

# Valuing Ecosystem Services: A Pluralistic Approach

by

Sarah Therese Parks

A Thesis Submitted to the Graduate  
Faculty of Rensselaer Polytechnic Institute  
in Partial Fulfillment of the  
Requirements for the degree of  
DOCTOR OF PHILOSOPHY  
Major Subject: Ecological Economics

Approved by the  
Examining Committee:

---

John Gowdy, Thesis Adviser

---

Dan Shawhan, Member

---

Michael Mascarenhas, Member

---

Steve Breyman, Member

Rensselaer Polytechnic Institute  
Troy, New York

June, 2012  
(For Graduation August 2012)

## ABSTRACT

The field of ecological economics continues to grapple with addressing issues surrounding the value of ecosystem services. What is clear is that there is not one correct set of values, concepts or methodologies which can address issues of ecosystem valuation. There is a need for improved understanding of the value of ecosystem services, for value pluralism and for inclusion of local communities in valuing ecosystem services. In developing countries, where ecosystem services play a critical role in social and economic well-being, it is essential to understand how ecosystem services contribute to various aspects of well-being, including physical, economic, cultural and spiritual. In this regard, there is a need to develop indicators of human well-being as an alternative to the often-used Gross Domestic Product (GDP) and per capita income measurements. As these countries continue to develop, there is and will continue to be a need for empirical work which can contribute to decisions regarding trade-offs between development and conservation.

This dissertation, composed of a theoretical overview and synthesis of valuation and of three separate case studies, attends to these issues in several ways: (1) by advancing understanding of how different development pathways can affect economic, environmental and social outcomes; (2) by analyzing the links between ecosystem services and human wellbeing; (3) by analyzing the shortcomings of commonly-applied human well-being indicators; (4) by applying participatory valuation techniques and integrating social and ecological data into a single spatial framework; (5) by applying a recently-developed methodology—spatial value transfer—to estimate the economic value of ecosystem services at a local level.

The first case study on two neighboring Thai provinces, examines the drivers of the divergent development patterns, the corresponding effects of these divergent pathways as revealed through well-being indicators, and the critical aspects of well-being overlooked by these indicators. Over 30 years ago, two neighboring Thai provinces, Samut Songkhram and Samut Sakhon, were ecologically, socio-economically and culturally similar. However, the provinces have since diverged, resulting in different economic, environmental and social outcomes. Samut Sakhon was influenced by conventional economic forces, dramatically expanding its

manufacturing sector. By contrast, the UNDP cited Samut Songkhram as a “showcase of the sufficiency economy,” although the extent to which the Sufficiency Economy Philosophy was deliberately applied is unclear. Today, the Gross Provincial Product is much higher in Samut Sakhon, but Samut Songkhram ranks higher on the Human Achievement Index (HAI). In comparison to conventional economic indicators, the HAI provides a more realistic depiction of the provinces; however, the index has shortcomings in regards to social and environmental issues. Samut Sakhon struggles with numerous environmental and social issues, while Samut Songkhram has become a sustainable tourism destination, capitalizing on its well-preserved natural and cultural heritage. This case study provides empirical evidence regarding the limits of the GDP as a proxy for human wellbeing, the detrimental effects of focusing primarily on economic values, and the positive development benefits of preserving and acknowledging environmental and social values.

The second case study uses the concept of a coupled social-ecological system to identify social-ecological “hotspots” through combining perceived community values with ecological data on the Rensselaer Plateau, which is one of the largest ecologically intact habitat areas in New York State. This study responds to the call for value pluralism and for inclusion of local community in valuing ecosystem services. Data on community values was collected through participatory mapping workshops, and later coded into a value typology, and finally digitized using ArcGIS software. Ecological value—priority biodiversity conservation areas—were designated by a local ecologist and also digitized using ArcGIS software. Through analysis in ArcGIS, community values were combined with the ecological values to identify social-ecological “hotspots.”

The third case study applies the recently-developed methodology of spatial value transfer to estimate the economic values of ecosystem services on the Rensselaer Plateau. Economic values are estimated for numerous ecosystem services which include biological control, disturbance prevention, gas and climate regulation, habitat refugium, nutrient regulation, other cultural, pollination, recreation and aesthetics, soil retention and formation, waste assimilation, and water regulation and supply across various land cover types which include forest, lakes and reservoirs, cropland, riparian

buffer, rivers and streams, and wetlands. It was estimated that the ecosystems on the Rensselaer Plateau provide over \$300 million in benefits each year. Spatial variation in economic values was minimal because the land cover on the Plateau is mostly forested.