

# Global Gridded Crop Model Intercomparison (GGCMI)

**GGCMI brings together a diverse international community of crop modelers for climate impact assessment, model intercomparison and improvement at the global scale**

**Background and Motivation** In 2012 AgMIP led a fast-track multi-model intercomparison in coordination with the Inter-Sectoral Impacts Model Intercomparison Project (ISI-MIP). The fast-track assessment projected climate change impacts using global high-resolution crop models driven by CMIP5 inputs. The project culminated with the submission of 6 papers to a special issue of PNAS (Figures 1 and 2). Initial results demonstrate the potential of global gridded crop model simulations and the need to further improve understanding of mechanisms, assumptions, and uncertainties of model design and execution.

## Objectives and Activities

Following the success of the 2012 fast-track project, GGCMI aims to continue to build the community of GGCM researchers through protocol-based research. This community will develop consistent methodologies, including simulation protocols and evaluation metrics, for intercomparison and improvement of gridded model applications. Core activities for the next three years include:

- Historical simulations for model evaluation
- Analysis of model sensitivity to carbon, temperature, water, and nitrogen (CTWN)
- Coordinated global impact assessments

## Membership

GGCMI currently includes more than 14 modeling groups from 8 countries and we actively encourage the participation of new model groups. For those groups that have experience running models regionally, GGCMI can provide the necessary data products and support to scale existing models to global simulations.

## Coordination

GGCMI is coordinated by an interdisciplinary team from **University of Chicago, US DOE Argonne National Laboratory, NASA GISS, and PIK.**

## Data and IT

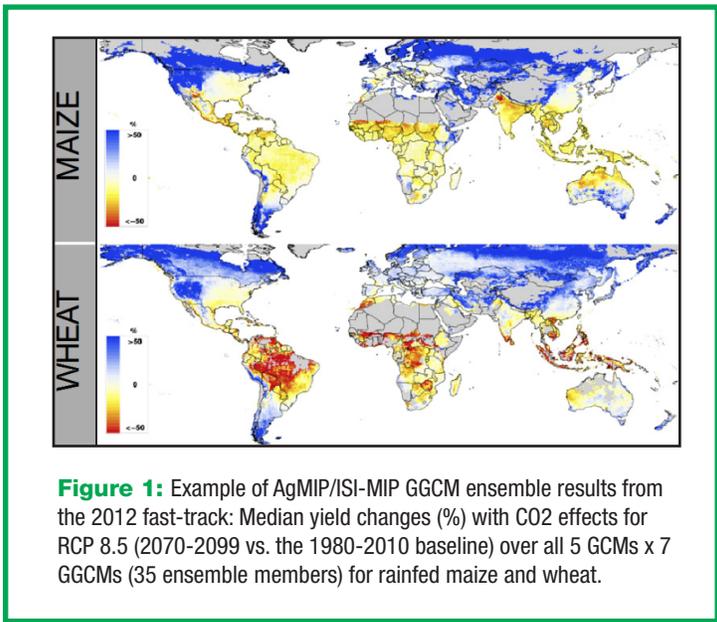
GGCMI maintains an archive of all associated data products and model outputs that provides:

- A key service to the climate impact community
- A tool for ongoing risk assessment and decision support
- A resource for collaborations within the GGCMI network

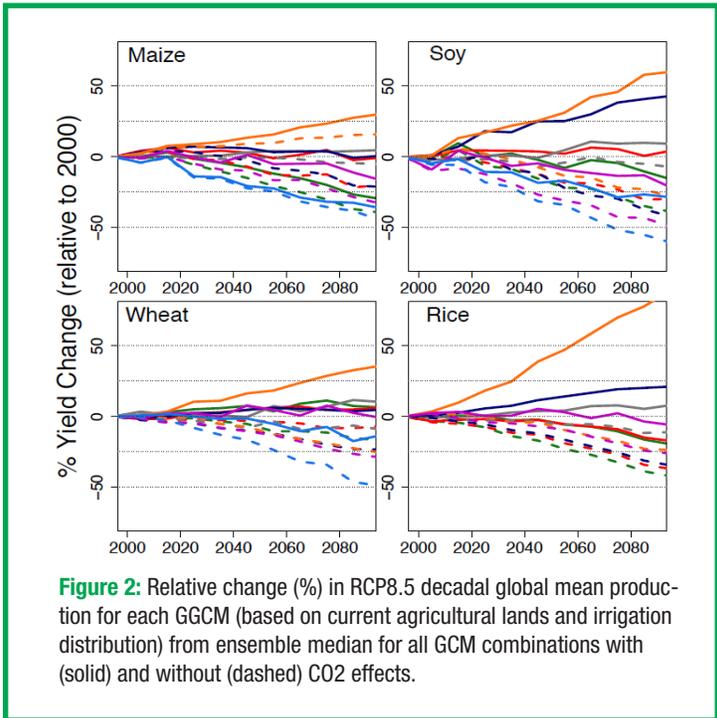
## Timeline

The current phase of GGCMI started in April of 2013 and will run for three years, with each of core activities including phases for planning, simulation, analysis, and publications.

To learn more about the GGCMI visit <http://www.agmip.org/ag-grid/ggcmi/> or contact **Joshua Elliott** and **Christoph Müller** at [ggcm@agmip.org](mailto:ggcm@agmip.org)



**Figure 1:** Example of AgMIP/ISI-MIP GGCM ensemble results from the 2012 fast-track: Median yield changes (%) with CO<sub>2</sub> effects for RCP 8.5 (2070-2099 vs. the 1980-2010 baseline) over all 5 GCMs x 7 GGCMs (35 ensemble members) for rainfed maize and wheat.



**Figure 2:** Relative change (%) in RCP8.5 decadal global mean production for each GGCM (based on current agricultural lands and irrigation distribution) from ensemble median for all GCM combinations with (solid) and without (dashed) CO<sub>2</sub> effects.