

International Agricultural Trade at the Centennial: The Need for New Database Infrastructure

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Historical emphasis on agricultural trade policy is reflected in these papers

- **Schmitz: interactions between domestic and border policies in agricultural markets**
- **Anderson: measurement of protection and predicting its future evolution in the absence of policy discipline**
- **Josling and Tangermann: legal and institutional aspects of multilateral trade negotiations**
- **Databases have evolved to support these types of studies: OECD CSE/PSE data base; GTAP data base; MAcMap, Anderson and Valenzuela time series data on protection, etc.**

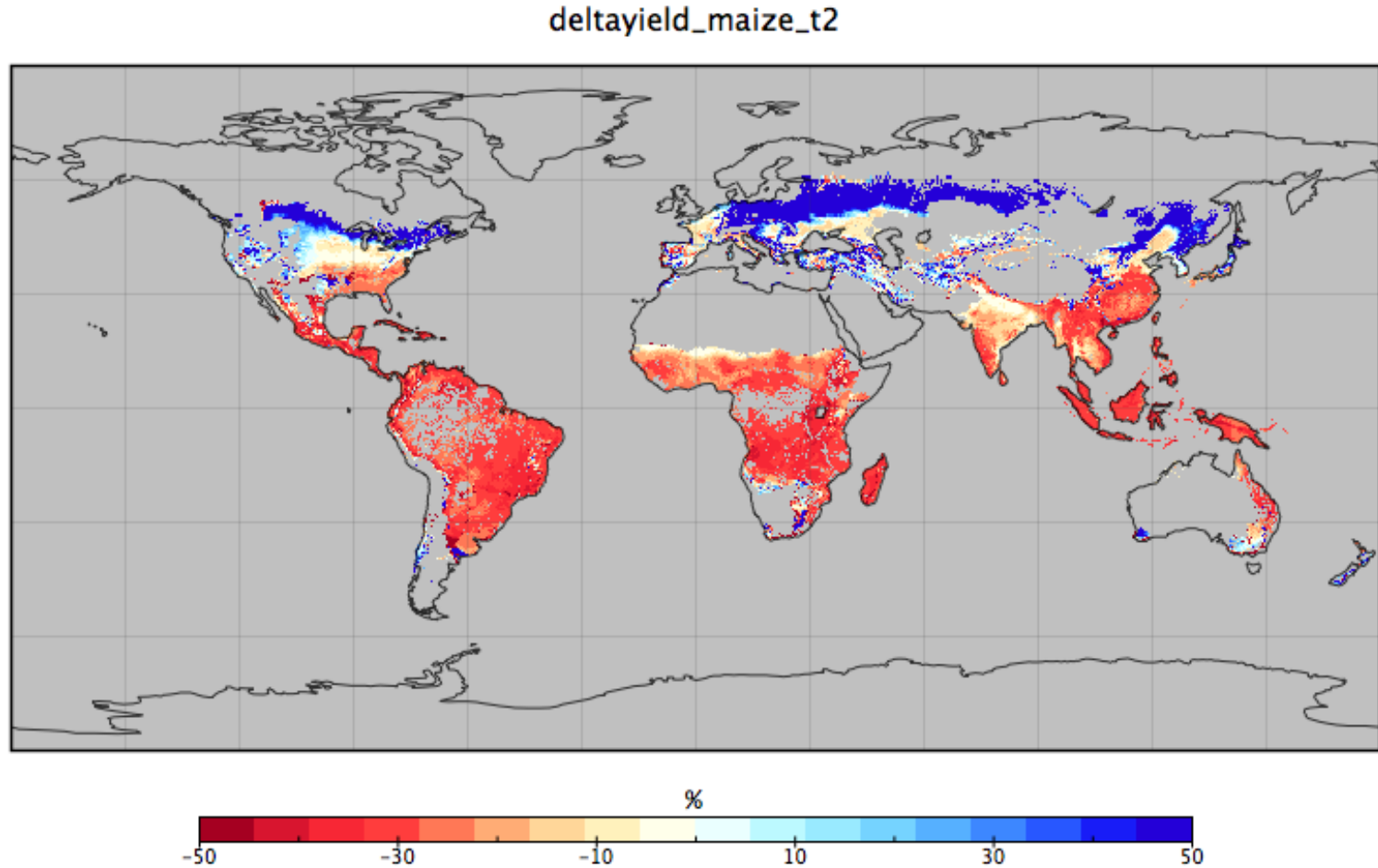
Over next century, issues will change, dictating entirely new database needs

- *Role of individual firms in trade* (see Andy Bernard et al.)
 - Bulk of international trade undertaken by largest firms
 - Exporting firms are more productive
 - Fixed costs play a key role in determination of who trades: these are determined by institutions as well as policies; lowering fixed costs boosts trade
 - Entry/exit of firms; expansion of exports affect economy-wide productivity and economic growth
- To study these factors, need firm level data: Bernard et al link census data with customs data; this is a totally different game!

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- *Climate change looming as global issue of the 21st century; agriculture is central to this debate as:*
 - **Sector most exposed to climate impacts**
 - **Key mediator between impacts and poverty**
 - **A large source of mitigation potential: 30% GHG emissions, but 50% abatement potential**
- **International trade will be critical to dealing with the climate impacts in agriculture, and it will provide an important constraint on mitigation potential (leakage)**
- **Studying these links requires new data and methods**

Impact of temperature change on maize yields ($T = + 2^{\circ}\text{C}$) as predicted by the AgroPegasus crop simulation model (allowing changes in planting/harvesting dates)

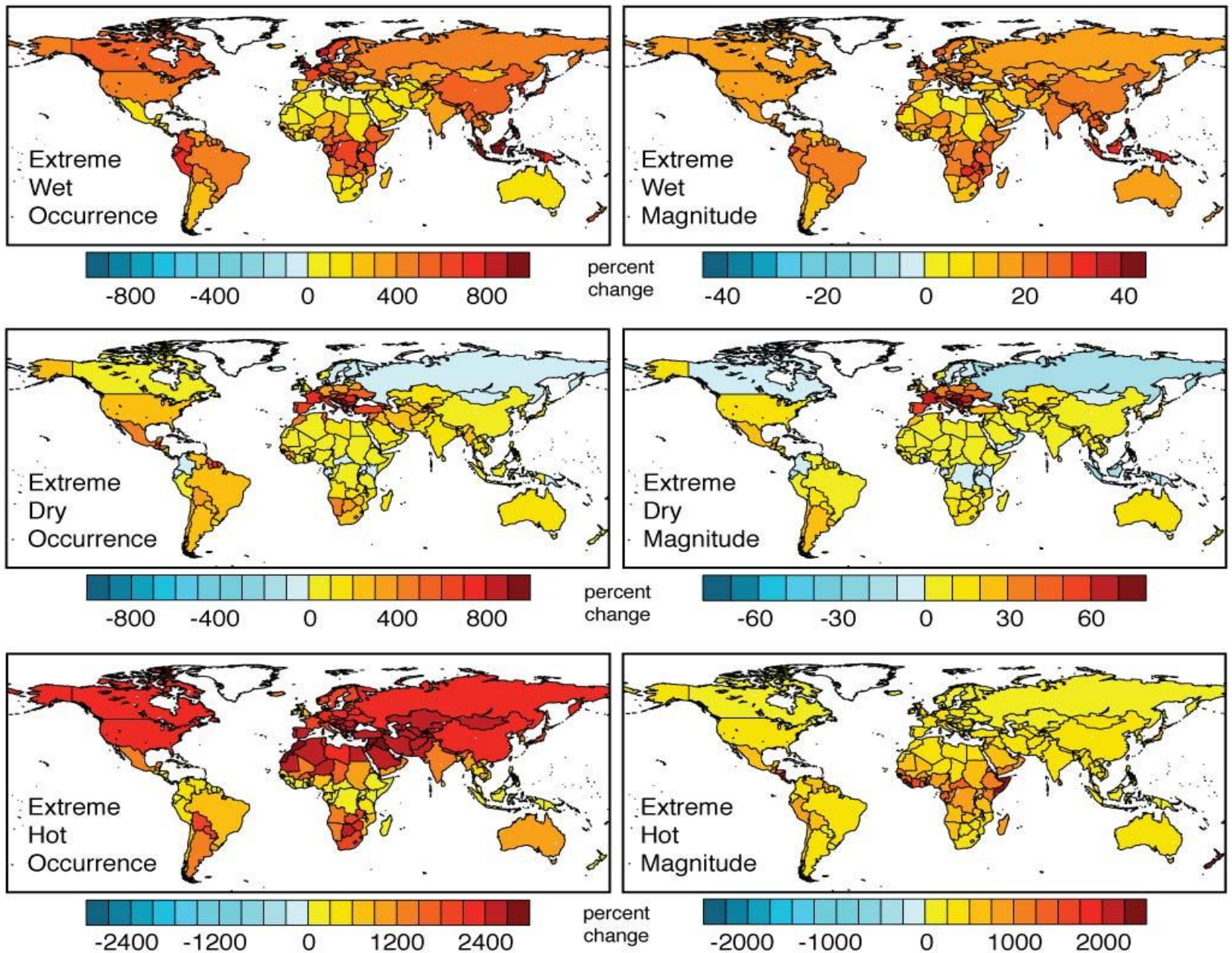


Trade is required to mediate between these diverse impacts

Source: Deryng, D., W. J. Sacks, and N. Ramankutty. 2009. Simulating the effects of climate and agricultural management practices on global crop yield. McGill University.

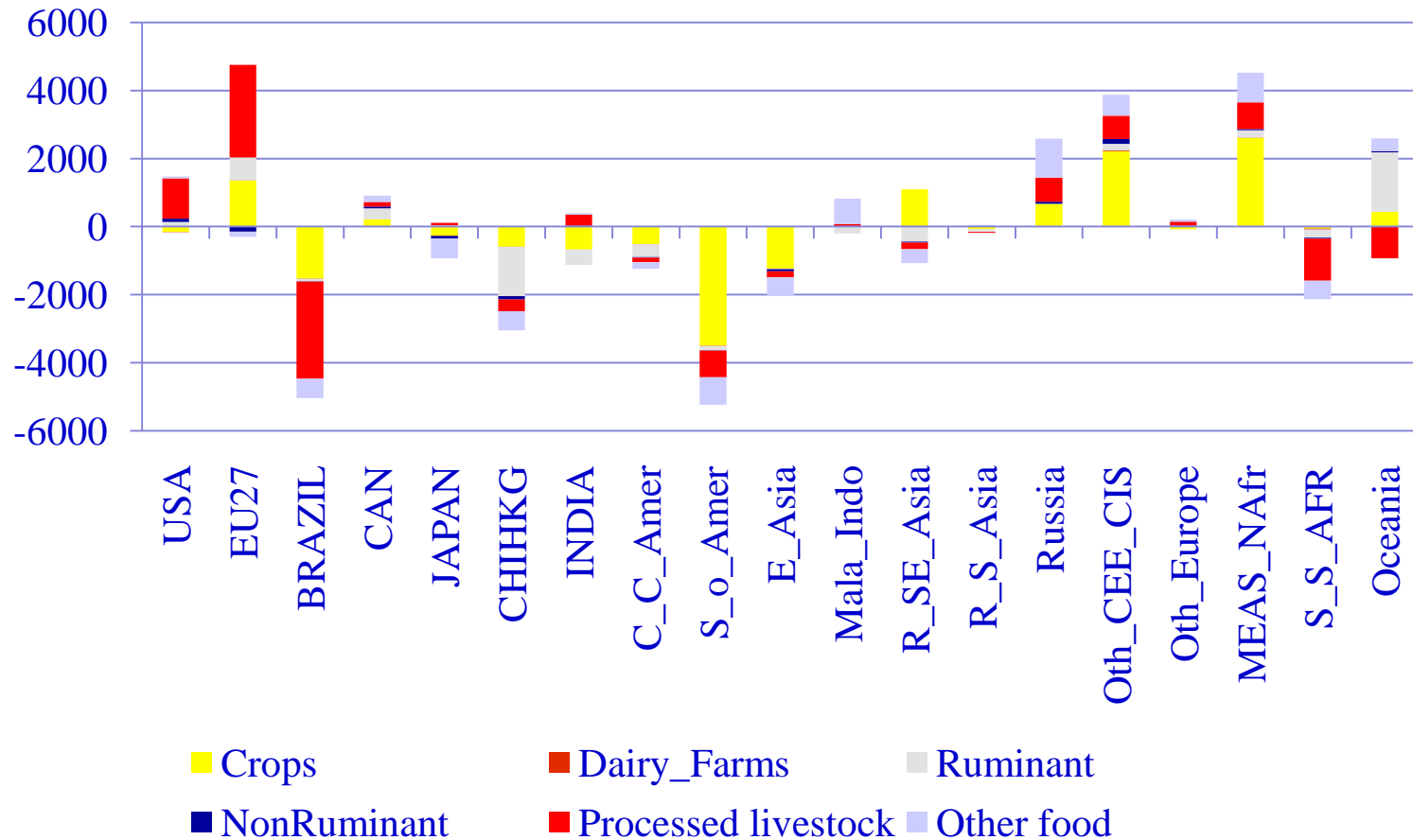
Climate-related risk expected to increase

- In addition to long run changes in mean temperature and precipitation, variability is also expected to change, indeed climate volatility is already changing (Easterling et al, 2000)
- Extreme outcomes may be particularly important for agriculture (White et al, 2006; Mendelsohn et al, 2007)
- Trade is a critical element of any insurance strategy against such extreme events (e.g., Donaldson's study of RRs and famine in India)
- Inter-annual climate volatility is expected to increase over the next century (see next slide):
 - Greater frequency of extreme events
 - Greater intensity of extreme events



Source: Ahmed, Hertel and Diffenbaugh, Environmental Research Letters, 2009.

Global carbon tax (\$28/tCO₂e) alters agricultural trade: Changes in agric trade balance by sector and region in the face of climate mitigation policy (2001 \$US mill)



Source: Golub, Henderson, Hertel, Rose and Sohngen, Center for Global Trade Analysis, Purdue (2010).

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- **Climate change impacts and mitigation policy and impacts analysis require different data:**
 - **Explicitly spatial data on land and water resources and use as well as climate**
 - **Integrate with data on commodity markets: global supply and demand for agricultural products and international trade**
- **Such a data base is not currently publicly available; constructing it on your own requires years and \$\$\$,\$\$\$**
- **AAEA should champion such a public good**