

Measuring Resilience After a Catastrophic Natural Disaster: A Case Study of Fayette, Haiti after the 2010 Earthquake

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We examine the resilience of the community of Fayette following the 2010 Haiti earthquake from engineering, ecology, and social science perspectives. This comparison demonstrates how different disciplinary conceptions of resilience are useful for understanding different aspects of a system and that those different conceptions can generate very different conclusions about the effect of a natural disaster on resilience. We are working with the community as an experiment in applied sustainability science, conducting fieldwork and involving stakeholders as an integral part of the knowledge generation process. The engineering community has historically used the term resilience to refer to the ability of a system to return to a single well-defined equilibrium state after a disturbance. In the case of Fayette, we measure the engineered resilience of the housing stock to a 7.0 earthquake and consider the change in resilience of built infrastructure to the multiple hazards that Fayette faces. Scientists utilizing resilience in terms of ecological systems typically conceptualize a system as having multiple equilibrium states; a critical difference from engineering resilience. Ecological resilience measures the amount of disruption or change required to transform a system from one set of mutually reinforcing processes to a different set of processes and structures. The principal ecological problems identified in Fayette are erosion and agricultural pressure due to population growth. Erosion is exacerbated by widespread deforestation and agricultural pressure may lead to declining soil quality. The ability of the community to provide the necessary level of subsistence agricultural production to the community residents is the primary indicator of ecological resilience. If this threshold were surpassed, a significant social shift would occur. Finally, social scientists have drawn from both the engineering and ecological conceptions of resilience to consider community resilience. In the disaster response literature, community resilience is composed of two primary factors. The first is the ability of community members to act quickly and appropriately as first responders to a disaster. The second is the ability of community members and institutions to work together, strengthen and maintain important social institutions, and use those to recover socially, emotionally and economically from a disruptive event. In Fayette, community resilience is examined through personal stories by first responders to the earthquake, as well as the strength of important institutions like schools, churches, and community groups. Genuine engagement with problems the community members identify as important is a crucial aspect of maintaining the strong relationship necessary to develop a sufficient understanding of the social and environmental changes that are occurring in Fayette. Therefore, in response to community identified desires, we are working with community members to implement a garden at the reconstructed school that will provide a source of income for the school and an educational laboratory for students. We will also work with community members to develop a revenue-generating tree planting program, hoping to reduce the challenges that Fayette faces from erosion.