

Evaluating the economic impacts of climate variability and change on Maui's freshwater resources and ecosystem services

PI: Kirsten L. L. Oleson, NREM UH Mānoa

Co-PI: Victoria Keener, PacRISA, East West Center, UH Mānoa

Post-doctoral Fellow: Carlo Fezzi, NREM, UH Mānoa

Project Summary and Objectives

Local and regional governments need to prepare for long-term impacts of climate change, and want to choose adaptation options based on technical and socio-economic considerations. This project, a collaboration between UH-NREM and PacRISA, focuses on the socio-economics of Maui's natural resources and ecosystem services. Functioning ecosystems across Maui provide important services that benefit humans in myriad ways. In West Maui (Fig. 1), for example, conservation land in the mountains provides habitats for native species and recharged aquifers, well-managed agricultural land retains sediment, and coral reefs provide food and opportunities for recreation. Shifting ecological dynamics will alter the ability of the system to deliver these services.

We seek to assess and translate technical climate information and analysis into socio-economic terms by evaluating vulnerabilities and related impacts on freshwater resources and ecosystem services. Specifically, we will help Maui communities and decision makers plan for a future with uncertain climate impacts by attaching value to different adaptation outcomes and business-as-usual trajectories. Our research will suggest which adaptation options will deliver the most benefit under alternative climate futures.

We propose to use novel ecological-economic modeling and environmental valuation methods to model and evaluate impacts of climate change and adaptation. The first step of the project will be to characterize adaptation and policy options that should be assessed, as well as relevant outcome metrics. We plan to have extensive Maui community consultation in this step to ensure the relevance of the choices. Next, an ecological-economic model will be developed to use selected climate change, policy, and adaptation scenarios to predict select outcomes. Analysis will be done of the various scenarios, and results will be reported back to the community and its decision-makers.

The products of the project will come in several forms: a set of policy options and outcomes desired by the community; ecological-economic models that link outcomes of concern for the community with climate change, adaptation actions, and policy decisions; scenario analyses; a slide deck for further outreach; and one to two journal articles.



Fig. 1: Lush, functioning ecosystems of West Maui.