

## Overview

The pilot project in the Eastern Northern Range focuses on the ecosystem services provided by forest ecosystems in the Maracas and Caura Valleys, and specifically on the soil protection and water purification services.

The goal is to establish how different stakeholders can benefit most from these services by:

- quantifying how the forest ecosystems help to protect the soils from erosion and provide freshwater for local and national use;
- mapping the flow of benefits from these forest ecosystem services to different stakeholders in the Caura Valley and in other areas of Trinidad; and
- using these maps as the basis for participatory identification of priority areas in the landscape and priority resource management actions.

Key stakeholders will be involved in the research and decision-making through a series of workshops that will focus on increasing the resilience of ecosystems. Stakeholders include community members of the Caura Valley, research institutions such as the University of the West Indies, and government agencies such as the Forestry Division, the Environmental Management Authority, the Institute of Marine Affairs, and the Town and Country Planning Division.

### The Science

The equation that describes the soil protection service by forest ecosystems is based on a modification 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 modified version of the RUSLE will be used to estimate avoided soil loss due to the presence of forests in watersheds. The modified RUSLE will be used in a geographic information system (GIS) to model and map values of avoided soil loss across the eastern Northern Range landscape.

The aspect of freshwater provision by forests that will be researched is water purification. The equation for water purification is based on the export coefficient model. The export coefficient model is used to describe how nutrients such as nitrogen and phosphorus are transported from agricultural areas in a watershed into the main waterways. The export coefficient 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 phosphorus, and influence the amount of nutrients that are exported into waterways.



### Expected Results

The outputs of the research will include:

1. Equations that describe soil protection and water purification services provided by forest ecosystems;
2. GIS-based maps of the soil protection and water purification services provided by forests in the Eastern Northern Range; and
3. A methodology for engaging multiple stakeholders in land use planning.

These products and approaches will be used to support decision-making for land use management of Trinidad's Eastern Northern Range. In conjunction with the findings and results from the other pilot sites, this project will also contribute to a more complete picture of the value of ecosystem services provided by ecosystems in Trinidad and Tobago and to the integration of ecosystem service values in national planning and accounting.

The methodology for the development of the project's decision-support tools will be shared with the international land use management community through peer-reviewed journal publication(s).

The project is being 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 by September of 2014.