

### **MOSAICC:**

### An inter-disciplinary system of models to evaluate the impact of climate change on agriculture

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### MOSAICC

**Mo**delling **S**ystem for Agricultural Impacts of **C**limate **C**hange



# Models

- Statistical Downscaling Portal (ENSEMBLE)
- 2 crop models:
  - AQUACROP
  - WABAL
- 1 Hydrological model: STREAM
- 1 Economic model: DCGE



## STREAM (Aerts et al. 1999)

• Raster-based precipitation-runoff model







# Integration

- Server
- Spatial database
- Web interfaces
- Utilities: data interpolation, PET calculation, data and experiment management etc.





#### • Home page – log-in

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User login Username: *	FAO Modelling System for Agricultural Impacts of Climate Change
Password: *	
Create new account	Welcome to FAO-MOSAICC (for <u>MO</u> delling <u>System</u> for <u>Agricultural Impacts of Climate Change</u> ), the system of models designed to carry out each step of the impact assessment from climate scenarios downscaling to economic impact analysis at national level.
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FAO-MOSAICC is being developed in the framework of the EC/FAO Programme on "Linking information and decision making to improve food security" (GCP/GLO/243/EC), theme 3 "Climate change and food security". More information on www.foodsec.org.

The project manager and the expert users can take advantage of this system to carry on the following tasks:

- custom data management (upload, download, layout control and update)
- custom module management (upload and update)
- · run the installed modules with the available data for multiple experiments
- geo-processing
- · publish their experiments to be used from everybody



#### Functions (utilities and models)

FAO-MOSAICC<sup>alfa</sup> about us FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS helping to build a world without hunger Home Data Tools Home Functions Documents CCI - User Functions Definition of the study area Downscaling climate variables The FAO-MOSAICC User Interface is designed around a few concepts: (Tmin, Tmax, Prec) A Data Type Calculation of PET (Hargreaves) B. Module C. User Function Data interpolation - PCA Several Data Types are defined, but basically we can trace them back to some general types: Data interpolation (Prelim & Grid / Raster data Aurelhy and Kriging) Polygon-related Data Point-related Data Calculation of growing season onset and length (GSO and GSL) Those general data types define the different methods the modules work with them and then the concept of "Work Mode" has been define. Crop modelling with WABAL One of the aims of FAO-MOSAICC is to create a proper user interface for each module, trying to generalize them in order to limit the number of interfaces to develop and maintain. The modules can easily be classified and the concept of "Module Type" has been define. Some functions can be used in different modes, Crop modelling with such as "Calibration" and "Simulation": the concept of "Function Mode" has been defined to handle those modes. AQUACROP The concept of "User Function" combines the different ideas reported above and extends them to some functionalities of the system that don't require to run an STREAM calibration external module. More precisely, the User Function provides a general method to provide the parameters to a module and allows to specify the following STREAM simulations information: Economic Model definition the work mode, i.e. main type of data the module will work on • the function mode, i.e. the way a module works with the data Economic simulations • the module parameters, that depend on the work and the function modes f.delobel Ň Edit My account Log out

#### • Data management

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#### • Experiment management

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Data intervolation (Prelim & Aurelhy and Kriving)										

# **Objectives**

- Capacity development tool for
- Assessing climate change impacts on agriculture at national level (trends)
- By national experts (ministries, universities, research institutions)
- Using own data
- In a perspective of decision support



## Advantages

- Participatory approach
- Remote access
- Nothing to install (web browser)
- Easy data exchange
- Low computing time
- No data format or unit conversion
- Data tracking down the flow



### **Advantages**

- Replicability/ study comparison
- Modularity and substitution
- Maintenance needed but no licensing cost



## **Open questions**

- Study design
  - Model underlying assumptions and level of abstraction
  - Consistency
- Calibration, validation and error propagation
- Need for tests



### **Current status**

- MOSAICC v.0.1 is being installed in Morocco and in the Philippines
- These pilot experiences comprise:
  - server and software installation
  - constitution of a working group of national experts
  - trainings

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- tests of the models and conduction of an impact study at national level
- These experiences will serve as references for future implementations

# Thank you for your attention

- Info:
  - www.fao.org/climatechange/mosaicc
  - MOSAICC@fao.org
- Partners

