

Building Vulnerability And Resilience

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Introduction

Amidst the alterations in the climate, especially when prone to extreme weather, the greatest challenge faced is to live sustainably (National Research Council, 2014). To establish a resilient community, a major shift towards a pre-emptive approach is required, one where the integrated systems work synergistically rather than the incoherent reactive approach currently in practice. Building resilience in the community is associated with improved adaptability and strengthened policies through the cohesion of institutional, economic, political, ecological, and social resources (Ross, 2014). Anticipation of future disasters and solidification of adaptive capacity are important to remain prepared and increase competence in recovering from extreme situations (National Research Council, 2014).

The United Nations (UN) recognized the “small island developing states (SIDS)” as a distinct case of sustainable development due to certain distinguishing characteristics, including “size, remoteness, insularity, vulnerability to external shock,” among others. Although the many challenges concerning oceans, natural disasters and climate change are global, their intensity and immediacy amplify in the case of SIDS as these are at the forefront (United Nations, 2014). Regardless of the global strategies and policy debates, the challenges of sustainability for SIDS are on the rise. Proactive planning is required to successfully anticipate, manage and alter growth in response to these snowballing threats, thereby mitigating the chances of future risk, all the while collaborating and coordinating within and across organizations, systems, and infrastructures (Berke et al., 2015). This paper aims to accurately characterize hazards faced by a small island developing state, i.e., Saint Kitts and Nevis while establishing a better understanding of the vulnerability of those natural structures that are more disposed to hazards. The paper further aims to explore the plans and strategies that rule the settlement of humans in risky areas.

Accurate Identification of Hazards

Only through an accurate assessment of the risks posed to a community can there be a possibility of outlining realistic and effective pre-emptive strategies that aim to reduce its adverse effects. The Federation of Saint Kitts and Nevis is based on twin islands that are located in the Eastern Caribbean. Characterized by the humid and tropical climate and an average temperature of 27 degrees, the island, while rocky, has fertile land (United Nations Development Program, 2021). The north-eastern winds influence the cyclonic movements in the oceanic zone, resulting in a high risk of hurricanes and cyclones. Lying towards the south of the Atlantic hurricane belt, the country is most exposed to

tropical cyclones from August till October. Climate change has further intensified the frequency of hurricanes, with five major hurricanes impacting from 1995 – 1999, resulting in serious implications (World Bank Group, 2021). Coastal floods are another hazard that the island is vulnerable to, and over the next ten years, there is approximately a 20% chance of potentially destructive coastal waves. Flooding is localized to the areas that receive heavy rainfall, resulting in overflowing ghauts and water retention in Basseterre, owing to its coastal location and inhabitation by a greater population percentage (Global Facility for Disaster Reduction and Recovery, 2021).

Since the two islands are the summits of a mountain range submerged along the eastern border of the “Caribbean Tectonic Plate”, the volcanic hazards are termed to be high. Various studies indicate that Mount Liamuiga, situated to the North, is the most probable site for future eruptions. The majority of the island’s population is settled along the coastline. With the growing need for agricultural land, forested lands were cleared, leading to deforestation and increased hazards. Being a remote and small island state, Saint Kitts and Nevis is susceptible to many environmental risks, such as water pollution and soil erosion resulting from deforestation. The rising sea level is a threat to water resources, and these are also adversely impacted by increasing temperatures (United Nations Development Program, 2021). Since the island receives less than 50 inches of rainfall per annum, it is critically at risk of drought, especially in the southern and southeastern parts. The island experiences short periods of droughts throughout the year, however, the period from February till April is a time of extended drought (Global Facility for Disaster Reduction and Recovery, 2021).

Understanding Natural and Engineered Systems

To plan successfully, it is imperative to understand the susceptibility of the various systems that can benefit through the activities that promote resilience building. From the point of view of the infrastructure, the vulnerability threshold is defined as the highest magnitude of damage that the system can endure without failing to function. While the vulnerability assessment is carried out effectively for engineered systems, it is difficult to ascertain the vulnerability of natural systems. Understanding the intensity of the impact of an event on a community is central to proactive planning. While there is little that can be done to mitigate the magnitude of an event such as a cyclone, much can be done to lessen its impact on the local community (Berke et al., 2018; Berke et al., 2018).

Due to its high vulnerability to hurricanes, the power system of Saint Kitts faces an increased threat. The wooden power pole structure has a low vulnerability threshold and is at risk of failure during destructive storms. The radial power system of Saint Kitts has no redundancy, and power outages result in a loss of power supply to the water wells, leading to a disruption of water and power distribution systems (Stodde et al., 2021). The urban centres are exposed to direct strong winds. These can be devastated, especially in case of a hurricane, thereby necessitating the fortification of these structures and strengthening their foundations. Flash floods and storm surges expose the low-lying areas along the coast to the greatest risk. To build the resilience of this natural feature,

revegetation of the coastline and conservation of the mangroves are vital, along with building engineered defences such as seawalls. Low rainfall poses a threat to the availability of freshwater. The impact of this risk can be curbing saltwater infiltration in wells and aquifers. The decimation of forests due to tropical cyclones and deforestation has fuelled the island's vulnerability. Therefore, the solution to restrict the overflow of ghauts and culverts lies in the process of reforestation and re-vegetation (World Bank Group, 2021).

Planning and Policy

The conventional methods of planning are, while quite well-suited to stable and predictable systems, cannot be replicated in situations with high uncertainty. For such situations, proactive planning that guides decisions through adaptive concepts is most suited. Clear identification and prioritization of uncertainties can lead to the planning and implementation of strategies that are evidenced in available data through an interdisciplinary approach. Prioritizing disaster risk management through assessment studies of the potential disaster, followed by the development of an early warning system and public investment for a sustainable outcome, is essential (Berke et al., 2018).

For Saint Kitts and Nevis, comprehensive assessment studies to map the flood, drought, and hurricane risk areas are completed. Integrating the findings of these assessments into policies that govern land use will mitigate the extreme economic loss incurred due to the destruction of infrastructure in these high-risk zones. Similarly, while the early warning system to track hurricanes is in place, investing in warning systems for other disasters, such as floods and drought, can ensure safety and lessen their impact. The expensive insurance against catastrophic vulnerability and the unwillingness of certain companies to ensure areas of high-risk strain the government due to lack of financial surplus increases the impact on public finances (World Bank Group, 2021). To build exceedingly resilient communities, an active contribution is required from its highly diverse and engaged population. Such populations are vigorously involved in addressing community issues, fostering greater adaptability. Therefore, the involvement of community partners is extremely important at every stage of the process, from the identification of the risk to its evaluation (Berke et al., 2018).

Conclusion

Although policy outlines are in place to mitigate the impact of certain vulnerabilities, there is a need to adopt community-engaged proactive planning, evidenced in interdisciplinary data, to strengthen adaptability and resilience. "The Caribbean Community Climate Change Centre (CCCCC)", the "United States Agency for International Development (USAID)" and the "Climate Change Adaptation Program (CCAP)" are actively involved in various projects such as water harvesting in Saint Kitts and Nevis. To enhance the "Community Volunteer Programme" in Saint Kitts and Nevis, various steps are outlined for effective implementation of the "Community Resilience Framework (CRF)", which aims to mobilize

resources by strengthening partnerships (Neufville, 2020).

The impact of climate change is on the rise, and the intensity, as well as the frequency of the extreme weather, has become a global concern. For small island communities, the heightened risk calls for immediate response. Only through proactive planning and building a cohesive community that is aware of the local vulnerabilities, can we achieve sustainable development. The time for reactive, short-sighted approaches is far gone. The survival of our island communities against coastline erosion, drought, flooding, hurricanes, and cyclones is only attainable through on-ground action and not through the policies created in a void.

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