

The Agricultural Modeling Intercomparison and Improvement Project (AgMIP)



Dominique van der Mensbrugghe
Global Perspectives Studies Team
The Food and Agriculture Organization
of the United Nations (FAO)



Food and Agriculture
Organization of the
United Nations

for a world without hunger

Integrated Assessment Modeling Consortium (IAMC) 5th Annual Meeting
Foundation of Renswoude, Utrecht, the Netherlands
12-13 November 2012



Background

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

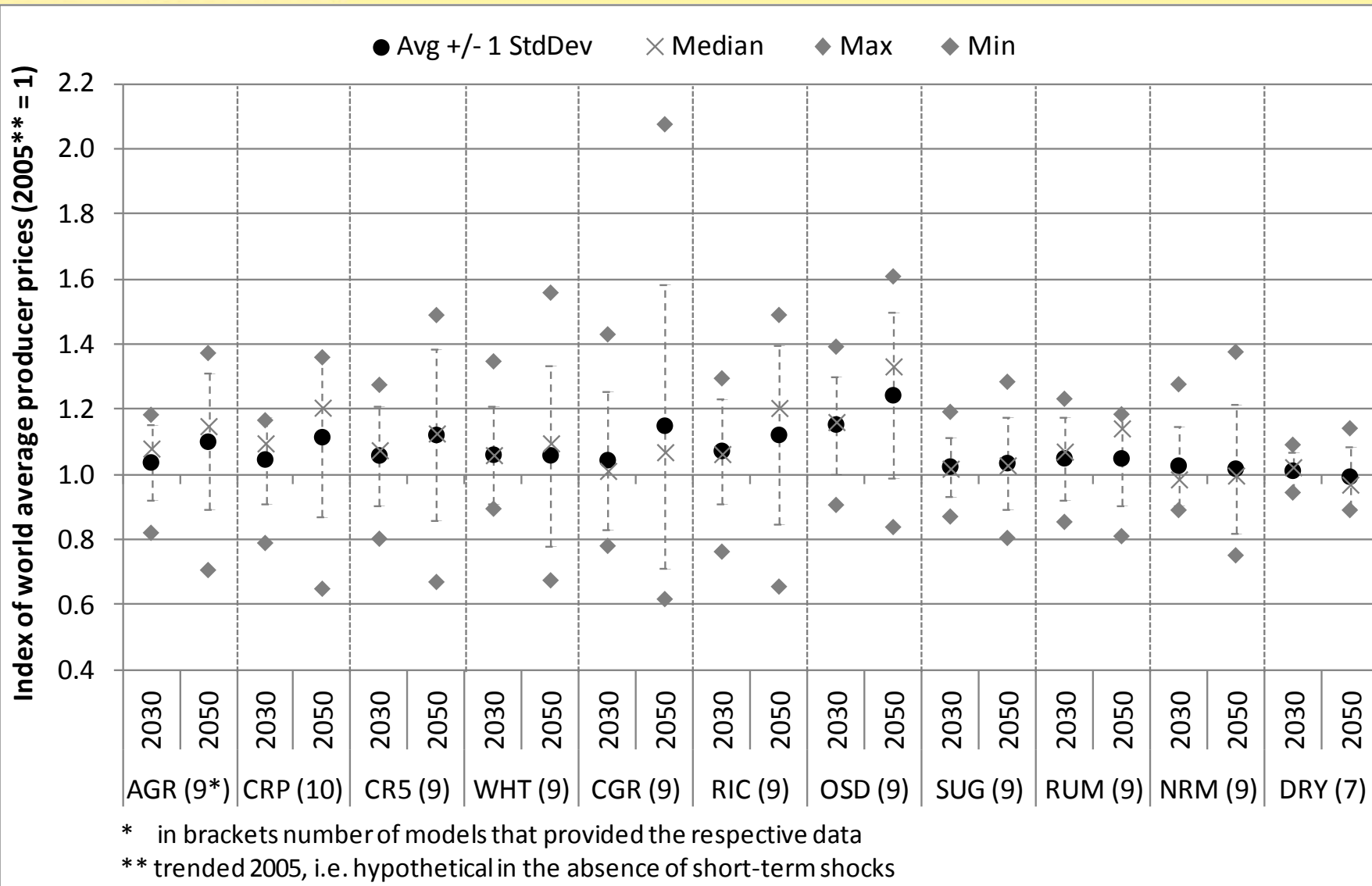
- **What is the future trend of agricultural prices?**
 - No or slight decline, i.e. replicate most of the last century
 - Doubling
- **How will agricultural production evolve?**
 - Land expansion vs. yield growth and intensification
- **What are the regional implications?**
 - Under-nourishment
 - Food security
- **How will climate change impact prices, land use, trade and under-nourishment?**



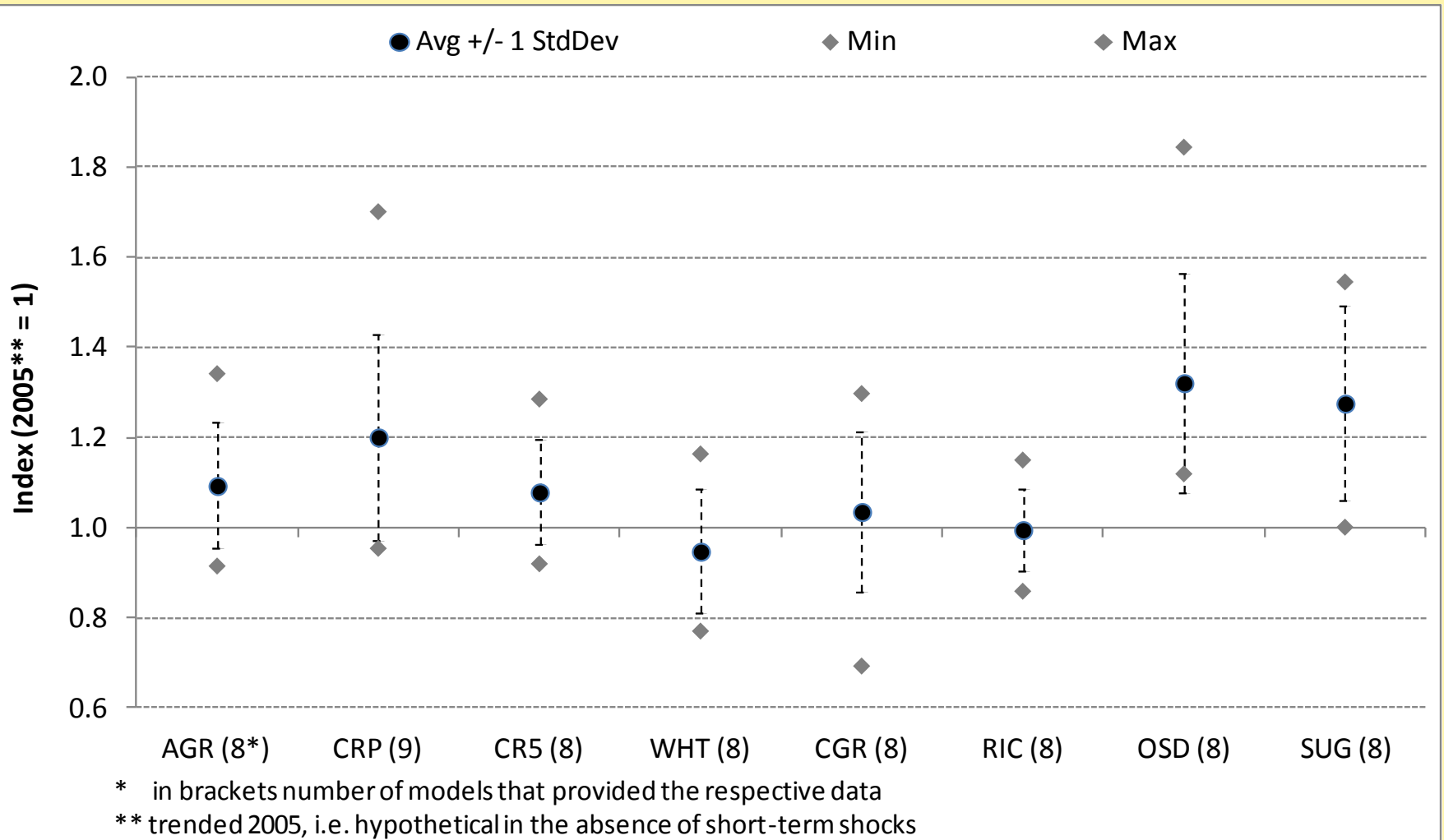
Scenario design

- **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)**

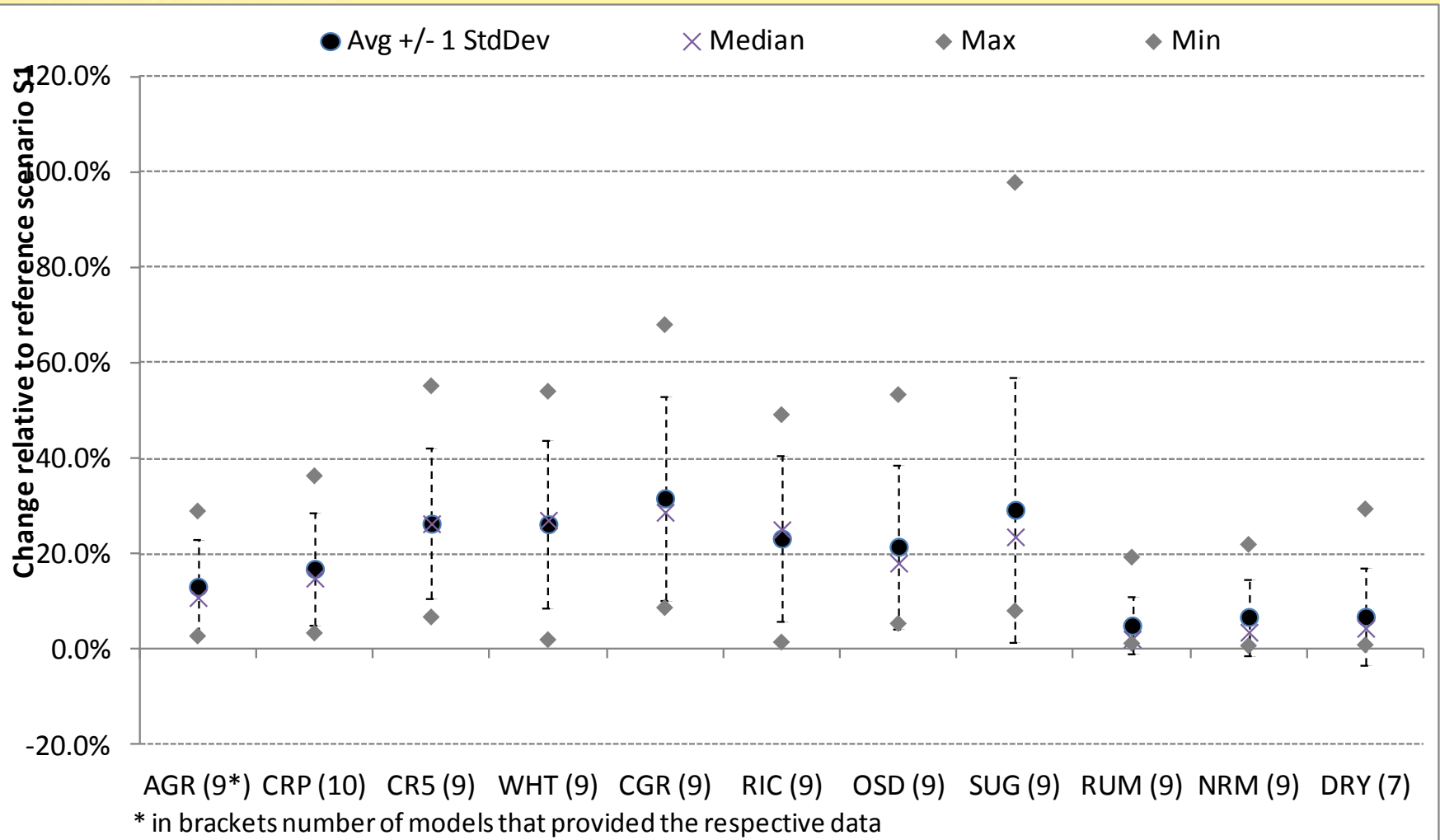
World price developments



Global land use in 2050



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**