FAO WATER

Water, Food and Agriculture

Challenges and Responses

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Futures of European Waters
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Basic Water Needs

Liters per person per day

Drinking	2-4
Domestic	40-400
Food	1000-5000

Strong & Inextricable Link between food and water

Roughly, 1 Kcal per liter

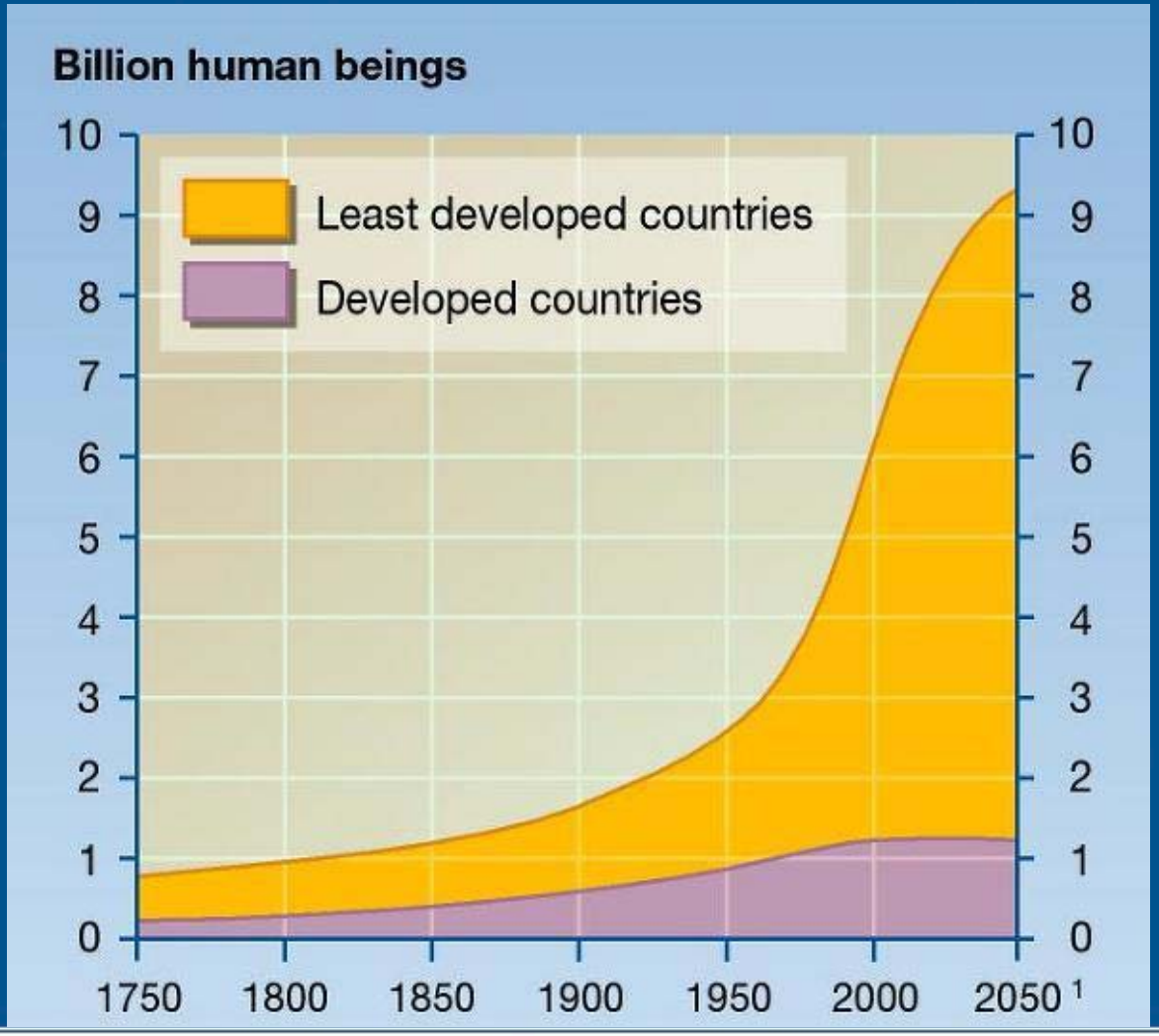
Drivers of Demand

Population Growth

Around Year 0
~ 200 M

Around 1600
~ 300 M

<1700	3 X
1700-1900	3 X
1900-2050	5 X



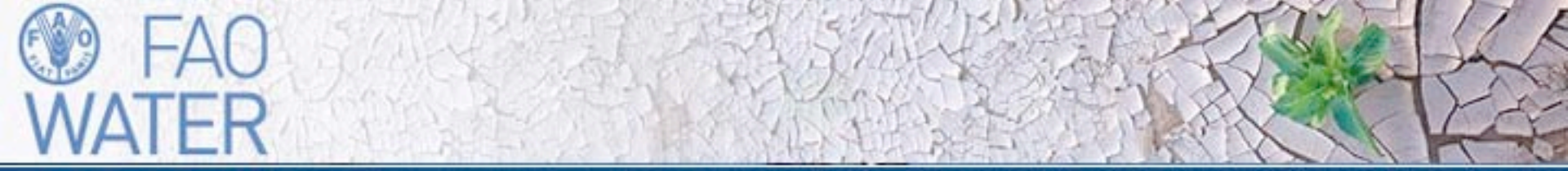
Urbanization

in 1960	in 2007	in 2040
1/3 Urban	1/2 Urban	2/3 Urban
2/3 Rural	1/2 Rural	1/3 Rural

- Changes in dietary preferences
- Increased importance of value chains from producers to consumers
- Food processing & supermarkets

Mega-Cities

- > 10 Million inhabitant
- up to 2000 people per km^{-2}
- In 1950, > 83 cities with ≥ 1 M
- In 2007, > 460 cities with ≥ 1 M
- Rome had 1 M people in 1º Century BC



Famous Megacities

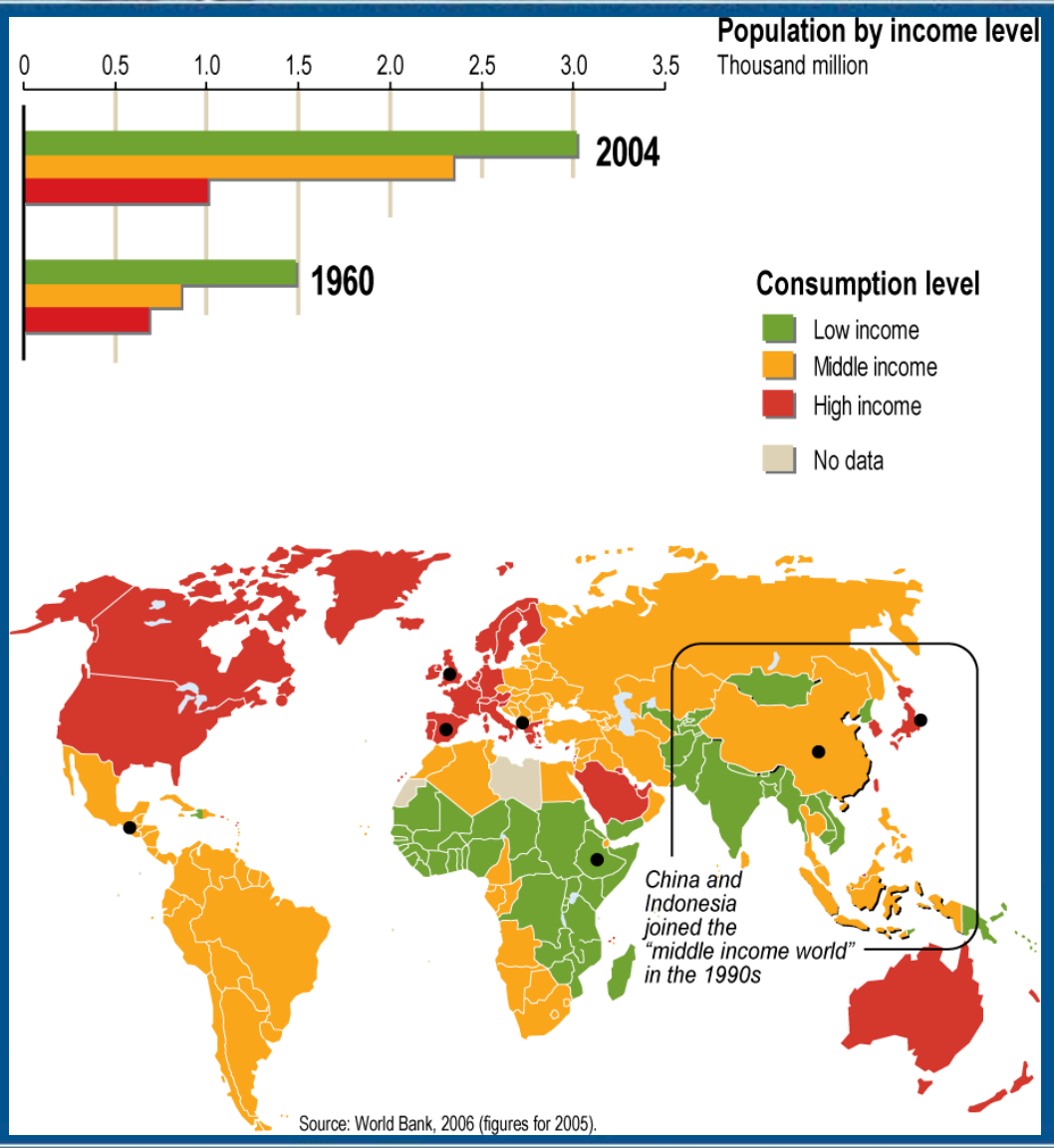
- Tokyo
- Seoul
- Mexico City
- New Delhi
- New York
- San Paulo
- Shanghai
- Los Angeles
- Osaka
- Cairo
- Moscow
- Beijing
- Buenos Aires
- Istanbul
- London

Forecast for Asia in 2025

- Mumbai (India) >> 33 M
- Jacarta (Indonesia) >> 25 M
- Karachi (Pakistan) >> 27 M
- Shanghai (China) >> 27 M
- Dhaka (Bangladesh) >> 26 M

Income

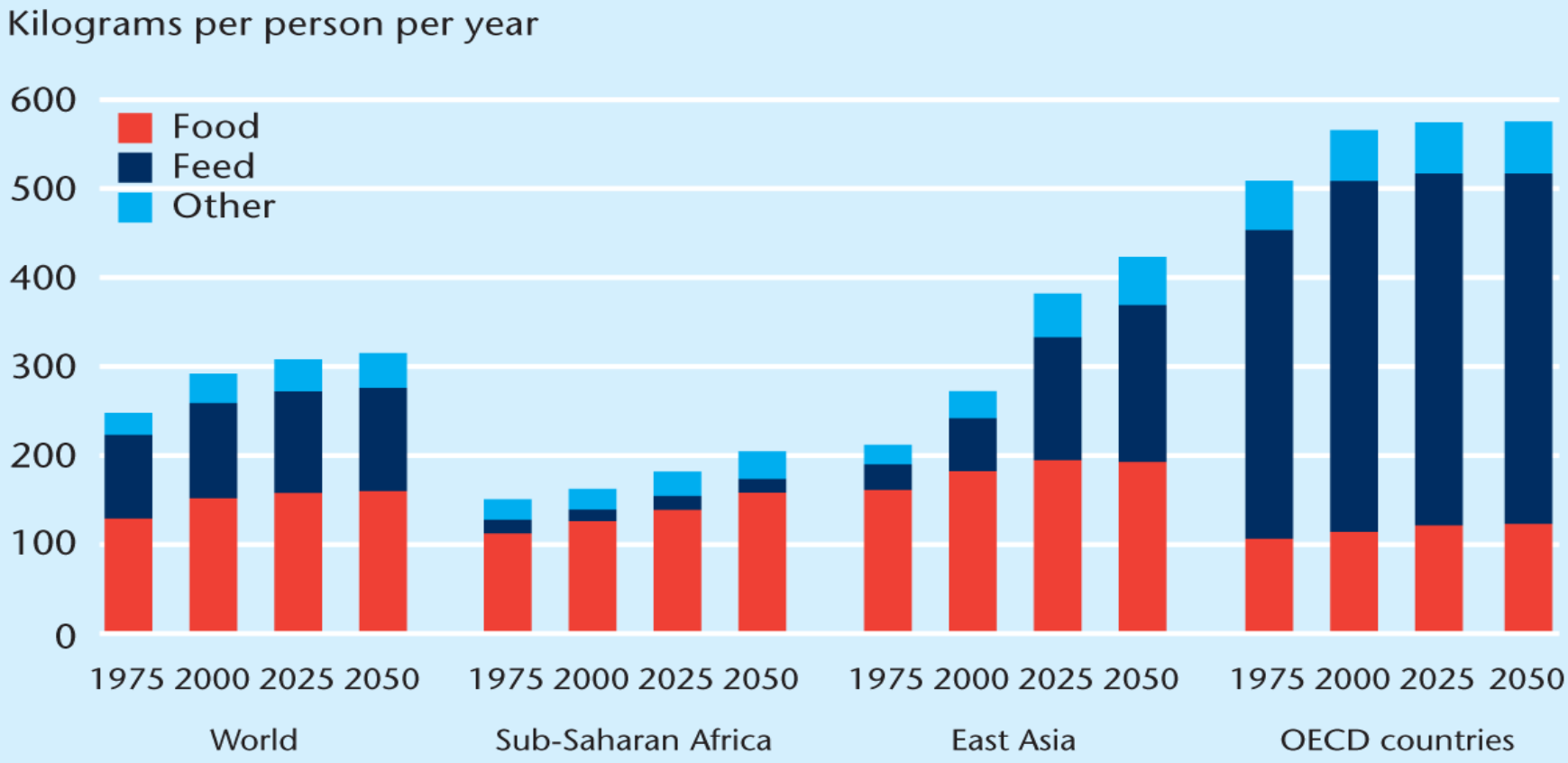
- Change in food habits toward richer diets
- Overall increase of demand in products and services
- Higher consumption (including luxury cons.)
- Increase of waste



Diet

Product	(m^3 per Kg)
Beef meat	15
Sheep meat	10
Pork meat	6
Chicken meat	2.8
Eggs	4.7
Cheese	5.3
Milk	0.9
Cereals	1.5
Fruit	1
Legumes	1

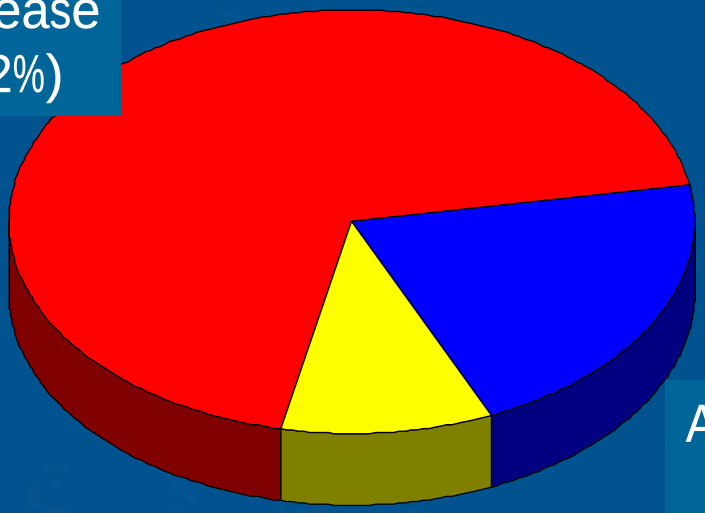
Feed demand drives future demand for grains

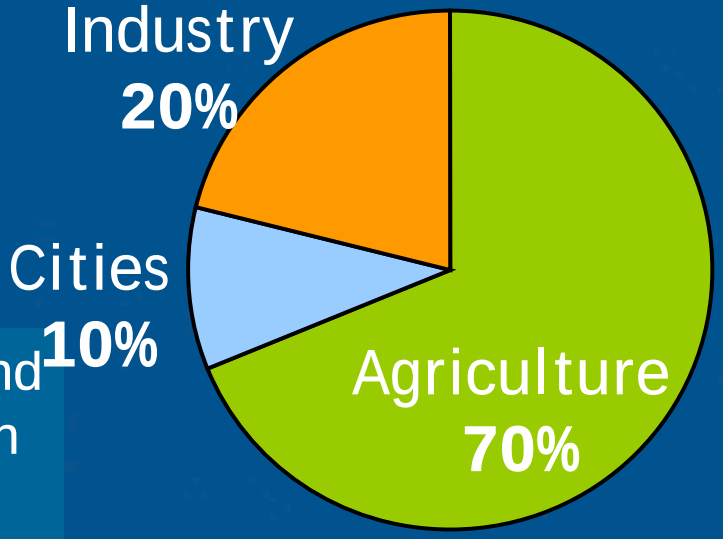


Source: Based on Comprehensive Assessment of Water Management in Agriculture 2007.

Projections

By 2050: + 70% food (or even 100% in LDC)
+ 5% rainfed area
+ 7% irrigated area
+ 10-14% water withdraw

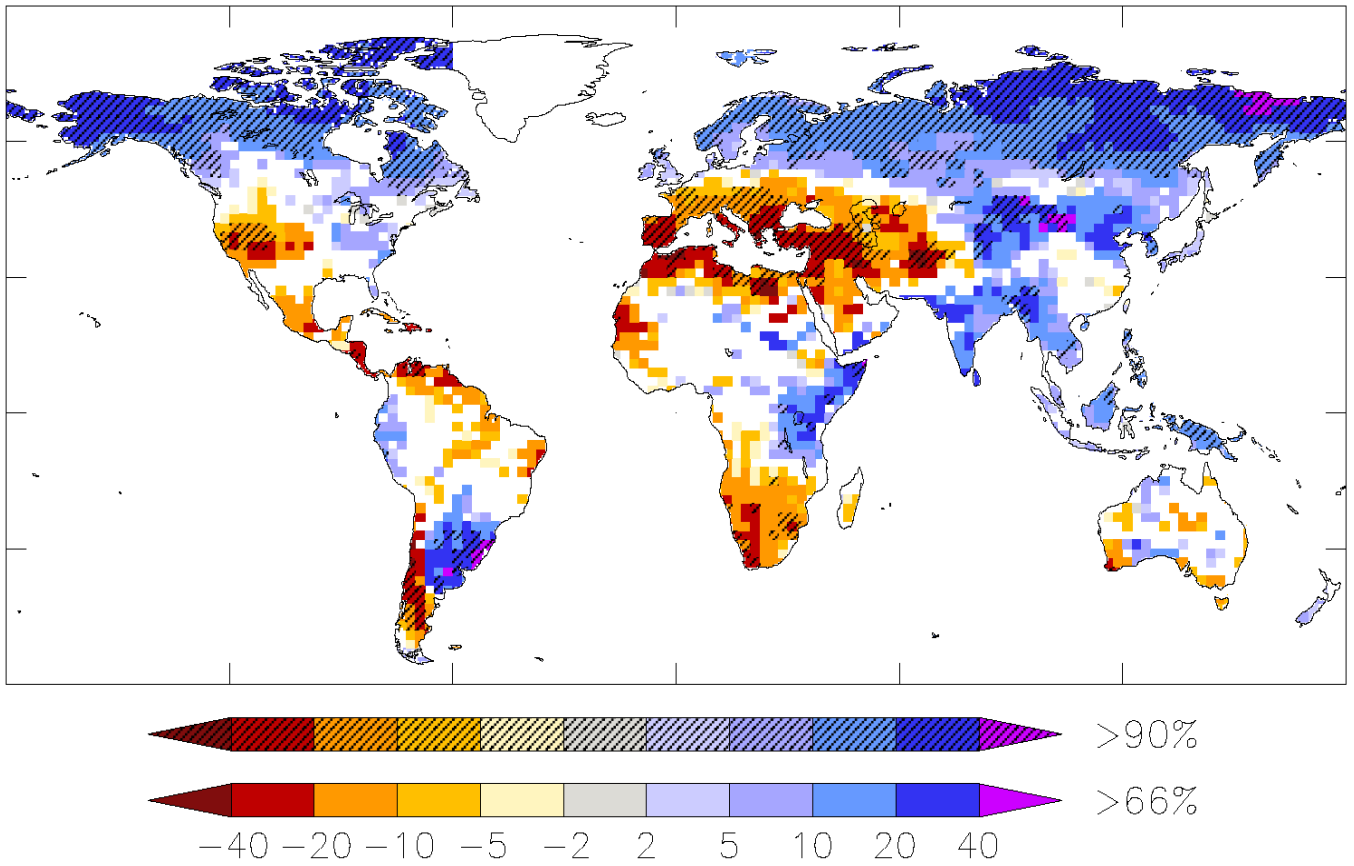




Water Abstraction

Add-on Challenges

Impact of Climate Change



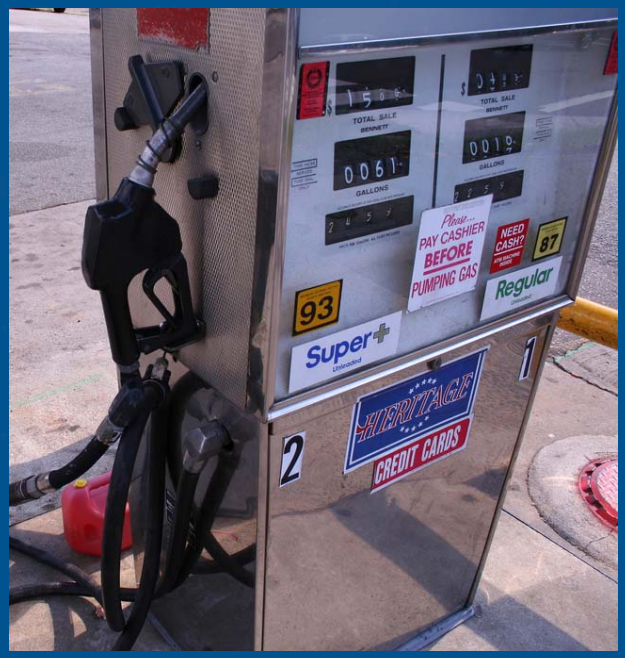
runoff

≈ year 2050

Bio-fuels

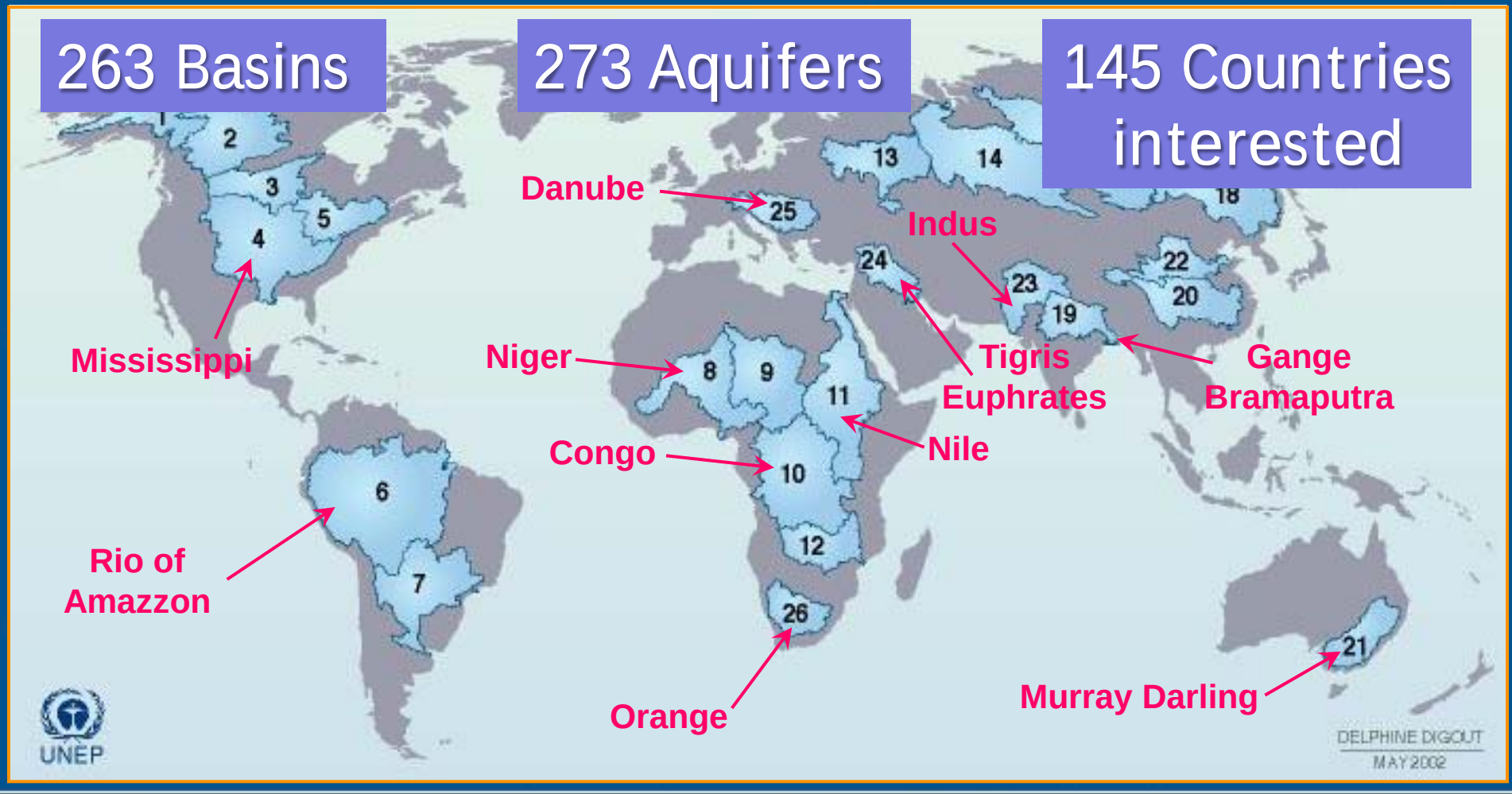
~240 Kg of maize are needed to produce 100 liters of ethanol

Either fill the tank of a SUV or feed one person for a year



Increase competition for land and water and between use of crops for food versus fuel

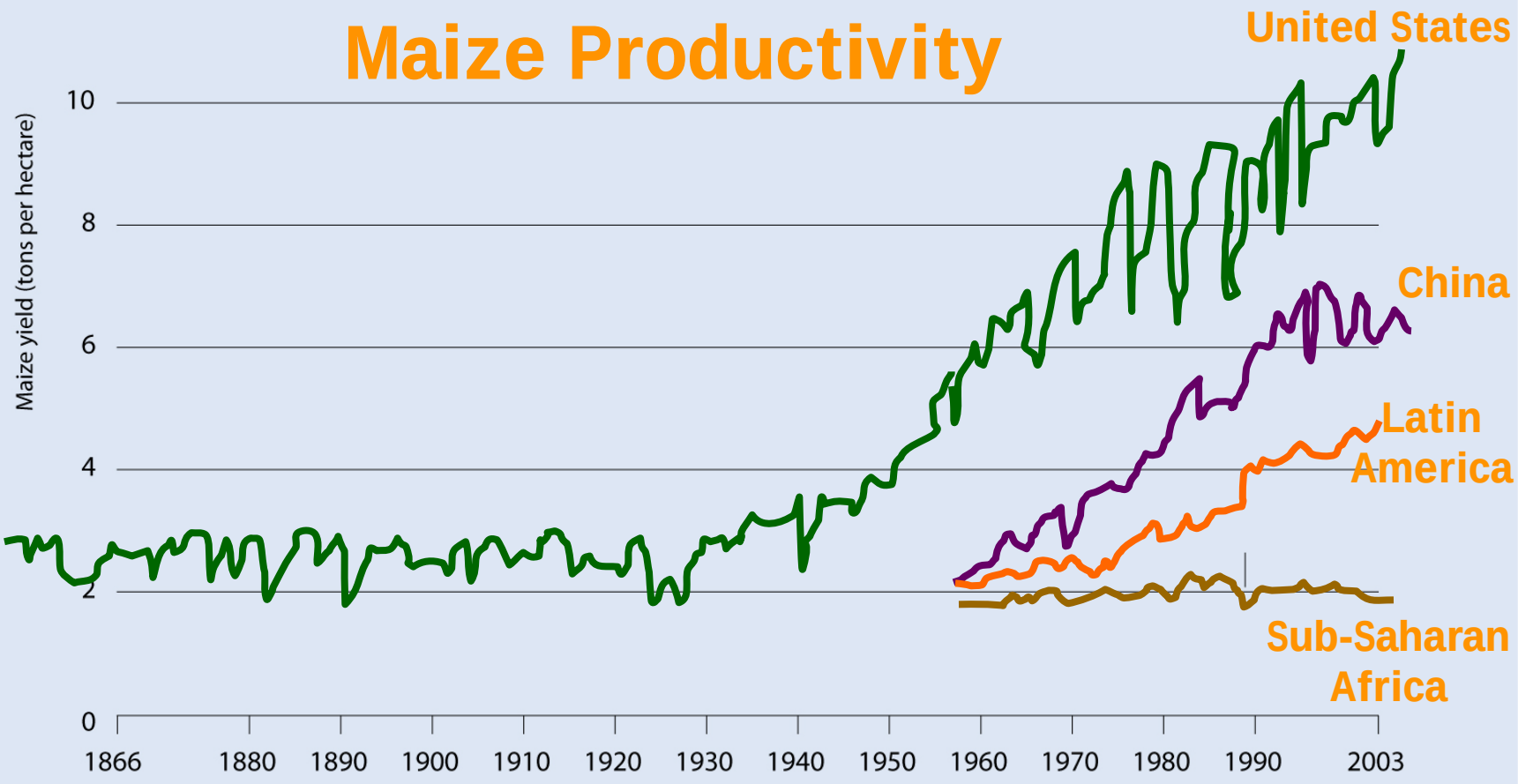
Transboundary Waters



The Responses

- Increase agricultural productivity (*supply*)
- Improve water management practices (*efficiency*)
- Revise the consumption patterns (*demand*)
- Rework international agreements (governance)

Reducing the *Yield* gap



Source: U.S. data, U.S. Department of Agriculture's National Agricultural Statistics Service; all other countries and regions, FAOStat.

Irrigated Agriculture

On-farm Irrigation

- Surface
- Sprinkler
- Localized
- Sub-surface

Scheduling

- Supplementary
- Deficit
- Full

Technology & Knowledge

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Modernization of Irrigation Systems & Services

- Multiple Use
- Operation & Maintenance

Collective Irrigation Systems

- Institutional Capacity

PIM

WUA

Rainfed Agriculture

- roof-harvesting
- soil moisture management
- run-off farming
- small dams

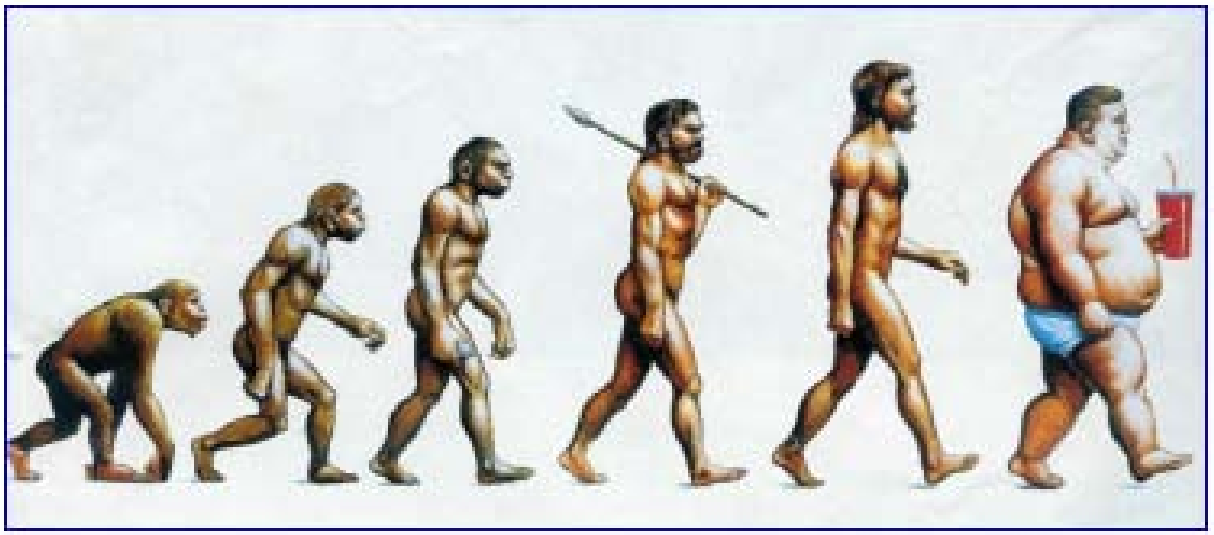
Conservation Agriculture/Arido-culture

Reduce wastes

- In post harvest (storage, transport, market)
- At home

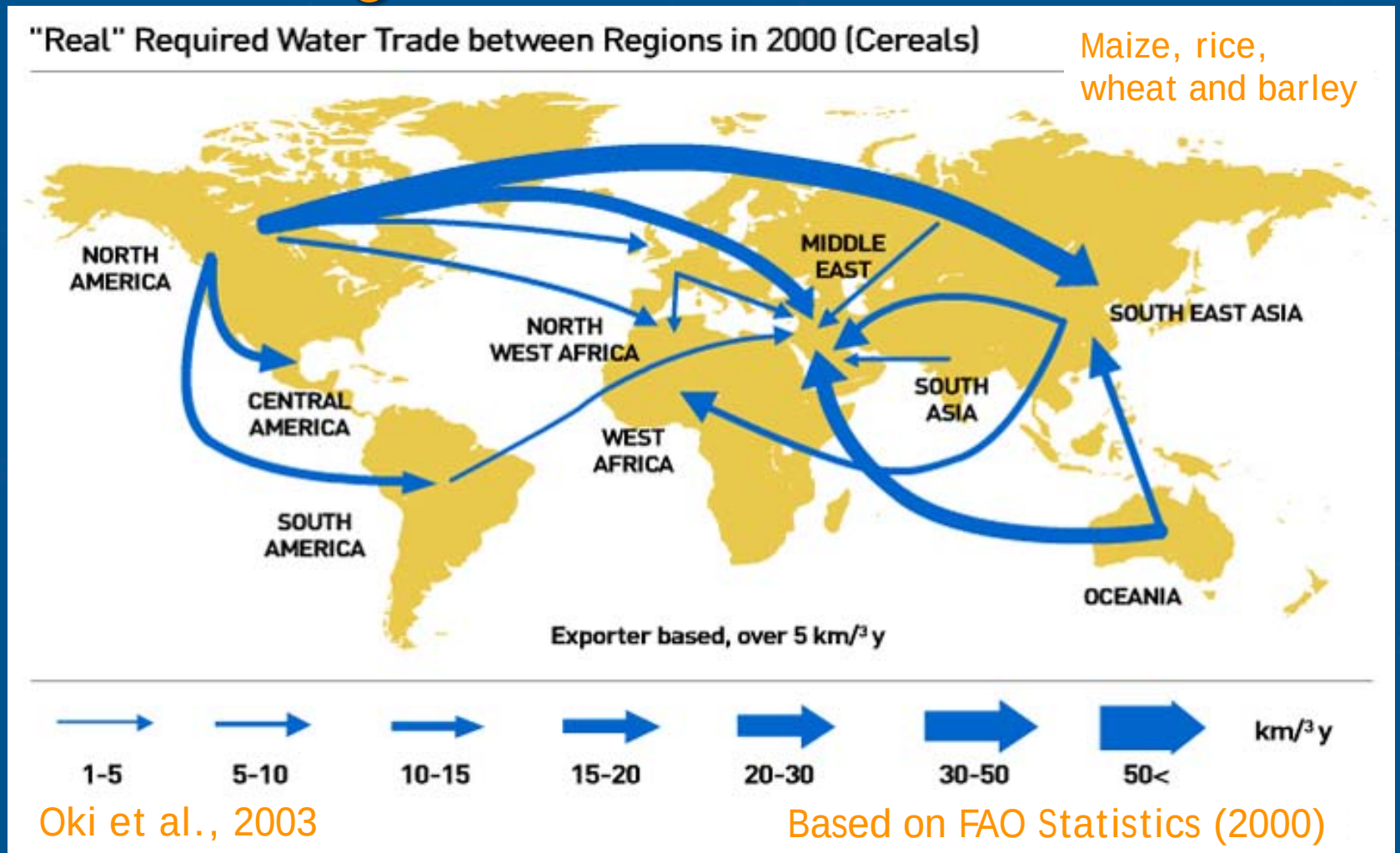
EU, avg waste of 179 kg p^{-1} y^{-1} (SIWI, 2010)

Revise nutrition/diets



- 1,400 M overweight
- 400 M obese

Trade agreement &"*Virtual water*"



Oki et al., 2003

Based on FAO Statistics (2000)

Conclusions

- World food demand will almost double by 2050
- Without increase in water productivity, or a significant reduction of the demand, water consumption in 2050 may double as well
- The World is exposed to a progressive and critical increase in water scarcity (+ climate change)
- Solutions to future food & water challenges exist, and they pass through Agriculture and the demand management and trade of its products
- However, Agriculture needs to be more efficient, more resilient and more accountable in social, economic, and environmental terms

Thank You

www.fao.org/nr/water