti ranks as one of the countries with the highest exposure to multiple natural hazards¹ in the world, with 96% of Haitians currently living at risk. Of the 10 million people living in Haiti, two thirds live below the poverty line, and as a result, lack the capacity or resources to cope with the impacts of natural hazards. These numbers underscore the dire need for comprehensive evacuation strategies that adequately defend communities against natural hazards, including increasing climate-related events such as heavy rains, hurricanes, floods, and landslides. Emergency shelters are a critical component of evacuation strategies and need to take into account the challenges faced by individuals and families forced to vacate their homes and leave behind their livelihoods for indefinite periods of time.

In recent years, the government of Haiti made progress in reducing the loss of life associated with weather events by improving early warning systems. The government also provided training to decentralized networks of local community volunteer members, known as Municipal Civil Protection Committees (*Comités Communaux de Protection Civile – CCPC*), to mobilize before, during and immediately after a disaster event. Yet, evacuation strategies remain a challenge in a country that lacks an effective range of sheltering alternatives and resilient infrastructure (roads, bridges, shelters) to ensure communities' access to evacuation routes and essential services in emergency situations.

Previous attempts to improve the evacuation systems in Haiti failed to recognize the unique geographic, socio-economic, financial and capacity constraints of Haiti. For example, 1,400 buildings in Haiti were identified as evacuation sites to provide secure shelter in the event

of emergencies, but ninety percent of these buildings are schools. As such, they are not optimal because the hurricane and rainy seasons in Haiti overlap with the school year, thus causing disruptions in school attendance when required as emergency shelters.

The challenge therefore remains to design evacuation strategies across different scales, with different elements—from shelter facilities to open spaces to access systems—that assume a flexible and comprehensive approach to the complex nature of risks in Haiti, and consider the environmental, temporal, social, economic and cultural dimensions.

Intervention

To develop this multi-scalar and multi-dimensional strategy to evacuation and emergency sheltering, the Government of Haiti, in partnership with the World Bank's Disaster Risk Management and Urban Development team (LCSDU), collaborated with the Massachusetts Institute of Technology (MIT), Leibniz University of Hanover and the Harvard Graduate School of Design to better understand existing practices to cope with risk and inform an innovative, institutional approach to emergency evacuation systems. A **three-stage approach** was developed to design a series of hypothetical prototypes and conceive alternative evacuation strategies applicable to, and derived from various contexts across Haiti. These stages include:

Stage I: Strategic Design Research & Case-Study Analysis

Stage II: Pilot Conceptualization & Implementation Methodologies

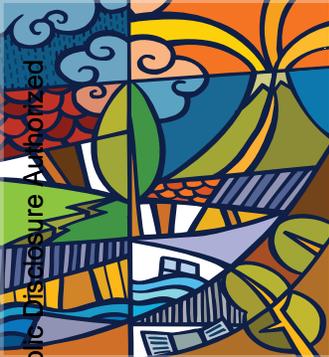
Stage III: Results & Recommendations for Scalability

Stage I: Strategic Design Research & Case-Study Analysis

Stage I of the innovative process focused on deepening the understanding of the range of risks in Haiti, including the urban nature of disasters and the current evacuation practices employed during emergency situations. An extensive field study was conducted to i) assess and characterize existing vulnerabilities of the Haitian landscape; ii) uncover the overarching political and economic dynamics of the country and local livelihoods; iii) understand the cultural and organizational factors that influence decisions at the community level, including temporal dimensions such as onset of rainy season, harvest time, or start of the school-year; and iv) observe and interpret existing practices that correspond to risk and emergency situations. This research and analysis highlighted **these main findings:**

Observations from extensive field research and analysis.²

- Evacuation strategies differ significantly based on the geographical landscape, community settlements and hazard type;
- Spatial, environmental, social, cultural, political and temporal factors



	Vulnerability Scenarios		
	Coastal Areas	Plateau-Valley	Mountainous Areas
A. Settlement Type	Vertical, densely populated	Peripheries, growing density	Farmlands, dispersed density
B. Hazards	Flash floods, high speed winds, sea level rise	Flash floods, high speed winds, cholera, drought	High speed winds, landslides, torrential downpours
C. Potential Evacuation Strategies	On-site; to higher ground; collective manner	On-site; to higher ground; collective and distributed manner	On-site
D. Potential Evacuation Sites & Annex Types	School, market, wharf	School, market, road	School/church, mill, road

compound risk at the ground level. The most effective emergency strategies and their related shelter facilities consider and leverage these dimensions to mitigate socio-economic losses, and allow people and their livelihoods to be significantly less affected by recurrent hazards;

- Interconnectivity between production and consumption sites is key to enhance resilience and provide access to evacuation routes.

Stage II: Pilot Conceptualization & Implementation

Based on the analytical work of Stage I, the design team incorporated multiple layers of risk and local information to conceive topographically-based evacuation sites and strategies based on the three different vulnerability scenarios in Haiti (see table above).

To test the validity of the new approach, **nine pilot sites** and nine communities will be targeted. Nine evacuation parks that include shelter facilities and support infrastructures will be constructed by the Government of Haiti by the end of 2014, based on vulnerability scenarios and evacuation strategies (see table, lines C/D).



Design prototypes of evacuation shelters based on vulnerability scenarios.

The pilot evacuation designs are inspired by the [prototypes](#)³ and informed by local emergency response practices, livelihood strategies and accessibility issues. Research conducted during Stage I also supported the development of design standards and specifications for the new pilot evacuation shelters.

During Stage II, after the construction of each pilot, the technical team will observe and assess the pilot evacuation sites, shelters and systems across Haiti. Over the course of one year, they will continue to test the minimum requirements and basic guidelines developed during Stage I, which vary according to geographic location, regional factors, population densities, and existing local practices, capacities and available resources. Each pilot will be evaluated overall on the new approach to evacuation strategies to fulfill the three main objectives: *security, shelter and livelihoods*.

“The dormitory of Madames Saras⁴ is not just a dormitory, it also served as a shelter”.

—Marie Julienne Joseph, President of AFODEF/ Font Batisse, Commune d’ Arcahaie.

Stage III: Results & Recommendations to Scale-up

Stage III will provide final recommendations for emergency shelter strategies in Haiti based on the results and assessment of the nine pilot sites. The Civil Protection Agency, through national investments, is expected to scale-up this pilot emergency site initiative to improve emergency evacuation systems throughout the country.

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Outcomes

The government of Haiti is transforming the concept of an emergency shelter from a basic, standalone building – to a component of a broader evacuation system that entails geographic, temporal, cultural and socio-economic factors, vital for decision-making in emergency situations. This new, and alternative thinking dramatically expands the vision of evacuation strategies to increase capacities of people to reduce loss of life, injuries, property damage, and productivity loss, and improve connectivity to the transportation network immediately after a natural hazard event.

The Haitian Civil Protection Agency and national authorities are taking ownership of this initiative and plan to use the project’s prototypes and experience from the nine pilot evacuation parks to upgrade and expand the emergency sheltering and evacuation landscape across Haiti. The new approach to evacuation strategies is expected to be more regionally-adapted, infrastructurally-integrated and culturally-oriented communities to use the new facilities and ensure future investments are more effective and sustainable. It is also expected that the new approach will trigger changes in policy, and practices in emergency response and sustainable recovery by donors and the DRM community as a whole. Thus, this pilot initiative seeks to demonstrate a positive impact to show how social dimensions and local knowledge can be leveraged to save lives, mitigate socio-economic loss, and bring value to change how practitioners address emergency shelters.

Although social engagement and spatial recommendations in this project are specific to evacuation strategies in Haiti, some of the key factors are common to and derived from other developing countries across the tropical and subtropical regions. Similar characteristics such as the institutional context (financial and capacity constraints, decentralized responses to risk, and reliance on community preparedness) are common. This approach is innovative due to the concept of a spatial and ecological model that couples environmental and economic risks that are relevant to a number of low-income countries, highly exposed to extreme climate dynamics and changes. Countries such as in Africa (e.g. Malawi, Mozambique, or Madagascar) may benefit from new knowledge, design, and experience in the field of disaster risk management and urban development.

Endnotes

- ¹ According to the World Bank’s Natural Disaster Hotspot Study, 2005.
- ² Images showcase observations and findings of field research. <http://www.photosnack.com/FE7975B8B7A/pt98y955>
- ³ Based on the prototypes developed, a specific landscape architectural design strategy will be conceived for each of the nine evacuation parks, and their shelter facilities. <http://www.photosnack.com/my/slideshows/details/pt90bf00?jsalbum=1>
- ⁴ Madames Saras are women who run market systems, cooperatives and socio-economic networks built around the marketplace.