First Annual Geography & Environment MPhil/PhD conference
Thursday 12 February 2009, 13:00-16:30

Venue: Geography/Soils laboratory (upstairs, south side of Soil Science building - 43 on the campus map: <http://sta.uwi.edu/maps/viewbldg.asp?id=42&gridloc=C2>)

Programme

13:00-13:30:   Determining the Edaphic Factors that Causes Plant Zonation in Godineau Swamp (Melissa Atwell)

13:30-14:00:   Spatial Properties of soils as related to cadmium in cocoa (Aqila Sunshine DeCaires)

14:30-15:00:   An Assessment of the Potential Effects of Coastal Dynamics on the Spatial and Temporal Nesting Patterns of *Dermochelys coriacea* at Matura and Grande Riviere, Trinidad (Alana Kezia Joseph)

Refreshments

15:30-16:00:   Modeling terrestrial flood risk in the Caroni River Basin of Trinidad (Jason Dwaine Tambie)

16:00-16:30:   Children's Contact with Nature and How It Influences Their Knowledge and Attitude to Nature (Doreen Jodhan)

Abstracts

Melissa Atwell
Determining the Edaphic Factors that Causes Plant Zonation in Godineau Swamp
Wetland ecosystems are facing unprecedented degradation and loss in the face of anthropogenic landuse-change. Wetland ecosystems provide a range of important ecosystem services for society including absorbing carbon dioxide, efficiently absorbing surplus storm water, recharging aquifers, keeping streams from drying up and filtering pollutants from water. In Small Island Developing States (SIDS), such as Trinidad and Tobago, wetlands provide an important buffer, often protecting vulnerable coastal and marine ecosystems. In addition, the wetlands can provide important wildlife habitats and an income source for those living on the fringes of the wetlands that graze animals, fish or practice cultivation. Increasing urbanization, development, and efforts to control and manage river flow via sluice gates has altered much of the hydrology and surface water flows in the Godineau swamp area of Trinidad. As a result saline water is believed to have intruded into large portions of the swamp, altering the soil salinity and changing the floral spatial patterns. Saline tolerant species are invading into areas formally occupied by non-saline species, as a result there's an increasing threat of fire from the invasive species, which die off in the dry season en-mass. Moreover, the swamp has been modified so that large areas are covered by monocultures of invasive species, reducing the biodiversity, which may limit the ecosystem services that the swamp formally supplied. In this research we focus on determining the relationship between plant zonation and soil properties, specifically soil salinity and redox potential, to determine the edaphic controls on plant zonation. By obtaining a better understanding of the controls on zonation we aim to develop guidelines for aiding restoration of wetland areas so that they can optimally function and provide a broad range of ecosystem services.

Aqila Sunshine DeCaires
Spatial Properties of soils as related to cadmium in cocoa
Heavy metals are a growing concern in the production of chocolate and other products derived from cocoa. Cadmium (Cd) and Lead (Pb) have been identified as two of the most important heavy metals that pose threats to both soil quality and human health. In particular, Cadmium (Cd) has been increasingly identified in raw cocoa products. Cd, in high concentrations, is toxic to humans. As a result many countries are enacting legislation that will require the testing of cocoa products for heavy metals. In 2000, the European Union (EU) proposed that the

maximum residual level (MRL) of Cd in chocolate should be 0.8 mg/kg. Information on heavy metal concentrations in Trinidad's cocoa beans is relatively scarce, but indications are that some beans from areas in Trinidad may exceed the EU's proposed MRL. As a result the aim of this project is to map spatial soil properties that might be correlated with Cd in Cocoa, and affect the mobility and bioavailability of Cd such as pH, Organic Matter (OM) content, mineralogy, and clay content. In addition, by identifying soil properties associated with Cd availability we hope to propose remediation methods to reduce Cd levels in cocoa beans.

Alana Kezia Joseph
An Assessment of the Potential Effects of Coastal Dynamics on the Spatial and Temporal Nesting Patterns of *Dermochelys coriacea* at Matura and Grande Riviere, Trinidad
The *Dermochelys coriacea* (leatherback turtle) is identified on the IUCN Red List of Threatened Species 2008, as being critically endangered. The beaches at Matura and Grande Riviere have been identified as important nesting sites for this species of marine turtle in Trinidad. Seasonal beach and river mouth erosion is regarded as a natural threat to leatherback nests at both these locations. This research aims to determine the relationship between seasonal beach and river mouth dynamics and the spatial and temporal nesting patterns of *Dermochelys coriacea*, in addition to nest loss at the Matura and Grande Riviere beaches. Primary data will be collected by conducting beach surveys using a Zeiss Elta 3 Total Station and locating and identifying turtle nests on the beaches using Global Positioning System coordinates. Secondary data relating to river flows, weather and tidal readings will be obtained from relevant local bodies. The data collected from the beach surveys will facilitate the creation of Digital Terrain Models and maps to illustrate changes in beach morphology. The GPS locations of the turtle nests will be used in conjunction with the beach maps to establish zones of variable stability and subsequent susceptibility of the nests to erosion.

Jason Dwaine Tambie
Modeling terrestrial flood risk in the Caroni River Basin of Trinidad
Flooding is a major issue that impacts on humans and the environment and it is a global problem. Presently, the world is facing two great challenges: climate change and urbanisation, which are both contributing factors to the dynamics of the global hydrological cycle. As a result, the frequency and occurrence of floods is going to be altered significantly. The Caroni River Basin which is found in the island of Trinidad is an area that is always prone to flooding. Modeling of this basin will be undertaken by using the distributed hydrological model CASC2D. In addition, this model will be coupled with the HEC-RAS hydraulic model to simulate flood inundation extent. The models require data to be set up hence, fieldwork such as surveying and aerial photography needs to be carried out. Furthermore, the tropics are plagued with data problems, which can be rectified by using TRMM and Terra SAR-X data. The outcomes of this research will help in the prediction of flooding and the delineation of flood-prone areas, hence facilitating better planning and management of the area.

Doreen Jodhan
Children's Contact with Nature and How It Influences Their Knowledge and Attitude to Nature
A growing database of research shows that adult's attitudes and behaviours to the environment are linked to experiences in their early childhood years. The most important of these experiences is direct contact with nature. What our children know and experience of nature is a reflection on how environmentally-conscious they will be as adults.

This research is a comparative prospective study on the spatial distribution of the occurrences of direct contact with nature, of children in urban areas and rural areas. The first phase of this study investigates what children in Trinidad know about nature and how they come about those ideas.

Children will be recruited from public urban and rural schools in Trinidad. Questionnaires and interviews will be used to gather information on knowledge of, direct experiences with and attitude to nature. A variety of attributes will be looked at e.g. ethnicity, gender, income, educational background of parents etc. Parents will also be surveyed in order to obtain some socio-demographic data and for verification of information from children.

Using geostatistics, the occurrences of direct contact with nature within and outside spatio-temporal clusters will be compared by calculating the distance to natural areas (forests, beaches etc), any green area (parks, savannas etc.) and school location, individual's residence or the center of closest town; average frequency and length of period of outdoor play; some socio-demographical data; sex ratio and so on. Statistical analyses will be used to identify trends and associations.