The Agricultural Modeling Intercomparison and Improvement Project (AgMIP)

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A distributed climate-scenario simulation exercise for historical model intercomparison and future climate change conditions with participation of multiple crop and agricultural economics modeling groups around the world (www.agmip.org)

- Initiated by Cynthia Rosenzweig, Jim Jones and Jerry Hatfield
- Initially mainly crop models, i.e. physical process models of crop growth
- Jerry Nelson had foot in two camps and catalyzed the global economic modelers—they convened in October 2011 at the 2nd Annual AgMIP workshop, only 13 months ago!

- Other teams:
  - Climate Scenarios
  - Regional Agricultural Pathways—linking SSPs to sub-national economic models
  - IT
Global economic models

- Six general equilibrium models
  - AIM, NIES
  - ENVISAGE, FAO/World Bank
  - EPPA, MIT
  - FARM, USDA
  - GTEM, ABARES
  - MAGNET, LEI/Wageningen

- Four partial equilibrium models
  - GCAM, PNNL
  - GLOBIOM, IIASA
  - IMPACT, IFPRI
  - MAgPIE, PIK

- 1 Coordinator/aggregator (Martin von Lampe, OECD)
Key questions

- What is the future trend of agricultural prices?
  - No or slight decline, i.e. replicate most of the last century
  - Doubling

- How will agricultural production evolve?
  - Land expansion vs. yield growth and intensification

- What are the regional implications?
  - Under-nourishment
  - Food security

- How will climate change impact prices, land use, trade and under-nourishment?
Scenario design

- Harmonization
  - Population
  - GDP
  - Oil price
  - (Exogenous) yield growth
  - 2000+ through 2050

- Six basic scenarios
  - Reference (SSP2, OECD scenario for GDP)
  - SSP3 (fragmented world)
  - Four climate shocks—all 8.5 w/m² (coupled with SSP2)
    - 2 GCMs (Hadley and IPSL)
    - 2 Crop models with yield impacts (DSSAT and LPJ)
Index of world average producer prices (2005** = 1)

- Avg +/- 1 StdDev
- Median
- Max
- Min

* in brackets number of models that provided the respective data
** trended 2005, i.e. hypothetical in the absence of short-term shocks
Global land use in 2050

- AGR (8*)
- CRP (9)
- CR5 (8)
- WHT (8)
- CGR (8)
- RIC (8)
- OSD (8)
- SUG (8)

Index (2005** = 1)

* in brackets number of models that provided the respective data
** trended 2005, i.e. hypothetical in the absence of short-term shocks
Climate change and prices†

† RCP 8.5 relative to no climate impact scenario in 2050 (Hadley + DSSAT).
Next steps

- Final submission of results for current phase is done
- Special issue of Agricultural Economics (submission date 31st Jan)
  - Overview of comparison exercise and key findings
  - PE vs. GE, description and comparison of production technologies and technological change
  - Demand and food security
  - Agricultural impacts of climate change
  - Bioenergy
  - Land use changes
  - Agricultural trade