

# Integrating multi-disciplinary models to evaluate the impact of climate change on agriculture: the example of MOSAICC



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Climate change poses a great challenge to agricultural productions systems, potentially threatening those who particularly depend on local food production for their livelihood. Information on the impacts of climate change forms a primary tool for policy makers to cope with climate change.

The impacts of climate change on crop production result from a combination of factors: changes in temperature and rainfall regimes, variations in growing season starts and lengths, CO2 fertilization, water availability for irrigation among many others. In turn changes in agricultural yields will affect food production and national economies through the inter-linkages with other sectors. To this regard, a multi-disciplinary approach is useful to deal with these different aspects jointly.

## Objectives

MOSAICC is a capacity development tool for assessing climate change impacts on agriculture at national level by national experts (ministries, universities, research institutions) using own data in a perspective of decision support

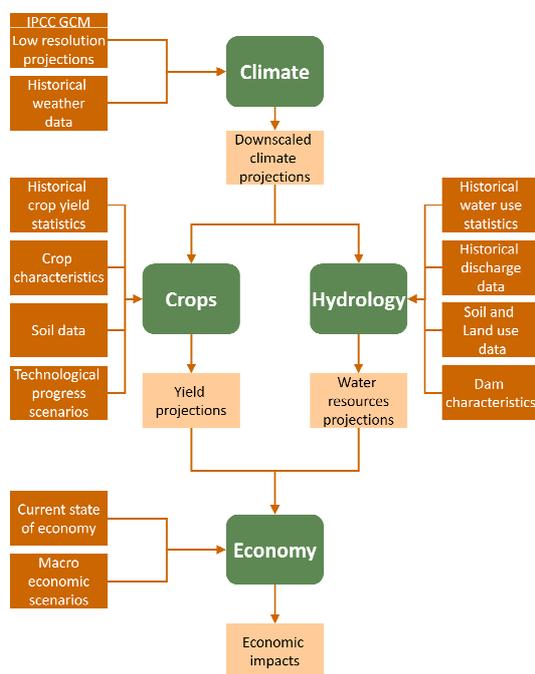
MOSAICC is designed for specialized institutions and delivered with training program on the system administration and the utilization of the models.

### Models

1 Statistical downscaling portal  
2 Crop models: AQUACROP and WABAL

1 Hydrological model: STREAM  
1 Economic model: DCGE

Utilities: interpolation, PET calculation, growing season start and length estimation, GIS tools etc.



## Integration

Models and utilities are integrated within a software architecture based on a data typology. About 60 data types have been defined to manage the data exchange between the system and the users and to link the data with the models. A set of web interfaces has been developed to manage data, simulations and user accounts. The system is installed on a server.

## Discussion

The integration of models and utilities has several advantages such as:

- Remote access through web interfaces opens opportunities for participatory approach. Users do not need to install any software on their own computer since the system is accessed through usual web browsers.
- The time spent on carrying out experiments is reduced thanks to easy data exchange, low computing time and automatic data formatting and unit conversion
- Data can be tracked down the flow. Experiments replication and comparison is easy.
- Once installed, the system requires maintenance but no licensing cost.

The utilization of the system however requires particular attention on the study design (consistent use of the different models, in accordance with their own characteristics) as well as on the calibration, the validation and the error propagation.

Fig.: Overview of the system with the 4 disciplines, the inputs (dark orange boxes) and the generated data (light orange boxes)

## Status

MOSAICC v.0.1 is being installed in Morocco in the framework of the EU/FAO programme on global governance for hunger reduction and in the Philippines for the FAO/Japan AMICAF project. These pilot implementations comprise the installation of the server and the system, the constitution of a multi-disciplinary working group of national experts, the organization of trainings in the specialized institutions, the tests of the models and conduction of an impact study at national level. These experiences will serve as references for future implementations.

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Partners:



FAO Modelling System for Agricultural Impacts of Climate Change

