

SECURING FOOD/NUTRITION FOR ALL – COHERENCE IN POLICIES AND ACTION

Club of Rome – India



New Delhi, 30 October 2014

Ashok Khosla

Chair, Development Alternatives

Co-Chair, IRP





**For Around 1 Billion People,
Malthus' Law
is a Living Reality**



RAPID Transition From an Empty to a Full World



HOLOCENE

Upto 1800

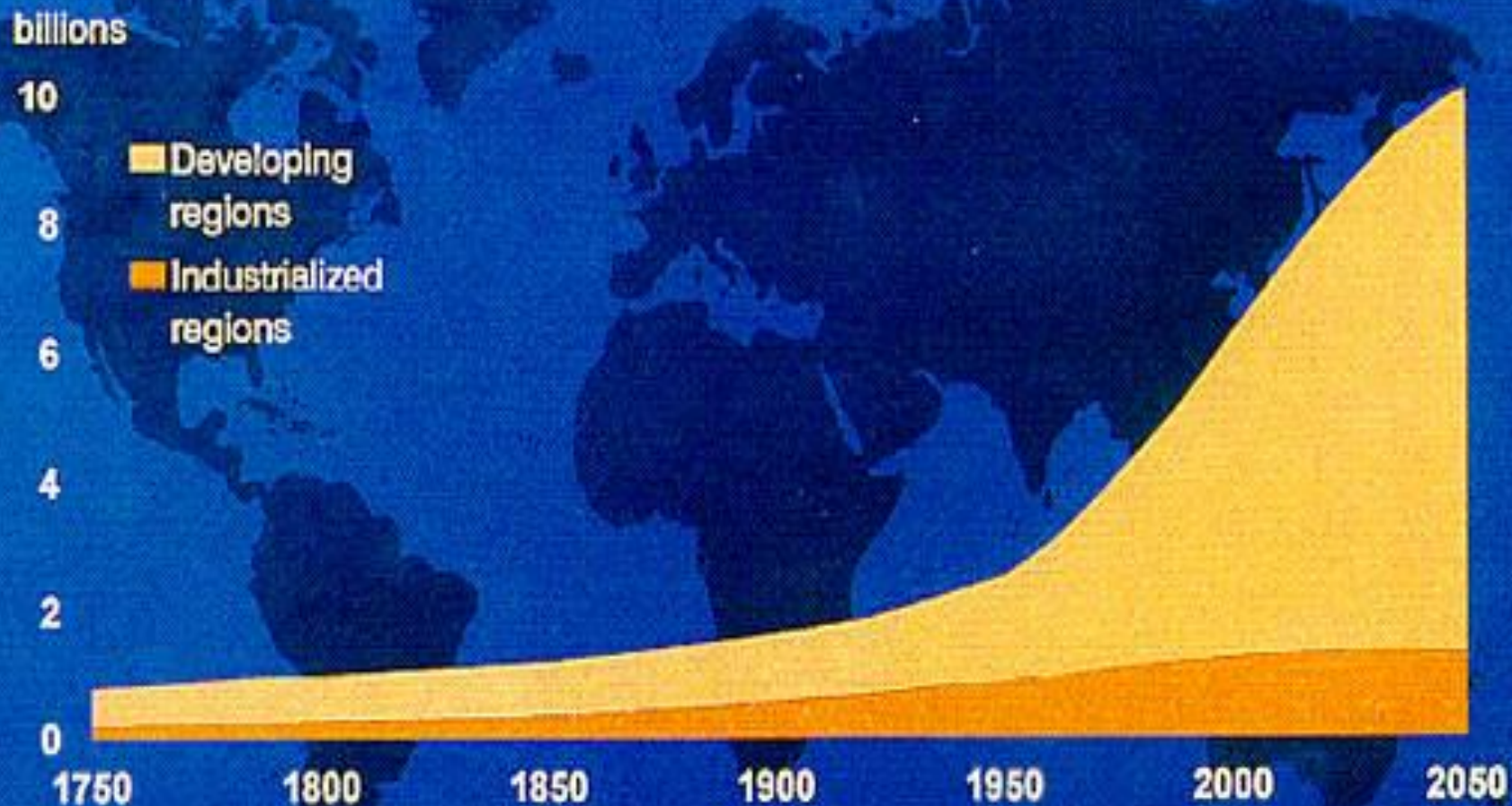


ANTHROPOCENE

Since 1800



World Population Growth



World
Resources
Institute

Sources: United Nations Population Division and Population Reference Bureau, 1993.

World Population & GDP-PPP

1820 TO 2010: IN 2010\$ PURCHASING POWER

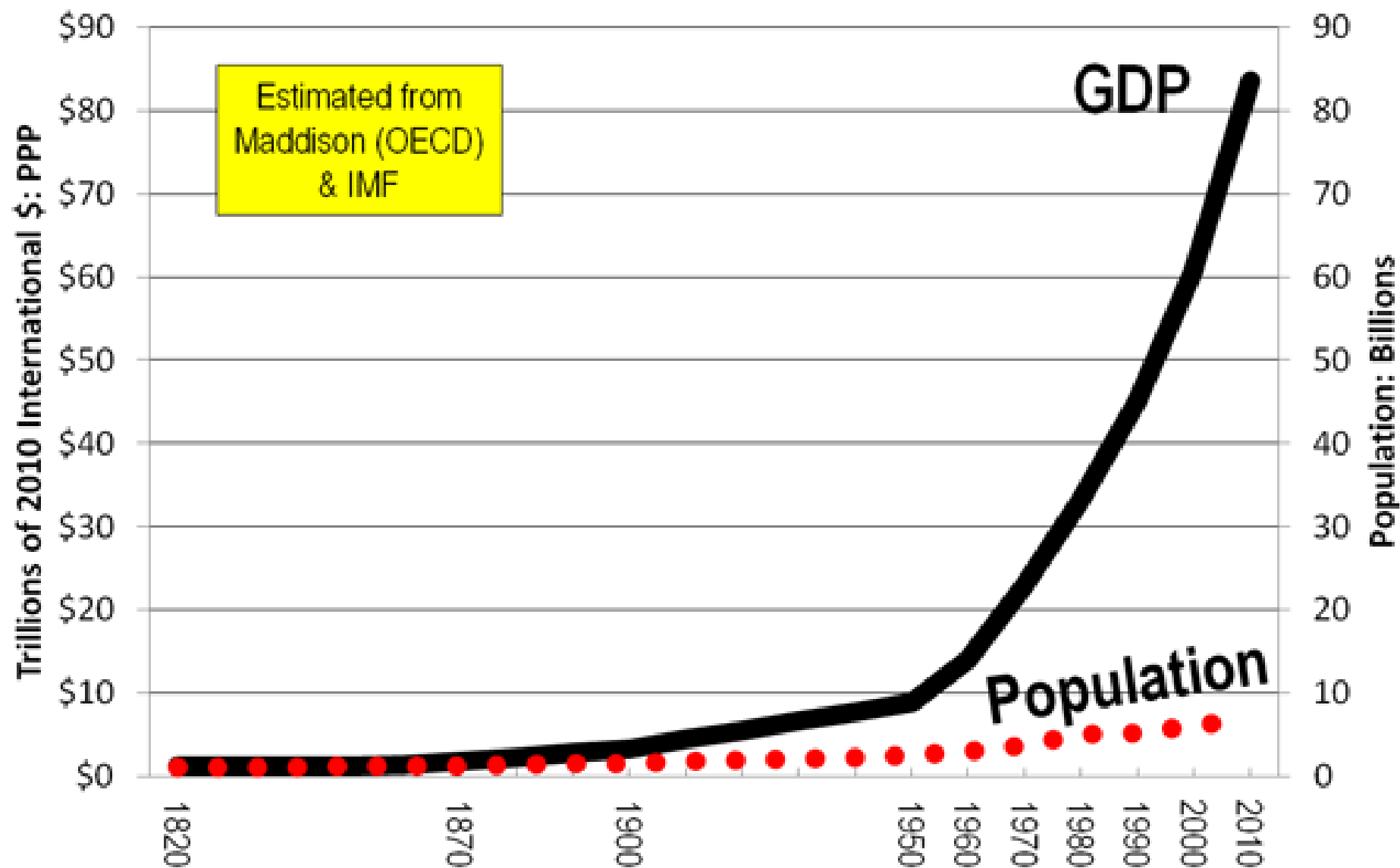


Figure 1

SHIFT TO AN URBANIZED WORLD

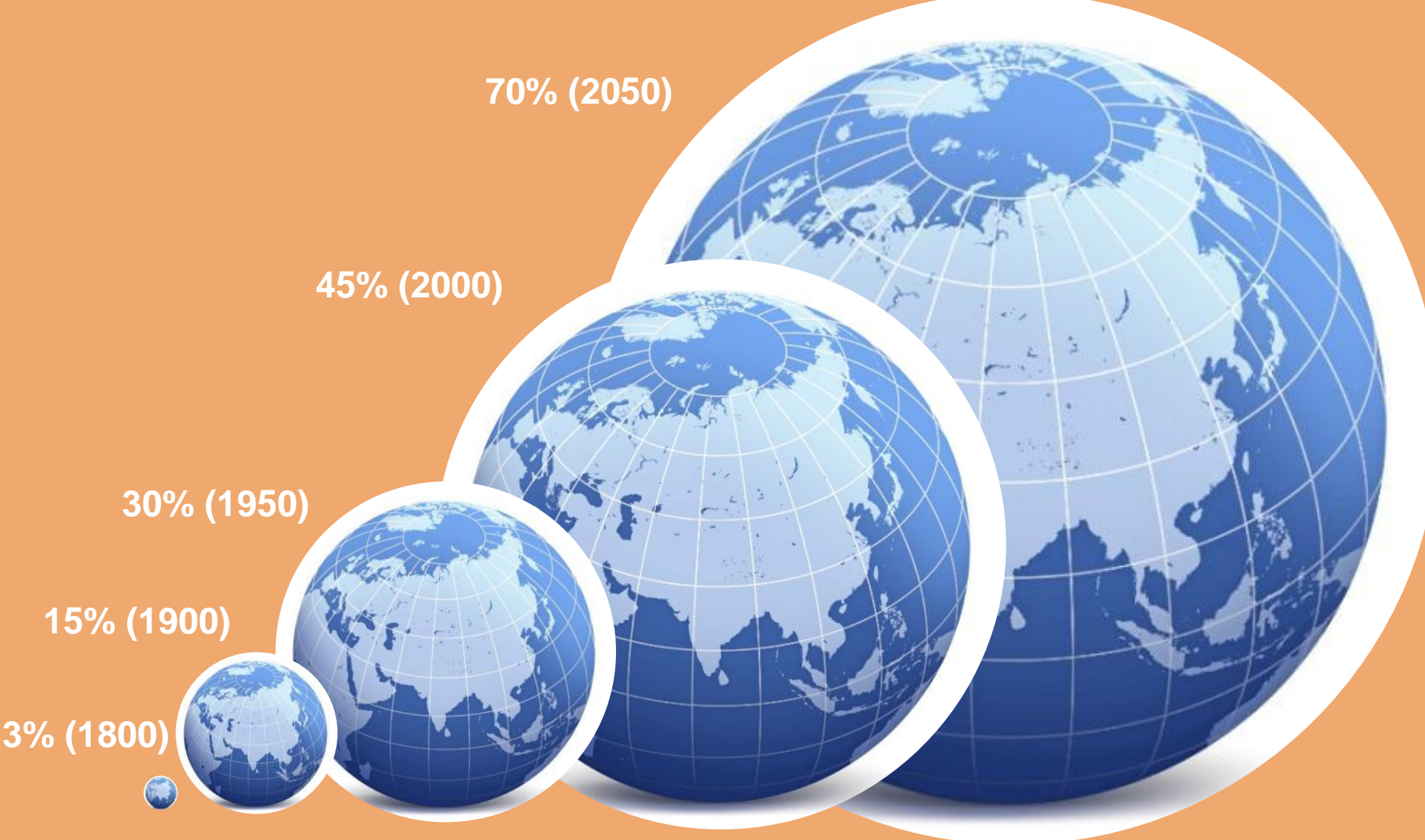
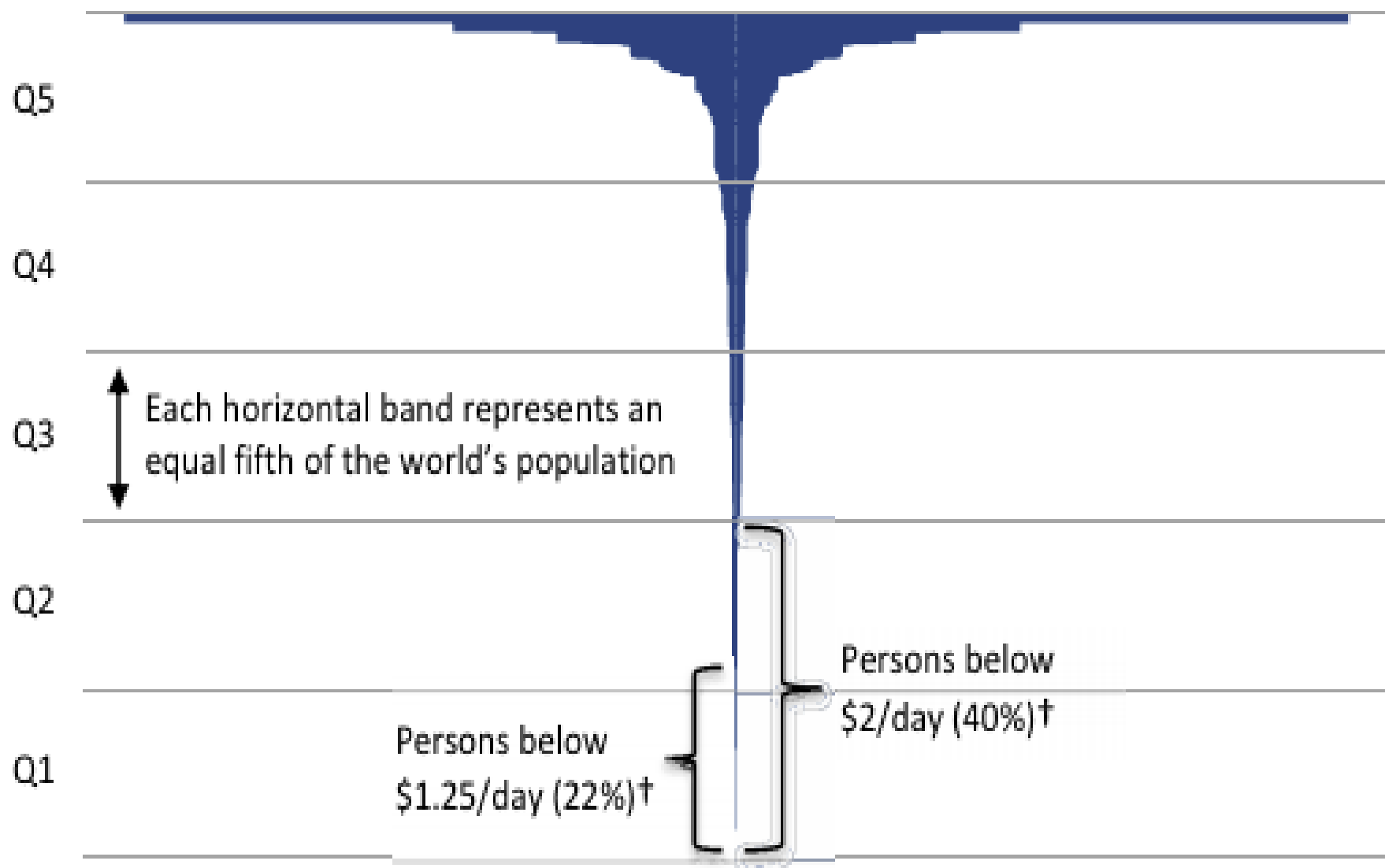


Figure 7. Global Income Distributed by Percentiles of the Population in 2007 (or latest available) in PPP constant 2005 international dollars*



Climate Change

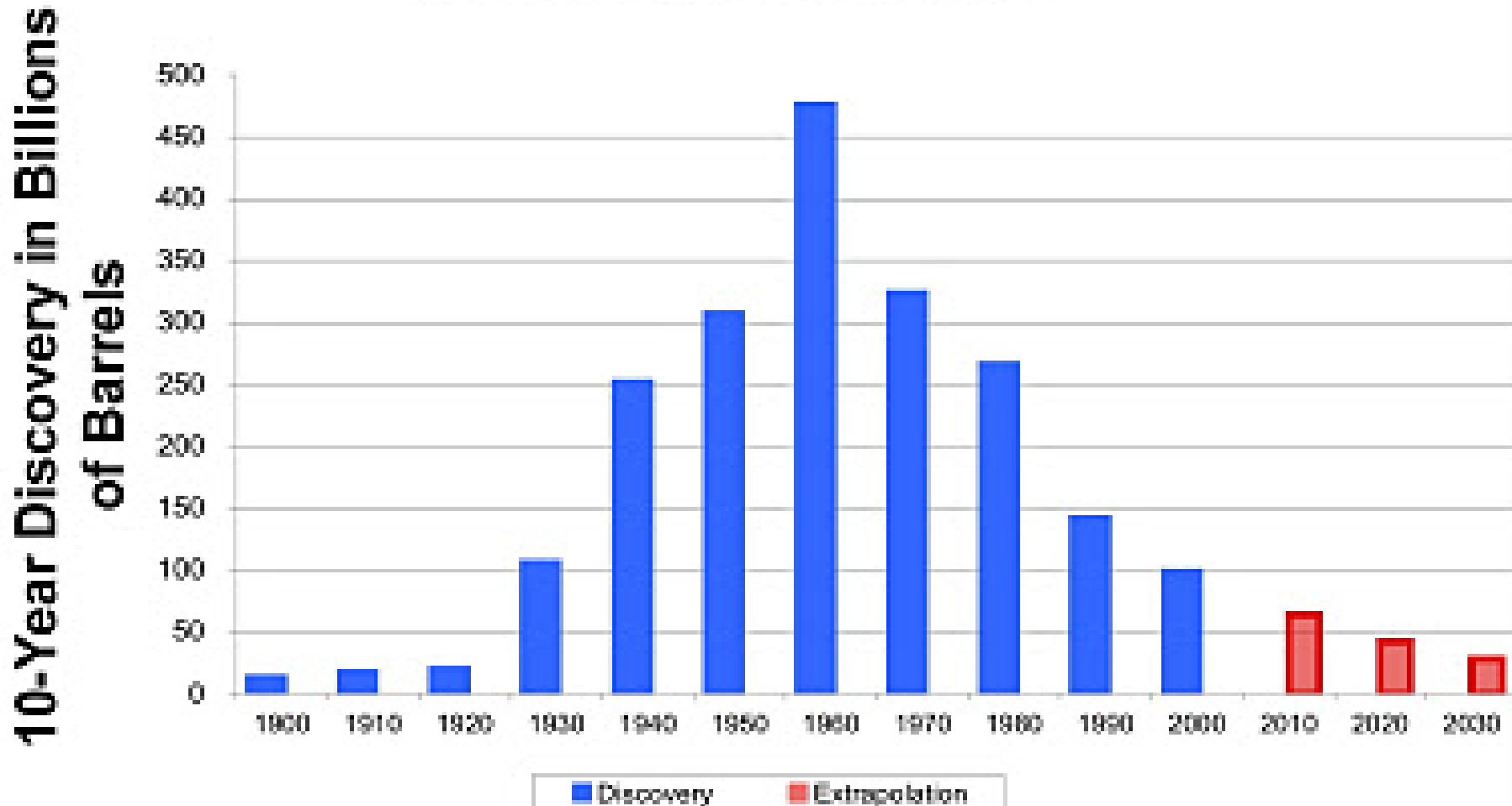




Species Extinction

PEAK OIL

New Oil discoveries have been declining since 1964



Note: World oil discovery over 10-year periods, by Association for the Study of Peak Oil and Gas.

Not Just Peak Oil... “Peak Many Things” In The Next 20 Years

- Food production
- Topsoil
- Phosphorous
- Fish
- Water supplies
- Uranium
- **Rare Earths**



Peak Phosphorus curve

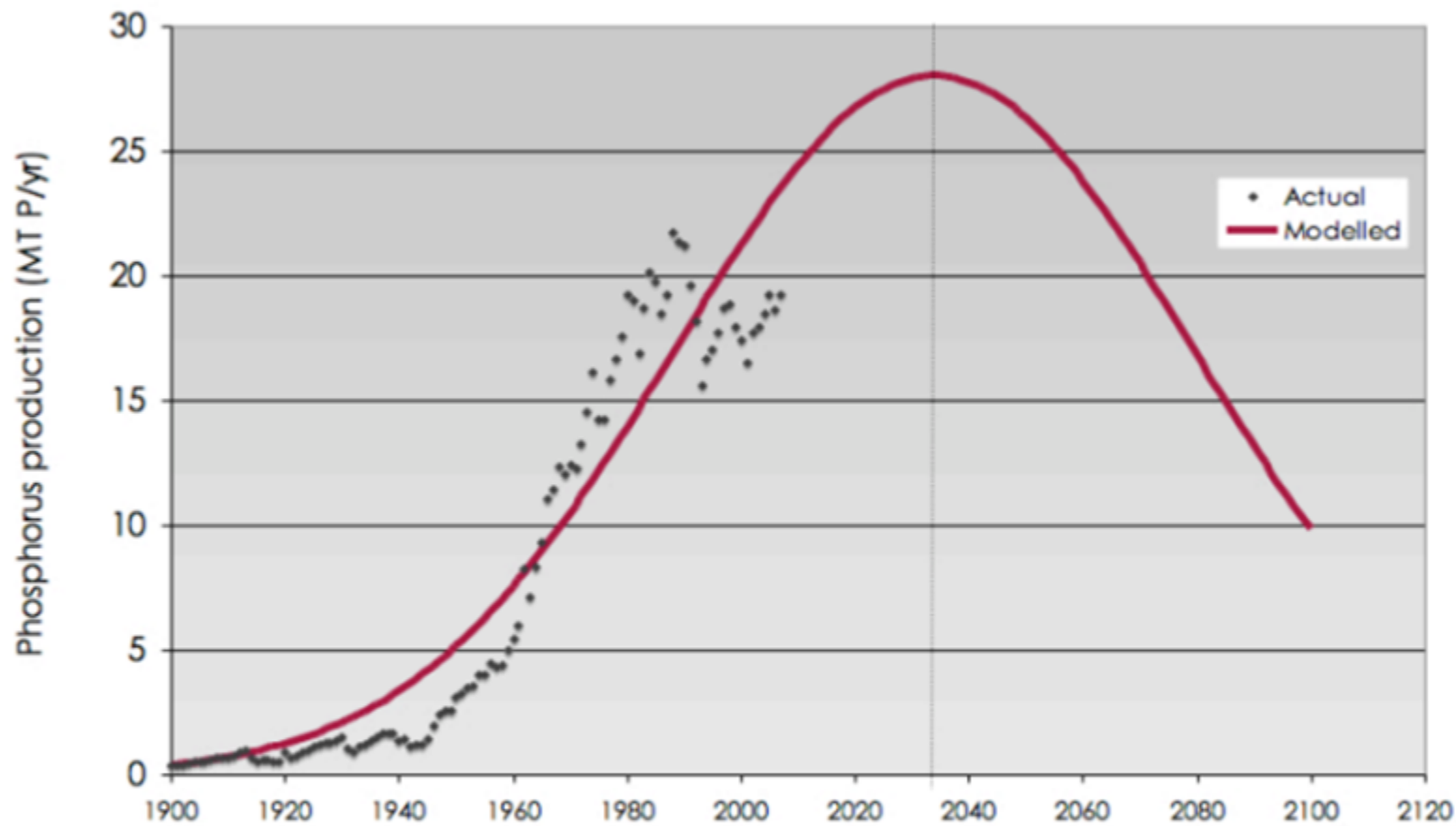
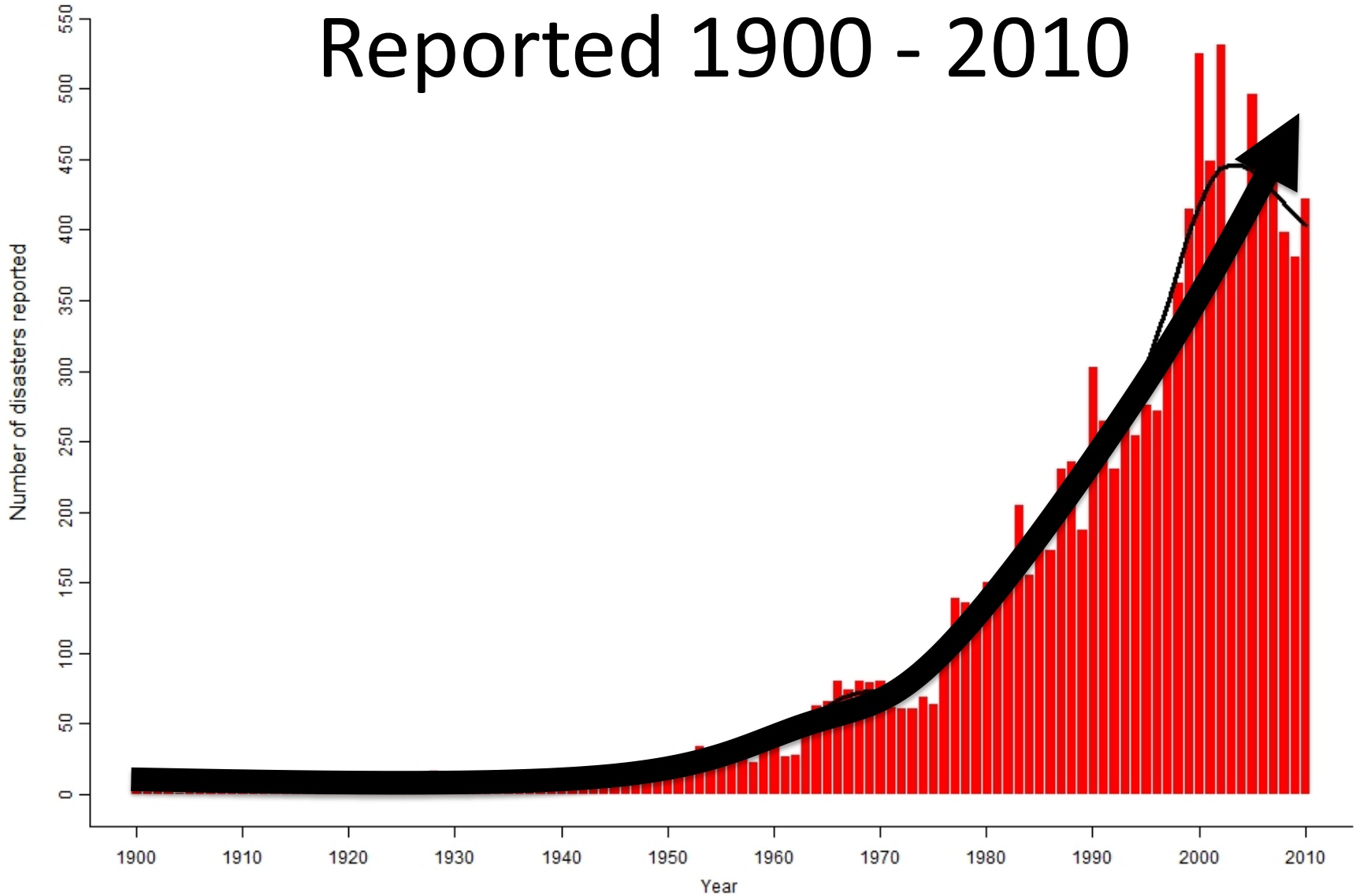
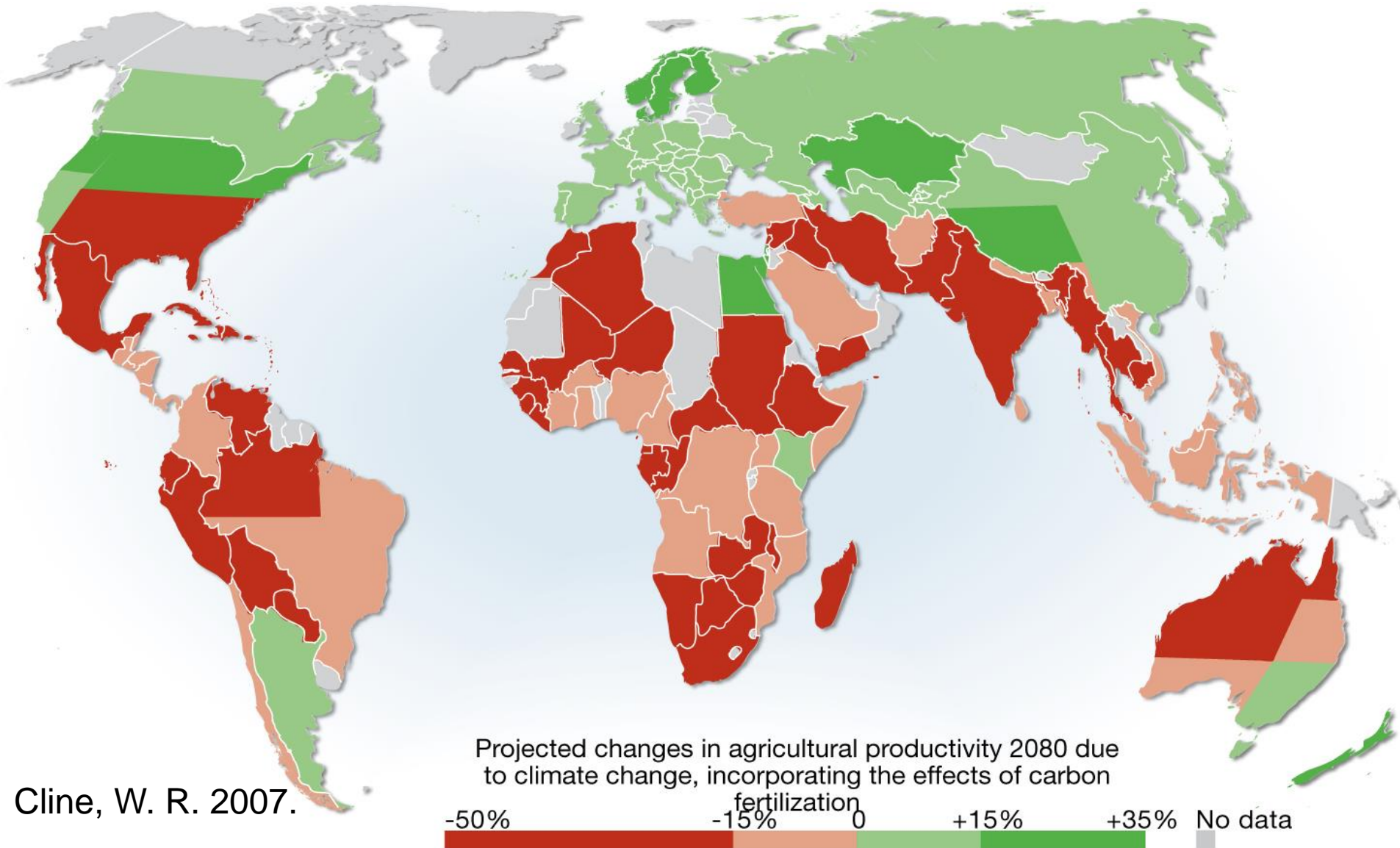


Figure 1: Peak phosphorus curve, illustrating that, in a similar way to oil, global phosphorus production is also likely to peak (Source: http://phosphorusfutures.net/index.php?option=com_content&task=view&id=16&Itemid=30)

Natural Disasters Reported 1900 - 2010

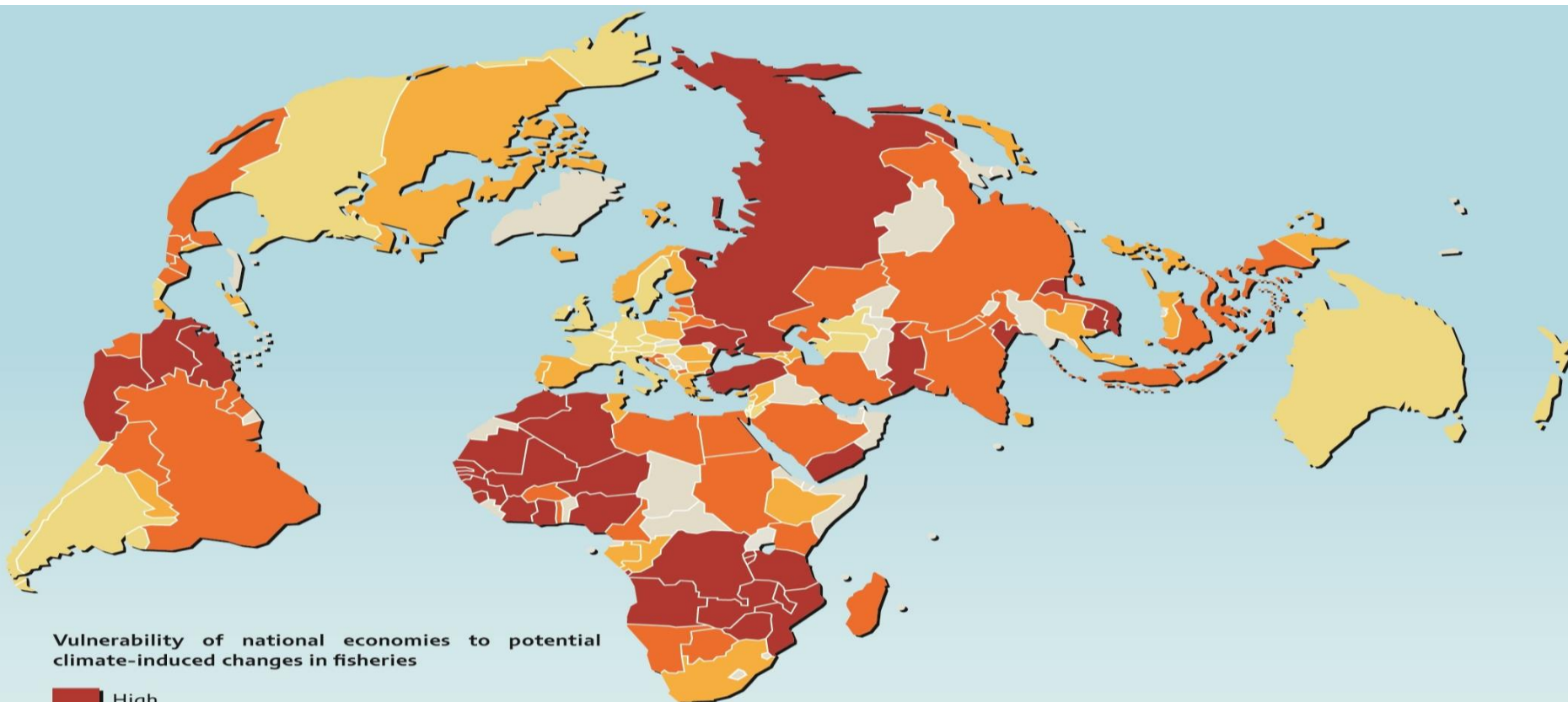


Agricultural productivity will fall by 15-50% in Asia by 2080

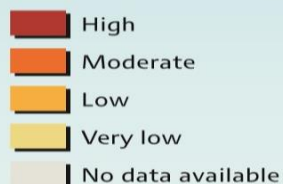


Cline, W. R. 2007.

Vulnerability of National Economies to Fisheries Affected by Climate Change



Vulnerability of national economies to potential climate-induced changes in fisheries



19 of the 33 countries included in the High Vulnerability class are Least Developed Countries. For some of the most strongly fishery dependent countries (Benin, Chad, Comoros, Maldives, the Republic of Korea, São Tomé and Príncipe) vulnerability data are not available.

Source: E. H. Allison et al, Vulnerability of national economies to the impacts of climate changes on fisheries, *Fish and Fisheries*, 2009, 10, pp. 173-196.

The vulnerability of national economies to potential climate change impacts on fisheries was calculated combining composite indicators that evaluate the adaptive capacity of countries, their exposure to climate change and their fisheries dependence.

The adaptive capacity indicator is calculated from indexes of health, education, governance and size of economy.

The country-specific mean surface temperature increase by 2050 for IPCC scenario B2 (local development, lower emissions) was considered as indicator of exposure to climate change.

The indicator of fisheries dependence was deduced from the national number of fishers (absolute and relative to the labour force) and landings, the income dependency on fisheries-derived exports and per capita fish proteins as a proportion of total animal proteins consumed.

**Climate
Change**

**Ozone
depletion**

**Atmospheric
Aerosol
Loading**

**Biogeochemical
loading: Global
N & P Cycles**

**Ocean
acidification**



Planetary Boundaries

**Rate of
Biodiversity
Loss**

**Global
Freshwater
Use**

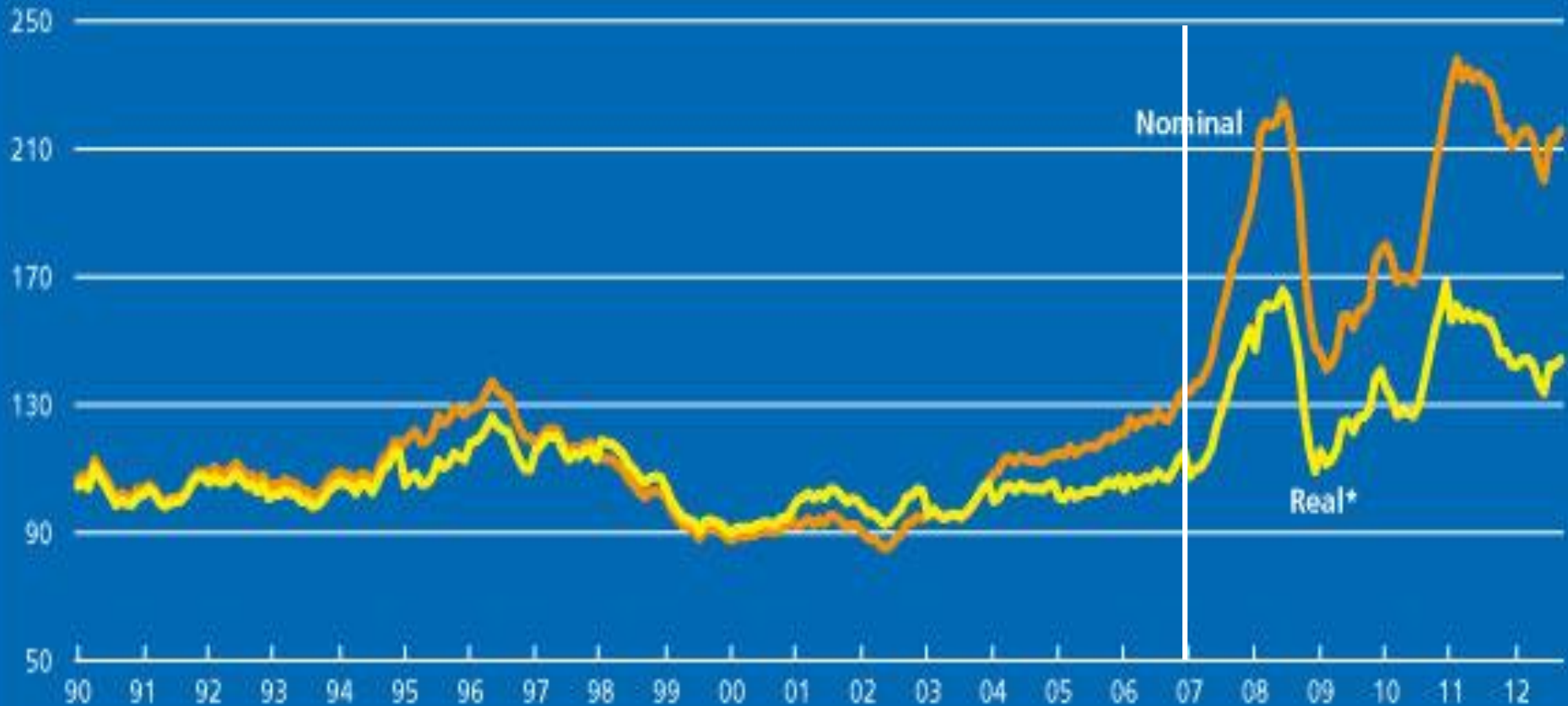
**Land
System
Change**

**Chemical
Pollution**

World Food Prices - FAO

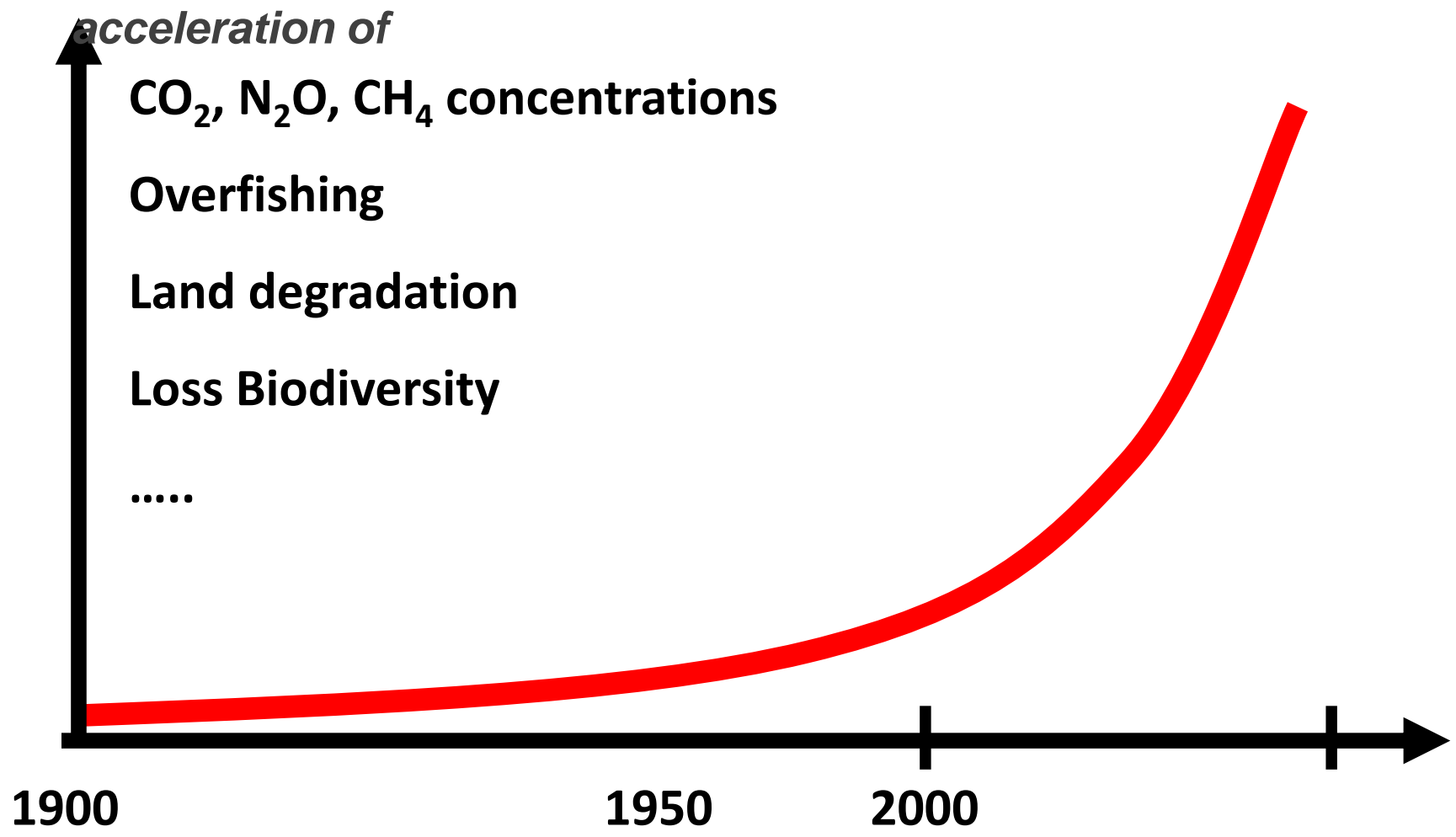
FAO Food Price Index

2002-2004=100

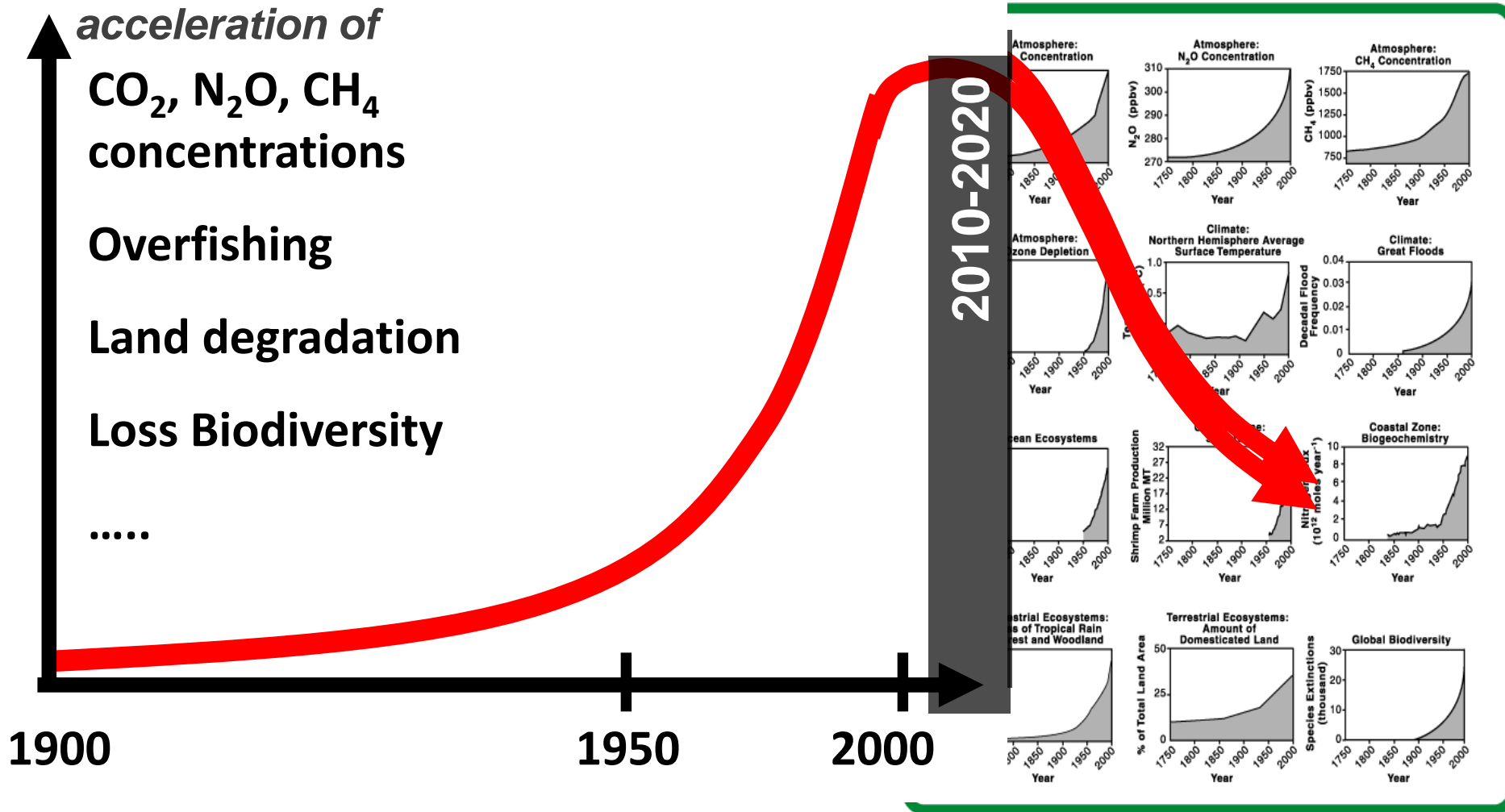


* The real price index is the nominal price index deflated by the World Bank Manufactures Unit Value Index (MUV)

Green Growth – an Oxymoron ?



Exponential Growth -- and Collapse ?



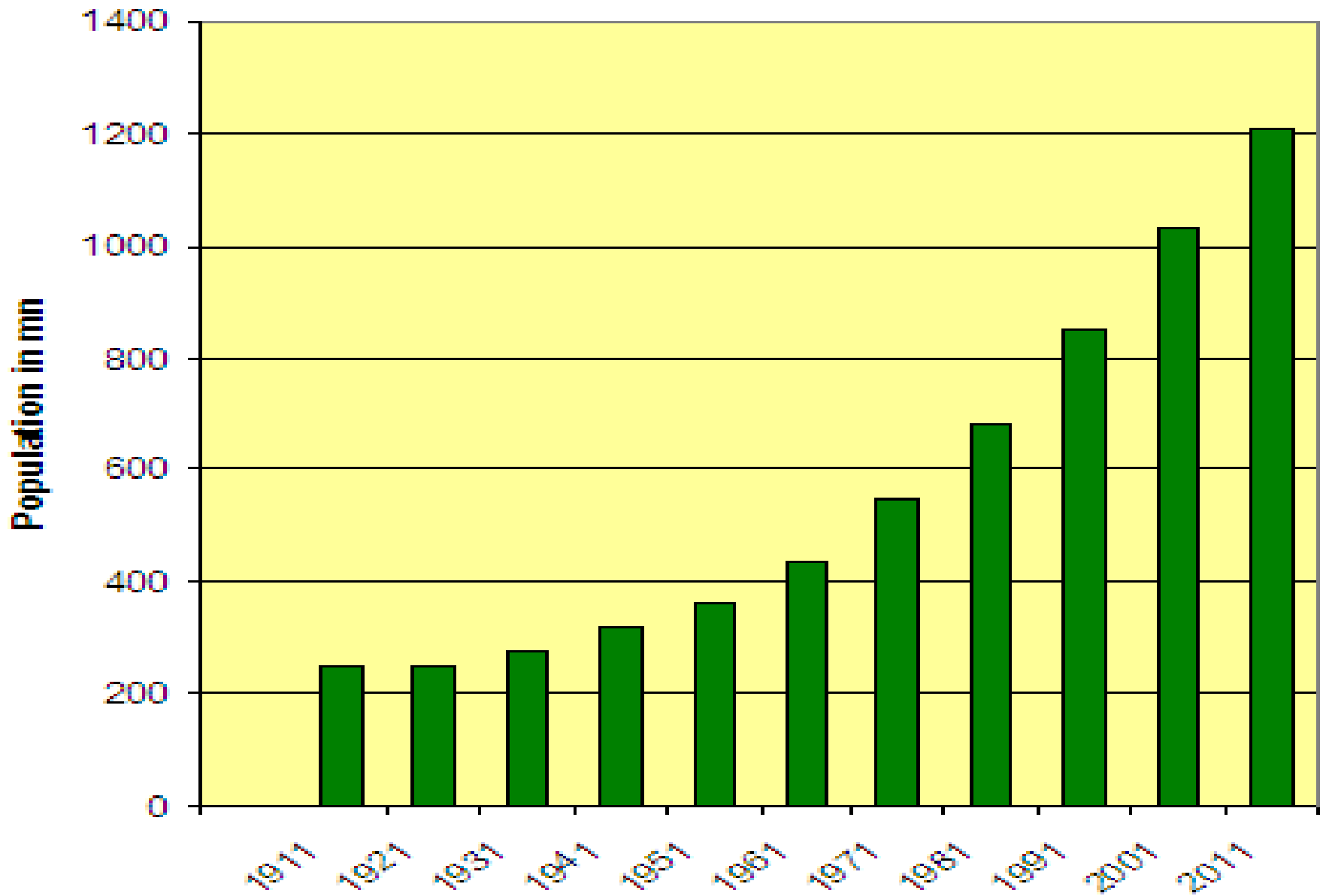
Eliminating Hunger and Malnutrition in India



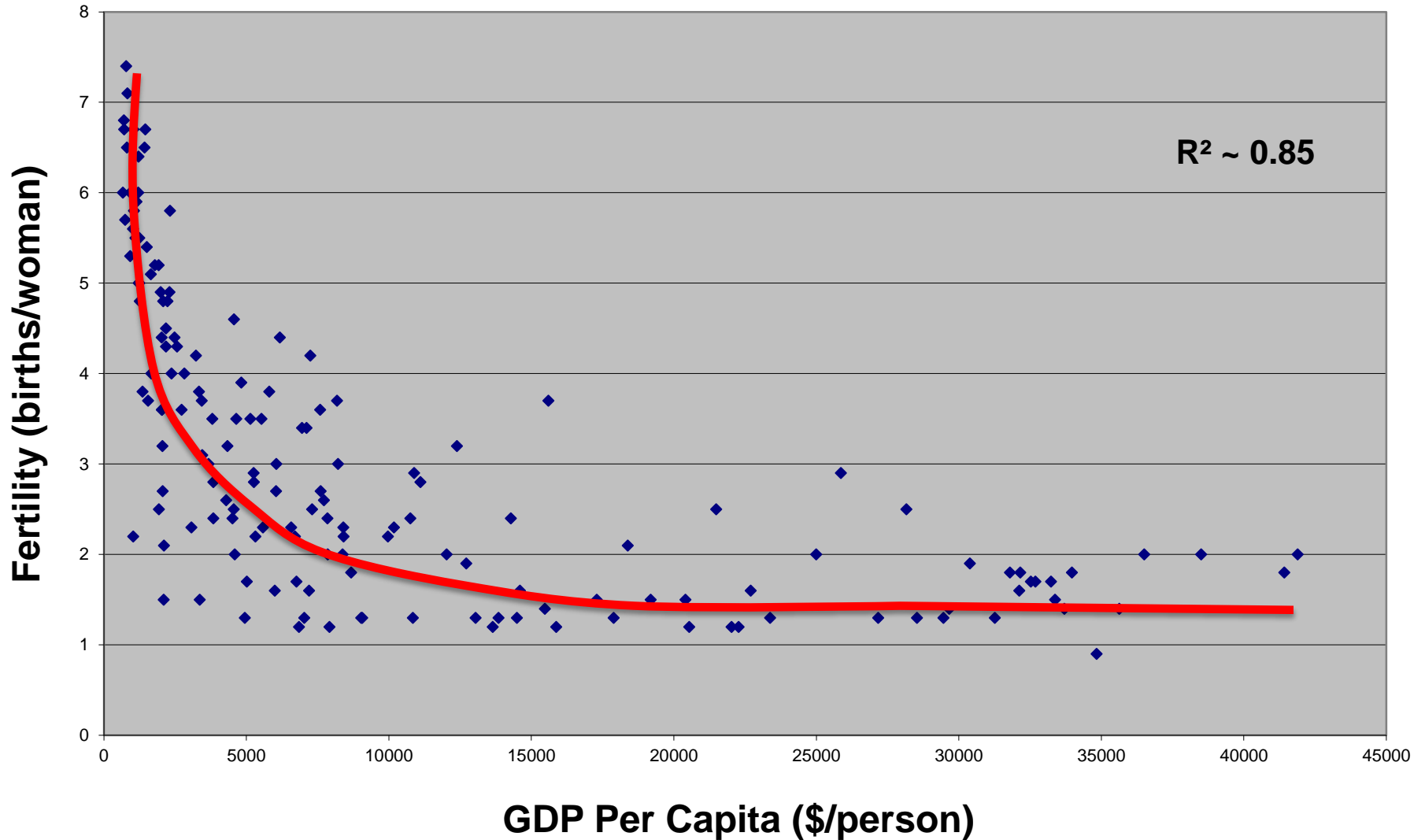




India's Population



Fertility vs GDP Per Capita (2005)

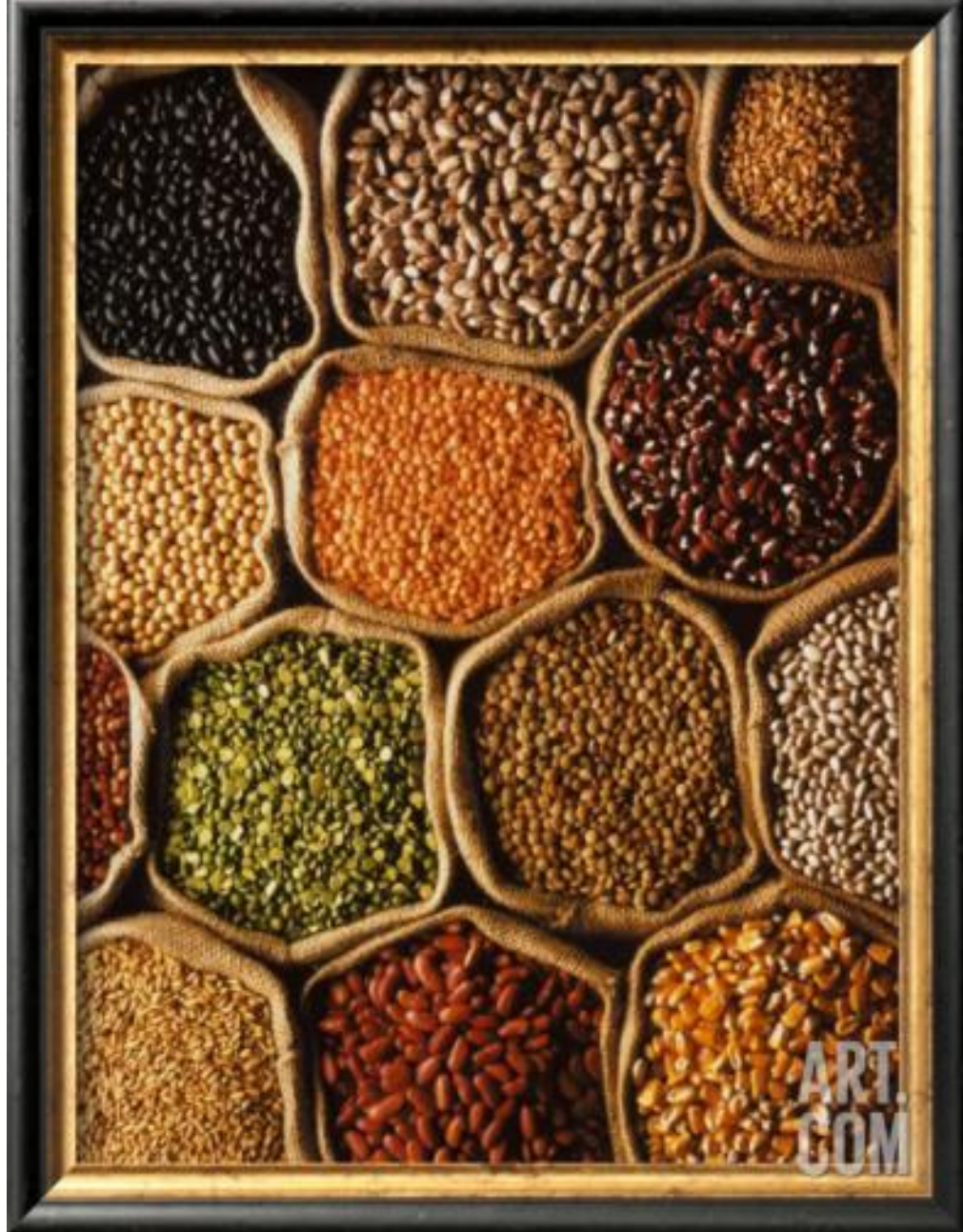




The Many Ingredients of Nutrition

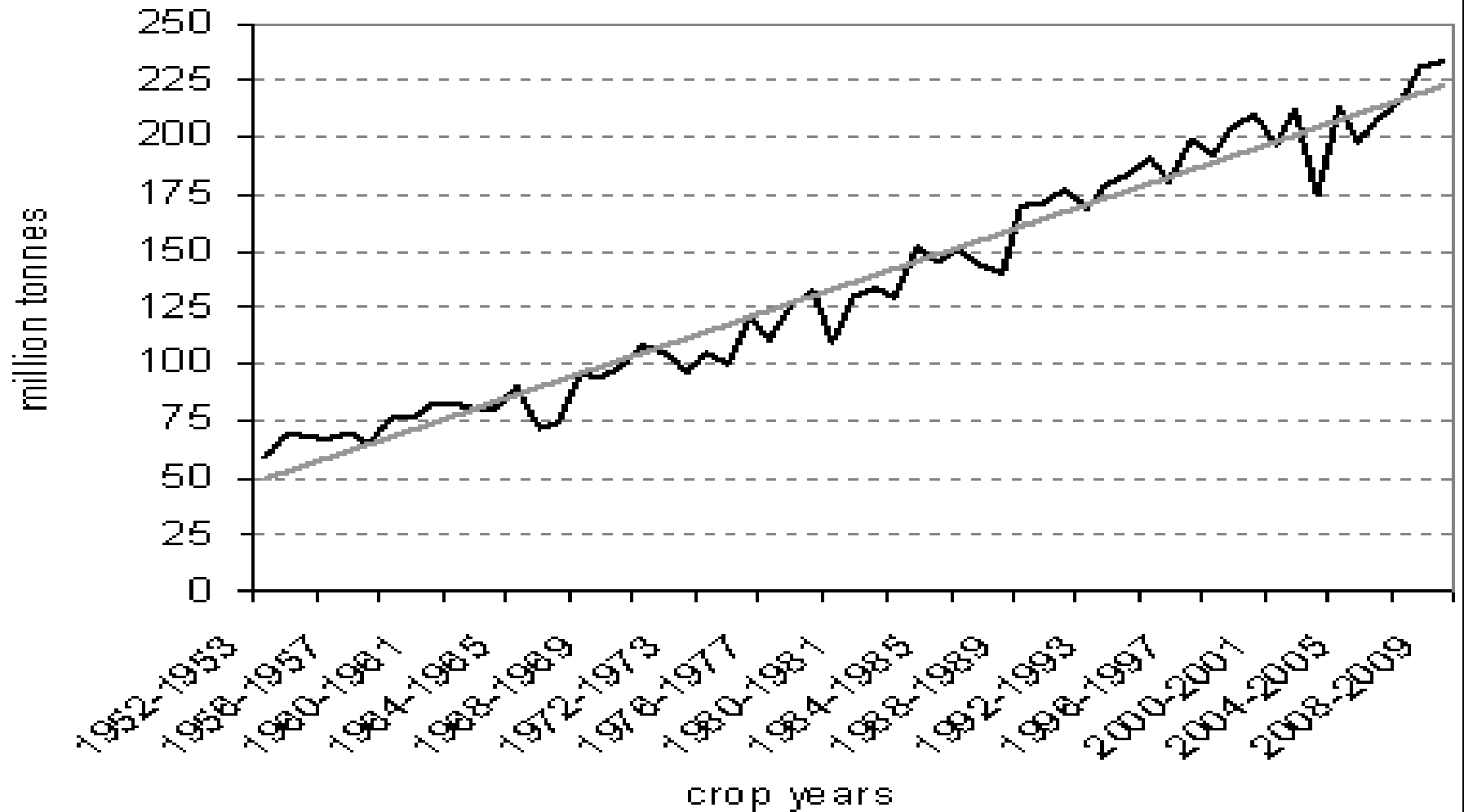


Nutrition and Food



Grains and Pulses

INDIA: ALL FOODGRAIN PRODUCTION

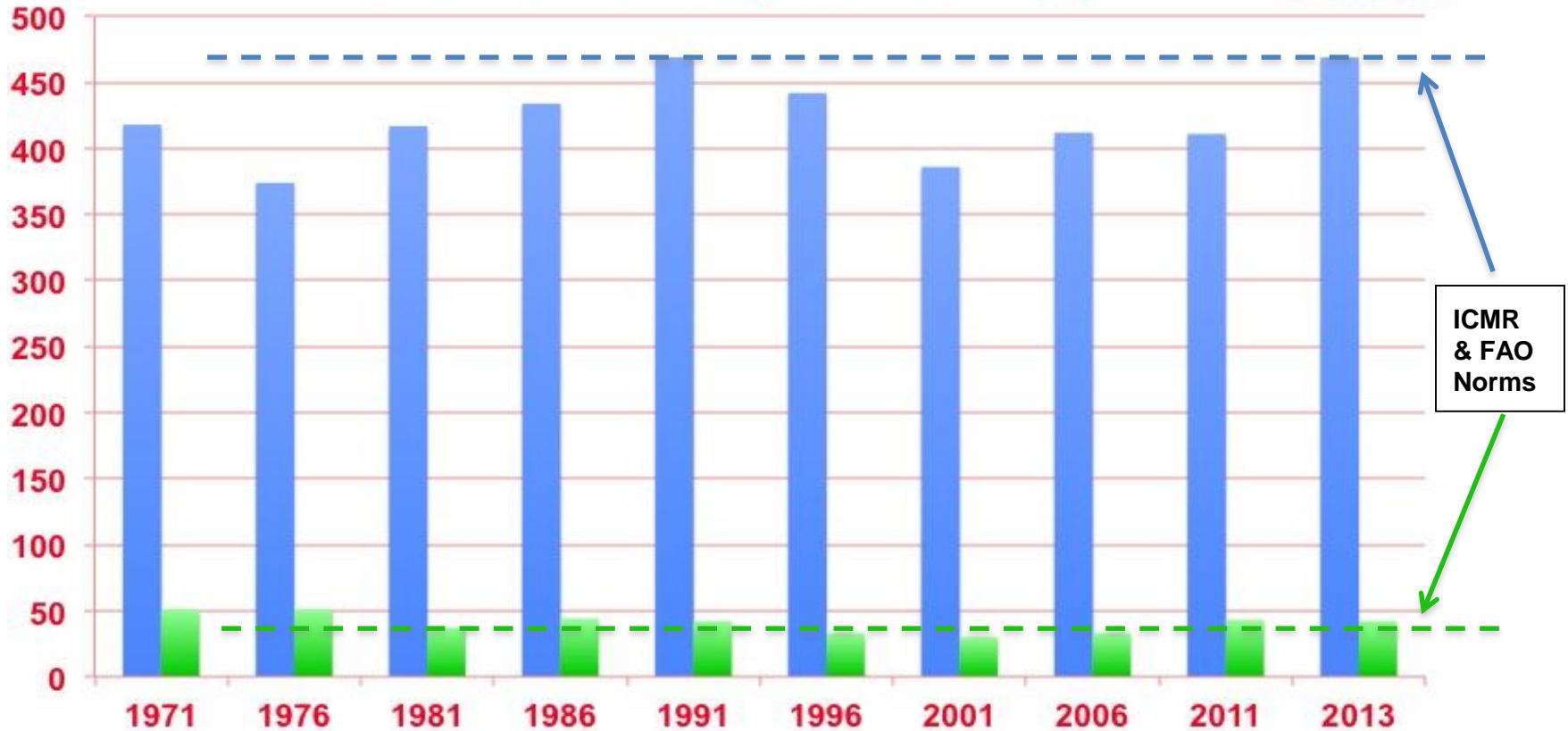


Source: Government of India

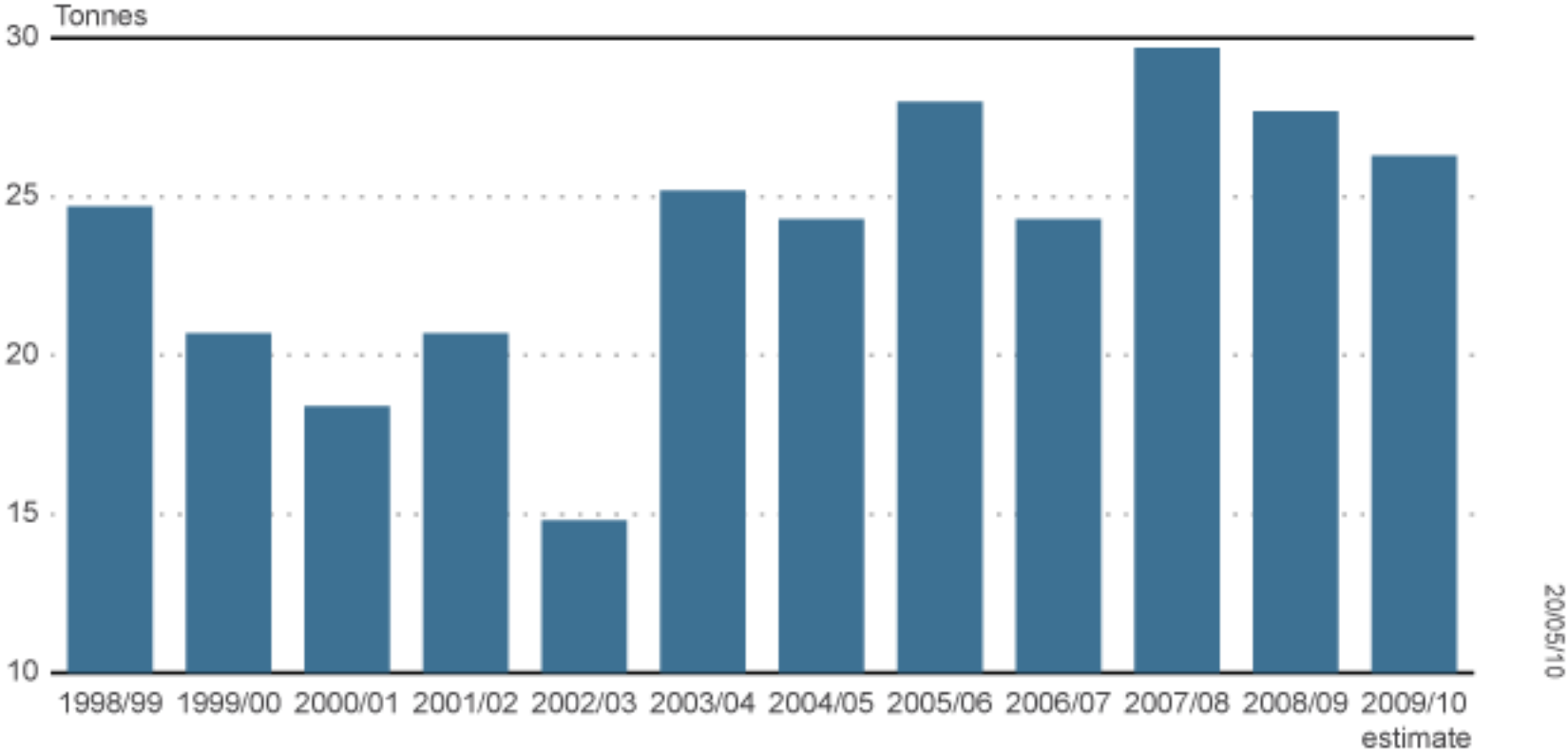


Average Net Availability in Grams Per Capita Per Day

■ Cereal
■ Pulses



India – oilseed output



Source: India's Agriculture Ministry

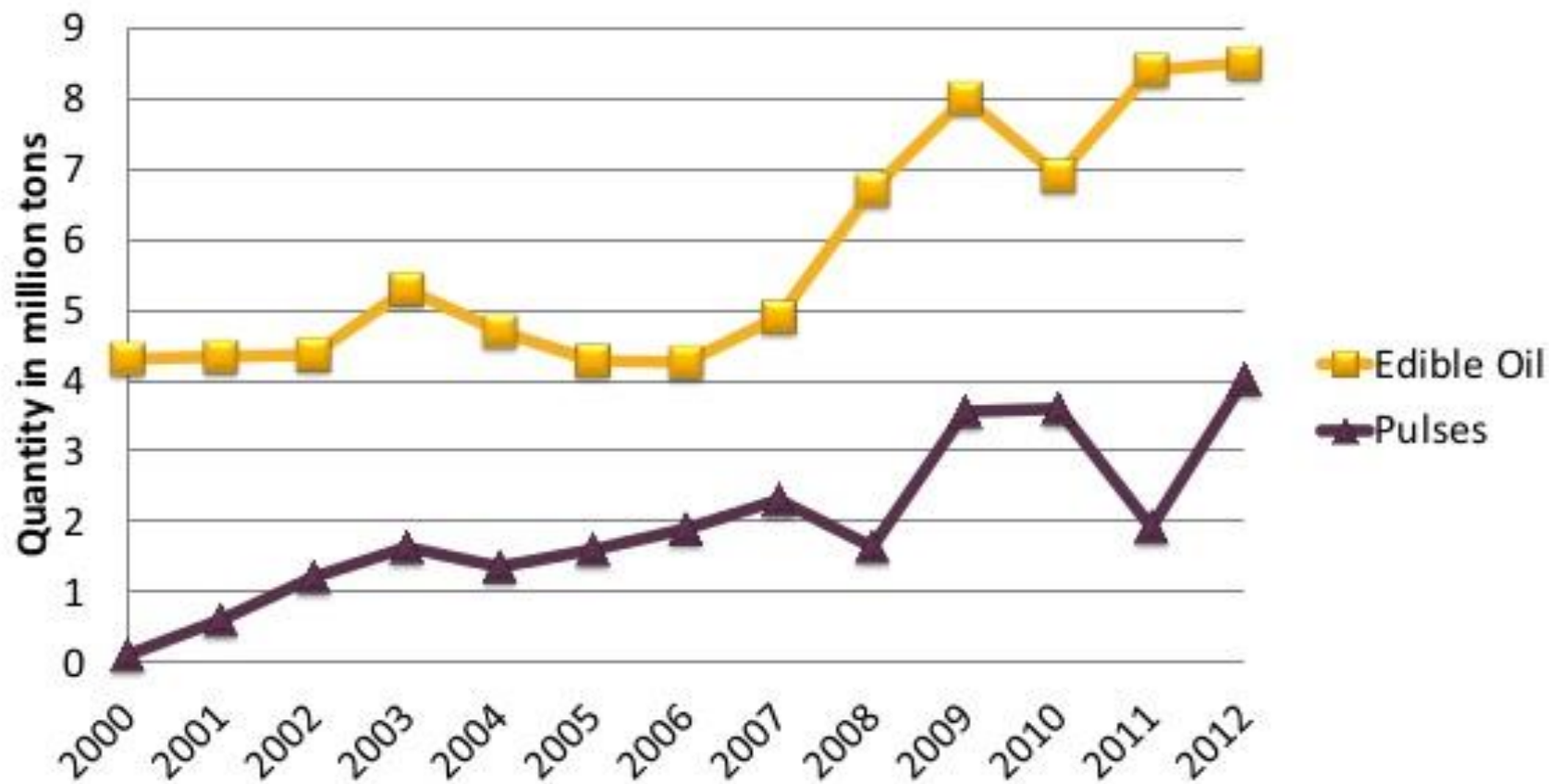




Pulses-Next Edible Oil??

Portent Signs

Total Quantity Imported- Edible Oil & Pulses



Source: Agricultural Statistics at a Glance, 2012



The von Melanders of Germany (2005)
1 Week's Food: \$ 342

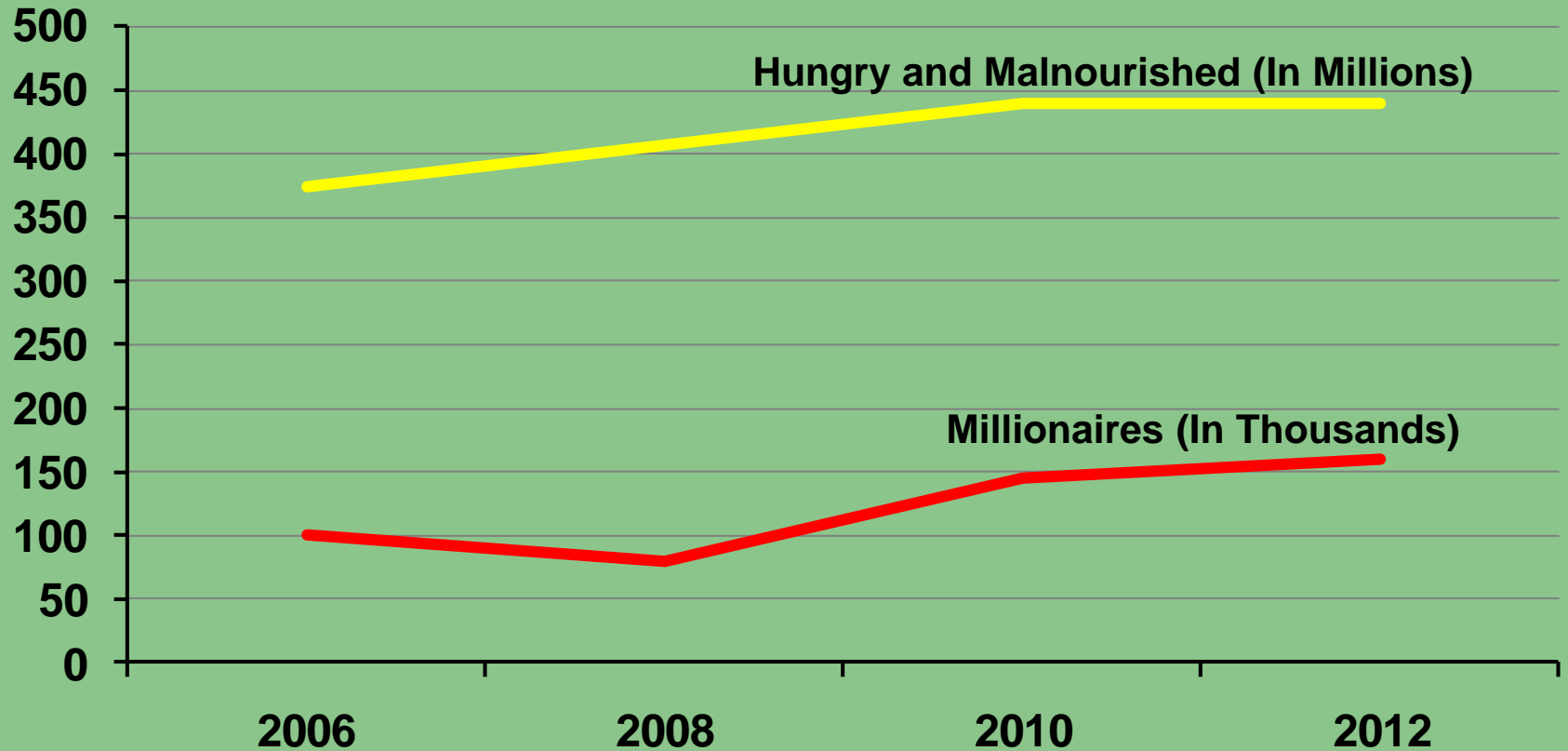


The Patkars of Ujjain (2005)
Food for one week: ₹ 1,636



**The Prajapatis of Bundelkhand (2012):
One Week's Food ~ ₹ 300**

Millionaires and Hungry People in India

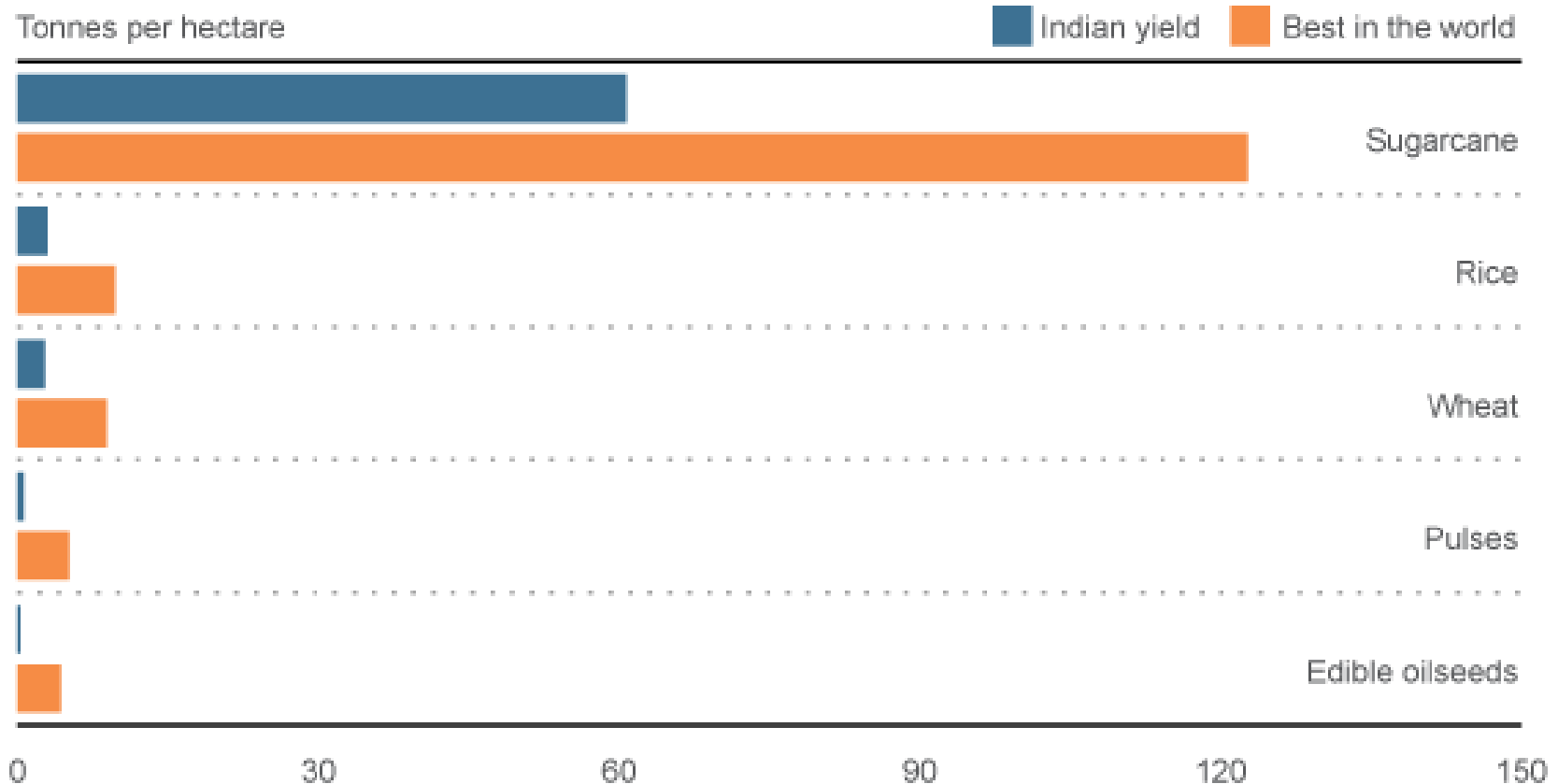




Yesterday's Debate



India average crop yields vs best in the world



Source: Computed by the Indian Council for Research on International Economic Relation using FAO statistics



Reuters graphic/Catherine Trevethan



AVAILABILITY

ACCESS

**Food and
Nutrition
Security**

UTILISATION

STABILITY



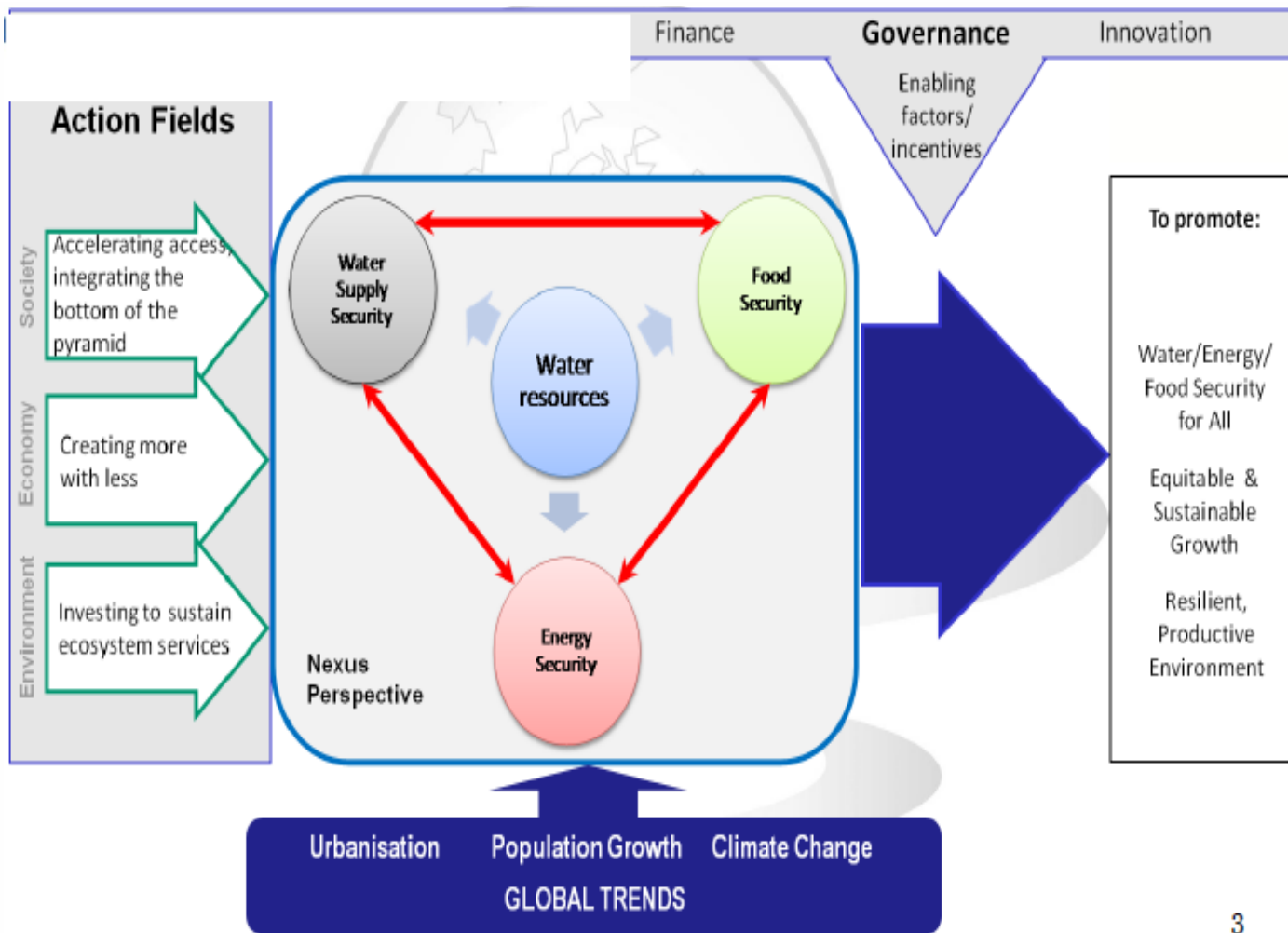
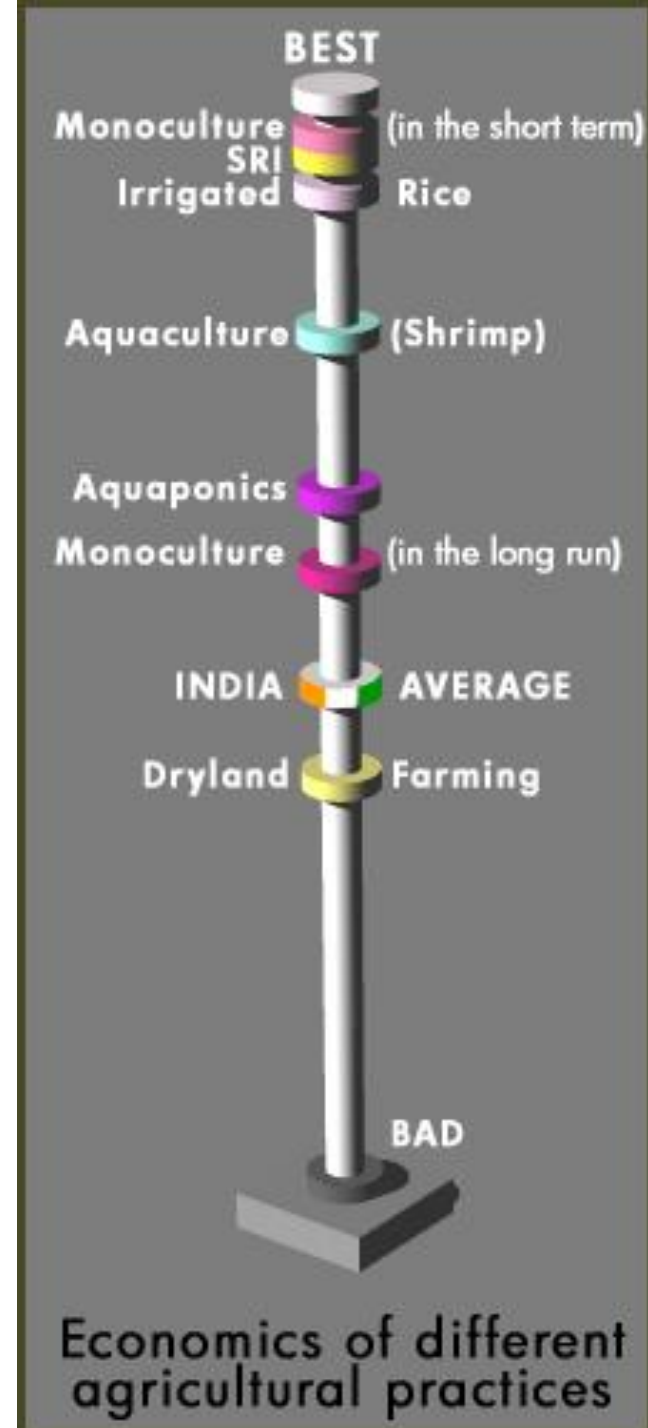


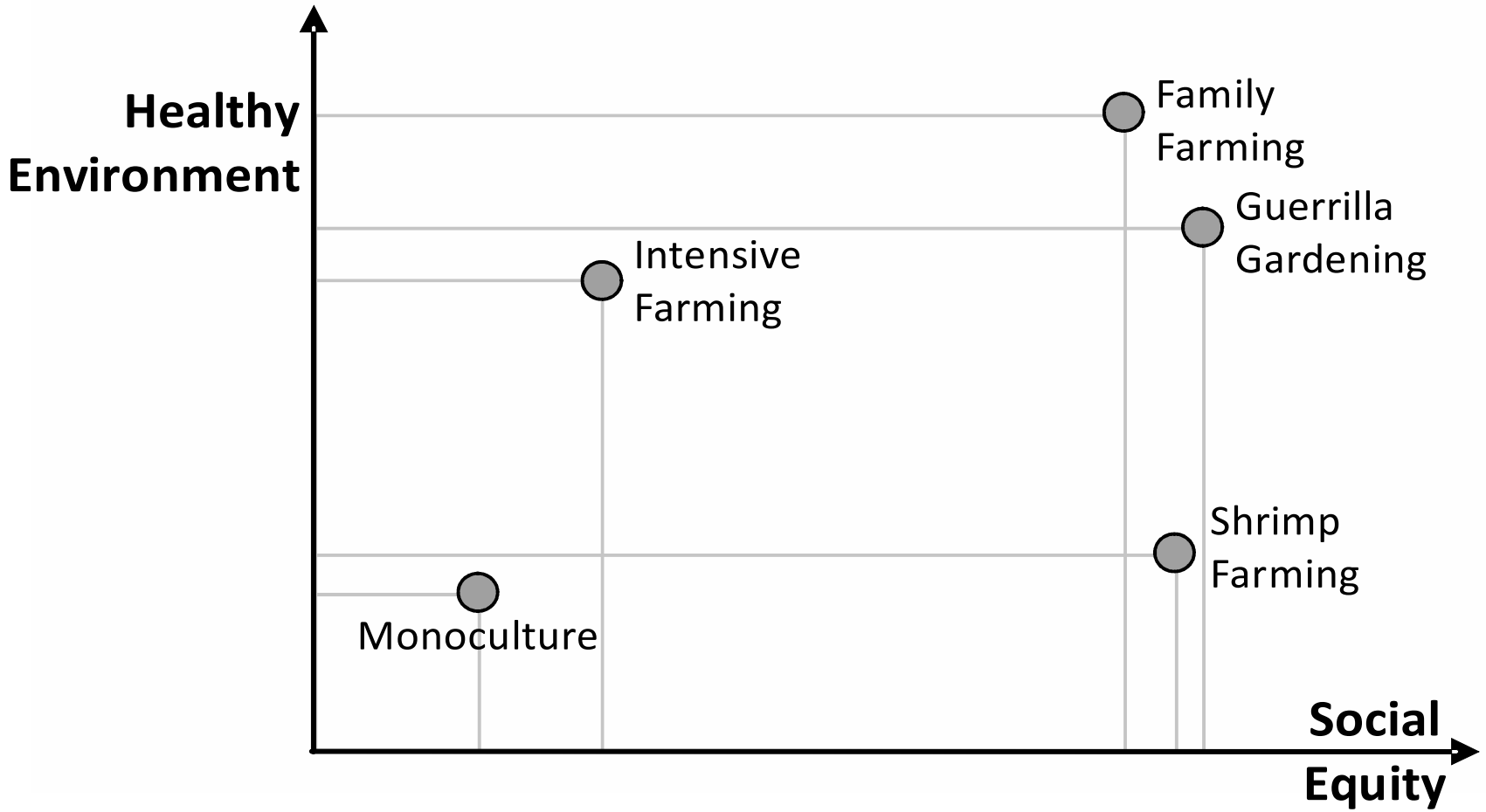
FIGURE 1. FRAMEWORK SUGGESTED FOR THE BONN2011 NEXUS CONFERENCE: THE WATER, ENERGY AND FOOD SECURITY NEXUS

Source: Hoff, 2011.

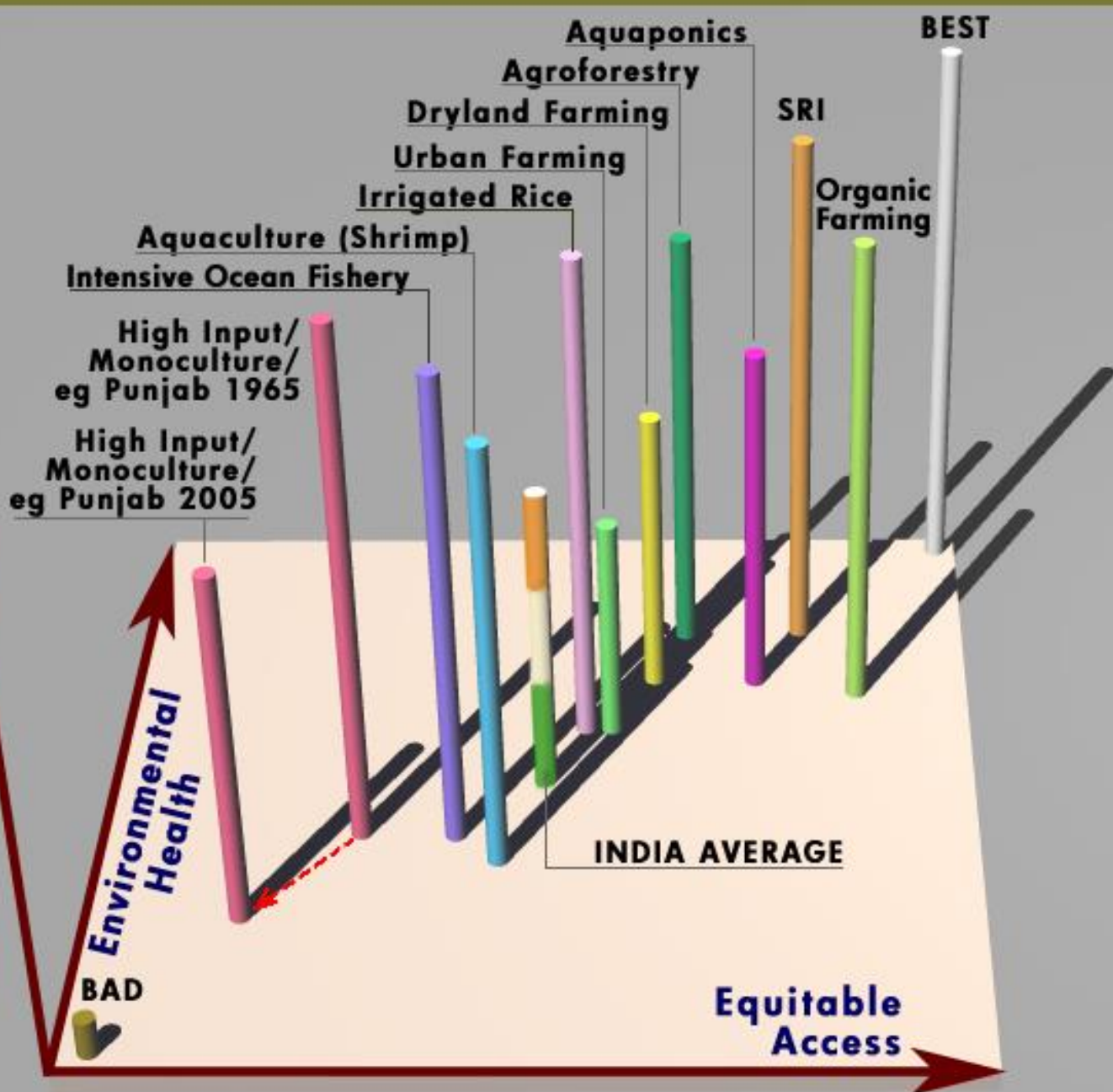


**Without *Financial Viability*,
No Production or Consumption
System Can Be Scaled Up
To Reach Everyone, Everywhere
and for All Time**





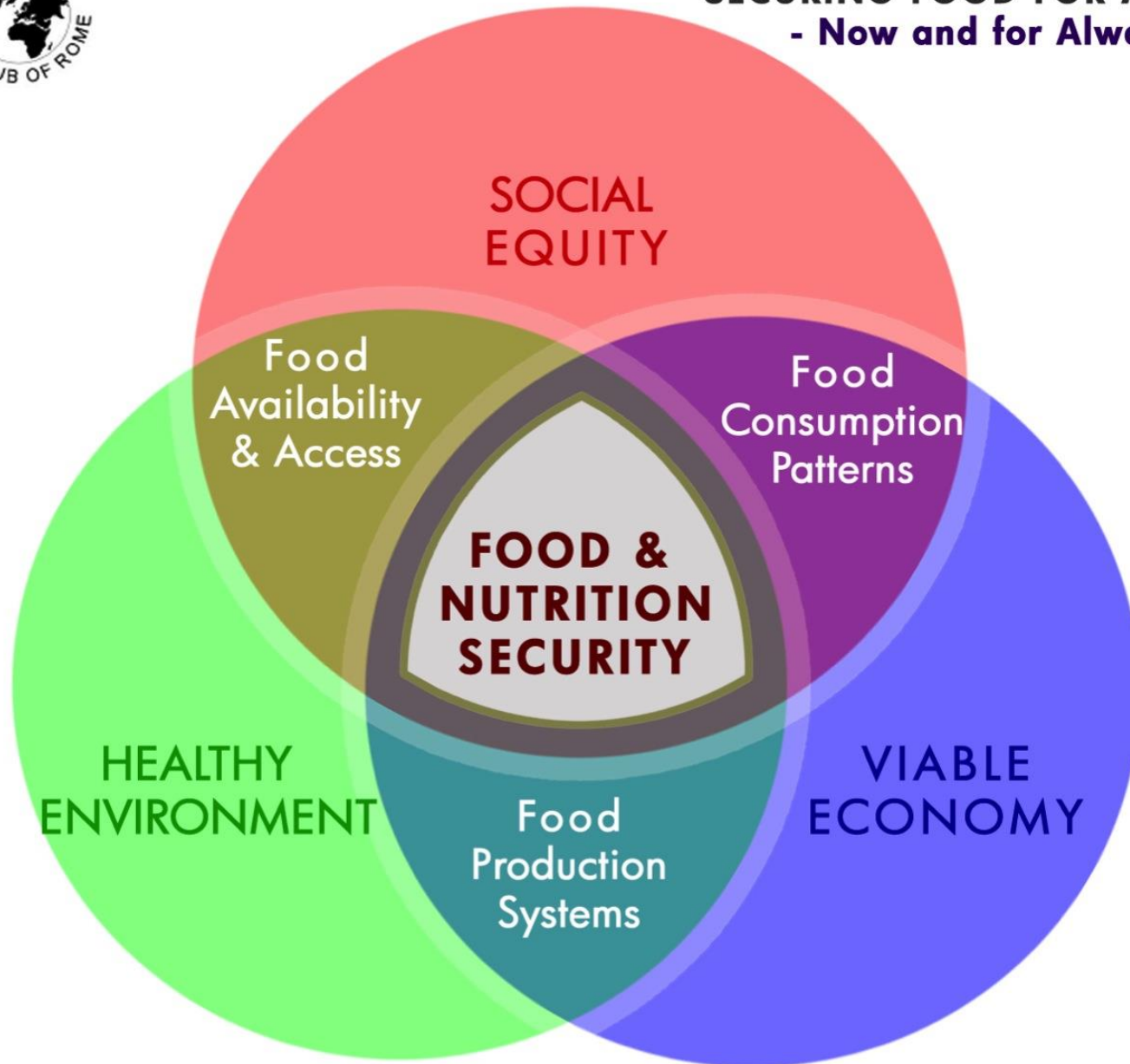
Economic Viability



Visualization of the Impact of Different Agricultural Practices on the 3 E's
(Magnitudes subjective, to generate debate and stimulate research)



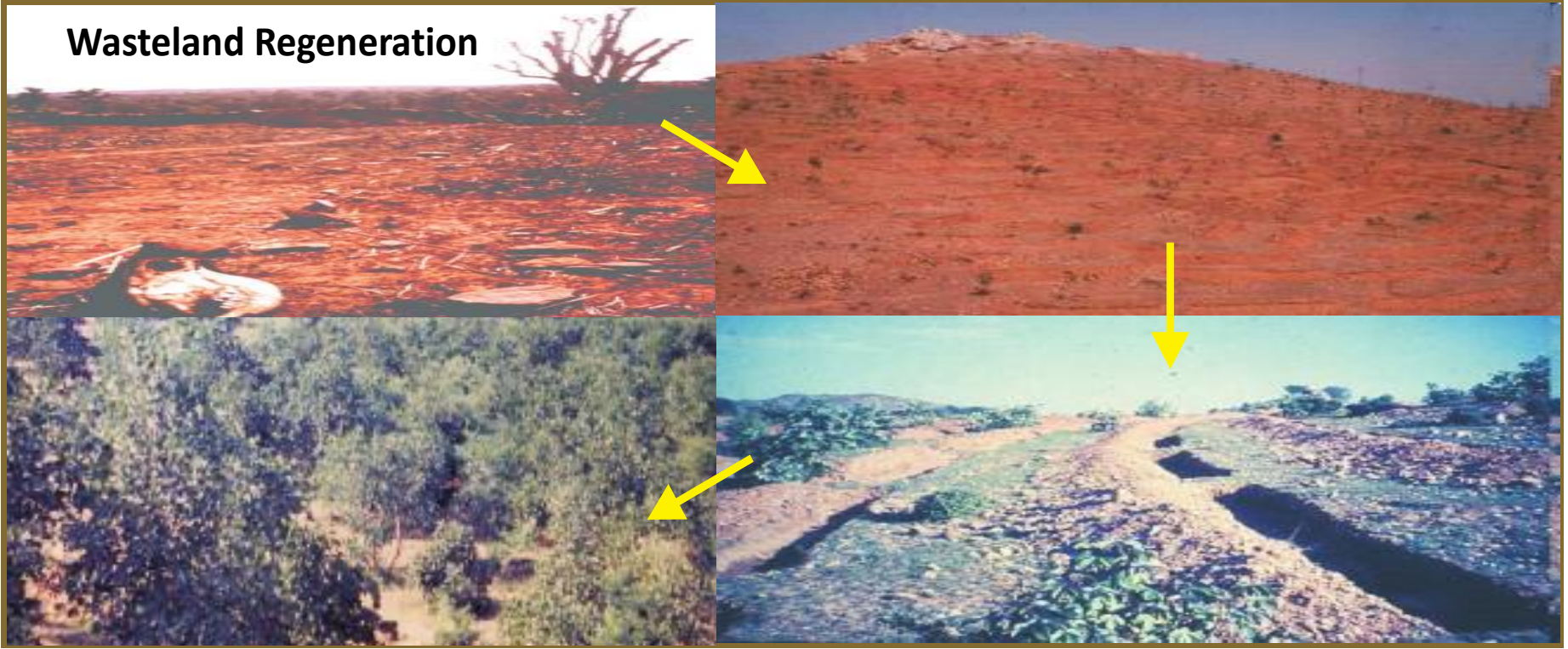
**SECURING FOOD FOR ALL
- Now and for Always**



THE DEBATE NEEDED TODAY



Wasteland Regeneration



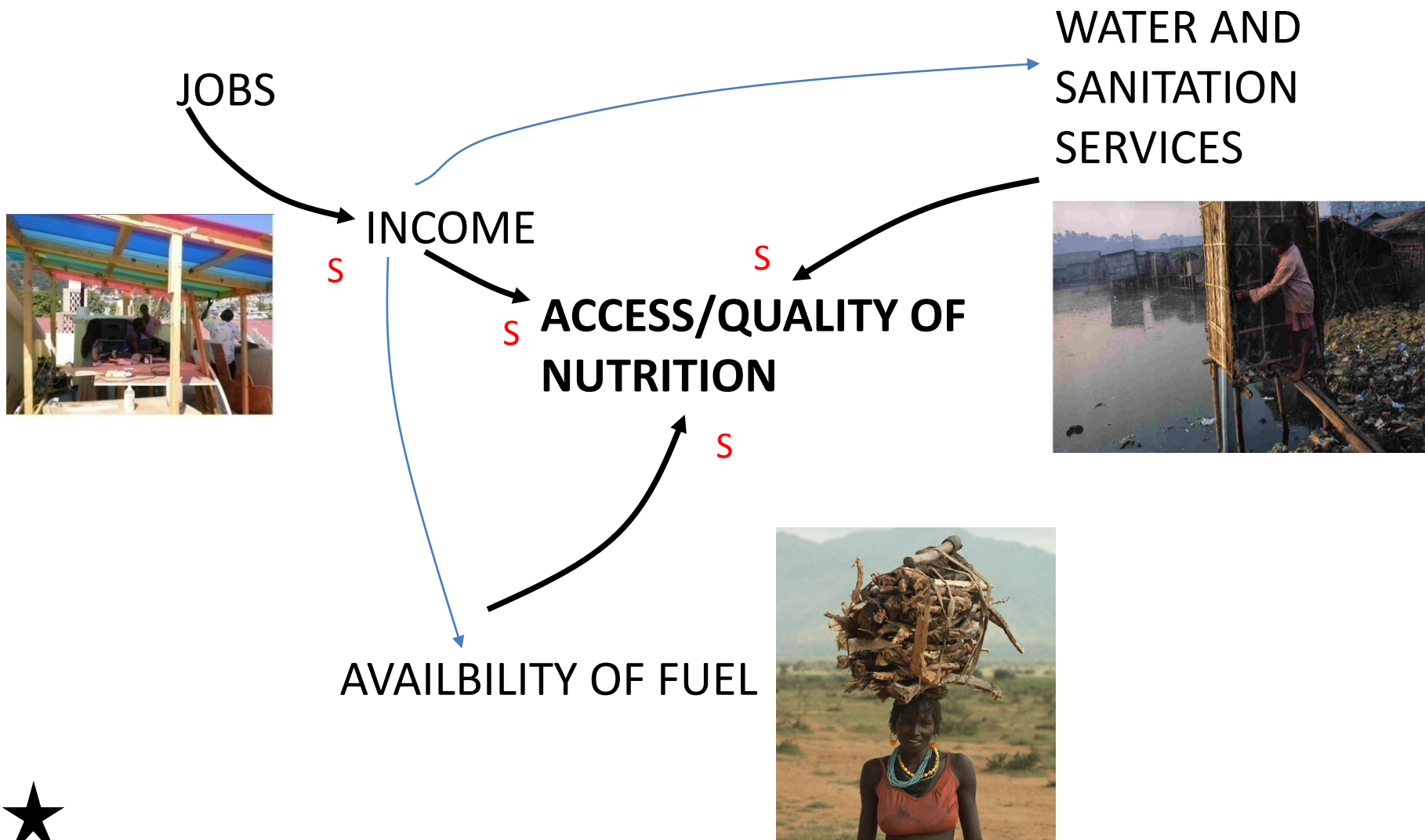
Simple, affordable actions – e.g., *Trenches* – to “Keep the Cattle Out and Keep Every Drop of Water In” and Natural Regeneration and Local Species can convert “Wastelands” into Forests in a Couple of Years at VERY LITTLE Cost



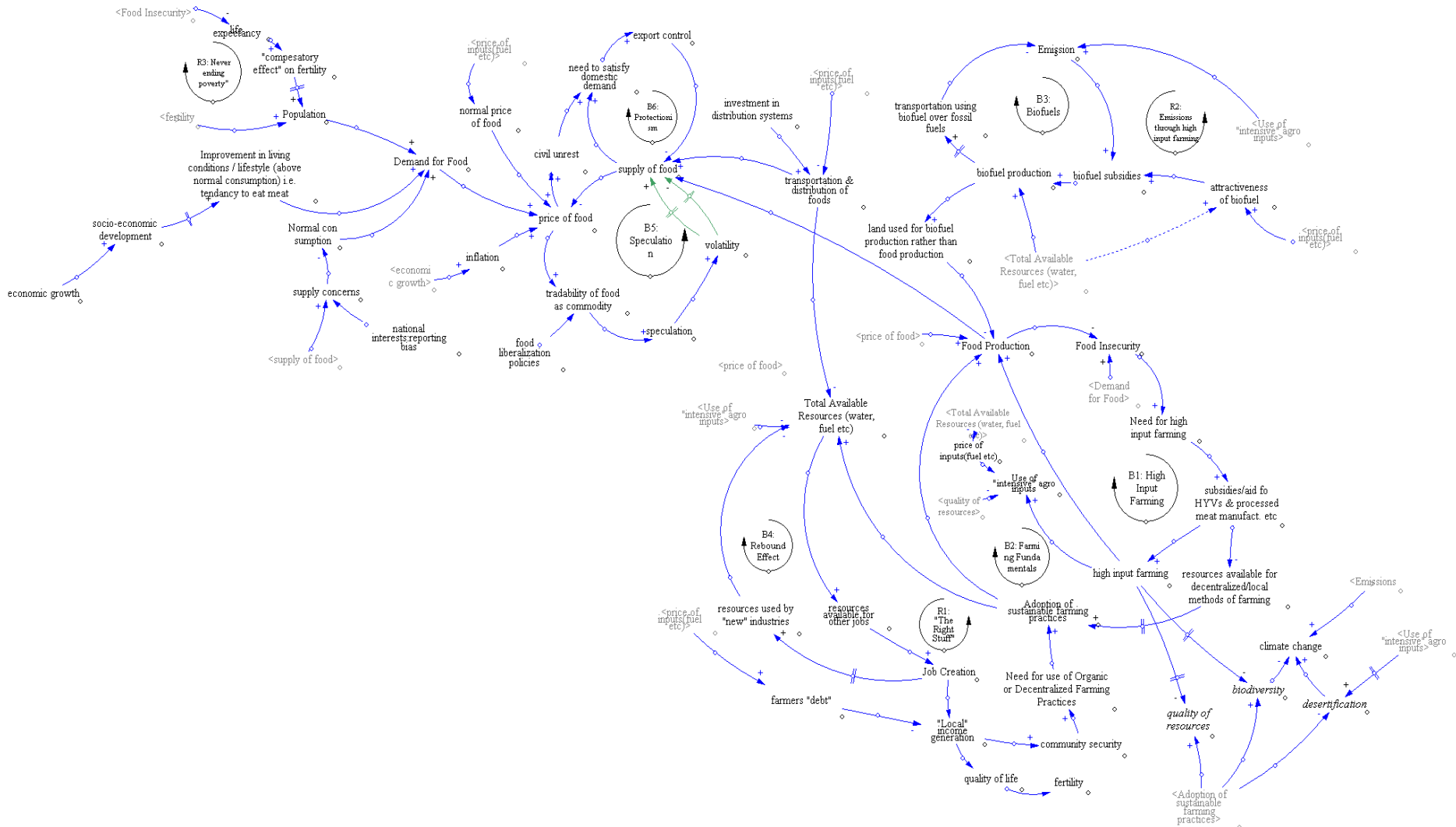
FOOD FUTURES OVERVIEW



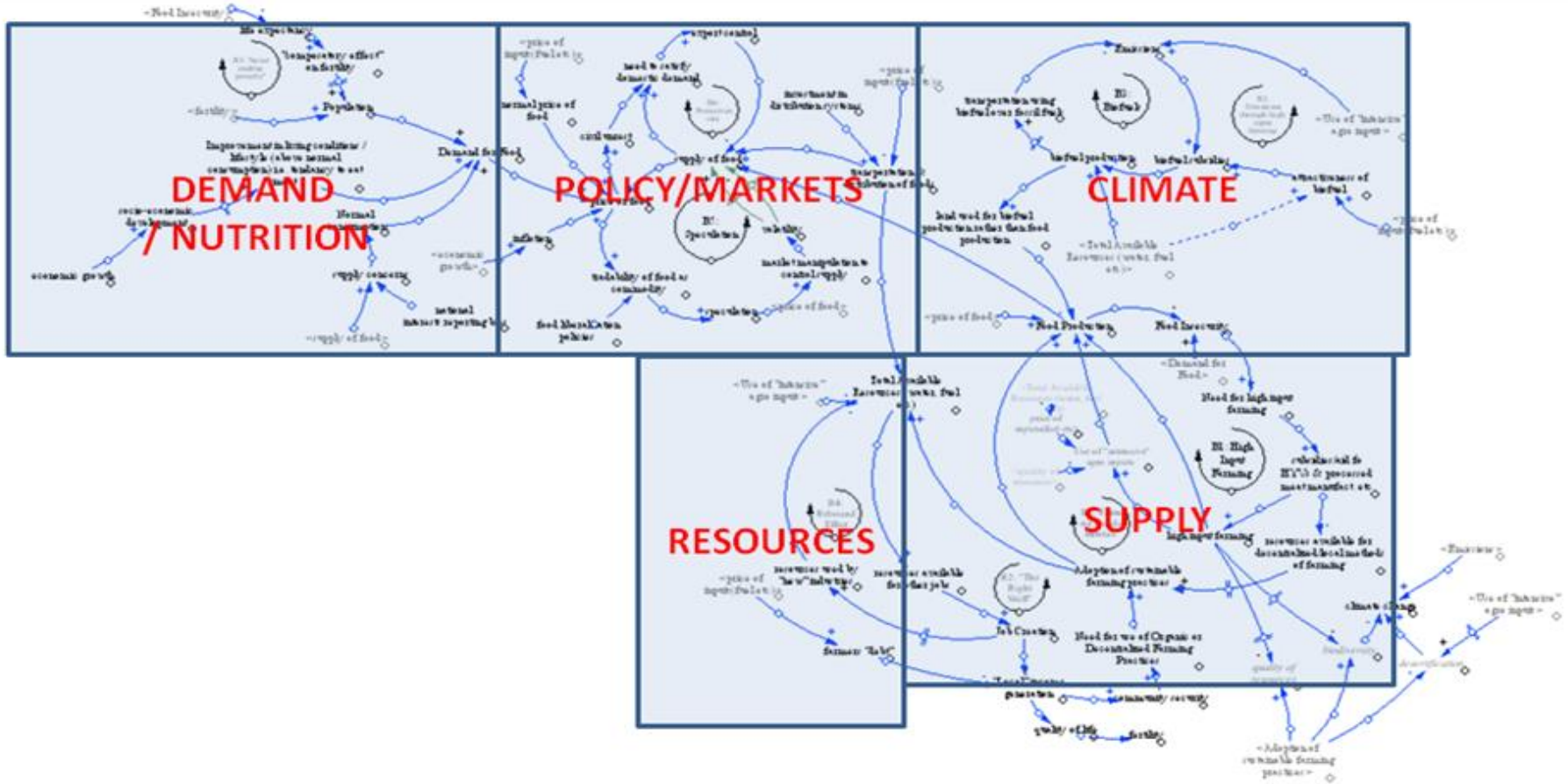
FOOD FUTURES OVERVIEW: NUTRITION – DEVELOPING WORLD



FOOD FUTURES OVERVIEW



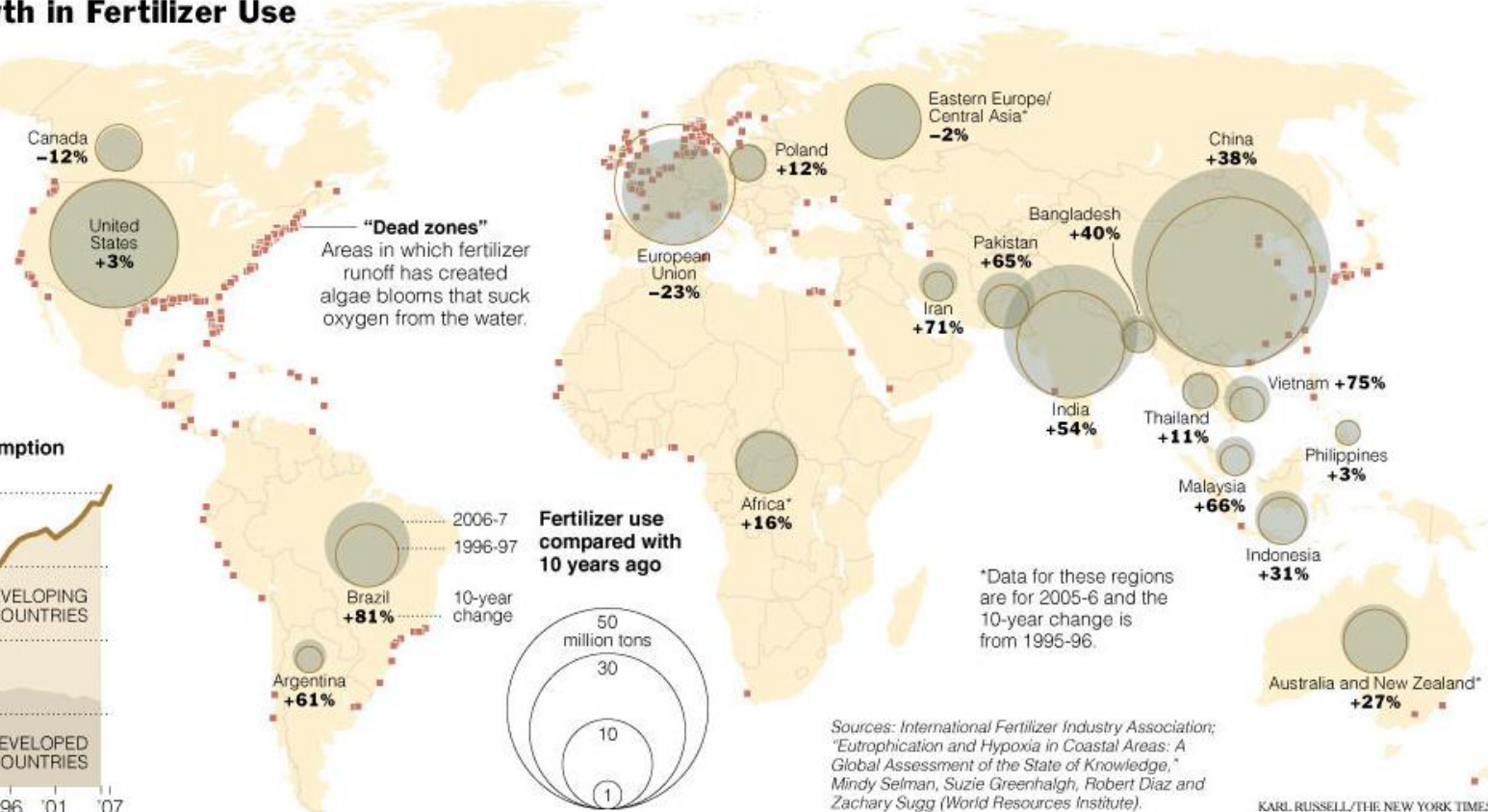
FOOD FUTURES OVERVIEW



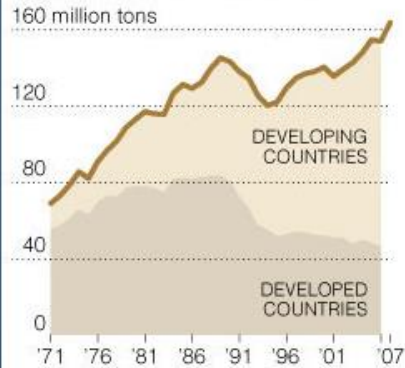
FOOD FUTURES OVERVIEW: SUPPLY

Worldwide Growth in Fertilizer Use

Fertilizer use has been growing faster in developing countries than in the industrialized world in recent years. But rising demand has produced a big price jump. Increased fertilizer runoff is expected to worsen the problem of dead zones along ocean shores.



Worldwide fertilizer consumption

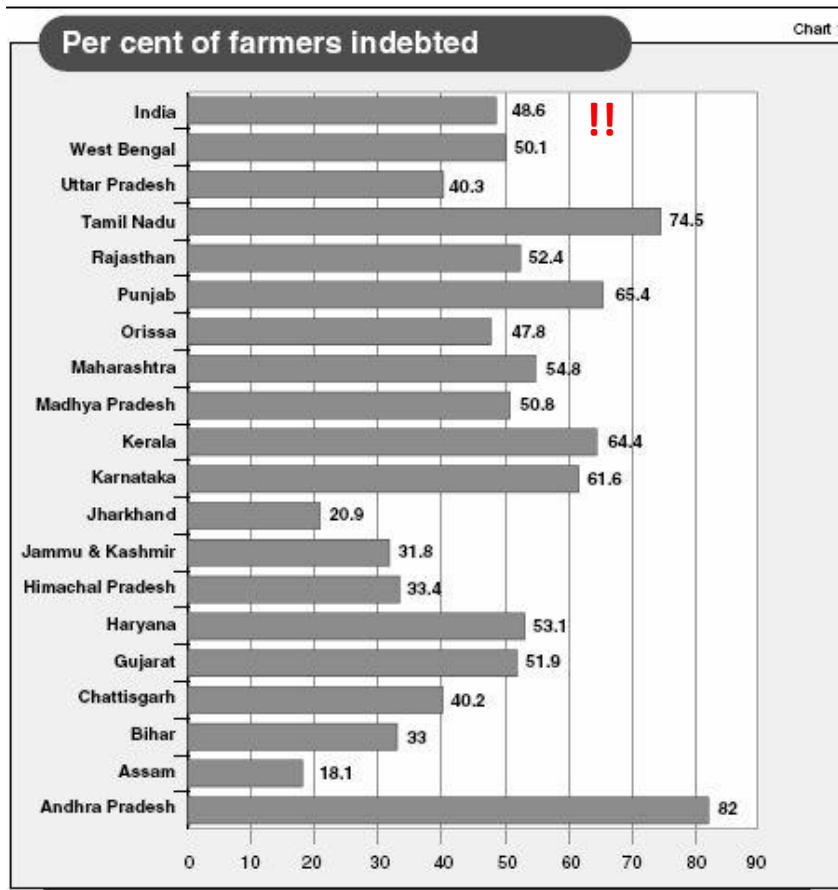


Sources: International Fertilizer Industry Association; "Eutrophication and Hypoxia in Coastal Areas: A Global Assessment of the State of Knowledge," Mindy Selman, Suzie Greenhalgh, Robert Diaz and Zachary Sugg (World Resources Institute).

KARL RUSSELL/THE NEW YORK TIMES



FOOD FUTURES OVERVIEW: SUPPLY



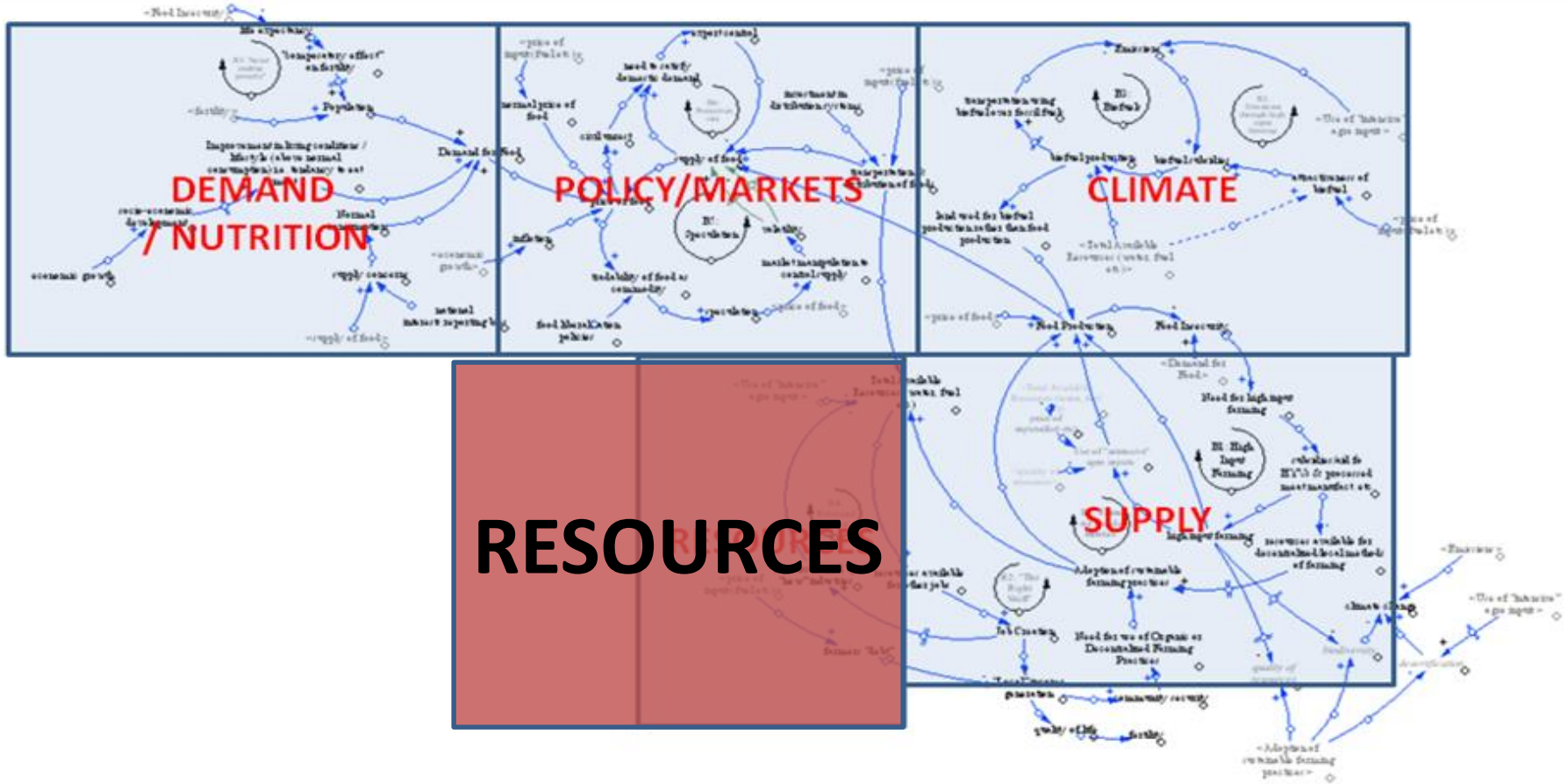
Statewide Breakup: National Sample Survey, based on the 59th Round Survey conducted in 2003,



FOOD FUTURES OVERVIEW: SUPPLY

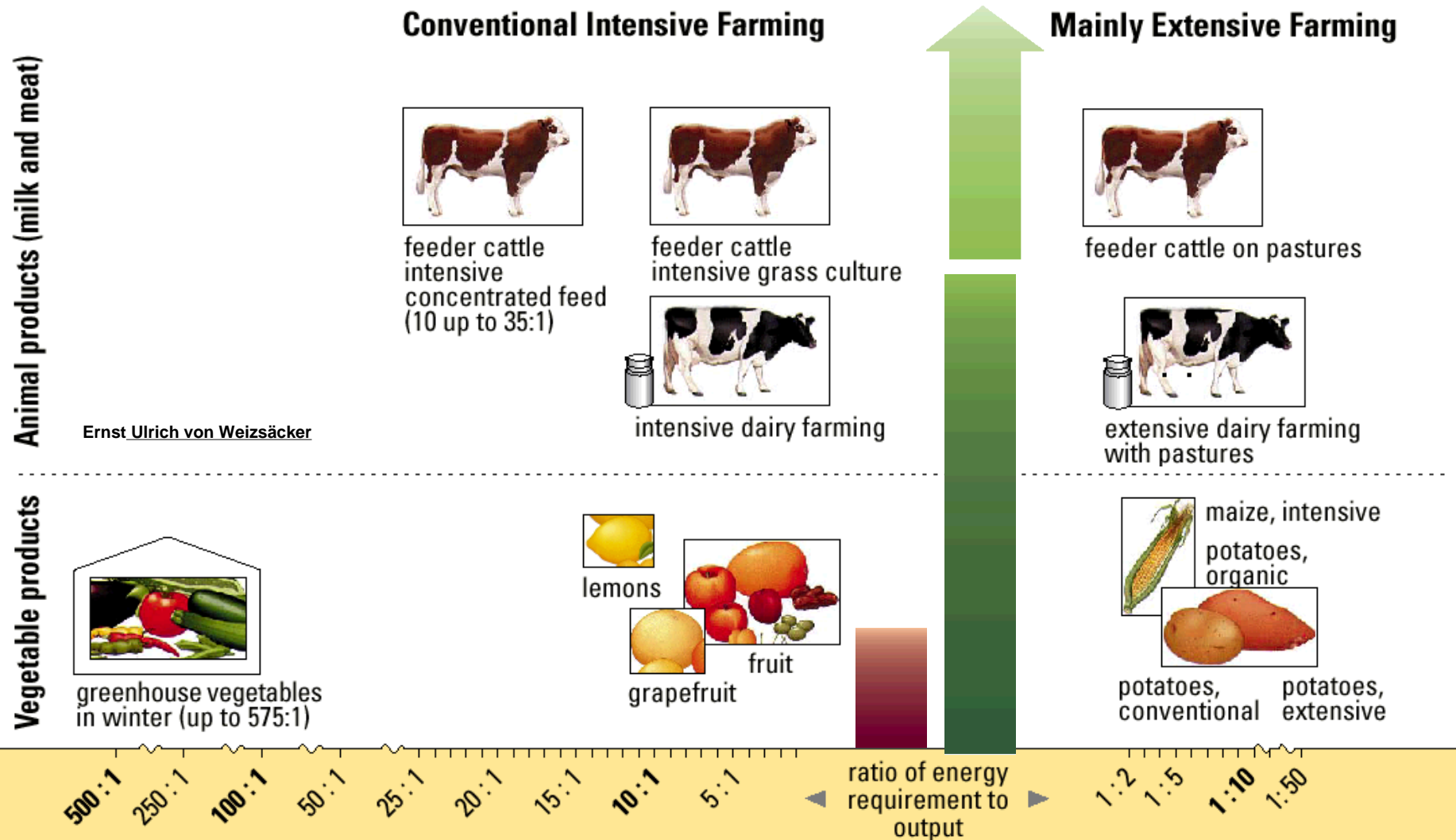


FOOD FUTURES OVERVIEW



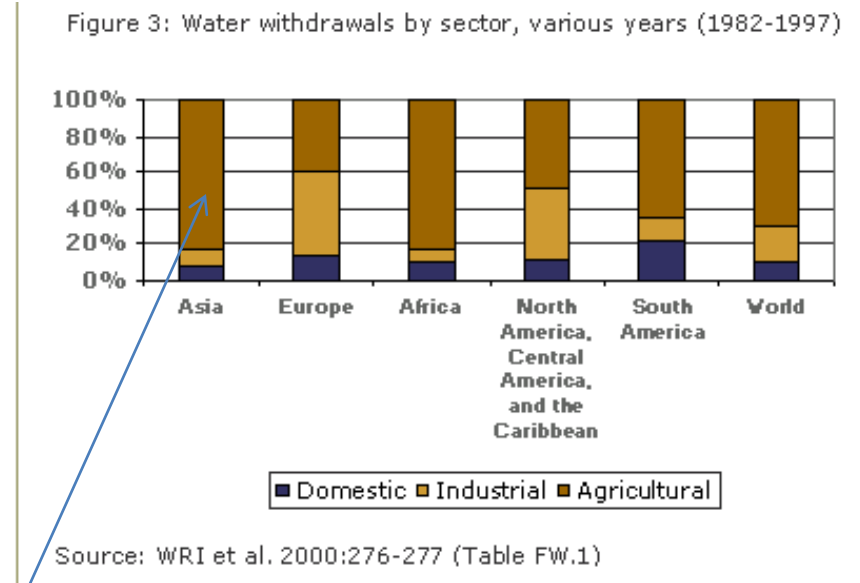
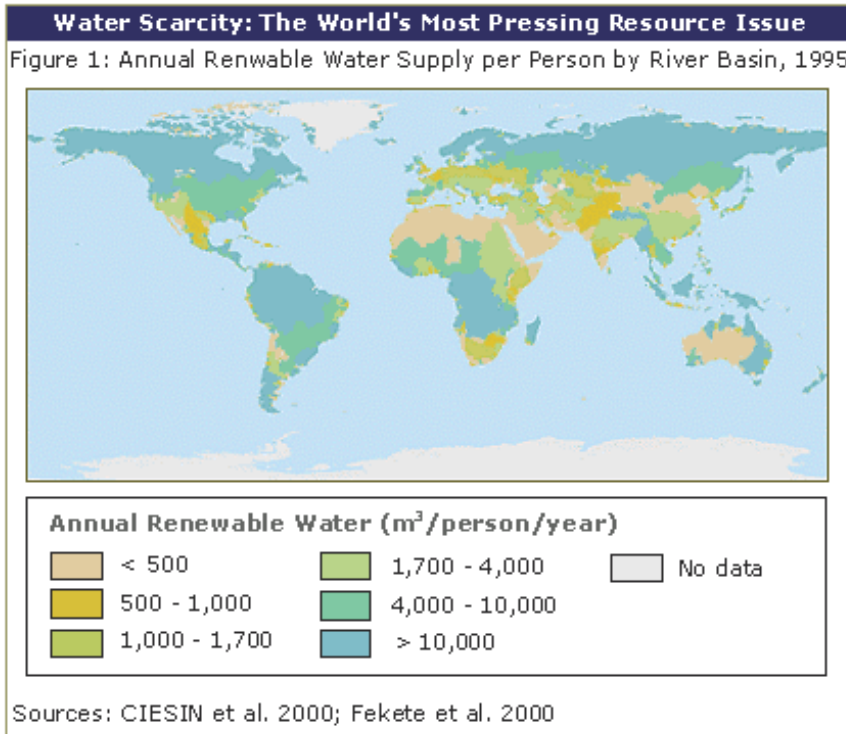
Selection of Foods and their Input-Output Energy Balance

High values correspond to low energy efficiency. For greenhouse vegetables in winter we expend over 500 calories of foreign energy for one calorie of food.



FOOD FUTURES OVERVIEW

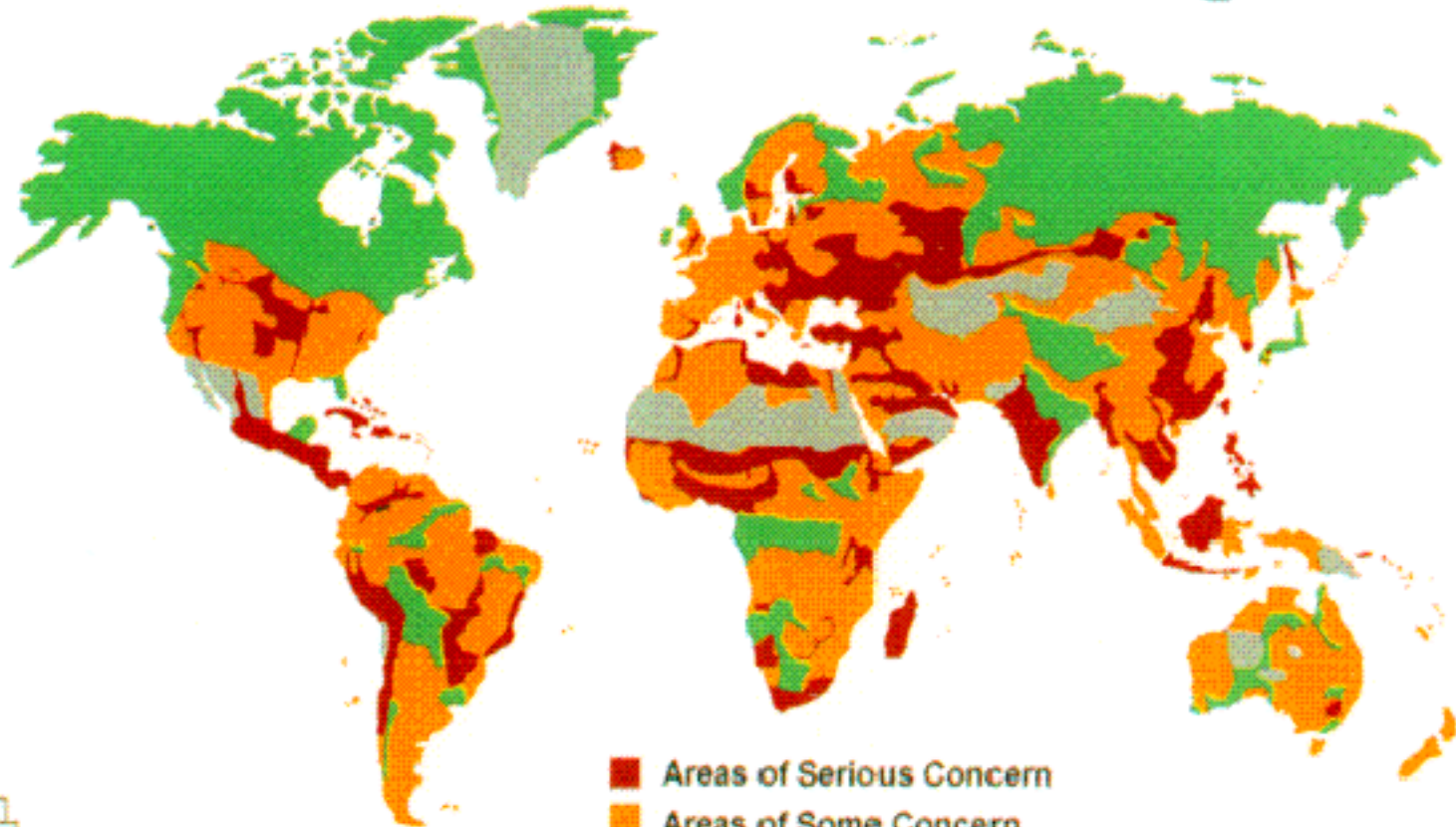
RESOURCES: WATER



Dark brown indicates water withdrawals for agriculture



Areas of Concern for Soil Degradation



- Areas of Serious Concern
- Areas of Some Concern
- Stable Terrain
- Nonvegetated Land



World
Resources
Institute

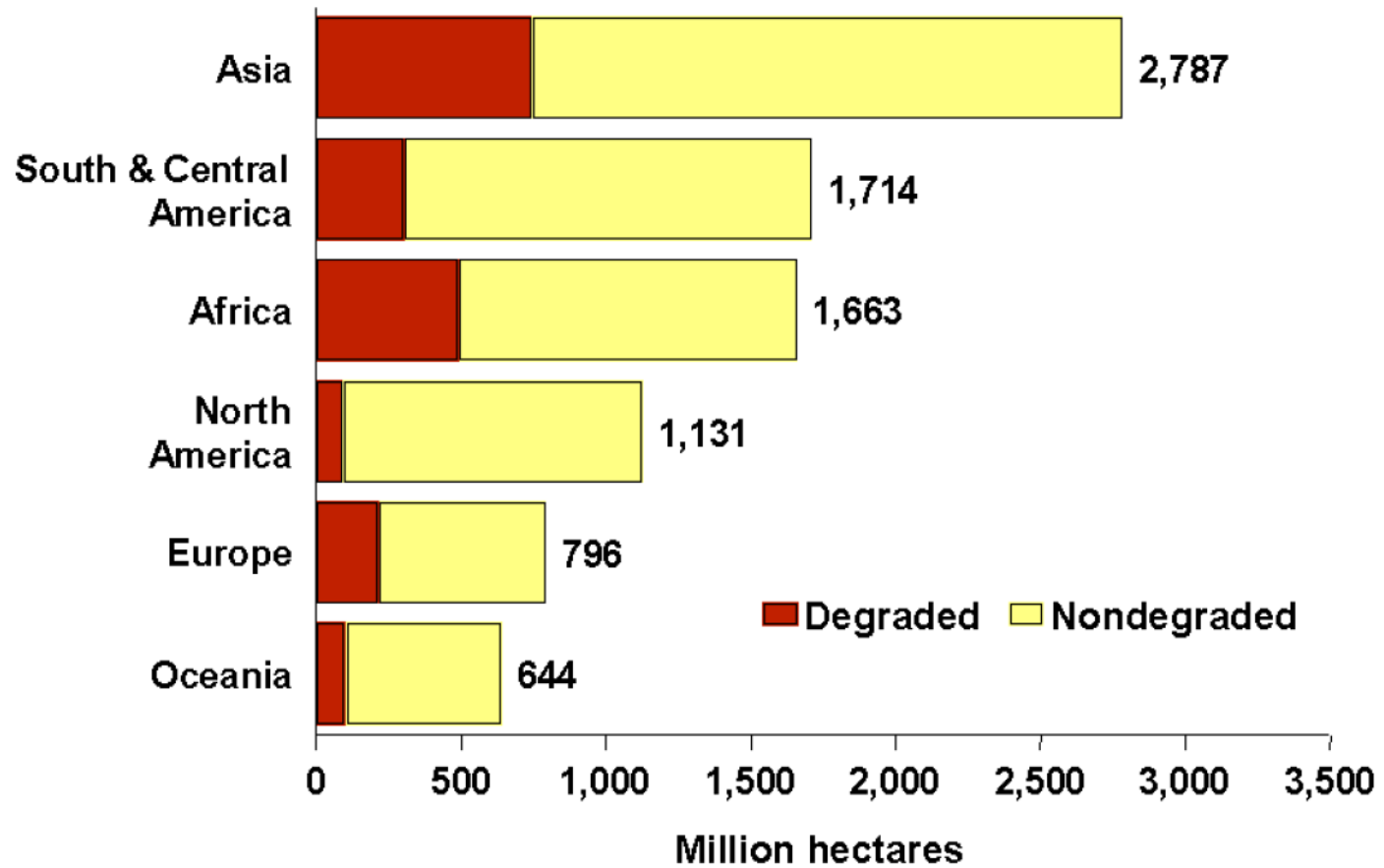
Source: International Soil Reference and Information Centre, unpublished map
(Wageningen, the Netherlands, 1990)



FOOD FUTURES OVERVIEW

RESOURCES: LAND

Global estimates of soil degradation



Source: S. Scherr, *Soil degradation: A threat to developing-country food security in 2020?* (Washington, D.C.: IFPRI, 1999).



Logging & Clearing



Resource Extraction





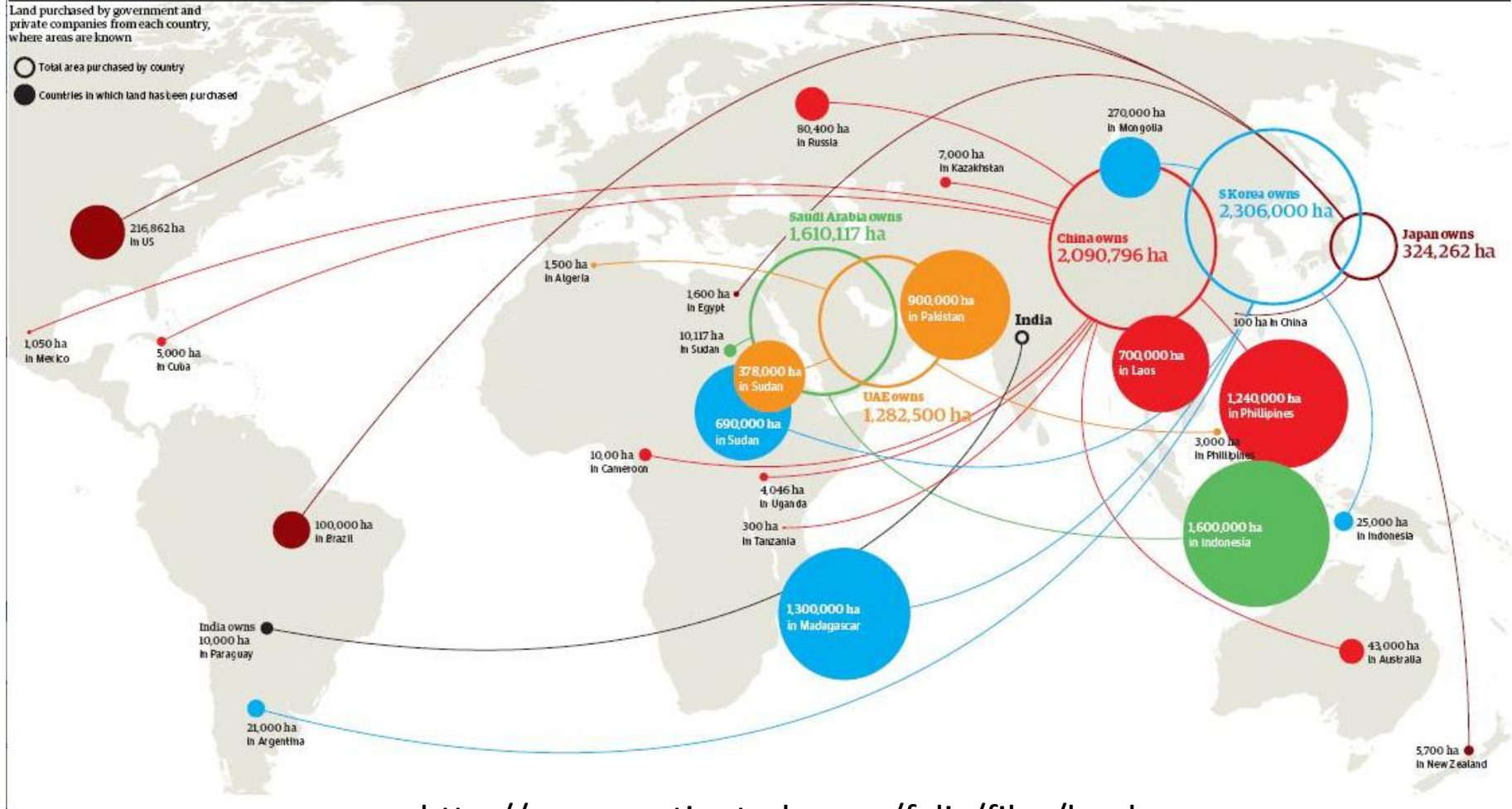
FOOD FUTURES OVERVIEW

RESOURCES: LAND

World land grab

Land purchased by government and private companies from each country, where areas are known

- Total area purchased by country
- Countries in which land has been purchased



http://conservationtoday.org/felix/files/land_grab.jpg

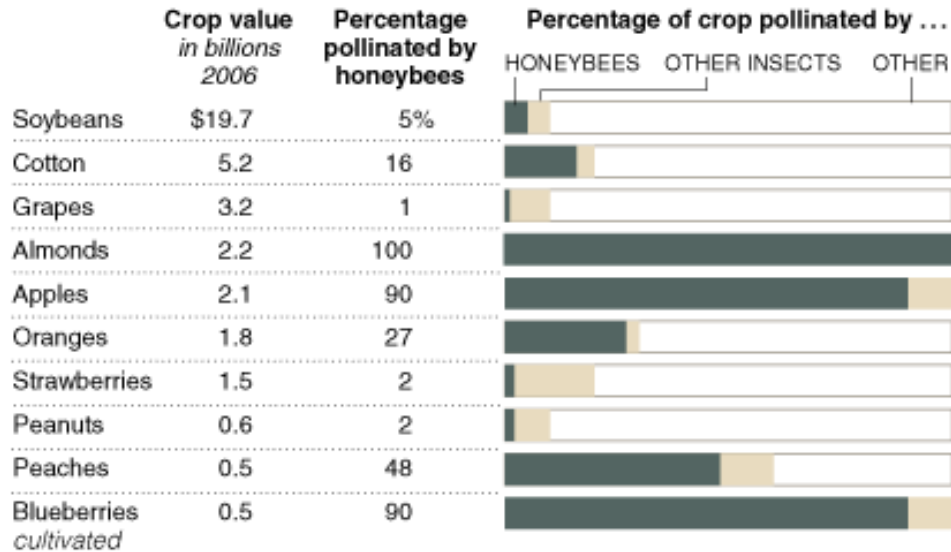


FOOD FUTURES OVERVIEW

RESOURCES:BIODIVERSITY

Relying on Bees ✕

Some of the most valuable fruits, vegetables, nuts and field crops depend on insect pollinators, particularly honeybees.



Besides insects, other means of pollination include birds, wind and rainwater.

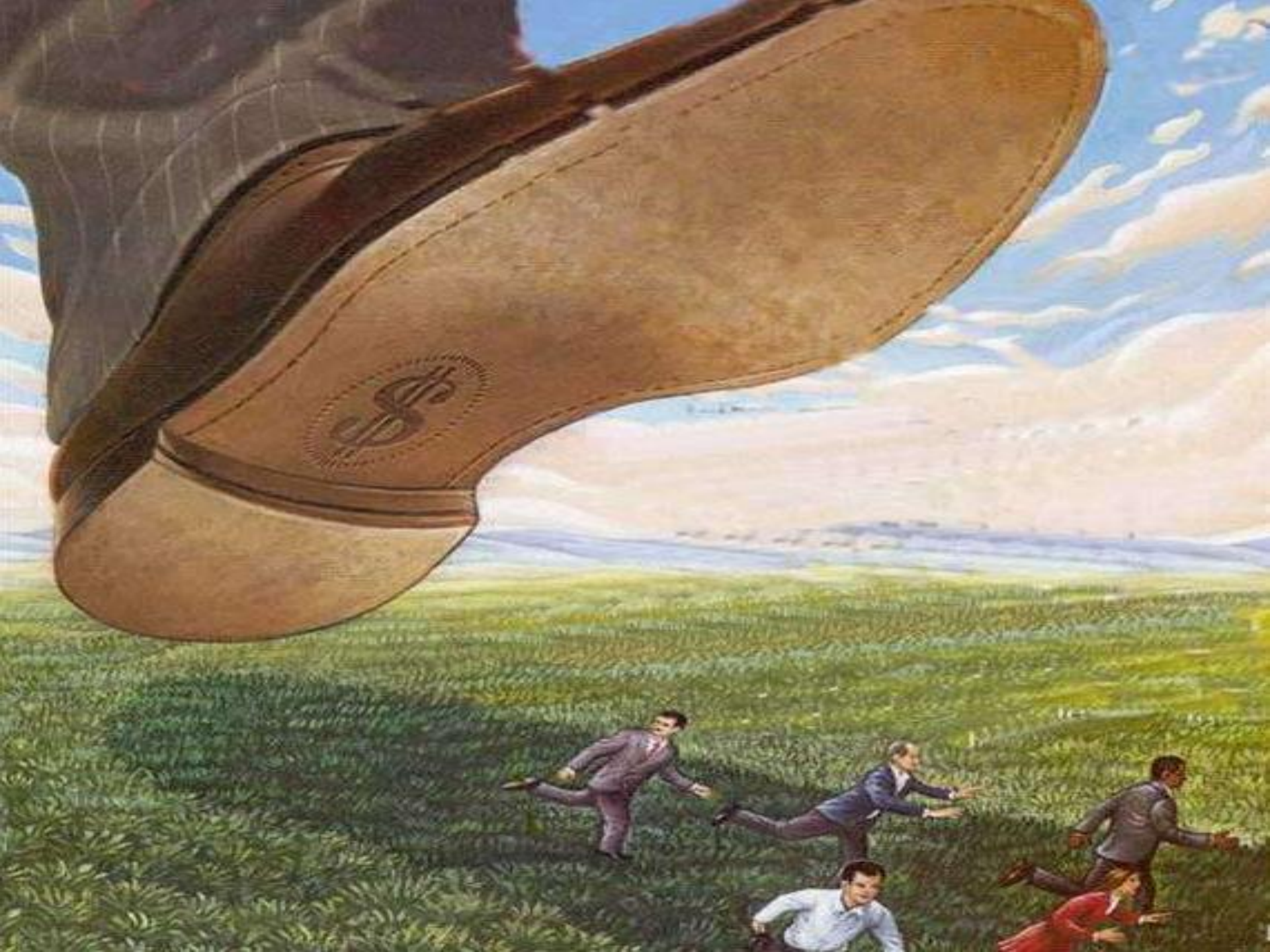
Sources: United States Department of Agriculture;
Roger A. Morse and Nicholas W. Calderone, Cornell University

The New York Times



The Ecological Footprint





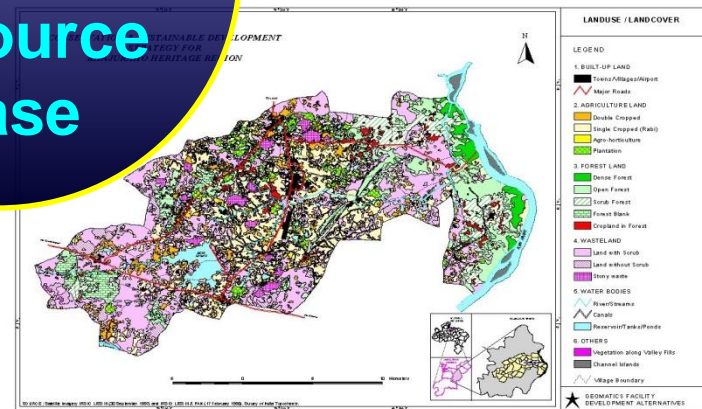
**POLICIES AND
MEASURES TO REGENERATE
THE RESOURCE BASE**



- ❖ **Watershed planning and management**
- ❖ **Wasteland rejuvenation**
- ❖ **Enhanced productivity from farmlands**



**Rejuvenating
the Natural
Resource
Base**

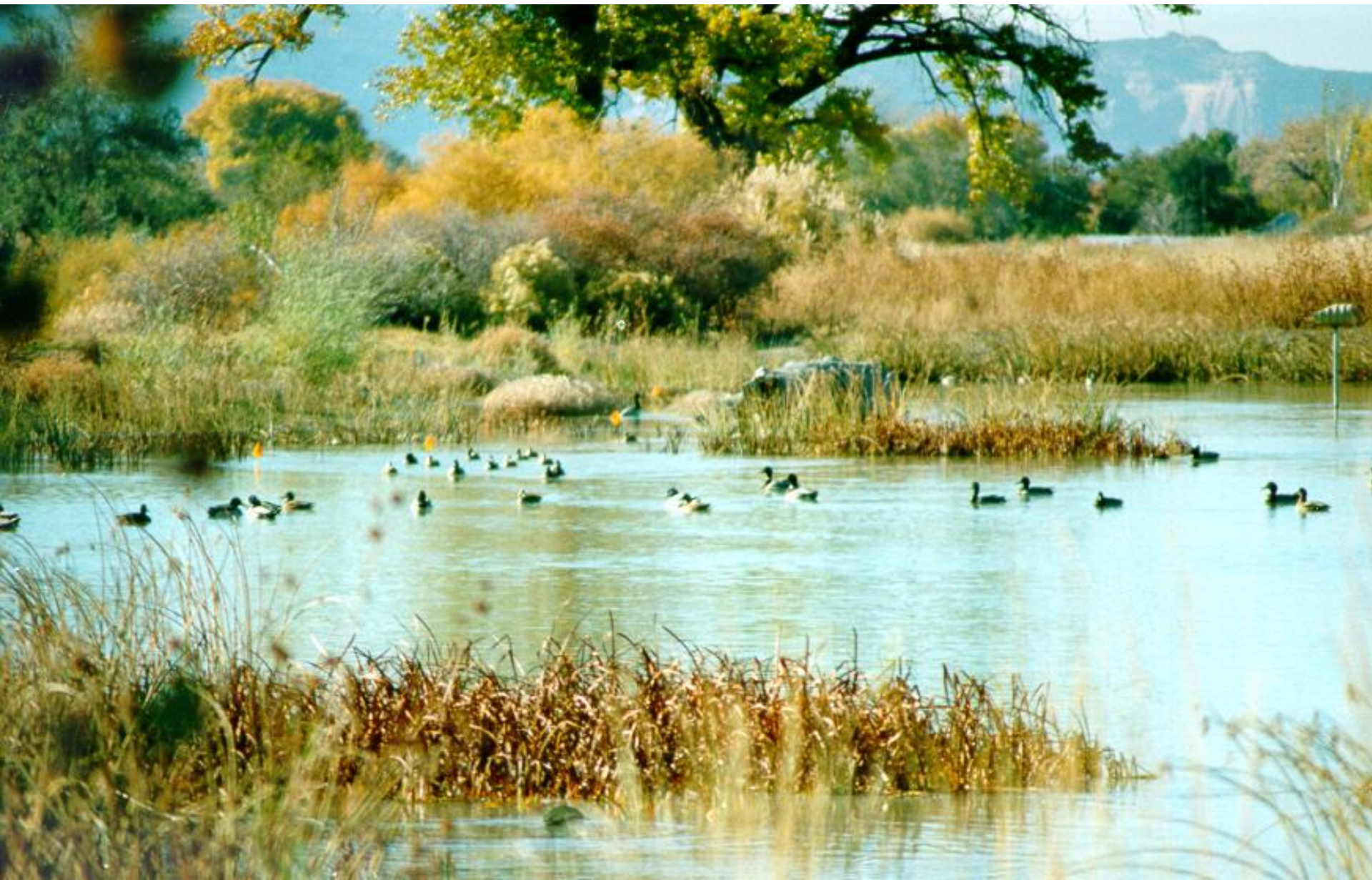




Mini Watershed Development



Ecosystem Services



Ambition of the Club of Rome for This Conference

Identify:

- **Policies that counteract F & N Security**
- **Changes needed to promote greater Coherence**
- **Innovations for Greater F & N Security and Policies appropriate for these**



