



Trinidad and Tobago

How Ecosystems Support Us

Soil Protection and Water Purification in Trinidad's Northern Range

Forests provide more than trees

The watersheds of Trinidad's majestic Northern Range provide most of the island's freshwater. The forest ecosystems there protect water quality by filtering it as it flows through roots and soil. They also maintain soil quality, and reduce run-off and erosion to help avert floodwater damage and landslides in the low-lying regions at the foothills of the Range. This is especially important for the heavily populated areas on the southern flanks of the Range.

Traditionally less disturbed than the western portion of the Range, the eastern section and the critical services it provides the country are facing increasing pressure from encroachment for housing, agriculture and quarrying. Freshwater sources are being depleted and waterways contaminated. Loss of forest cover has led to increasing levels of soil erosion and is contributing to flooding, which, in turn, has led to damage at the source and further downstream.

Research focus

In Trinidad and Tobago, the Project for Ecosystem Services (ProEcoServ) is examining the soil protection and water purification services provided by forest ecosystems in the Maracas and Caura Valleys of the Northern Range. The ecosystems are being examined to provide information on the quantity of services supplied and where they are found. Together with the results and findings from ProEcoServ's other pilot sites (Nariva Swamp and south-western Tobago/Buccoo), the Northern Range research project is expected to contribute to a more complete picture of the value of Trinidad and Tobago's ecosystem services and to the integration of these values into national planning and accounting.

The goal of ProEcoServ's research in the Northern Range is to establish how different stakeholders can bene-

fit most from soil protection and water purification provided by the forests by:

- Quantifying how the forest ecosystems help to protect the soils from erosion and provide freshwater for local and national use;
- Measuring and mapping the social and economic benefits derived from the services provided by the forests within the Caura Valley – both within the Caura Valley itself, and throughout the country; and
- Using this information as the basis for participatory identification of priority areas in the landscape and priority resource management actions.

The project is also developing a pilot payment for ecosystem services (PES) scheme in the Caura Valley. This scheme will explore how Caura farmers and residents can be given incentives in exchange for managing the land and forest resources to enhance soil protection and water purification services in their own and other communities.

Methodology

The soil protection ecosystem service will be modeled using a modified version of the Revised Universal Soil Loss Equation (RUSLE). The RUSLE is used for estimating soil loss due to erosion from watersheds on an annual basis. The adapted version of the RUSLE will be used to:

- Estimate avoided soil loss due to the presence of forests in watersheds; and
- Model and map values of avoided soil loss across the Northern Range landscape in a geographic information system (GIS).

Nutrient retention by forests will be used as a stand-in measure for the water purification ecosystem service, and will be modeled using the Export



Key stakeholders are engaged in research through a series of workshops on increasing the resilience of ecosystems. Photo: Nicole A. Brown

Coefficient model. The model will be used in a GIS to determine how different types of land use (with a focus on forests and agricultural areas) act as sources or sinks of nitrogen and phosphorous, and influence the amount of nutrients transported to the main rivers of the Northern Range.

Participatory action research tools and methods will be used for engaging the local community and other stakeholders groups in the PES design and capacity building activities.

Researchers are quantifying how the forest ecosystems help protect the soils from erosion and provide freshwater for national and local use, including agriculture. Photo: Nicole A. Brown



- A methodology for engaging multiple stakeholders in land use planning;
- Lessons for the development of Payment for Ecosystem Services schemes; and
- Benefit flow maps that identify people and groups who have an important stake in the PES scheme.

These products and approaches will be used to support decision-making for land use management

of Trinidad's Northern Range. They will feed into a computer-based information system that is being developed under the ProEcoServ Trinidad and Tobago component to help in planning and development decision-making.

Work in the Northern Range is coordinated by Maurice Rawlins as part of his research for a PhD at the University of the West Indies. Maurice began his research in 2011 and expects to complete it in 2014. For more information, contact Maurice via email: mrawlins@thecropperfoundation.org

Results

The outputs of the research will include:

- Equations that describe soil protection and water purification services provided by forest ecosystems;
- GIS-based maps of the soil protection and water purification services provided by forests in the Eastern Northern Range;

The Project for Ecosystem Services (ProEcoServ) 2010 - 2014

The Project for Ecosystem Services (ProEcoServ) is a four-year global initiative that aims to better integrate ecosystem assessment and economic valuation of ecosystem services into poverty reduction and sustainable national development planning.

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ProEcoServ Trinidad and Tobago is led by the Department of Life Sciences, University of the West Indies, St. Augustine Campus and the Ministry of Planning and Sustainable Development, in collaboration with a consortium of local partners.



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For more information on ProEcoServ and the Trinidad and Tobago component go to <http://www.proecoserv.org/>

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