

# Statement of Research Interests

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## Introduction

My research interests focus on renewable energy and ecosystem services, particularly the economic, policy, and social dimensions of these. As a broadly-trained natural resource manager I am well-suited to understand and communicate the connections among the ecological, economic, and social dimensions of these systems within the context of sustainable development. The willow biomass energy crop trial at GVSU's Sustainable Agriculture Project (SAP) is an ideal opportunity to help students learn about these connections. The project integrates two strands of my research, renewable and energy and ecosystem services, within the context of sustainability.

My educational background includes a B.S. in Biology from the State University of New York (SUNY) College at Geneseo, a M.S. in Forest Ecosystem Management from SUNY College of Environmental Science and Forestry (ESF), and a Ph.D. in Natural Resource Policy with a concentration in economics from SUNY ESF.

## Renewable Energy

I have a long-standing interest in renewable energy. For my master's thesis, I evaluated the insect pest resistance properties of 25 willow and poplar biomass energy production clones. These willow and poplar clones were part of SUNY ESF's willow biomass project which has commercialized a production system to provide a bio-based feedstock to energy and biorefinery systems.

While employed at Grand Valley State University, I expanded my energy research to include wind and solar energy. I served as the principal investigator for the West Michigan Wind Assessment ([www.gvsu.edu/wind](http://www.gvsu.edu/wind)). This project, funded by Michigan Sea Grant, synthesized the state of the science on the economic, social, environmental, and technical dimensions of wind energy and applied it to West Michigan's coastal counties. In 2012 I was awarded a Fulbright Scholar grant to investigate the wind energy potential of Kenya's tea-growing regions. I analyzed the benefits and costs of wind power in providing electricity for tea factories. I found that in the best wind resource areas, particular those in the eastern side near Mt. Kenya, wind power can be cost-effective. I have been involved in various other renewable energy research projects including offshore wind energy and projects at GVSU-MAREC.

## Ecosystem Services

My other research area is in the economic valuation of ecosystem services. Ecosystem services are the end products of natural that enhance human well-being by providing important goods and services. Ecosystem services include, but are not limited to, providing clean water, forest products, recreation opportunities, and wildlife habitat. As a Ph.D. student, I used a property value model to estimate the value of ecosystem services provided by public open space land in Long Island, New York. I have since applied economic methods to understand how the invasive wetland plant Phragmites negatively affects waterfront property values along the Grand River as well as the economic development impact of recreation in the Rogue River (Michigan) area. This summer I will be part of a team estimating the economic value of the Huron River.

## Biomass energy at GVSU

The proposed biomass energy clone-site trial brings together these two research interests. Willow biomass energy crops provide a feedstock for energy and biorefinery processes that produce useful products. They also provide a range of non-market ecosystem services such as wildlife habitat, soil stabilization, and aesthetic value. The GVSU trials will enable me to work with students to understand the ecological and economic dimensions of renewable biomass energy in the West Michigan context. The trial will be integrated into a course I am teaching this summer, NRM 380 Renewable Energy Management and Modeling.

## Sustainability

Both renewable energy and ecosystem services fall under the larger umbrella of sustainability. A sustainable, resilient society will require transitioning to low-carbon energy sources like wind and sustainably-harvested biomass. Climate change threatens the ecosystem services that communities depend on, especially in developing countries where people are directly dependent on ecosystem services for their livelihoods. Reducing greenhouse gas emissions by adopting renewable energy sources protects the valuable ecosystem services.

As an educator, I teach students how to understand and use economic and policy tools to make their societies more resilient and sustainable. I have developed curricula on sustainability through my work at GVSU, as a consultant with the Pan American Development Foundation (PADF), and through the UN Regional Center of Expertise in Education for Sustainable Development in Grand Rapids (UN RCE). I teach courses in the GVSU Natural Resources Management Program including Natural Resource Policy, Renewable Energy Management and Modeling, and Environmental and Resource Economics. As a Fulbright Scholar, I taught Environmental Economics and Energy for Sustainable Development at Kenyatta University. As a consultant for PADF, I created a curriculum in disaster risk reduction and climate change adaptation for young adults in St. Vincent and the Grenadines. I serve on the steering committee for the UN RCE which advances education as a means of achieving sustainable development in both formal and informal settings.

My master's thesis advisor, Dr. Dan Robison, wrote about foresters having "an expertise of breadth." A forester's training necessarily involves ecology, economics, and social systems in the service of sustainable forest management. This breadth of training in itself is a kind of expertise. I believe this phrase is an apt description of my research interests. In a world that encourages specialization, my research draws on my expertise of breadth to draw the connections among ecological, environmental, and social systems in working towards sustainability.