



Food and Agriculture
Organization of the
United Nations

FAO AND THE ENHANCED TRANSPARENCY FRAMEWORK

THE MODELLING SYSTEM FOR AGRICULTURAL IMPACTS OF CLIMATE CHANGE (MOSAICC) TOOL AND THE ENHANCED TRANSPARENCY FRAMEWORK (ETF)

Using MOSAICC to report on adaptation in the agriculture sectors under the Enhanced Transparency Framework

MOSAICC AND THE ETF IN A NUTSHELL

The Paris Agreement, in particular through the Enhanced Transparency Framework (ETF), requires countries to report on their efforts to adapt to climate change. The Modelling System for Agricultural Impacts of Climate Change (MOSAICC) approach helps users model the impact of climate change on crops; water and forest resources; and the national economy. MOSAICC can be used to produce medium- to long-term projections based on different climate scenarios. Results provide an evidence base for identifying appropriate adaptation strategies, programmes and areas for investment.

Type of tool



Modelling tool using
WEB-GIS technology

Type of data required



Quantitative
~30 years historical
meteorological
data for whole country
Crop, water & forest
resources data

Duration



Climate change
impact assessment:
8–10 months
Climate component: 4 months
Crop, water, forest
components: 4 months

Expertise/ special training



Training &
support from FAO

Cost



Climate downscaling:
~ USD 25 000
Crop modelling:
~ USD 35 000
Water & forest modelling:
~ USD 30 000

BACKGROUND INFORMATION

The 2016 Paris Agreement (PA)'s ETF requires United Nations Framework Convention on Climate Change (UNFCCC) parties to report on how well their efforts to adapt to climate change have worked; and what support they have received or still require.

MOSAICC is a capacity development tool which provides a scientific evidence base to help countries fulfill their ETF reporting requirements related to climate change adaptation. It also helps policy makers define adaptation strategies and programmes; and identify areas for investment. MOSAICC can help address the UNFCCC Least Developed Countries Expert Group (LEG)'s request for more country-specific climate information and impact assessments.

WHAT IS MOSAICC?

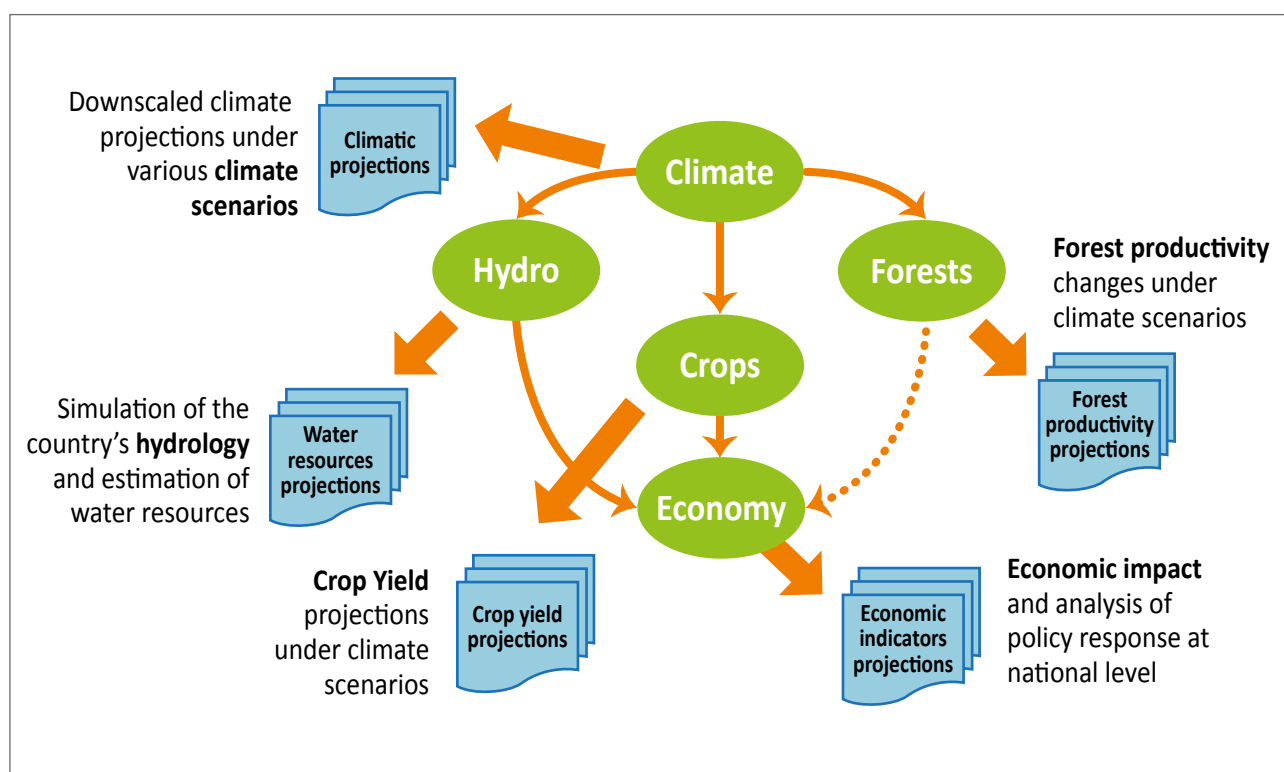
MOSAICC allows users to assess the impact of climate change on agriculture at the national and sub-national level – highlighting both threats and opportunities. Its models simulate the impact of changing climatic conditions on crop production; water and forest resources; and the national economy. MOSAICC uses “statistical downscaling”

to make climate predictions at finer temporal and spatial scales relevant to agriculture. These can be used for local level analysis and planning.

Countries can customize MOSAICC to suit their specific needs. FAO provides interested parties with the models and training to enable national experts to work, and prepare the final results, independently.

FIGURE 1

MOSAICC ALLOWS FOR MULTI-DISCIPLINARY ASSESSMENTS



HOW CAN MOSAICC BE USED IN THE CONTEXT OF THE ENHANCED TRANSPARENCY FRAMEWORK?

MOSAICC is especially useful for preparing climate change adaptation information for areas A, B and C of the ETF (see Table 1). It can also be used by countries reporting on their efforts to monitor and evaluate climate adaptation actions in various sectors.

HOW DOES MOSAICC INFORM AREAS OF THE BIENNIAL TRANSPARENCY REPORTS ON ADAPTATION?

MOSAICC provides:

- ◆ downscaled climate projections under different climate scenarios - including an analysis of historical and projected climate trends and hazards;
- ◆ information on the potential impacts of climate change on four key sectors and their main vulnerabilities; and
- ◆ information that can be used for medium- to long-term adaptation planning; and for identifying appropriate climate adaptation measures.

TABLE 1

ASPECTS OF THE ETF WHICH MOSAICC ADDRESSES

Aspect of ETF	Specific areas of ETF aspect	What MOSAICC can do	Specific MOSAICC output to use
A. National circumstances, institutional arrangements and legal frameworks	a) National circumstances relevant to adaptation actions of Parties, including biogeophysical characteristics and information on adaptive capacity	Provide information on adaptive capacity related to climate impact assessments	Downscaled climate projections under various climate scenarios (e.g. most vulnerable and resilient regions)
B. Impacts, risks and vulnerabilities	a) Current and projected climate trends and hazards b) Observed and potential impacts of climate change, including sectoral, economic, social and/or environmental vulnerabilities	Provide information on current and projected climate trends and hazards Provide information on the current and potential impacts of climate change on crop production; water and forest resources; and the national economy. It also highlights key vulnerabilities	Crop and forest yield projections under downscaled climate scenarios (e.g. most vulnerable and resilient crops), simulation of the country's hydrology and estimation of water resources
C. Adaptation priorities and barriers	a) Domestic priorities and progress towards these priorities b) Adaptation challenges and gaps; and barriers to adaptation	Inform medium- to long-term adaptation planning and help identify appropriate and timely climate adaptation measures	Analysis of the economic impacts of climate change and policy responses

WHAT ARE THE MAIN OUTPUTS OF MOSAICC?

- ◆ **Projections of temperature and precipitation** under different Relative Concentration Pathways (RCPs) for the medium (2010-2040) and long (2041-2070) term downscaled to the station level.
- ◆ **Climate data processing tools**, such as statistical downscaling and spatial interpolation tools, aimed at preparing climate data for input into the crop, hydrology, and forestry models.
- ◆ **Crop models** that simulate crop growth under different climate change scenarios using the data produced by the climate data processing tools.

- ◆ **Analysis of agro-climatic indices** using climate outputs and agricultural parameters.
- ◆ **Hydrological models** that model the hydrology of river basins under various climate change scenarios using the data produced by the climate data processing tools.
- ◆ **Economic models** that simulate the impact of yield variations due to climate change on national economies.
- ◆ **Forest models** that assess the impacts of climate change on forest dynamics.
- ◆ **Visual representations** and summaries of findings for technical reports and policy briefs.

WHAT ARE THE PREREQUISITES FOR USING MOSAICC?

MOSAICC requires substantial resources, data and support including:

- ◆ A minimum of about 20 years of data (e.g. observed meteorological variables) covering the regions of interest for the climate module.
- ◆ A minimum of about 20 years of historical yield and cultivated area data covering specific crops and regions of interest for the crop module.
- ◆ Adequate financial resources to cover ongoing technical support from universities or research institutes.

WE WANT TO USE MOSAICC – WHAT ARE THE NEXT STEPS?

Countries take the lead in using MOSAICC. Studies are designed and carried out by national experts, using their own data, and aligned with national objectives and priorities. The typical duration of an impact assessment study is from 6 to 12 months. FAO can provide training as well as support with building a collaborative network among national experts and stakeholders.

Next steps for applying MOSAICC are to:

- ◆ Contact FAO (MOSAICC@fao.org) and set up inception meetings with national institutions.
- ◆ Create national working groups and teams for working on various MOSAICC modules (crops, climate, etc.).
- ◆ Collect the data and check their quality.
- ◆ Receive training on climate downscaling; and crop, water and forest modelling.
- ◆ The national “climate team” produces downscaling results with support from FAO.
- ◆ The national “crop team” produces climate change impact assessments on crops with support from FAO.
- ◆ The national working group disseminates results and provides policy recommendations.

FOR MORE INFORMATION, PLEASE VISIT:

- ▶ MOSAICC
<http://www.fao.org/in-action/mosaicc/en>
MOSAICC@fao.org
- ▶ FAO CBIT-AFOLU project
<http://www.fao.org/climate-change/our-work/what-we-do/transparency/en/ETF@FAO.ORG>
- ▶ SCALA program
<http://www.fao.org/climate-change/programmes-and-projects/detail/en/c/1273079/>
FAO-NAPs@fao.org



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