Agricultural Model Intercomparison and Improvement Project: Phase I Activities By a Global Community of Science

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~600 listserve members

1st Global Oct 2010

2nd Global Oct 2011

3rd Global Oct 2012

Sub-Saharan Africa #3

Latin America & Caribbean #2

Wheat #2

Rice

Maize

South Asia #3
AgMIP Objectives

- Incorporate state-of-the-art climate, crop/livestock, and agricultural economic model improvements into coordinated multi-model regional and global assessments of future climate impacts and adaptation and of other key aspects of food systems.

- Utilize multiple models, scenarios, locations, crops/livestock and participants to explore uncertainty and the impact of data and methodological choices.

- Collaborate with regional experts in agronomy, animal sciences, economics, and climate to build a strong basis for model applications, addressing key climate-related questions, adaptation priorities, and sustainable intensification.

- Improve scientific and adaptive capacity in modeling for major agricultural regions in the developing and developed world, with a focus on vulnerable regions.

- Improve agricultural models based on their intercomparison and evaluation using high-quality regional and global data and best scientific practices, and document improvements for use in integrated assessments.

- Develop modeling frameworks to facilitate data-sharing and to identify and evaluate promising adaptation technologies and policies and to prioritize strategies.
Track 1: Model Improvement and Intercomparison
Track 2: Climate Change Multi-Model Assessment

Cross-Cutting Themes
Uncertainty, Aggregation and Scaling, Representative Agricultural Pathways
Regional and Global Scales

AgMIP Sentinel Sites
Platinum
Gold
Silver

Rosenzweig et al., 2013 AgForMet
Teams, Linkages and Outcomes

Climate Team
Crop Modeling Team
Economics Team
Information Technology Team

Improvements and Intercomparisons
- Crop models
- Agricultural economic models
- Scenario construction
- Aggregation methodologies

Assessments
- Regional
- Global
- Crop-specific

Capacity Building and Decision Making
- Regional expertise
- Adaptation strategies
- Technology exchange

Links to CCAFS, Global Yield Gap Atlas, Global Futures, MACSUR, et al.

Rosenzweig et al., 2013
- Regional projects awarded on competitive basis
  - 15 countries in Sub-Saharan Africa
  - 5 countries in South Asia
  - 60 institutions and 120+ scientists.
- Methods for Integrated Regional Assessment (IRA) of climate change impacts on agriculture
  - Link climate, crop, and economics models in protocol approach to provide distribution of impacts across farm households
  - Create and disseminate handbook, climate scenarios guidebook, and tools to enable research teams
  - Train over 250 scientists
  - Engage regional stakeholders and national media
- Handbook Series on Climate Change and Agroecosystems (2012-2013)
  - AgMIP regional project partners chapter authors
  - Citable IPCC references
- Multiple crop model training
  - 10 scientists ‘trained as trainers’ for Africa, Asia
  - 50 scientists trained in multiple crop models and analytical methods
- TOA-MD model training
  - 25 socio-economic scientists from Africa and S Asia trained
Phase 1 Initiatives

Model Intercomparisons/Improvements and Regional/Global Assessments
What AgMIP has learned so far

- **Tremendous interest** in agricultural research community in interdisciplinary multi-model research and assessment
- **Median of crop model ensembles** reproduces observed yields
- ‘**Best Practices’ for model calibration essential** for rigorous results
- **Crop responses to CO₂, temperature, and water** remain key sources of uncertainty
- **Regional integrated assessments** are extending methods for projecting changes in farm systems
- **Global crop yield impacts** project greater vulnerability in lower latitudes and are vulnerable even in earlier decades; **model uncertainty now explicitly characterized**
- **Limitations in fresh water** for irrigation may compound climate impacts in many regions, while abundance could help in others.
- **Agricultural prices** projected to go up
- **Crop and economic model uncertainty** is large and generally greater than global climate model uncertainty, **depending on scales and methods**
Modus Operandi – Flexible structure to facilitate effective working relationships

MOUs between AgMIP leadership and cooperating programs and universities

Country-to-country MOUs facilitated by USDA-ARS Office of Int’l Programs, as needed
Phase 2 Major Directions

- **Track 1** -- Develop Next-Generation Decision Support Tools for Agriculture
  - Components
  - Systems

- **Track 2** – Coordinate Global and Regional Multi-Model Assessments
  - Climate Change
  - Sustainable Intensification
Coordinated Global and Regional Multi-Model Assessments

Regional Research Teams – Farming systems biophysical and socioeconomic models

GGCMI – High-resolution gridded crop modeling for gap-filling and aggregation in each region

Global Economics – Model analysis of world and regional prices

Production systems and regional economics respond to price changes
1. **Scientific Integrity**
   • AgMIP projects and activities must have a primary public-good purpose. AgMIP endorses the use and development of open-source/open-access models, data and methods.

2. **Conflict/Declaration of Interest/Bias**
   • AgMIP operates with transparency, conducts activities objectively, and is accountable to all stakeholders.

3. **Advocacy**
   • Advocacy of any kind by AgMIP is strictly limited to promotion of the use of the best science and methods for development, evaluation, and application of agricultural models.

4. **Transparency in Meetings and Publications**
   • All AgMIP meetings are open and publications attribute all intellectual contributions, including data.

5. **Participation in AgMIP Activities**
   • AgMIP methods and activities should facilitate transdisciplinary integration and collaboration.

6. **Resilient but flexible AgMIP Structure**
   • AgMIP should endeavor to retain a structure that increases recognition of its expertise and authority while retaining the greatest possible flexibility.
Upcoming Events

Workshops

– Latin America: Brazil, Sep 2013
– East Asia: China, Oct 2013

– Fourth Annual Global Workshop:
  New York, Oct 2013

– South Asia and Sub-Saharan Write-up Workshop: Sub-Saharan Africa, Jan 2014

– Pests and Disease Workshop, (in development)

– Climate Methods: ICTP, Trieste, (in development)

– Fifth Annual Global Workshop:
  Location tbd, 2014

For protocols, up-to-date events and news, and to join AgMIP listserve – www.agmip.org