

EERI-NSF Rapid and Research Needs Workshop

Breakout Session Title: Civil and/or Environmental Engineering Related Disciplines

Discussion Leaders and Recorders: Ozlem Ergun and Norma Alcantar

Panel Members: Jane Harrison, Stephanie Lansing, Franco Montalto, Amenold Pierre

Session Overview

Integrated infrastructure and environmentally benign services are one of the primary needs for making the reconstruction efforts successful and advantageous for the people of Haiti. It seems that one of the reasons for Haiti's current deficiencies of basic services (water distribution, waste management, power, community housing, roads, transportation, urbanization lines, communications centers, etc.) is the division between governmental organizations (where the management of financial resources has been limited) that can provide and maintain services and the inclusion of integrated infrastructures. The panel recognized that there is a niche for problem-solving solutions where civil, environmental, chemical, mechanical, industrial and electrical engineers can provide positive contributions.

Integrated Infrastructures approach

Efforts to eliminate such division should consider environmentally and sustainable-sound solutions and the availability of local resources to serve community needs in conjunction with community profit (Meaning: these efforts must be respectful of Haitian traditions and for the improvement of the social situation of Haitians). In addition, these efforts must lead to the evaluation of different management strategies and complete ecosystem services under limited resources that involve the following:

- ❖ Built infrastructure
 - Safe drinking water
 - Drainage
 - Energy
 - Waste management
 - Transportation
- ❖ Green infrastructure
 - Reforestation
 - Sustainable agriculture
 - Restore ground fertility
 - Use of solar power
- ❖ Social infrastructure
 - Public health
 - Education
 - Team work

Cascading effects of Infrastructure Development and Environmental Decisions

Development of design criteria for infrastructure development must take into consideration what factors influence the Haitian society and how. Such events must analyze dependency paths of societal resiliency and recovery (i.e., economic, social). Consequently, important factors of study to determine the influence of infrastructure development are the following:

- time scales (short vs. long term effects)
- multiple-players (new sustainability metrics with respect to equity)
- Centralization vs. decentralization
- Uncertainty
- Multiple-ways to get to the same equilibrium point
- Optimization vs effectiveness
- Capacity building – implementation plan within the local community

Problem solving solutions involving interdisciplinary research teams

The panel recognized that interdisciplinary teams can make positive contributions to this approach. The definition for environmental and sustainable solutions for Haiti must fit a specific scope. That is, solutions shall take into consideration the short and long term benefits of local resources, community profit (meaning respectful of traditions and for the improvement of their social situation), and realistic endeavors that can impact broadly current practices. Research questions that can result from such analysis are the following:

- How do infrastructural decisions impact local community based economies?
- How can we integrate infrastructural decisions to foster economic development?
- Recognizing interactions between social, economic, environmental and technical systems, what are appropriate integrated infrastructure decisions?
- How can sustainability –in the context of Haiti- influence engineering decisions and design criteria?
- How to provide realistic and effective waste management?
- What are the socio-economic limitations that influence the distribution of safe drinking water?
- What are feasible solutions for sustainable development of integrated infrastructures?
- What are the sustainability's matrices with respect to Haiti?
- What is the cost for providing environmental services?
- What are the effects on ecosystems for developing integrated infrastructures?
- How to use education to leverage the implementation of integrated infrastructures?