Water and food security
Feeding the world in a sustainable way

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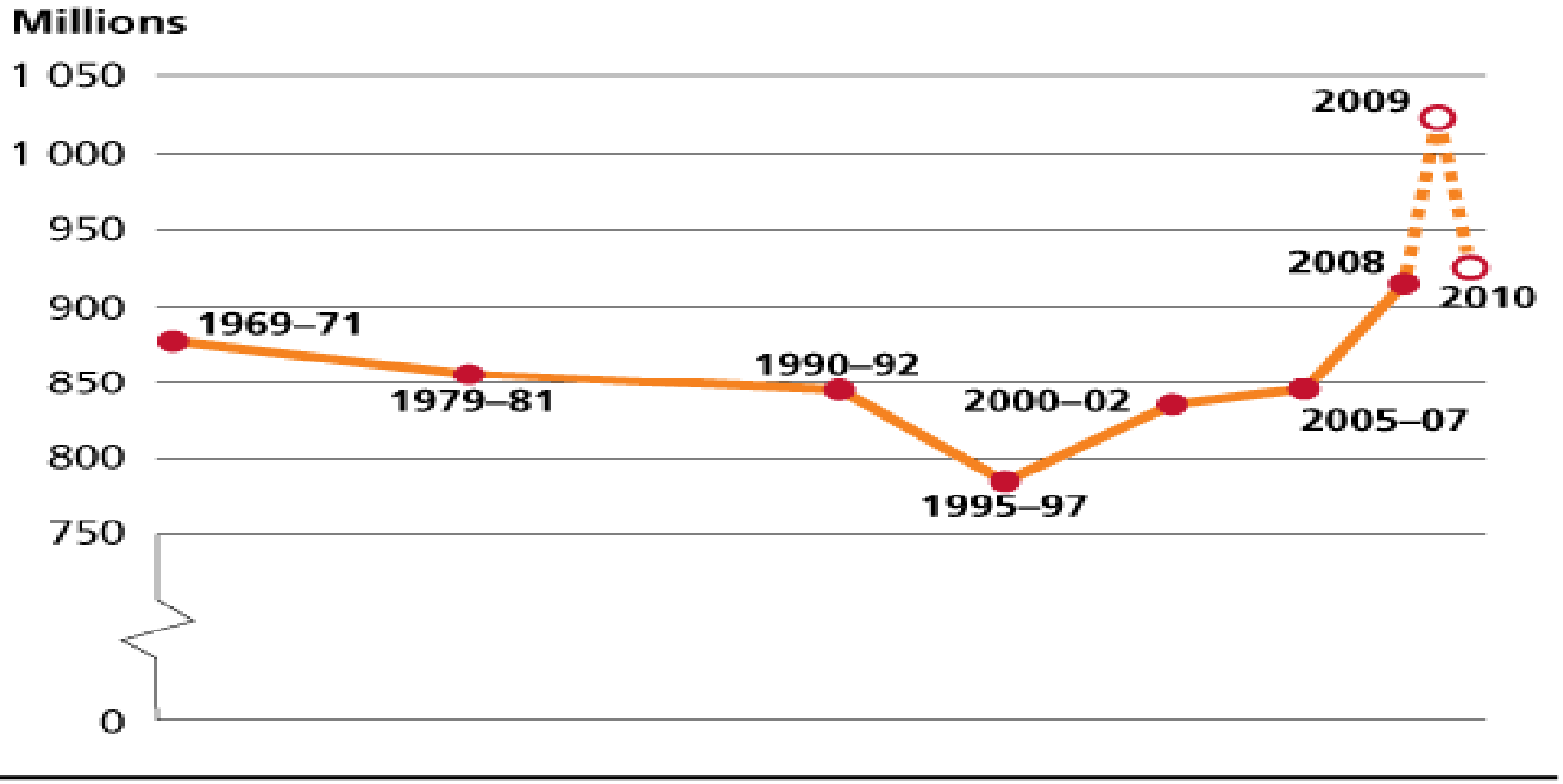
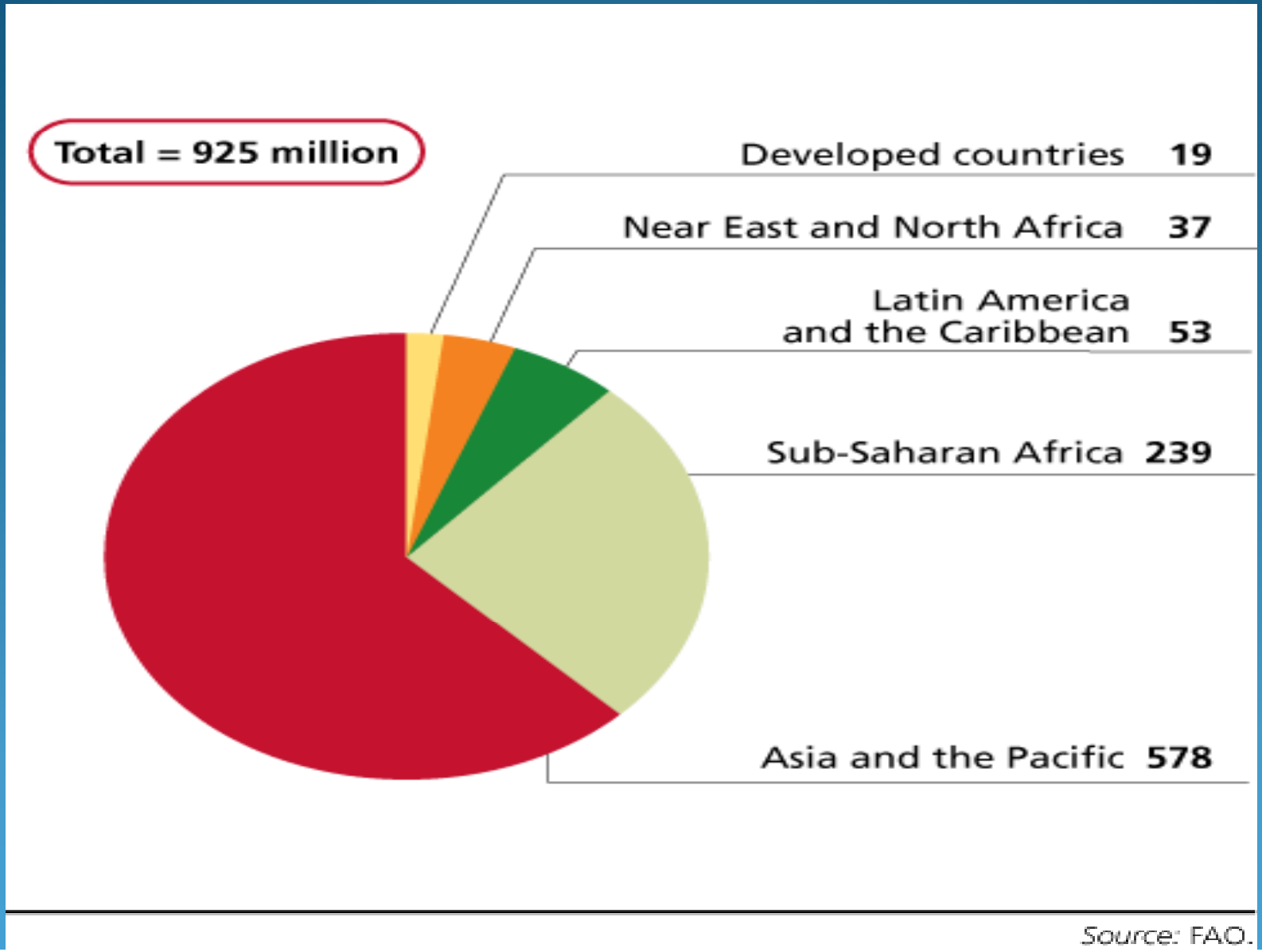
Trends in world hunger



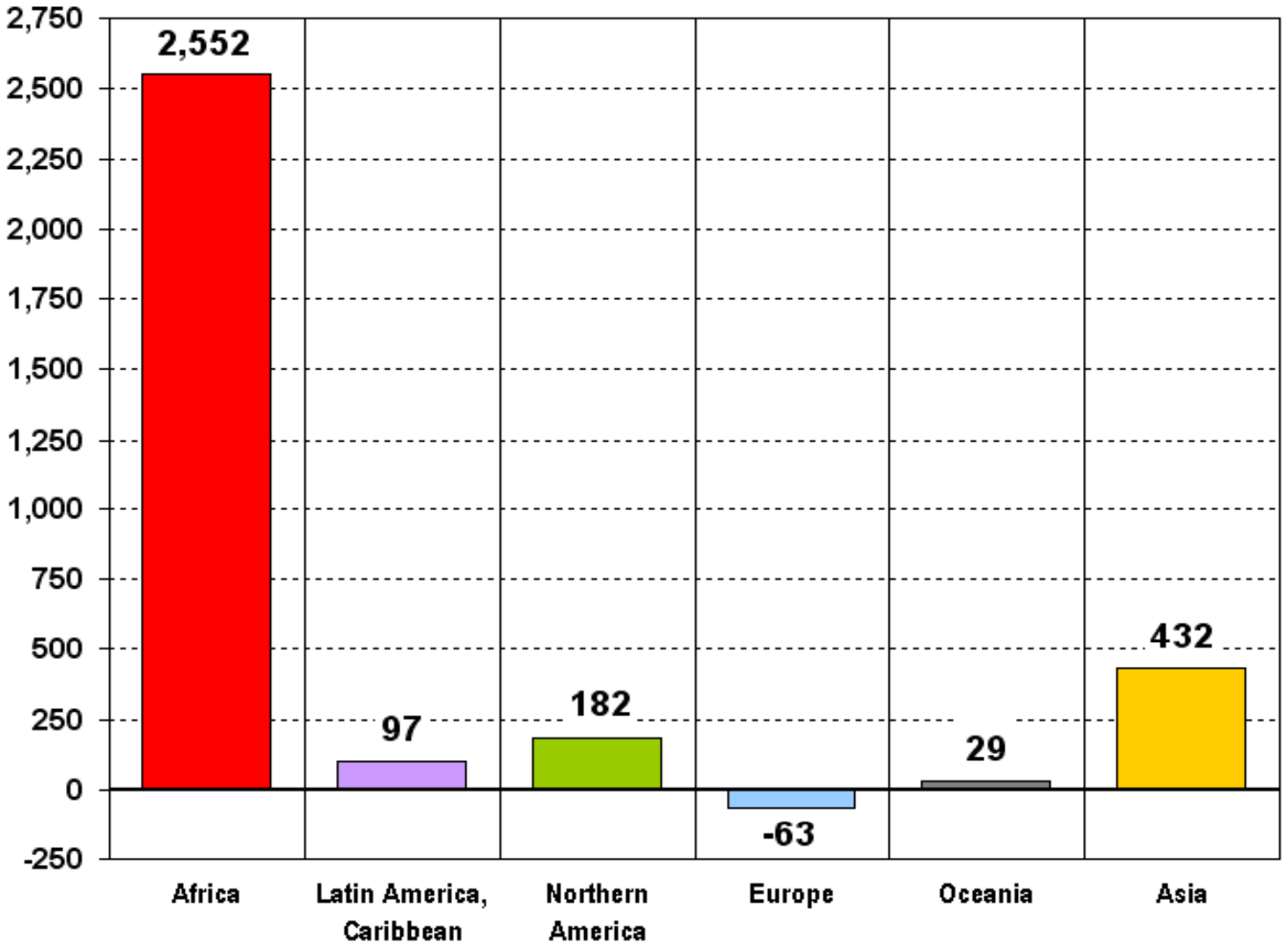
Note: Figures for 2009 and 2010 are estimated by FAO with input from the United States Department of Agriculture, Economic Research Service. Full details of the methodology are provided in the technical background notes (available at www.fao.org/publication/sofi/en/).

Source: FAO.

Where do the hungry live?

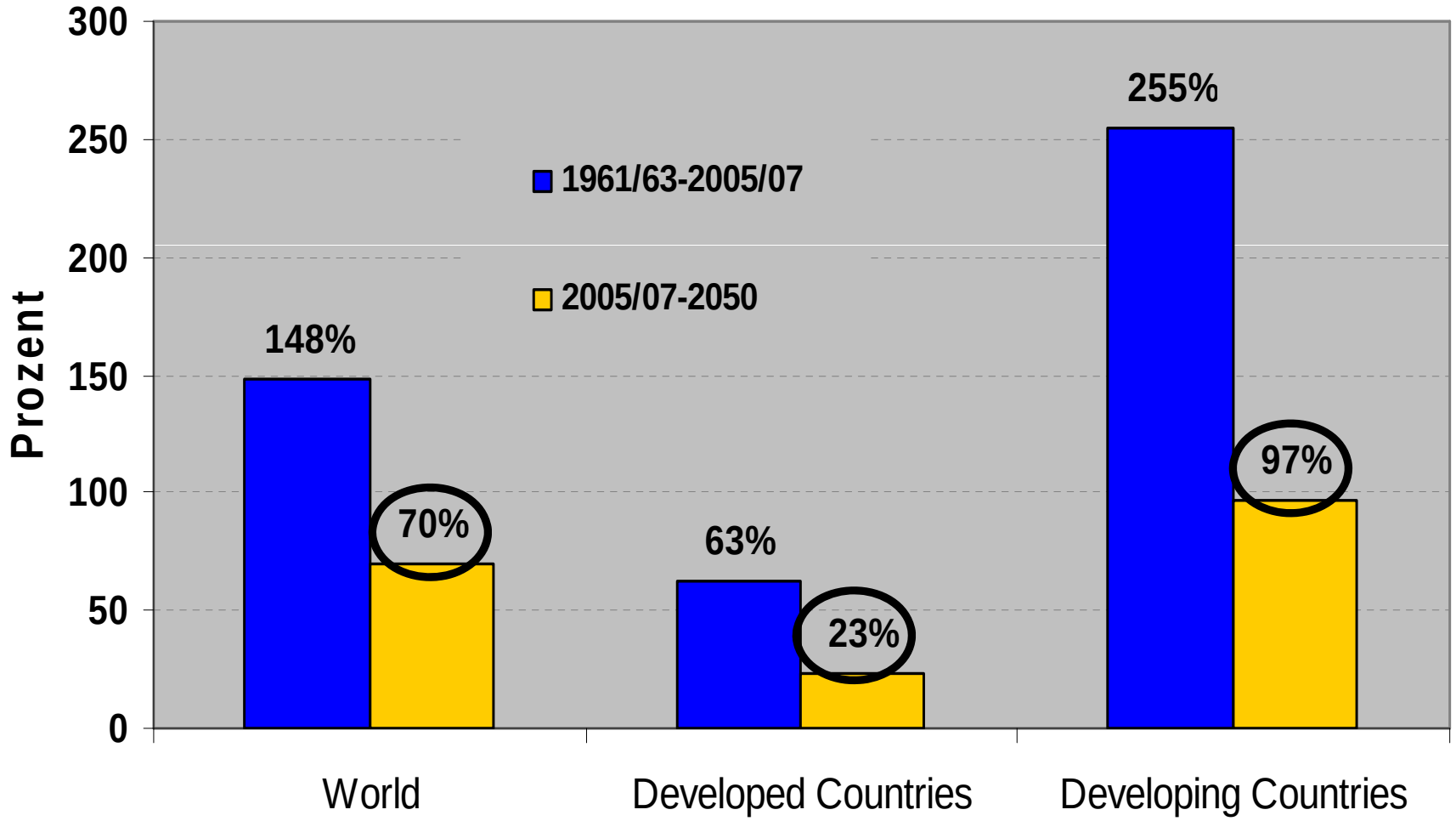


World Population Prospects – Change between 2010 and 2100 (millions)



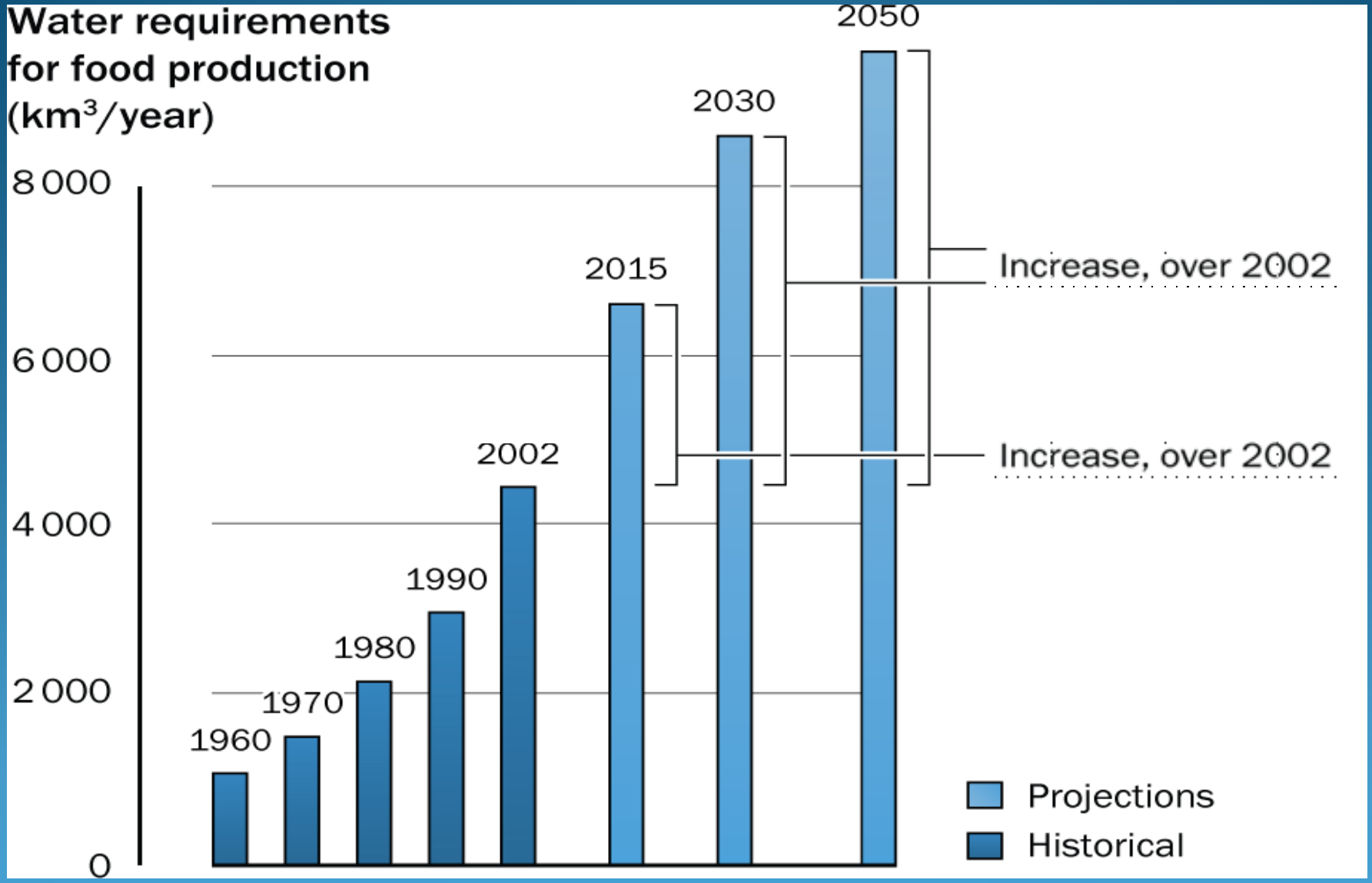
Source: United Nations, Department of Economic and Social Affairs, Population Division (2011): World Population Prospects: The 2010 Revision. New York

Growth in Agricultural Output
Past and Future



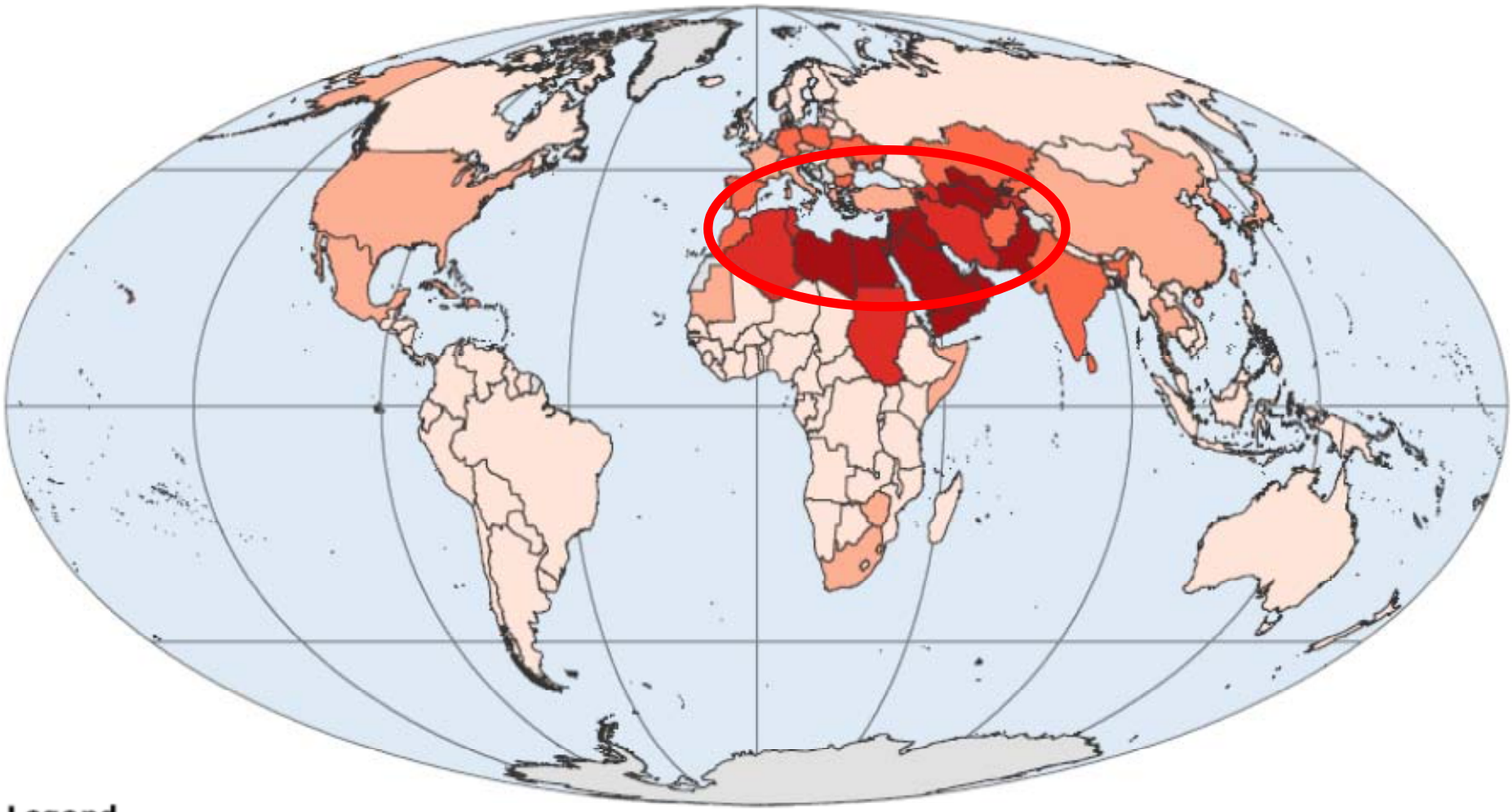
Water Requirements in 2050: +5.500 Km^3 y^{-1}

~ the capacity of 55 Aswan Dams every year



Proportion of renewable water resources withdrawn (MDG Water Indicator)

Surface water and groundwater withdrawal as percentage of total actual renewable water resources (around 2001)



Legend

No data | < 10 | 10 - 25 | 25 - 50 | 50 - 75 | > 75 %

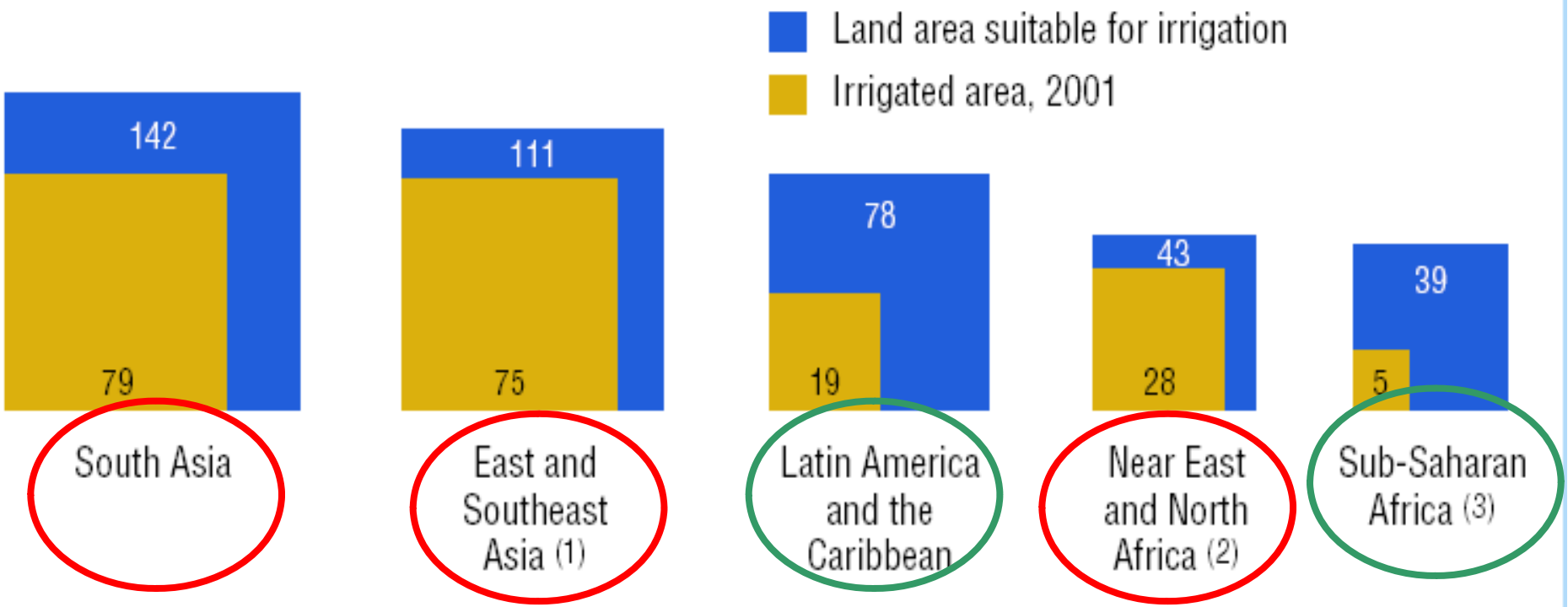
FAO - AQUASTAT, 2007

AQUASTAT
Projection: Mollweide

Disclaimer

The designations employed and the presentation of material in the map do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal or constitutional status of any country, territory or sea area, or concerning the delimitation of frontiers.

Irrigated area and land suitable for irrigation, 2001 (million ha)



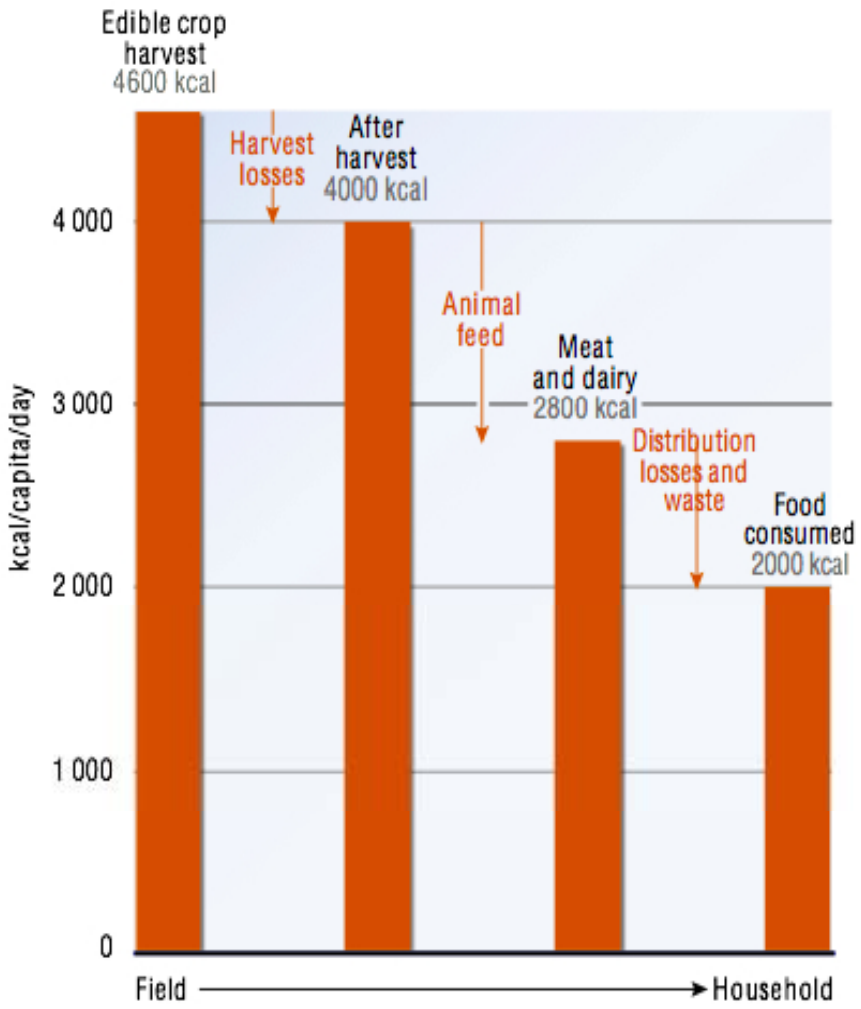
(1) excluding Japan
(2) excluding Israel
(3) excluding South Africa

The figure shows that the potential for expanding irrigated agriculture is relatively the greatest in sub-Saharan Africa and Latin America.

Water and Diet

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

The Makeup of Total Food Waste



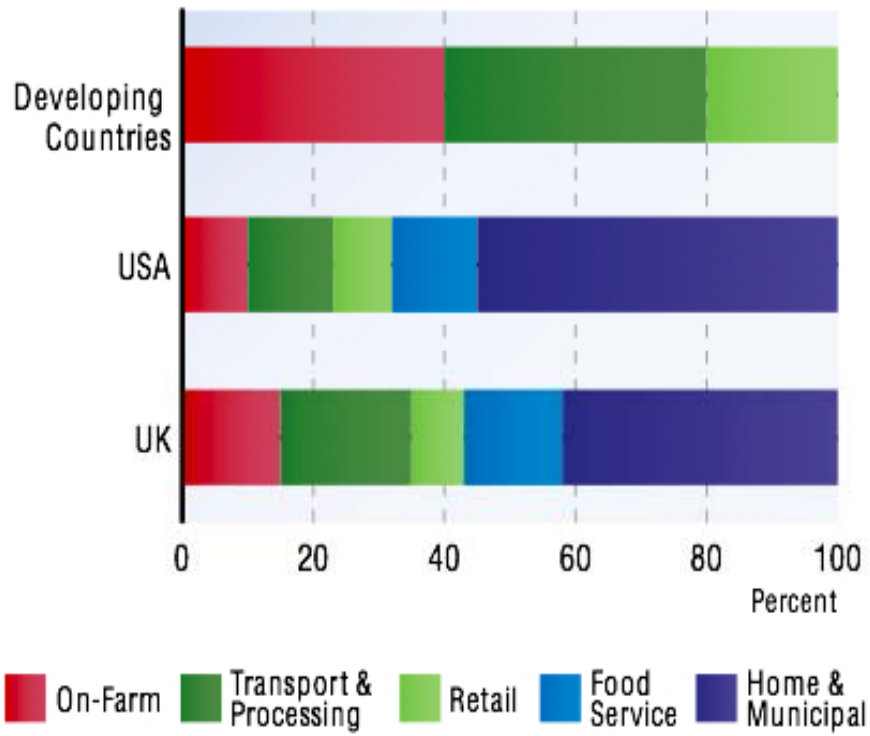
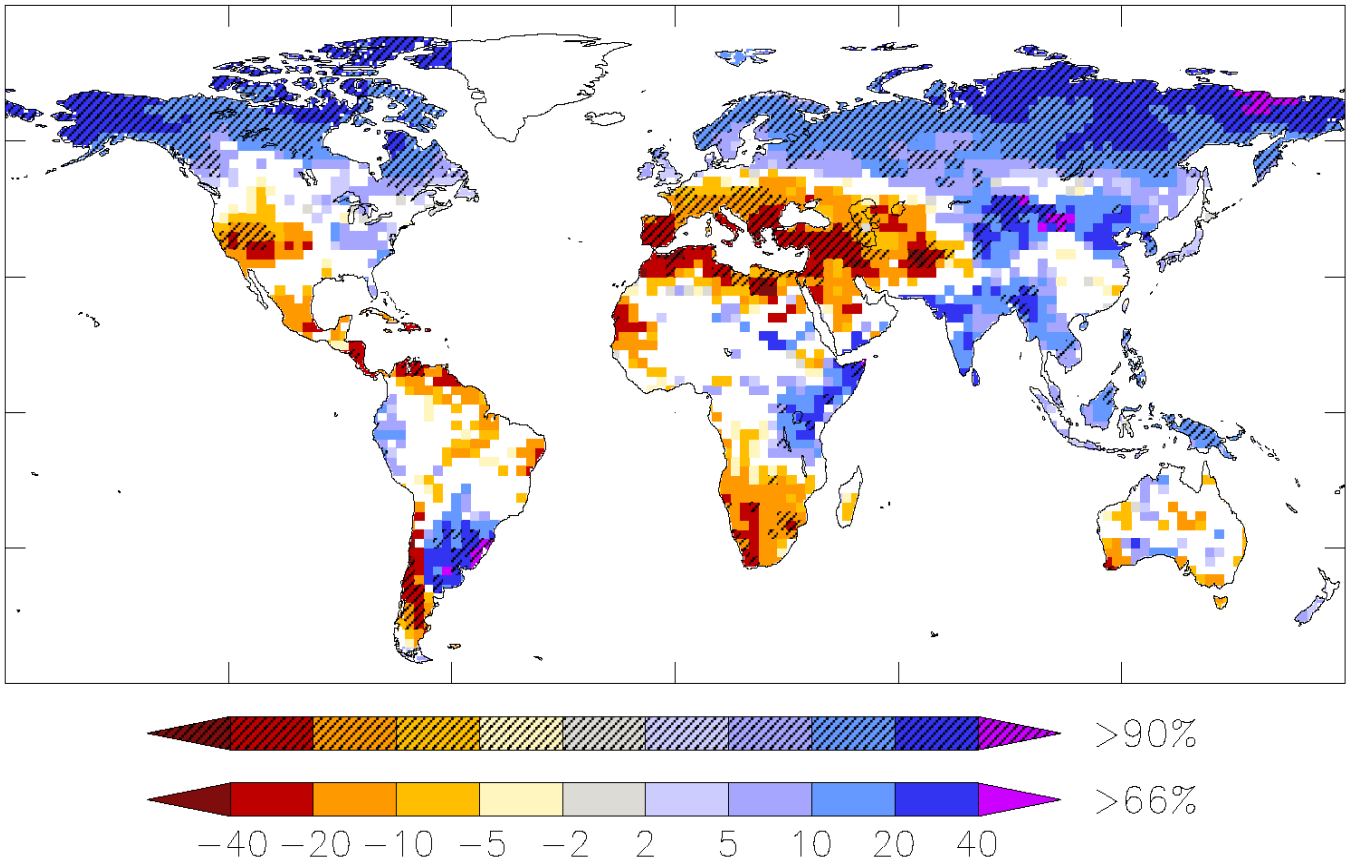


Figure 9a-b: The makeup of total food waste[11]

Source: Lundqvist et al., Godfray

New Challenges

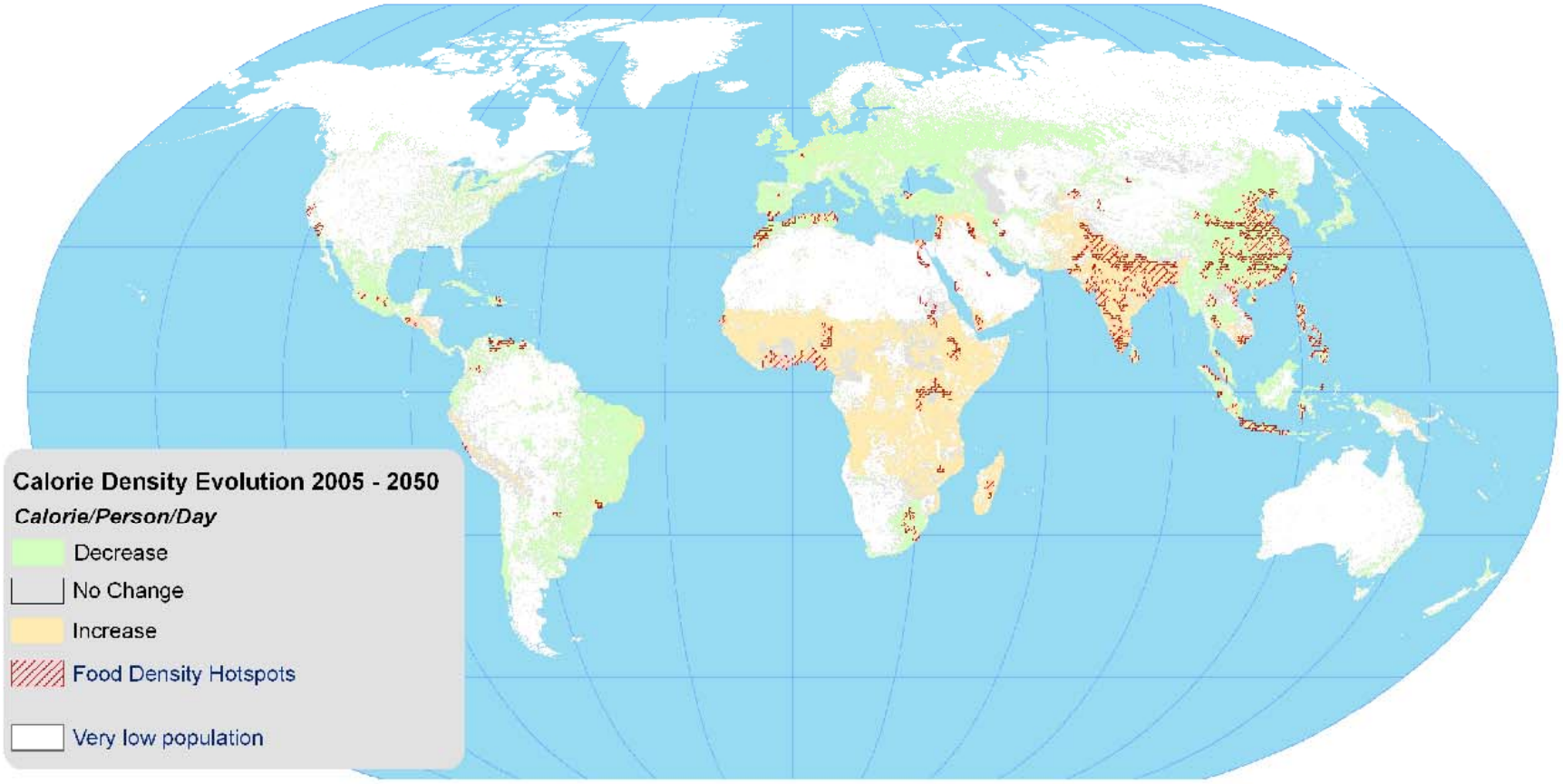
Impact of Climate Change



runoff

≈ year 2050

Global Calorie Density Evolution and Food Density Hotspots (2005 and projection for 2050)



Source : FAO

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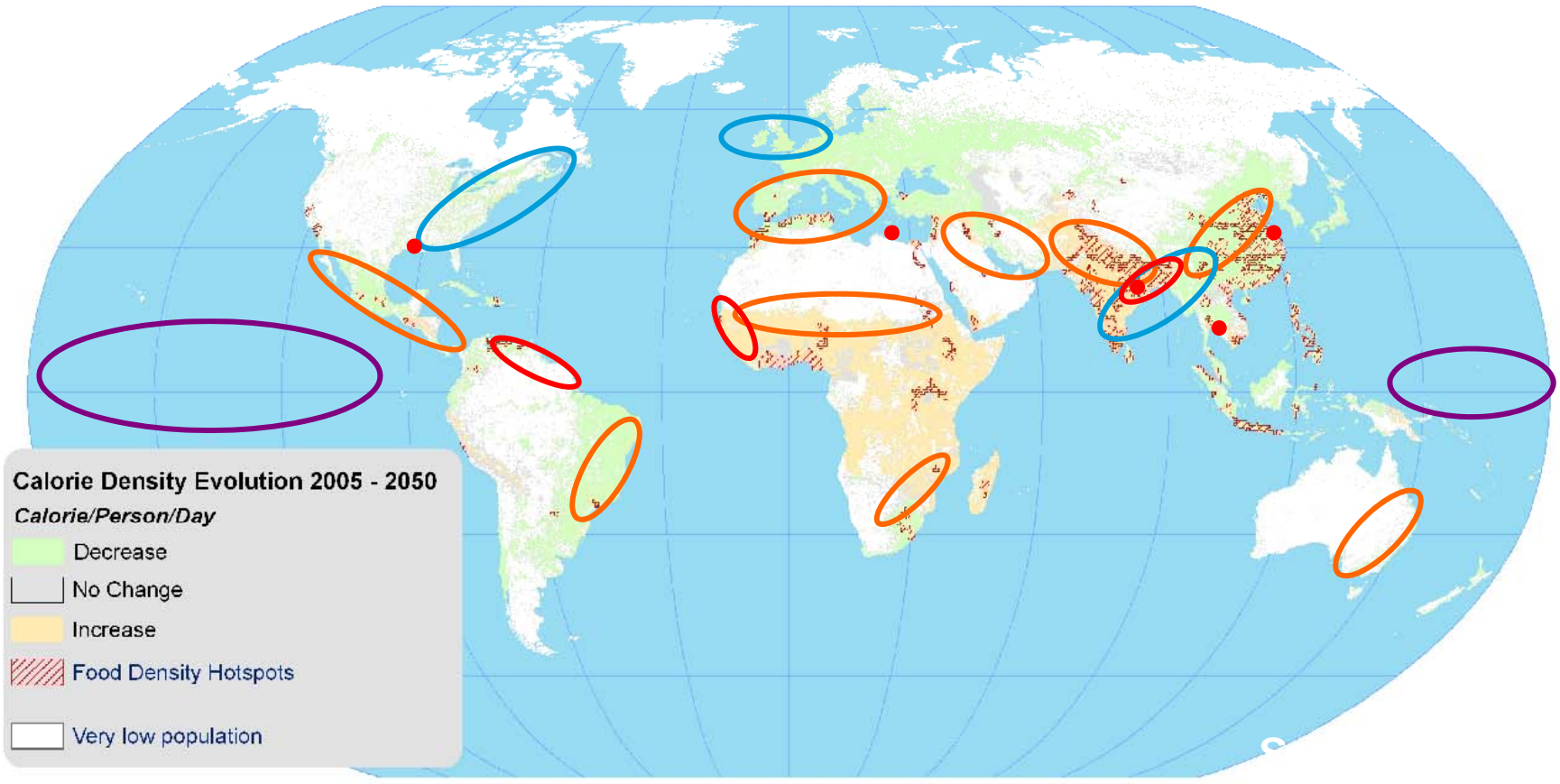


Drought

Cyclones/Extreme events

SIDS

Sea level rise incidence

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

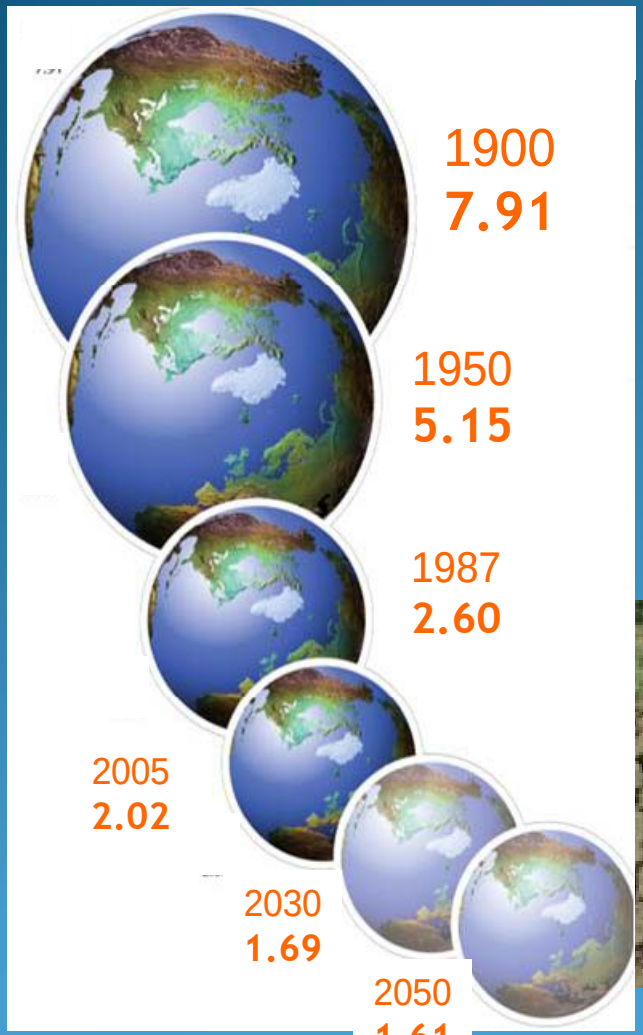
Increase competition for land and water and between use of crops for food versus fuel

Water, food and bioenergy

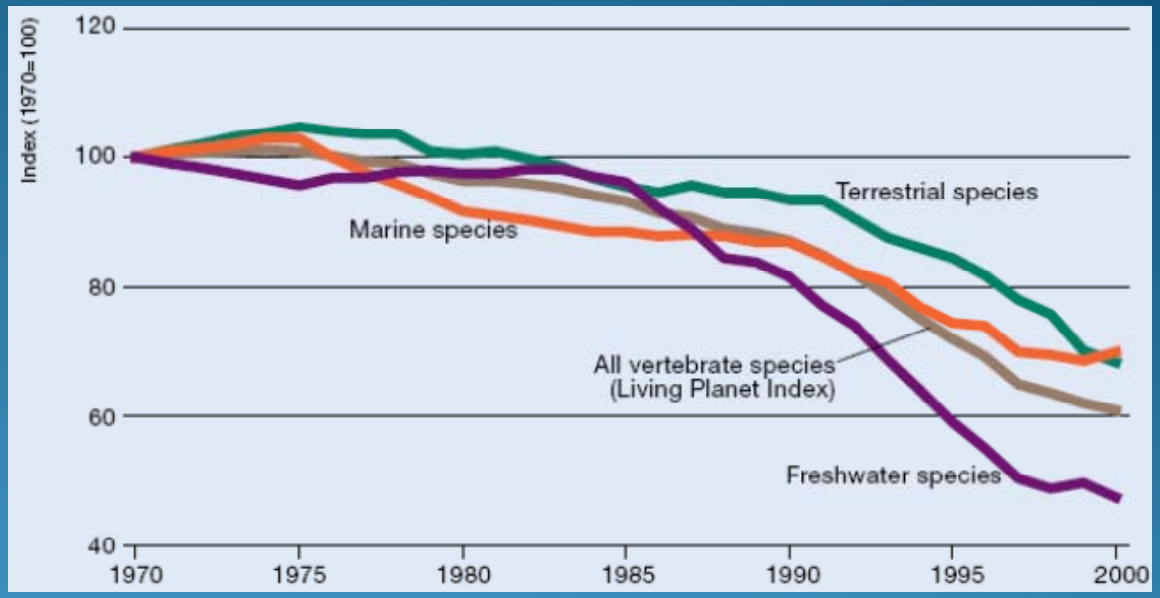
- Water needed to produce:
  - 1 kilo of wheat: 1 000 litres
  - 1 kilo of meat (beef): 15 000 litres
- Daily water requirements per person:
  - Drinking: 2-3 litres
  - Domestic needs: 20–300 litres
  - Food: 2 000-3 000 litres
- with 2 500 litres of water, we can produce:
  - food for one person for one day
  - 1 litre of biofuel
- Bioenergy likely to add pressure on water withdrawals:
  - depending on type of crop
  - depending on farming system: rainfed/irrigated
  - depending on region

Reduction in Natural Resources

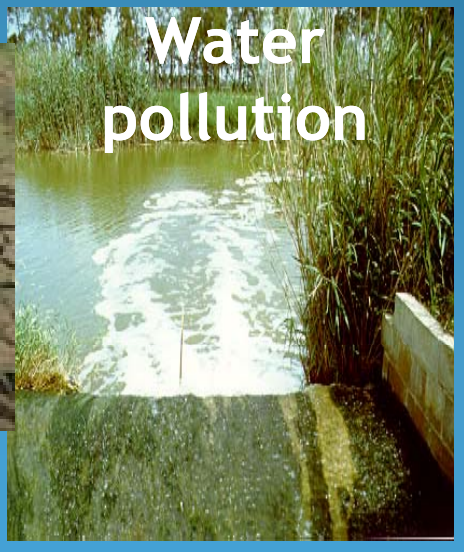
Ha per person of arable land



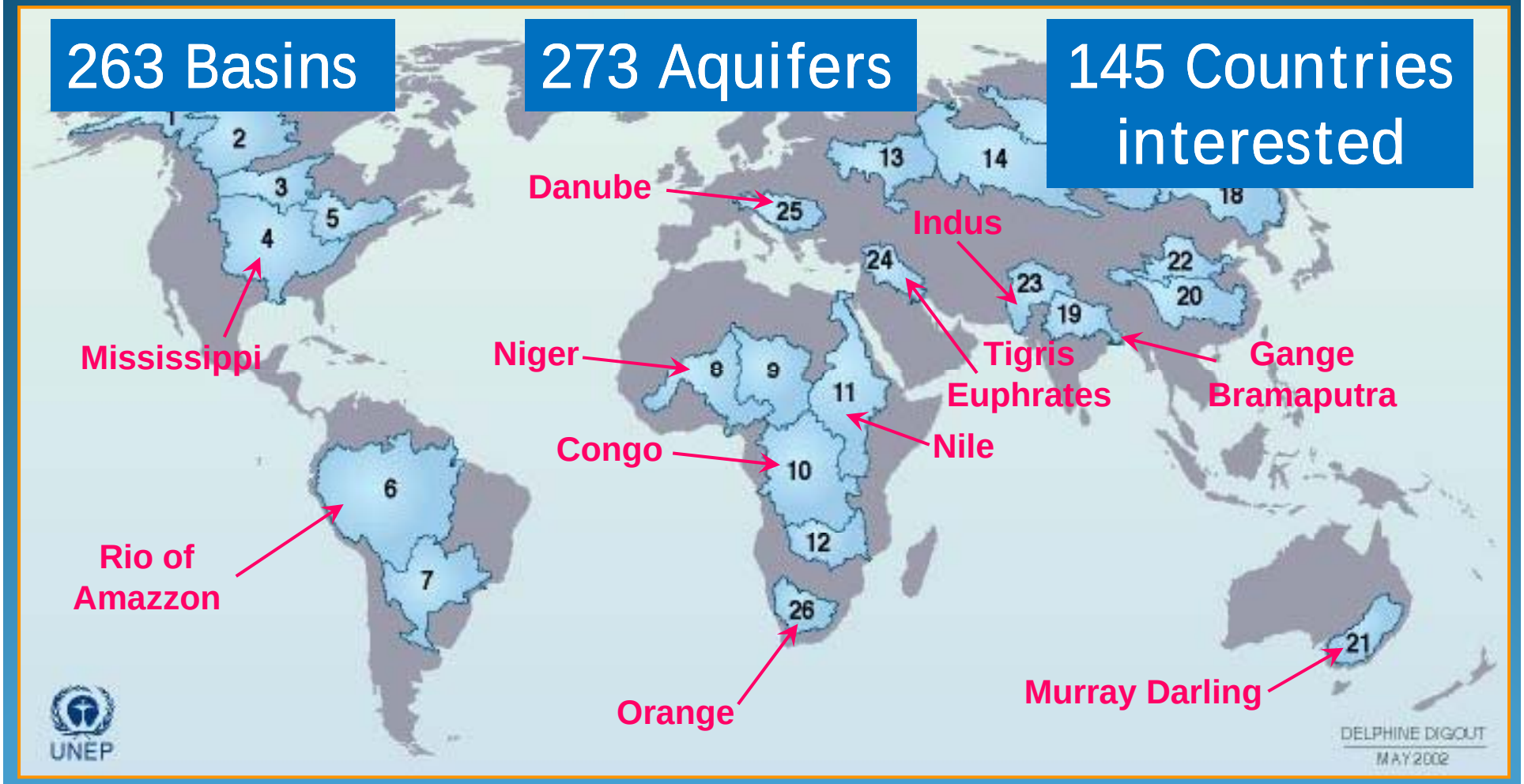
Biodiversity



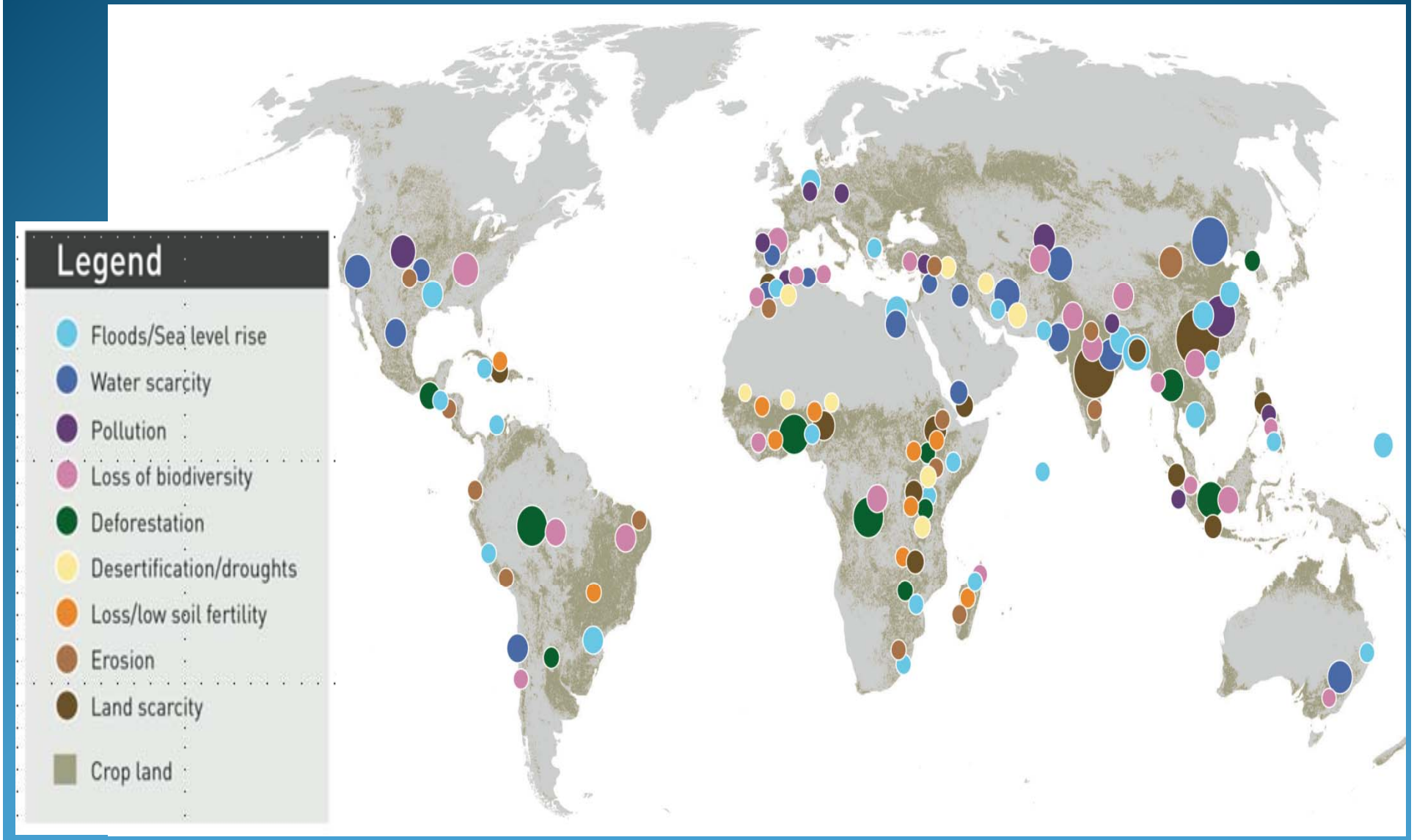
Land degradation



Transboundary Waters



Managing systems at risks



The Responses

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

efficiency-i

Irrigated Agriculture

On-farm Irrigation

- Surface
- Sprinkler
- Localized
- Sub-surface

Modernization of Irrigation Systems & Services

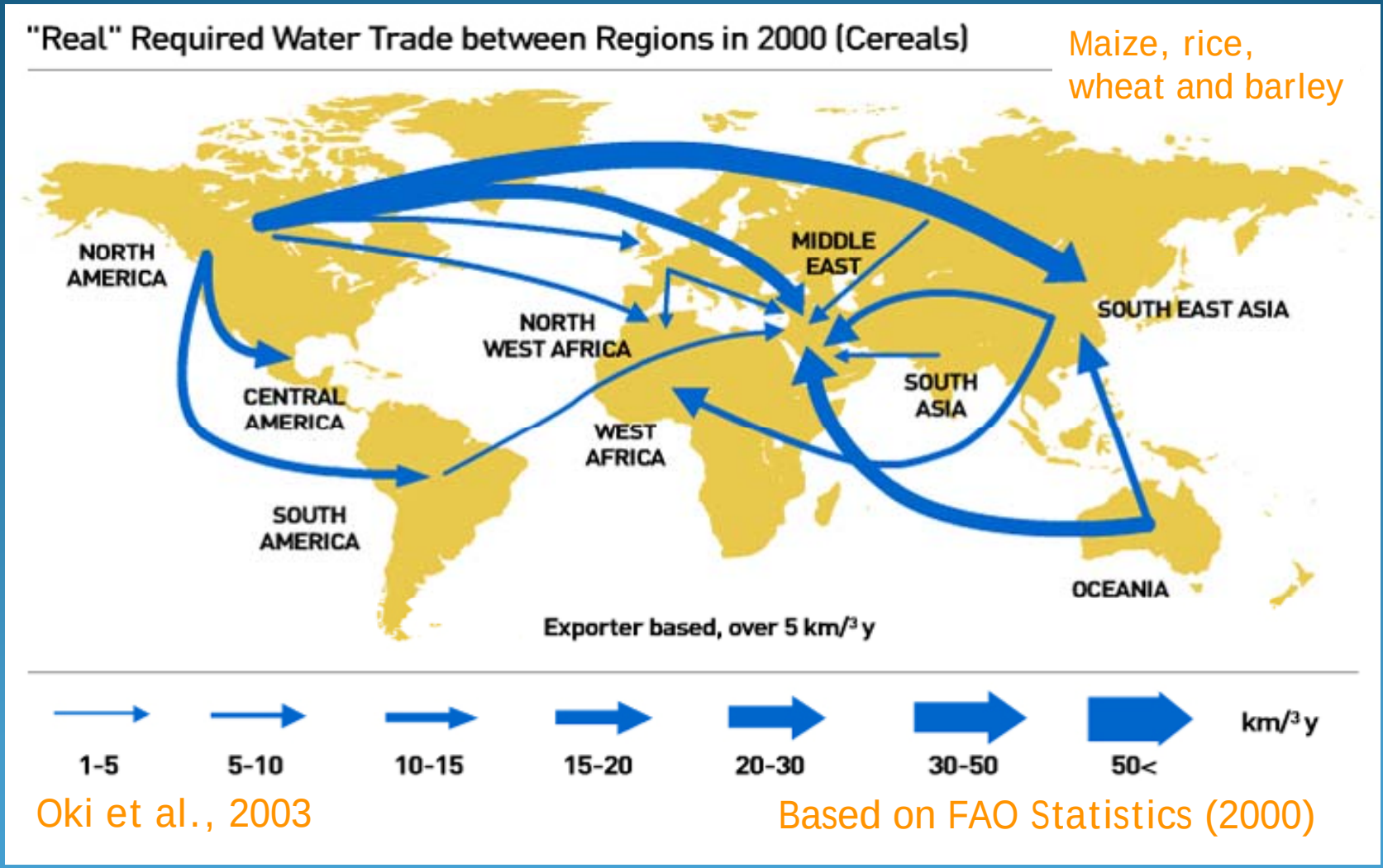
Technology & Knowledge

Rainfed Agriculture

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

Sustainable Land management/Arido-culture

Trade &"*Virtual water*"



Concluding Remarks

- It seems that the era of cheap food is over
- World food demand will increase 70% by 2050
- Without increase in water productivity, or a significant reduction of the demand, water consumption in 2050 may increase by 70 %
- The World is thus exposed to a progressive and critical increase in water scarcity (+ climate change impacts)
- Therefore, food and water securities are two faces of the same coin

- Land and water productivities are required to be assessed conjunctively for a correct optimization of natural resources use
- All solutions pass through Agriculture and the demand management and trade of its products
- The paths to solutions requires not only appropriate policies, institutional reforms and adequate investments, but also filling the gap from knowledge to implementation

Thank You

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