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National Science Foundation grant for revitalization study

23-Oct-09 14:23 | [anonymous member](#)

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Hilo and Kailua-Kona. How have these two Hawaii Island urban areas evolved in such different ways over the last 50 years?

Researchers at Yale University's School of Forestry and Environmental Studies, the U.S. Forest Service in Hilo, and The Kohala Center, backed by a grant from the National Science Foundation, are going to take a stab at answering this question.

"Hawaii Island provides a model setting to test theories about human impacts on the earth system and about resource constraints on urban growth. Resource management issues are of critical concern for Hawaii Island," said Marian Chertow, director of the industrial environmental management program at the Yale School of Forestry and Environmental Studies.

"By focusing on the major urban areas of Hilo and Kailua-Kona, this project will provide a comparative analysis of the structure and function of two socio-ecological systems related through resource exchanges, geographic proximity, and historical and contemporary cultural configurations. Although similar in population and area, these areas have markedly different socioeconomic and biophysical characteristics," Chertow said. "These areas could benefit tremendously from a close analysis of resource allocation and use and how their patterns of consumption affect the island's human and natural communities."

The study is a first step in the Long-Term Industrial Ecosystem Model for Hawaii Island initiated this spring by a local-global partnership that aims to help Hawaii Island decision-makers discover what sustainability means for the island and management of resources.

"Finding qualitative answers to the evolution of East and West Hawaii and other frequently asked questions about how to resolve our island's significant challenges with energy, food, water resources, and waste management will play a critical role in the revitalization of Hawaii Island's economy. The entire project supports decision-making through high quality information and independent analyses," said Matt Hamabata, executive director of The Kohala Center, a partner in the project.

The Kohala Center and the School of Forestry and Environmental Studies at Yale University are working on the long-term project with the University of Hawaii at Hilo, the Redlands Institute, the Institute for Advanced Studies at Waseda University in Tokyo, Japan, and the Institute for Social Ecology in Vienna, Austria.

Mayor Billy Kenoi's administration submitted a letter of support to the National Science Foundation, endorsing the work of this unique research partnership.

"The science of sustainability, [or] 'industrial ecology,' looks at energy, food, and water sustainability, as well as the unique characteristics of this island, in terms of its social, cultural, historical, and industrial systems," Kenoi said.

"When we think about how to become sustainable, we see that we need to make a collective effort and work together to change the status quo. Contained in this community are the answers for moving forward into the next generation," Kenoi said. "We have many assets. This project will help us talk about the gifts we have, including our island leaders.

"This partnership is ideal. It gives public- and private-sector decision-makers access to high quality information and independent analysis, so that we can make informed choices about resource allocation in areas such as agriculture, forestry, energy, housing, and public infrastructure. This partnership helps us work with the fact that we live in a world with limited resources and turn that limitation into ways in which we can be more efficient, create greater local business opportunities, and enhance the health of our ecosystems."

Hamabata said, "The project offers careful and informed thinking about the future of our island society. This effort will show the linkages across sectors-for example, how high utility costs have a negative effect on the farming industry-just when it is clear that local food production is critically important in light of the fact that we import 85 percent of the food we eat and that we have 10 days or less of food on the shelves."

"The important point is that we need to talk about and look at the bigger picture to understand how best to move forward in light of this island's unique local circumstances. The bottom line is that we can do a lot better in maximizing our sustainable use of materials and energy than we're

doing now," Chertow said.

This work is not new.

The Kohala Center and its university partners have been working with island experts, especially those in the County's Division of Research and Development, on resource allocation and consumption issues on Hawaii Island since February 2007.

For example, the county Energy Sustainability Plan showed the growth in fossil fuel consumption between 2007 and 2030 could largely be eliminated through efficiencies.

Hamabata gives more examples of the cross-sector linkages-the Department of Water Supply is the largest consumer of electrical power in the county government because of the need to pump water; thus, fixing leaks not only conserves a precious resource (potable water) but also reduces the consumption of electricity, which in turn reduces the island consumption of fossil fuels.

"What this project will do is allow leaders and residents to see these interlinkages. When the project develops the capacity to build scenarios rapidly, using GIS technology, leaders and residents can actually visualize what will happen, given the choices they are about to make. This is all useful and practical stuff. It just makes very accessible useful information and analyses from independent sources," Hamabata said. "How much better can this get?"

Among other things, the long-term project will generate comparative scenarios-for example, heavy biofuel development versus local food production-which will help stakeholders visualize which futures they want, and which futures they don't want. These analyses will be of immediate use to the county, but the project will have global benefits as well.

By addressing the concerns of island residents, the regular gathering and analysis of data will-over the years-lead to significant understanding of the complex interaction between human and natural systems. Thus, the resolution of Hawaii Island's local challenges will have global impact. Indeed, this project positions Hawaii Island as a global knowledge resource.

Existing long-term projects such as the Hubbard Brook research site in New Hampshire in which Yale has been deeply involved and Hawaii Island's own Mauna Loa CO2 measurement facility have been essential for global understanding of environmental phenomena such as acid rain and climate change.

The Hawaii study will add social and cultural depth to the research on natural systems already underway on the island, as well as provide a platform for the synthesis and integration of hundreds of ongoing studies.

Hawaii is a perfect location for a system-wide project-as an intricate, diverse, urban-rural environment, it contains the full complexity of human-natural interactions, but it is a small and bounded environment, allowing scientists to track those interactions in real time.

The ongoing work is projected to cost between \$150,000 and \$300,000 a year. The Kohala Center and its university partners continue to raise funds for the project.

In addition to the National Science Foundation \$145,346 grant, funds will also be raised from national and international research agencies and private foundations.

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