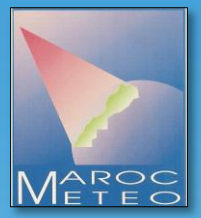

MOSAICC-MOROCCO: NEW PLATEFORM FOR ASSESSING CLIMATE CHANGE IMPACT ON AGRICULTURE/Climatic component

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Climate information

- The end users of Climate Change Information and especially in its impact aspect are Decision makers such National institutions which will use and integrate this information in the development strategies of the country: in agriculture, in water resources management, etc

- The end user of Weather and Seasonal forecast information are not only decision makers but also and especially the last users in the chain who needs the information in real time such as farmers and so on.

Background: The Modelling System for Agricultural Impacts of Climate Change (MOSAICC)

- ✓ **The Modeling System for Agricultural Impacts of Climate Change (MOSAICC) is an integrated package of models for assessing the impact of climate change on agriculture;**

- ✓ **MOSAICC has been developed by the FAO in the Framework of the EC/FAO Programme on "Linking information and decision making to improve food security ".**

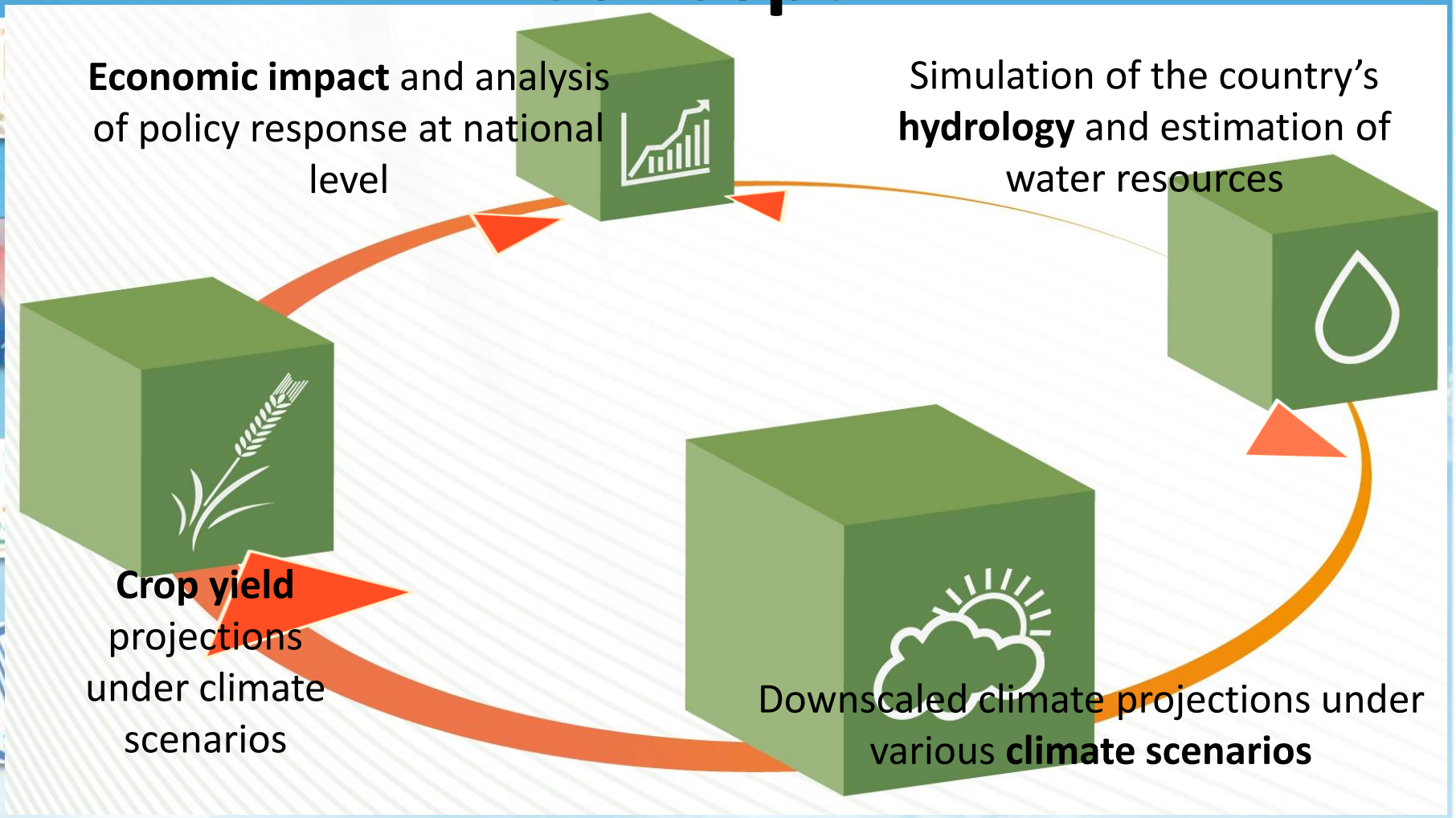
1. Objectives

- **MO**delling **S**ystem for **A**gricultural **I**mpacts of **C**limate **C**hange
- **Integrated impact assessment on crop yields, from climate data handling to economic assessment**
- **Provides information to support decision-making at national level**
- Delivered to national institutions with training

Concept

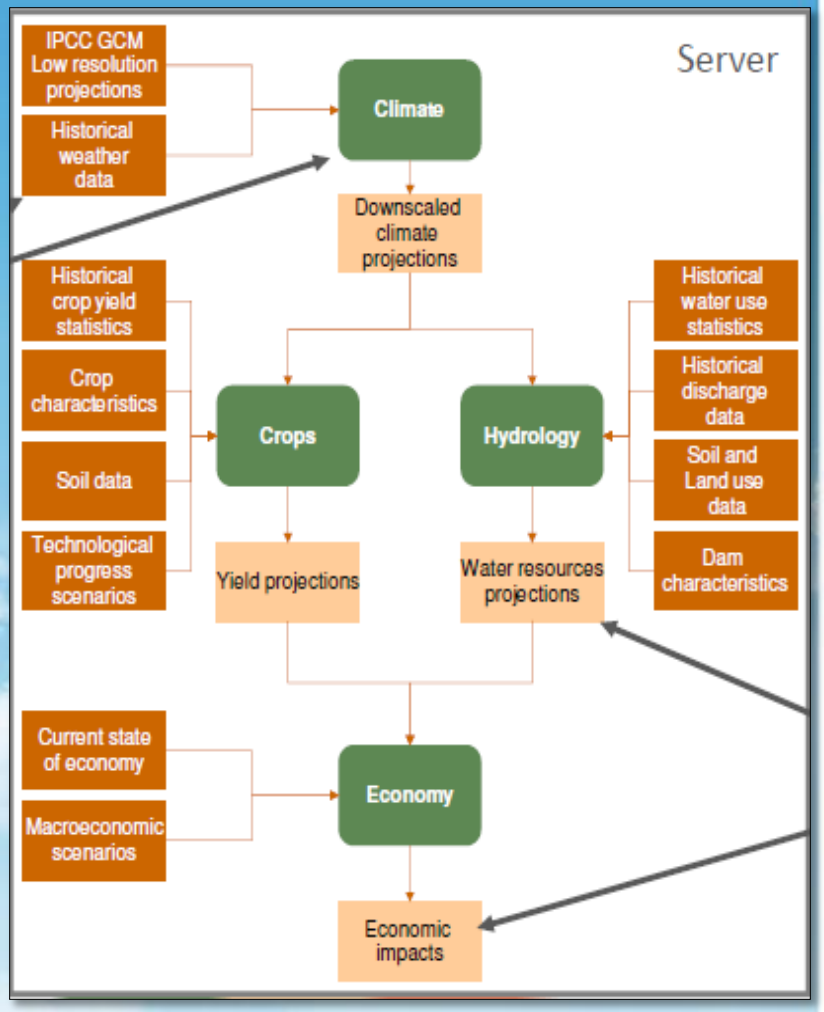
- **Need for a tool to facilitate the user experience by simplifying data processing and simulation runs**
- Include additional models
- Transferable (capacity reinforcement)
- At no cost (freeware)

Concept



Background: Integration of FOUR MAIN COMPONENTS

- ✓ **CLIMATE:** Supports the preparation of downscaled climate data and their interpolation;
- ✓ **HYDROLOGY:** Estimates water resources under future climate projections
- ✓ **CROPS:** Simulates crop yields under future climate projections and technological progress scenarios
- ✓ **ECONOMY:** Evaluates the economic impacts of future crop yields and water resources projections
- ✓ These components include models and utilities to achieve the successive steps of impact assessment. A set of different user profiles allow users to design studies and manage data flow and production.



2.1 Climate

- Aim: Preparation of **climate projections** for crop and hydrological modelling from observations and GCM outputs
- Models:
  - Statistical downscaling tool based on DAD Portal, developed by the Santander Meteorology Group, University of Cantabria (Spain)
  - Interpolation module based on AURELHY (an interpolation method using the topography) developed by P. Grosjean, University of Mons (Belgium)
  - Potential evapotranspiration calculation routine
  - Planting date and growing season length calculator (PLD) developed by R. Gommes, JRC-IES (Italy)

2.2 Hydrology

- Aim: Simulating the water flow accumulation in river catchments for **water resources estimation**
- Model:
  - STREAM (precipitation – runoff model), developed by Water Insight, the Netherlands
- Inputs: climate data, soil characteristics, land cover, discharge observations
- Outputs: discharges, water accumulation in dams

2.3 Crops

- Aim: Generating **crop yield projections** under climate change scenarios using a crop forecasting approach
- 2 Models:
  - AgroMetShell: crop specific soil water balance (FAO-NRC)
  - AQUACROP: water driven crop model (FAO-NRL)
- Inputs: climate data, soil characteristics, crop parameters, management options
- Outputs: according to the model, yield estimations, biomass production, crop water balance variables etc.

2.4 Economy

- Aim: Modelling the **impacts of changing yields on national economies** and simulating the effect of policy responses
- Model:
  - Generic Computable General Equilibrium Model developed by the Institute for Environmental Studies (IVM), Free University of Amsterdam, the Netherlands.
- Endogenous variables: crop yield projections + additional scenarios (population, agricultural land)

Les données nécessaires pour que MOSAICC marche sont les suivantes:

- Composante climatique: séries temporelles des données quotidiennes de Tmax, Tmin et RR, Modèle numérique du terrain et shapefile du pays où de la zone d'étude

- Composante Agronomique: Les données des rendements pour calibrer et ajuster WABAL et/ou Aquacrop, LANDUSE, les coefficients culturaux

- Composante Hydrau: les séries temporelles des débits

- Composante Economique: une matrice des côuts de production

MOSAICC in MOROCCO: The Web interface is Reachable by public with any internet Browser

81.192.163.58

MOSAICC in MOROCCO: Success story with several aspects

✓MOSAICC MOROCCO is the first pilot experience in the world thanks to the previous experiences and to the successful synergy between stakeholders (Climate, Water, Soil, Agriculture, Economy) ;

✓MOSAICC MOROCCO federates national institutions and experts around Climate Risk Governance: ACCAGRIMAG (Insurance and CC);

✓MOSAICC MOROCCO is an other added system which strengths national capacity for crop monitoring and yield forecasting: CGMS-MAROC;

✓MOSAICC MOROCCO Experience is able to be exported to other countries: Maghreb and North Africa, West and central Africa, Central Asia……

Climate information

- The end users of Climate Change Information and especially in its impact aspect are Decision makers such National institutions which will use this information in different development strategies of the country: agriculture, water resources, etc

- **The end user of Weather and Seasonal forecast information are not only decision makers but also and especially end users such as farmers in agriculture sector.**

Evaluation of CGMS Morocco: Socio-economic impact

- ✓ Crop monitoring and forecasting is an essential component of the climate risk management in agriculture;
- ✓ CGMS-MAROC allows to instantly forecast grain yields two to three months before harvest.
- ✓ Forecasting the production of crops early before harvest allows decision makers to be prepared in advance for eventual consequences of abnormal deviations of the climate, particularly for strategic commodity crops to food security like cereals.
- ✓ Currently the Moroccan ministry of agriculture has not yet carried out a quantitative socio-economic evaluation regarding cost-savings made by the CGMS-MAROC system that was implemented in e-Agri. Nevertheless, given the dependency of Moroccan agriculture on cereal imports (as outlined above), the potential savings from strategic commodity trading can be substantial.

CGMS MOROCCO: Outlook and further development

- ✓ CGMS-MAROC can be improved and used in agricultural early warning, by **incorporating modules for forecasting short-term weather events** (rain, drought, heat waves and cold) and biotic hazards (diseases, insects) and the choice of sowing date.
- ✓ CGMS-MAROC cereal yield predictions can be produced earlier by incorporating modules **for climate seasonal forecasting especially for rainfall**
- ✓ CGMS-MAROC can be adapted for forecasting cereal yields in countries **with similar climate to that of Morocco, such as the Mediterranean countries.**
- ✓ CGMS-MAROC the system can also be adapted to other purposes, through additional improvements, **like drought insurance, mapping potential of land and land use and impact of climate change on agricultural productivity.**