



Training Program on DSSAT Version 4

Assessing Crop Production, Nutrient Management, Climatic Risk and Environmental Sustainability with Simulation Models

23rd –28th August 2004

African Network for Soil Biology and Fertility (AfNet) of the Tropical Soil Biology and Fertility (TSBF) institute of CIAT and Project 5 of the Challenge Program on Water and Food- Volta Basin coordinated by ICRISAT

and

Presented by the International Consortium for Agricultural Systems Applications (ICASA)

Rationale:

Today more than ever, increased food production depends on judicious use of resources. In addition, issues such as climate change, climate variability, soil carbon sequestration and the long-term impact on food security and environmental sustainability, have become important. Many weather, soil, genetic and management factors affect the way a crop will respond to irrigation, fertilizer and other management practices. Determining appropriate crop management strategies under these uncertainties has major economic and environmental implications. Computer simulation models of the soil/plant/atmosphere system can make a valuable contribution to both furthering our understanding of the processes that determine crop responses and predicting crop performance, resource use and environmental impacts for different environments and management scenarios. User-oriented simulation models greatly facilitate the task of optimizing crop growth and deriving recommendations concerning crop management. They can also be used to determine the potential impact of climate change on crop production and long-term soil carbon sequestration, or provide management scenarios for adapting to climate variability.

Program Goal and Objectives

The overall goal of this training program is to familiarize participants with a

comprehensive computer model for the simulation of crop growth and yield, soil and plant water, nutrient and carbon dynamics and their application to real world problems.

Specifically the program will focus on:

1. Operation of the new windows-based Decision Support System for Agrotechnology Transfer (DSSAT) Version 4 software (www.ICASA.net/DSSAT/)
2. Description of the new DSSAT-Cropping System Model, CSM and its modules, such as CROPGRO, and CERES, and the science embedded in the models.
3. Minimum data requirements and experimental data collection for systems simulation.
4. Integration of crop simulation models with data base management
5. Application of the new DSSAT-CSM model to improve management of cropping systems.

PROGRAM HIGHLIGHTS

The program will:

- Describe a practical approach for simulating effects of soil, weather, management, and pest factors on crop production.
- Demonstrate how processes of crop growth and development, water use, uptake of water and nutrients and carbon dynamics can be simulated.
- Make extensive use of 'hands on' sessions that apply the new DSSAT-CSM model to cropping systems in various regions of the world.
- Describe procedures for collecting and managing crop, weather and soil data for model evaluation.
- Give participants the opportunity to work with their own data and determine the accuracy of the models for application to specific problems.
- Analyze management alternatives for single seasons or over long-term crop rotations.
- Assess economic risks and environmental impacts associated with agricultural production.

Cropping System Model & DSSAT

The program will make extensive use of the DSSAT-Cropping System Model (CSM).

CSM is a new, general cropping system model for simulating crop growth and development and soil and plant water, nitrogen and carbon dynamics. CSM is comprised of the CROPGRO module for soybean, peanut, common bean, chickpea, faba bean, cowpea, and other grain legumes, the CERES module for maize, sorghum and millet, the CERES-Rice module for rice, the SUBSTOR module for potato, the CROPSIM-CERES module for wheat and barley, and the CROPGRO module for tomato, bahia and brachiaria. The CENTURY model for the simulation of soil carbon and nitrogen is also included in CSM. DSSAT v4 is windows based and includes the CSM model as well as tools and utility programs for managing soil, weather, genetic, crop, economic and pest data, and application and analysis programs.

ABOUT THE TRAINING WORKSHOP

When the Workshop Begins

The program will start on 23rd and end 28th August, 2004. It will be held in Arusha Tanzania. International participants should plan to arrive one or two days before the program begins to adjust to time zone differences and recover from travel fatigue.

Resource persons/ Trainers

The following will train in this training program:

Dr. G. Hoogenboom, The University of Georgia

Dr. J.W. Jones, The University of Florida

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