Darwin Fellowship - Final Report

(Please check guidance for submission deadlines, max 6 pages.)

Darwin Project Ref No.	EIDSP017
Darwin Project Title	Training in forest modelling
Name of Darwin Fellow	Mr Seepersad Ramnarine
UK Organisation	University of Oxford
Your Organisation	Forestry Division, Government of Trinidad and Tobago
Your role in your Organisation	Director Forest Resources, Inventory and Management
Start/end date of Fellowship	October 03 to November 02, 2007
Location	University of Oxford
Darwin Fellowship funding (£)	1000
Type of work (e.g. research, training, other, please specify)	Combination of training and research
Main contact in UK Organisation	Dr Nick Brown, University of Oxford
Author(s), date	Seepersad Ramnarine and Dr Nick Brown

Background

A collaborative project exists among the University of Oxford, The University of the West Indies (UWI) and the Forestry Division. This joint venture originated as a result of the Memorandum of Understanding between the Forestry Division and the University of the West Indies and collaboration between the University of Oxford and the University of the West Indies. Dr Nick Brown of the University of Oxford had been visiting Trinidad since 2004 for the purpose of preparing the project entitled "A biodiversity monitoring system for Trinidad and Tobago". In July 2005 this project was approved for funding by the United Kingdom Department for the Environment's Darwin Initiative. During this period I was the only Forestry Professional who has been collaborating with the UWI and Oxford University on this project. I assisted with project preparation, selection of field locations, training and mobilization of staff for the project, field visits and distribution of men and equipment for the establishment and enumeration of the sample plots across several forest types and associations. During field visits and discussions with Dr Brown and others from the Oxford University and the University of the West Indies I sought assistance for development of growth and yield models for the natural forests as part of the overall project. The overall aim of the project is to promote biodiversity protection and sustainable resource use in Trinidad and Tobago.

Aims and Objectives

The aims and objectives of this training are to assist in inventory data analysis and management. This analysis will yield invaluable information for the sustainable management of the forest resources of Trinidad and Tobago. The management of the natural forests of Trinidad and Tobago is based on regulation and monitoring of harvest levels to ensure biodiversity conservation and sustainable management.

Specifically the programme of work consisted of the following:

1. Training in design, construction and use of database software;

2. Design and implementation of cleaning and error checking functions;

3. Training in the use of forest modelling tools – construction of simple growth and yield models.

Role of the University of Oxford

Provide Laboratory and Library facilities.

Provide expert guidance in ecological data and forest inventory data analysis.

Role of the Forestry Division Trinidad and Tobago

Prepare input data for 170 permanent sample plots in the natural forests of Trinidad and Tobago and make available this data to the Darwin Fellow for further manipulation and analysis.

Achievements

The main activities undertaken during the period of Fellowship were:

- Data entry, editing, verifying and correcting errors on 52,352 individual sample trees located in 170 permanent sample plots on 13 forest reserves and 6 forest types. The number of enumerations varied from one measurement to 10 measurements Some of the common errors were errors in species names, input on computer, wrong measurements in the field data sheets, status (dead or alive) of trees over several years,

- Training in ordination techniques to classify data based on objective criteria. The main methods of ordination utilized in this study were: Polar ordination (Bray and Curtis), Sorensen's Similarity Index and Nonmetric multidimensional scaling (nmds).

- Preparation of data for analysis by ordination techniques.

- Conversion of volume tables into volume equations to predict stand volume

- Update of species list in sample plots based on Brahms Data Base

- Commence preliminary work on the use of modeling tools available at Oxford (MYRLIN- Methods of Yield Regulation with limited information) and a DOS version of TREMA (A tree management and mapping software).

Outcomes Lessons and Impact

As a result of the training undertaken during the Fellowship I can now classify data by objective criteria through ordination techniques, construct pivot tables and prepare data for analysis through ordination so that distribution of individual species can be examined and compared and forest types/ associations can be grouped based on objective criteria. Since my return I have already exposed two young graduates to MYRLIN and provided them with some training. I am now the Director of Forest Inventory Management and Planning where the skills acquired are being used to summarize the data on the permanent sample plots for further analysis.

Since my return I have already began analyzing the data of the various sample plots. Some of the stand parameters that are being looked at are: density (stems per ha), mean diameter along with diameter distribution, Ingrowth (stem numbers, basal area and volume), mortality (stem numbers, basal area and volume), net basal area, gross basal area, net volume and gross volume. Trends in mean annual increment over time in basal area and volume have been calculated. The aim of this analysis is to determine allowable cut by forest types based on growth in volume and basal area. This would assist in managing the natural forests through regulation and monitoring of harvests by a variety of methods to ensure biodiversity conservation and sustainability of timber and other non-wood forest products. It should be noted that the natural forests along with the teak and pine plantations serve an industry which comprises of 85 sawmills and approximately 200 furniture manufacturers. Since their demand is greater than the supply it is imperative that growth and harvest be balanced to prevent any potential impacts on long term sustainability.

In 2008 /2009 the Forestry Division will be conducting a national forest inventory to establish the extent of forest resources by forest types, species and species distribution. One of the major outputs of this inventory will be the production of stand and stock tables across various forest types and associations to determine species and sizes available for harvesting so that sustainable harvest levels can be established. Based on the skills acquired during the Fellowship at Oxford I will be able to prepare these tables for the forest inventory.

Studies on biodiversity, forest growth and development in the tropical world are few and scattered. This data base from Trinidad and Tobago on growth of tropical forests is a unique set which can be used to inform the wider management of tropical forests on a global scale. Further analysis of the permanent sample plot data which has been collected for over a period of twenty-five years in the natural forests of Trinidad and Tobago would facilitate the construction of growth and yield models that are crucial to the sustainable management of the natural forests and biodiversity conservation. Another fellowship for a similar or longer period would enhance our ability to investigate the dynamics of ingrowth and mortality across forest types and model the growth of the various forest types.

This training will improve the Forestry Division's ability to forecast growth rates of the various species across the landscape by forest types and the possibility of further modeling the growth of the forests in Trinidad and Tobago as regards biodiversity monitoring, harvesting schedules, felling cycles and improved management of the growing stock for carbon sequestration.