Haiti: Spatial Analysis of Vulnerability

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**INTRODUCTION:** The Caribbean Basin is among the most vulnerable regions to natural hazards and climate change (e.g., Manuel-Navairete et al. 2007; Ibarra et al. 2009; Rossing & Rubin 2010). Haiti has the combined challenges of a severely degraded environment, extreme poverty, limited institutional and governmental capacity, and repeated occurrence of natural hazards such as hurricanes, floods, landslides, and earthquakes (e.g., McKee & Paravinsini-Gebert 2011). However, these challenges are not distributed evenly across the country. Key drivers of deforestation and land degradation in Haiti include the internal demand for charcoal and the cultivation of steep slopes (e.g., Murray 1987; Stevenson 1989). Interactions between socio-economic and natural hazard vulnerabilities need to be better understood spatially in order to support sustainable development efforts aimed at reducing poverty while managing multiple hazard-related risks.

**RESEARCH HYPOTHESIS:** We hypothesize that vulnerability is greatest among populations that are: living in locations most remote from Haiti's capital city, Port-au-Prince; disadvantaged by limited and difficult access to health care facilities; and living in areas where soils on steep slopes are under cultivation and/or areas that lack vegetation cover.

**RESEARCH METHODOLOGY:** To initiate the development of a spatial database for the integrated analysis of natural hazard and social vulnerability in Haiti, we mapped the following data sets utilizing a combination of remote sensing and geographic information system (GIS) techniques: (1) high-resolution population data from Haiti's 2003 nationwide census to derive population density (people per km²); (2) the distance of populations from Port-au-Prince, using road network data, as a measure of accessibility to the country's capital city (this measure serves as a proxy for formal institutional and governmental capacity); (3) the distance of populations to health care facilities, which serves as a proxy for access to health and emergency services; (4) Landsat TM satellite images for 2007 used to produce a land-use and land cover map of Haiti at 30m resolution, based on LandSat image of 2007.

**DATA SOURCES:**

- The Columbia University School of Nutrition (2010) adapted an innovative approach for counting population displacement. Analysis is based on the movement of cell phones right after the earthquake until March 2010.
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