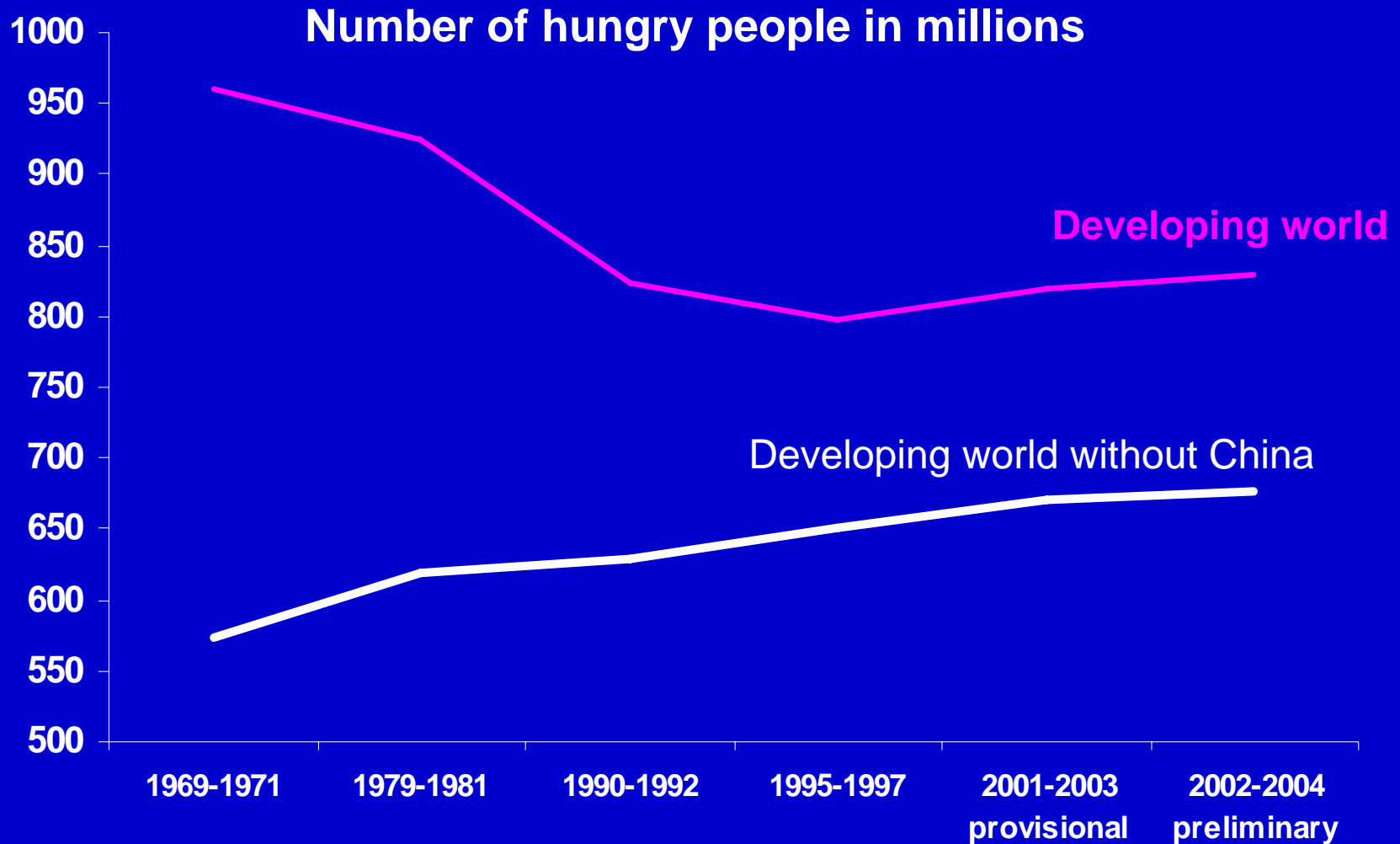


# **Emerging Risks and Opportunities Related to Food, and Agriculture in Development - Implications for Policy and Research**

**Joachim von Braun**  
International Food Policy Research Institute

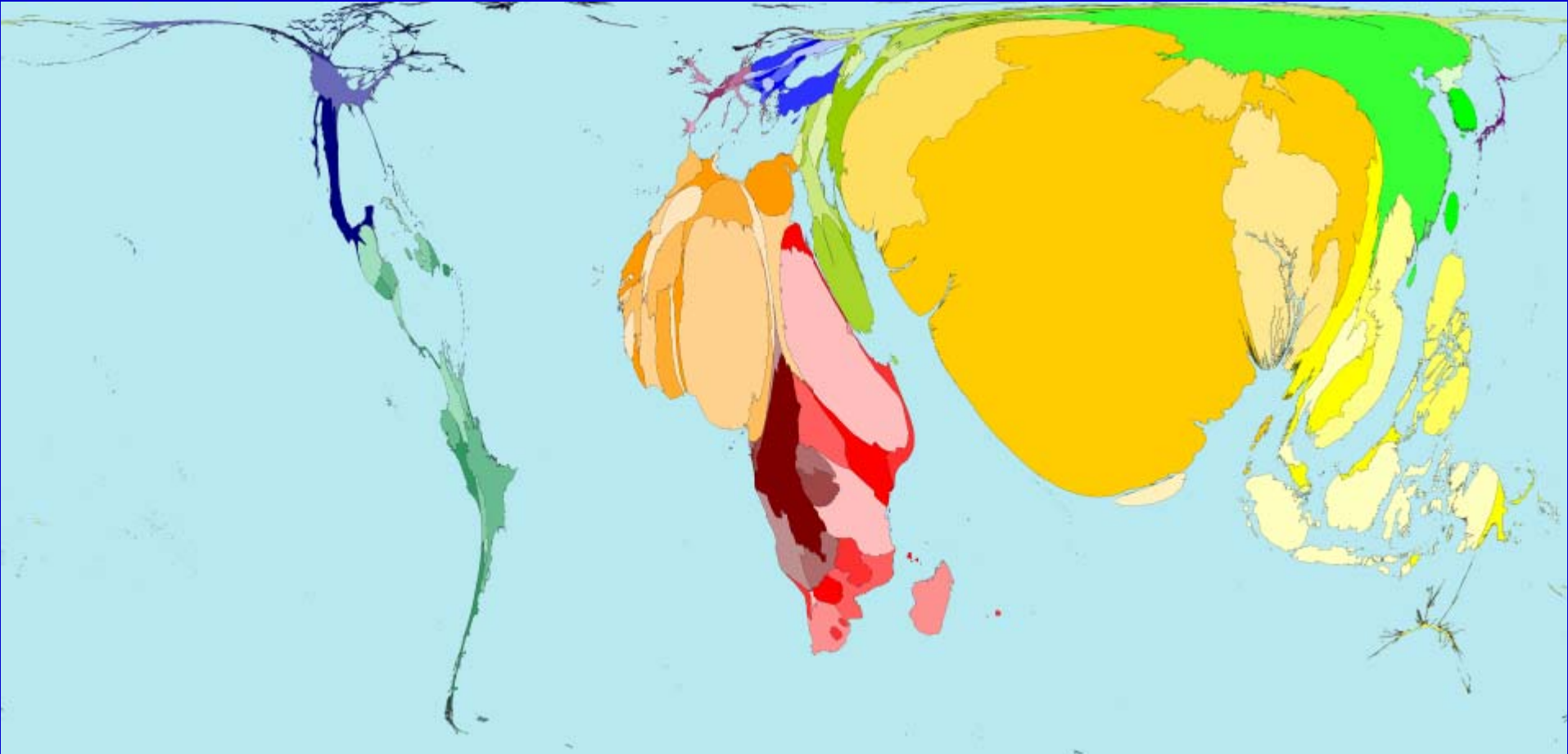
DFID-ODI seminar  
September 18, 2006

# Hunger and malnutrition



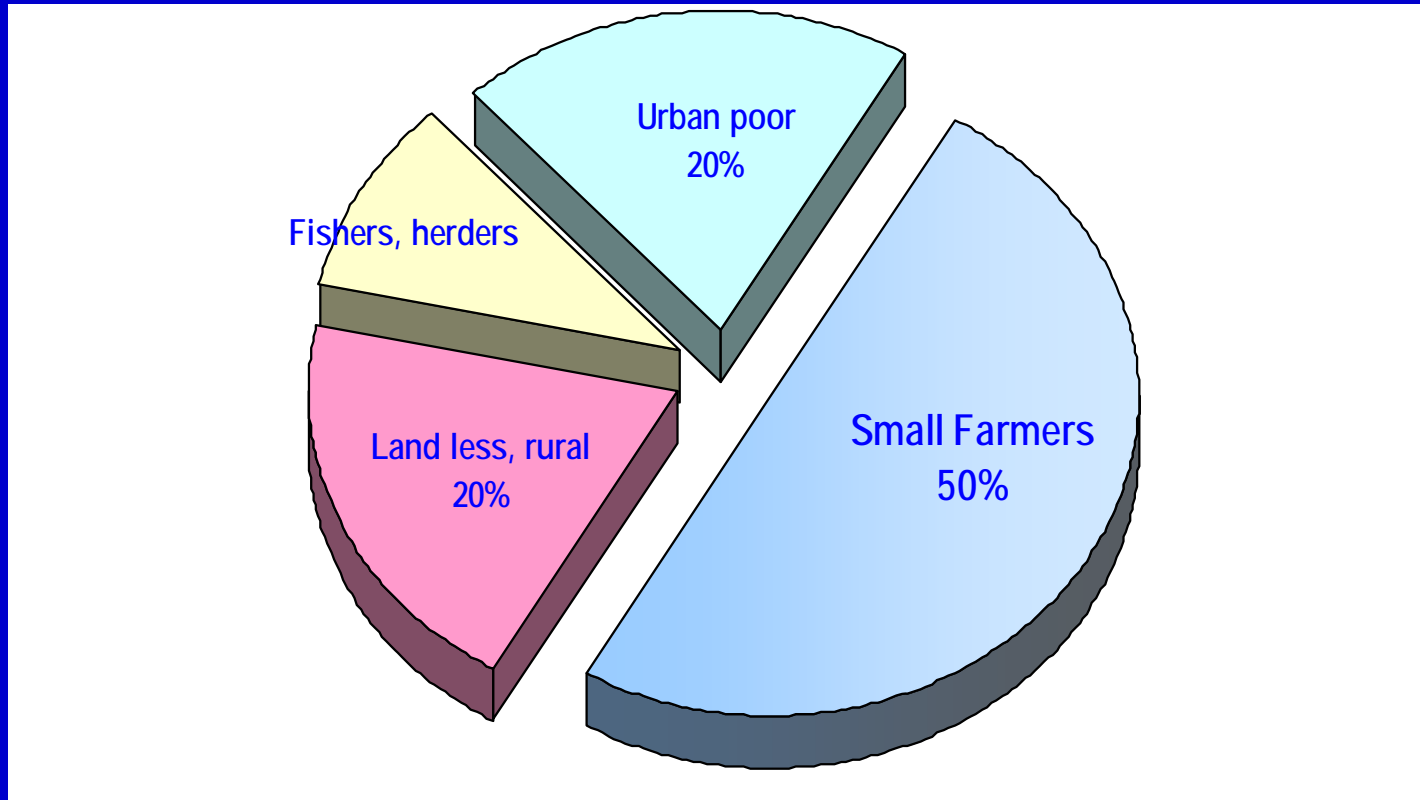
Data source: FAO 2006

# Territory size based on the proportion of underweight children that live there



Source: SASI Group (University of Sheffield) and Newman (University of Michigan) 2006

# Who is affected by hunger?



Source: UN Millennium Project, Hunger Task Force, 2005

# Overview

1. Big drivers of the food, health and agriculture situation
2. Agriculture and food/health related development concepts and complexities
3. Getting jointly to priorities for research and development actions

# Driving forces of the food, health and agriculture situation

1-Consumer and corporate driven agri-food system

2-Science and Technology

✓ Pop. growth and aging

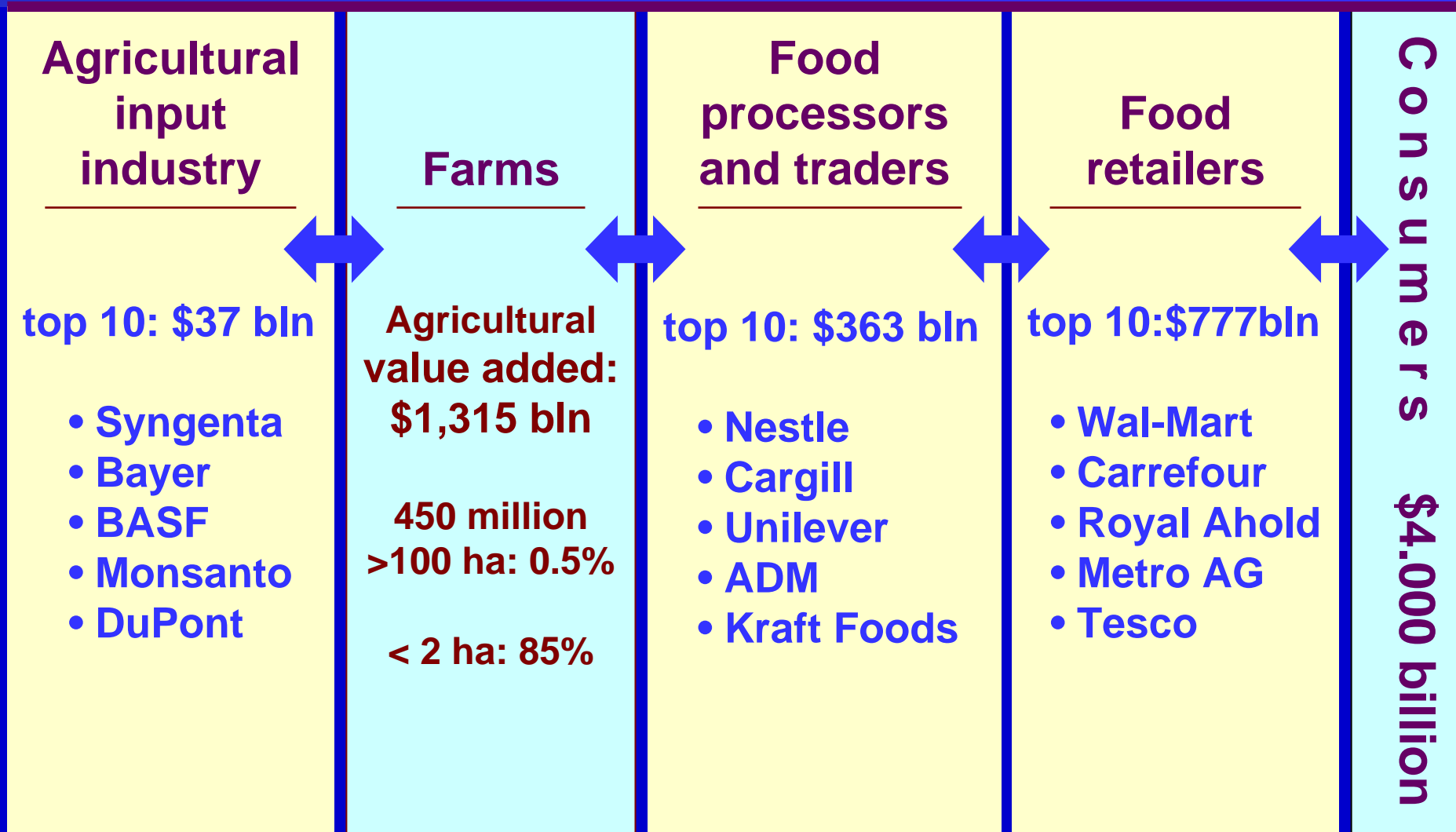
3-Energy and Climate

✓ Infections

4-Economic growth and distributions

Linkages among them, nat. resource impacts, and different risk/opportunity profiles

# 1-The corporate world food system, 2005



Source: von Braun 2005

# Consumer demand for food quality and safety and attributes of agriculture

- Growing consumer demand for product quality and food safety are due to
  - rising incomes levels
  - changing dietary habits
  - increasing health awareness
- Consumers increasingly aware of ethical and environmental aspects related to food and agricultural trade; > costs of compliance
- Increased latent demand for agric. eco-systems services

# 2-Science and Technology

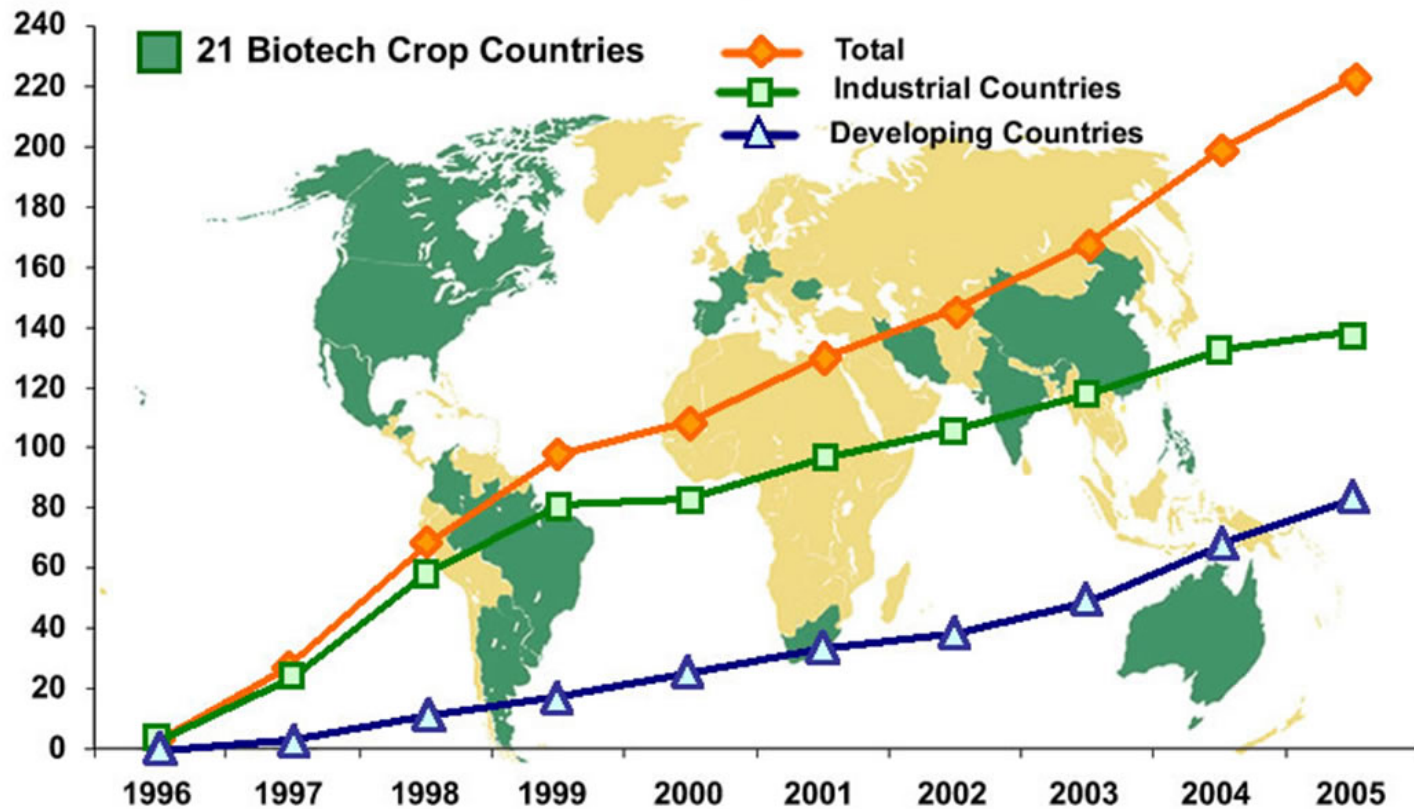
- **Innovation systems in agriculture**
- **Molecular biology**
- **ICT revolution and development**

# Agriculture research expenditure 1991 and 2000

Region/country	Share of global total (percent)	
	1991	2000
China	8.7	13.7
India	5.0	8.1
Brazil	5.0	4.4
Sub-Saharan Africa (44)	6.8	6.3
Middle East and North Africa (18)	5.7	6.0
Developing Country subtotal (117)	47.3	55.7
<b>Total R&amp;D expenditures (billion, 2000 international dollars)</b>		
<b>Global (139)</b>	<b>19,9</b>	<b>23,0</b>

# Biotechnology

## Global Area of Biotech Crops Million Acres (1996 to 2005)



*Increase of 11%, 22 million acres or 9.0 million hectares between 2004 and 2005.*

Source: Clive James, 2005

# Information technology and the poor

- Telephones annual growth, 1990–2003
  - South Asia: **22 %**
  - Sub Saharan Africa: **17%**

*but access remains too low: 6% in 2003*
- Net value for the rural poor of a phone call
  - Peru: **US\$ 1.62**
  - Bangladesh: **US\$ 1.19**

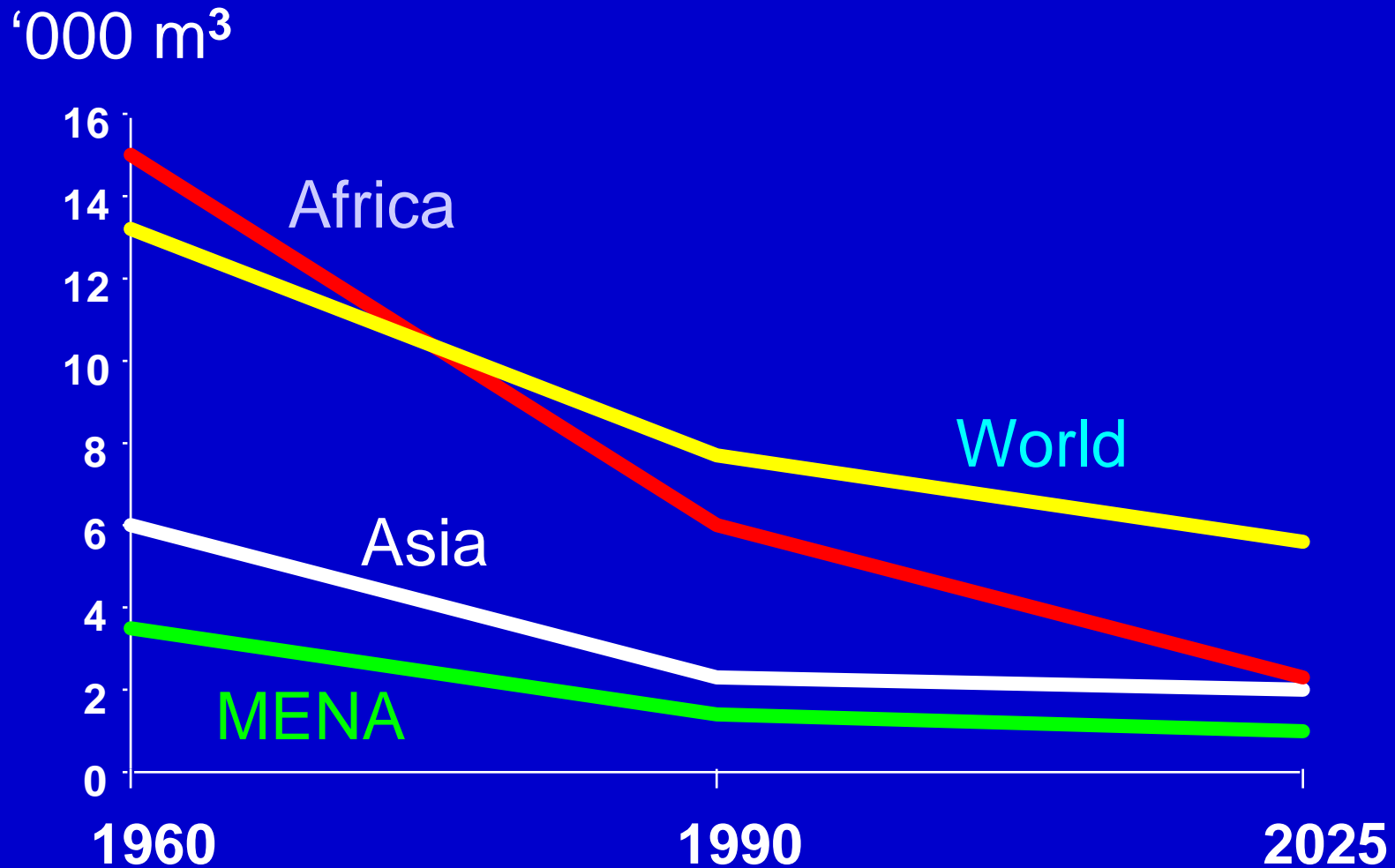
Source: Torero and von Braun 2005

# 3-Climate change

- Changed perception and concern
- Large impact on the poor
- Need for an ecosystem perspective

# Climate and water??

## Regional per capita availability of water



Source: Serageldin 2005

# Biofuels: potential benefits & risks

## opportunities:

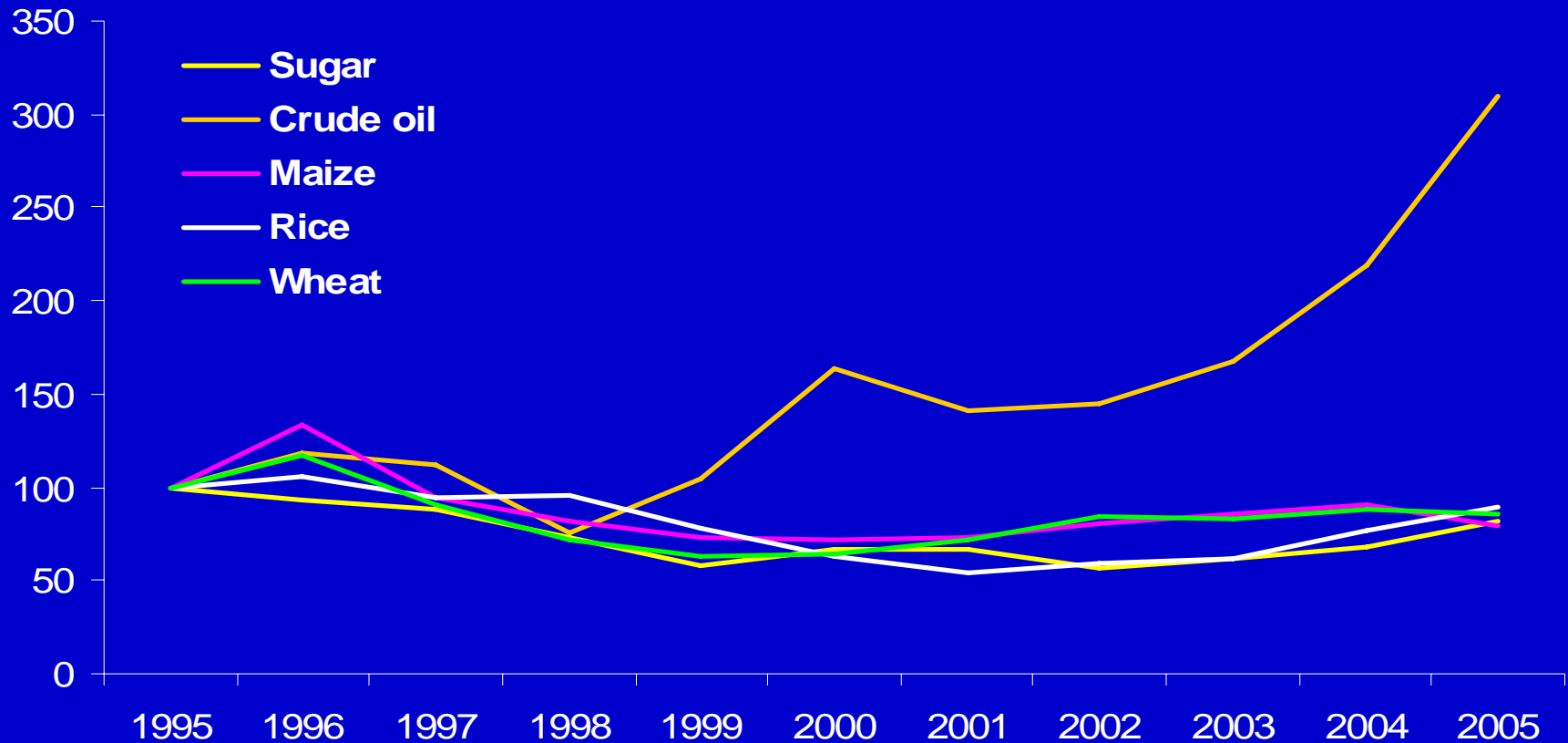
- Alternative energy source
- Potential reduction of greenhouse gases
- Opportunity for new income sources for farmers

## risks:

- diversion of land and water away from food and feed?
- higher food prices?
- Environmental impacts?

# World food and energy prices, 1995–2005

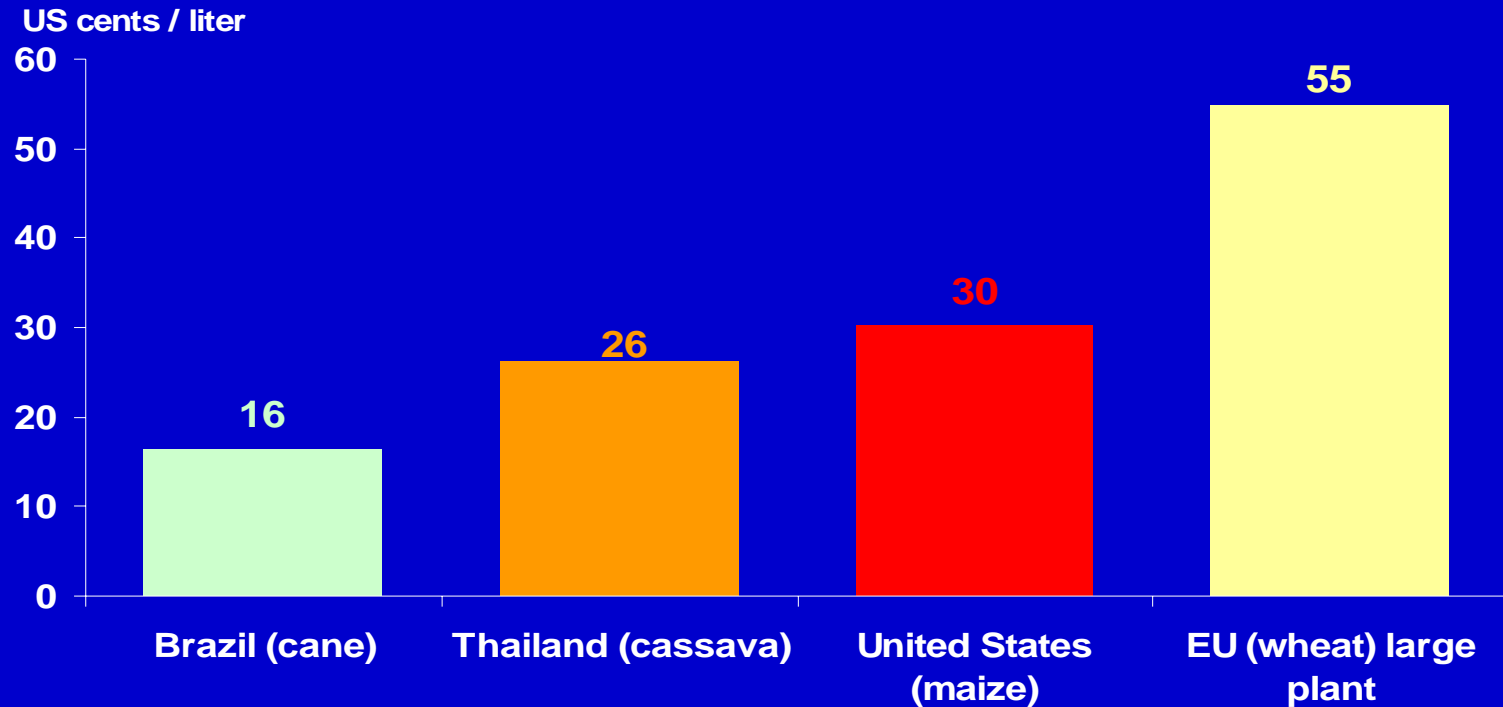
Price indices 1995= 100



Source: World Economic Outlook, IMF, April 2006

# Agriculture as a producer of energy has become competitive

Net cost of Bio-ethanol production (US cents/liter)



Source: Henniges 2005 and European Commission 2005

# 4-And what about agriculture and growth?

- **Driven by markets, technology, infrastructure, institutions / governance**
- **Re WTOs agriculture trade policy**
- **African growth**
- **Distributions**
- **Link to hunger**

# WTO Doha negotiations: Potential scenarios

	Developed countries	Middle income countries	Low-income countries
Initial share in real world income	80	18.7	1.2
<b>Basic scenario</b>			
Real income gain (billions of US\$)	32	21.7	1
Share of real income gain (%)	58.5	39.6	1.9
<b>Free LDC access to OECD</b>			
Real income gain (billions of US\$)	38.9	23	7
Share of real income gain (%)	56.4	33.4	10.2

Source: Bouët 2006

# Sub-Saharan African agriculture growth needed for economy wide growth and poverty reduction

## Five year average of annual growth rates (in %)

<b>GDP</b>	<b>1980-84</b>	<b>85-89</b>	<b>90-94</b>	<b>95-99</b>	<b>2000-04</b>
<b>Agriculture</b>	<b>0.1</b>	<b>4.5</b>	<b>1.1</b>	<b>4.5</b>	<b>3.5</b>
<b>Total GDP</b>	<b>1.7</b>	<b>2.6</b>	<b>0.6</b>	<b>3.5</b>	<b>3.8</b>

Data source: World Bank 2006

**Correlation between Ag and total GDP growth  
remains strong**

Pro-Poor? in some countries growth has been accompanied by increased poverty...

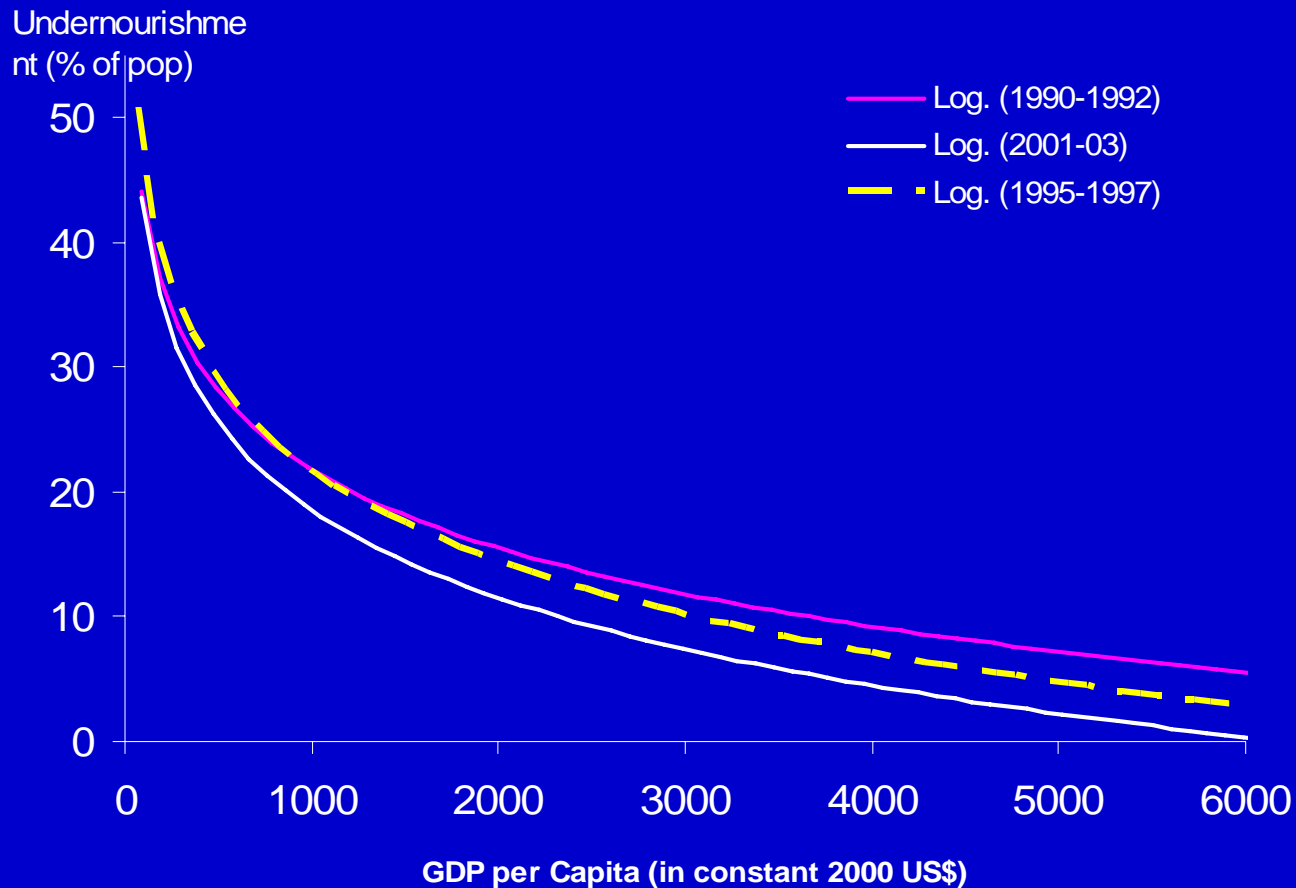
Out of **30** developing countries (recent world wide data),

- in **12** increased poverty with growth (e.g. Peru, Uganda, Pakistan)
- In **18** reduced poverty with growth

**Implications for rural growth strategies**

# Growth matters: hunger - income linkage

## Hunger and GDP/ capita in developing countries



Source: von Braun, regressions based on data from World Bank (2005) and FAO (2005)

# Traditional but relevant concepts

- 1. Ag. growth works in combination with infrastructure, market access, and innovation**
- 2. Agriculture-to-rural growth linkages remain strong (high value agriculture)**
- 3. Food and nutrition security has key links to agriculture (availability of healthy diets)**

# Overview

1. Big drivers of the food, health and agriculture situation
2. Agriculture and food/health related development concepts and complexities
3. Getting jointly to priorities for research and development actions

# Newly understood **complications** in food, health and agriculture

1. **Around Poverty:** pathways, transformations, traps and thresholds
2. **Around Risks and Uncertainties:** combined risks, the long run, scenarios

# Re 1: Pathways and dynamics of transformations

## Pathways from poverty:

- **Institutional rigidities (communities, and assets)**
- **Transformation of small farm agriculture**

# What future for the small farms? “grow, or part time, or move out”

---

<b>Farm Size (ha)</b>	<b>% of all farms</b>	<b>Number of farms (millions)</b>
<b>&lt; 2</b>	<b>85</b>	<b>387</b>
<b>2 - 10</b>	<b>12</b>	<b>54</b>
<b>10 - 100</b>	<b>3</b>	<b>12.5</b>
<b>&gt; 100</b>	<b>0.5</b>	<b>2</b>
<b>Total</b>	<b>100</b>	<b>456</b>

---

The numbers still increase in Africa and diminish very slowly in Asia;  
Labor markets, food markets, and technology will determine the course of transformation

Source: von Braun 2003

# Big Picture on global *employment*: farm, services, and industry 2005 – 2020 (Billions)

	<b>Farm</b>	<b>SI-Rural Areas</b>	<b>SI-Urban Areas</b>	<b>Total</b>
<b>2005</b>	<b>0.9</b>	<b>0.6</b>	<b>1.5</b>	<b>3</b>
<b>2020</b>	<b>0.6</b>	<b>1.0</b>	<b>1.9</b>	<b>3.5</b>
<b>Change 2005-2020</b>	<b>- 0.3</b>	<b>+0.4</b>	<b>+0.4</b>	<b>+0.5</b>

SI refers to services and industry

Source: von Braun based on Tarantino 2005, UN World Population Prospects and ILO 2005

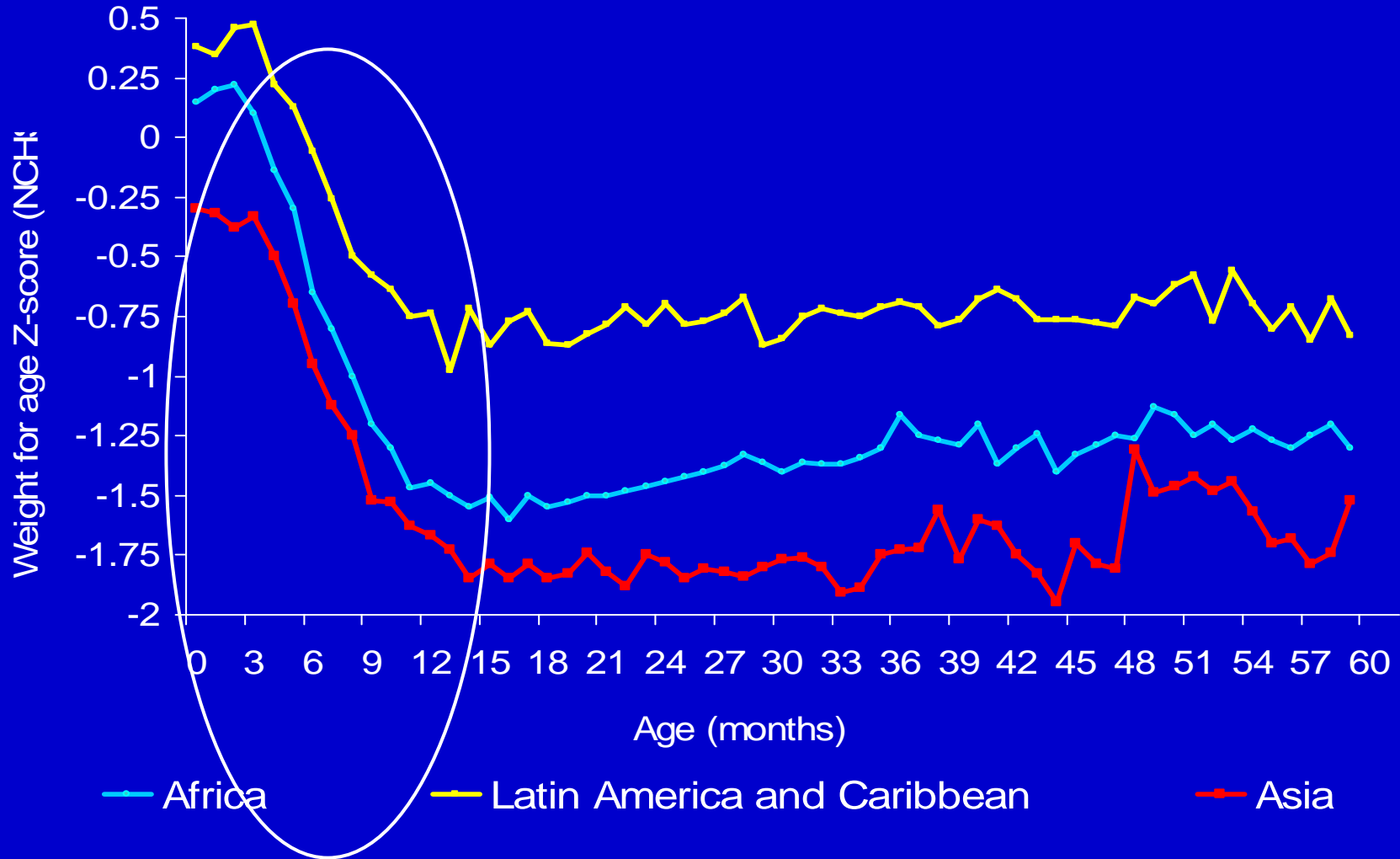
# Poverty traps and thresholds

## Conceptualization

- ❖ Poverty traps exist when certain people are excluded from opportunities
- ❖ Linkages +/- (e.g. agriculture to health) need to be better understood & managed

Source: more see Barrett, 2005

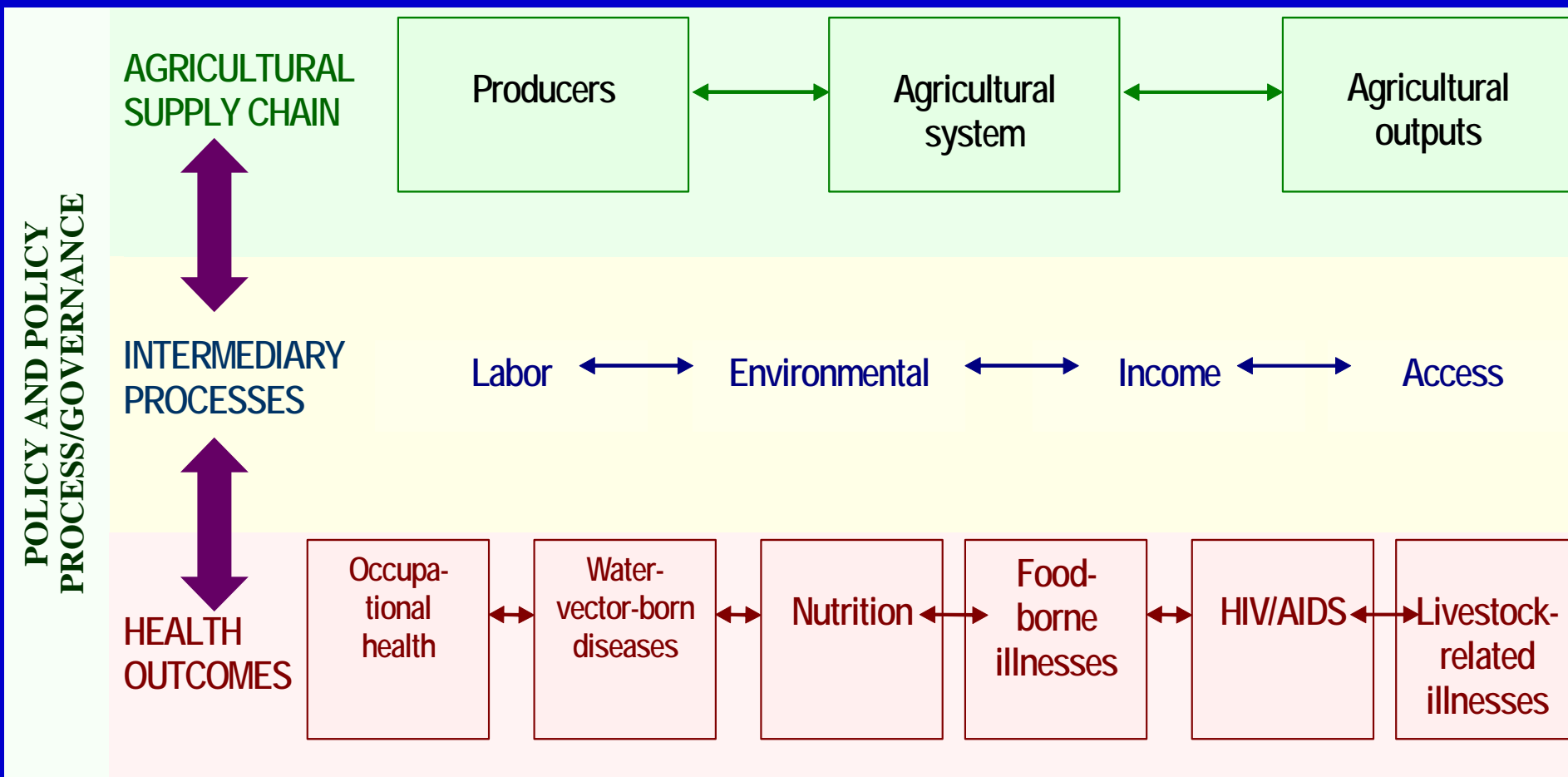
# Example of a trap: Early Childhood nutrition trap (mostly in rural areas)



Source: Shrimpton et al. 2001

# Linkages & externalities: value chain linkages (e.g. agriculture, food & health)

## Expanding the value chain concept



# Re 2. Risks and uncertainties

## General types of risks and uncertainties

### ✓ Political

✓ Economic and social

✓ Technological

✓ Health

✓ Environmental

***...and their adverse combinations and links;***

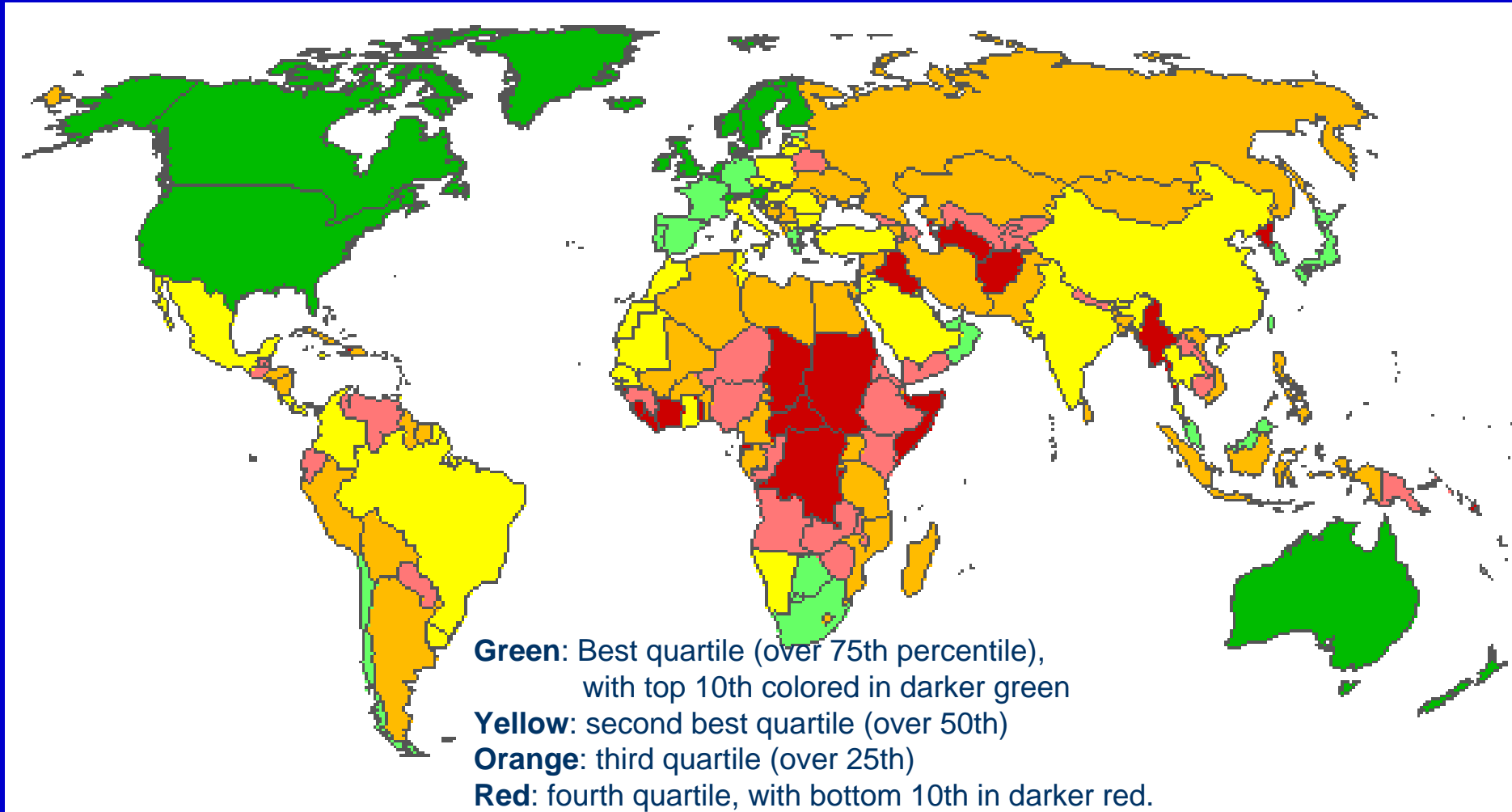
***...and more and less man-made***

# Inclusion of **governance** issues in risk and opportunities' assessments

Governance is key: Essential elements at the national level

- ✓ **Political stability and control of corruption**
- ✓ **Rule of law**
- ✓ **Voice and accountability**
- ✓ **Regulatory quality**
- ✓ **Government effectiveness**

# Government effectiveness map



# Poor people themselves cope with risk and uncertainty

→ Diversification

→ Innovation

→ Networks

→ Migration

→ Savings

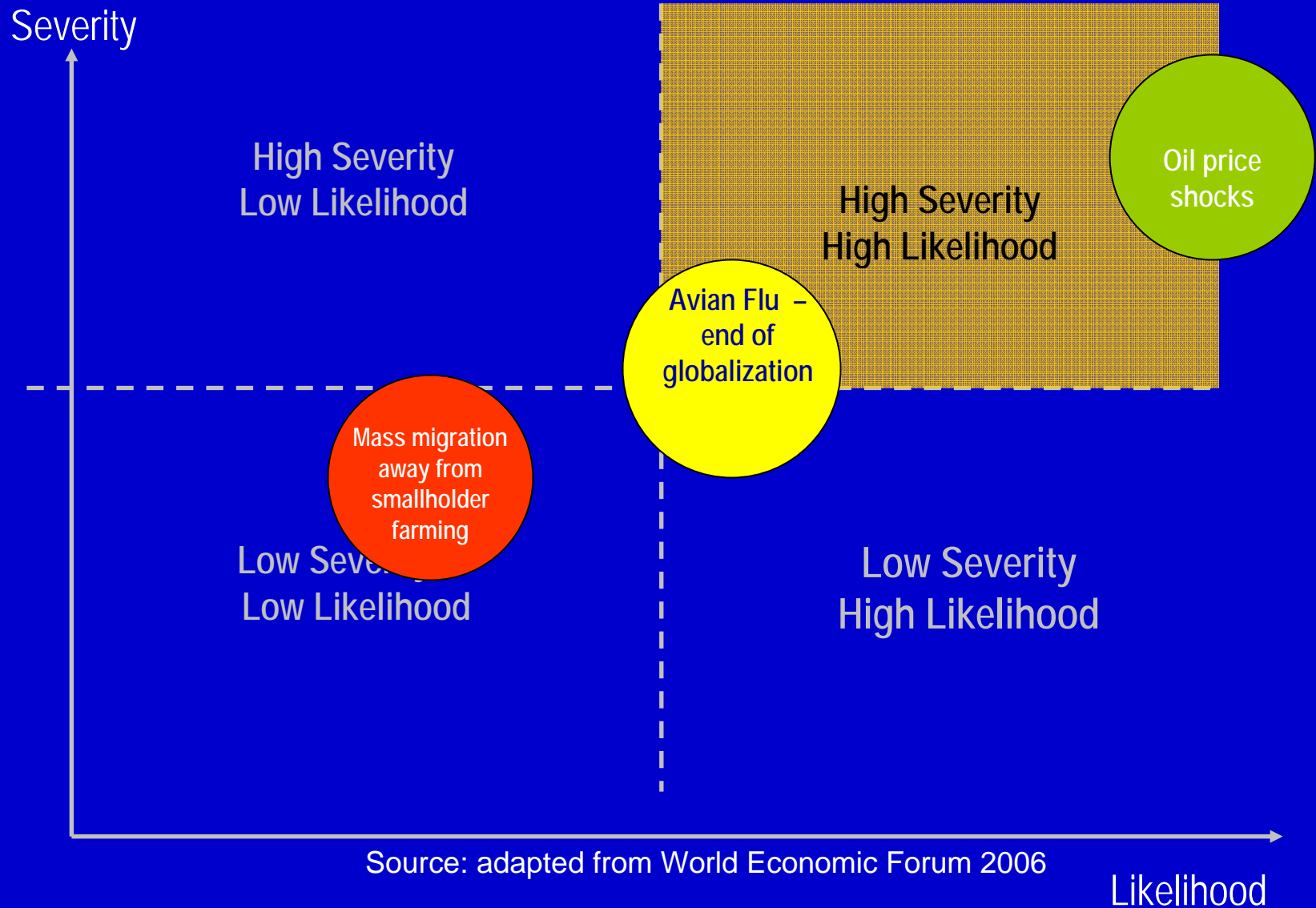
**and should be supported in these autonomous strategies with innovation, market access, social protection**

# So, what to do about these complications in policy research and advise?

## *Two ways forward:*

- 1. Apply a framework for risks and uncertainty**
  - 2. Apply better (more transparent) scenario building**
- and combine the two*

# Re 1. Framework: severity & likelihood of risks



# Re 2. Combining Risks and Opportunities: Scenarios of IMPACT Model

## **Progressive Policy Actions Scenario:**

- ✓ **New Focus on Agricultural Growth and Rural Development**

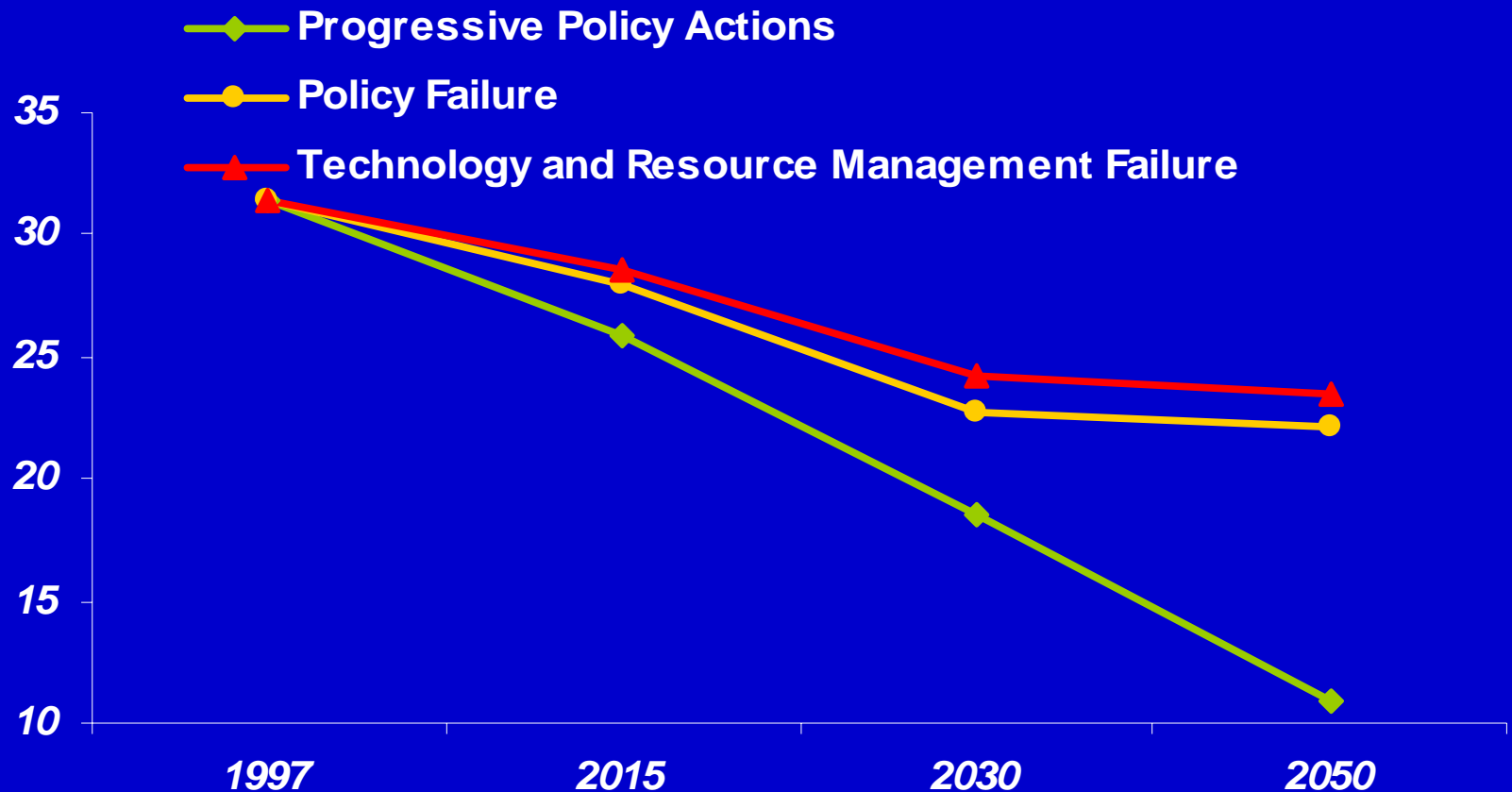
## **Policy Failure Scenario:**

- ✓ **Trade and Political Conflict, rise in protectionism worldwide**

## **Technology and Resource Management Failure Scenario:**

- ✓ **Adverse technology/natural resource interactions**

# Percentage of malnourished children



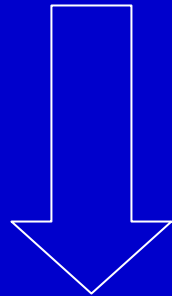
Source: von Braun 2003

# Overview

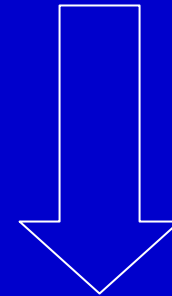
1. Big drivers of the food, health and agriculture situation
2. Agriculture and food/health related development concepts and complexities
3. Getting jointly to priorities for research and development actions

# *Two ways how to get to joint priorities for research and development actions*

**Connecting concepts to priorities for research and development in food and agriculture**



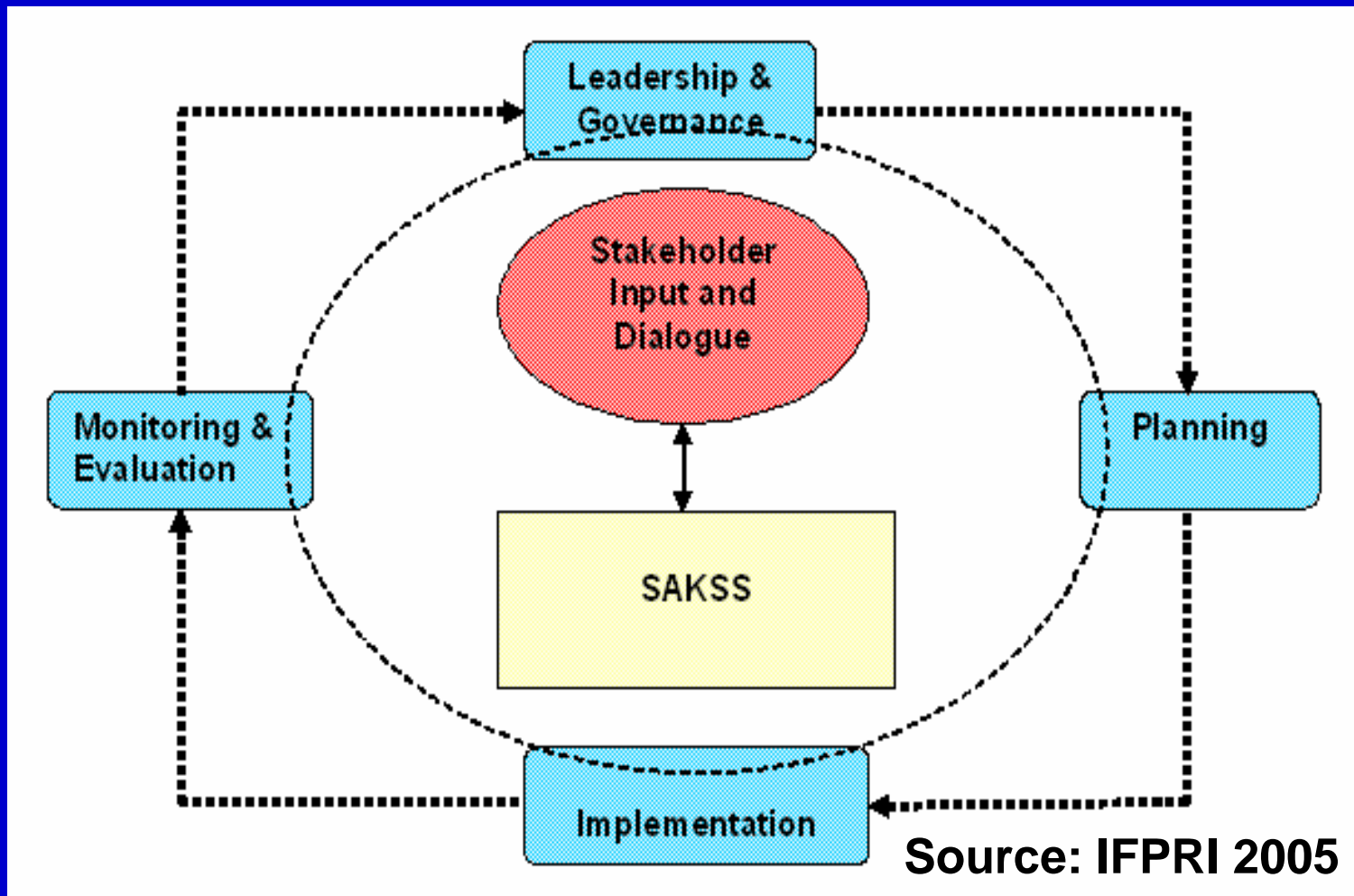
**1-development  
strategies**



**2-strategic  
experimentation**

# Re 1-Development strategy: macro framework

Building a Strategic Analysis and Knowledge System (SAKSS) to inform the design and implementation of rural development strategies

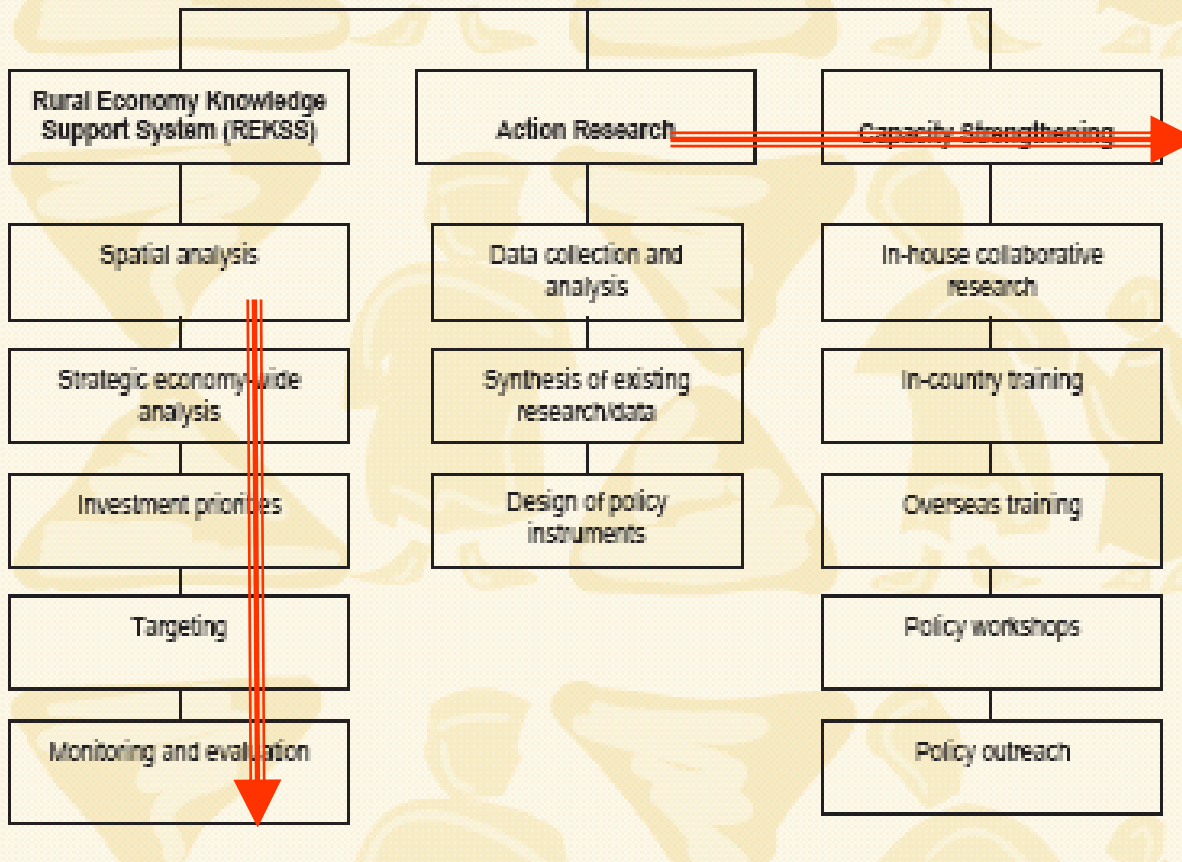


# An agriculture and rural growth strategy?

- **Not “one fits all”**
- **Each country is different**
- **Typologies may help**
- **Complex political processes**
- **Long-term institutional cooperation needed**

# Example: Ethiopia SAKSS

## ETHIOPIA STRATEGY SUPPORT PROGRAM



- smallholder commercialization
- ag/non-ag linkages
- price stabilization
- public investment

- development domains
- water harvesting
- access to markets and space

**Source: IFPRI 2005**

# Re 2- strategic experiments – the how to

**A new basis for cooperation of  
research with development  
policy on key agriculture & food  
action areas**

**Toward “experimentalism”**

- 1. Classical (a la China, Du Runsheng)**
- 2. Randomized (a la Progressa)**

# Experiments & evaluation design: new standards

**Good quantitative evaluation design requires the use of data collected:**

- Before *and* after the intervention is implemented

And

- From both beneficiaries and non-beneficiaries (those “with” and “without” the intervention)

**Pre-program/treatment and control groups have to be as alike as possible**

# Innovations through strategic experiments

**Some examples for experiments:  
institutional and technical changes in  
food and agriculture**

- ✓ **Breeding programs**
- ✓ **Crop insurance**
- ✓ **Extension systems**
- ✓ **Credit (micro-finance)**
- ✓ **Employment programs**
- ✓ **Health and nutrition interventions**

# Summing up: research for and with development

Influencing the “drivers”  
through  
attention to action areas,  
informed by the sets of  
concepts:

- 1. Dev. strategy work  
and**
- 2. Experimenting**

# Summing up: Linking the concepts to changing drivers and actions

## Drivers - >

- Demographics
- Consumer & corporate driven agri-food system
- Ag. Science & technology
- Energy and climate
- Disease (human, & animal)
- Growth and distributions

## <- Concepts ->

- Growth linkages
- Poverty pathways, traps, thresholds;
- Risks and uncertainties

\ how? /

\ ... /

**1. Dev. strategy work  
and  
2. Experimenting**

## -> Action areas

- Macro policy and governance
- Agricultural growth promotion
- Rural infrastructure & employment
- Targeted programs
- Insurance and social protection