FOTC 2014 Fertilizer Outlook & Technology Conference

MAKING THE RIGHT MOVES

OUR CHALLENGES. OUR IMAGE. OUR FUTURE

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Trade and Institutions
International Food Policy Research Institute

The Challenge of Feeding the World

The Fertilizer Institute
Nourish, Replenish, Grow

Fertilizer Industry Round Table

"The Challenge of Feeding the World"

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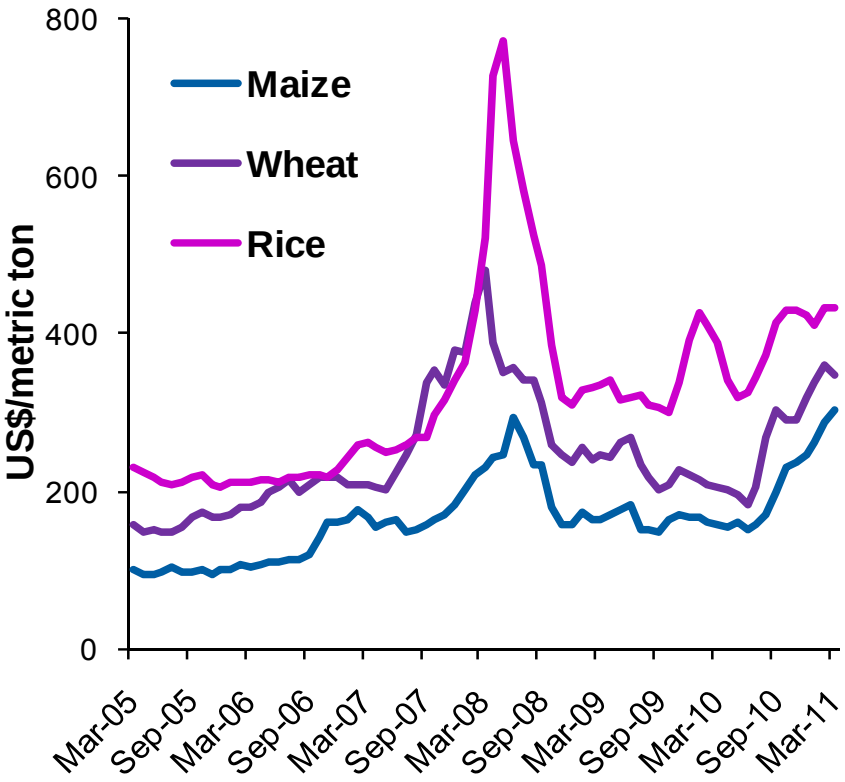
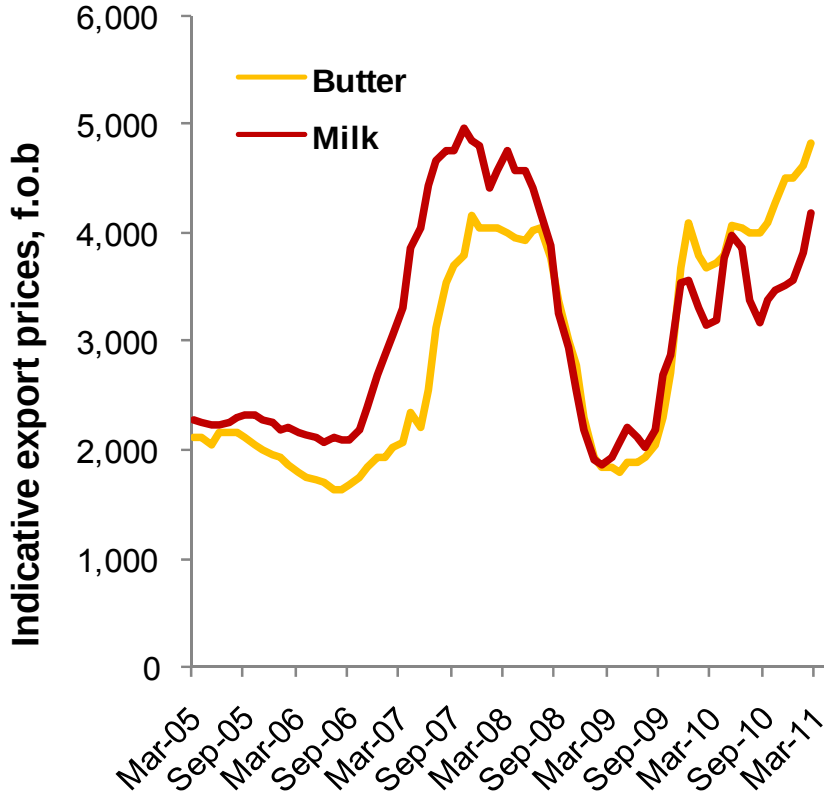
What we learned from 2007-08?

Evolution of prices



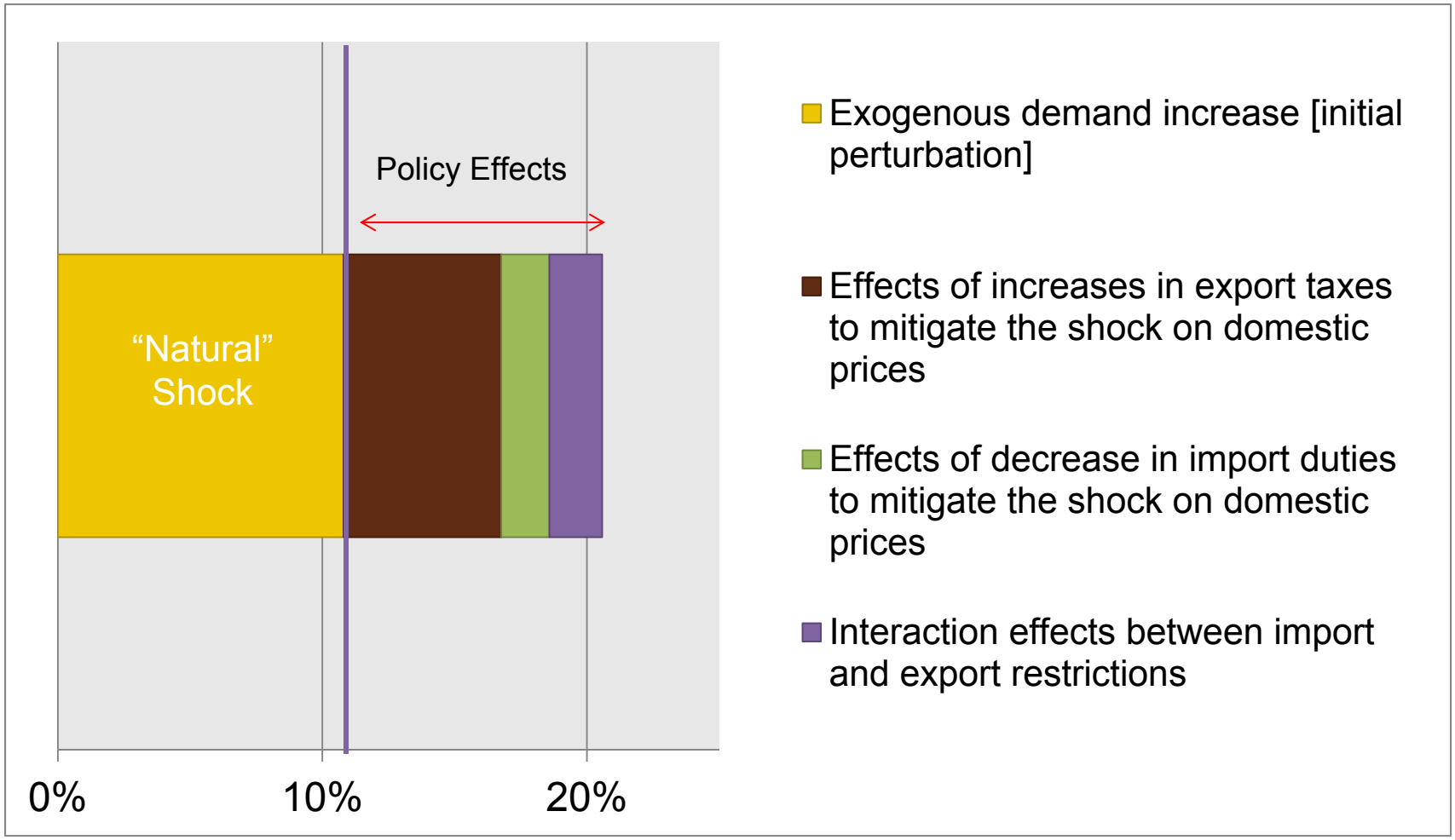


Source: FAO (Food and Agriculture Organization of the United Nations). 2011. International commodity prices database. Available at www.fao.org/es/esc/prices/PricesServlet.jsp?lang=en. Maize = US No.2, Yellow, U.S. Gulf; Wheat = US No.2, Hard Red Winter ord. prot, US f.o.b. Gulf; Rice = White Broken, Thai A1 Super, f.o.b Bangkok; Butter = Oceania, indicative export prices, f.o.b.; and Milk = Whole Milk Powder, Oceania, indicative export prices, f.o.b.

What was the response

- Export bans and restrictions
- Policies to stabilize prices
- New initiatives on reserves
- Food subsidies
- Price controls on strategic staples or on trader margins
- Input subsidies

Effects on world prices of trade policy reactions for selected countries



Source: Bouet and Laborde, 2009. MIRAGE simulations

What was the proposed options in 2008-09

(1) ER = Emergency Reserve, Von Braun & Torero (2009 a,b)

(2) ICGR= Internationally coordinated grain reserves, Linn (2008)

(3) RR = Regional Reserves as the one of ASEAN

(4) CR = Country level reserves, this could imply significant relative costs at the country level, significant distortions and little effect on volatility given low effect over international markets.

(5) VR= Virtual Reserves, Von Braun & Torero (2009)

(6) DFIF=Diversion from industrial and animal feed uses, Wright 2009

(7) IS+IFA= Better information on Storage and International Food Agency (Wright 2009)

(8) IGCA= International Grain Clearance Arrangement, Sarris (2009)

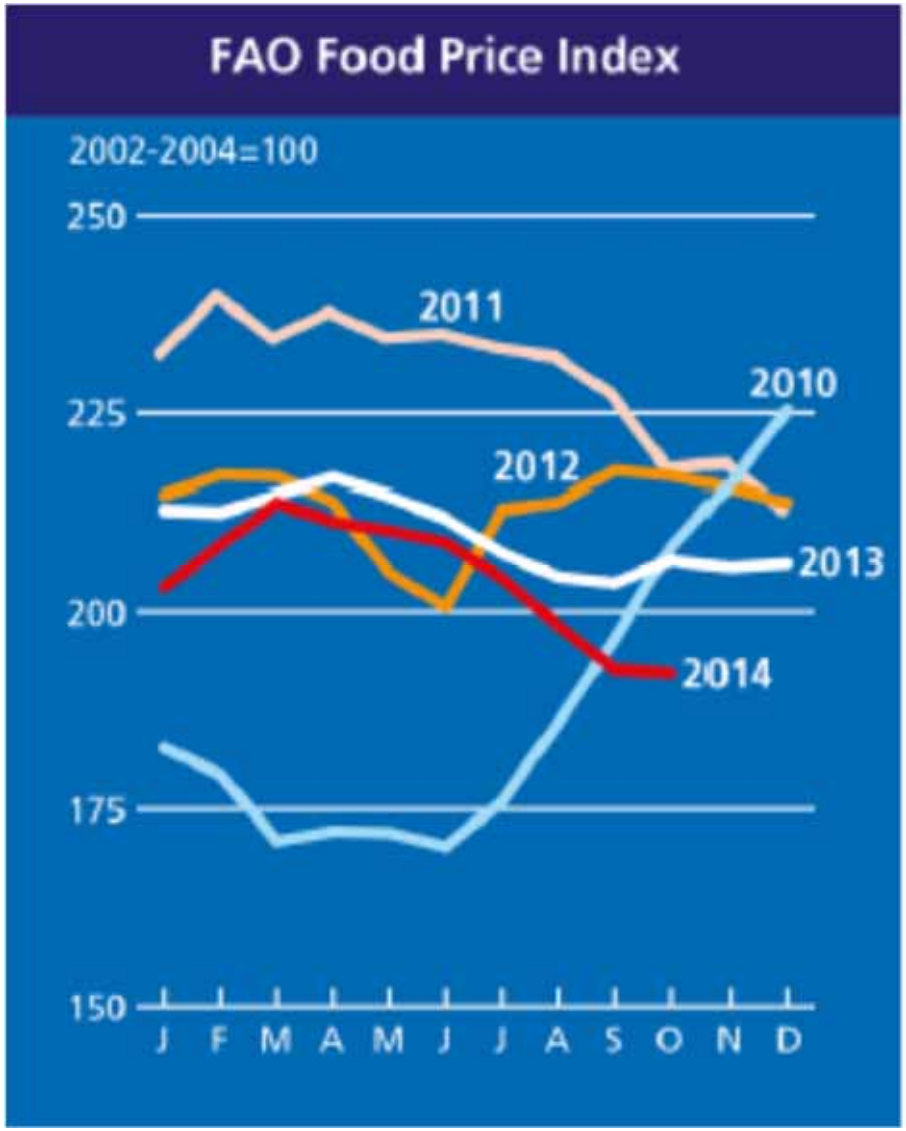
(9) FIFF= Food Import Financing Facility, Sarris (2009).

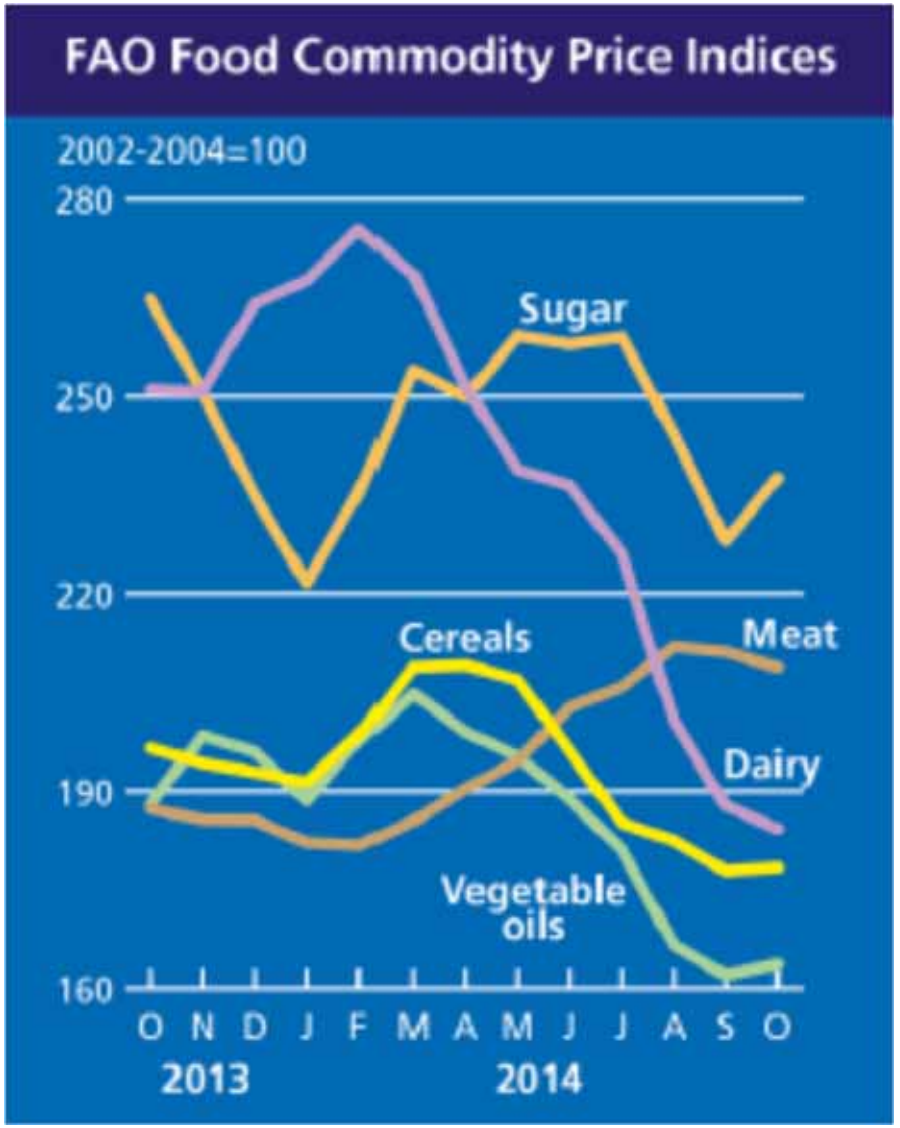
(10) EWM=Early Warning mechanism

(11) TF= Trade Facilitation - Wright (2009) and Lin (2008)

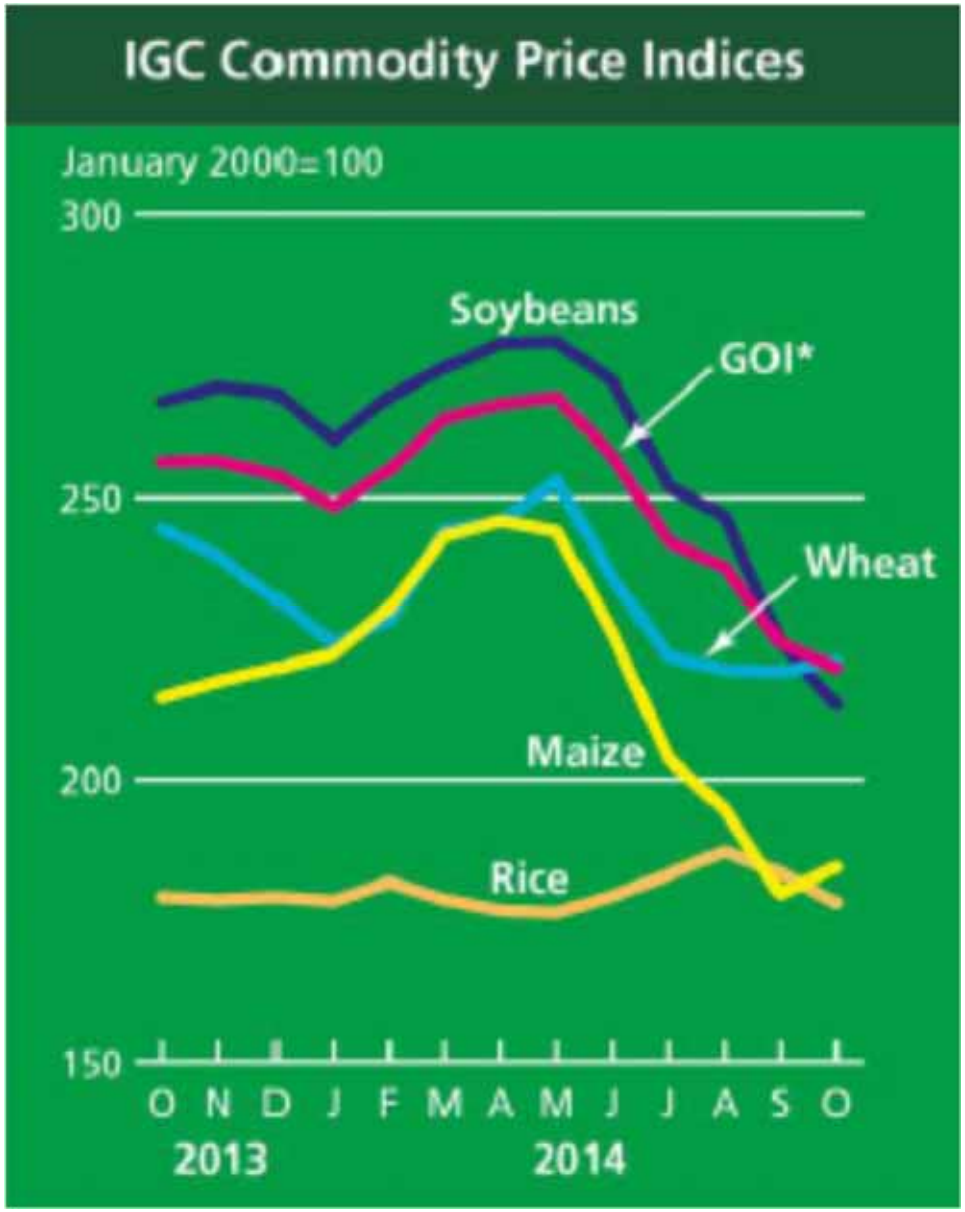
How are we today?

Price Levels

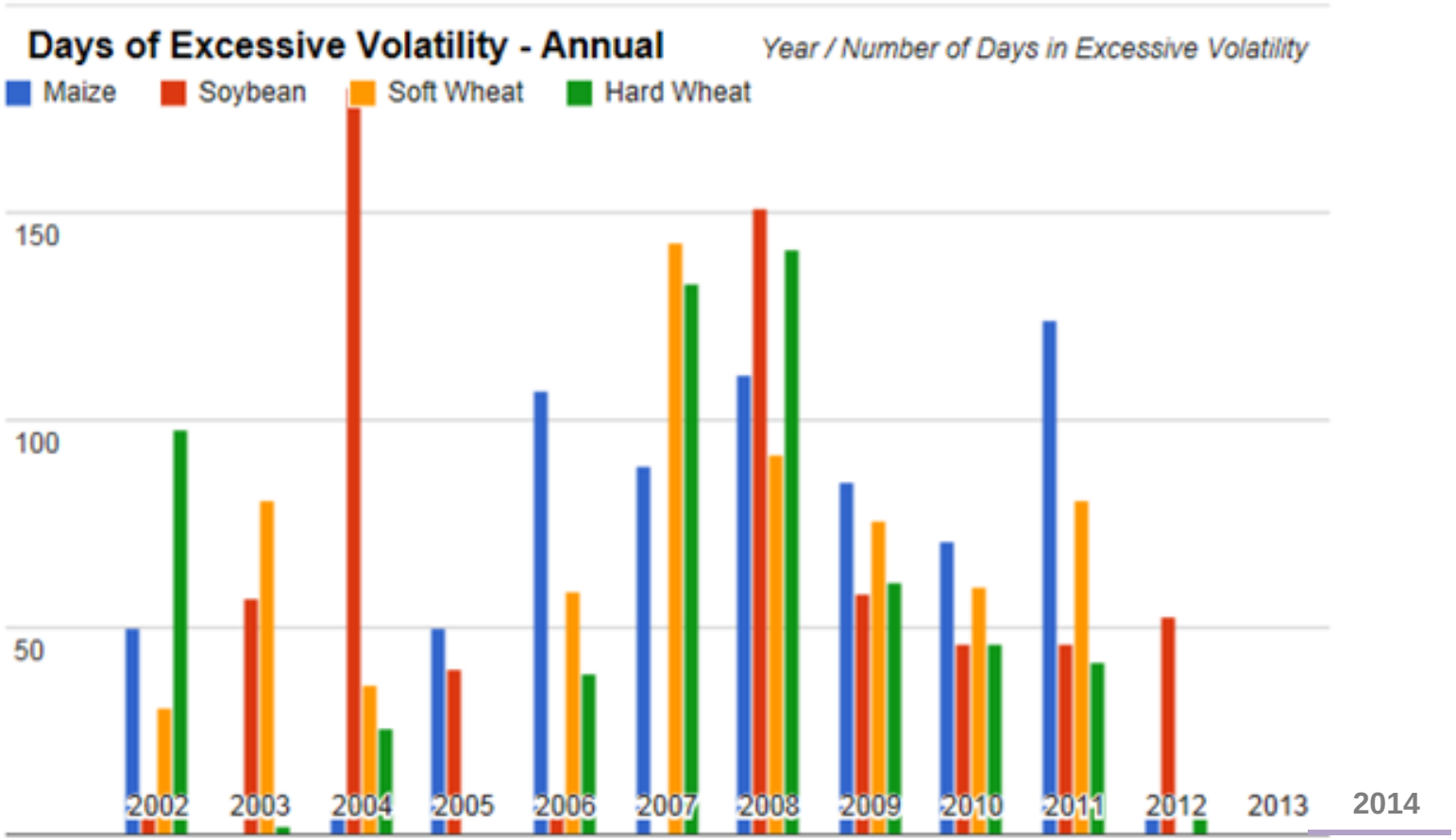




Price Levels



Periods of Excessive Volatility

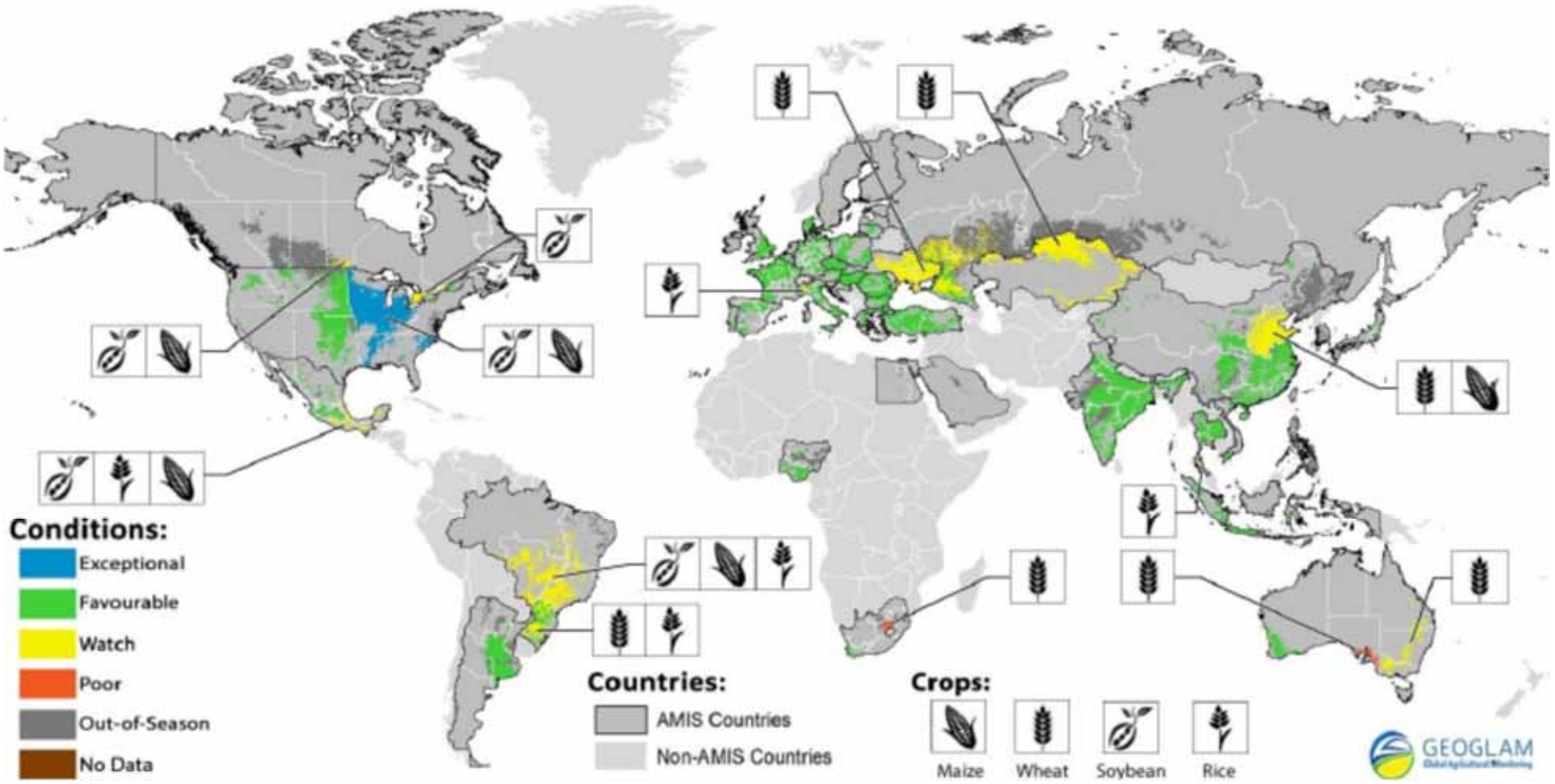


Please note Days of Excessive volatility for 2014 are through March 2014

Note: This figure shows the results of a model of the dynamic evolution of daily returns based on historical data going back to 1954 (known as the Nonparametric Extreme Quantile (NEXQ) Model). This model is then combined with extreme value theory to estimate higher-order quantiles of the return series, allowing for classification of any particular realized return (that is, effective return in the futures market) as extremely high or not. A period of time characterized by extreme price variation (volatility) is a period of time in which we observe a large number of extreme positive returns. An extreme positive return is defined to be a return that exceeds a certain pre-established threshold. This threshold is taken to be a high order (95%) conditional quantile, (i.e. a value of return that is exceeded with low probability: 5 %). One or two such returns do not necessarily indicate a period of excessive volatility. Periods of excessive volatility are identified based a statistical test applied to the number of times the extreme value occurs in a window of consecutive 60 days.

Source: Martins-Filho, Torero, and Yao 2010. See details at http://www.foodsecurityportal.org/soft-wheat-price-volatility-alert-mechanism

Production condition for products in main producing areas October 28th



Source: GEOGLAM

In summary

	From previous month f'cast	From previous season
Wheat	▬	▲
Maize	▬	▲
Rice	▬	▼
Soybeans	▼	▲

▲ *Easing* ▬ *Neutral* ▼ *Tightening*

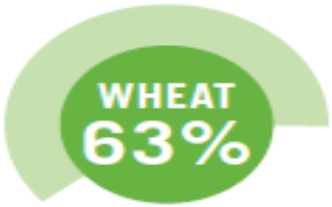
Have there been an improvement in the short term?

Global Stock to use ratios

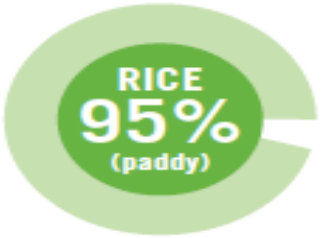
Source: USDA

High concentration of exports

United States (53.0%)
Argentina (15.1%)
Brazil (6.3%)
France (6.0%)
India (3.5%)



United States (22.9%)
France (12.4%)
Canada (12.0%)
Russian Federation (8.9%)
Argentina (6.7%)

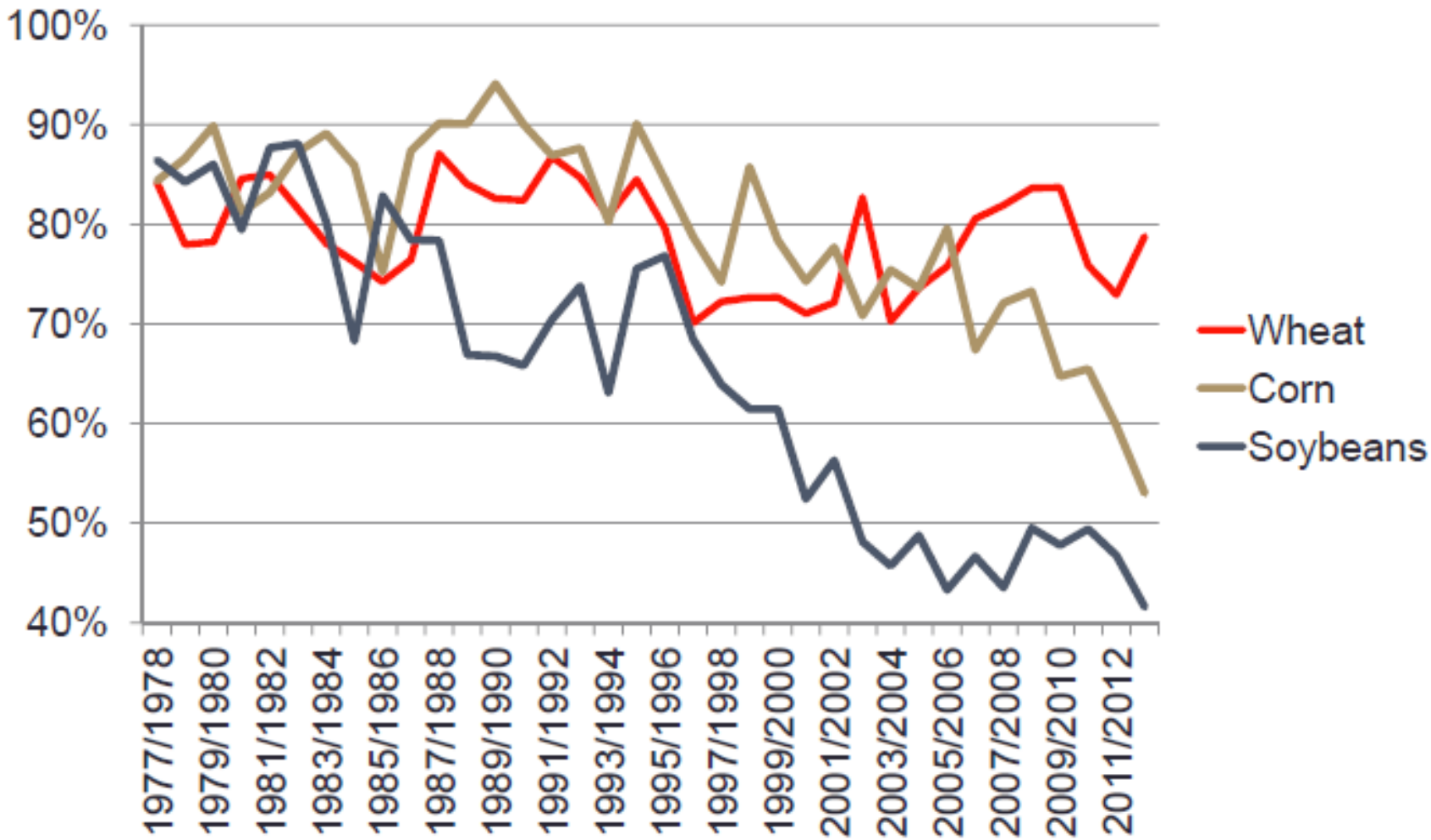


United States (90.4%)
Paraguay (1.4%)
France (1.2%)
China (1.1%)
Brazil (0.9%)

Thailand (54.8%)
Pakistan (9.1%)
Brazil (7.3%)
United States (4.4%)
Belgium (4.0%)

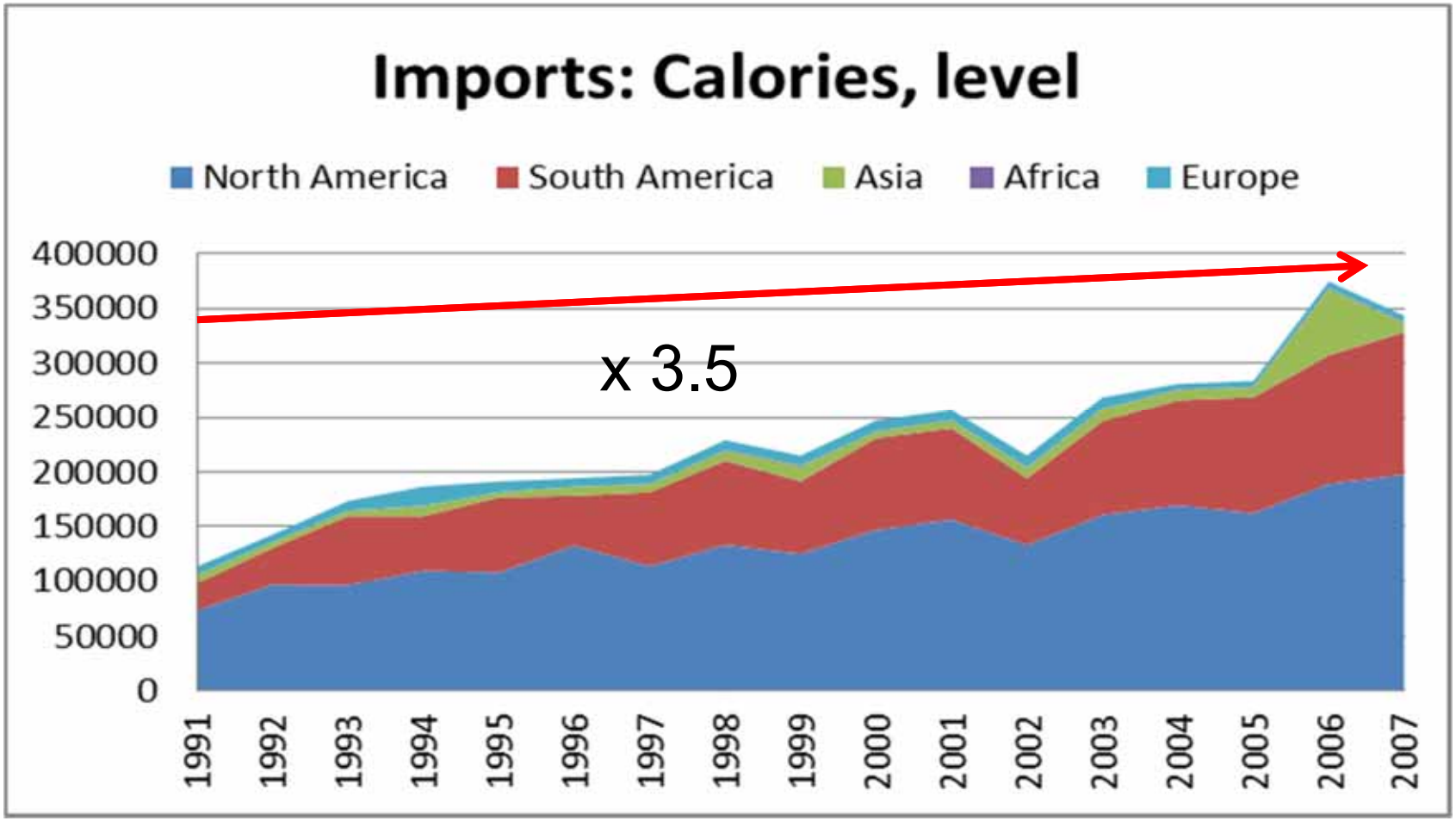
Source: FAO (2011a).

Some improvements
% of Exports from the Northern Hemisphere



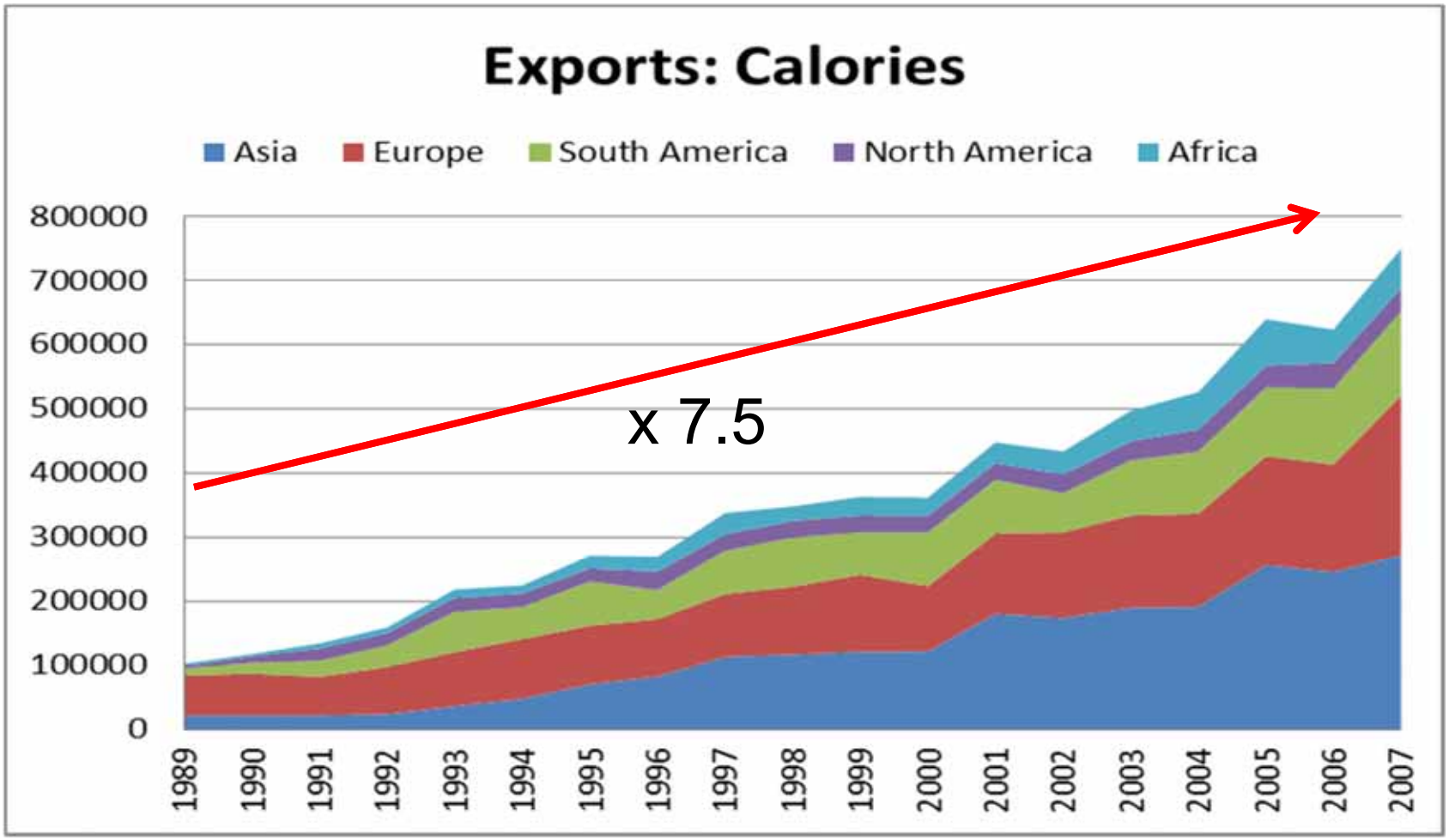
Source: USDA

Imports from the World to LAC



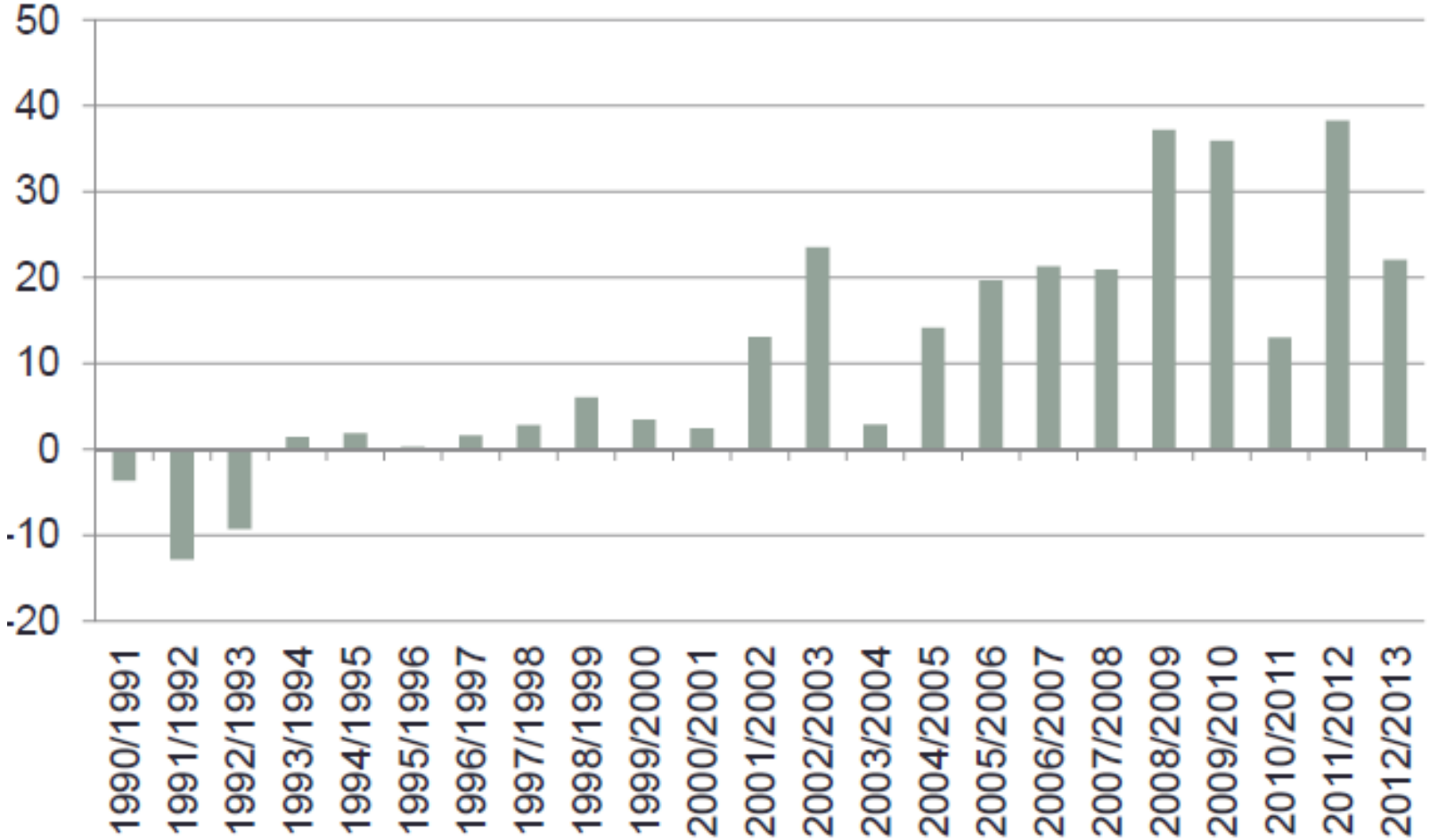
Source: 2012 Deason L. and D. Laborde, "Trading food: A Nutritional Assessment." IFPRI working paper, forthcoming.

Exports from LAC to the World



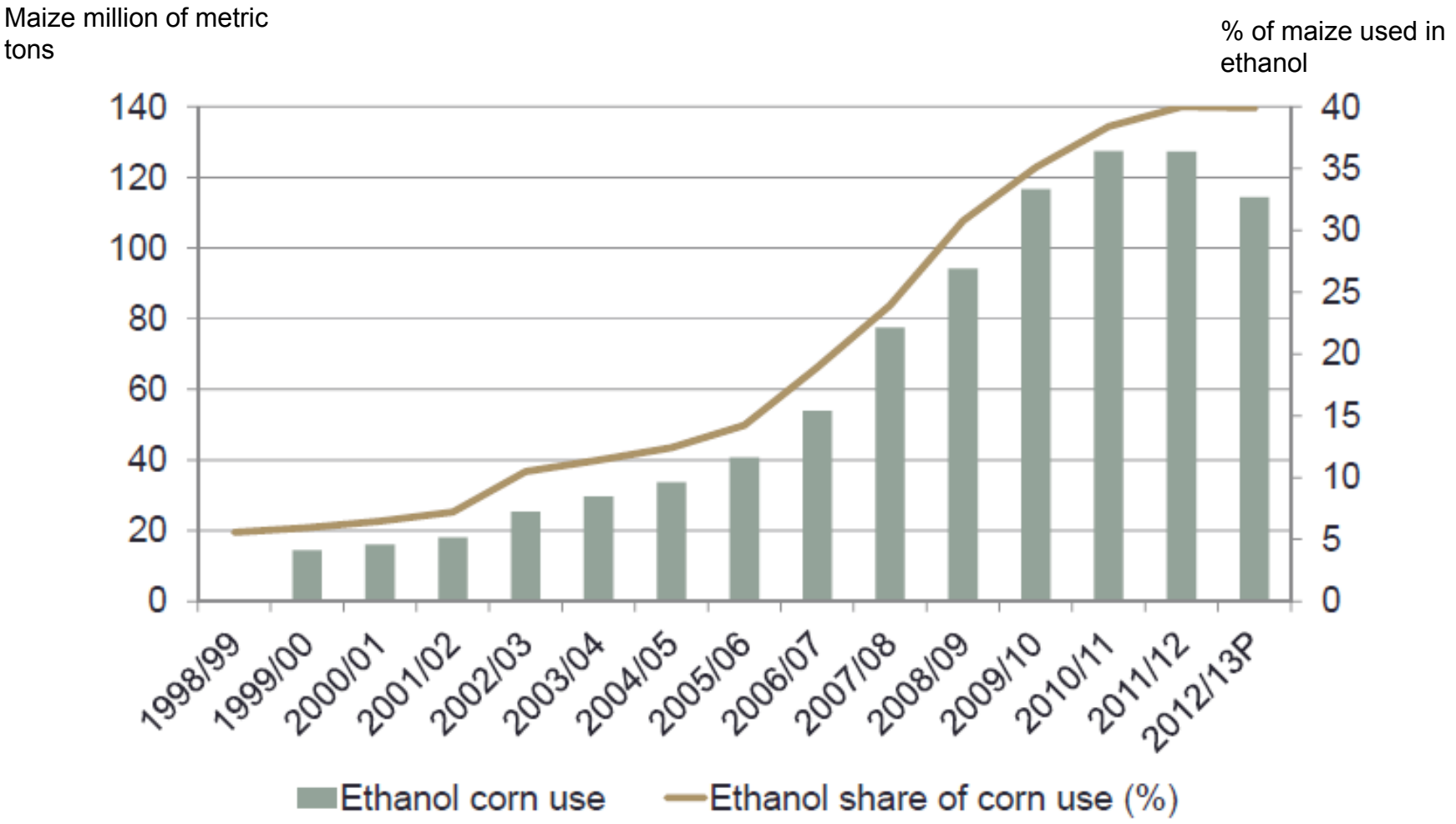
Source: 2012 Deason L. and D. Laborde, "Trading food: A Nutritional Assessment." IFPRI working paper, forthcoming.

Some Improvements
Significant increase on the production of wheat by the Black Sea region



Source: USDA

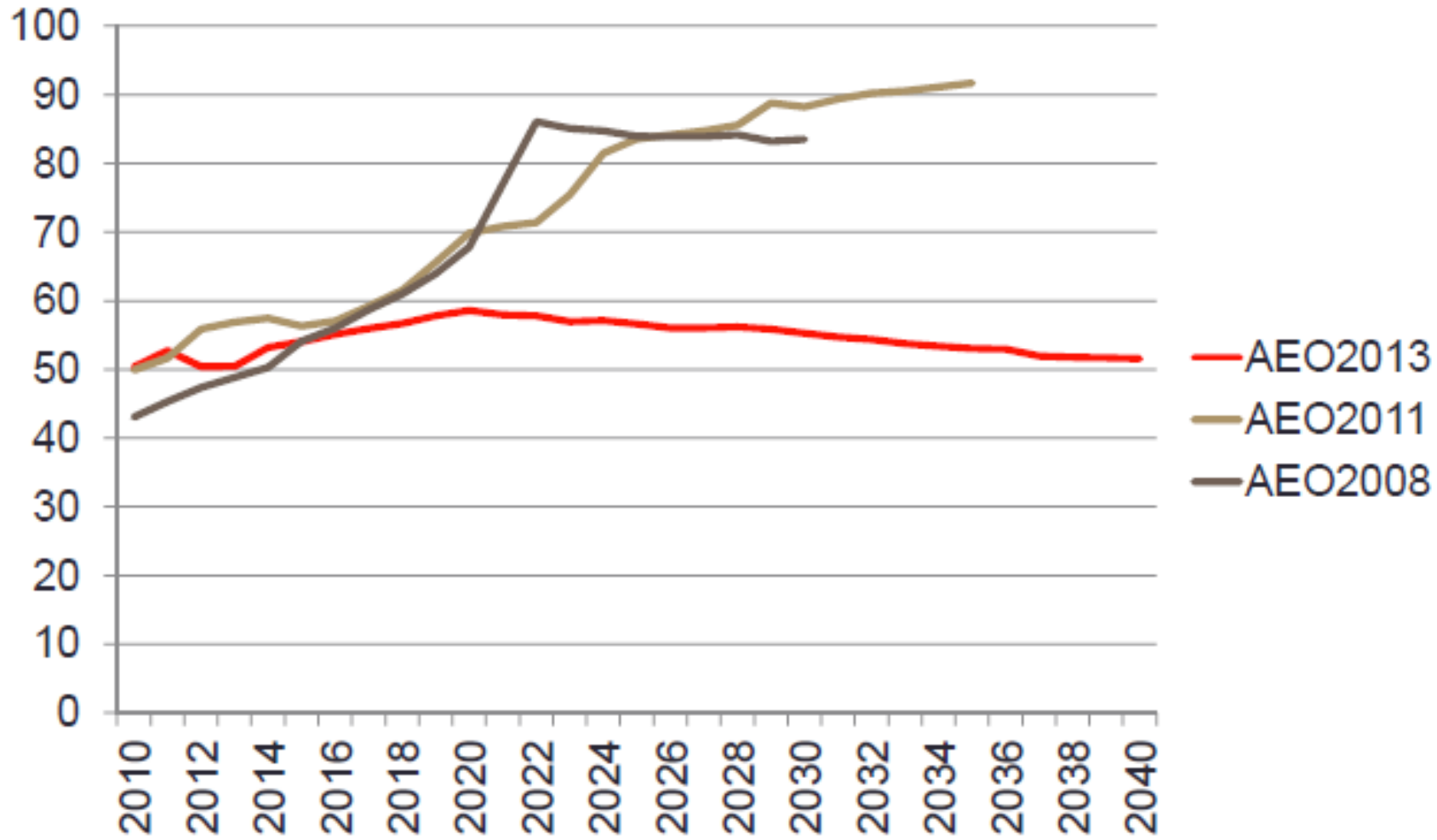
Proportion of maize production of the US in the production of biofuels, 1995–2010



Source: USADA

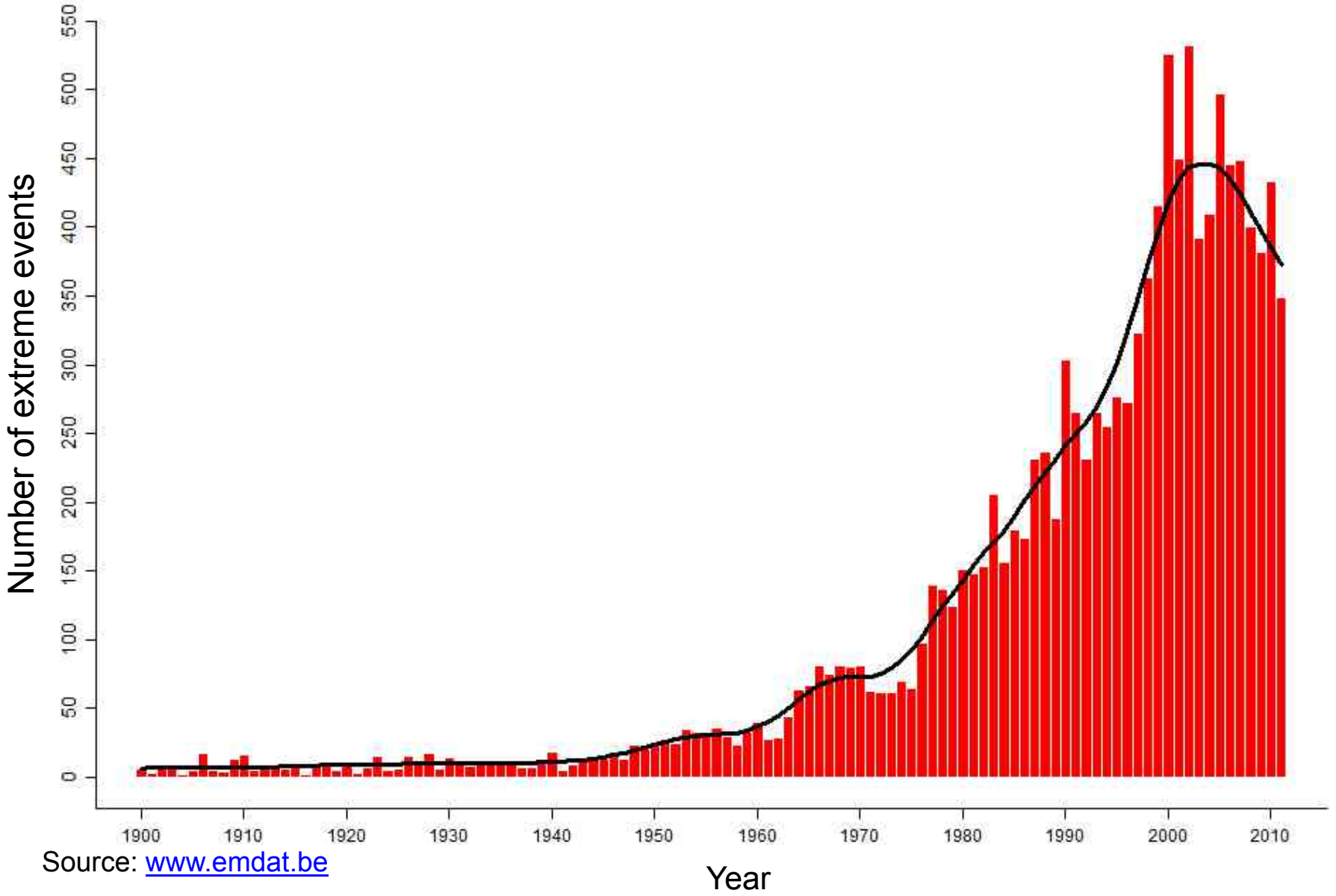
Projection of the US ethanol production

Bill Litros



Source: EIA, AEO 2013

Increase in the number of extreme events

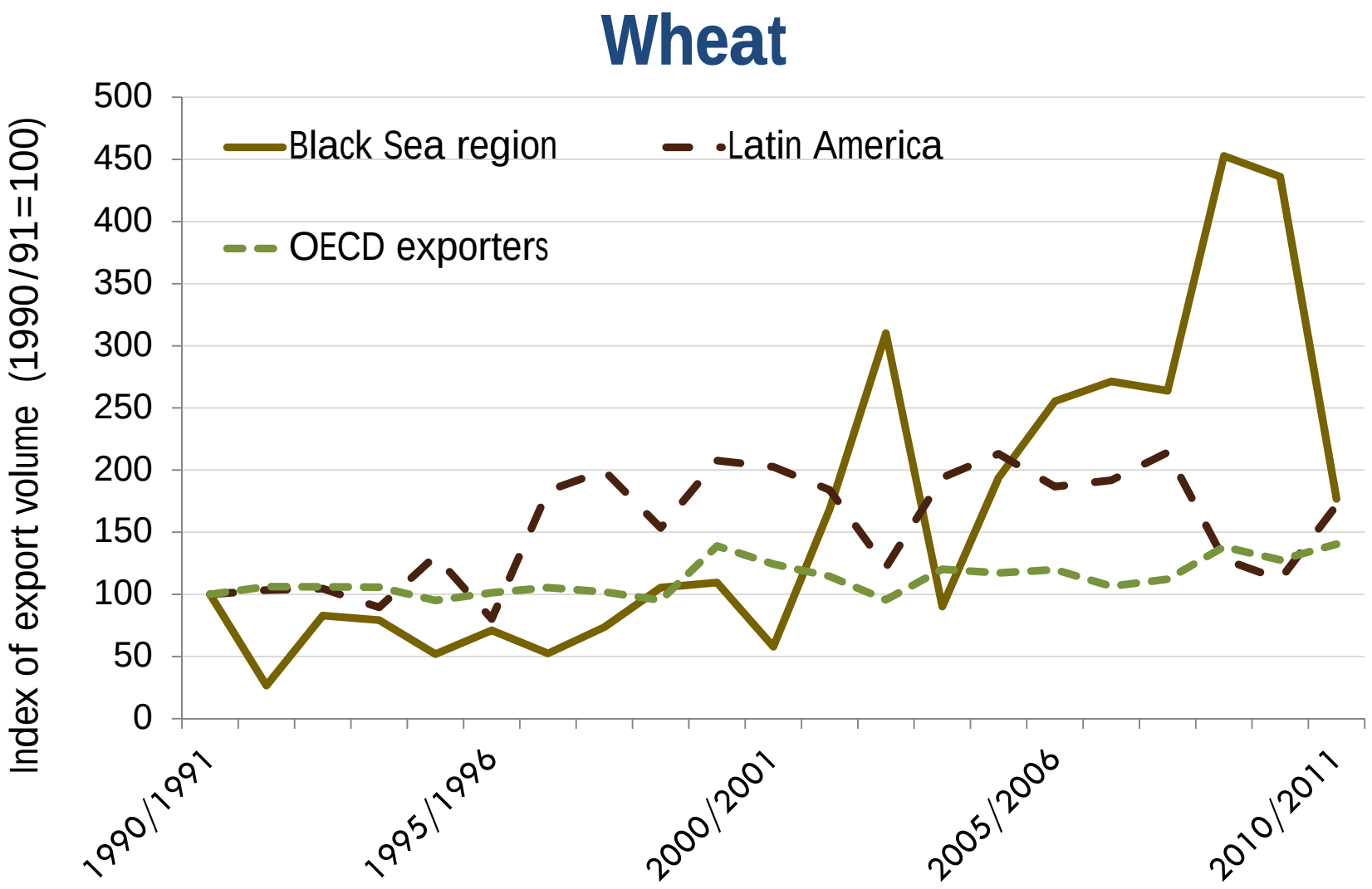


Source: www.emdat.be

Global distribution of risks associates with the main systems of agricultural production

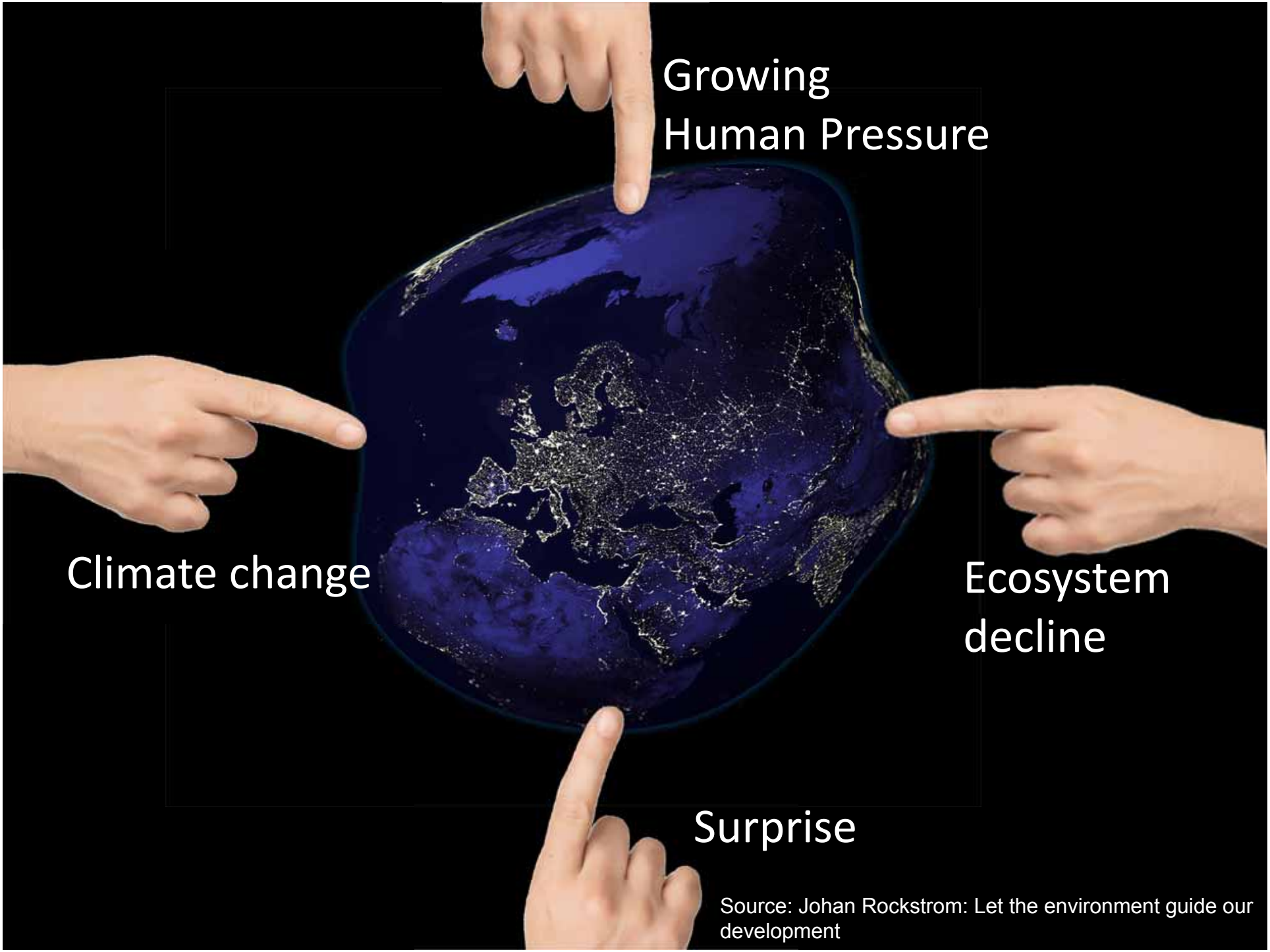
Fuente: Agriculture for Nutrition in Latin America and the Caribbean: From Quantity to Quality, WB 2014.

International markets are vulnerable to climatic shocks



NOT ENOUGH

How vulnerable are we in the medium and long term?



Source: Johan Rockstrom: Let the environment guide our development

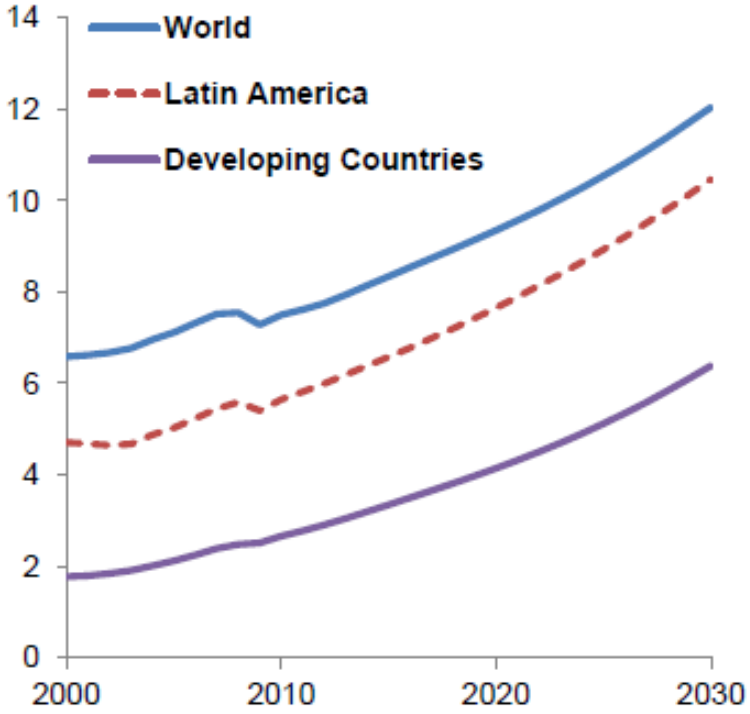
Drivers of Agricultural Growth and Food Security

- Demand drivers
  - Population growth: from 7.2 to 9.6 billion people in 2050 and to 10.9 billion ins 2100 (no peak population in 9 billion and then gradual decline)
  - Urbanization: 2008 = 50% urban; 2050 = 78%
  - Income growth: Africa rising
  - Oil prices
  - Biofuels and bioenergy
  - GHG mitigation and carbon sequestration
  - Conservation and biodiversity

http://www.government.nl/dsc?c=getobject&s=obj&objectid=101492

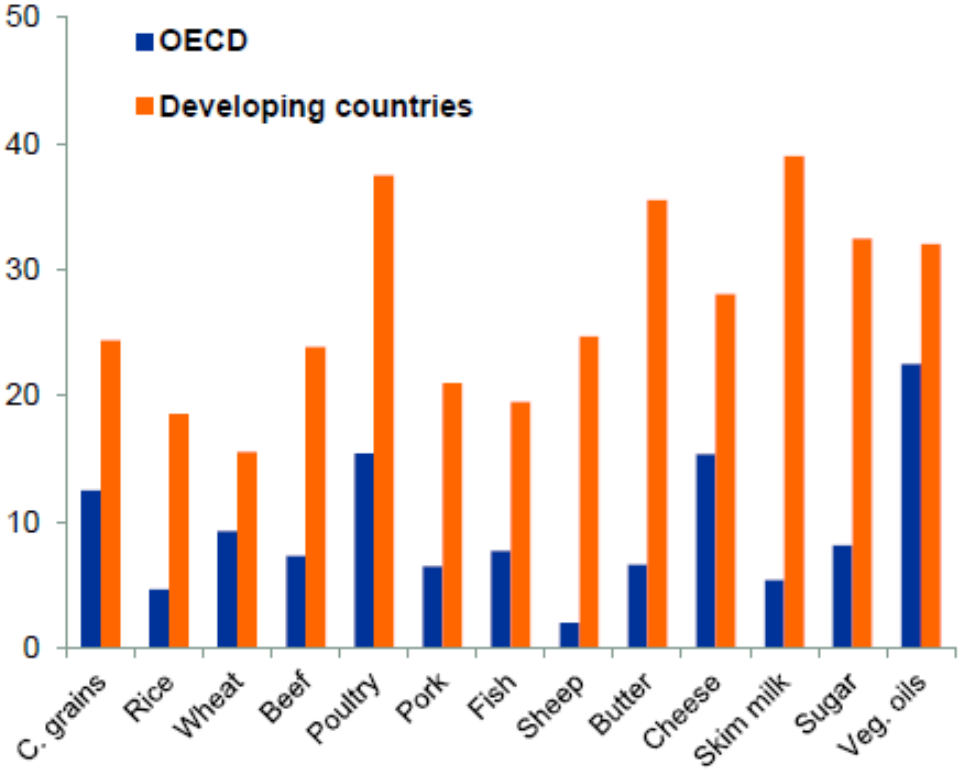
Population growth

GDP per capita
(2005 US $ in '000s)



Fuente: ERS-USDA 2012

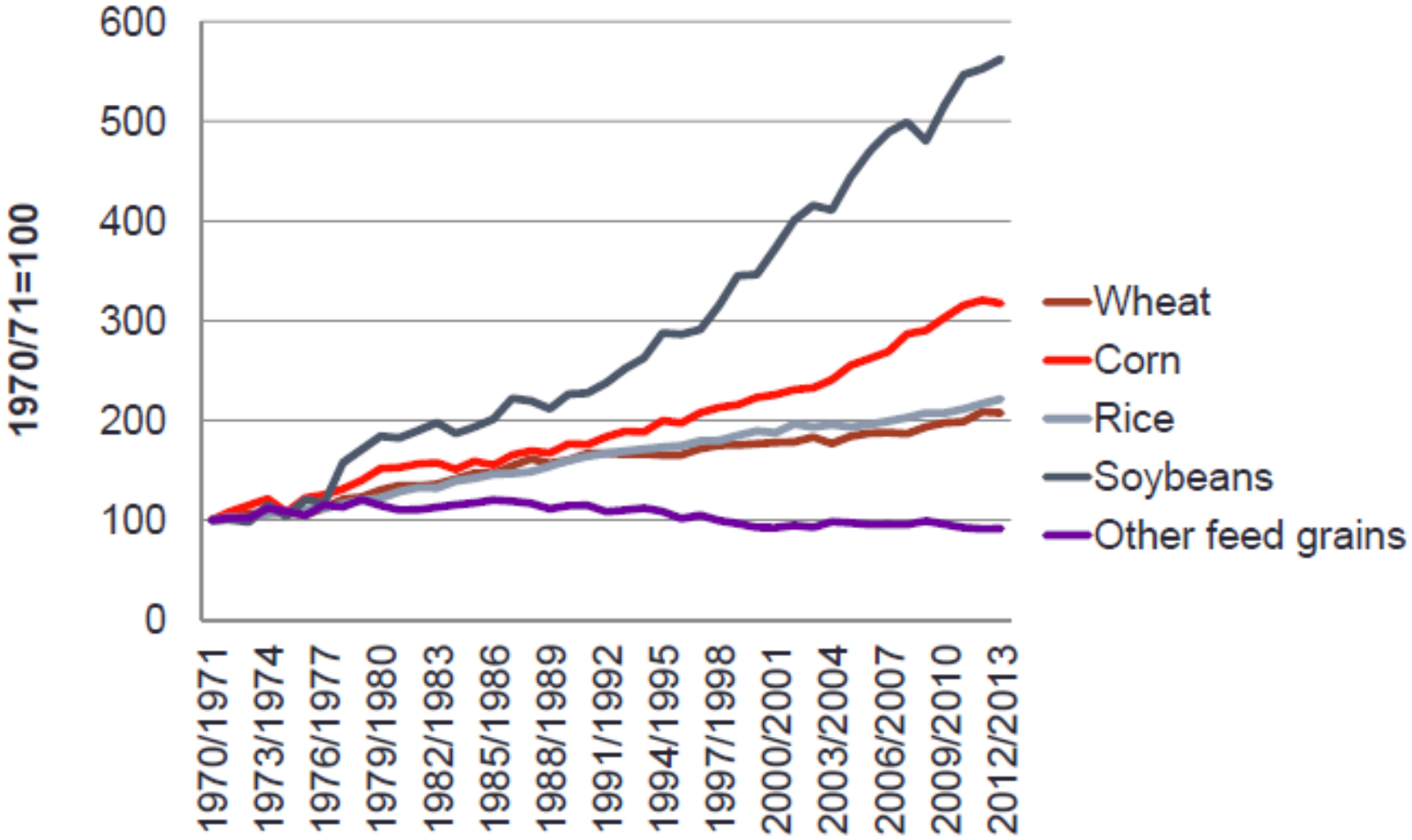
Change in the consumption of agricultural products 2009-2011 to 2021 (%)



Fuente : OECD-FAO 2012

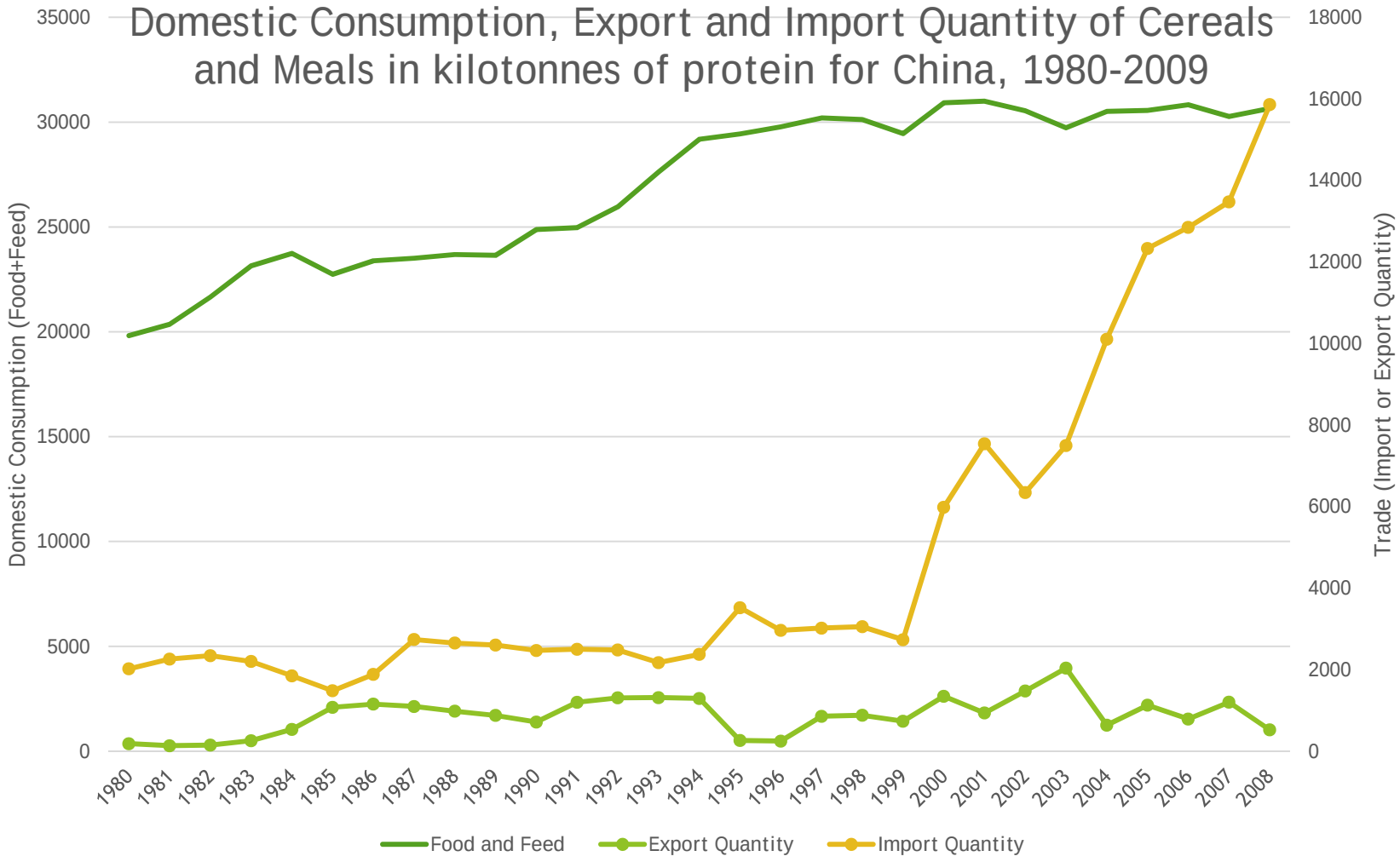
The global demand for food will increase in 60% by 2050 (FAO 2012)

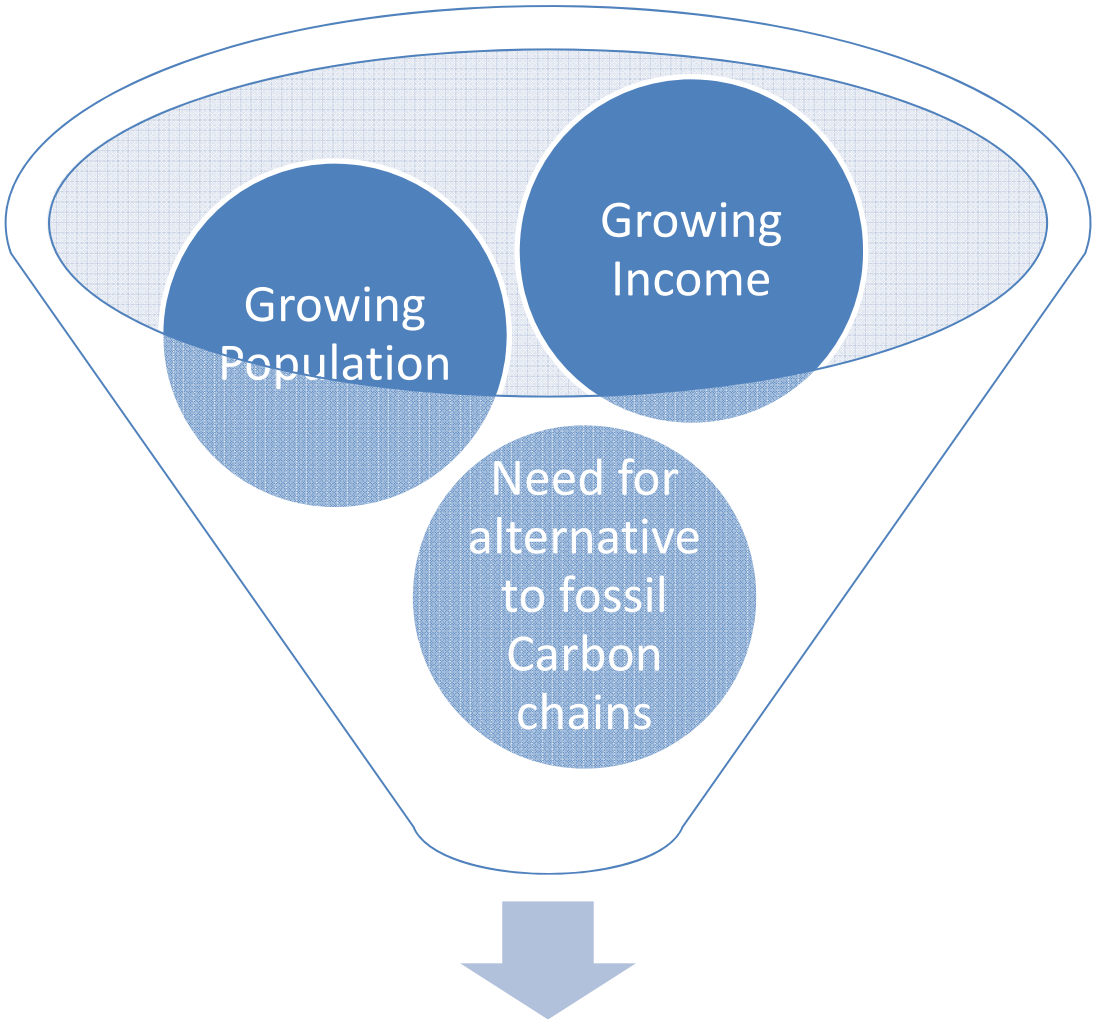
Growth of Global Demand



Source: USDA

Development = Higher Income, Higher Demand (and for different products)





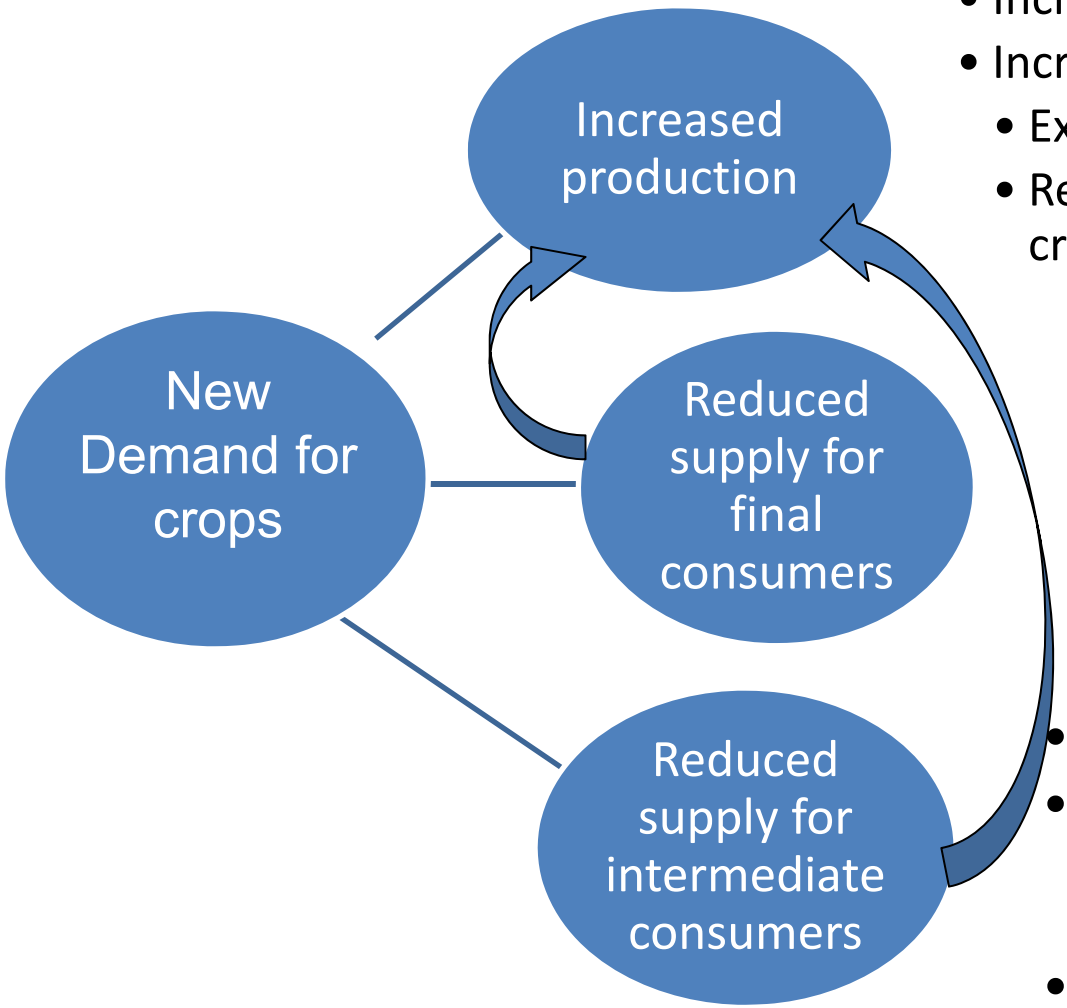
Additional demand for biomass

Growing demand

Additional Food Demand

Additional Bioenergy Demand

Additional industrial Biomass Demand



- Increase in **yield**
- Increase in **area**
  - Extension of **cropland**
  - Reduction of other crops

- Hunger?
- Substitution effects

- Feed
- Other sectors (agrifood, cosmetics)
- Substitution effects

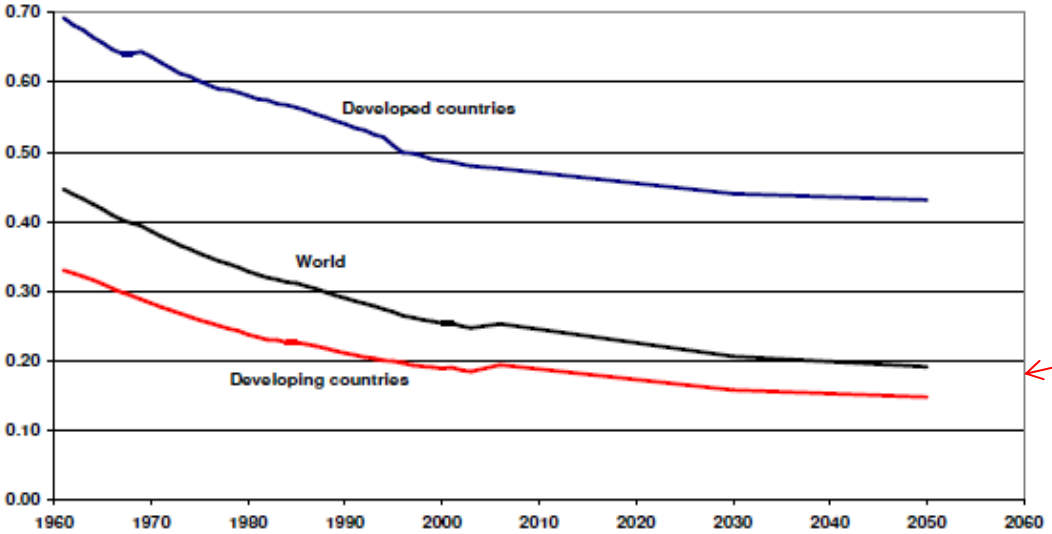
Drivers of Agricultural Growth and Food Security

- Supply drivers
  - Water and land scarcity
  - Investment in agricultural research
  - Climate change
  - Science and technology policy
    - Discovery, development, delivery
    - Intellectual property rights, regulatory systems, extension

http://www.tribuneindia.com/2004/20040721/har.jpg

http://fbae.org/2009/FBAE/website/images/btcotton_rice.jpg

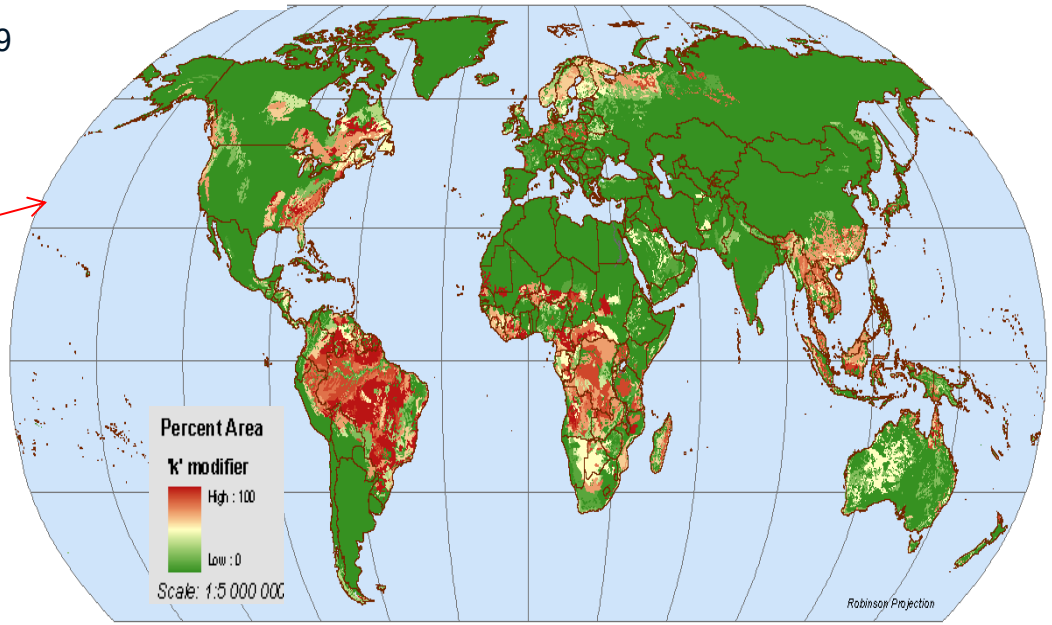
Restrictions in the access to Land



Percapita arable land (per capita hectare used)

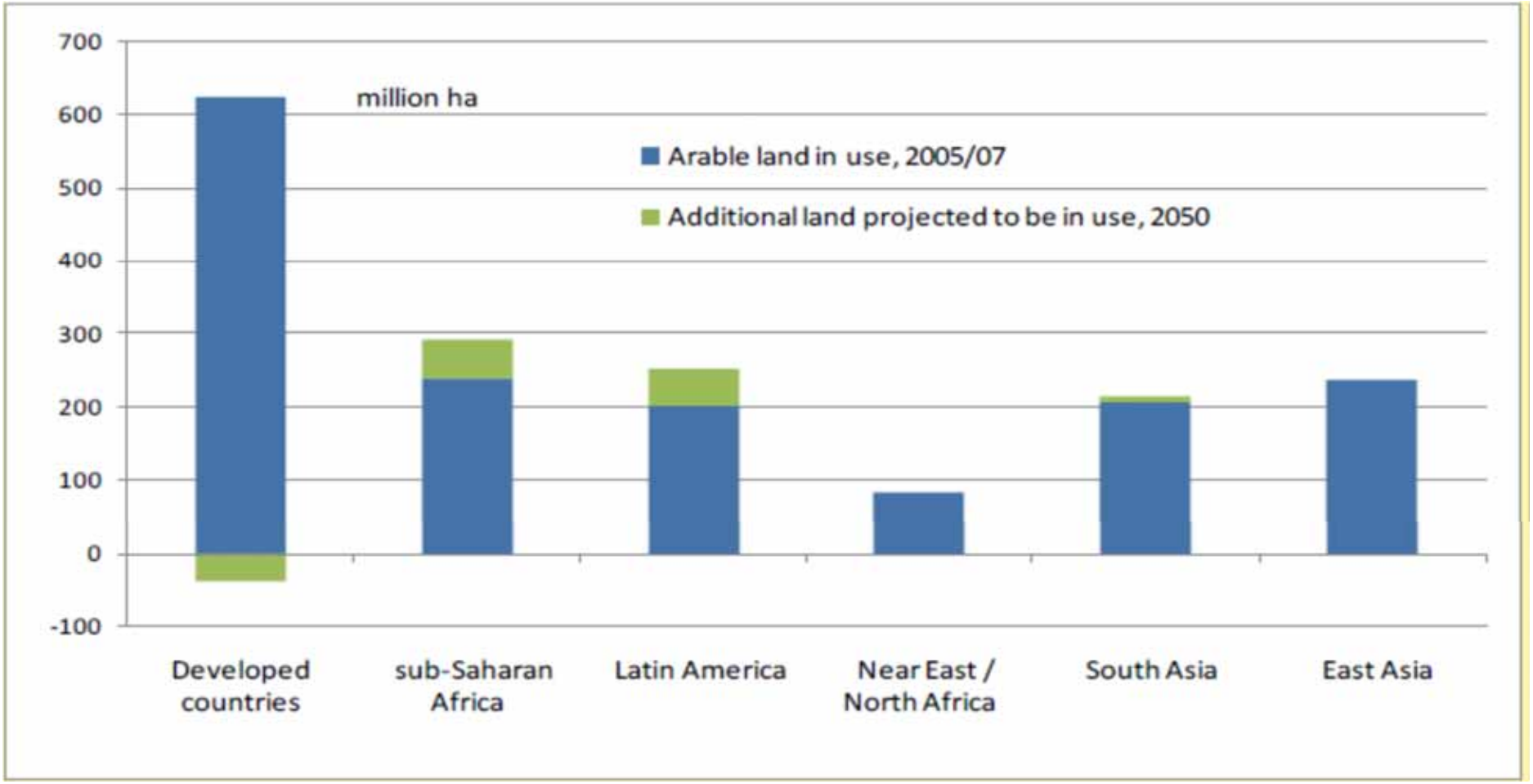
Source: Bruinsma 2009

Expansion of the land with low level of nutrient reserves (K)



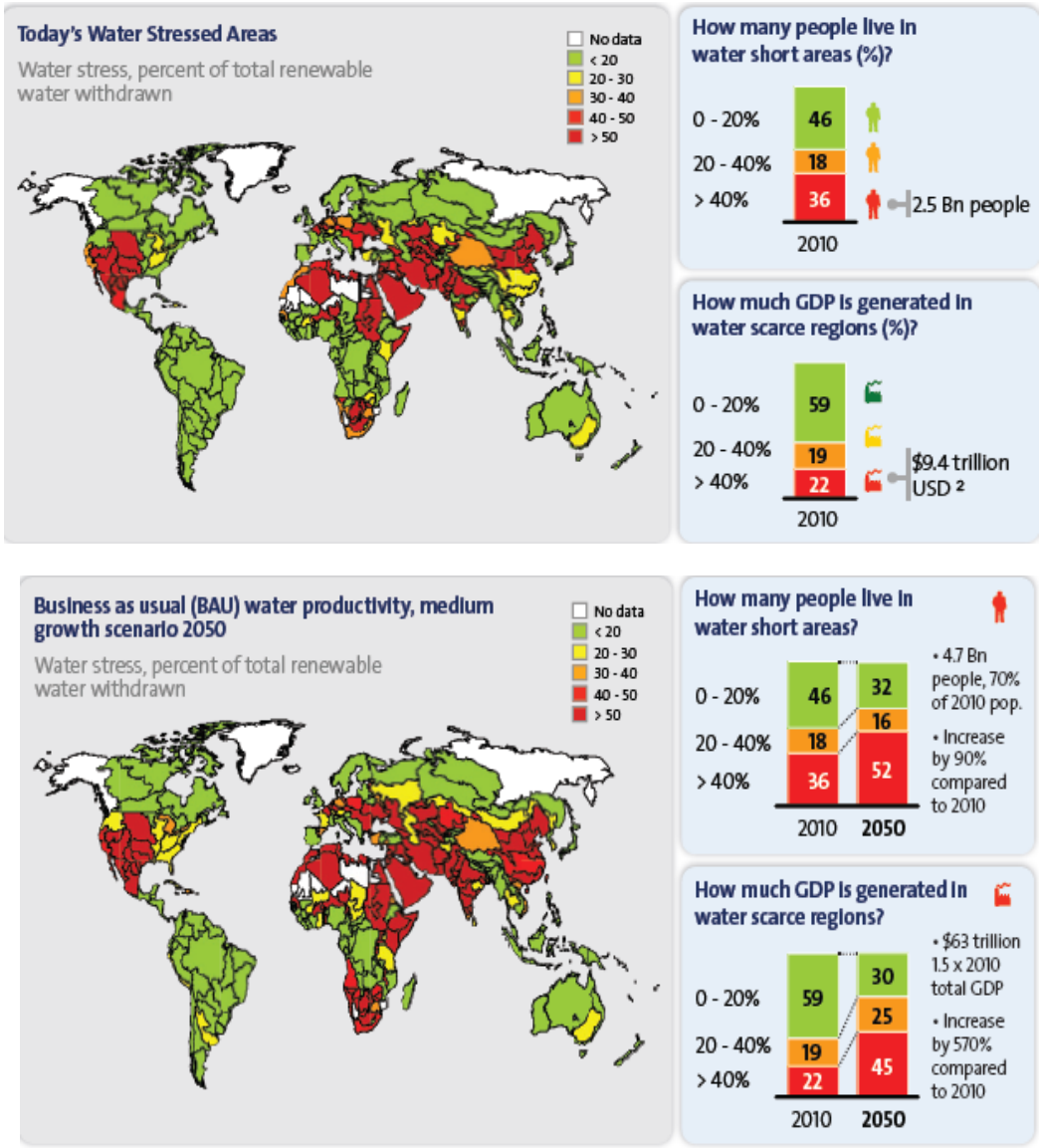
Source Ahamed et al 2006

Additional arable land that can be used in 2050 by region



Source: Van der Mensbrugghe, D. FAO. IADB and CIAT Seminar, March 2012

Serious restrictions in the access to water



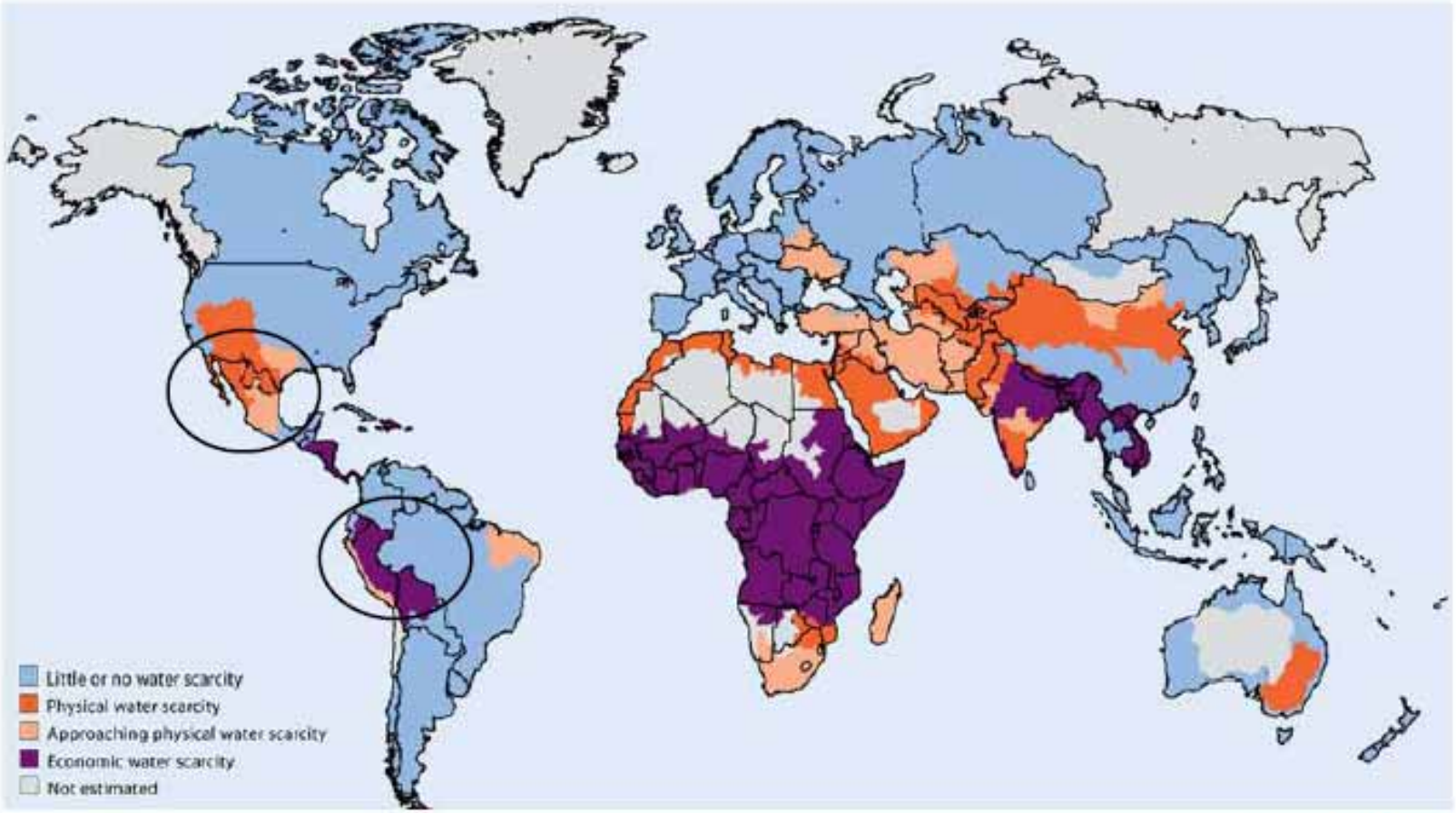
Under a "bussiness as usual" scenario the restriction of water by 2050 will put at risk:

→ 52% of the global population

→ 45% of the global production of grains

Source: Veolia Water and IFPRI 2011

Serious restrictions in the access to water



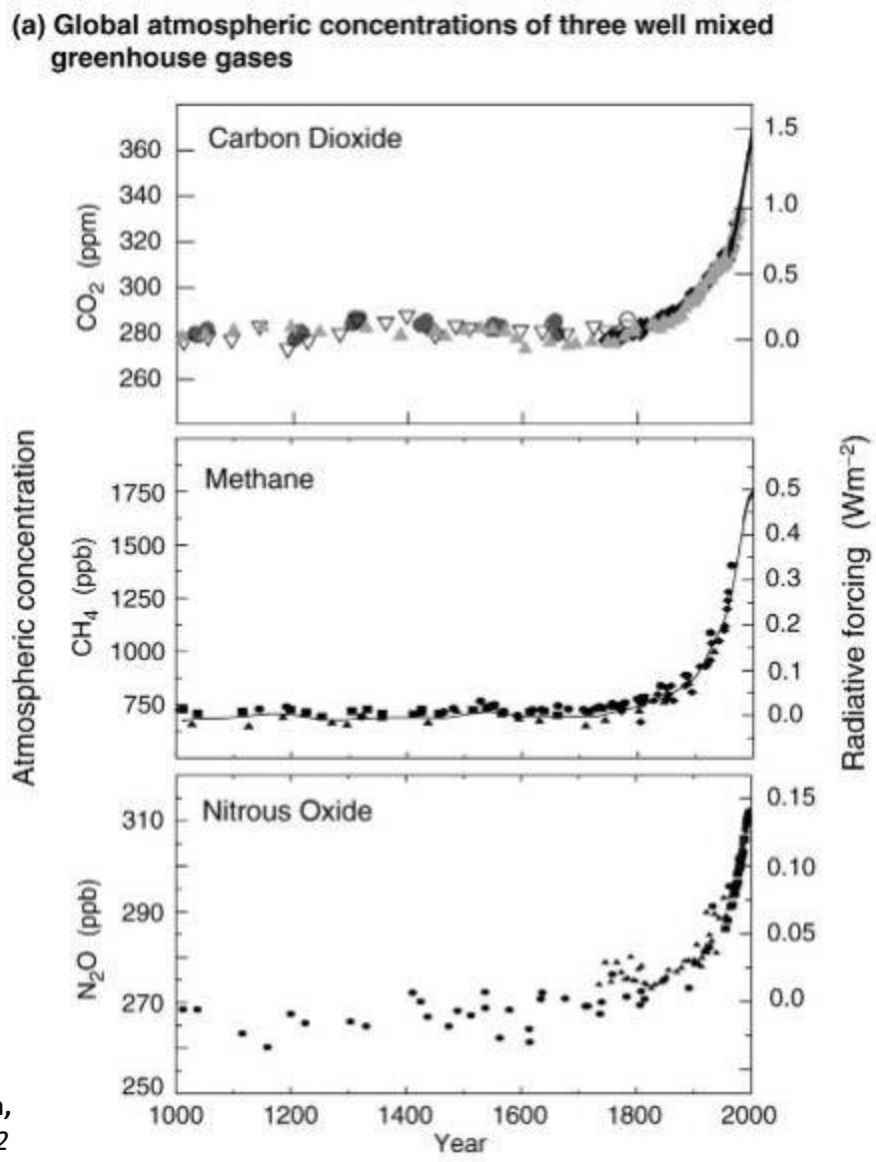
Source: IWMI 2007

The scarcity of water will be a challenge of growing economies in LAC (Peru and Mexico) and for Africa and Asia

Climate Change

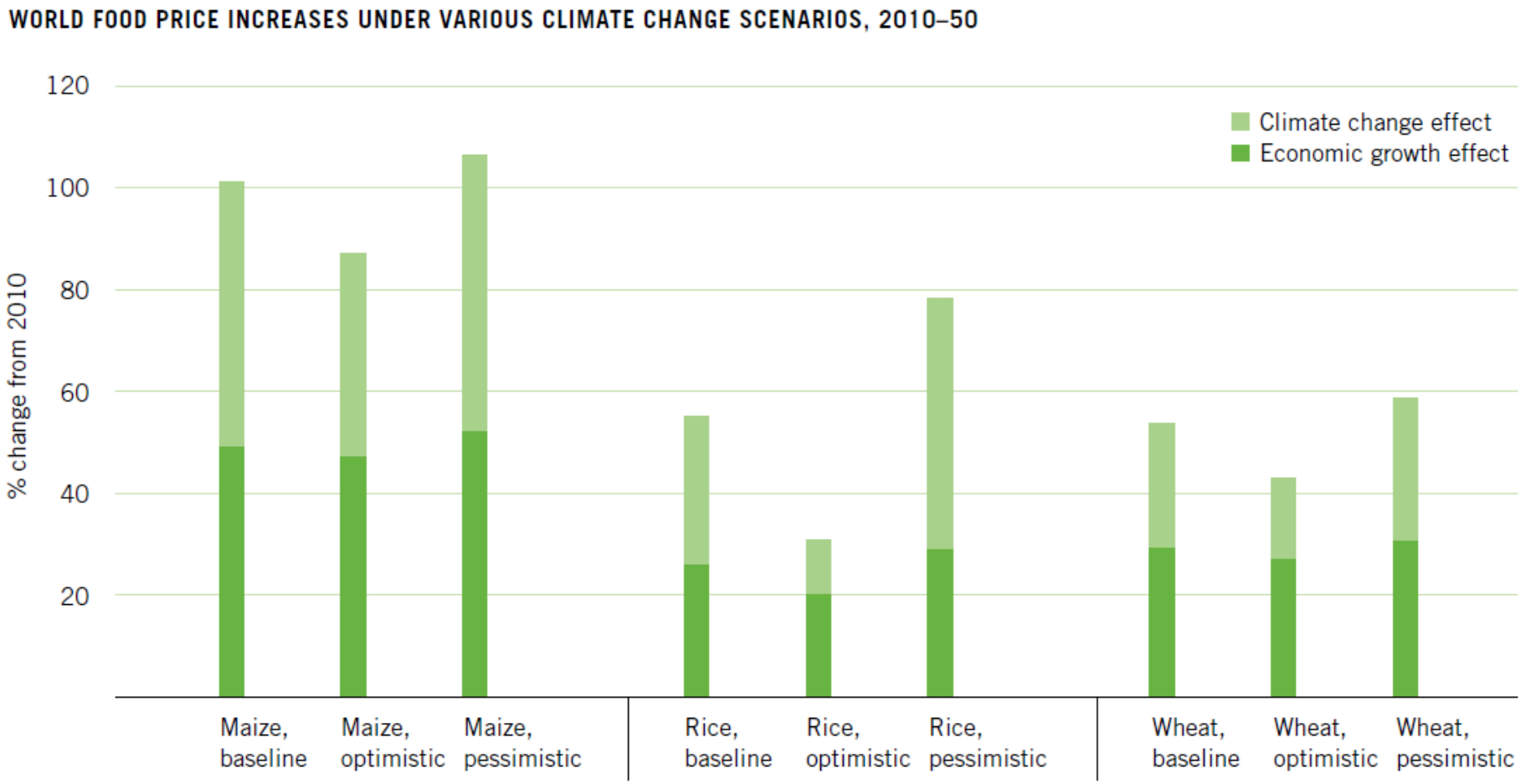
The concentration of greenhouse gases is increasing

Important consequences on climate and for appropriate climate for crops



Source: Andy Jarvis, Carolina Navarrete, Julian Ramirez, Emmanuel Zapata, Peter Laderach; *Centro Internacional de Agricultura Tropical, CIAT. Cali 2012*

Climate Change Effects

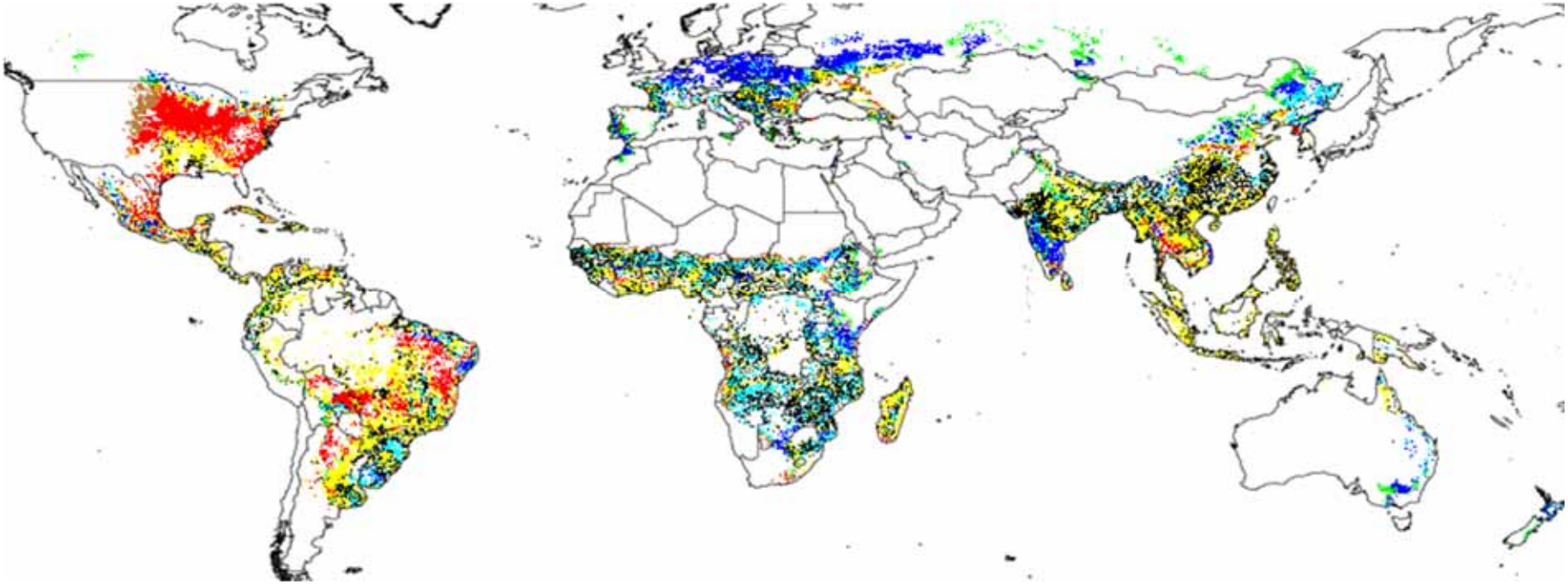


Source: Nelson et al. (2010).

Note: The study for this graph considers three combinations of income and population growth: a baseline scenario (with moderate income and population growth), a pessimistic scenario (with low income growth and high population growth), and an optimistic scenario (with high income growth and low population growth). Each of these three income/population scenarios is then combined with four plausible climate scenarios that range from slightly to substantially wetter and hotter on average, as well as with an implausible scenario of perfect mitigation (a continuation of today's climate into the future). The climate change effect presented in the graph is the mean of the four climate change scenarios.

Rainfed Maize: Impact of climate change in 2050

(MIROC/A1B)



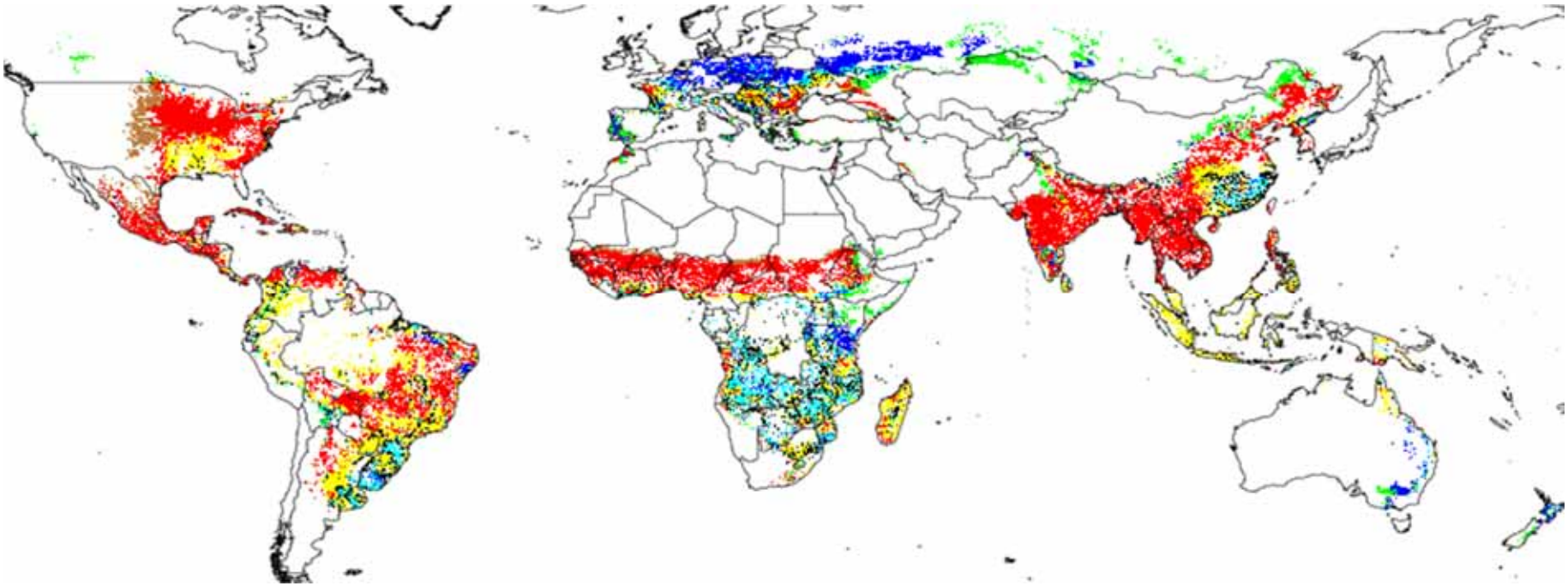
- 2000 old area lost
- yield loss > 25% of 2000
- yield loss 5–25%
- yield change within 5%
- yield gain 5–25%
- yield gain > 25%
- 2050 new area gained

Overall production change in shown existing areas: -11.2%

Source: IFPRI IMPACT simulations

Rainfed Maize: Impact of climate change in 2080

(MIROC/A1B)



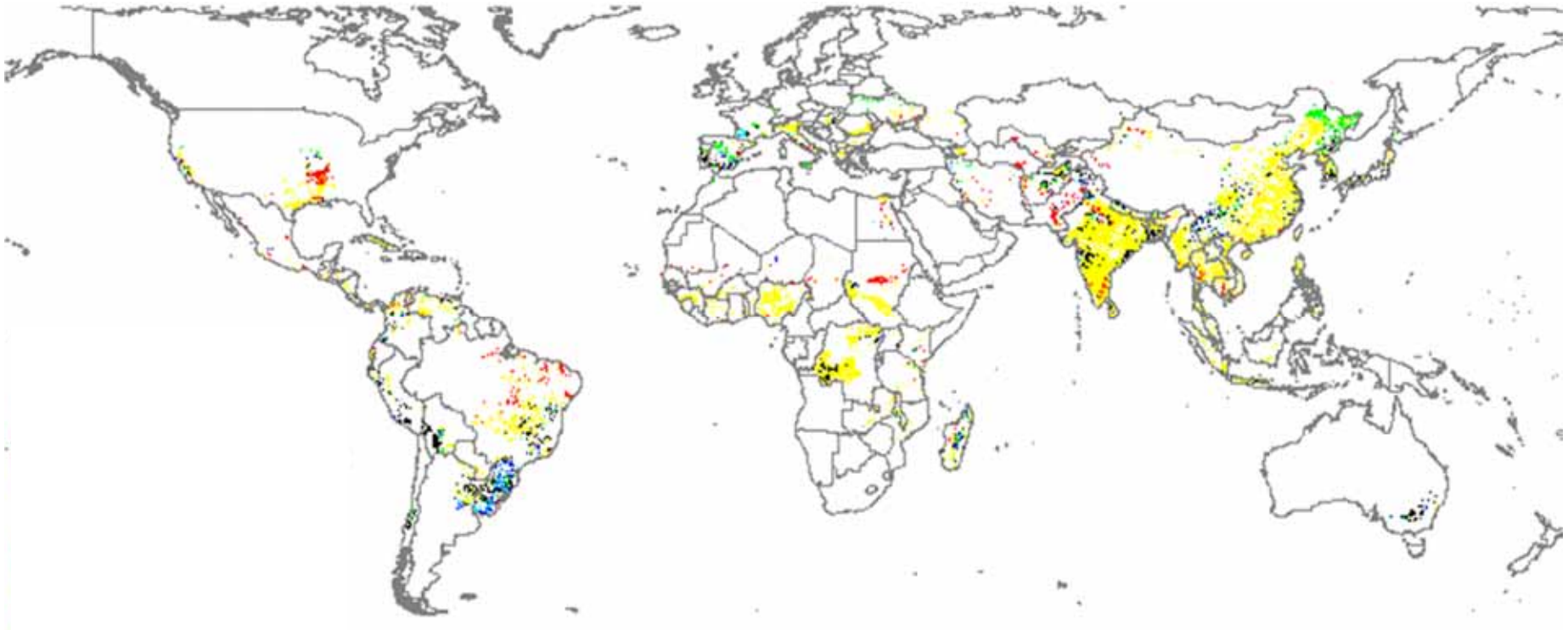
2000 old area lost
yield loss > 25% of 2000
yield loss 5–25%
yield change within 5%
yield gain 5–25%
yield gain > 25%
2050 new area gained

Overall production change in shown existing areas: -37.3%

Source: IFPRI IMPACT simulations

Irrigated Rice: Impact of Climate Change in 2050

(MIROC/A1B)

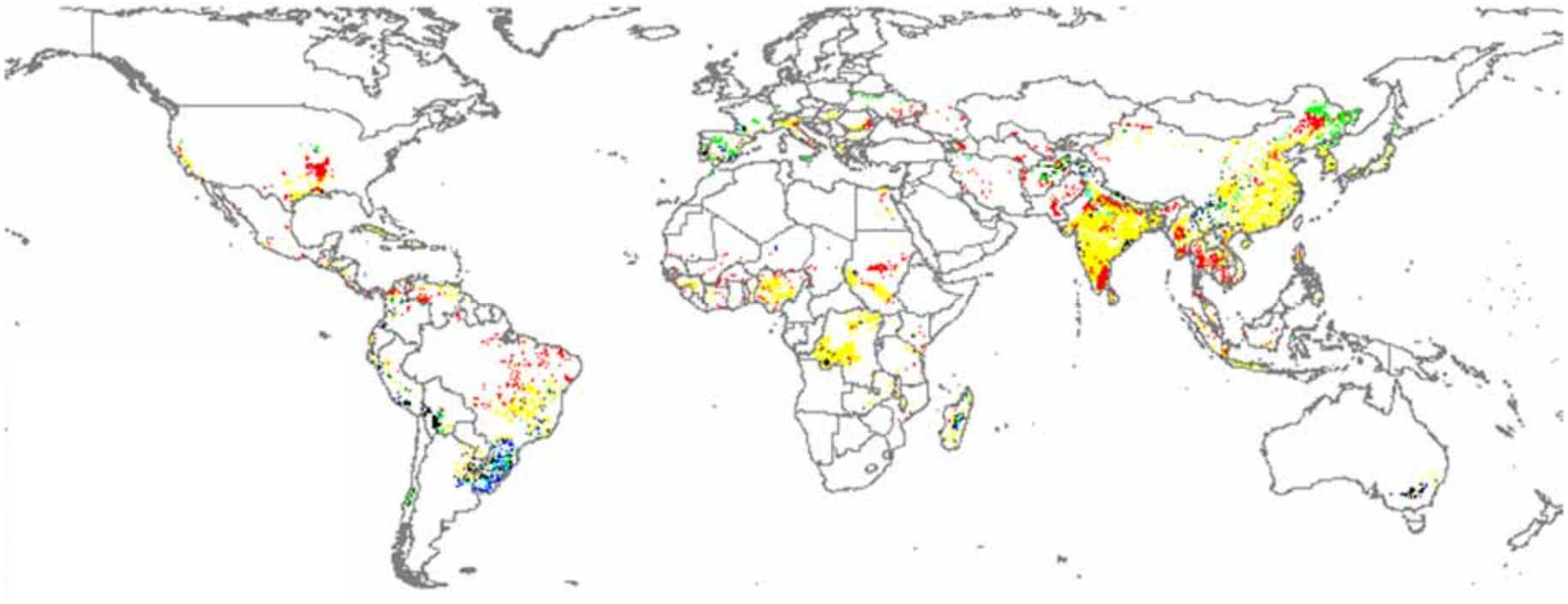


Overall production change in shown existing areas: -10.5%

Source: IFPRI IMPACT simulations

Irrigated Rice: Impact of Climate Change in 2080

(MIROC/A1B)



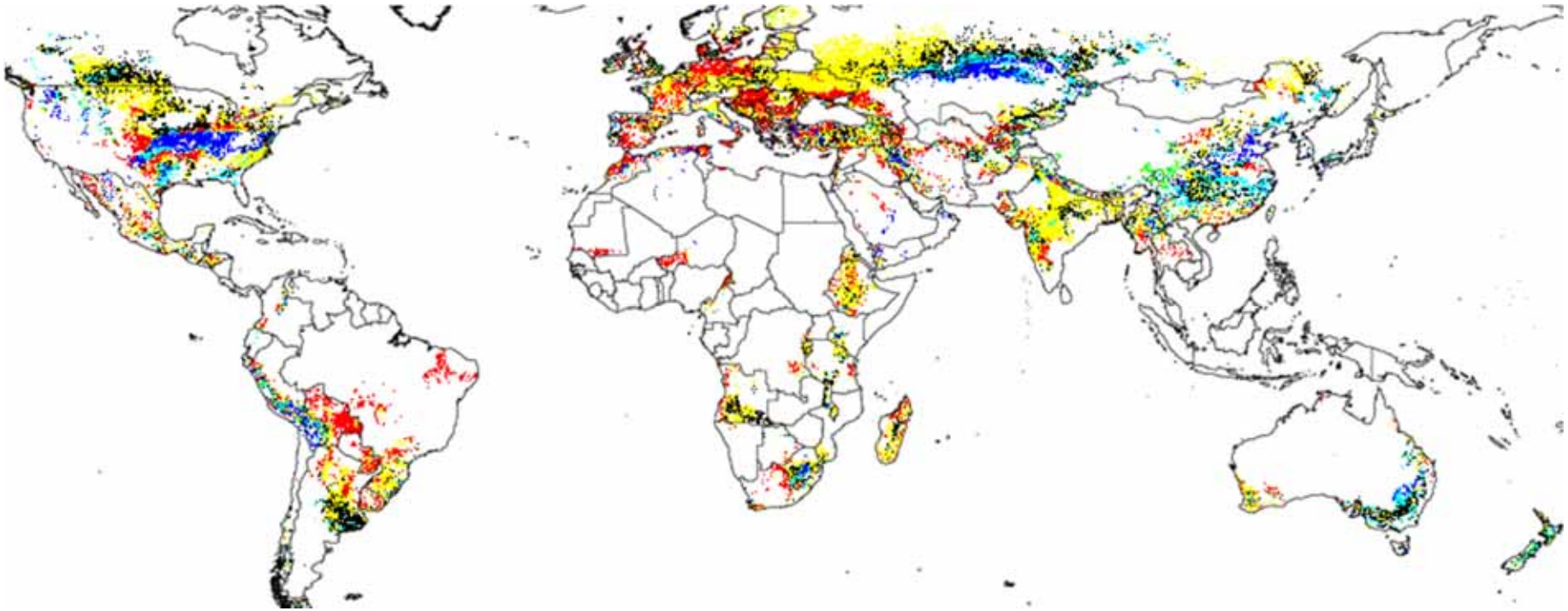
- 2000 old area lost
- yield loss > 25% of 2000
- yield loss 5–25%
- yield change within 5%
- yield gain 5–25%
- yield gain > 25%
- 2050 new area gained

Overall production change in shown existing areas: -16.1 %

Source: IFPRI IMPACT simulations

Rainfed Wheat: Impact of climate change in 2050

(MIROC/A1B)

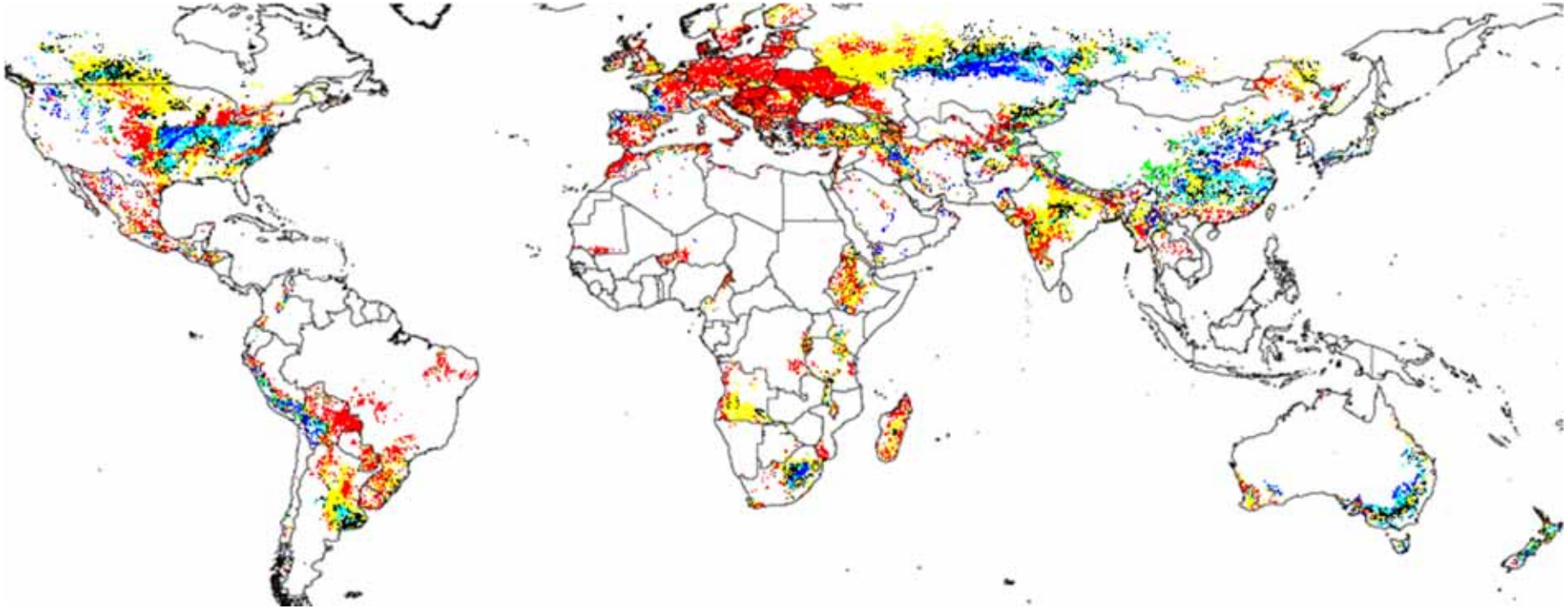


Overall production change in shown existing areas: -8.1%

Source: IFPRI IMPACT simulations

Rainfed Wheat: Impact of climate change in 2080

(MIROC/A1B)

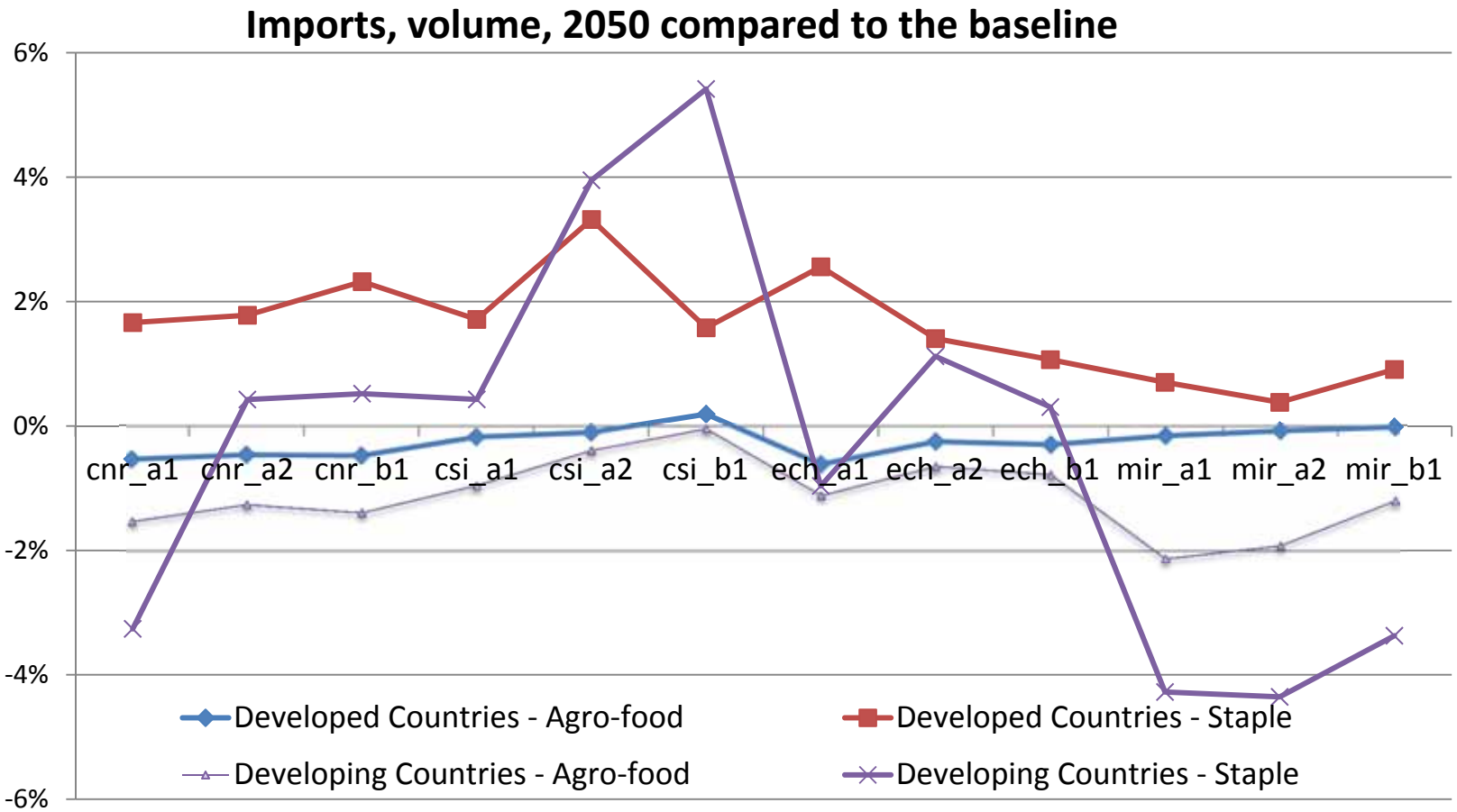


Overall production change in shown existing areas: -15.5%

Source: IFPRI IMPACT simulations

Scenarios matter for Global Trade pattern

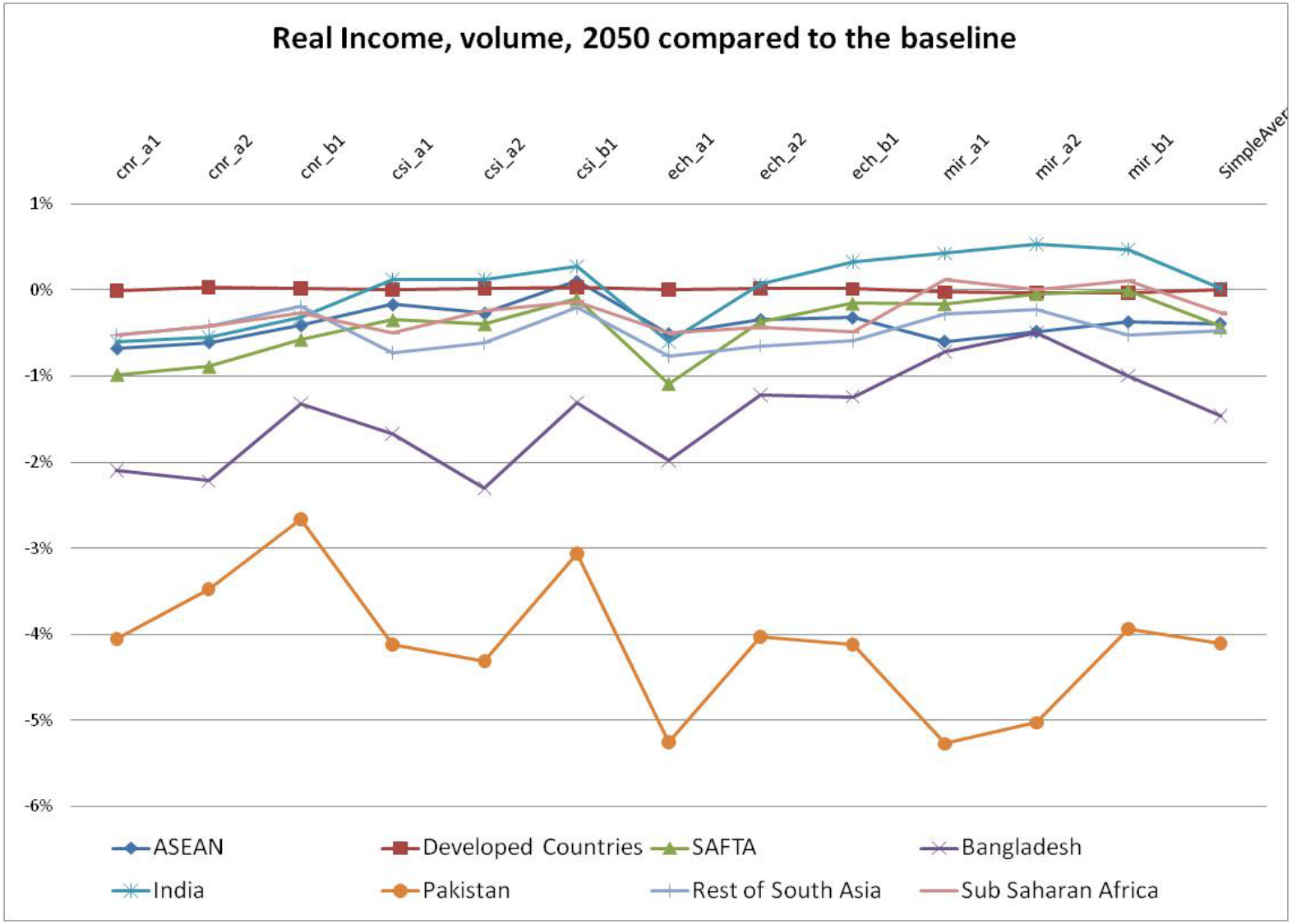
Agricultural world trade may increase or decrease due to climate change



Authors: D. Laborde, Csilla Lakatos, Geral Nelson, Richard Roberton and Marcell Thomas

Heterogeneous consequences on Real Income

Climate Change will lead to winners and losers among countries



Authors: D. Laborde, Csilla Lakatos, Geral Nelson, Richard Roberton and Marcell Thomas

Where should we go?

What to do?

- **In the short and medium term**: Market-Based Hedging Strategies for coping with excessive volatility

- **In the short term** – Targeted cash transfers (conditional or unconditional) for the most vulnerable groups

- **In the medium and long term**: Measures to increase productivity, sustainability and resilience of agriculture

Market-Based Hedging Strategies

- In countries with well-integrated commodity exchanges: mechanisms of financial hedges and physical commodity hedges, which integrate price protection into a physical import or export agreement, may be more feasible

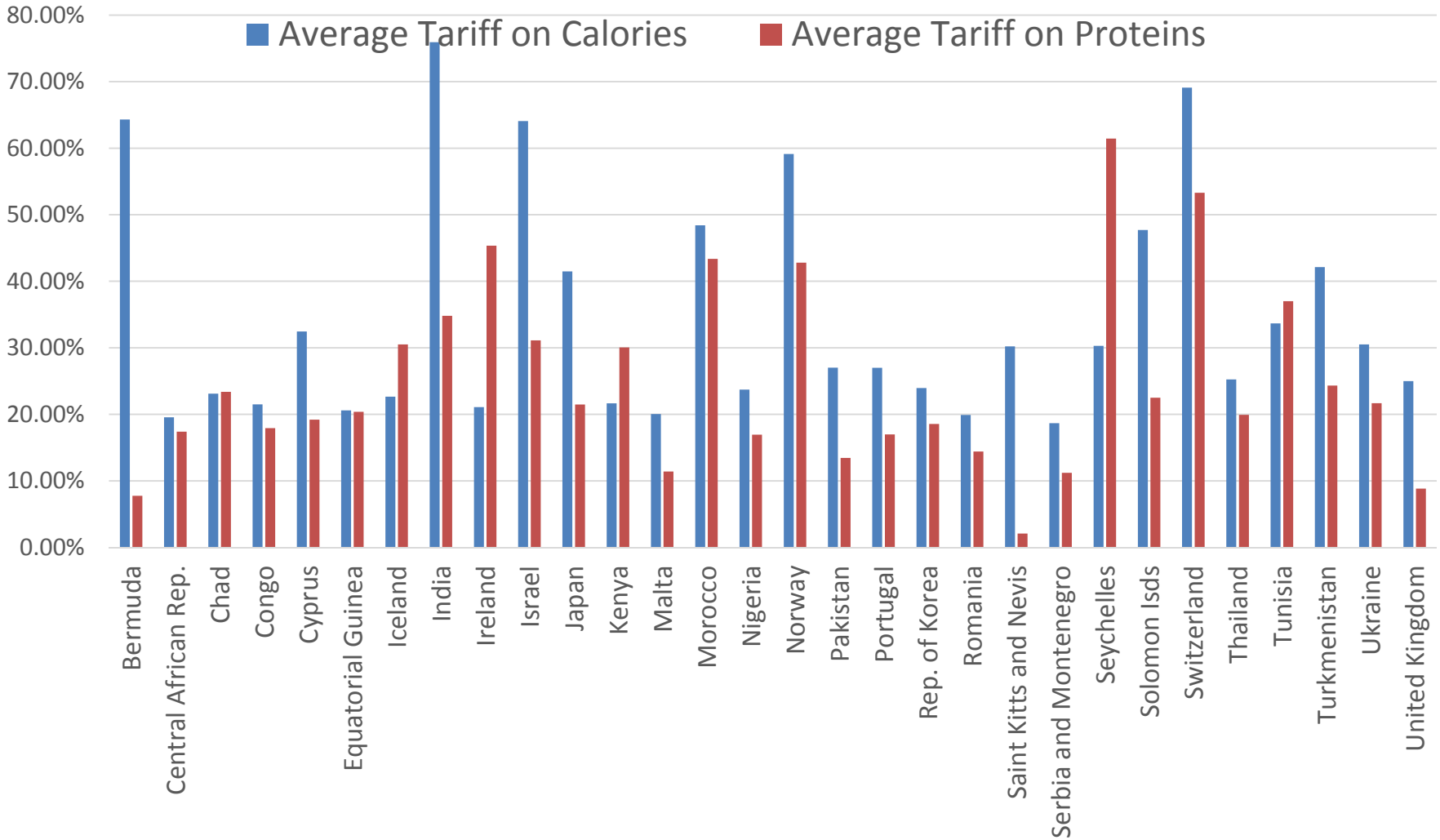
- In countries that don't have this: it is important first to build the necessary institutional arrangements to advocate for financial risk management instruments

- Use of weather or catastrophe risk transfer instruments should be specially considered

Medium and long term policies

- Pro-trade policies:
  - Improve Availability of food products (quantity). Trade allows to rely on world supply (large and stable)
  - At a low price. By definition, for importing countries : world price < domestic price, and in “real” terms: increasing income of households → trade liberalization
  - Of improved quality.
  - But trade openness generates winners and losers. It can increase inequalities!
    - Role for redistributive policies and safety nets
  - And some conflicting issues. FDI in land vs “land grabbing”: redefining property rights may lead to improved environmental sustainability but may lead also to social conflicts

Import tariffs on food products: a heavy burden for the poor



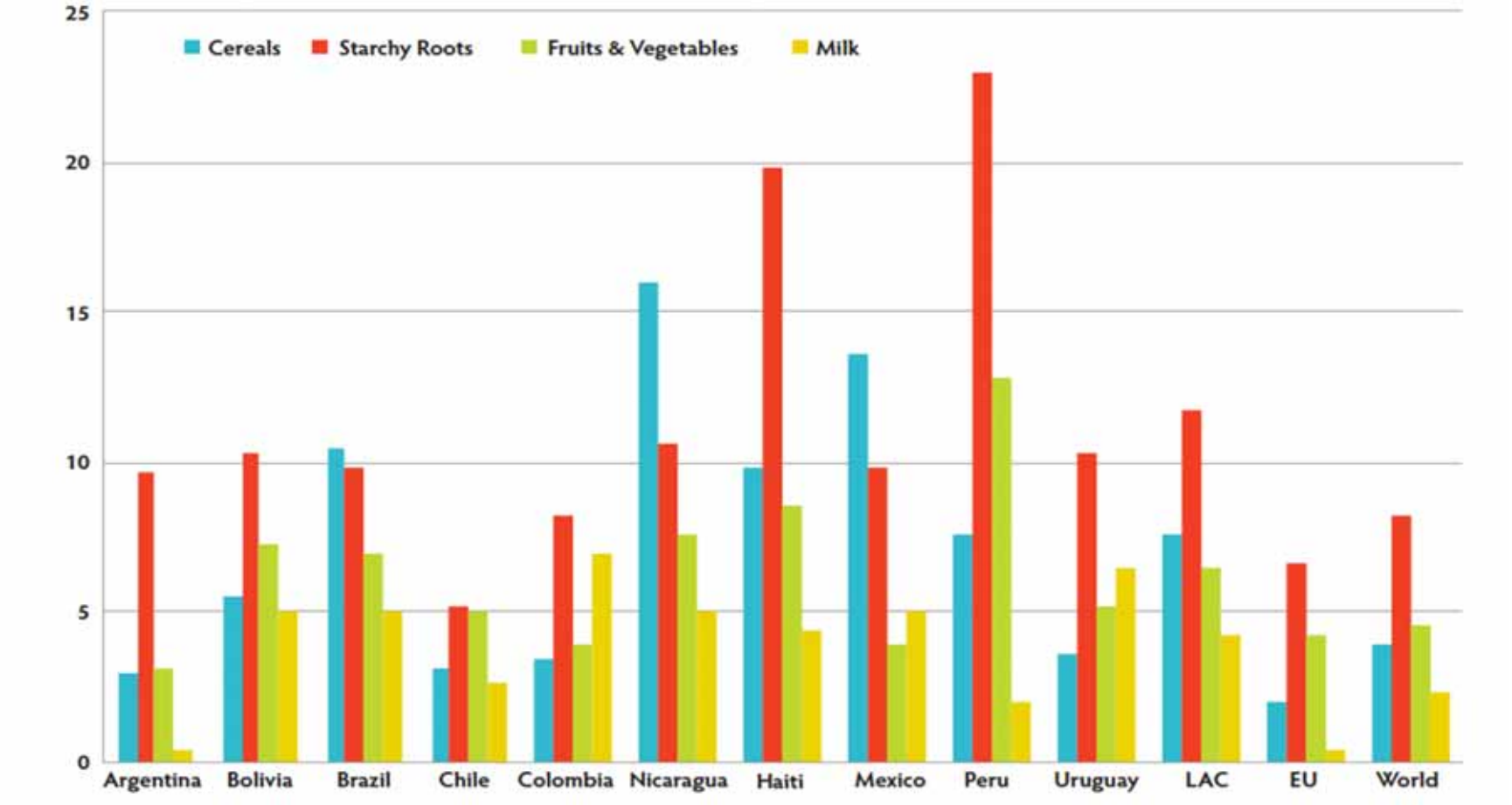
Source: Deason and Laborde (2010)

Medium and long term policies

- Policies to increase agricultural productivity and resilience
  - Input subsidies – Transitory, smart and well targeted input subsidies
  - Increase competition in the input industry
  - Investment in R&D
  - Investment in infrastructure – irrigation and roads
  - Policies to reduce post-harvest losses
    - Improved handling of harvests and storage practices

Importance of reducing post-harvest losses

Average % of post harvest losses



Source: J. Parfitt, M. Barthel and S. Macnaughton, Food Waste within Food supply chains: quantification and potential for change to 2050, Biological Sciences, 2010

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    - Improved handling of harvests and storage practices
    - Information systems
    - Rural roads

Thanks!