Meeting the rising demand for Animal Source Foods

Implications for Land use and natural resource in the developing world

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Better lives through livestock

THE WORLD BANK

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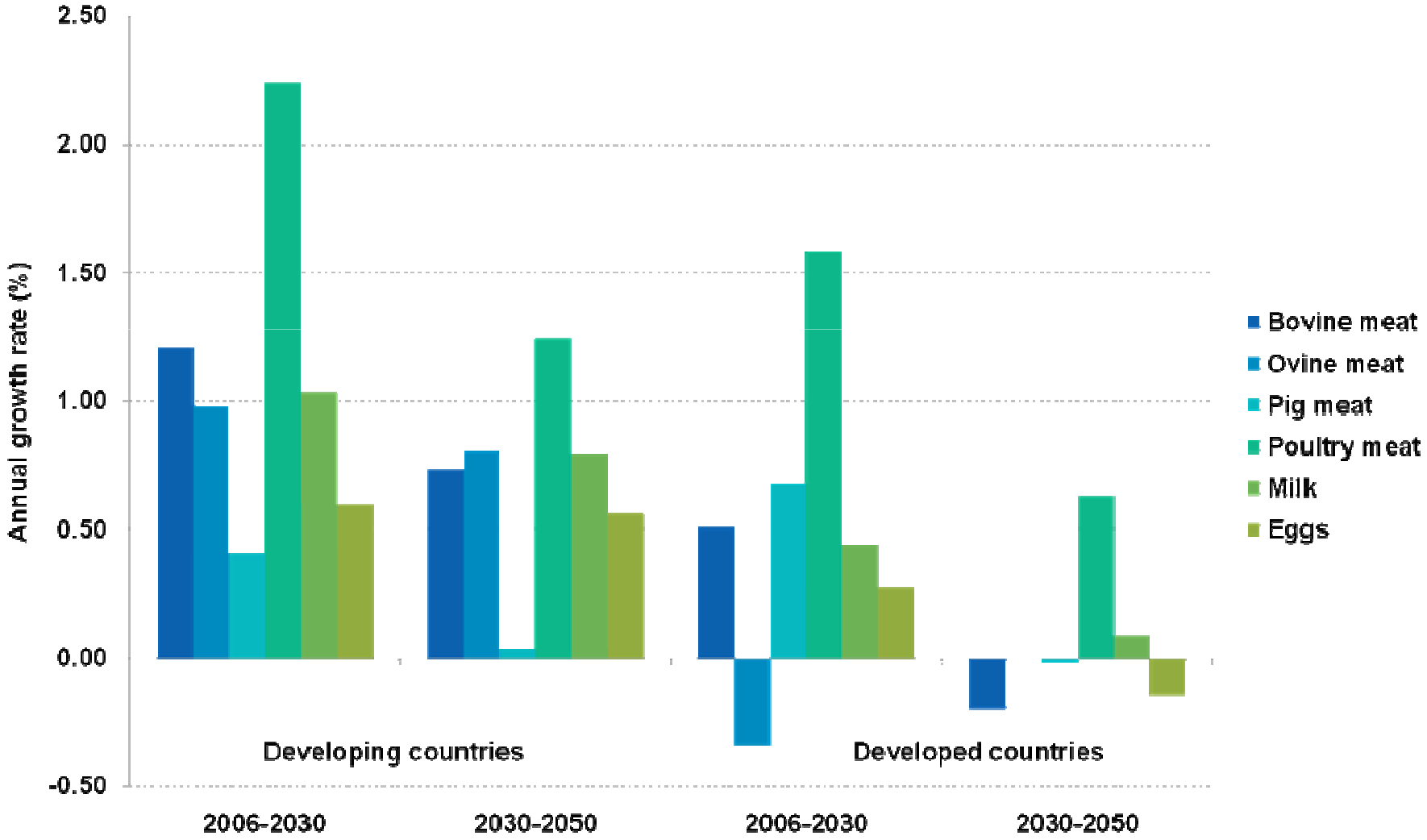
OUTLINE

- DRIVERS AND TRENDS
- RESOURCE CONSTRAINTS AND IMPLICATIONS
- HOW TO RESPOND TO RESOURCE CONSTRAINTS

Drivers and trends

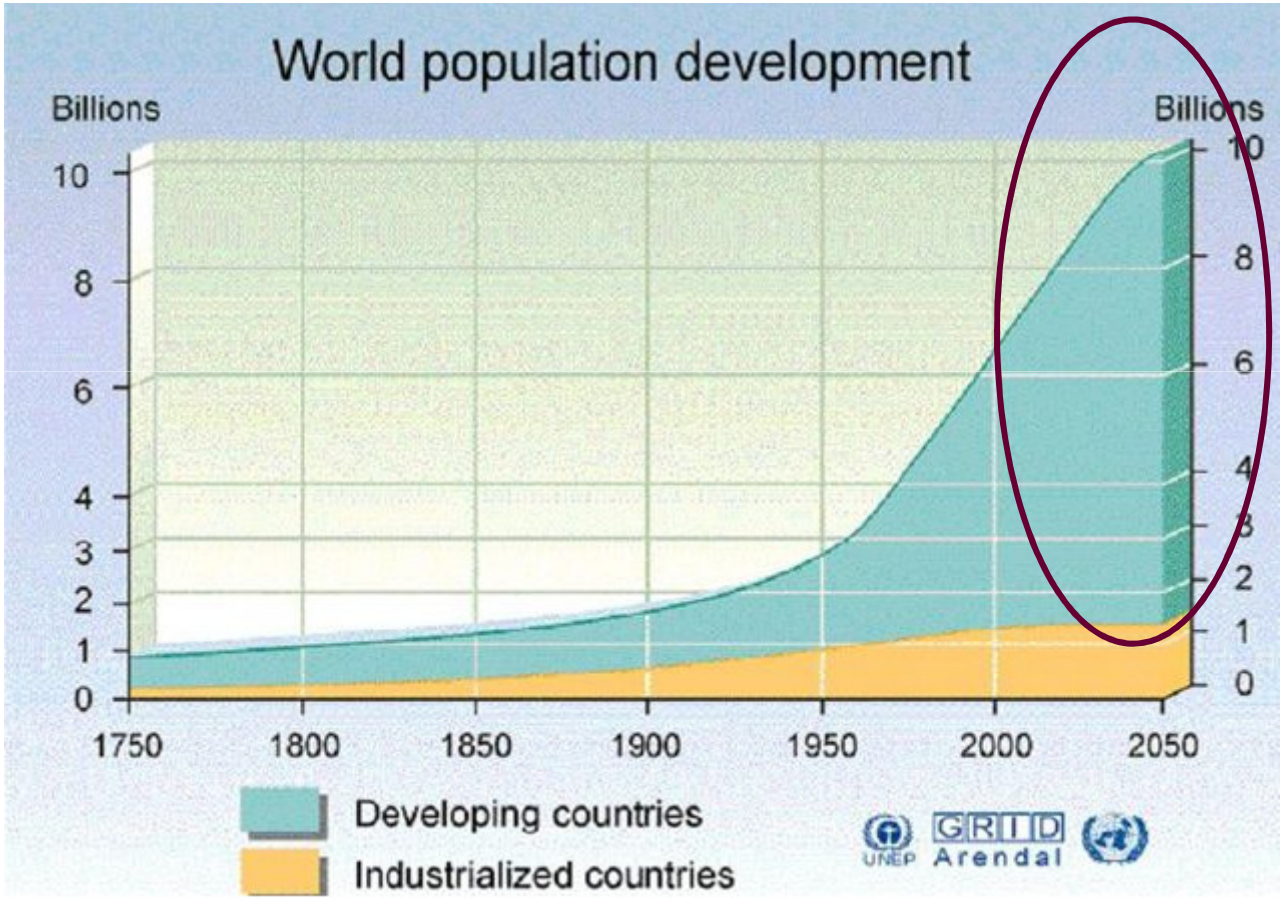
Annual growth in per capita consumption of livestock products



Demand for livestock products to 2050

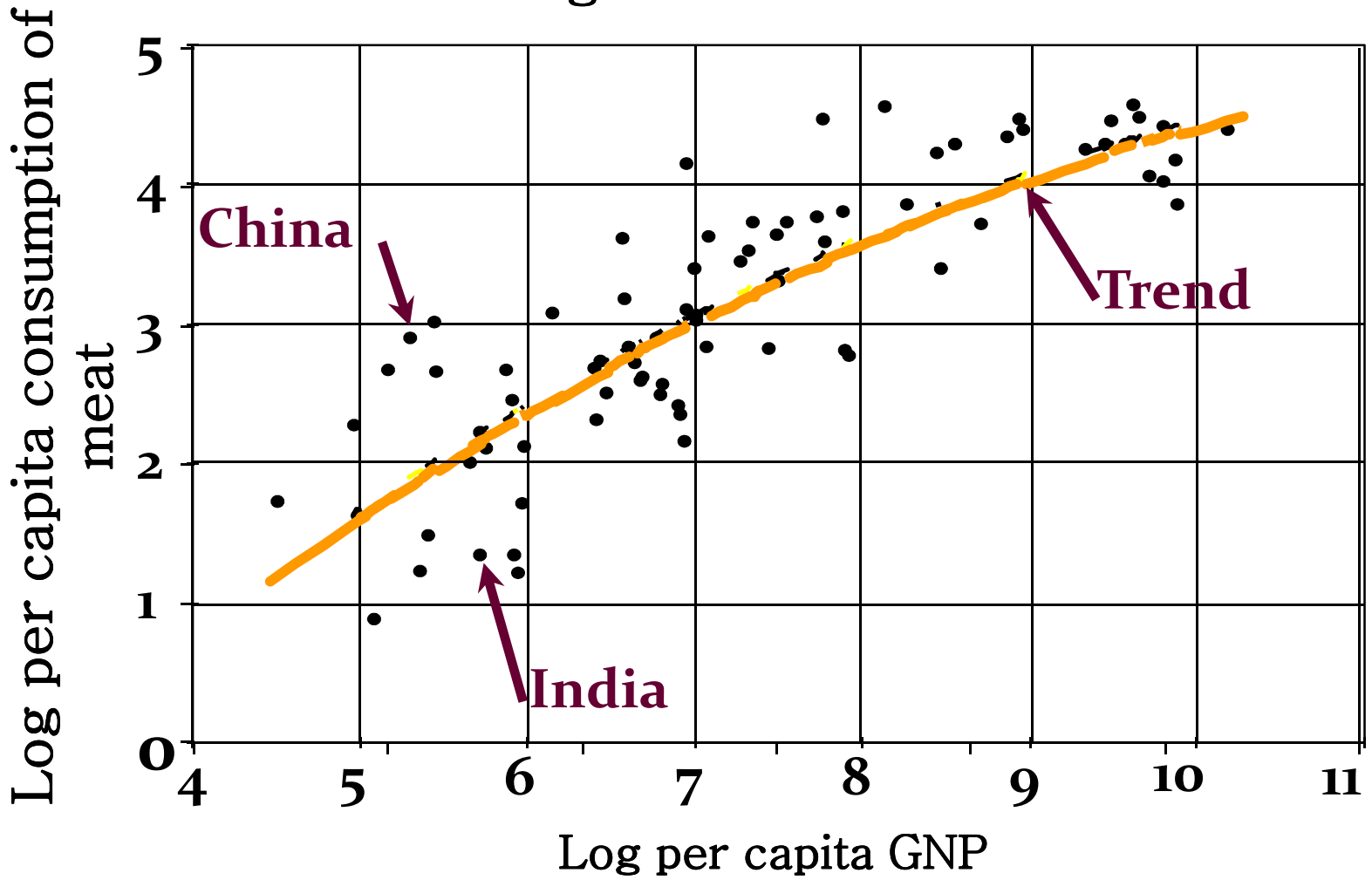
		Annual per capita consumption		Total consumption	
	year	**Meat (kg)**	**Milk (kg)**	**Meat (Mt)**	**Milk (Mt)**
Developing	2002 2050	28 44	44 78	**137** **326**	**222** **585**
Developed	2002 2050	78 94	202 216	**102** **126**	**265** **295**

Population Growth in Developing and Industrialized Countries: 1750 - 2050



The Livestock Revolution

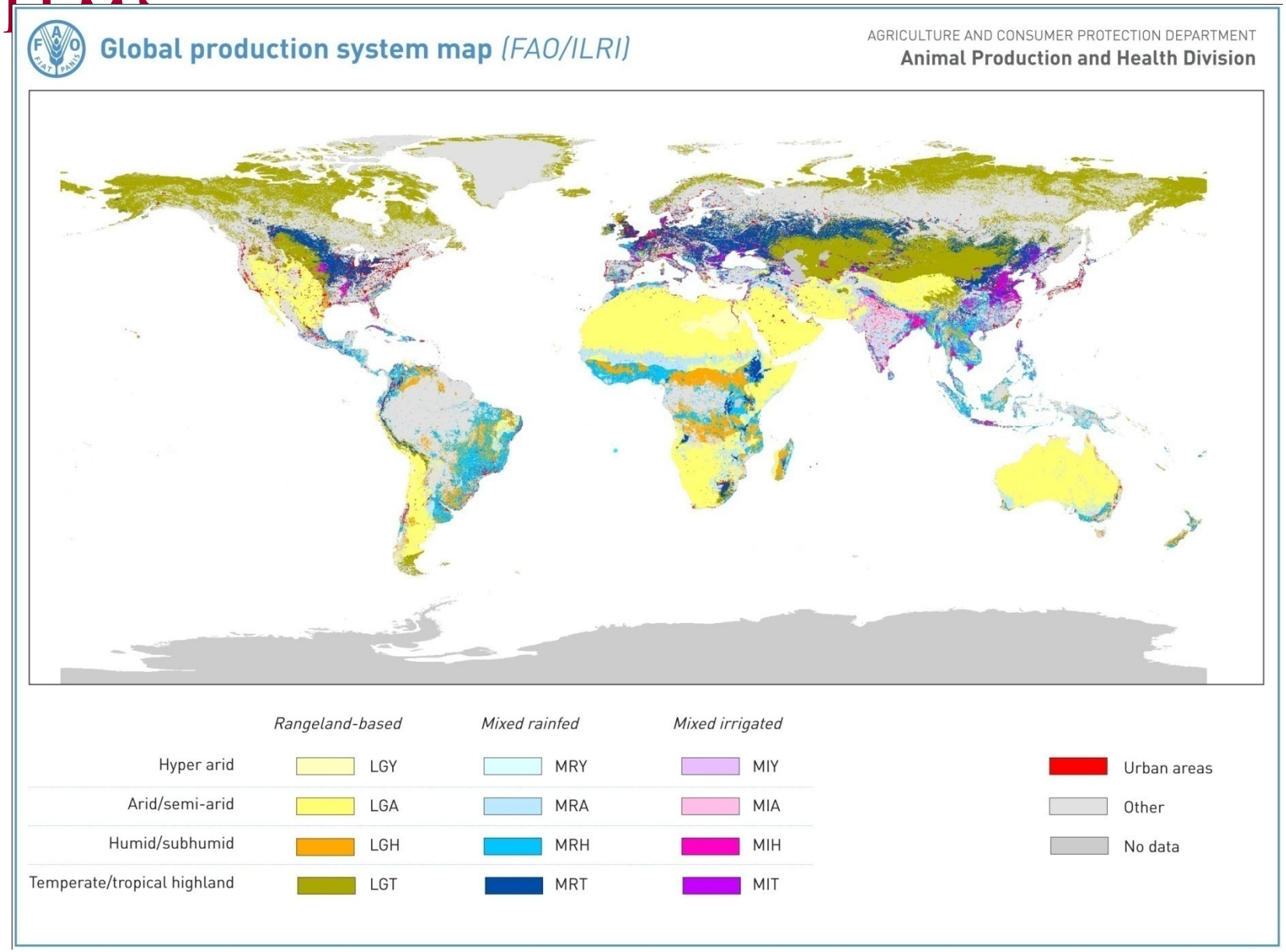
A strong increase in demand for meat and milk as income grows



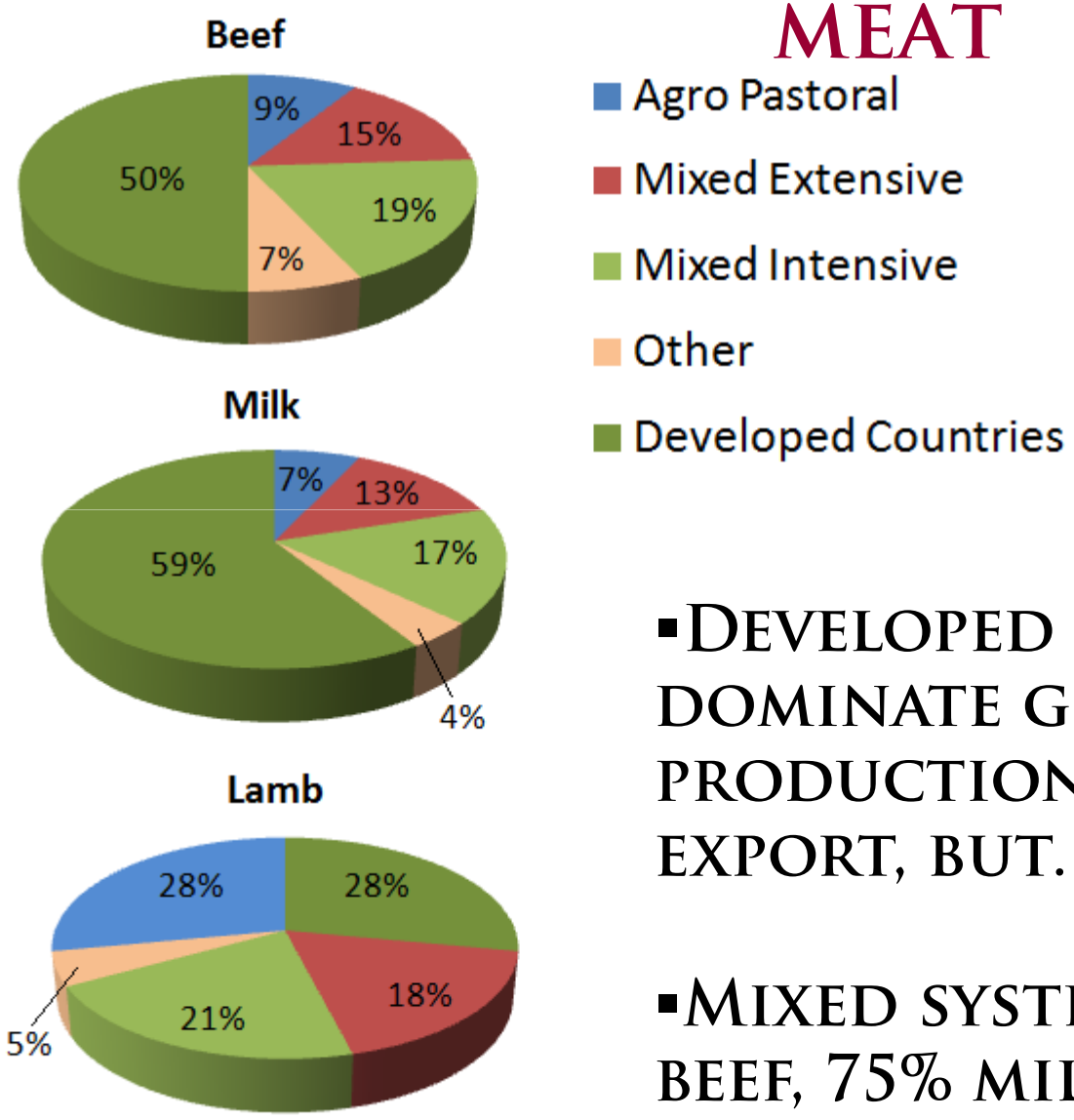
Livestock to 2020: The Next Food Revolution, a joint IFPRI, FAO, ILRI study.

Urbanization

17 BILLION ANIMALS IN DIVERSE FARMING SYSTEMS



MIXED SYSTEMS PRODUCE SIGNIFICANT AMOUNTS OF MILK AND MEAT



- DEVELOPED COUNTRIES DOMINATE GLOBAL MILK PRODUCTION, SIGNIFICANT EXPORT, BUT…

- MIXED SYSTEMS PRODUCE 65% BEEF, 75% MILK AND 55% OF LAMB IN THE DEVELOPING WORLD

Herrero et al 2009

Resource implications

Land use

- By 2050, 33 % more people to feed
- 70 % more meat and milk
- 12 % of global land is crop land (1/3 thereof is for feed)
- 26 % of global land is pasture
- Expansion of biofuels will continue to the foreseeable future
- Expanded yields must come from productivity increase

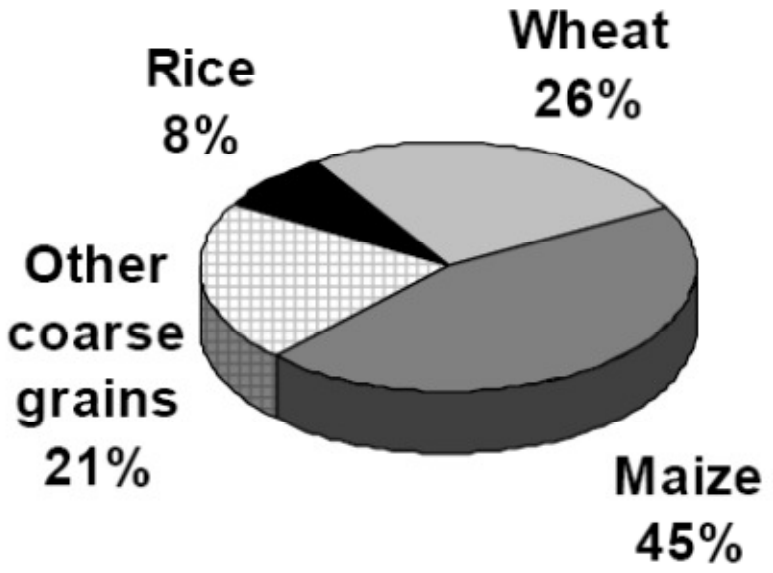
The world will require 1 billion tonnes of additional cereal grains to 2050 to meet food and feed demands (IAASTD 2009)

Additional Grains
1048 million tonnes more to 2050

Livestock
430 million MT
Monogastrics dominate

Human consumption
458 million MT

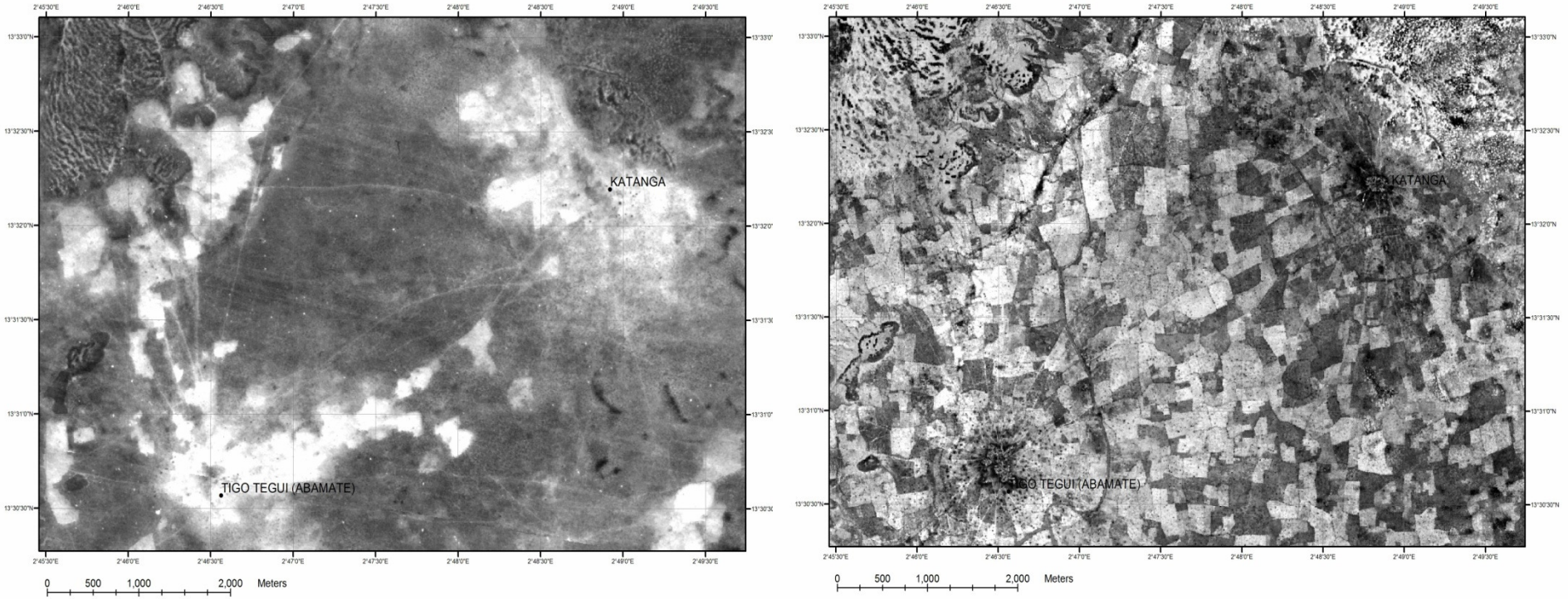
Biofuels
160 million MT



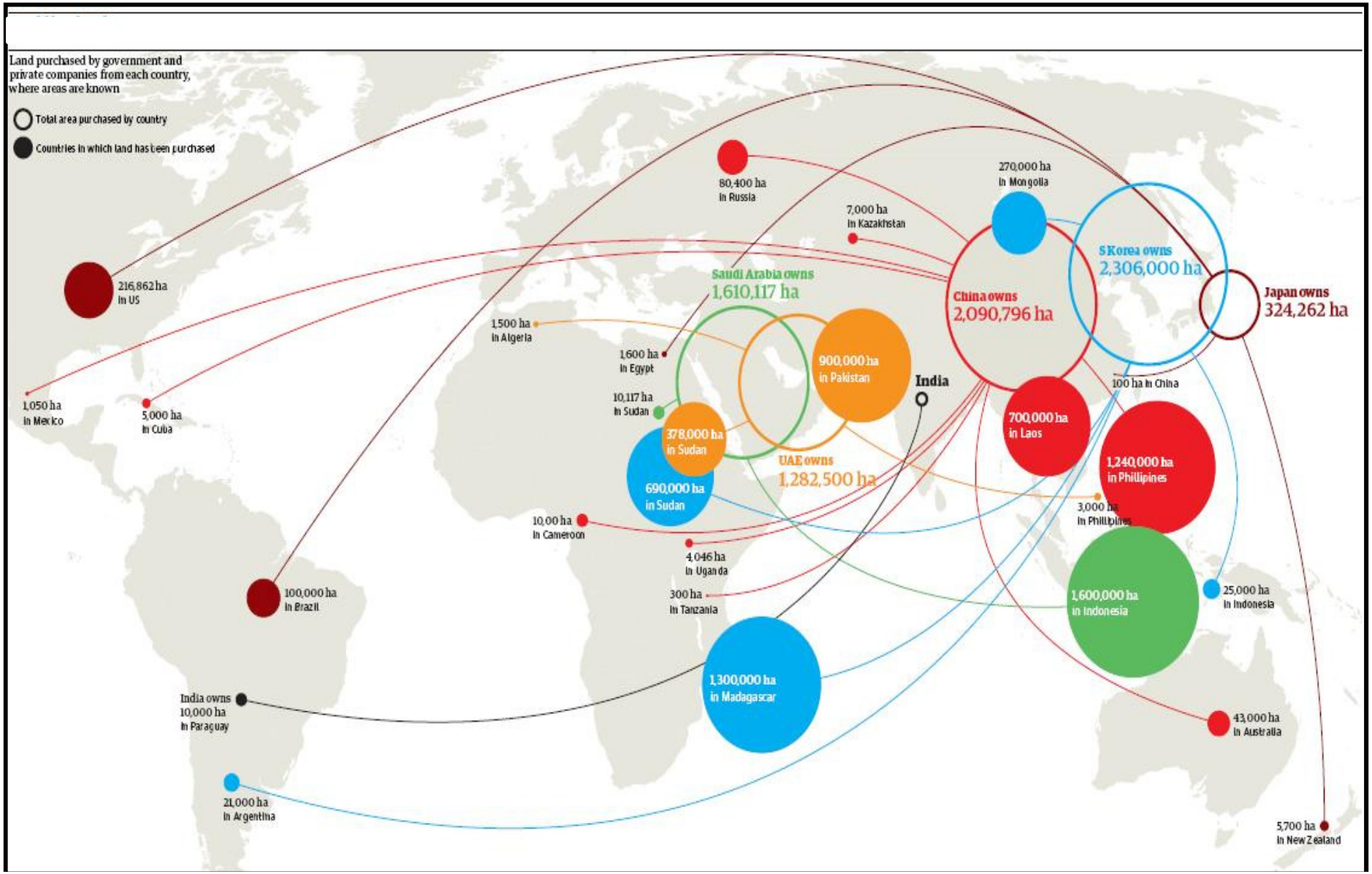
Systems and livelihoods in transition

Can we influence the next transition for the benefit of society and the environment?

W. Africa 1966 – pastoral system ⟶ 2004 – crop-livestock system

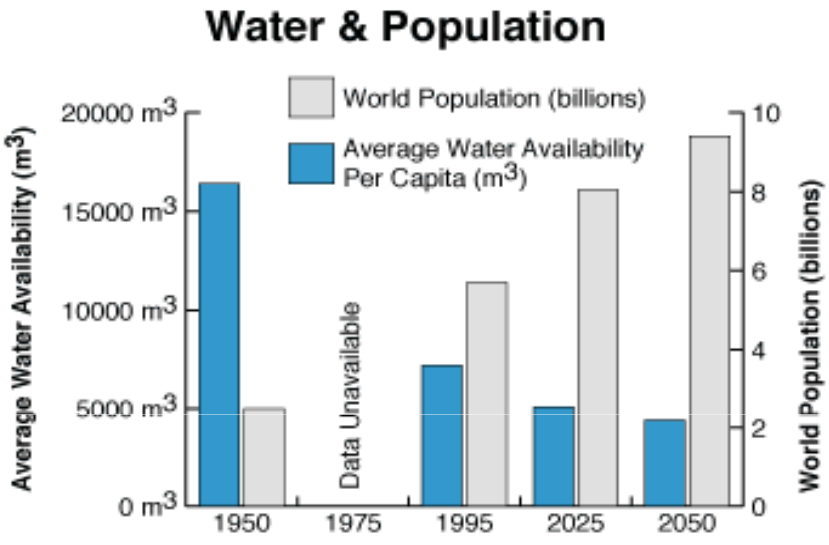


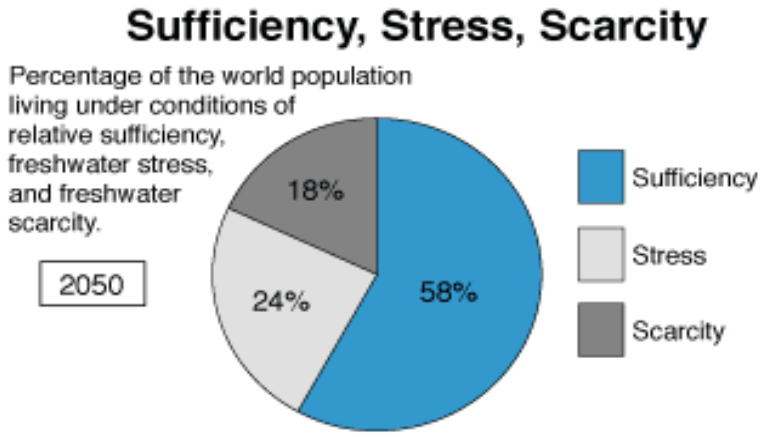
World Land Acquisition



A Global Water Crisis

- 2 billion people lack access
- Demand is growing; freshwater is getting scarce
- 70 % of total freshwater use is for agriculture

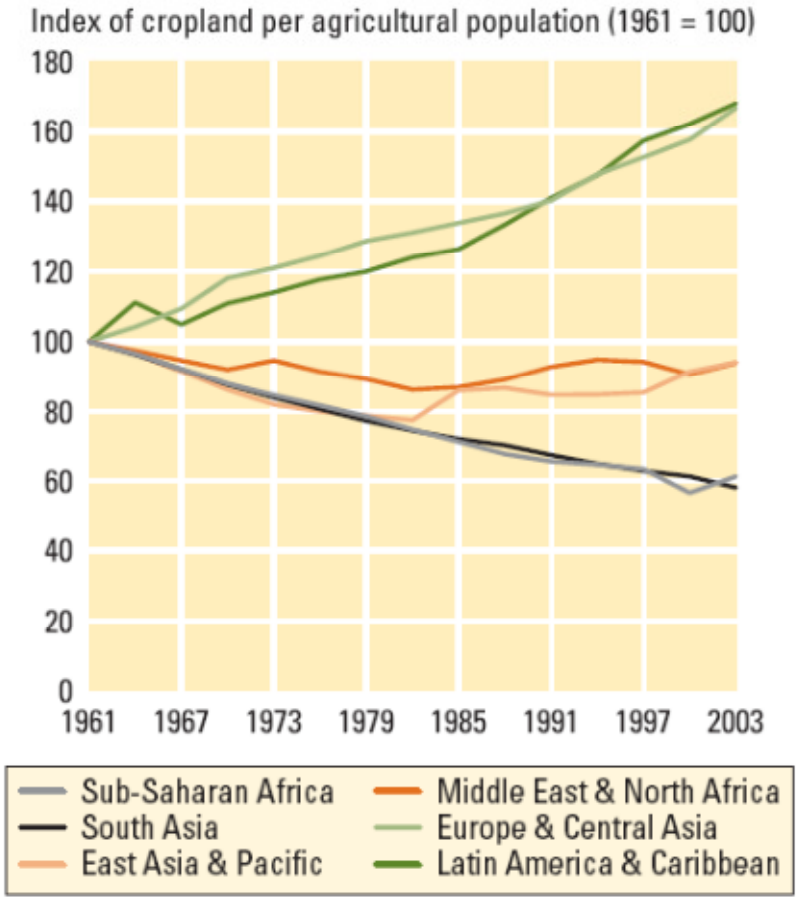




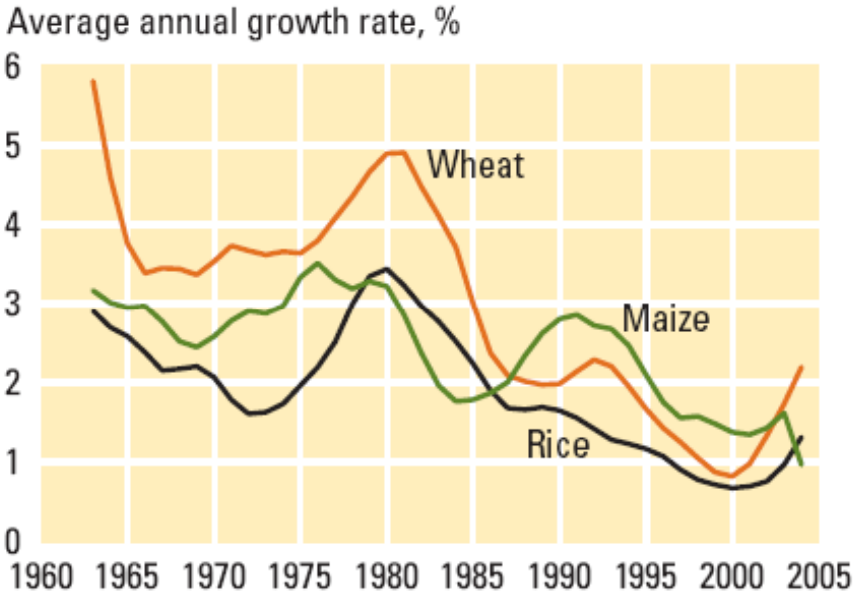
Livestock and water

- Direct water use is small
- Indirect water use and impact on water cycles is huge:
  - ✓Water for feed production.
  - ✓Impact of grazing on water quantity and water quality.
  - ✓Water pollution from livestock waste.

Area under cultivation and rates of growth in cereal yields



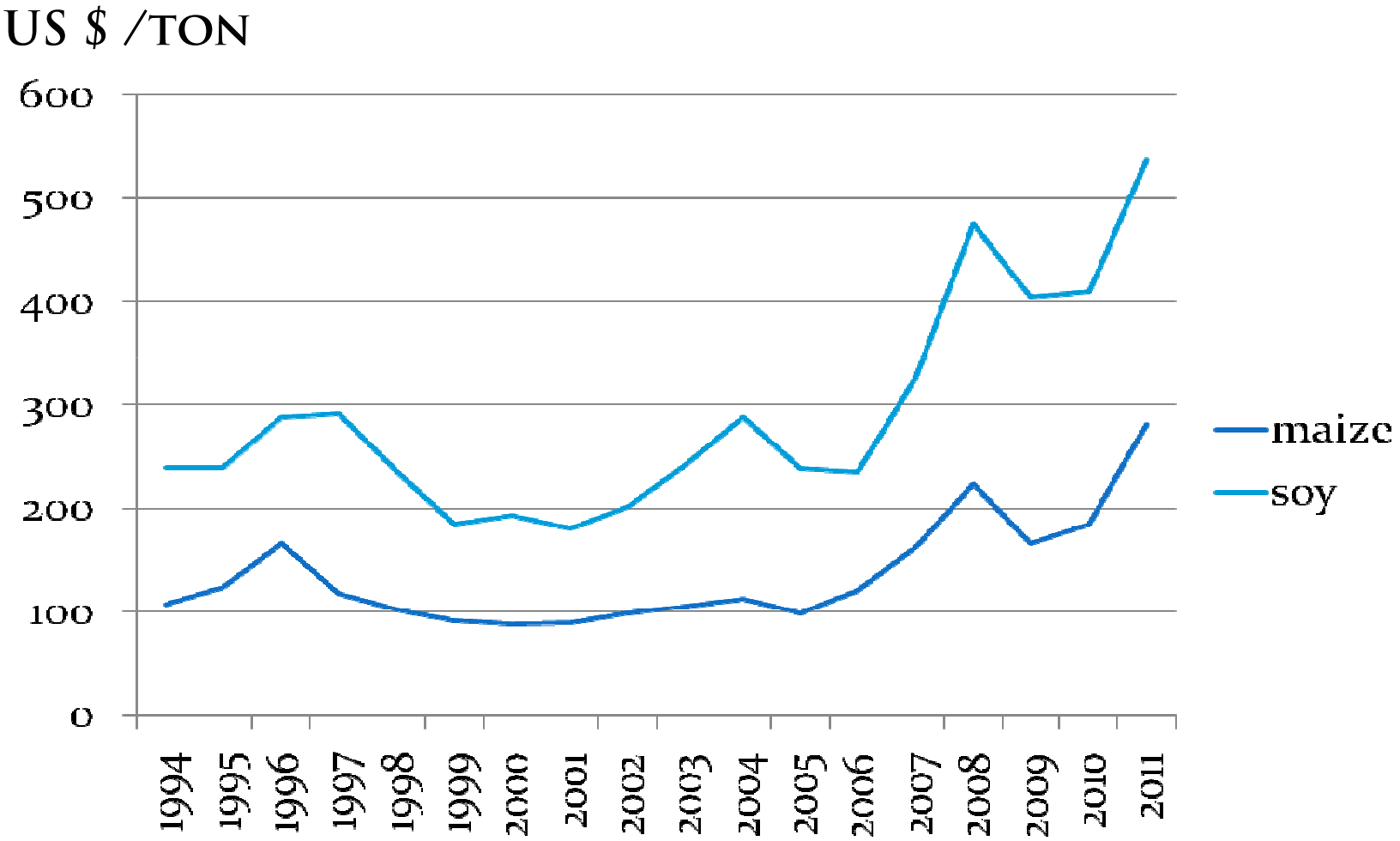
Source: FAO 2006a.
Notes: Cropland represents both arable and permanent cropland.



Source: FAO 2006a.
Note: Data smoothed by locally weighted regressions.

World Bank 2007

International prices for maize and soy



LIVESTOCK AND NUTRIENTS

- Manures provide 14%, 9% and 40% of N, P and K inputs for global crop production, respectively.

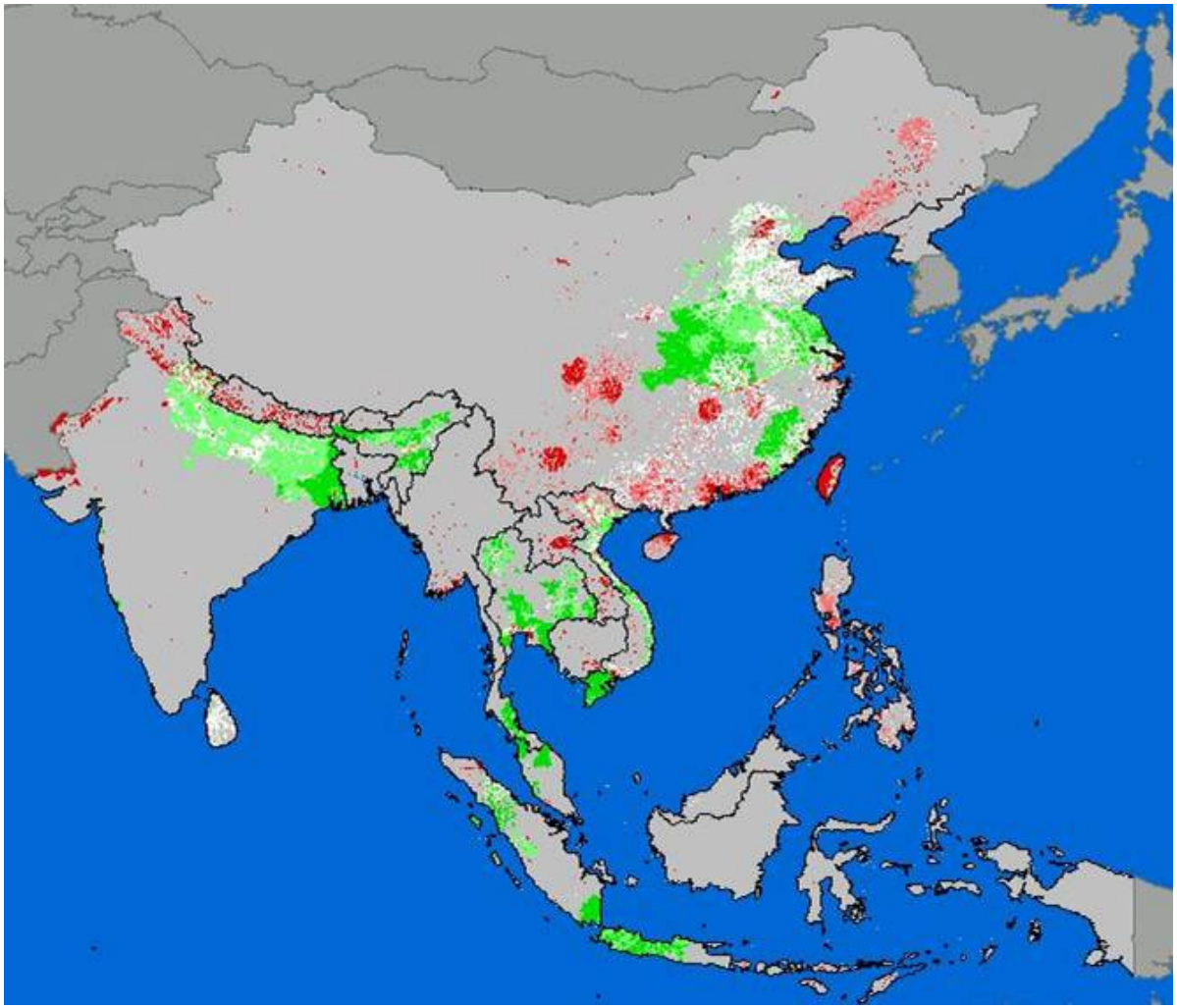
- Livestock crucial in smallholder systems as a source of fertilizer.

- …but at the same time concentrations of nutrients in industrial systems cause water pollution and waste disposal problems (lack of regulation).

Herrero et al. 2009

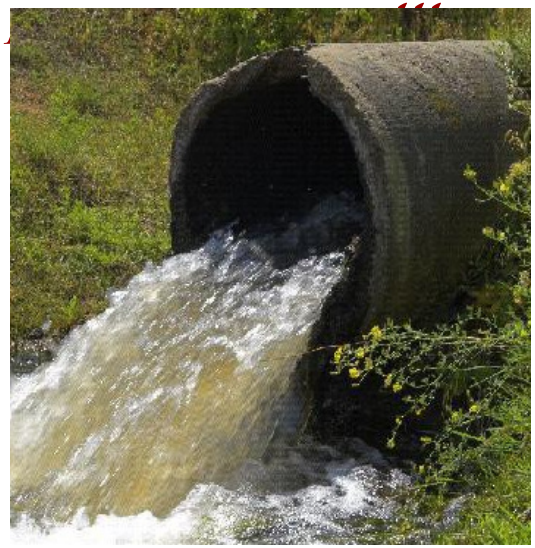
Intensive systems: need for learning from past experiences?

Livestock mediated nutrient overloads (Gerber et al 2002)



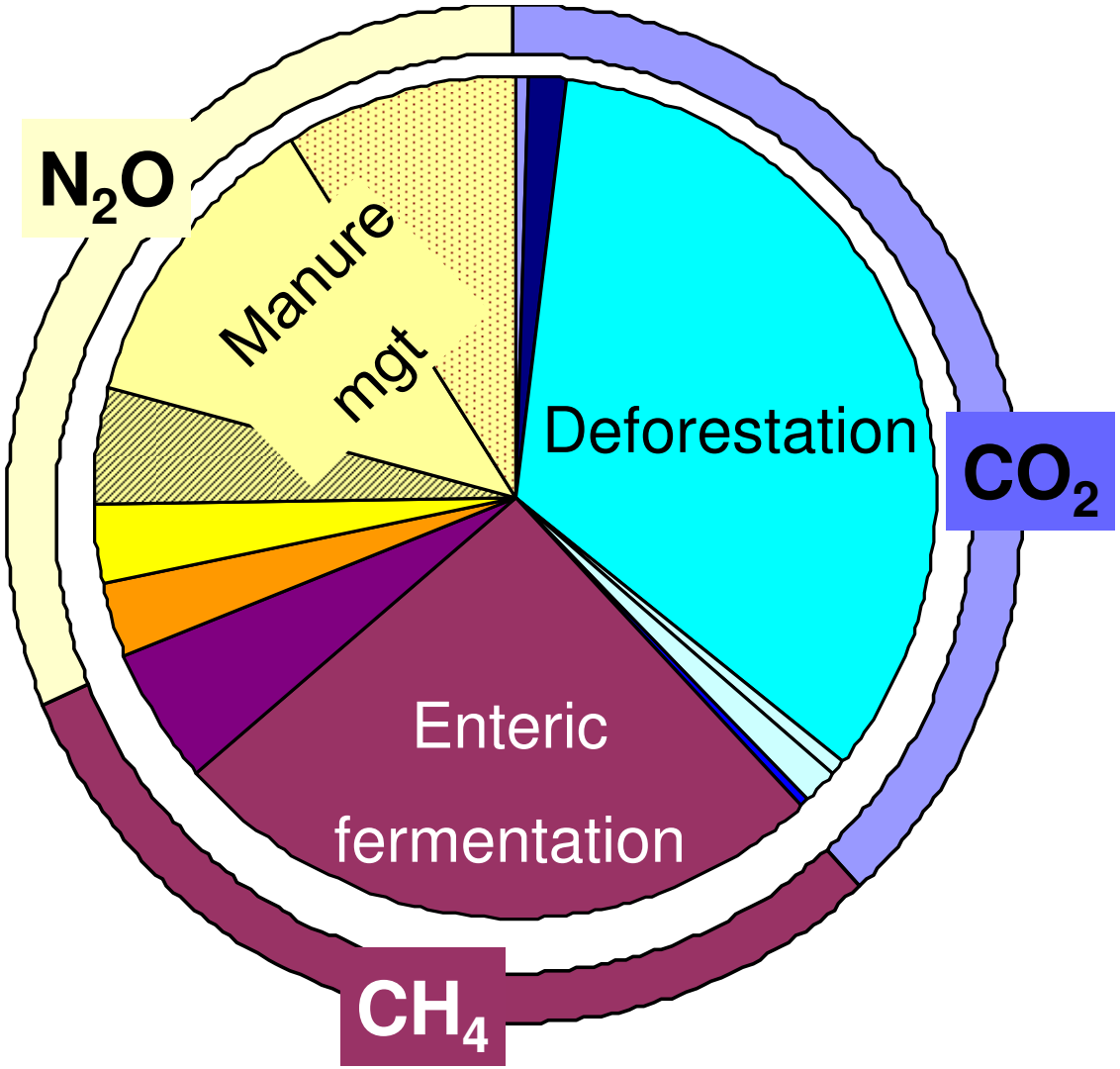
The developing world adopted industrial practices…..

BUT NOT THE



Livestock and Greenhouse Gases

18% of global emissions (FAO 2006)



- Chemical N. fert. production
- On-farm fossil fuel
- Deforestation
- OM release from ag. soils
- Pasture degradation
- Processing fossil fuel
- Transport fossil fuel
- Enteric fermentation
- Manure storage / processing
- N fertilization
- Legume production
- Manure storage / processing
- Manure spreading / dropping
- Manu indirect emissions

Prepared by Bonneau, 2008

How to respond?

Summary of issues

- Despite higher input costs, sector growth will continue
- Intensive production has lower GHG emissions per unit of product
- Huge performance gaps within systems and across countries
- Some technical solutions are available but incentives need to be better align

Summary of issues (continued)

- Livestock is at the centre of most contemporary resource use issues -- land, water, energy, nutrients (and of course climate change)
- Demand for livestock products will likely continue to be strong
- Efficiency is key to reducing resource requirements and environmental impacts;
  - ✓Technology development and adoption need to accelerate
  - ✓Supporting policy frameworks are needed
  - ✓Stakeholder participation

Sustainable intensification

- Better feeds
- Better breeds
- Better health
- Producing at higher resource use efficiencies (land, water, nutrients, GHG) where feasible
- + markets, incentives and others…

Sustainable intensification -institutional aspects

- Appropriate policies and regulations
- ✓ Managing externalities
- ✓ Managing nutrient loads
- ✓ Managing emissions

- Promoting an enabling environment

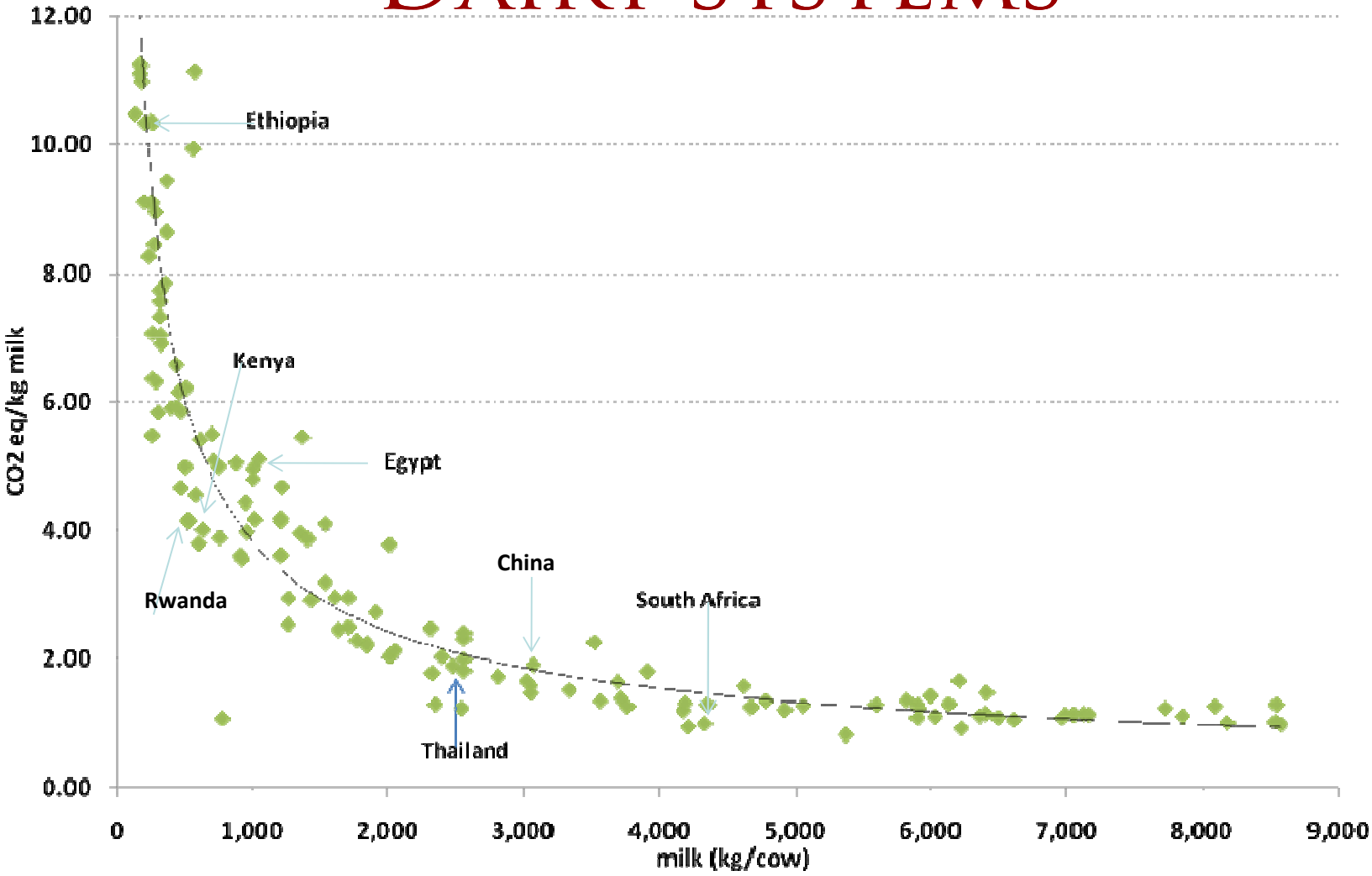
- Infrastructure development

Productivity gains and efficiency

--ILLUSTRATED--

- Intensive production has lower GHG emissions per unit of product
- Huge performance gaps within systems and across countries
- Some technical solutions are available but incentives need to be better aligned

Effects of Intensification on GHG emission intensity – Dairy systems



Gerber et al., 2011

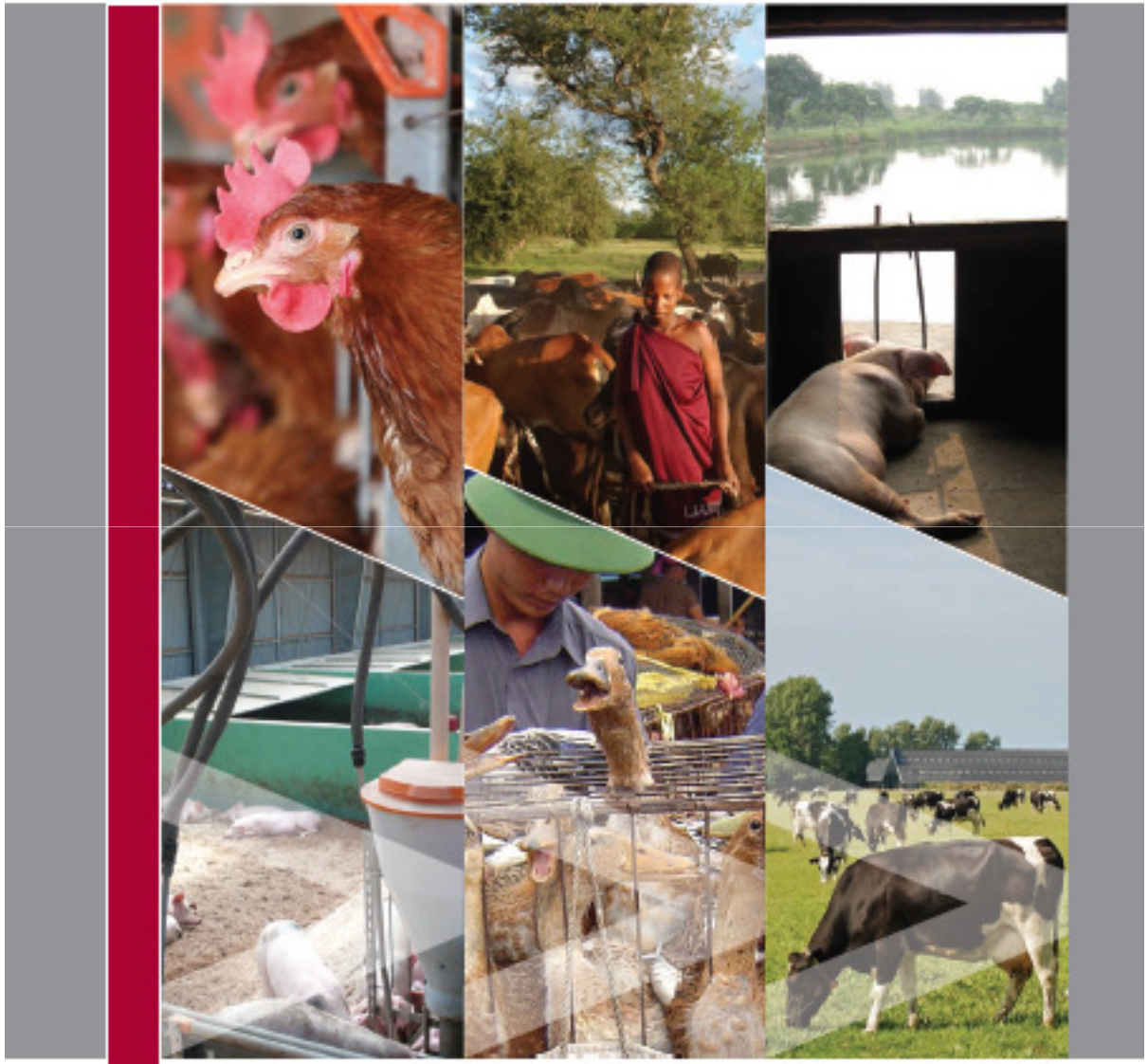
Comparison of resource inputs and waste outputs: dairy production in 1944 and 2007 in United States

	1944	2007	
Milk produced, billion kg	53.1	84.2	
	Resources/waste per billion kg milk produced		% of 1944
Total dairy population (10^3)	948	202	21
Resource use			
Feed, kg (10^9)	8.26	1.88	23
Land , Ha (10^3)	1,705	162	10
Water , Liters (10^9)	10.76	3.79	35
Waste Output			
N excretion, kg (10^6)	17.47	7.61	44
P excretion, kg (10^6)	11.21	3.31	29
Manure, kg (10^9)	7.86	1.91	24
GHG emissions			
Methane, kg (10^6)	61.8	26.8	43
Nitrous oxide, kg (10^3)	412	230	56
Carbon footprint per billion kg of milk, kg of CO2 (10^9)	3.66	1.35	37

Capper et al. 2009

BUILDING A GLOBAL AGENDA OF ACTION

IN SUPPORT OF SUSTAINABLE LIVESTOCK SECTOR DEVELOPMENT



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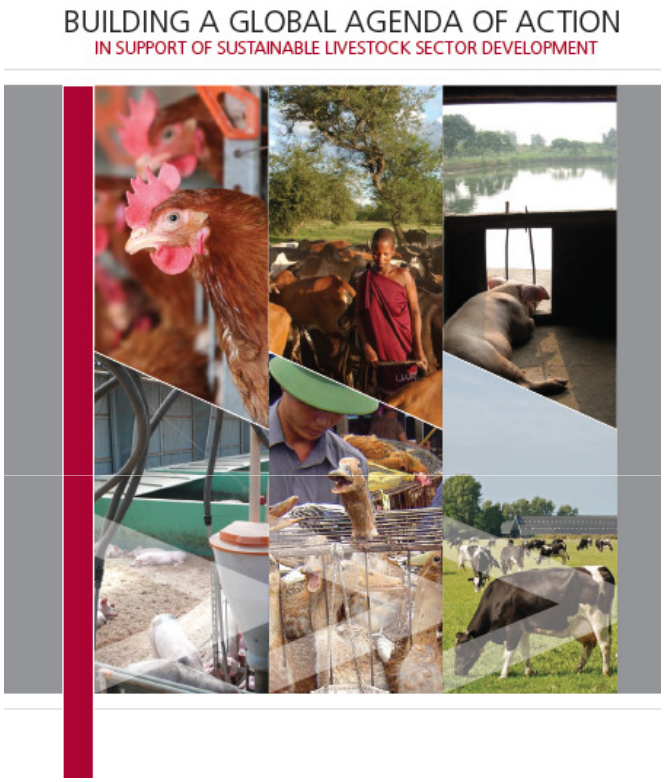

Global Agenda of Action

- A Multi-stakeholder Platform for generation and sharing of knowledge, experiences and practices.
- Advocacy, including within existing inter-governmental and other processes.
- Stakeholder consultations and awareness raising initiated by the “Dialogue Group” FAO and the World Bank.
- First multi-stakeholder platform meeting held in Brasilia, Brazil from 17 to 20 May 201.
- Next in Thailand at end of November

THANK YOU

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