Three years of collaboration in TradeM – **Agricultural markets and prices**

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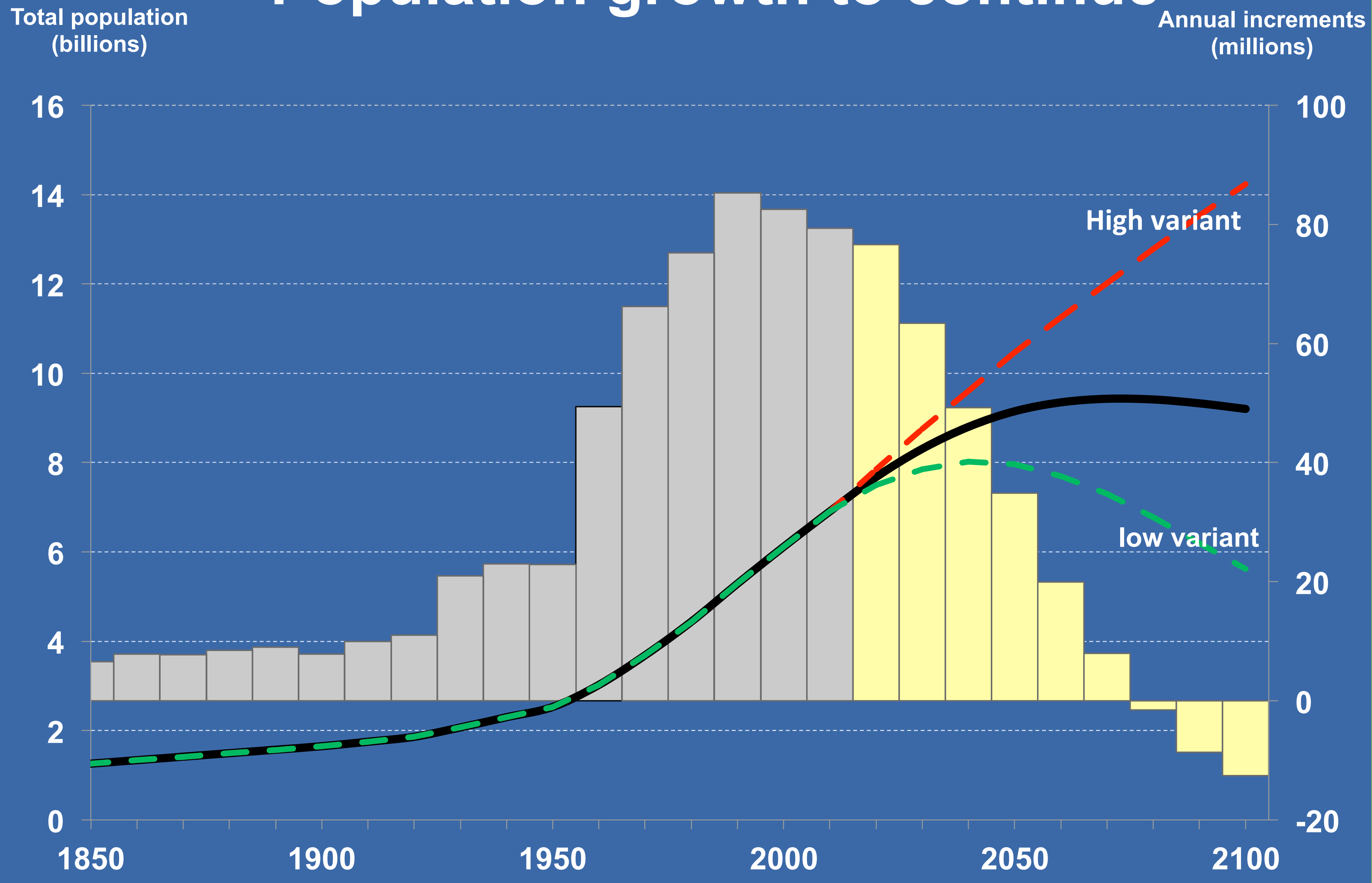
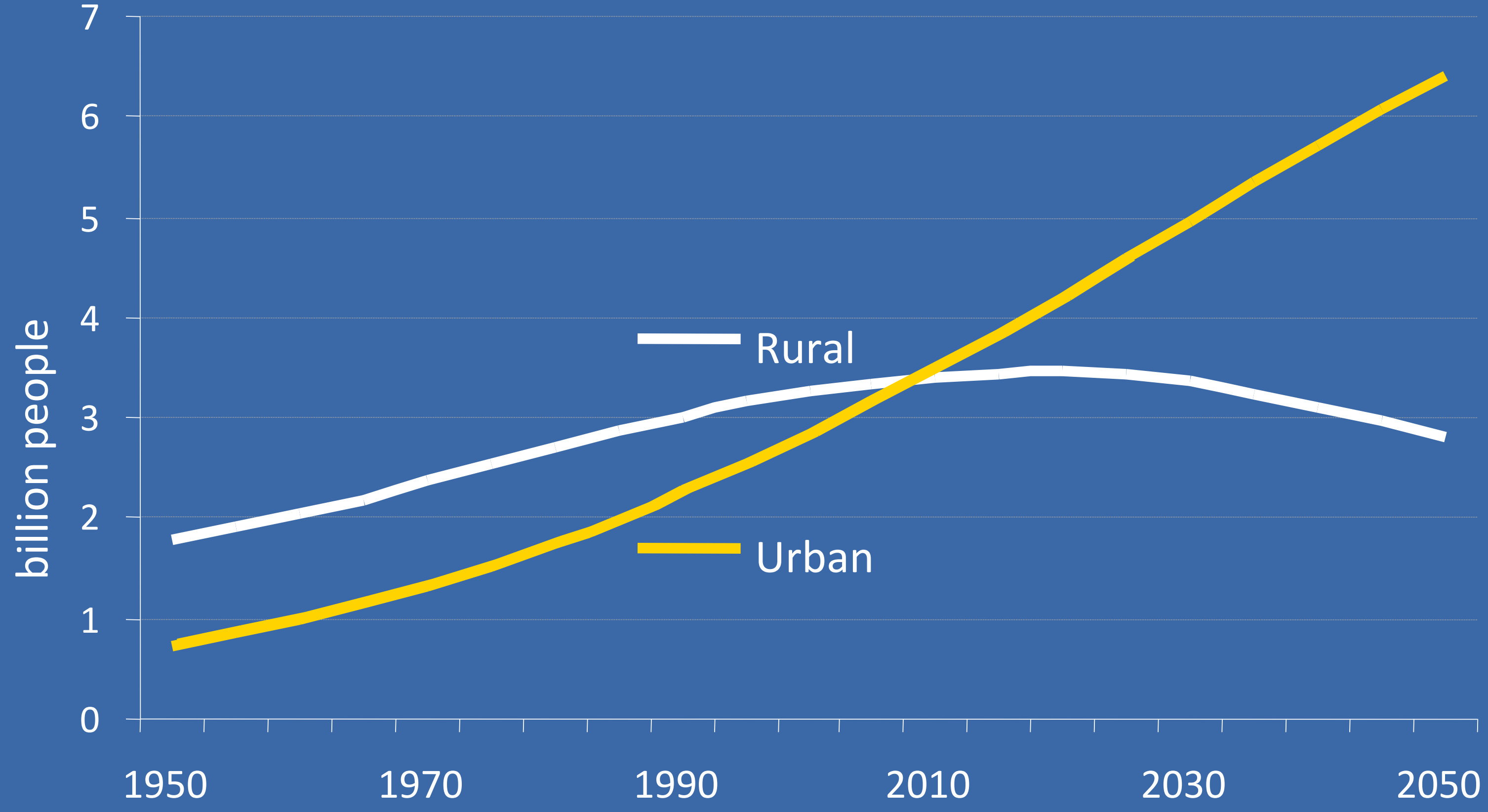
Work done and achievements

- ~ 50 researchers involved, mostly economists
- 2 scientific events per year
- Regional pilots through integrated assessments (South, Centre, East, North)
- Partners contributed to international model comparison (IIASA, PIK, Wageningen UR)
- special issue, papers, stakeholder events, network with new projects, improved models, …

Population growth to continue

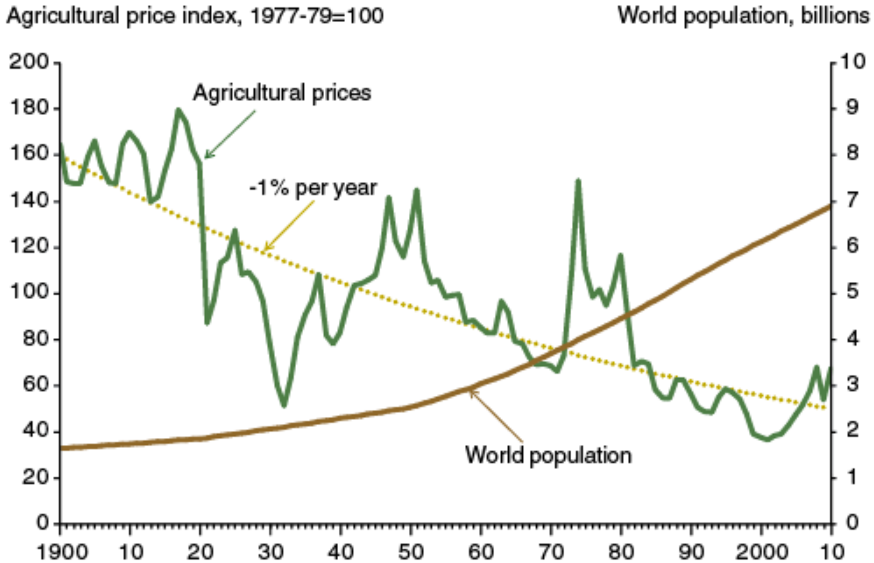


Urbanization to accelerate



Can we model long run trends?
Can we model short run departures from long run trends?

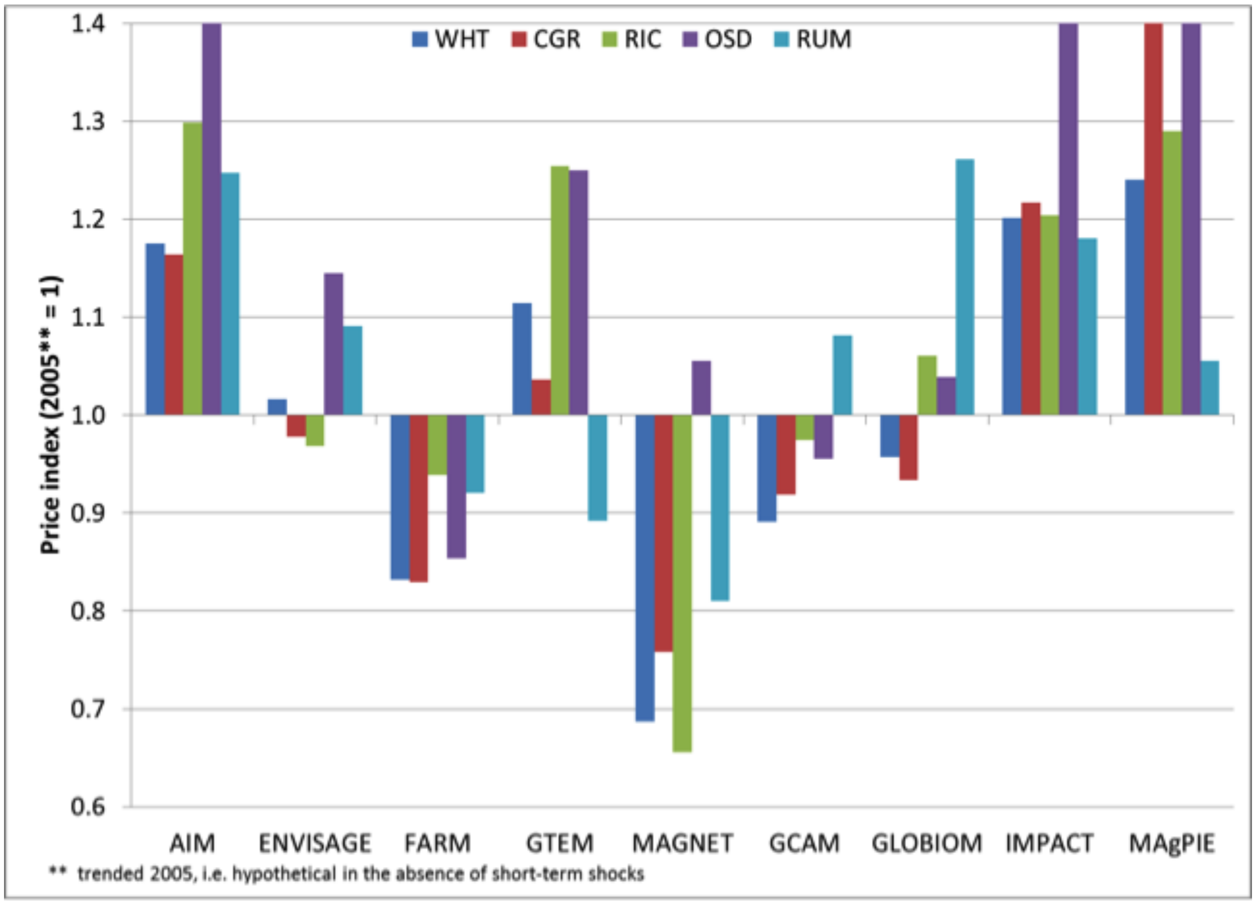
Real agricultural prices have fallen since 1900, even as world population growth accelerated



Source: USDA, Economic Research Service using Fuglie, Wang, and Ball (2012). Depicted in the chart is the Grilli-Yang agricultural price index adjusted for inflation by the U.S. Gross Domestic Product implicit price index. The Grilli-Yang price index is a composite of 18 crop and livestock prices, each weighted by its share of global agricultural trade (Pfaffenzeller et al., 2007). World population estimates are from the United Nations.

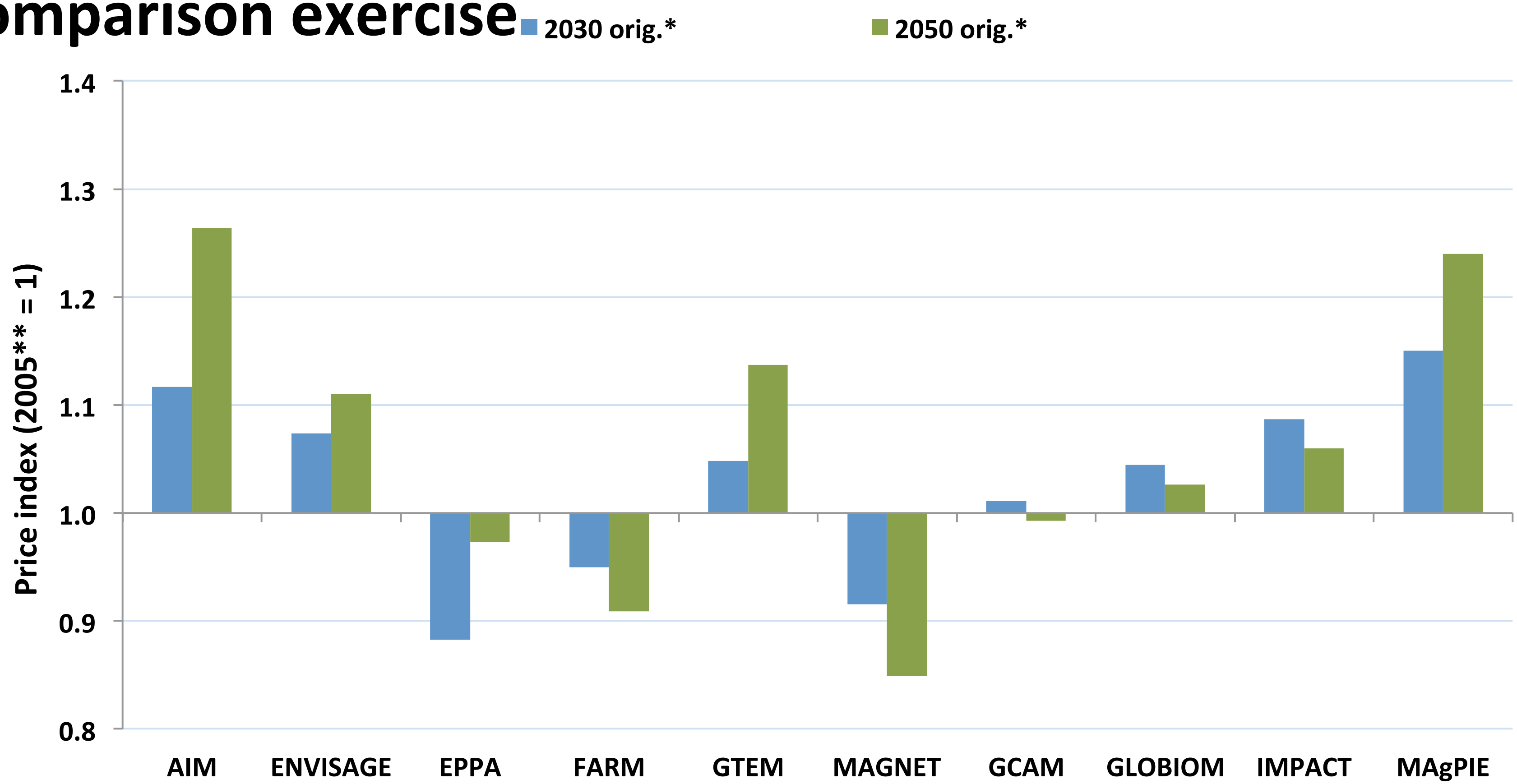
Source: IPCC AR-5, WGII, Ch 7.

Global Ag-Food System Projections - *Projected prices in 2050 without climate change*



AgMIP Global Agricultural Economic Model Intercomparison, Projected Changes in Commodity Prices in 2050 without Climate Change (source: Nelson et al. 2014). WHT = wheat, CGR = coarse grains, RIC = rice, OSD = oil seeds, RUM = ruminant animal products.

Still large differences in long-term price projections for agricultural aggregate, though sharp narrowing after comparison exercise



* original: relative to model-standard numéraire; rebased: relative to the price index for global GDP

** trended 2005, i.e. hypothetical in the absence of short-term shocks

Source: von Lampe et al (2014).

Further reading

Alexandratos, N. & J. Bruinsma (2012), "World Agriculture Towards 2030/2050: The 2012 Revision,", FAO, Rome. http://www.fao.org/docrep/016/ap106e/ap106e.pdf

Special issue of Agricultural Economics (2014): http://onlinelibrary.wiley.com/doi/10.1111/agec.2014.45.issue-1/issuetoc

- **von Lampe, Willenbockel et al.**, "Why do global long-term scenarios for agriculture differ? An overview of the AgMIP Global Economic Model Intercomparison"
- **Robinson, van Meijl, Willenbockel et al.**, "Comparing supply-side specifications in models of global agriculture and the food system"
- **Valin, Sands, van der Mensbrugghe et al.**, "The future of food demand: understanding differences in global economic models"
- **Schmitz, van Meijl et al.**, "Land-use change trajectories up to 2050: insights from a global agro-economic model comparison"
- **Müller and Robertson**, "Projecting future crop productivity for global economic modeling"
- **Nelson, van der Mensbrugghe et al.**, "Agriculture and climate change in global scenarios: why don't the models agree"
- **Lotze-Campen, von Lampe, Kyle et al.**, "Impacts of increased bioenergy demand on global food markets: an AgMIP economic model intercomparison"

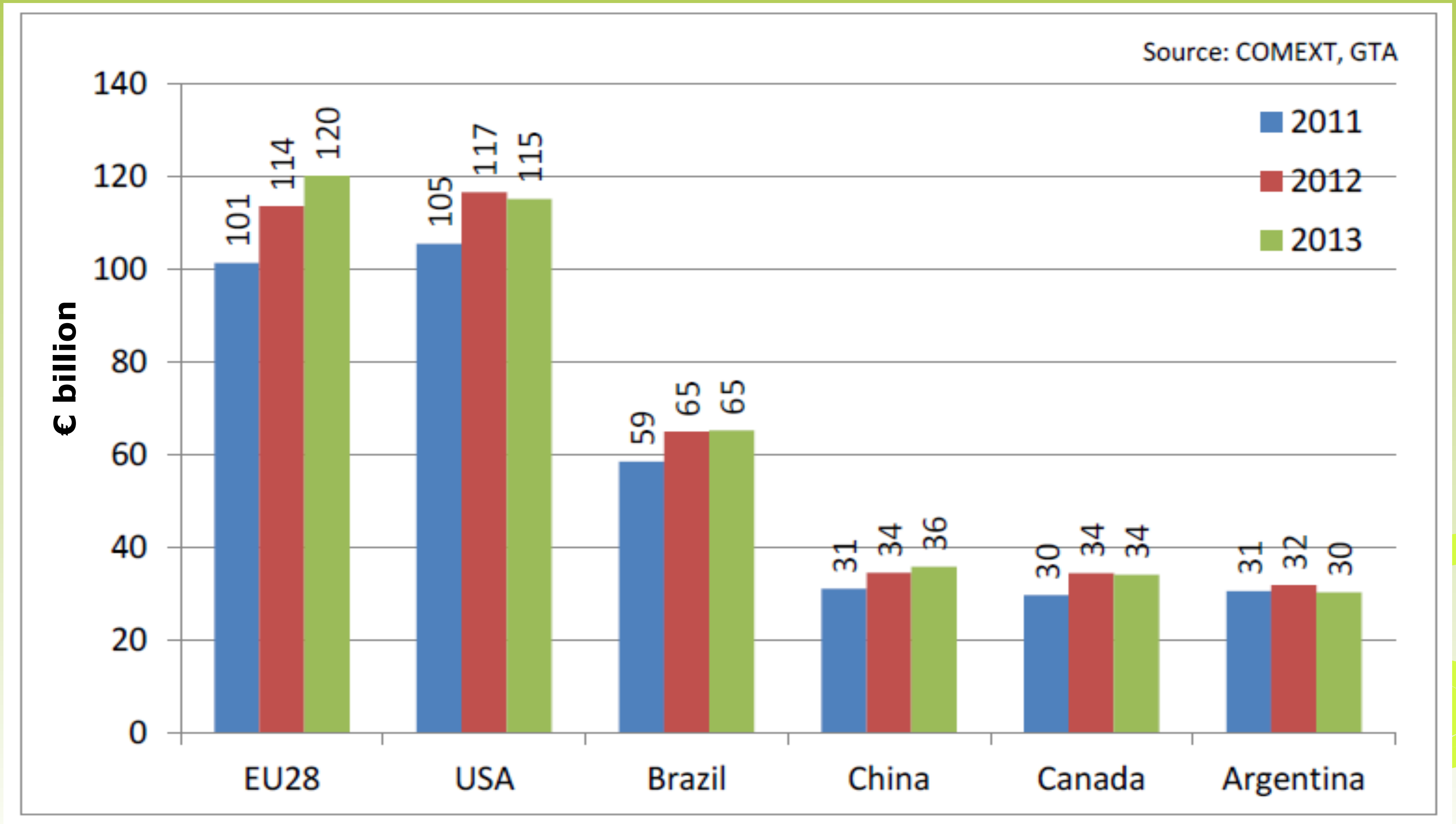
Proceedings of the National Academy of Sciences (PNAS) (2013): http://www.pnas.org/content/early/2013/12/12/1222465110.full.pdf+html

- **Nelson et al.**, "Climate change effects on agriculture: Economic responses to biophysical shocks"

GTAP Global Trade Analysis Project

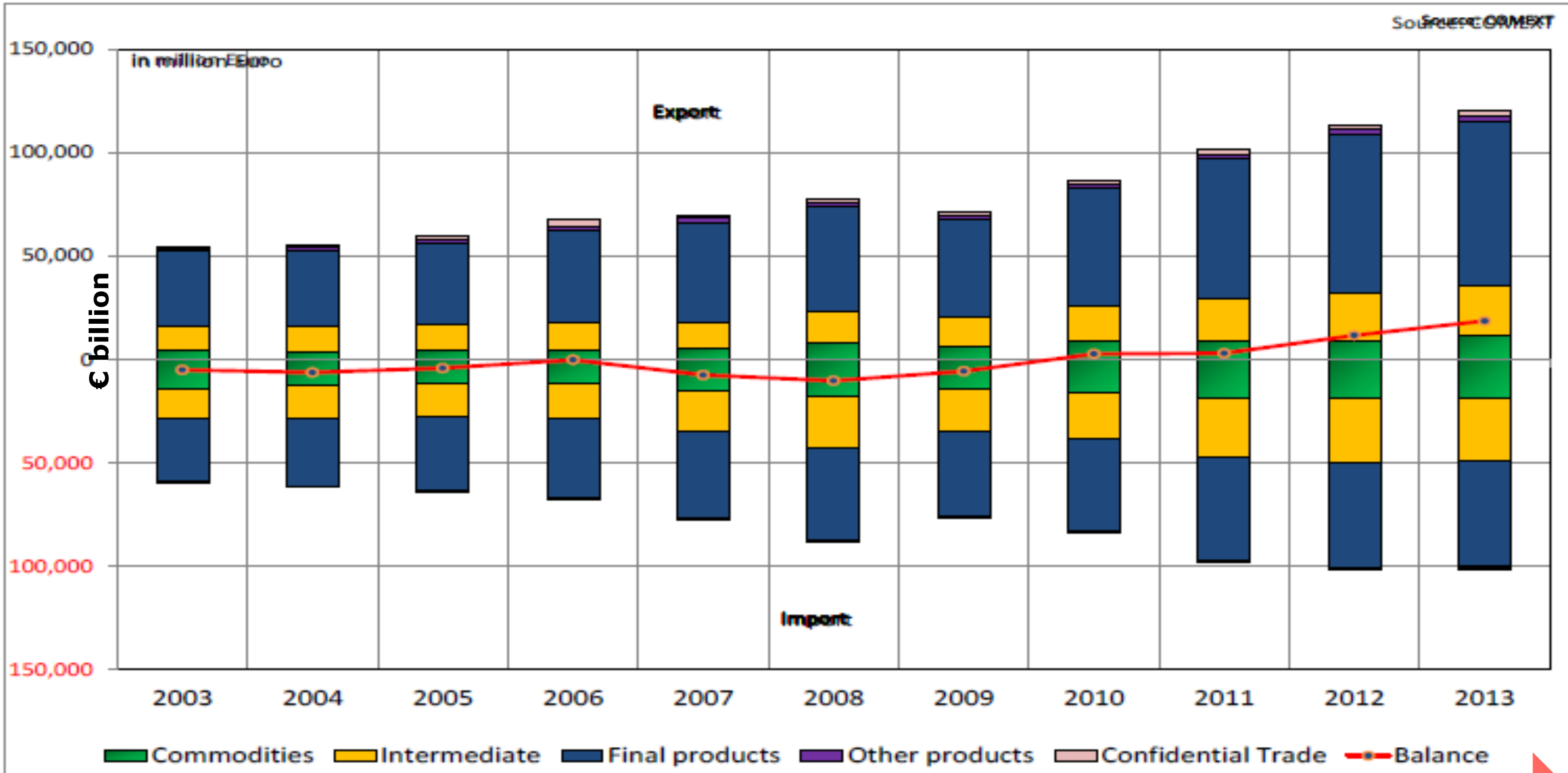
AgMIP The Agricultural Model Intercomparison and Improvement Project

Agriculture: global exports



Source: http://ec.europa.eu/agriculture/trade-analysis/map/2014-1_en.pdf

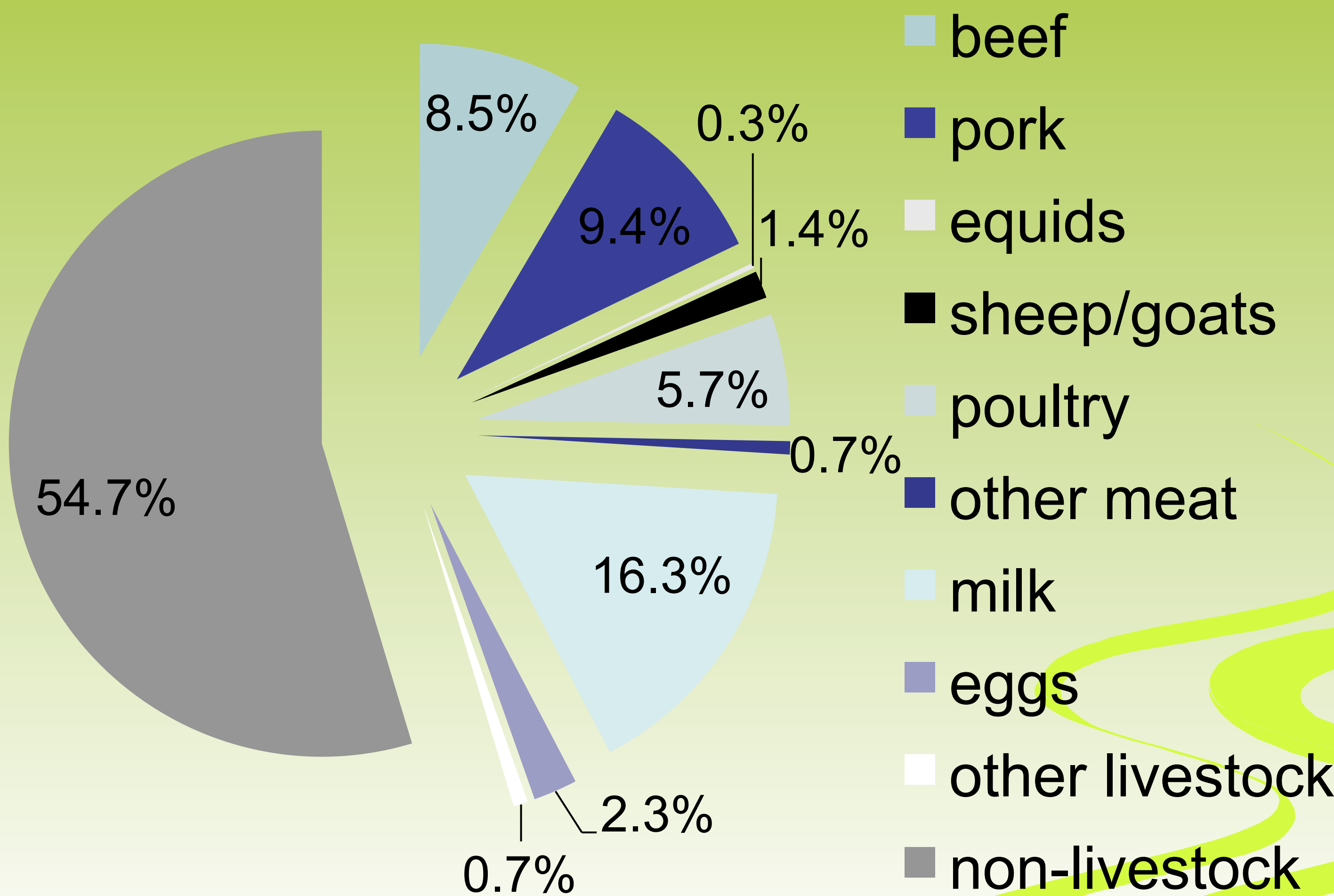
Agriculture in EU: trade



EU net exporter

Source: http://ec.europa.eu/agriculture/trade-analysis/map/2014-1_en.pdf

EU agr. output 2014: 380 bn €



Source: EUROSTAT – Economic Accounts of Agriculture; output of agricultural products

Economic and agronomic models

- Agronomic models of soils, crops and livestock mirror physical and biological processes, and farm management is given. Economic models are concerned with initiation and management of these processes
- Integration of agronomic and economic models are possible and fruitful, have been improved and will be improved further
- In general, economic responses tend to level down and smooth out the impacts from the agronomic models

Economist's wish-list for agronomic models

- Models that perform well in statistical tests with regard to experiments
- Models with relatively large time scale
- Models for main processes with a continuous scope of varieties and breeds
- Models that allow management to be varied.

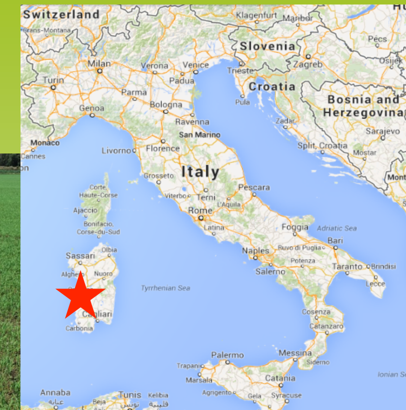
Northern Savo, Finland

- Increasing grass growth benefits dairy and beef
- Inter-annual volatility of grass yield increases. Managing grassland yield variation at the farm level – cost of drought risk may increase
- Positive market development and more flexible and encouraging policies needed for adaptation

Mostviertel - Austria

- Farmers may benefit from climate change in several regions of Austria; effects seem to be mixed for farmers specialised in crop production. Climate change induced intensification of land and benefits result from participation in agri-environmental programs
- Benefits of climate change (through productivity gains) will increase opportunity costs for participation in AEP. Payments may have to increase for such farmers

Sardinia, Italy



- Yields of forage crops are reduced from climate change, causing income drops for livestock farming. Rainfed hill sheep farming is under threat of abandonment.
- Irrigation costs increase in regions with collective water networks and volumetric water pricing.
- Higher temperatures during autumn and winter will provide income opportunities, but farmers need to understand the crop yield changes

Brandenburg, Germany

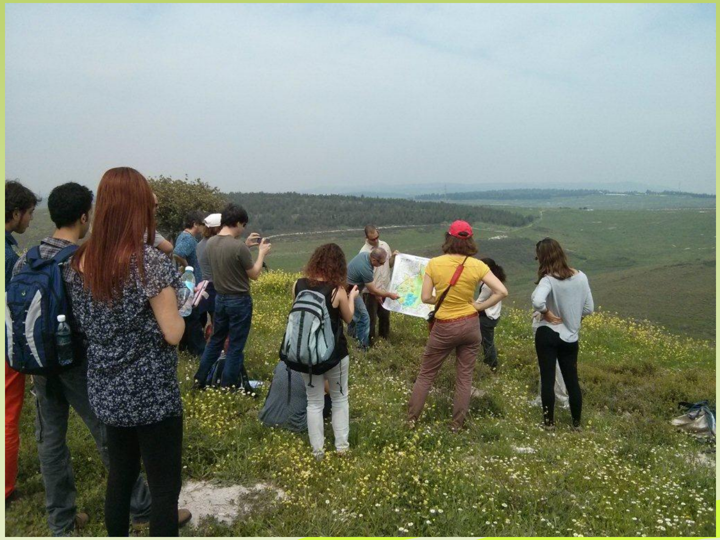
- Climate change may aggravate water stress for plant growth
- Rising prices for agricultural commodities can make irrigation profitable
- Irrigation may reduce seasonal variations of crop yield and may increase crop yields by up to 40% for maize and up to 20 % for wheat and sugar beat

Training on Integrated Impact Assessment

- Topics: Policy Impact Assessment, identification of policy instruments, goals and scope, Methods and tools for participatory approach, user interaction

Training on Integrated Impact Assessment

- Training for Master & PhD Students conducted at University of Haifa, March 2014: „Sustainability assessment of land use scenarios: what needs to be considered and how can it be done?" A Practical Policy Example Biosphere Reserve Ramat Menashe



Concluding remarks

- Some farmers may claim that climate change adaptation is easy compared to the difficulties caused by policies
- Action based on weather observations only, is insufficient for farmers to respond to climate change. Researchers need support from farmers in understanding the responses in practice.
- Policies might be too slow to respond to needs for change in agriculture.

Concluding remarks

- Winners and losers seem to be observed everywhere. The impacts of climate change is heterogeneous among farm types and regions
- Effects beyond 2050 remain largely unclear, mainly because the effects of extreme events are not considered
- Variability of yields is important to farm incomes, but most studies only consider average changes
- Farmers are ready to design their site-specific adaptation response providing that new knowledge and learning spaces are available. A learning process based on integrated models, assessment of short- and long-term effects, is needed for farmers to adapt to climate change, price fluctuations and policy change.