

International Assessment of Agricultural Science and Technology for Development (IAASTD)

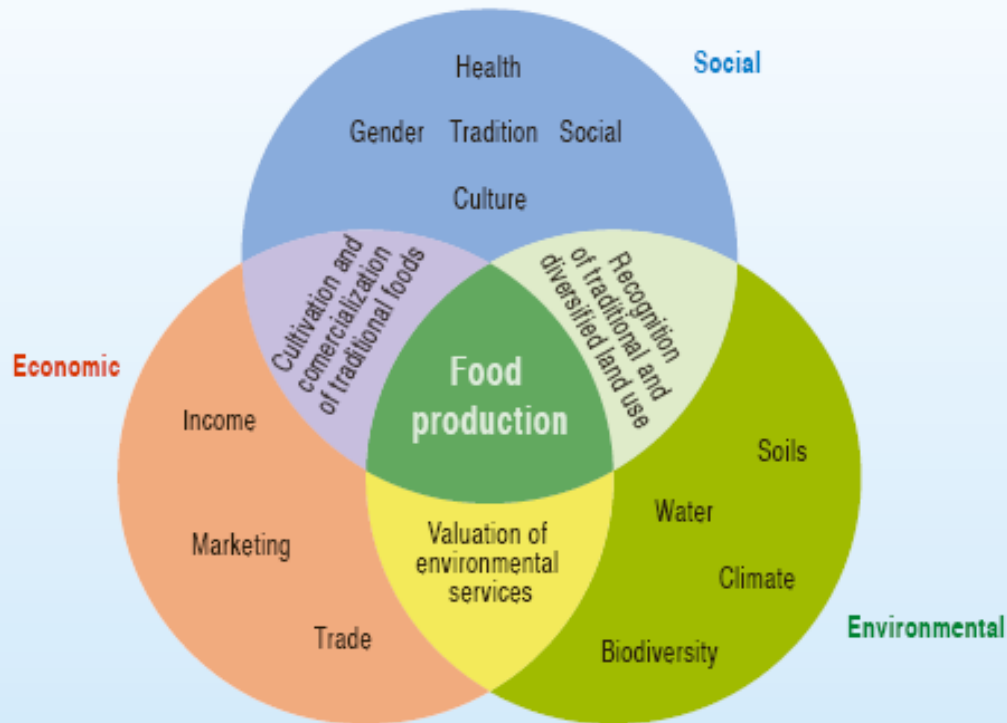
Main Findings

Hans Hurni, Co-ordinating Lead Author,
IAASTD Global Chapter 1, and Author,
Summary for Decision Makers and Synthesis
Report

Brigitte Portner and Markus Giger,
Contributing Authors, Global Chapter 1

Multifunctional perspective of agriculture

The inescapable interconnectedness of agriculture's different roles and functions



IAASTD 2008

Approximately 2.6 billion people – men, women and children – directly rely on agricultural production systems.

The IAASTD

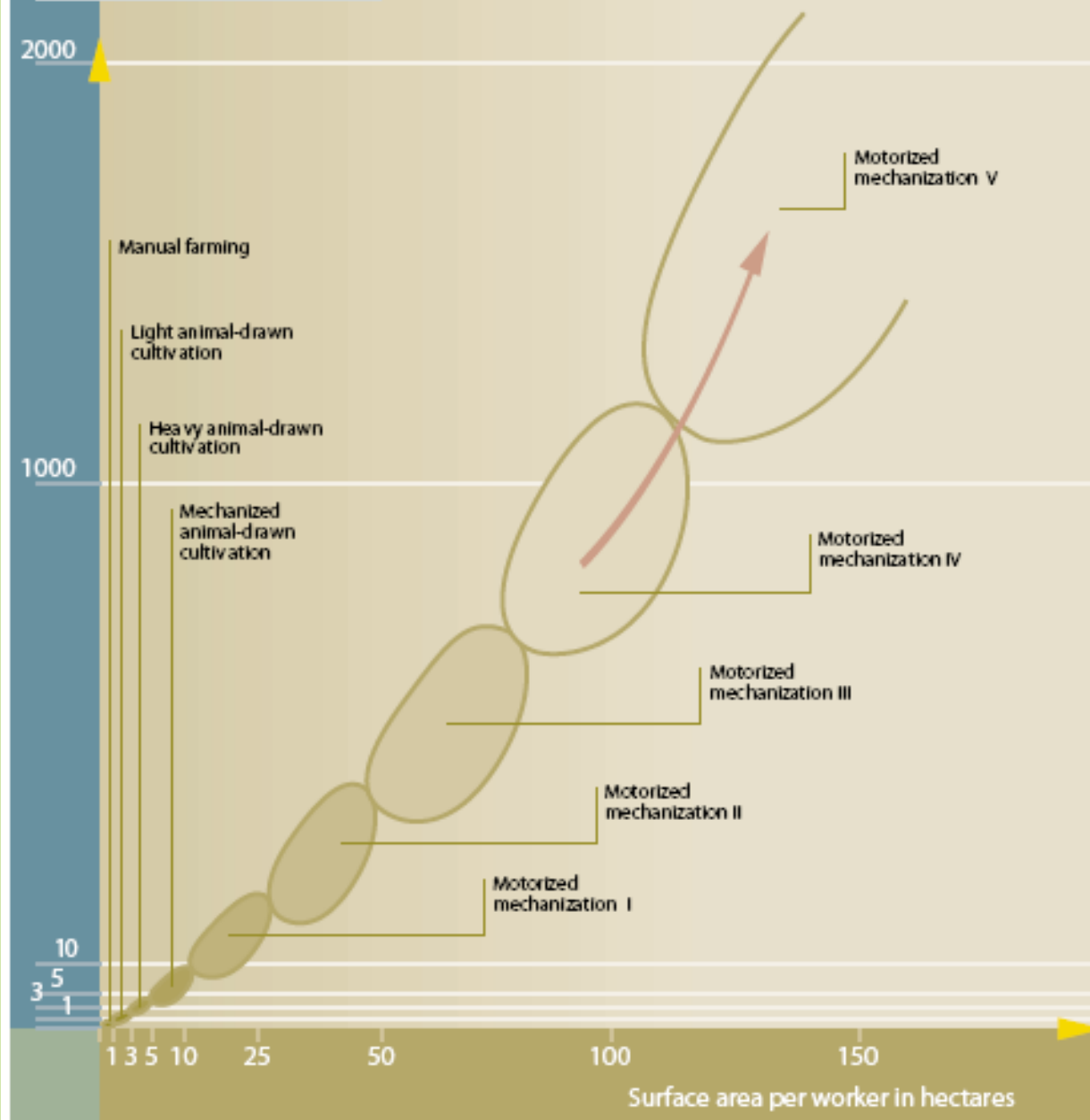
- Inter-Governmental process with multi-stakeholder bureau comprising government and civil society
- Co-Sponsors: FAO, GEF, UNDP, UNESCO, World Bank, WHO
- Multi-thematic, multi-spatial, and multi-temporal
- 400 experts authored the reports
- Peer reviewed by governments and experts
- Approved by over 60 governments

Development goals of the IAASTD

- Reducing hunger and poverty
- Improving rural livelihoods
- Improving nutrition and human health
- Facilitating environmentally, socially, equitable and economically sustainable development

Quantity of cereal produced per worker in tonnes

Stages of development of agricultural equipment and motorized mechanization



Mazoyer and Roudard 2006





Farm size by world region

World region	Average farm size, ha
Africa	1.6
Asia	1.6
Latin America and Caribbean	67.0
Western Europe	27.0
North America	121.0

von Braun 2005

A major challenge: The small scale farmer

Pro-poor progress requires:

- creating opportunities for innovation and entrepreneurship which targets this group
- Increased public research and extension investment

Small scale farm sustainability – poses difficult policy choices

- Payment for ecological services



Never before has it been more important for the world to generate and use Agricultural Knowledge, Science and Technology (AKST)

IAASTD GSDM 2008

Key questions

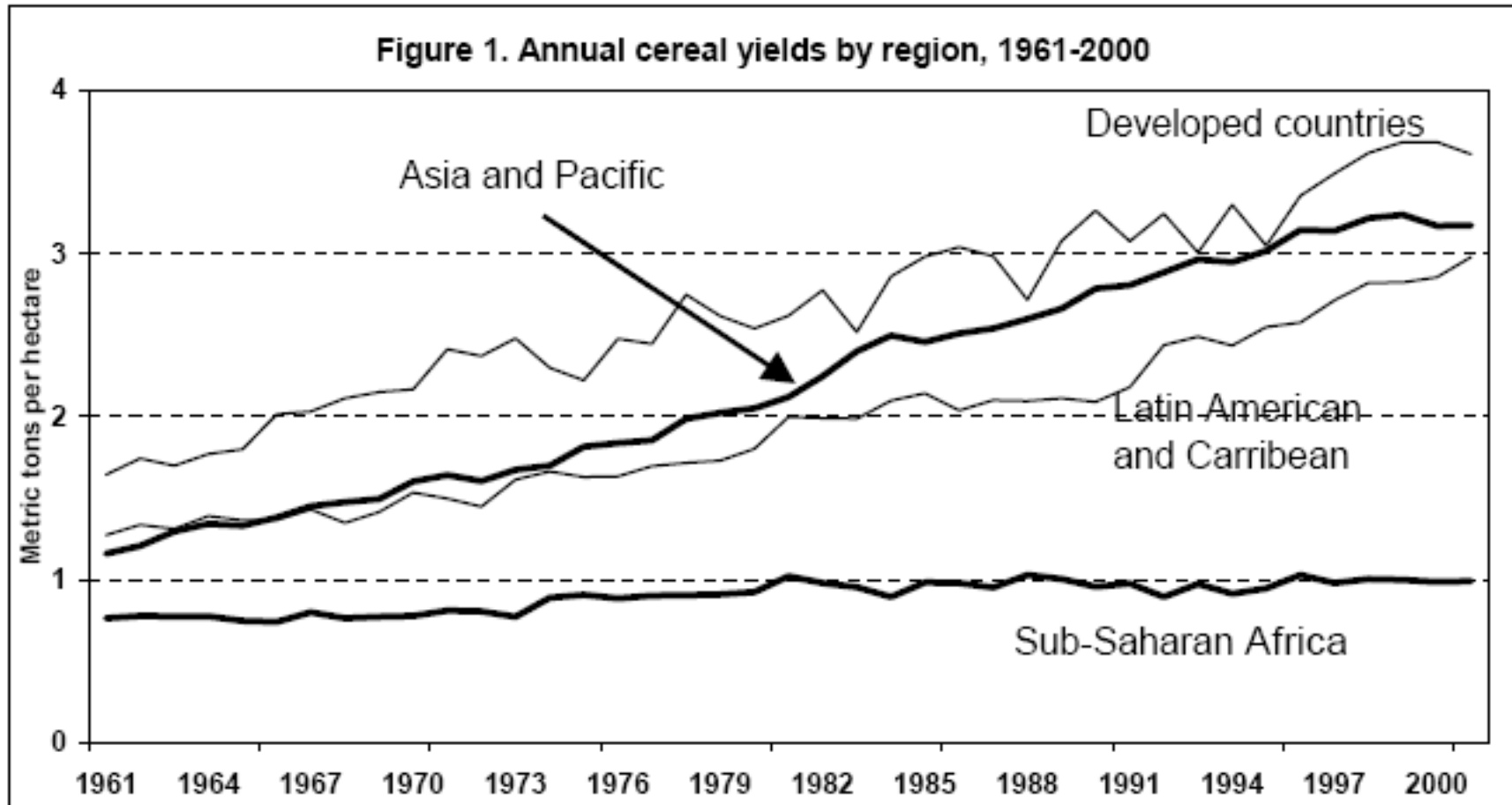
- Agriculture for development or agriculture in development?
- How many can make their living in other sectors than agriculture and/or in urban centres?



Environmental problems

- Biodiversity loss
- Water availability
- Soil degradation
- Pesticides
- Climate change

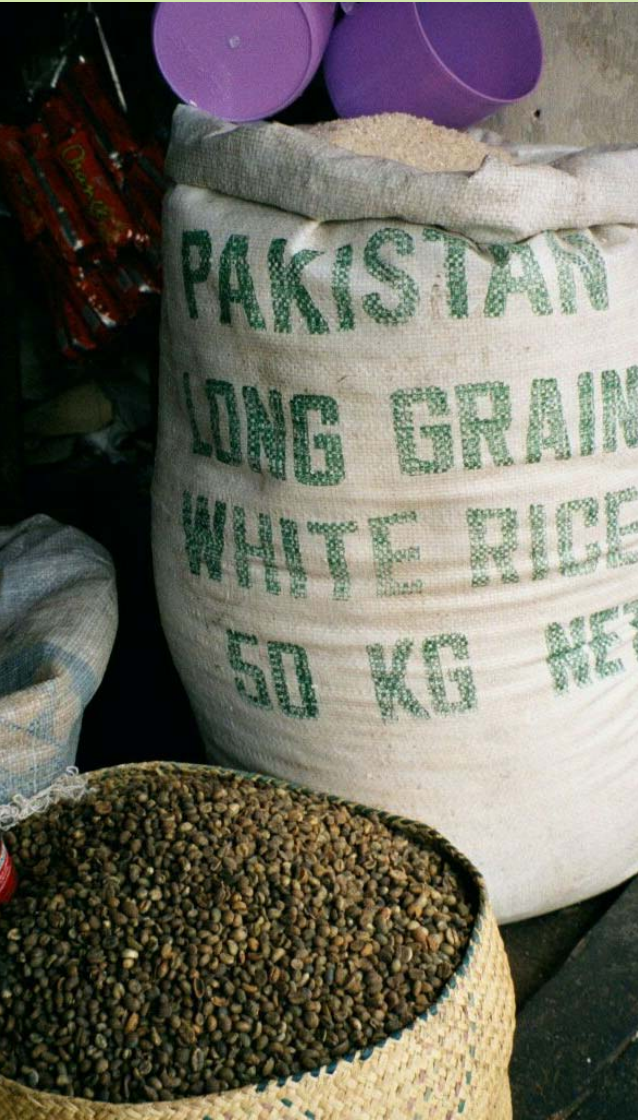
Challenge: food security



Source: FAO Stat database: <http://faostat.fao.org/faostat/collections?version=ext&hasbulk=0&subset=agriculture>.

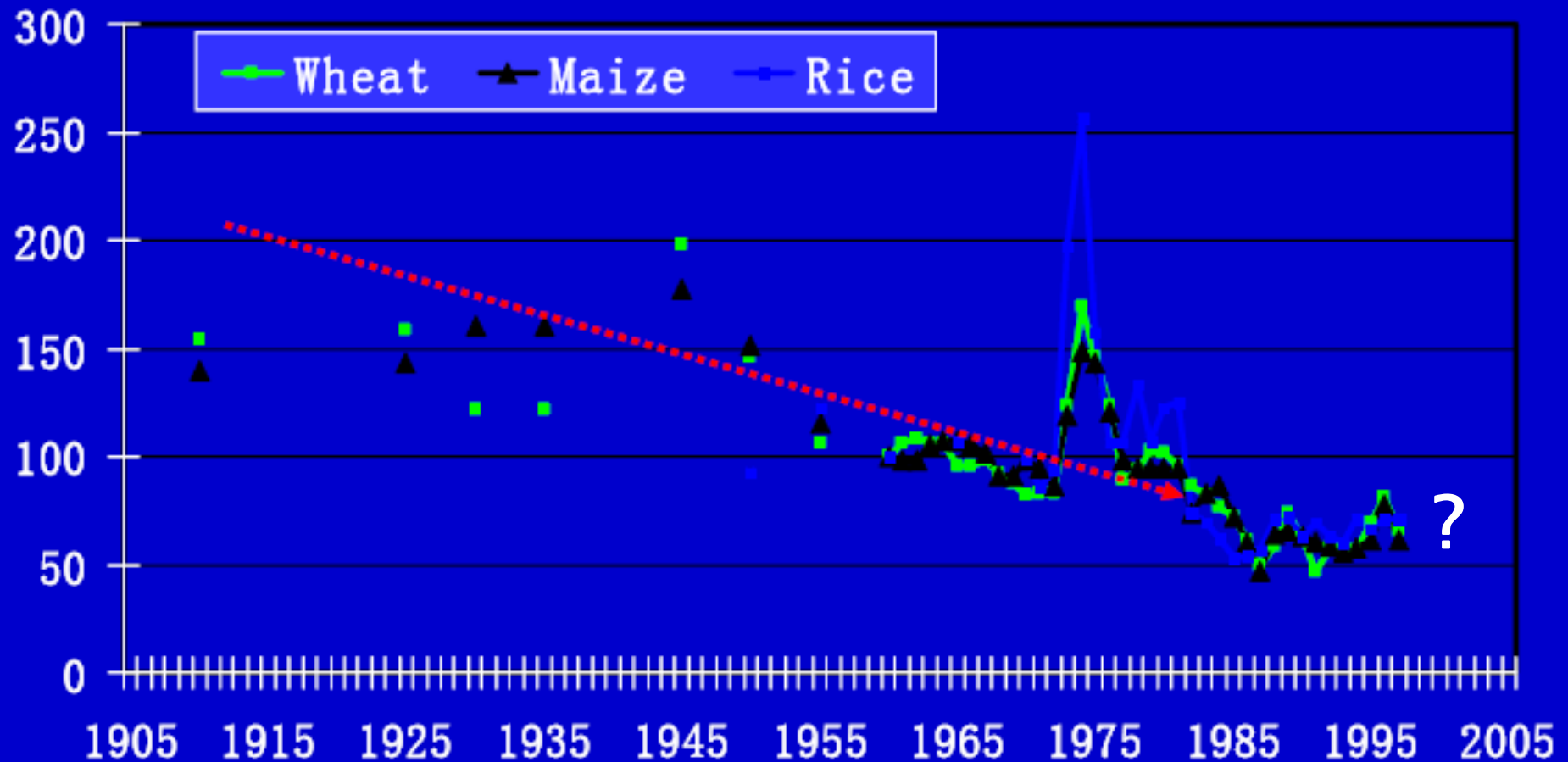
Annual cereal yields by region, 1961–2000
(FAOSTAT in: Jayne et al., 2005)

Challenge: food security



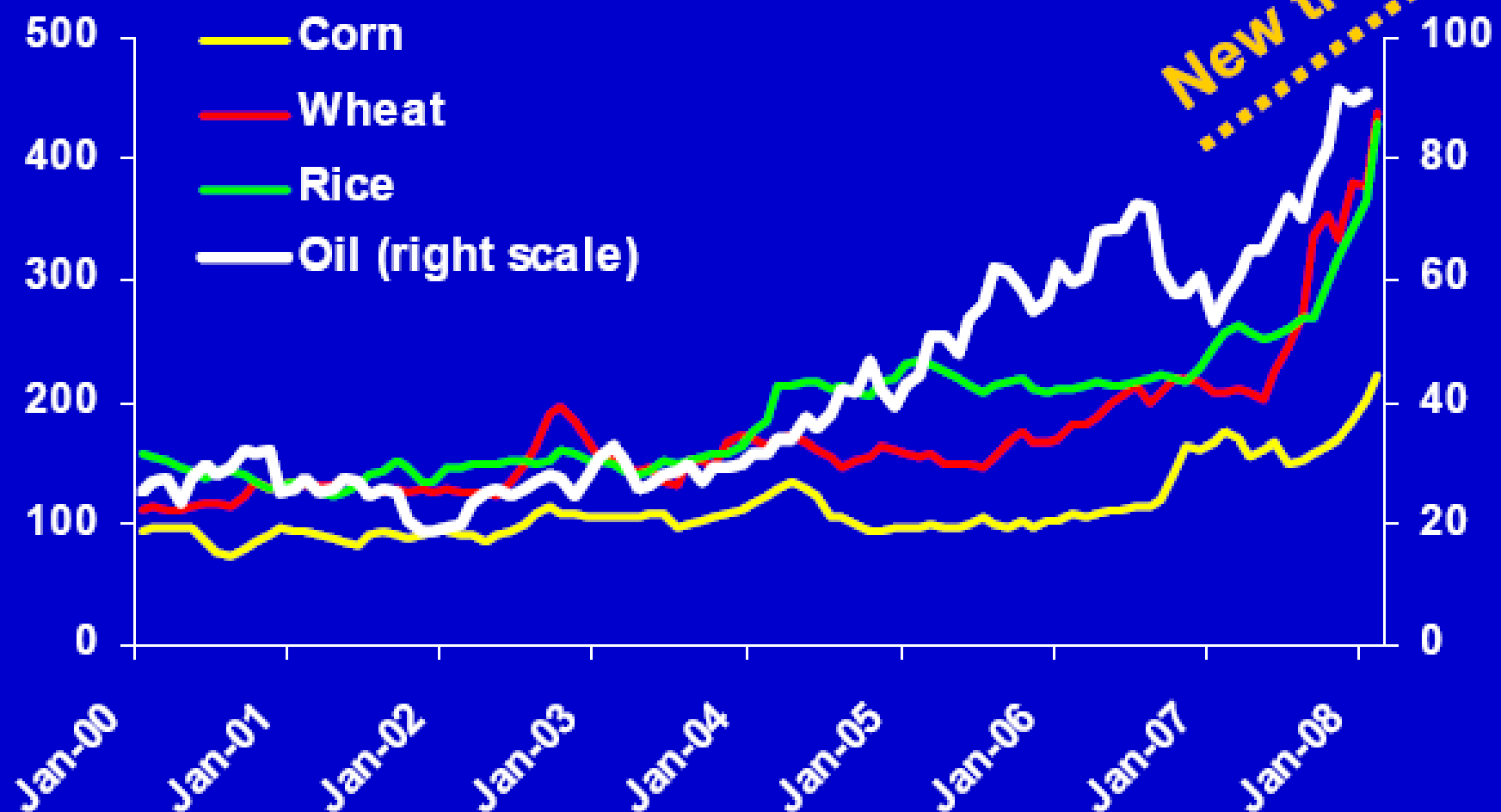
Cereal Price - Index 1905 - 2000

(All prices = 100 in 1960)

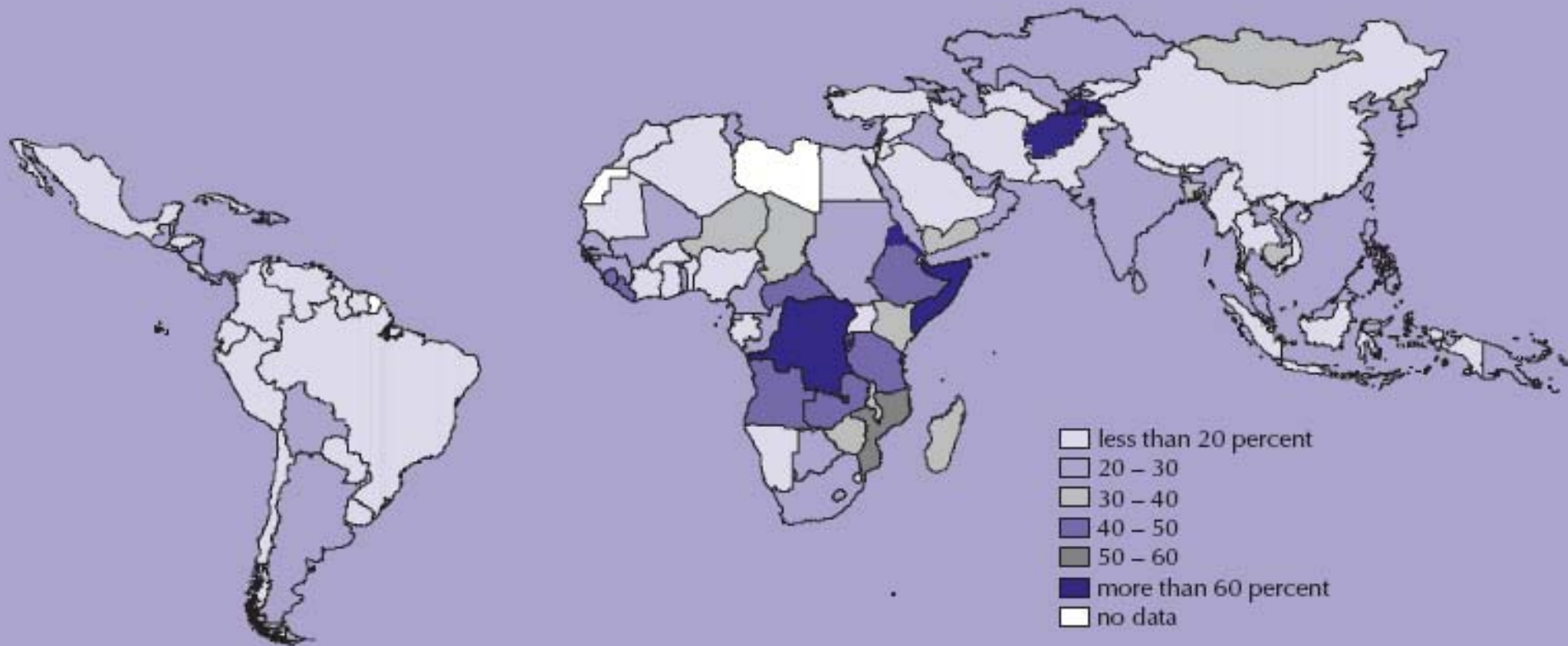


The new situation: Surge in prices

Commodity prices (US\$/ton)



Options for action: enhancing food security



Prevalence of undernourishment – proportion of the population unable to acquire sufficient calories to meet their daily caloric requirements, 2003 estimates (FAO 2003 in: Rosegrant et al., 2006)

Options for action: enhancing food security

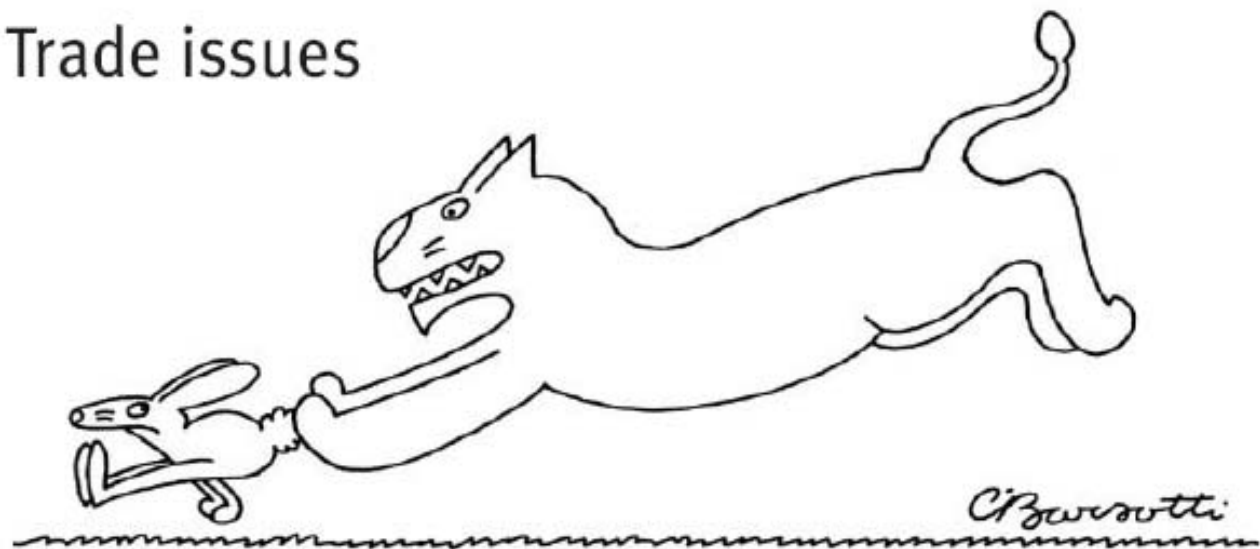
- High benefits of agricultural research has been proven
- More integrated application of formal and informal S&T is needed
- Broad range of technologies is needed (scientific and local)
- Appropriate policies and institutional arrangements needed

Options for action: using natural resources in a sustainable way

- Improving low impact practices
- S&T should focus not only on food production but also on social and environmental functions
- Improved policy framework and Incentives for sustainable management



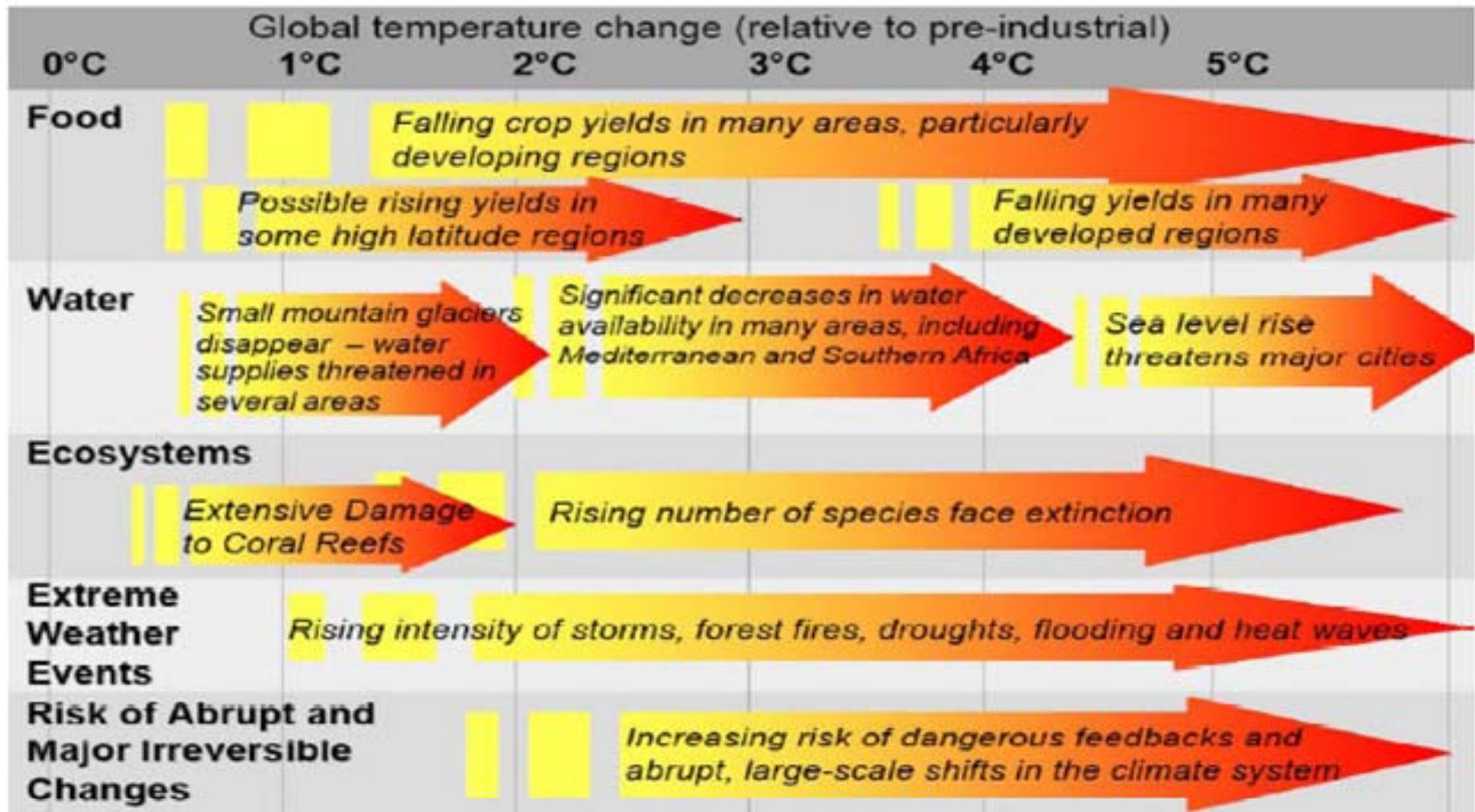
Trade issues



"What are you complaining about? It's a level playing field."

Opening national agricultural markets to international competition can offer economic benefits, but can lead to long term negative effects on poverty alleviation, food security and the environment without basic national institutions and infrastructure being in place

The challenge: climate change

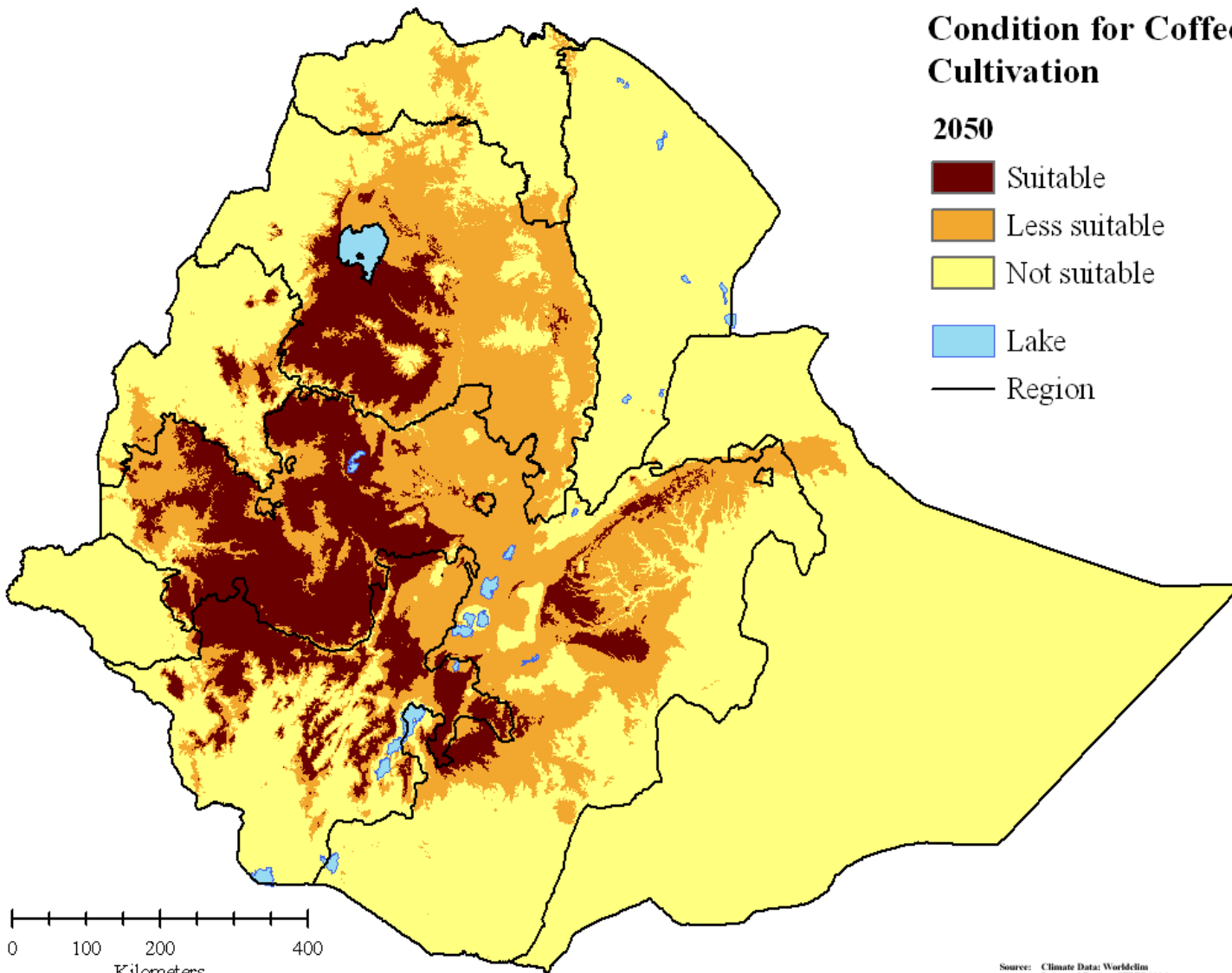


(Stern Review 2007)

Adaptation to climate change

- Important challenge for agriculture
- Climate change constitutes an additional stress to local systems
- High degree of uncertainty about regional climate change scenarios

Coffee Cultivation Area in Ethiopia



Condition for Coffee Cultivation

2050

- Suitable
- Less suitable
- Not suitable
- Lake
- Region

Current conditions (1950-2000)






Prediction for 2050 under climate change

Rueeggsegger 2008

Coffee Cultivation Area in Ethiopia

Condition for Coffee Cultivation

2080

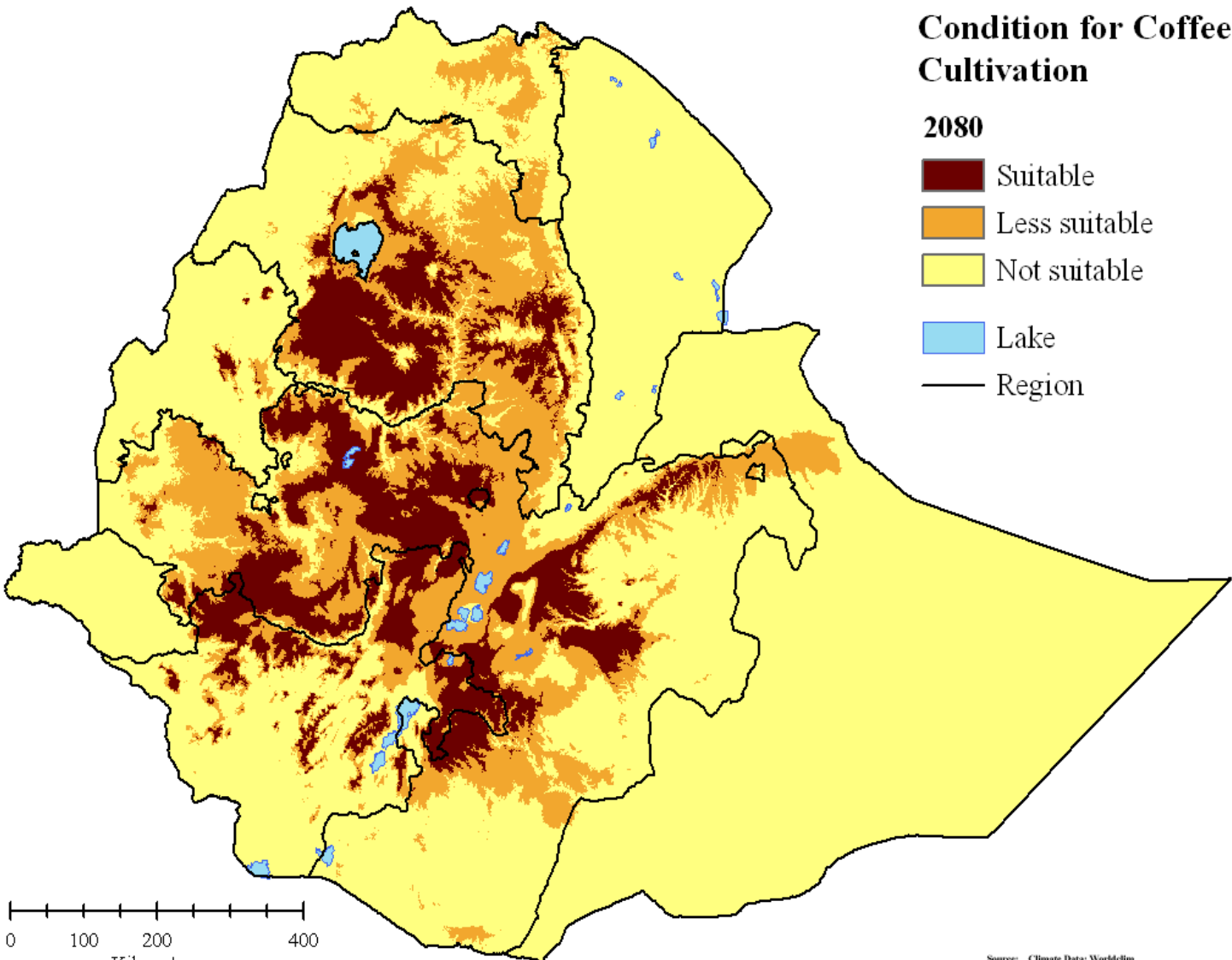
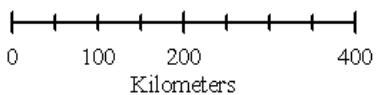
-  Suitable
-  Less suitable
-  Not suitable
-  Lake
-  Region

Current conditions
(1950-2000)

Prediction for 2050
under climate
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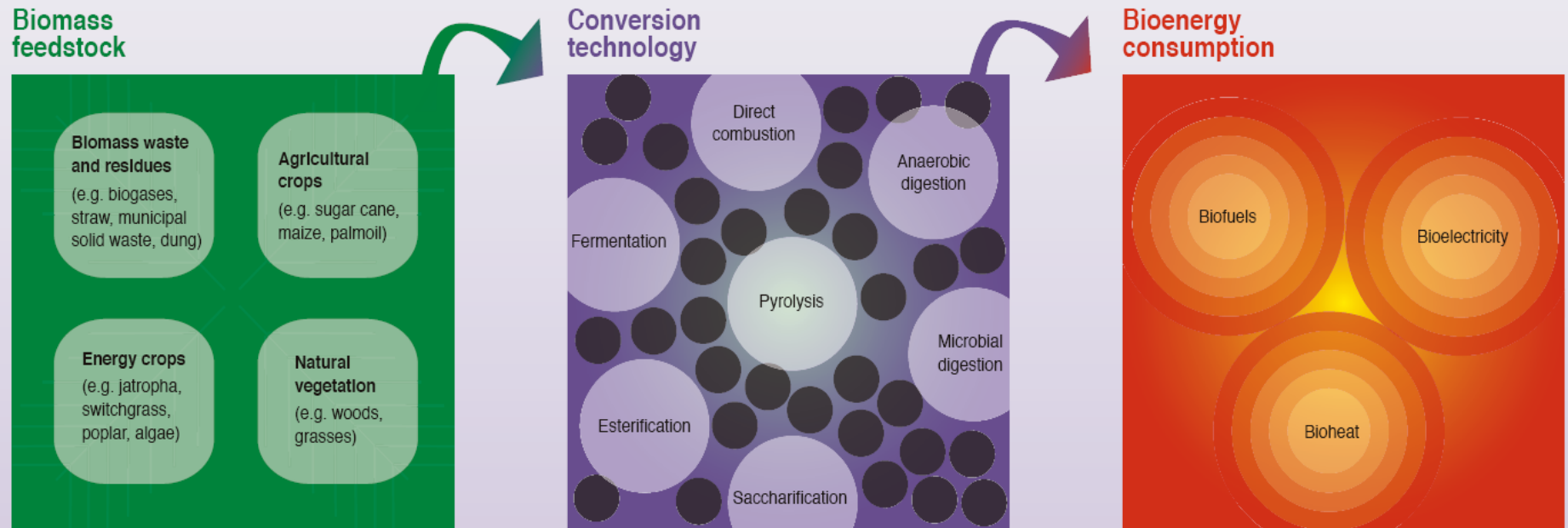
Prediction for 2080
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Rueegsegger 2008



The challenge: biofuel

From biomass to energy consumption



IAASTD/Ketill Berger, UNEP/GRID-Arendal

(IAASTD 2008)

Traditional use of bioenergy: energy source for 2.4 billion people



Metabolic energy still drives rural economies in many areas



Potential of biofuels for income generation and economic development still needs to be investigated

So far only a few countries like South Africa, India, China, Brazil may have a capacity to invest in R&D efforts:

- Large capital need
- Economics of scale
- Technical sophistication
- IPR

Some potential can be realised in marginal areas (Jatropha etc.)

Land requirements for biofuels production

	2004 ¹		2030 Reference scenario ²		2030 Alternative policy scenario ³		2030 Second-generation biofuels case ⁴	
	million ha	% arable	million ha	% arable	million ha	% arable	million ha	% arable
United States and Canada	8.4	1.9	12.0	5.4	20.4	9.2	22.6	10.2
European Union	2.6	1.2	12.6	11.6	15.7	14.5	17.1	15.7
OECD Pacific	neg.	neg.	0.3	0.7	1.0	2.1	1.0	2.0
Transition economies	neg.	neg.	0.1	0.1	0.2	0.1	0.2	0.1
Developing Asia	neg.	neg.	5.0	1.2	10.2	2.5	11.5	2.8
Latin America	2.7	0.9	3.5	2.4	4.3	2.9	5.0	3.4
Africa and Middle East	neg.	neg.	0.8	0.3	0.9	0.3	1.1	0.4
World	13.8	1.0	34.5	2.5	52.8	3.8	58.5	4.2

Sources: farm land — FAO; land requirements — International Energy Agency analysis

1 land used for biofuel production in 2004 and as a percentage of total arable land;

2 situation in 2030 if current trends remain unchanged;

3 situation if countries adopt all of the policies they are currently considering related to energy security and CO₂ emissions;

4 situation in which some biomass for biofuels production comes from non-arable land and residues, reducing arable land requirements. neg = negligible; ha = hectares.

Biofuel is but one factor influencing food markets

Summing up: causes of imbalances in the world food equation

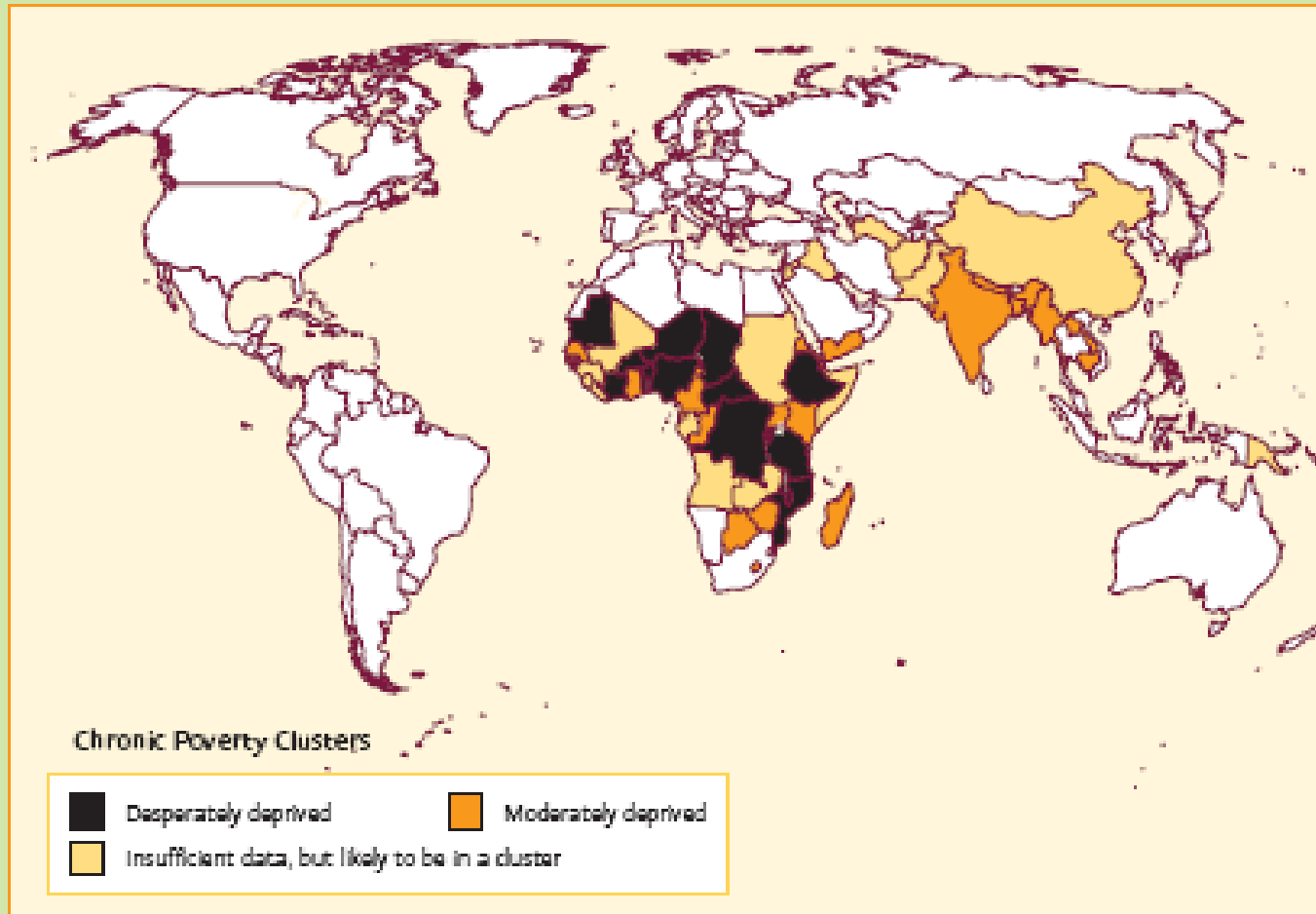
- 1. Income growth**
- 2. Biofuels (energy price)**
- 3. Lack of technology to respond**
- 4. Trade policy and low stocks**
- 5. Production shocks**
- 6. High input and transport costs (energy price)**
- 7. Population growth**

The way forward

- Avoidance of increased pressure on resources and on food markets by excessive promotion of biofuel
- Supporting smallholder farmers as a contribution to economic, social and environmental goals
- Increased investments in agriculture
- Build on the achieved consensus with regard to the important role of agriculture and its multifunction nature
- Unresolved issues (GMO's, trade liberalisation etc.) should be researched and negotiated, and not be left for decision to closed circles of policy makers and powerful economic actors

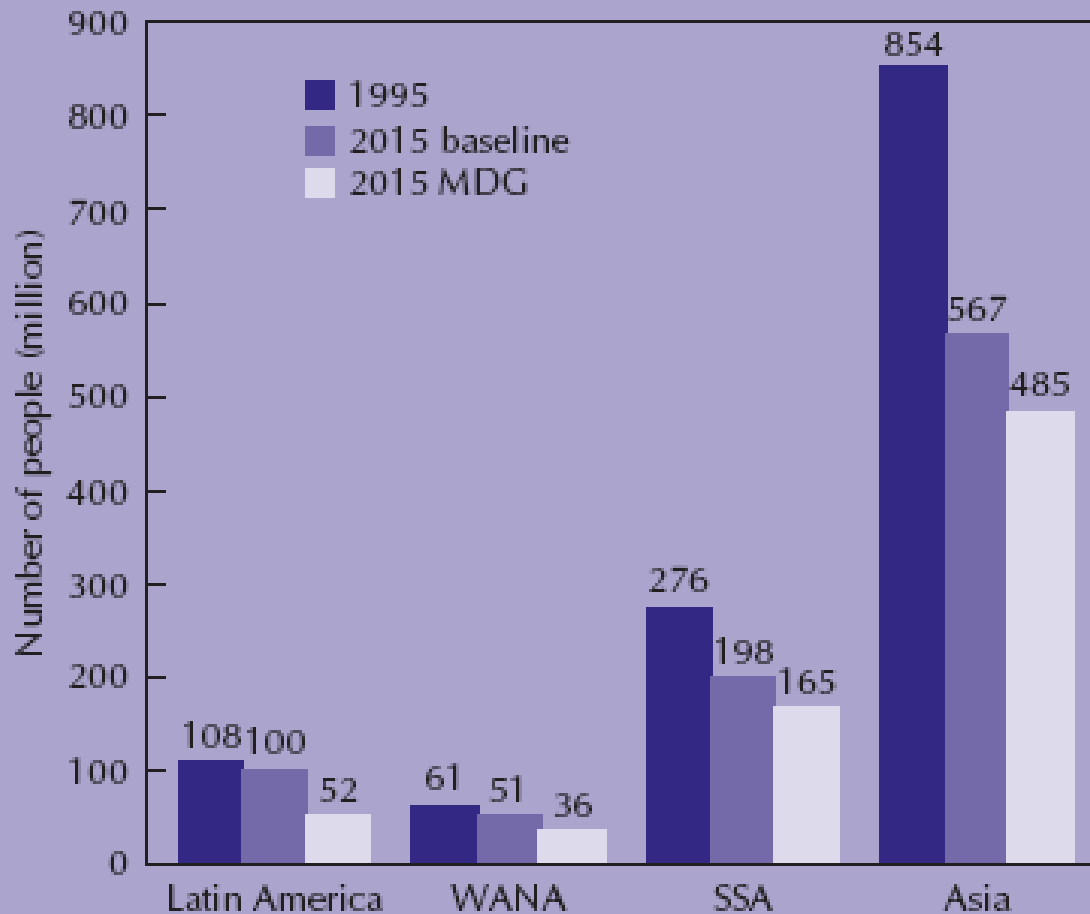


Options for action: fighting poverty and improving rural livelihoods



Where people are poor (Commission for Africa 2005)

Options for action: improving human health



Number of people without access to an improved water source, 1995, and projected 2015, baseline and MDG scenarios.

(Rosegrant et al., 2006)

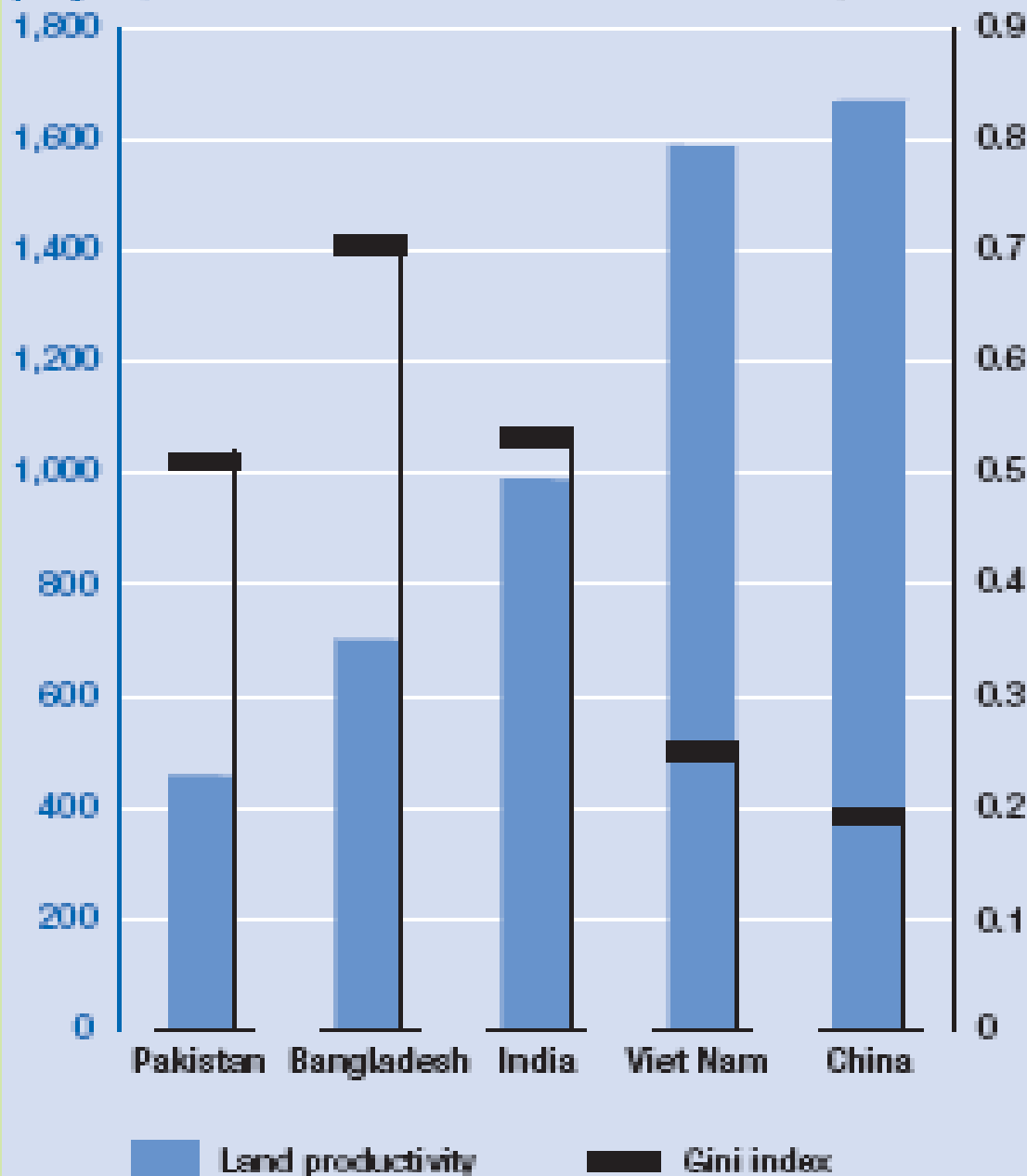
Source: IFPRI calculations.



US\$ per hectare
per year, 2000–01

Gini index of land
distribution, 2000–01

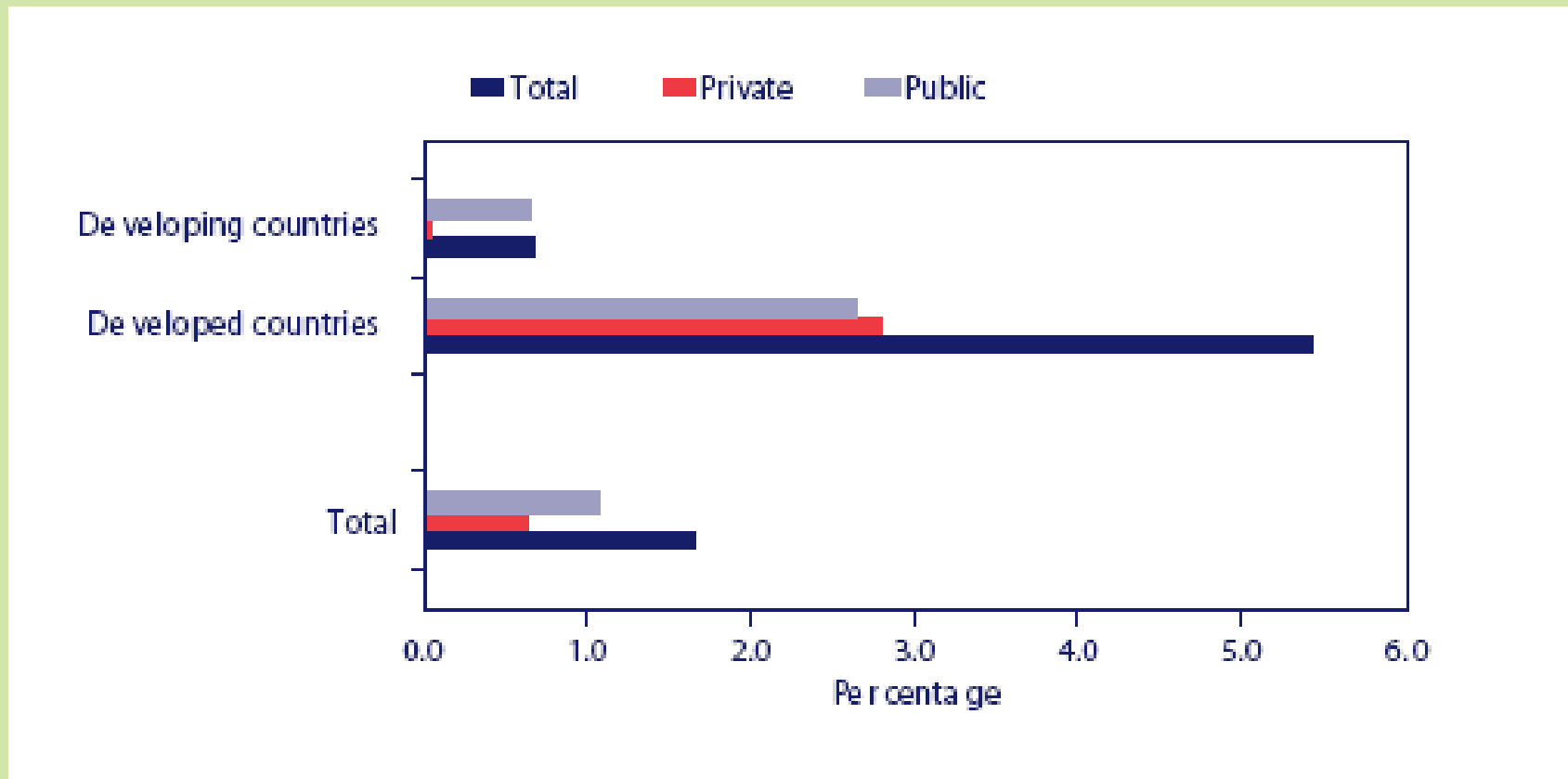
Main Findings of the IAASTD



Options for
action:
helping
achieve equity
in agriculture

Agricultural productivity
and equity are often
closely related (HDR
2006)

Public and private research intensities in developing and developed countries



(Pardey and Beintema 2001)