

Information of climate and its impacts on agriculture and food security for adaptation planning

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Motivation

- There are many climate change impact studies that are done for academic interest only and are never used by stakeholders
- There are many “climate change adaptation” projects in developing countries that are not backed by good understanding of current and future climate and its impacts
- FAO – Food and Agriculture Organization of the United Nations – a technical UN agency; counterpart is Ministry
- Agriculture and food security

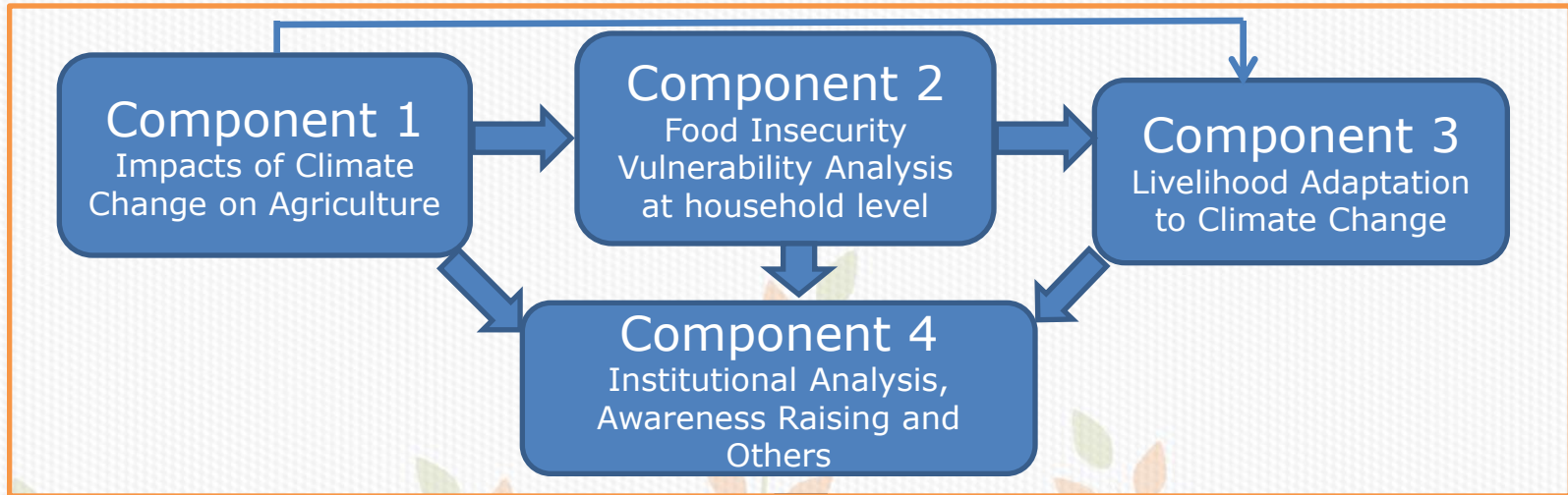
AMICAF Overview

- Analysis & Mapping of Impacts under Climate Change for Adaptation & Food Security (AMICAF)
- AMICAF builds evidence-base to enable climate change adaptation and food security planning and decision making
- Outputs are nation-wide coverage, disaggregated at sub-national level to support strategic planning/investments/decisions by national policy makers
- Combination of top-down and bottom-up approaches
- Phase 1 Participating countries: The Philippines and Peru



AMICAF Framework

AMICAF Phase 1 (The Philippines and Peru)



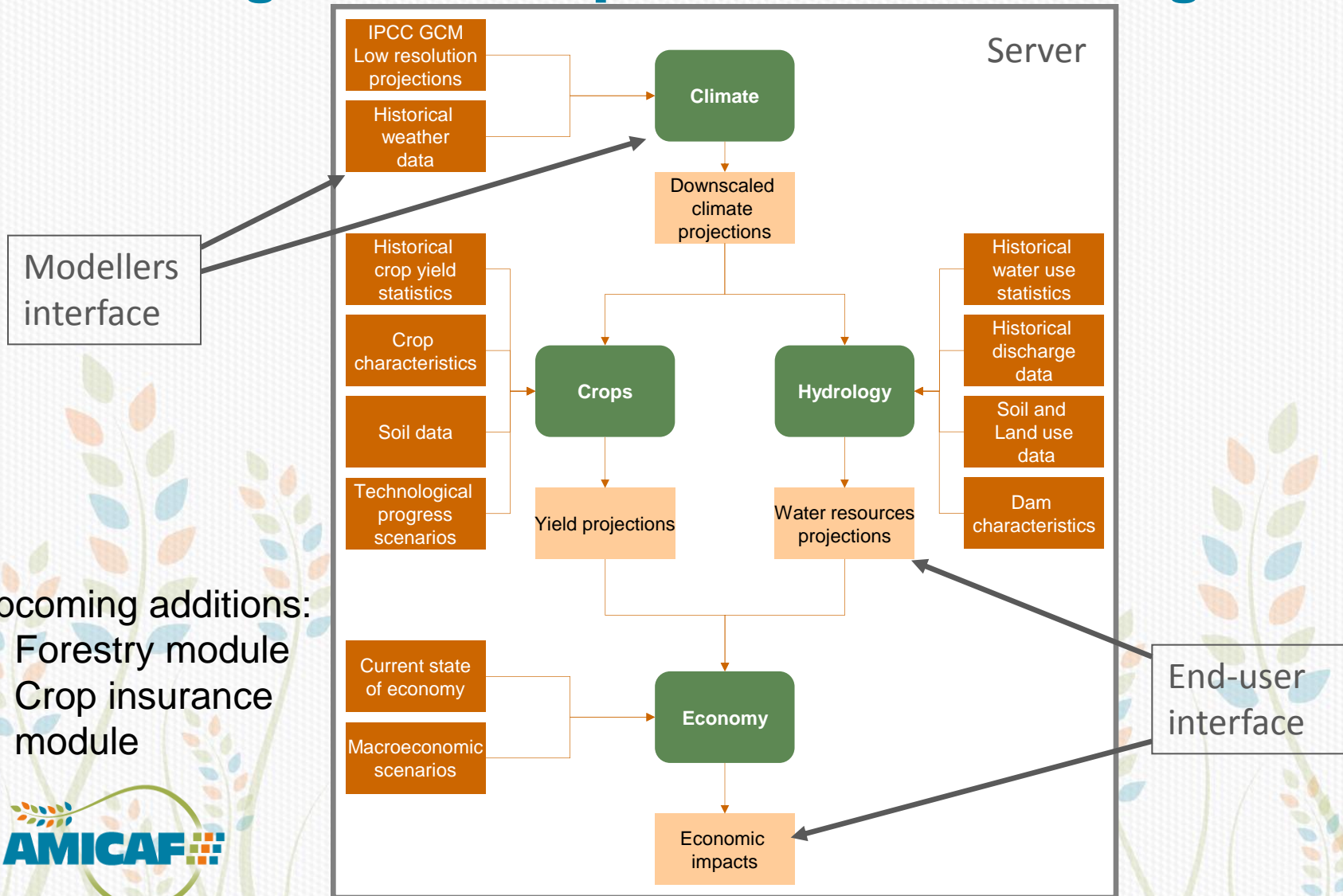
South-South Cooperation
from Phase 1 countries

AMICAF Phase 2 (AMICAF-SSC) 2015-2018
(One Asian and one Latin American country)

Guidance materials for promoting
the AMICAF approach in other countries

MOSAICC

Modelling System for Agricultural Impacts of Climate Change



MOSAICC Concept



A tool for assessing climate change impacts on agriculture

- Carried out by national experts (ministries, universities, research institutions)
- Software facilitates collaboration among experts of different disciplines
- Easy data exchange/sharing among models – spatial database
- Server and web interface



Component 1 Outputs

Impacts of climate change on agriculture

- Component 1 uses MOSAICC as a main tool
- Technical working group of experts/modelers from different institutions, and stakeholders
- Top-down approach – multi-disciplinary impact assessments starting from large-scale climate projections, and then crop, hydrology, agricultural market. e.g.:
 - Precipitation and maximum/minimum temperatures
 - Projected changes in yields of major crops (tonnes/ha) by province
 - Projected changes in river flows (m^3/s) by basin

Component 2 Outputs

Food Insecurity Vulnerability Analysis

- Component 2 makes an econometric analysis
- Bottom-up approach – analysis of contextual vulnerability to climate change in terms of food security with household surveys and econometric methodology
- Characterizing vulnerability to food insecurity under climate change, and identifying factors (variables) associated with highest levels of vulnerability
- Projected changes in the level of food insecurity

AMICAF

for National Planning and Decision Making

Outputs from AMICAF will answer such questions as:

- Better allocation of resources for adaptation, given differentiated climate projections, and future vulnerability to food insecurity, by province?
- Better national cropping pattern, given projected changes in crop productivity and water availability in different provinces?
- More attention to improve the factors (variables) that lead to food insecurity?

And AMICAF outputs will be able to support national planning and decision making, for example:

- National Adaptation Plans (NAP) for the UNFCCC
- National climate change action plans
- National disaster risk reduction and management plans
- National agriculture development plans
- Other climate change projects

Variety of climate information requirements – scales

	Temporal resolution	Spatial resolution	Variables	Timescale
Crop model	Daily or 10-daily	Provincial level	Precip, Tmax, Tmin, PET, Radiation	2030, 2050, or longer
Hydrology model	Monthly	Small grids (10km or smaller)	Precip, PET	2030, 2050, or longer
Agricultural market model	Monthly or annual	Provincial level	Precip, Tmax, Tmin	Time series up to 2030
Vulnerability analysis	Monthly or annual	Provincial level	Precip, Tmax, Tmin, Extreme indices	Single years circa 2030

Impact assessment design for adaptation planning

- It is not scientists who make adaptation strategies – adaptation planners (stakeholders) should drive the process
- Important to engage stakeholders from the design phase of the assessment – design from the end
 - Identification of end-users
 - Information needs of end-users
 - Evaluation of role and capacity of stakeholders
 - Design of assessment, including agreement of adaptation goals, methodology, data collection
- Methodology should not be pre-determined, in principle.

Impact assessment design for adaptation planning

- However, end-users are not always knowledgeable...
 - Not familiar with the state of science and what can be known and what is possible by science
 - Usually good understanding of the needed information do not determine the methodology. They do not shop around
 - The choice of scientists/institutes, often by personal connections, or tied with funding, determines the methodology
 - (We are not free from this constraint too)
- CC adaptation goal is much larger

Challenges

- Time – long chain of models - sequential, iterative improvements
- Technical terms (e.g. shock, projection, downscaling, impact)
- Familiarity with climate data, overwhelmed by the volume of data sets
- Consistency among model results
- Understanding uncertainties (emissions, GCMs, etc)
- Communication of results (robust signals of climate change) to stakeholders

Lessons

- Team work facilitated by technical framework
- Technical working group that meet regularly – once a month – to discuss progress, problems, and solutions
- Strong leadership of climate team is necessary – all interpretation of results in subsequent models/analyses require understanding of climate information and associated assumptions
- Working closely with Ministry of Agriculture and National Meteorological Service, national climate change office, including support for interpretation and use of assessment results, and dissemination of information

Thank you

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<http://www.fao.org/climatechange/amicaf>

<http://www.fao.org/climatechange/mosaicc>

