Trouble in Paradise
Natural Disaster Preparation in Jamaica: Looking at Flooding, Landslides and Human Vulnerability

INTRODUCTION

The name Jamaica comes from the country’s earliest inhabitants, and the Taino Arawak word “Xaymaca”, which means “the land of wood of water” due to the nation’s many rivers and mountainous terrain.

Unfortunately, this landscape also makes the lush tropical paradise highly susceptible to natural disasters, with a hurricane season running from June 1 to November 30. Even without the development of an actual hurricane there can be severe devastation due to flooding and landslides. It has been estimated that approximately US$15 million is spent on repairs to roads damaged by landslides alone and for historical and socio-economic reasons, both rural and urban areas have large squatter settlements that are severely impacted by these environmental hazards. The settlements are usually on precarious pieces of land highly susceptible to flooding or landslides, and due to the harsh economic reality of the inhabitants, they are usually very poorly built structures.

The nature of squatter settlements in Jamaica is tied to the nation’s history of slavery and the socio-economic climate that followed emancipation and apprenticeship in 1838. By 1866 squatting had become institutionalized as a form of land tenure in Jamaica. Furthermore, rural to urban migration, economic difficulty, housing shortages, political exploitation and the availability of idle land have only amplified the squatter community presence in the modern era.

According to the Jamaican Ministry of Transport, Works and Housing, “one quarter of Jamaica’s population (675,000) live in squatter settlements. Estimates also indicate that one in every three urban dwellers live in squatter settlements. Settlements are characterized by lack of/poor sanitation, inadequate physical infrastructure/poor quality housing, impoverished settlements. Settlements are characterized by lack of/poor sanitation, impoverished living areas that are prone to flooding and do vulnerable populations live in or near these areas? What areas are prone to landslides and do vulnerable populations live in or near these areas? How far are vulnerable populations from hospitals in the case of emergency during either of the disasters outlined above?

Purpose of Analysis: To determine the High Risk Areas specifically for Vulnerable Populations.

Given the poverty, weak infrastructure and political exploitation facing squatter communities, as well as the large percentage of the Jamaican population they comprise; squatter communities were the vulnerable population at the center of this analysis.

METHODOLOGY

Establishing the High Risk Areas specifically for Vulnerable Populations required two elements: an environmental risk analysis related to landslides and flooding, and a human vulnerability analysis related to the population that live in weak infrastructure and their proximity to hospitals in the event of an emergency. To Address the Weak Infrastructure Population and their Access to Hospitals: The Kernal Density Tool was used on both the Squatter Housing Data and Hospital Data to demonstrate the density of squatter communities and hospitals nationwide. The Euclidean Distance Tool was also used on Hospital Data to determine the relative distance of hospitals. These layers were then re-classified on a scale of 1 – 5 using the Reclassify Tool. These reclassified layers were then added into the Raster Calculator to determine Total Human Vulnerability.

To Address the Environmental Risks: The Euclidean Distance Tool was run on the River Data to determine the relative distance and then reclassified on scale of 1 – 5, from lowest to highest risk. The DEM Elevation Layer was also reclassified on a scale of 1 – 5. (N.B. During DEM reclassification, “Reverse New Values” needed to be used so that the lowest values (<3 meters to 200 meters) would be represented by a 5 demonstrating the extreme risk low elevations pose to increase the likelihood of flooding.) The Reclassified Distance to Rivers layer and the Reclassified DEM layer were then added into the Raster Calculator to obtain the Total Risk of Flooding.

To determine the risk for landslides, the Slope Tool was used on DEM to obtain the danger posed by steep slopes as most landslides occur between 10 – 35 °. Total Environmental Risk was determined by placing both the “Total Risk of Flooding” and the “Reclassified Slope” into the Raster Calculator.

RESULTS

Concentration of Squatter Communities

CONCLUSION/FUTURE RECOMMENDATIONS

To provide areas of prioritization for policy makers, the Zonal Statistics Tool was used to demonstrate the average risk per parish. This argues that rural parishes Portland and St. Thomas are areas of critical concern. While these parishes have fewer squatter communities than Kingston or St. Andrew; the urban centers of the nation, the squatter communities in Portland and St. Thomas are far more vulnerable because they have little to no access to hospitals while living areas that are extremely susceptible to flooding and landslides due to the mountainous terrain and proximity to rivers. The government needs focus efforts on providing far more hospitals to these areas, as both parishes only have one hospital each, compared to 14 in urban Kingston and St. Andrew.

Data Sources:
ESRI, GDAM, DIVA-GIS, CARISKA

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