

The Nexus of Forests, Food, Agriculture, Energy, Water and Poverty in A Dynamic World of Globalization, Climate Change and Technological Change

Implications for Future Financing for
"Optimal Land Use"

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Diverse Forest Management Capacities and Global to Local Impacts

Diverse Countries, Diverse Forests, Diverse Forest Values

Countries Ranging in Scale Of pop and forests

- Mega Countries 2 - pop 2.2 billion
- Large Countries 200m+
- Medium Size Countries - 100 to 200m
- Moderate Size Countries 50 to 100m
- Small countries
- Island States

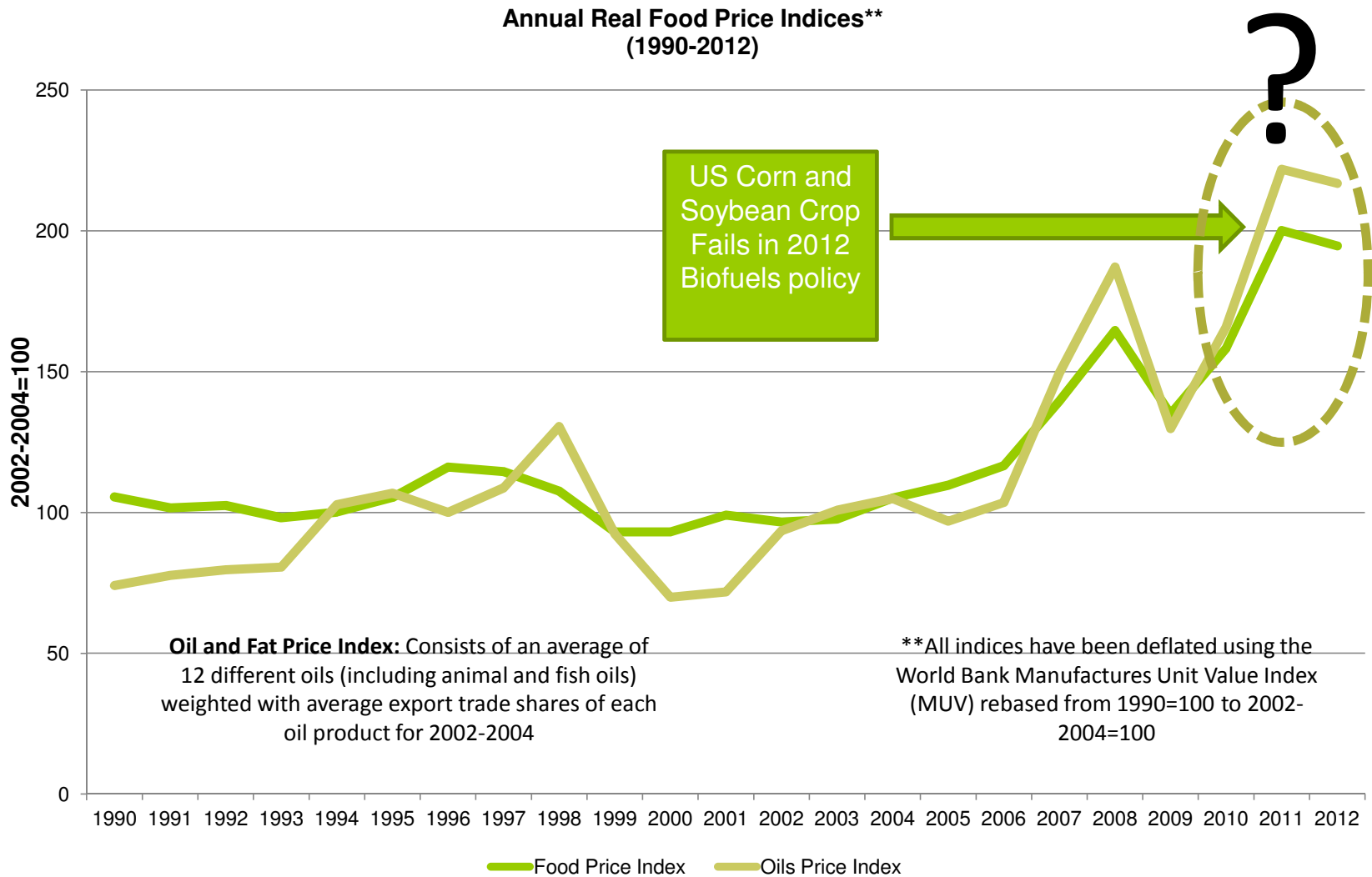
Diverse Forest Types and Trees Outside Forests

- Tropical
- Primary
- Secondary
- Temperate
- Boreal
- Dry land

Forests and Agriculture in Economic Transformation

- Declining share of forests and agriculture in GDP and employment
- Rural-urban migration
- Increased Demand for Land for service and manufacturing
- Demographic transition
 - reduction in population growth rates and
 - Reduction in poverty through labor transfers from agriculture and forestry to the urban sector.
- Agricultural Lands back into (Secondary) Forests
- Loss and (regain of some?) Biodiversity
- Payments for Environmental Services to Protect Ecosystem Functions
- Mosaic of Land Use-Including Community Forestry for Indigenous Peoples

Food and Energy Price Rises, Volatility, Financial Crisis have brought Food Security Back in 2007-2008, as in 1972



Source: www.fao.org/worldfoodsituation/en/

How Will Forests Fare In the Changing Dynamics?



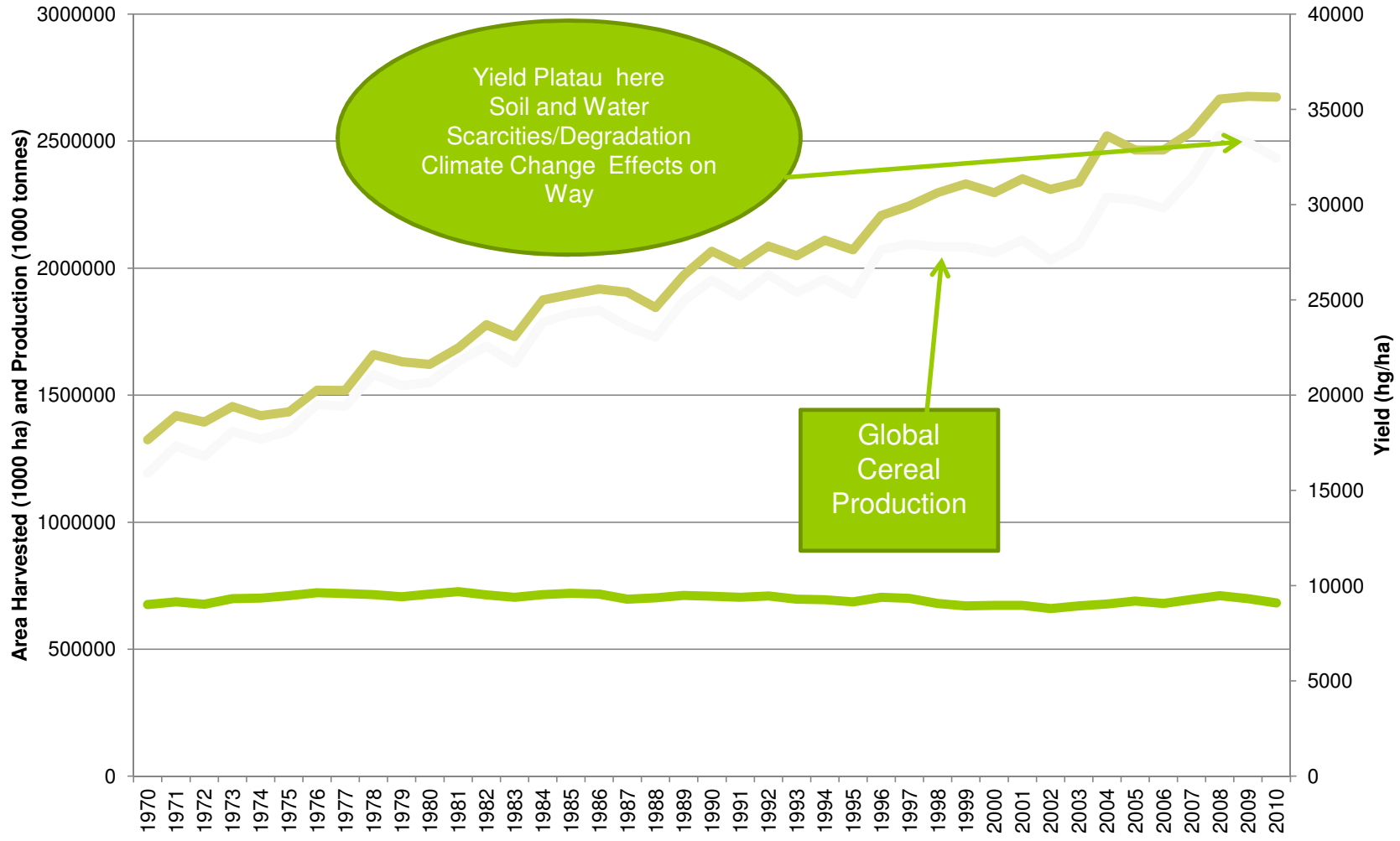
How Will External Factors Affect Forests?
Domestic Policy and Institutional Capacity
for Decision-Making
Under Complex Trade-offs and Uncertainty

Recent Myths Dispelled

Brian Wright, Fuglie, Josef Schmidhuber

1. Price rise and volatility result from low stocks, increases in biofuels
2. Recent food prices are not the highest nor more volatile
3. Yet Food and Energy Price Increases have Potentially Profound Implications for future land use changes (including lands under forests, pastures) and food insecurity of the poor

Yield Growth Powered Global Cereal Production (1000 tonnes), Net Area Harvested (1000 ha) remained almost stable (1970-2010)



Source: FAOSTAT

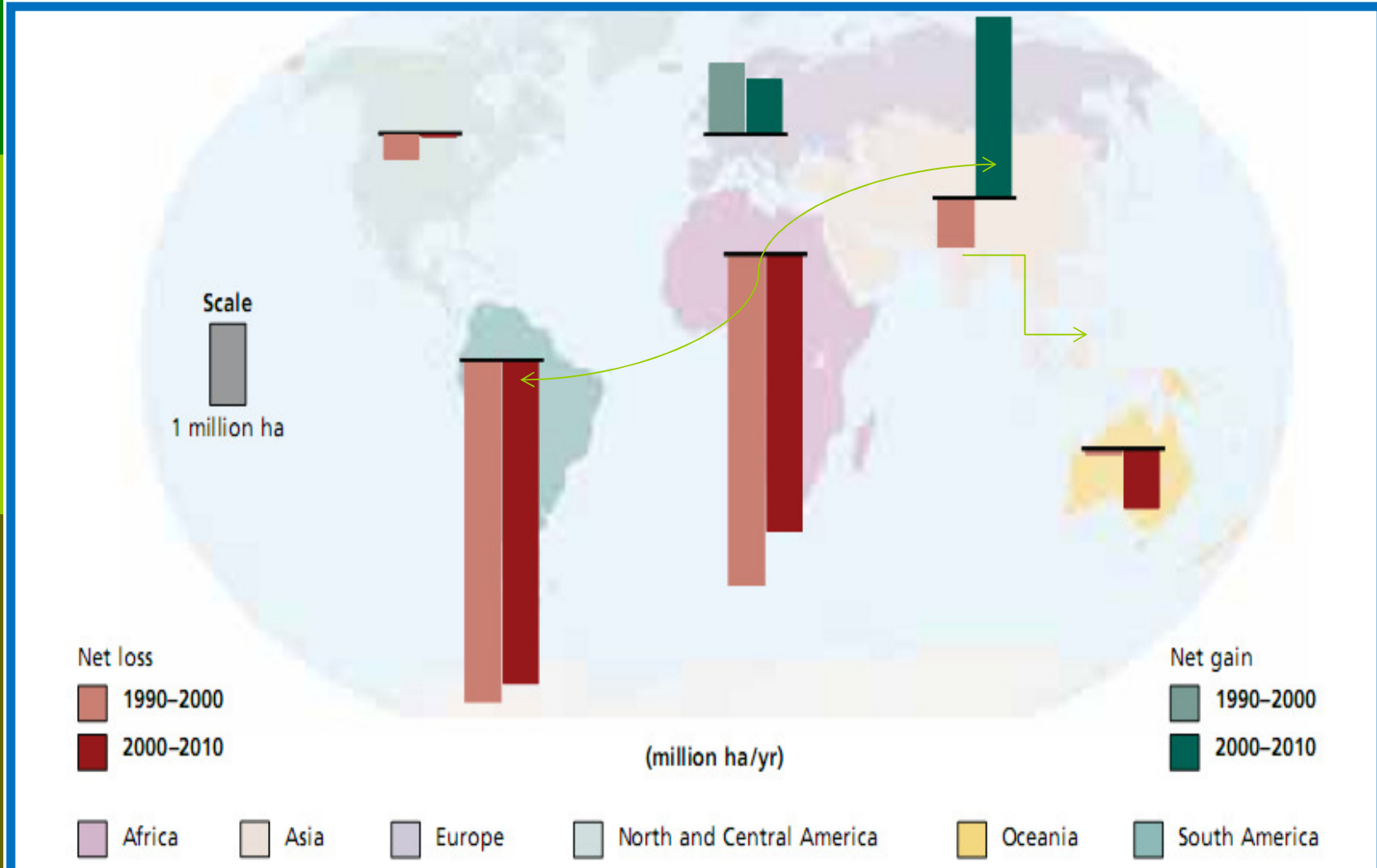
Area Harvested (1000 Ha) Production (1000 tonnes) Yield (Hg/Ha)

Inter-Connected “Insecurities” — and Trend to Move From MDGs to SDGs

- At National and Sub-National Levels:
 - Poverty, Water, Food, Fuel, Nutrition Insecurity, Forest Loss, Climate, Soil and Land Degradation
- At the household level:
 - Unclear relationship between income growth and changes in food consumption—in India
- Acute Infant and Child Mortality
- Women facing collective “Insecurities” of hunger, fuel wood, water, sanitation, diseases

Lele, Agarwal, Goswami, AAEA 2011

Extent of Annual Change in Forest Area by Region (1990–2010)



(Often) Unquantifiable Changes in Natural Resources Accompanying Forest Loss

- Extent of Forest Degradation
- Watersheds lost or threatened
- Excessive Groundwater Exploitation
- Increased Salinity
- Still Huge Dependence on Fuel wood as source of energy among the poor
- More Trees Outside Forests

Long Term Global Food Challenge

9 Billion + in 2050: Cereal Production (Net of Biofuels) Increase by 70%,
Meat production: 220%, Cereal Imports of Developing countries by 220%

On Demand Side

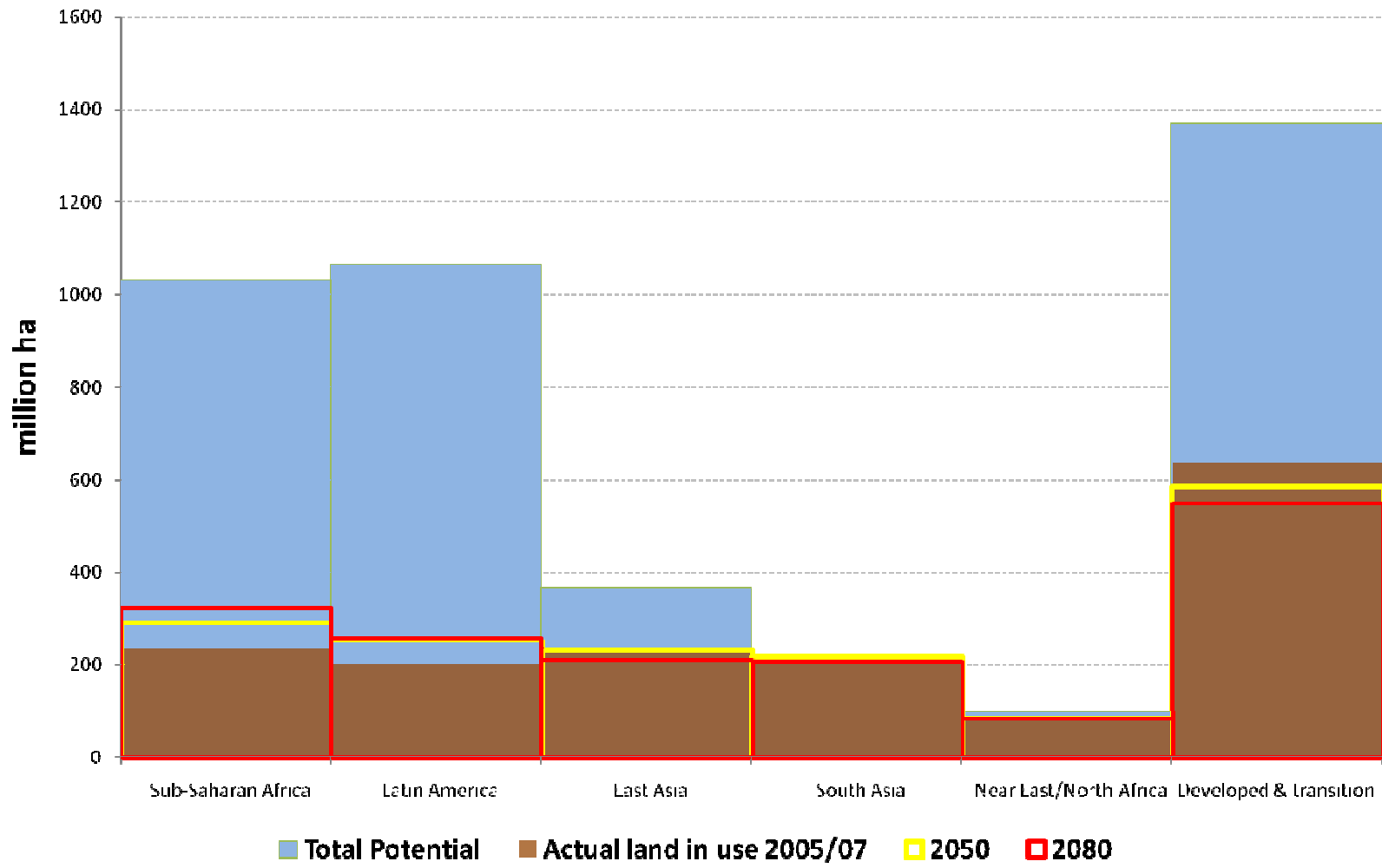
- Population Growth:
 - Almost all in SSA and SA
 - But Declining Growth Rates
- Income Growth:
 - Mostly in Developing Countries
- Urbanization Levels:
 - Up from 50% to 70%
 - Rural Population Will shrink
- Shift in Food Consumption Patterns:
 - Rice, Wheat, Maize, Soybeans for Feed
- Biofuels: maize, oilseeds
- Processed Foods

On Supply Side

- Slowing Yield Growth
- Climate Change
- Limits to Land, Water, Soils, Biodiversity, Forests, Fisheries
- Last Frontiers?
 - LAC, SSA, Eastern Europe
- Increased Market Related Risks and Uncertainty
- DE capitalization of Agriculture - Investment in R&D

Where Will Future Food Production Growth Come From?

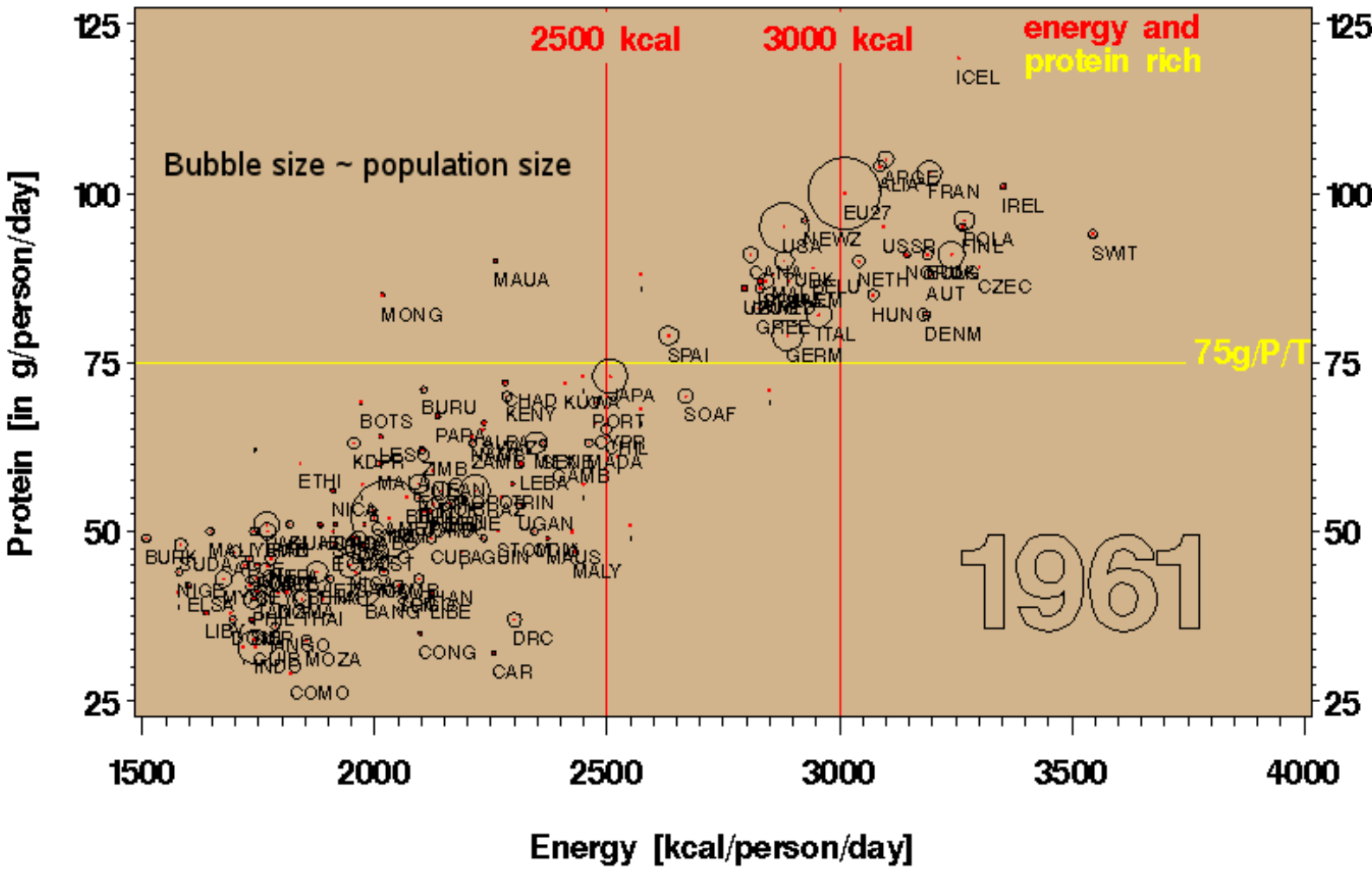
Land Potential for Rain fed Production, Actual Use in 2005/07, 2050 and 2080



Loss of Pastures, Grasslands and Forests?

- Much of the remaining land and water balance in Slide #12 (2.6 billion ha) is:
 - unevenly distributed
 - under forests, protected, under settlements
 - suitable for only a few crops
 - suffering from one or more constraints
- Crop land change is a net change!
- What about land degradation? Its magnitude and scope?
- LUC = GHG emissions, loss of biodiversity

Energy and Protein Content of the Diet, Total Availability (1961-2080)



Source: AT2050/80, Josef Schmidhuber, 2011 14

“Biofuels Are a Wild Card” -- Thomas Hertel

They could affect Croplands, Grasslands, Permanent Crops and Forests

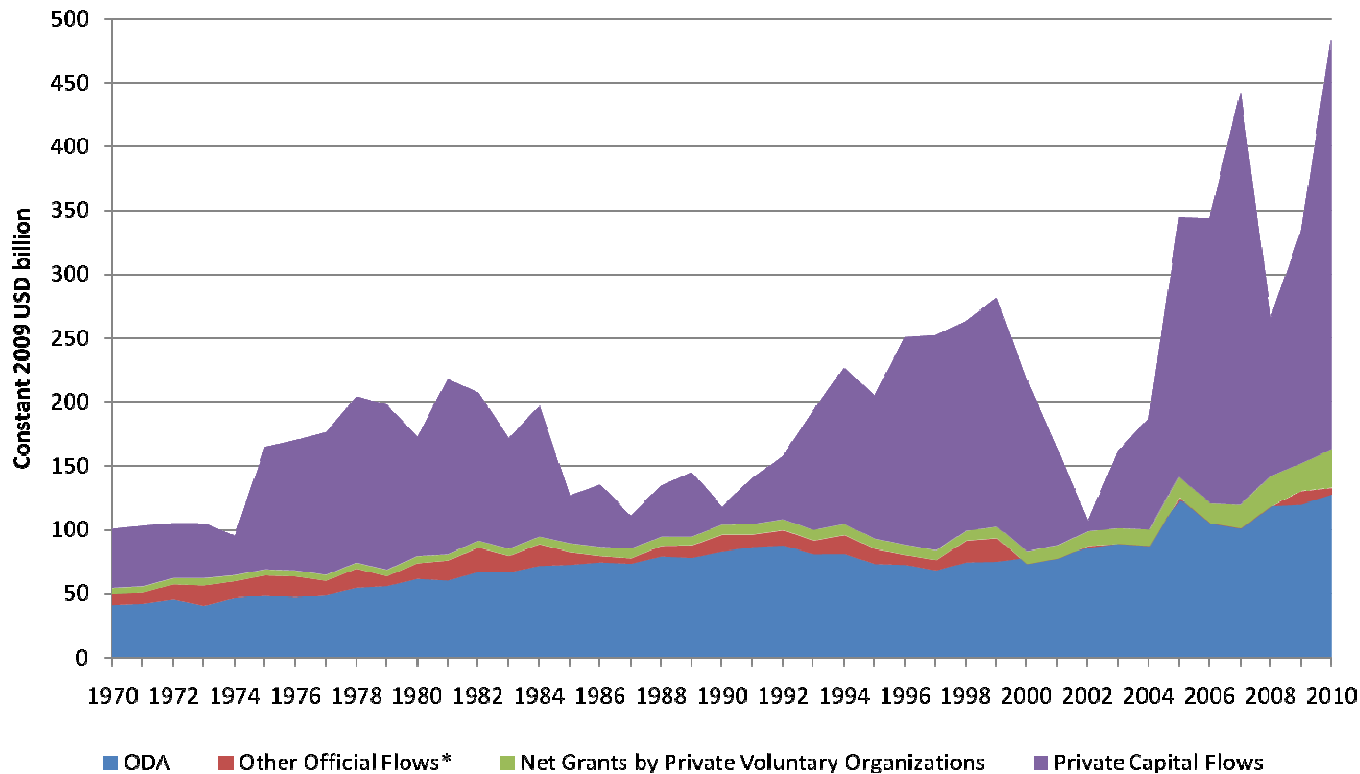
- “Food-competing biofuels ***can do more harm to the welfare of poor and landless***, globally, than ***the greatest conceivable aid efforts or productivity increases could compensate***” -- Brian Wright
- First generation biofuels ineffective for climate change
- Second generation (Cellulosic ethanol) could be more effective, but “if it is perennial crops, and compete with food production, could be worse than annual crops, because inflexibility” -- Brian Wright
- ***“Flexible Crops with possibilities to switch could be the future name of the game”*** -- Alain Karsenty

Reasons: Trade Offs!

- Low income elasticity of demand for food
- High income elasticity of demand for energy (e.g., Transport)
- Small share of biofuels in total energy use
- Increased demand for biofuels due to OECD mandates and subsidies for biofuels
- Possibility of substitution among fuels depending on relative prices and technologies
- **Opportunity Cost of Land Use Matters**
- **Growing International Private Investment in Land?**
- Reduced supply of land due to urbanization
- “Climate change mitigation policies leading to Rising Demand for Ecosystem services could come at the cost of food security for the poor”-- Hertel

Growing Private Capital Flows and Multinational Investments Call for Improved Global and Local Governance of Natural Resources and Commodities

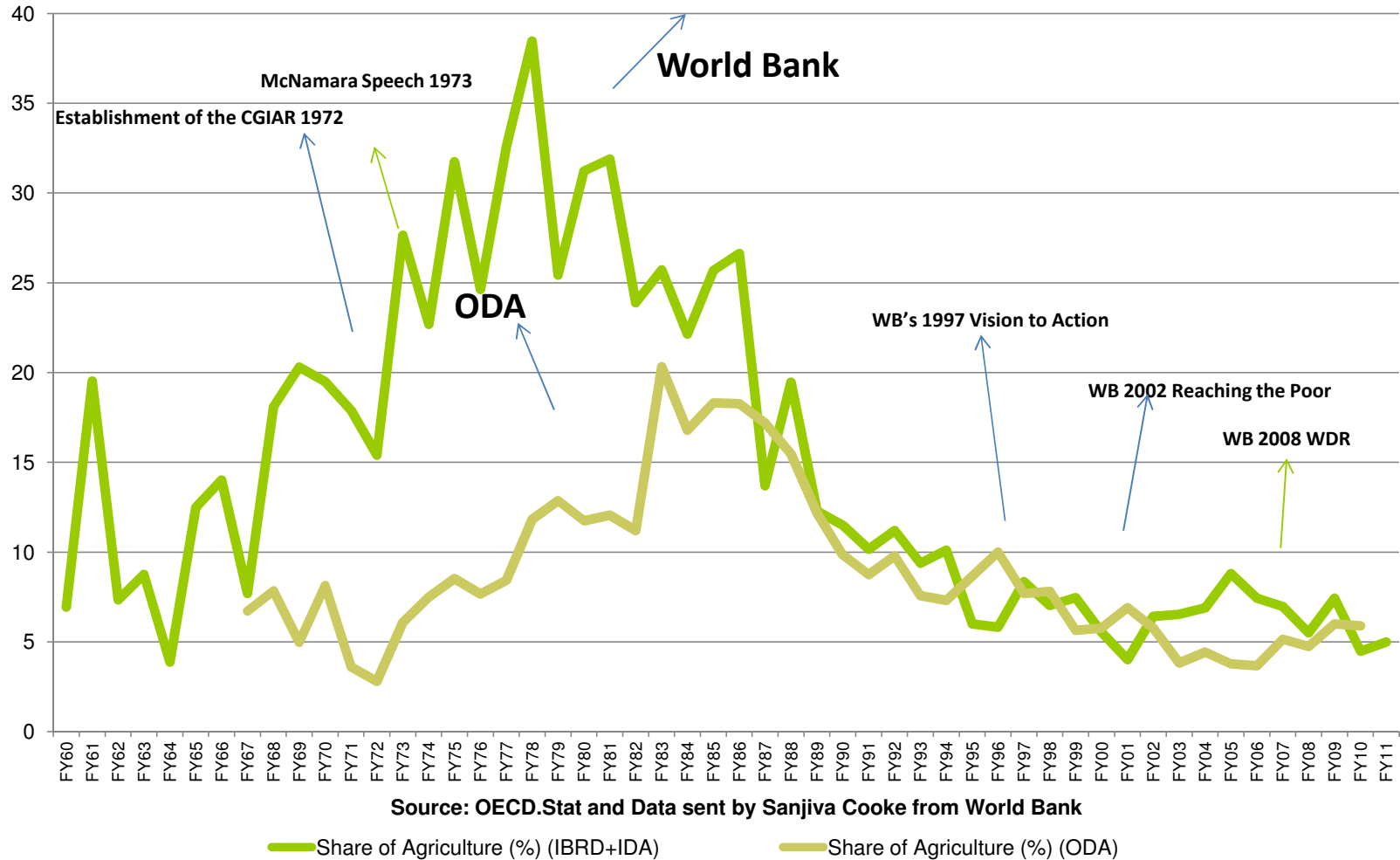
DAC & Non-DAC Members' Total Net Resource Flows to Developing Countries (1970-2010)



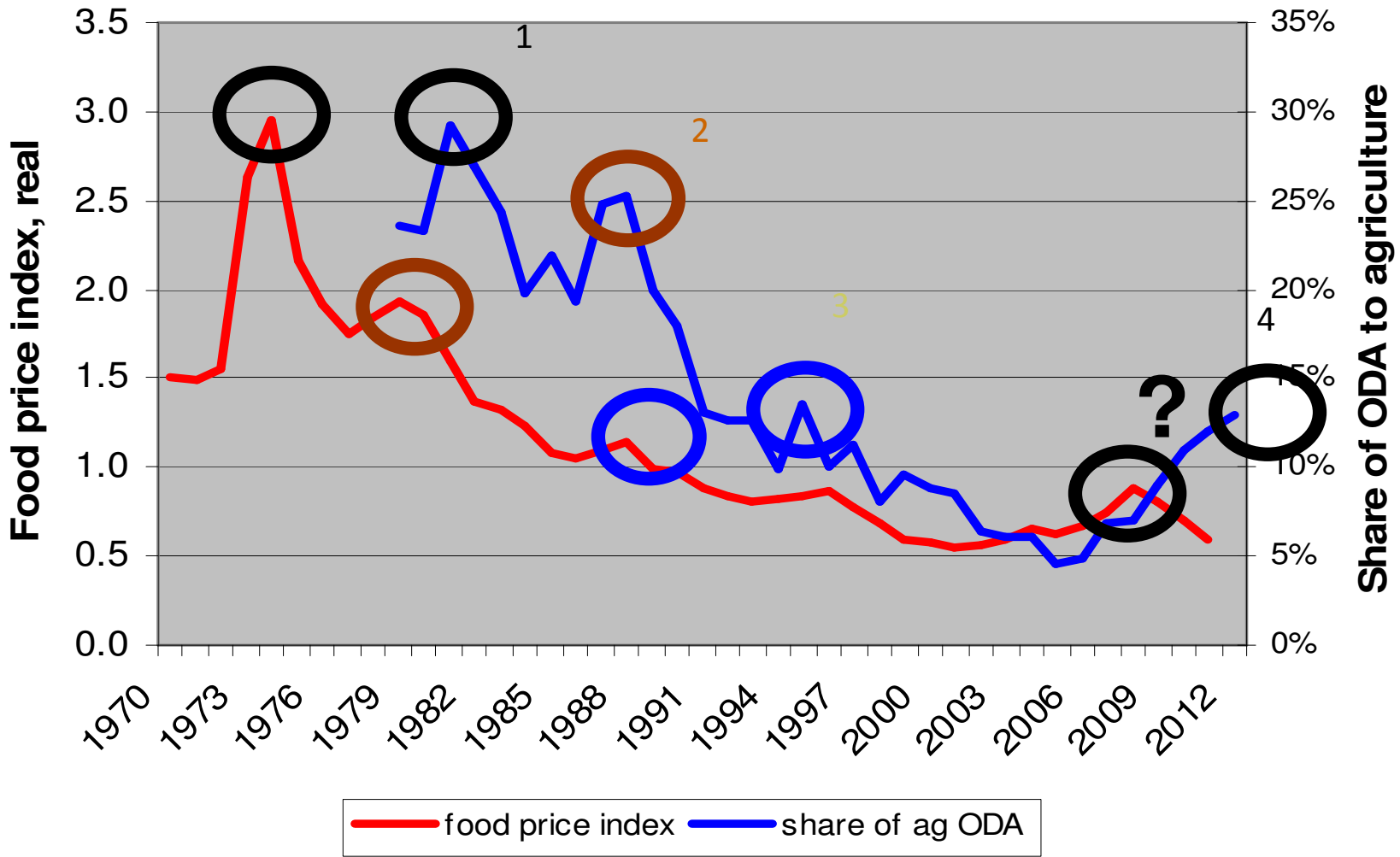
* Net OOF flows were negative in 2000-01, 2003-04 and 2006-07 & 08.

Source: <http://stats.oecd.org/Index.aspx?DataSetCode=CRSNEW>

Donor Support to Agriculture & Forests has Weakened



Food price index vs. share of agricultural ODA



Changes In Expectations From “Aid”

- Linking aid to output delivery is changing the character of aid
 - E.g., Cash for School Attendance, Carbon Sequestration, REDD readiness
- Increasing focus on outcomes and impacts as a condition for receiving aid
- Shifting focus from aid effectiveness to development effectiveness
- From macro growth indicators to household outcomes and impacts
 - e.g., nutrition, child survival
- From MDGs to SDGs
- Score Cards for (1) Countries, (2) International Organizations, and (3) Donors too?

Concluding Thoughts

- Landscapes will matter far more in the future than in the past
- Increased Complexity in Land Use Changes
- Growing Importance of Markets
- Tenure and Governance Will Need More Attention if Short Term Efficiency is not to trump Equity and Sustainability
- Future aid/PES should focus on improving policy capacity to deal with realities of developing countries on the ground and of Changes in the External Environment!

Future Nature of International Cooperation?

Thank You