

WATER FOR AGRICULTURE

In the Asia Pacific Region

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MESSAGES

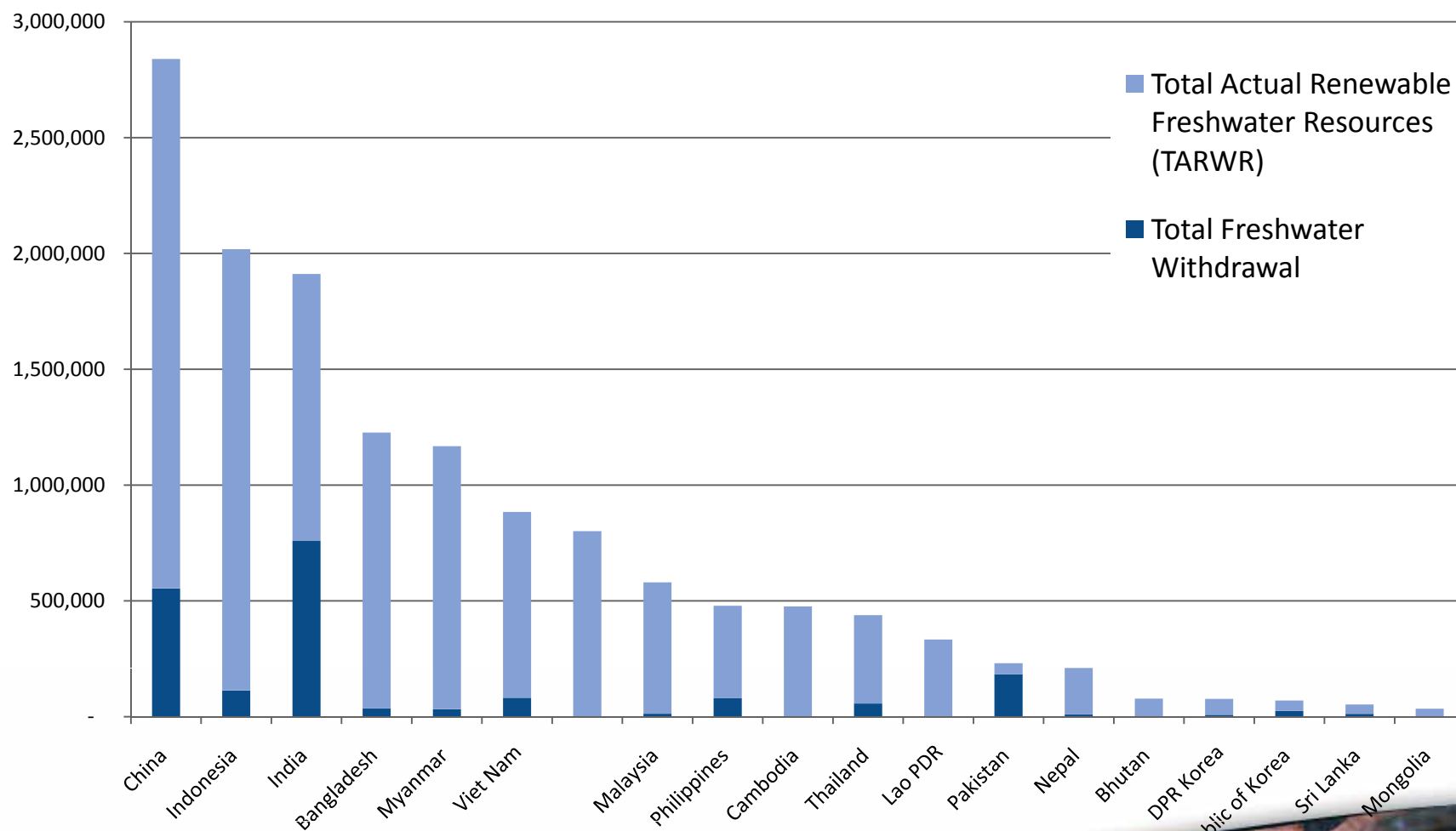
- **Water for agriculture is to ensure sufficient food production**
 - Expanding global population with depleting natural resources and increasing competition for water, land and energy
- **Challenges for food production is more than water**
 - Governance, population growth, urbanization, energy, crop/animal types, financing, changing food demand, greying farmers, climate change, etc
- **Water in agriculture include water for**
 - Irrigation/aquaculture/animal husbandry, energy, agricultural manufacturing, virtual water, etc

CONTENTS

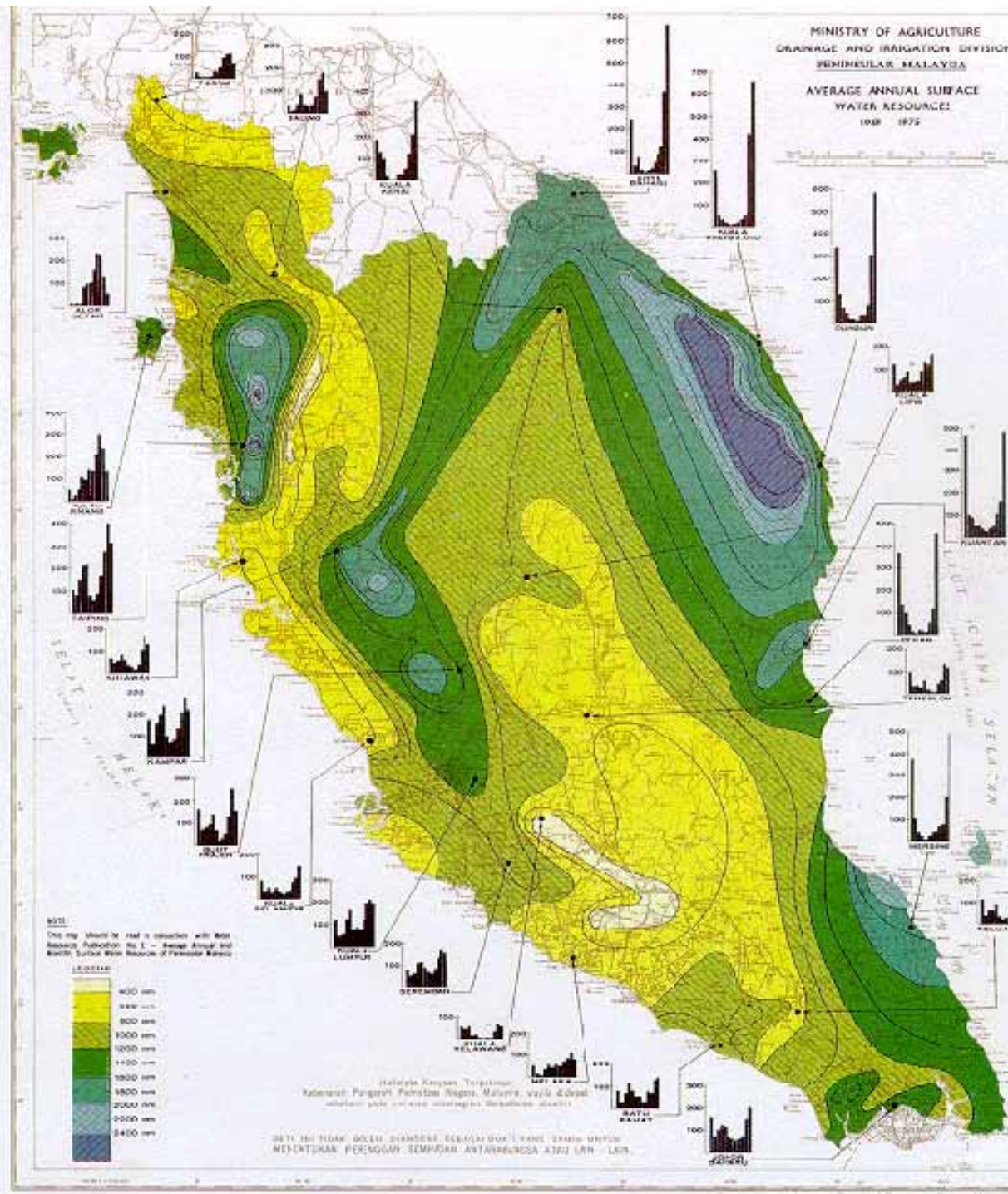
- Water and Agricultural Water in the Asia Pacific
- Agricultural Water Challenges
- Moving forward – “the future we want”

WATER & AGRICULTURE WATER IN ASIA AND THE PACIFIC

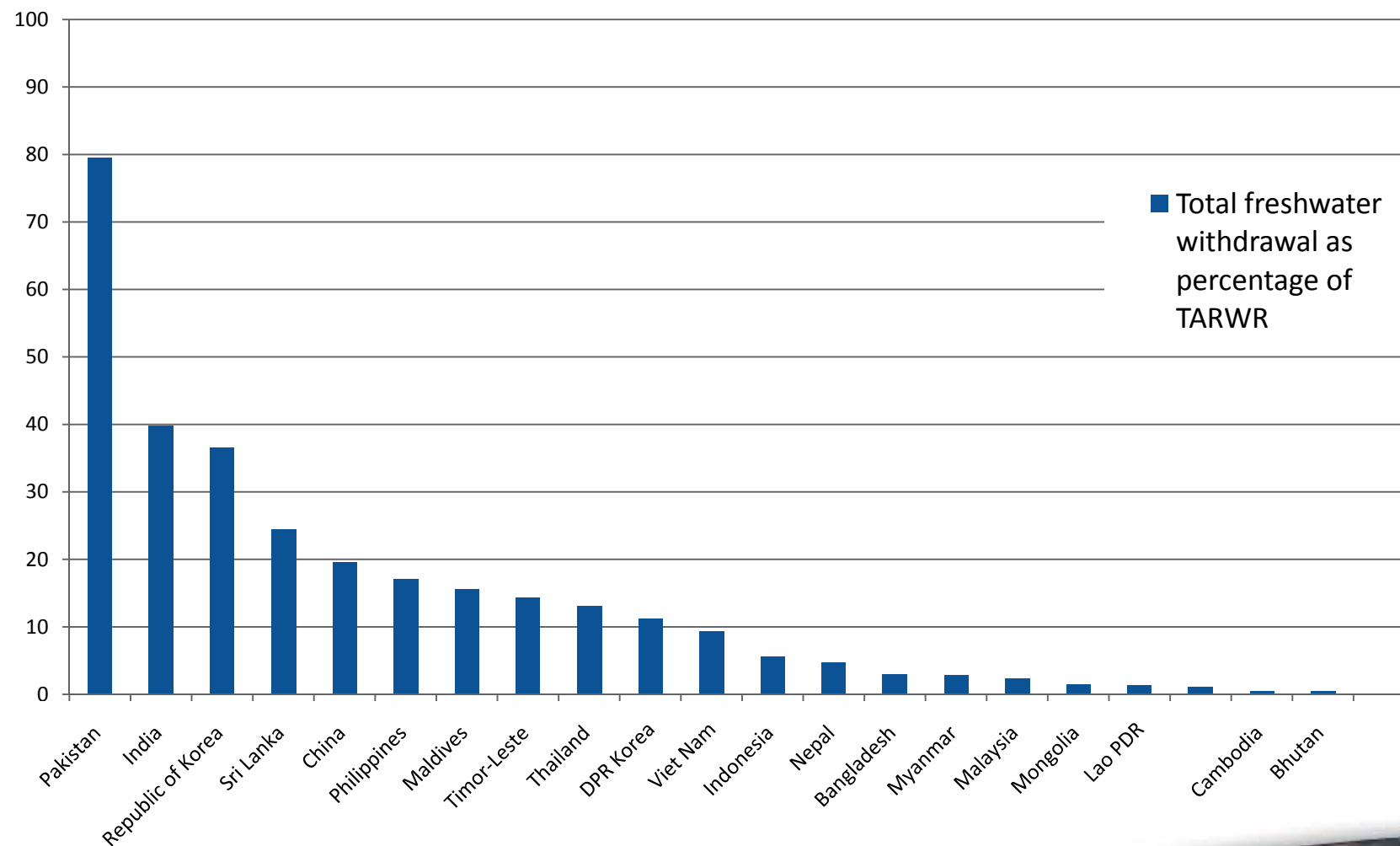
WATER POTENTIAL FOR SELECTED ASIAN COUNTRIES (MILLION M³)



Data Source: FAO Irrigation
 in Southern and Eastern Asia
 in figures, AQUASTAT
 Survey – 2011



TOTAL FRESHWATER WITHDRAWAL AS PERCENTAGE OF TARWR



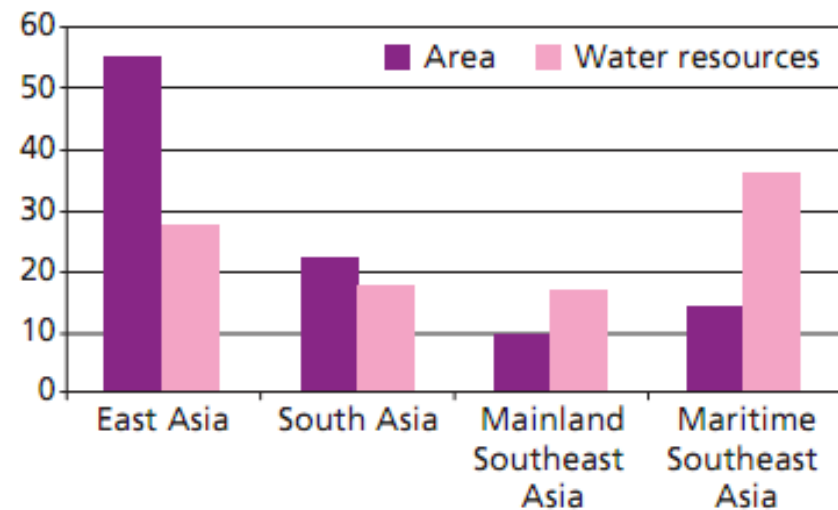
Data Source: FAO Irrigation
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LAND AREA AND WATER RESOURCES



In % of Southern and Eastern Asia

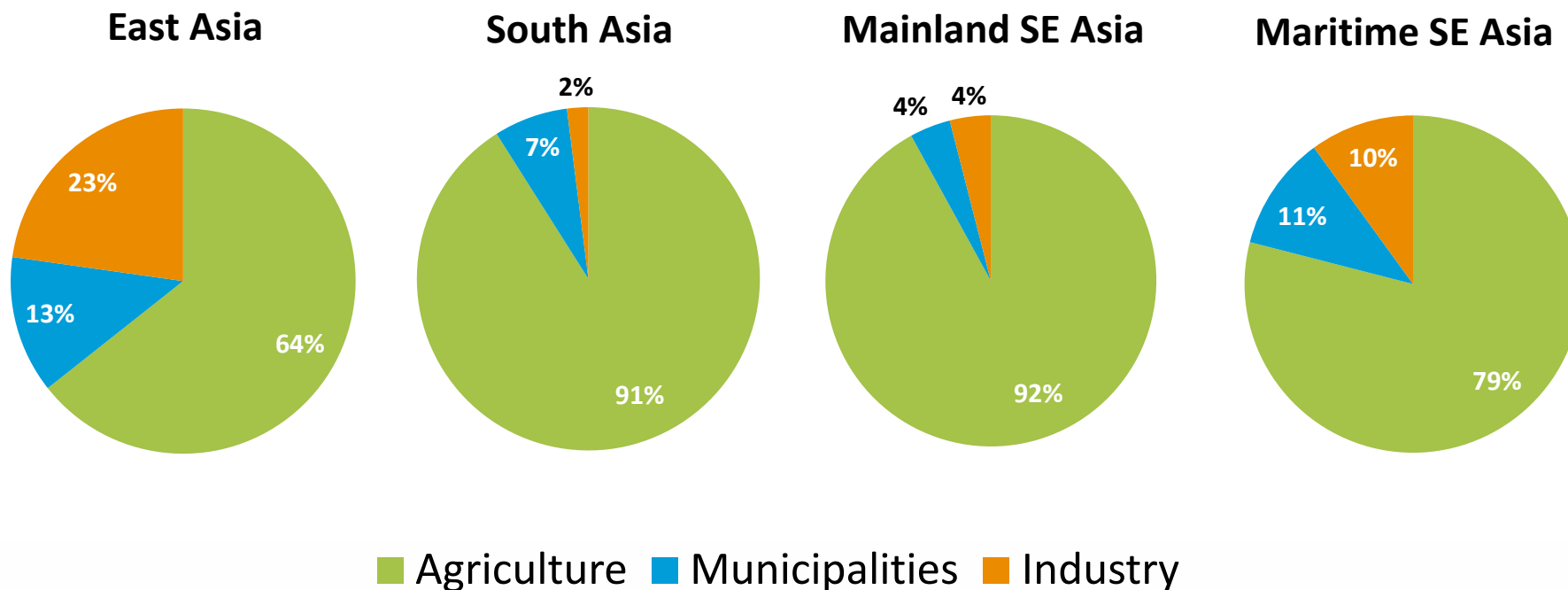
Regional distribution of area and water resources



Source: *FAO Irrigation in Southern and Eastern Asia in figures, AQUASTAT Survey – 2011*

COMPETITION FOR WATER

WATER WITHDRAWAL RATIOS BY SECTOR

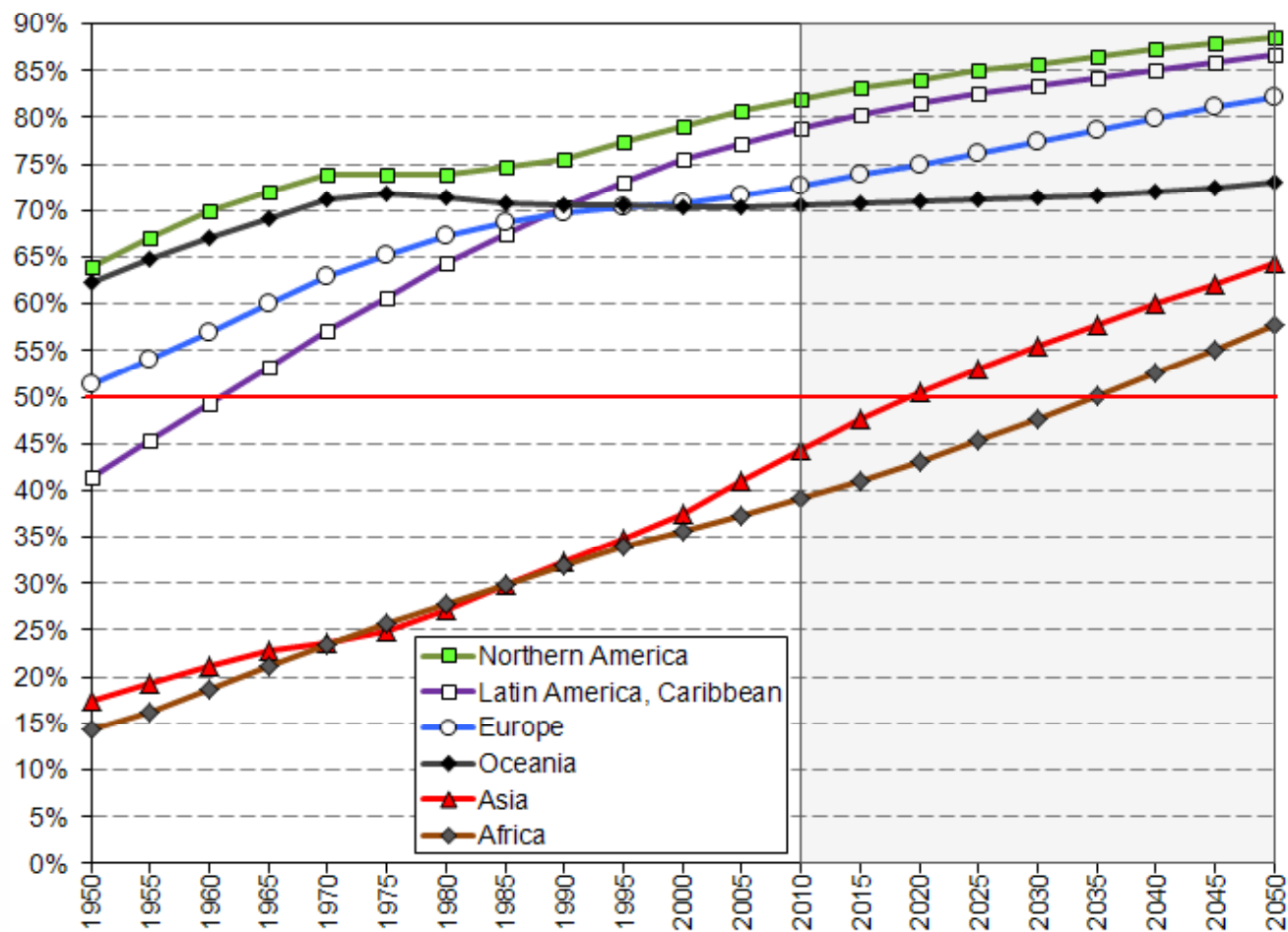


Data Source: FAO Irrigation in Southern and Eastern Asia in figures, AQUASTAT Survey – 2011

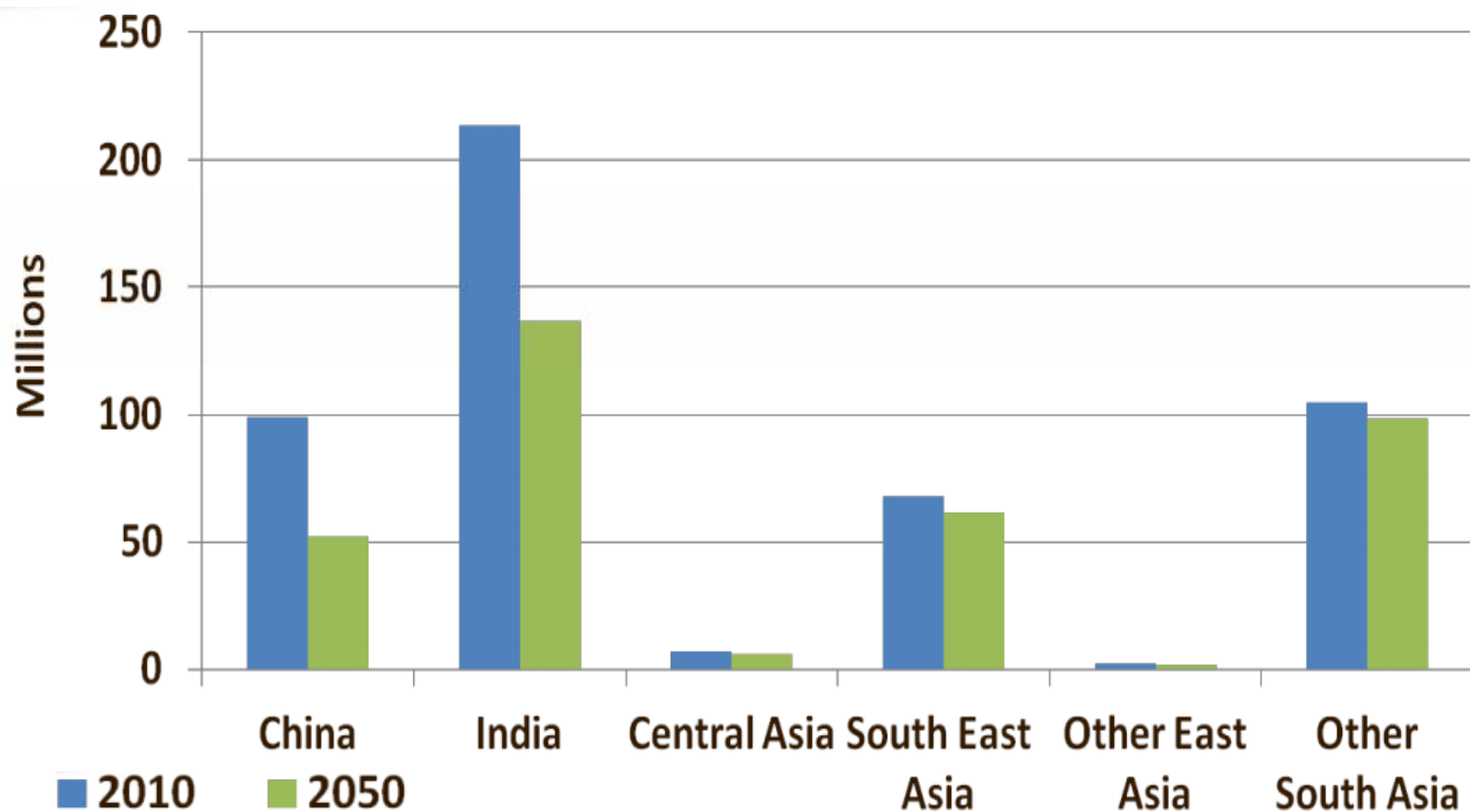
Agriculture Water Challenges

- Increasing population - More food needed
- Rapidly urbanizing world - Competition for water, international trade, virtual water and water foot prints
- Climate Change Impacts - changing weather patterns
- Governance –integrating all development needs

Urban population by major geographical area (in per cent of total population)



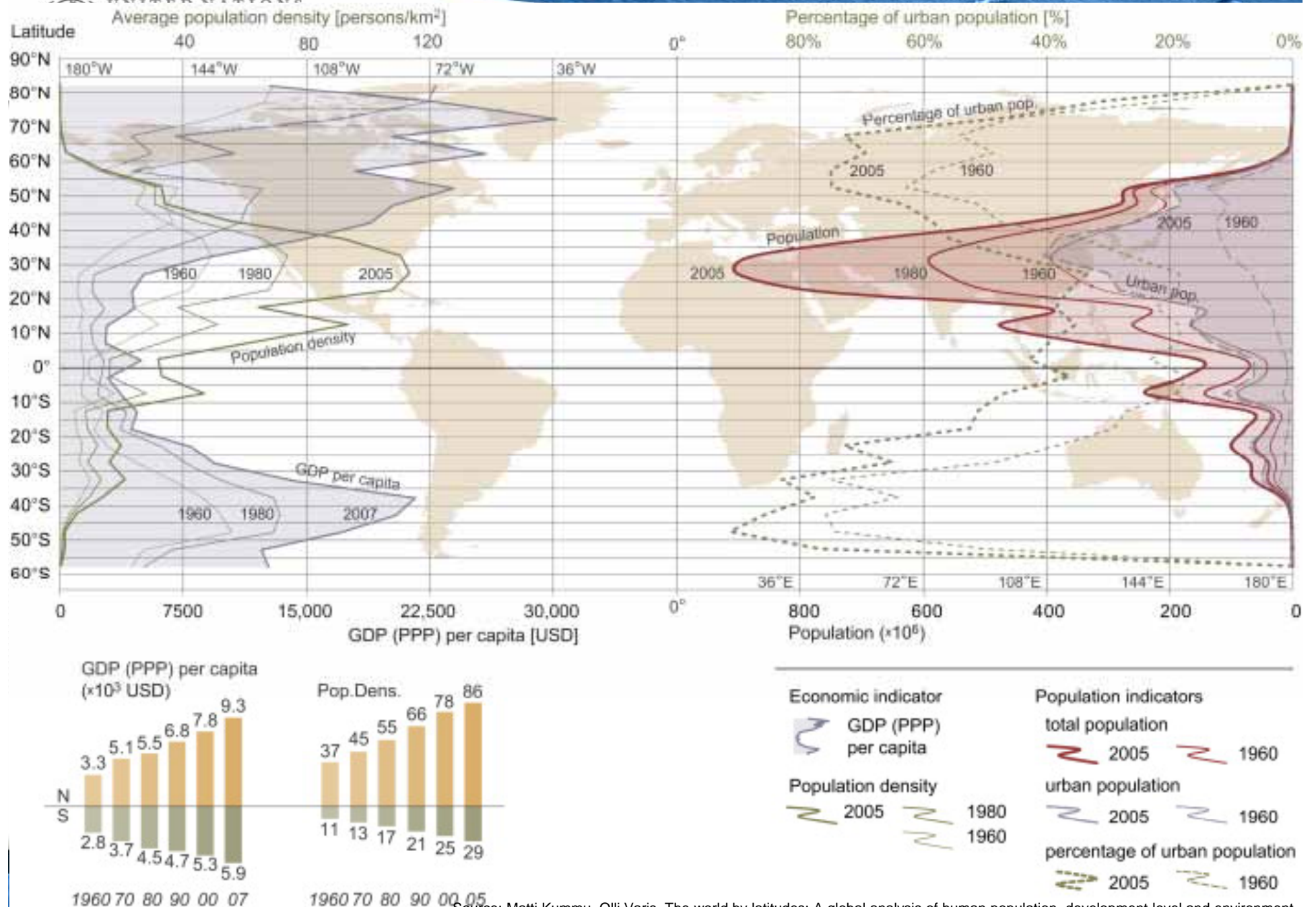
Population at Risk of Hunger in Asia



Source: IFPRI IMPACT Model, September 2011 simulations

Agriculture Water Challenges

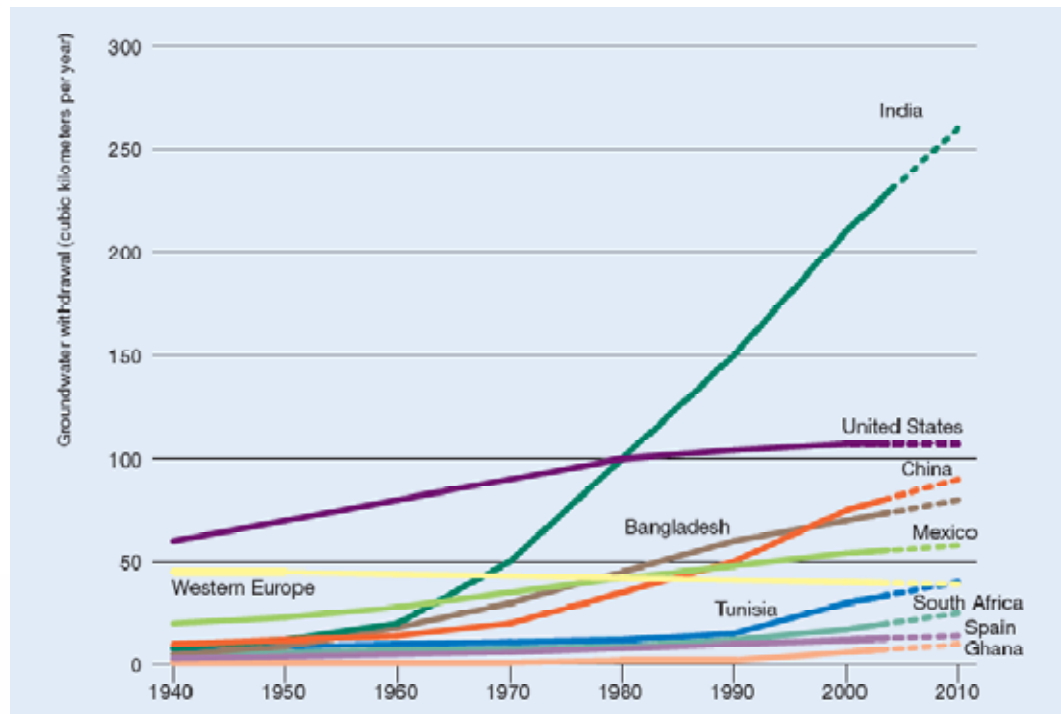
- Increasing population - More food
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Source: Matti Kummu, Olli Varjo, The world by latitudes: A global analysis of human population, development level and environment across the north-south axis over the past half century, Applied Geography, Volume 31, Issue 2, April 2011, Pages 495-507.

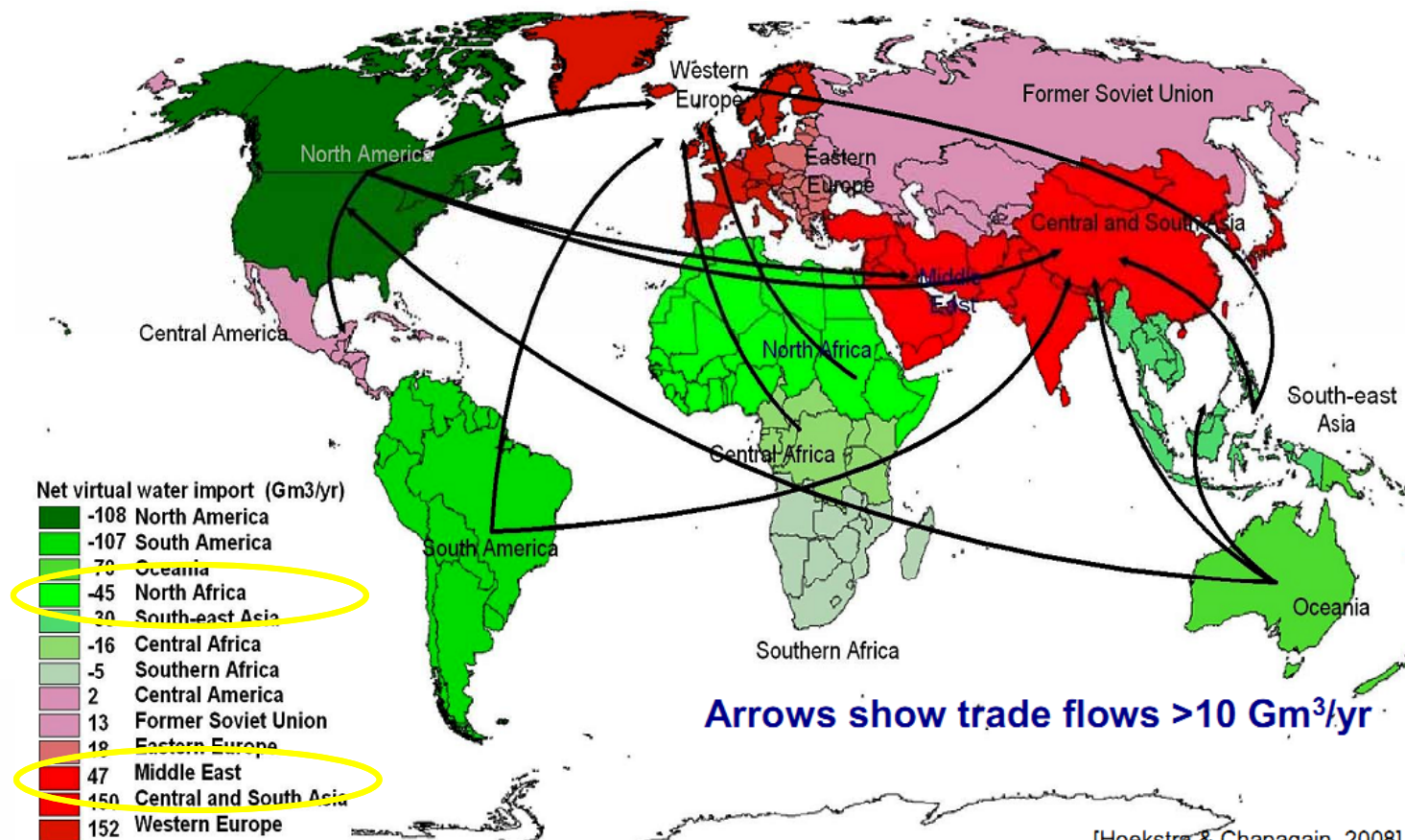
SOURCING FOR WATER FOR FOOD

- Rapid expansion in groundwater withdrawal
- Unsustainable trend



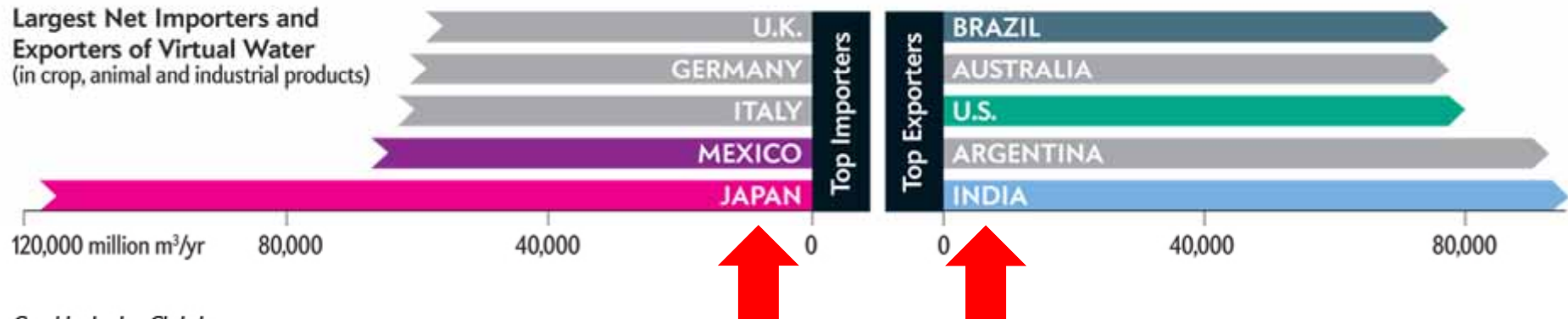
Source: Molden, D. 2007. Trends in Water and Agricultural Development in Molden, D. (ed) *Water for Food, Water for Life: A Comprehensive Assessment of Water Management in Agriculture*, Earthscan, London and International Water Management Institute, Colombo.

REGIONAL VIRTUAL WATER BALANCE: AGRICULTURE TRADE



IMPORT/EXPORT OF VIRTUAL WATER

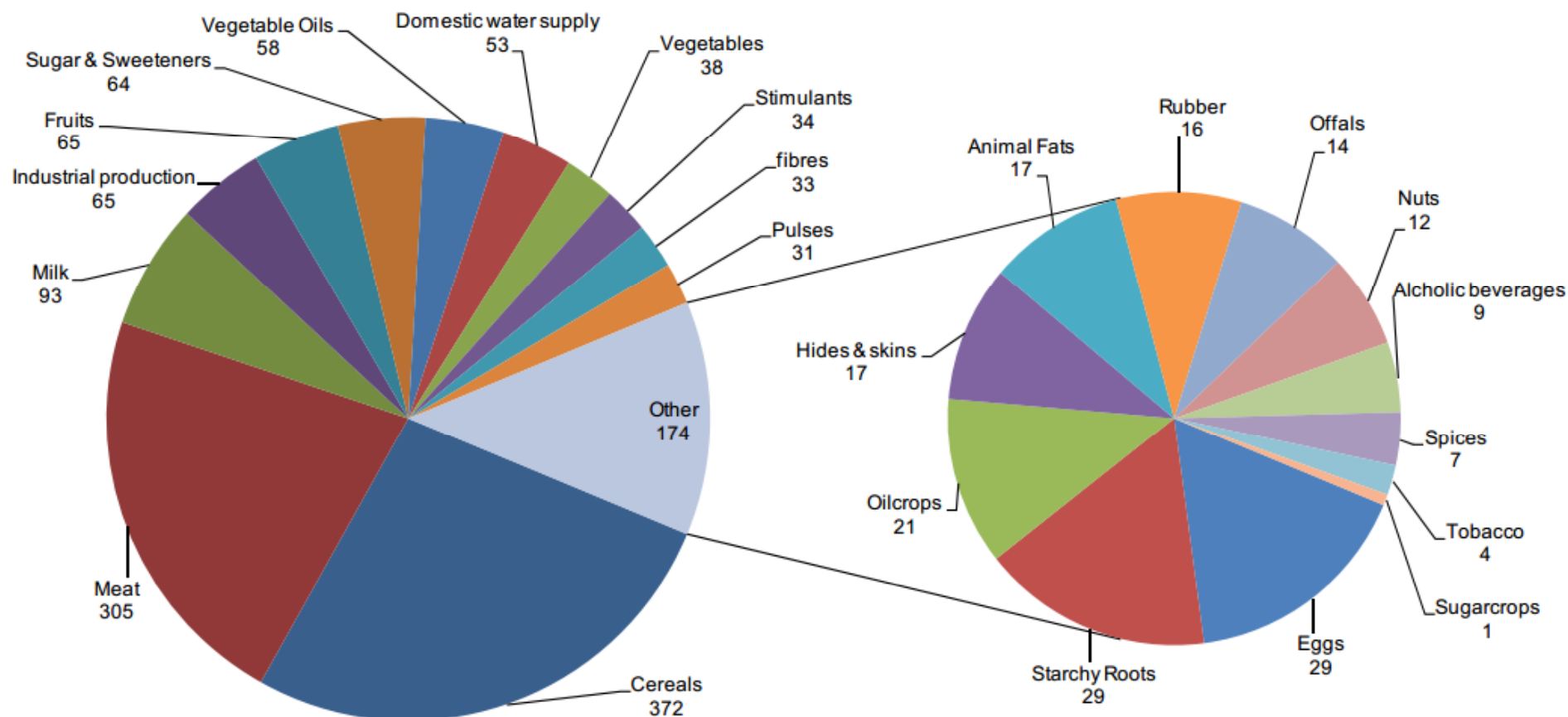
Largest Net Importers and Exporters of Virtual Water
(in crop, animal and industrial products)



Graphics by Jen Christiansen

Source: "The Water Footprint of Humanity," by Arjen Y. Hoekstra and Mesfin M. Mekonnen, in *Proceedings of the National Academy of Sciences USA*. Published online February 13, 2012

CONTRIBUTION OF DIFFERENT PRODUCT CATEGORIES TO THE GLOBAL WATER FOOTPRINT OF CONSUMPTION (IN M³)

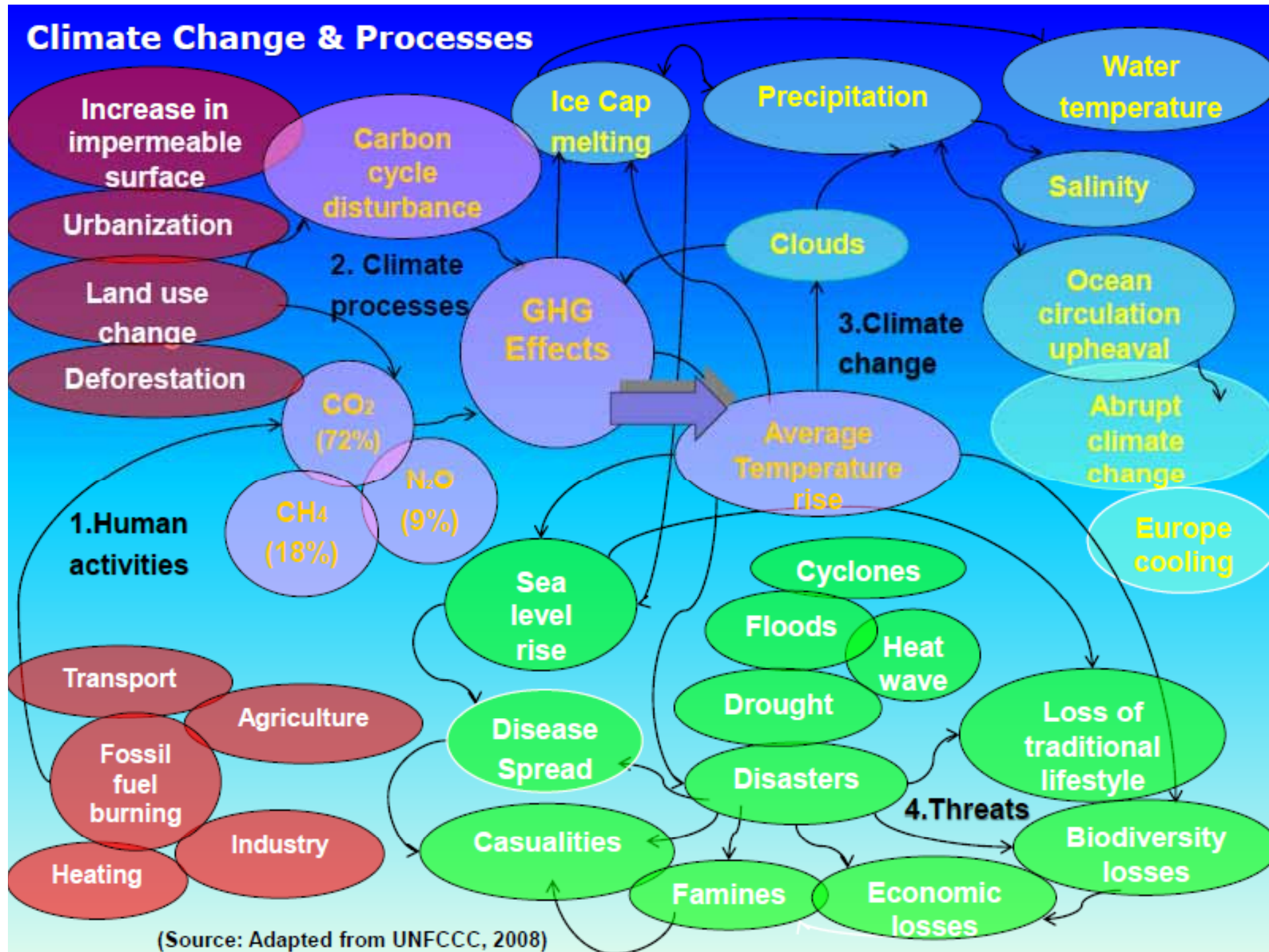


Source: Mekonnen, M. M. and A. Y. Hoekstra (2011).
 National Water Footprint Accounts: The
 Green, Blue, and Grey Water Footprint of
 Production and Consumption, UNESCO-IHE.

Agriculture Water Challenges

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Climate Change & Processes



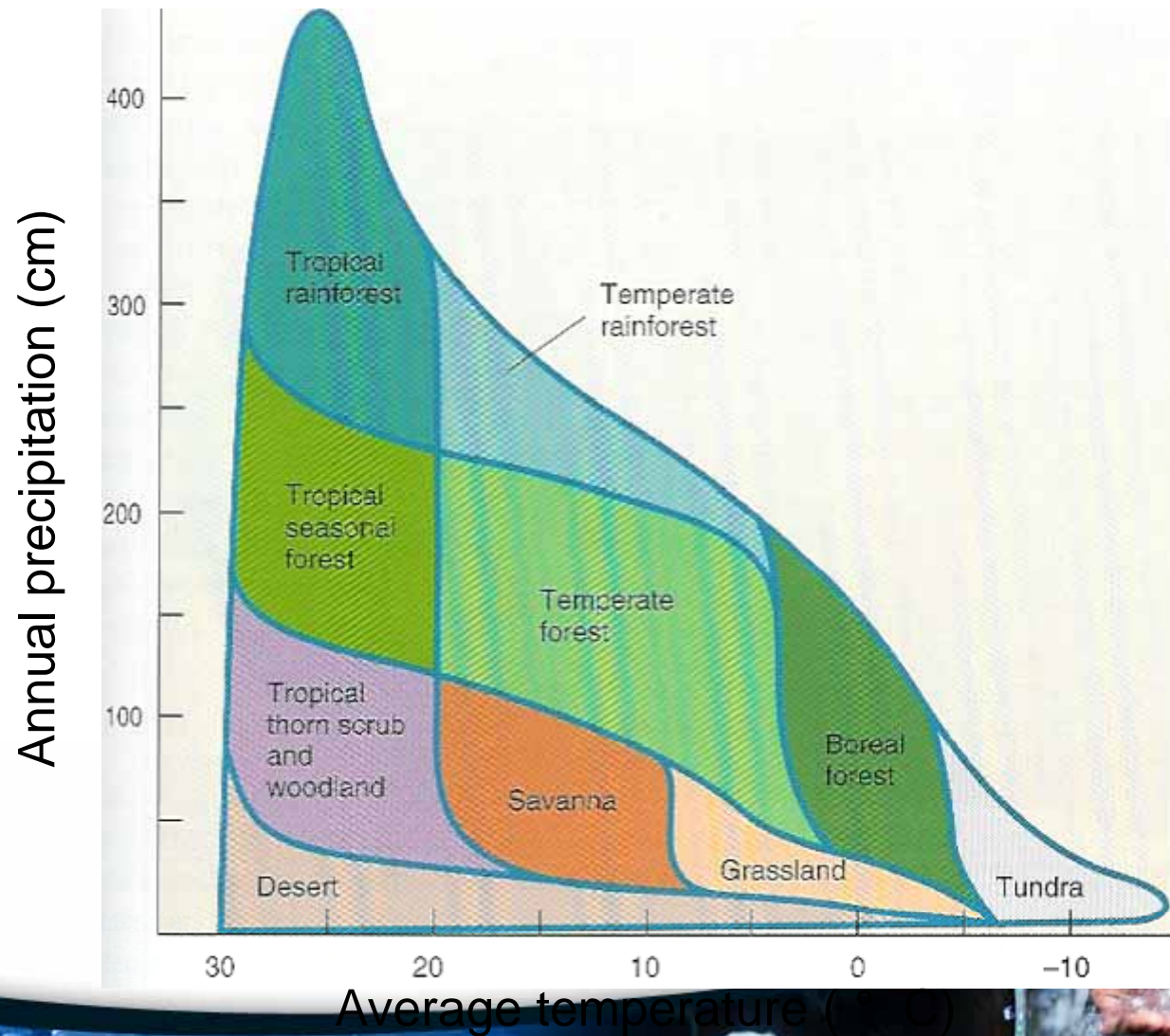
CLIMATE CHANGE IMPACTS

- reduction in crop yield and agricultural productivity where temperature constrains crop development;
- reduced availability of water in regions affected by falling annual or seasonal precipitation;
- exacerbation of climate variability in places where it is already highest (Peel et al., 2004 and 2004a);
- reduced storage of precipitation as snow, and earlier melting of winter snow, leading to shifts in peak runoff away from the summer season where demand is high (Barnett et al., 2005);
- inundation and increased damage in low-lying coastal areas affected by sea-level rise, with storm surges and increased saline intrusion into vulnerable freshwater aquifers;
- generally increased evaporative demand from crops as a result of higher temperature



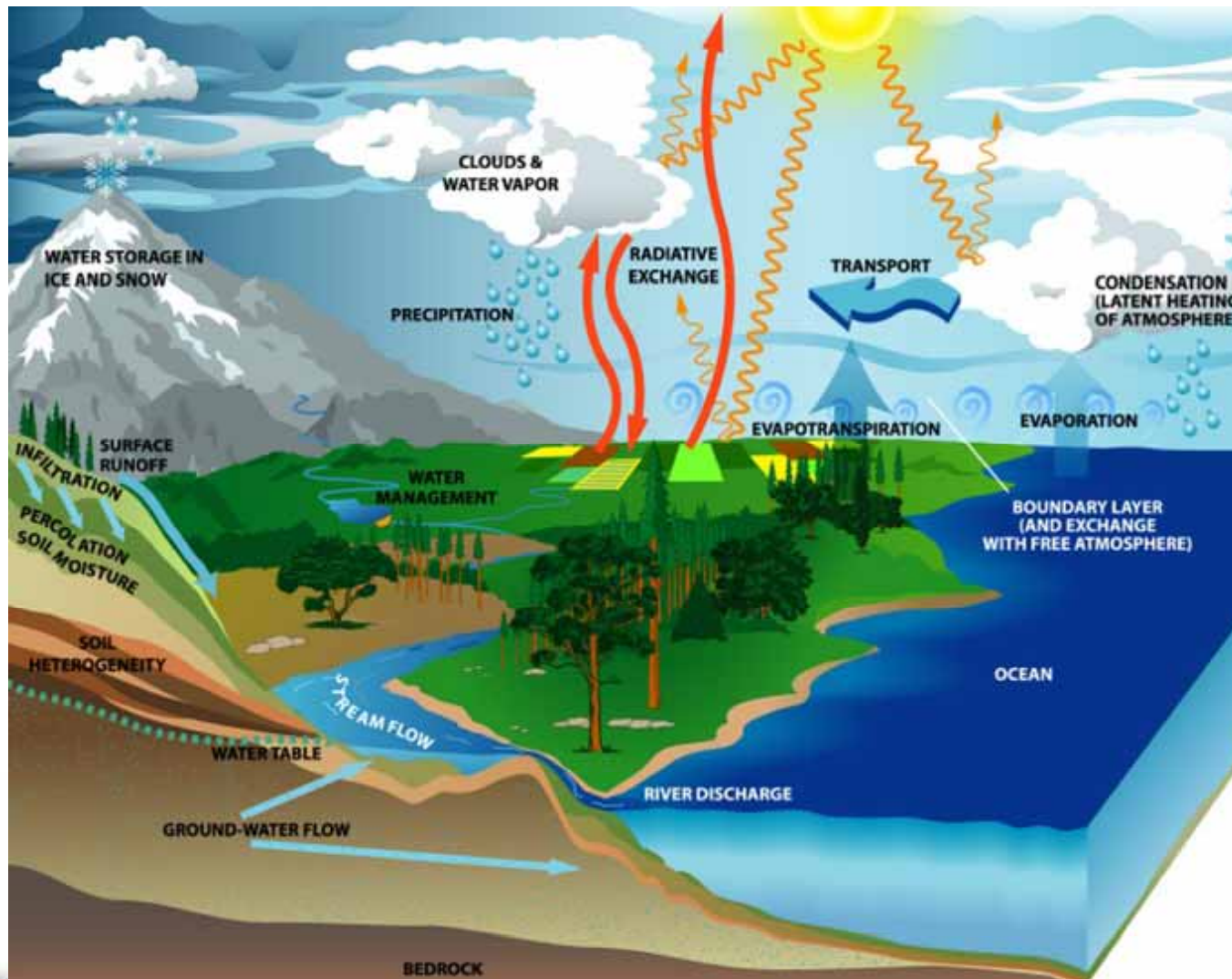
Source: FAO (2008). *Climate Change, water and food security.*

GLOBAL DISTRIBUTION BIOMES



Agriculture Water Challenges

- Increasing population - More food
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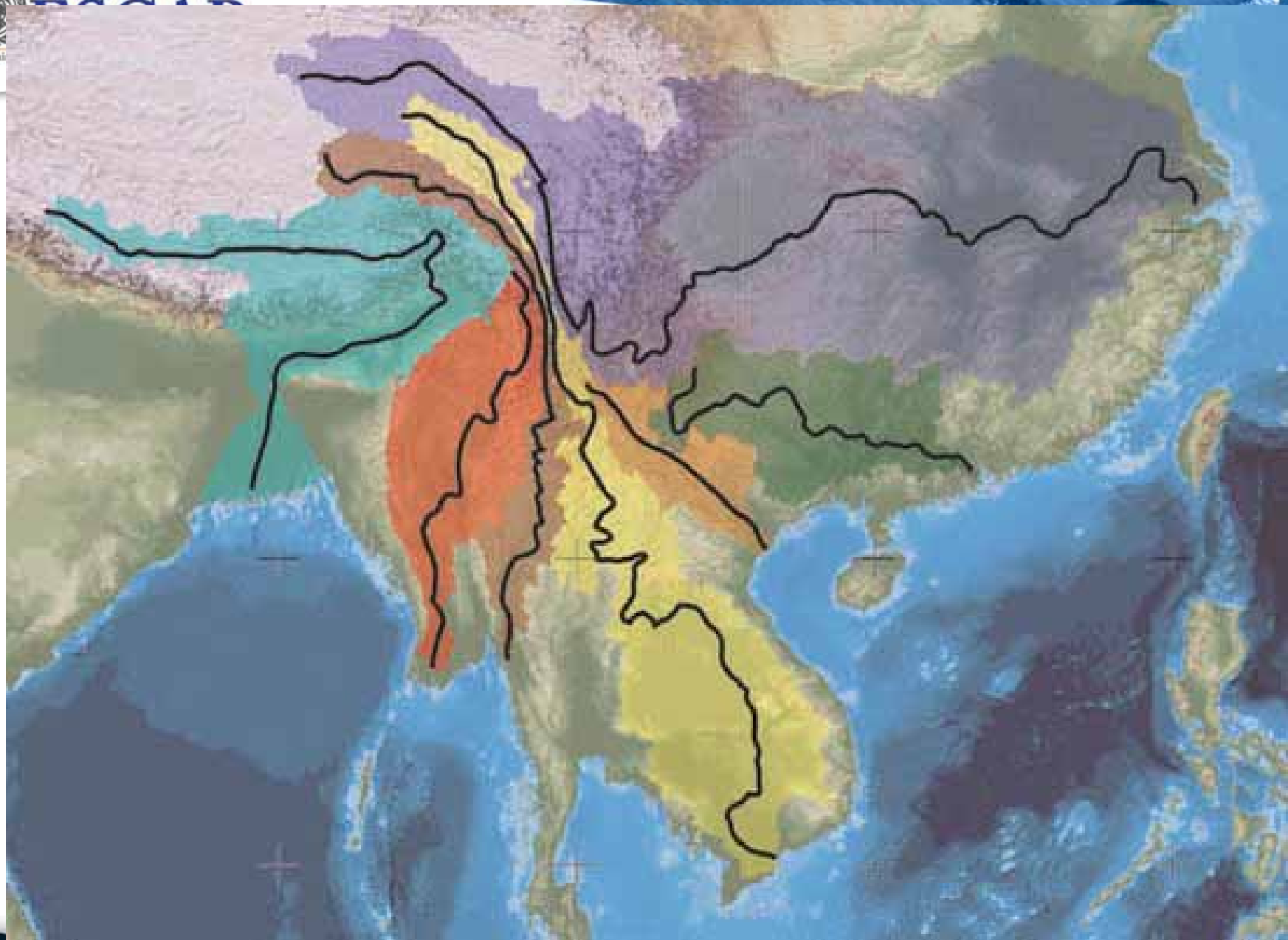
Water Cycle
- continuum of
water systems,
merging with
each other





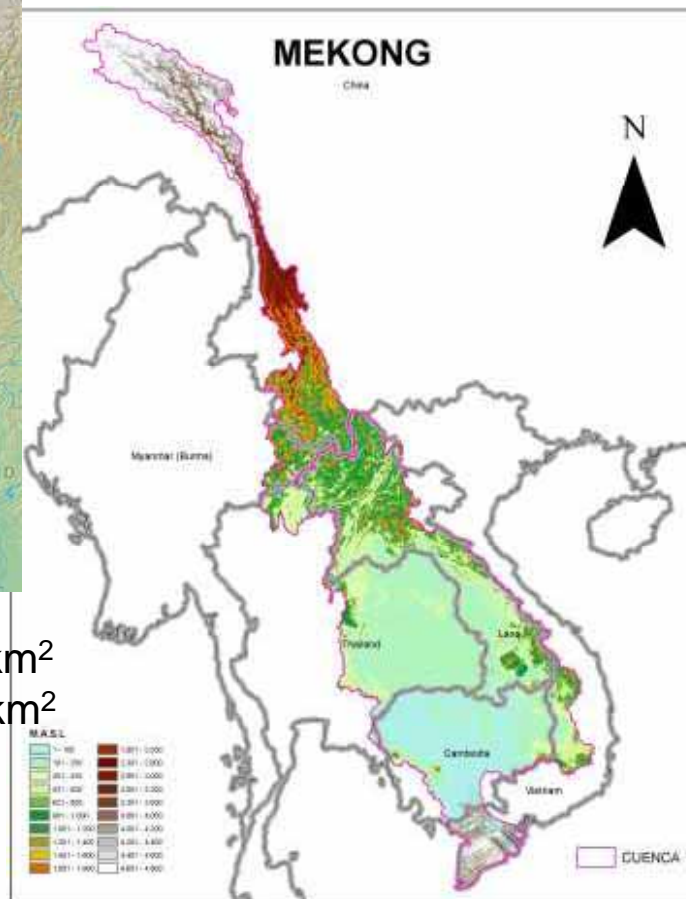
UNITED NATIONS

Economic





Irrawaddy = 413,712 km²
 Myanmar = 676,578 km²



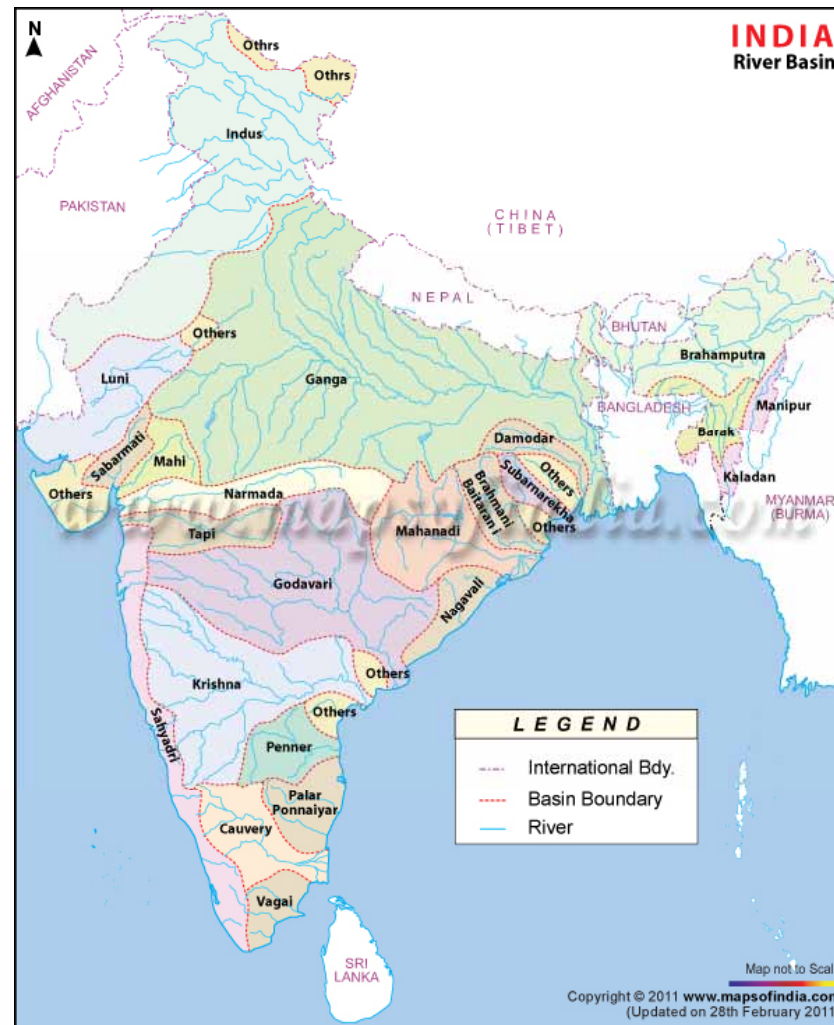
Mekong River Basin = 795,000
 km²



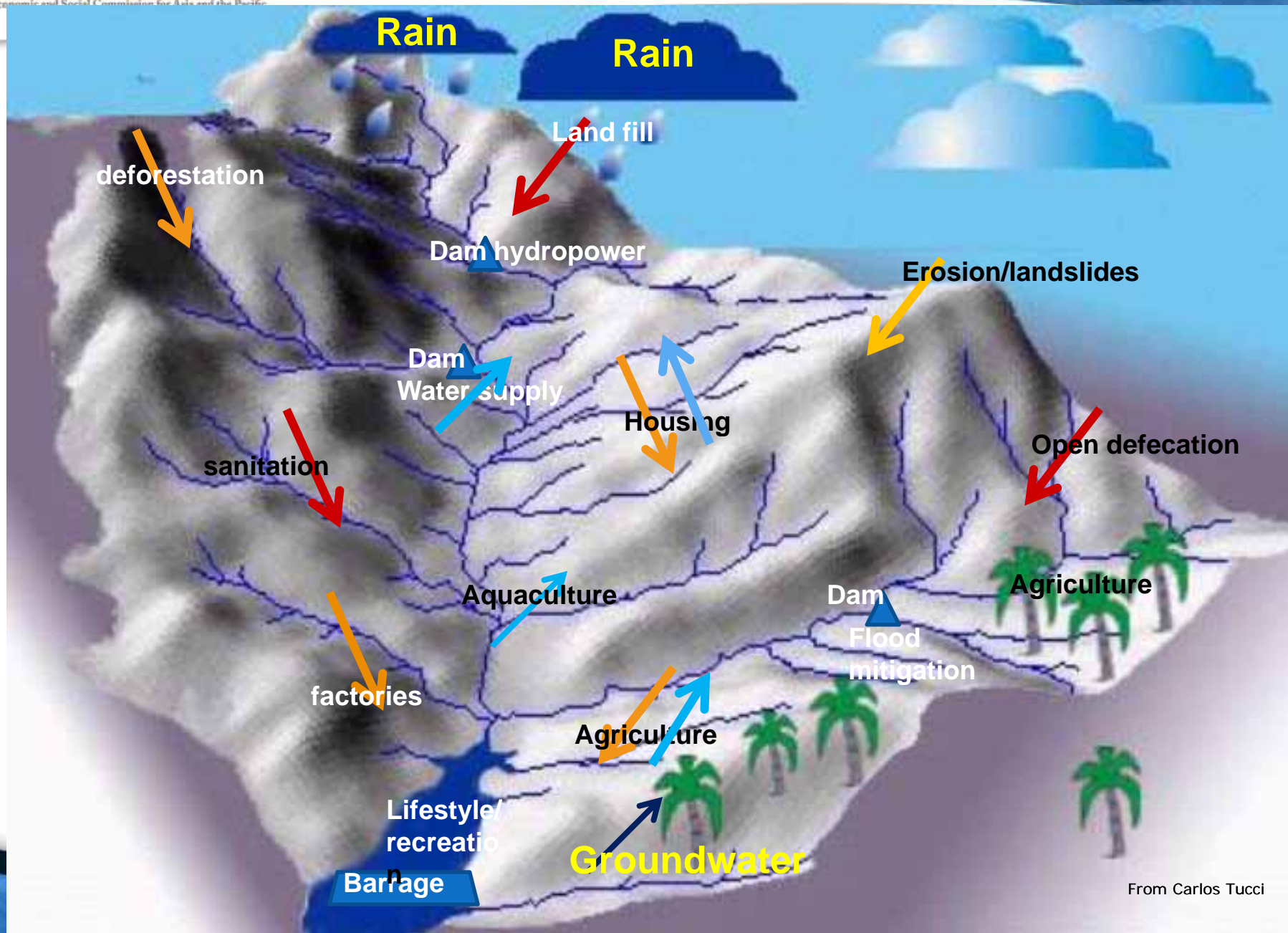
Chao Phraya River Basin = 157,924 km²
 Thailand = 513,120 km²
 Average Annual Rainfall = 1700mm



INDIAN SUB-CONTINENT RIVER BASINS

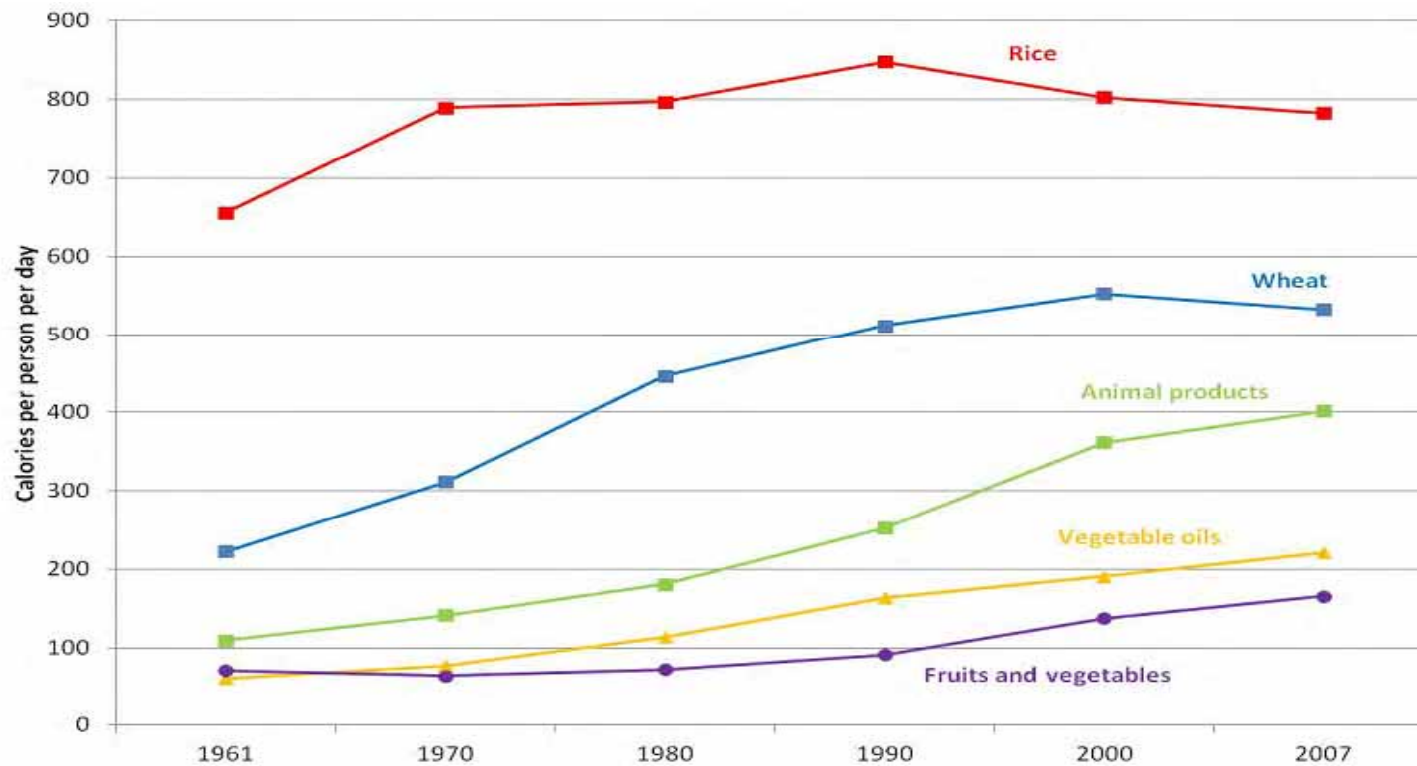


The River Basin



From Carlos Tucci

Asian diets are diversifying

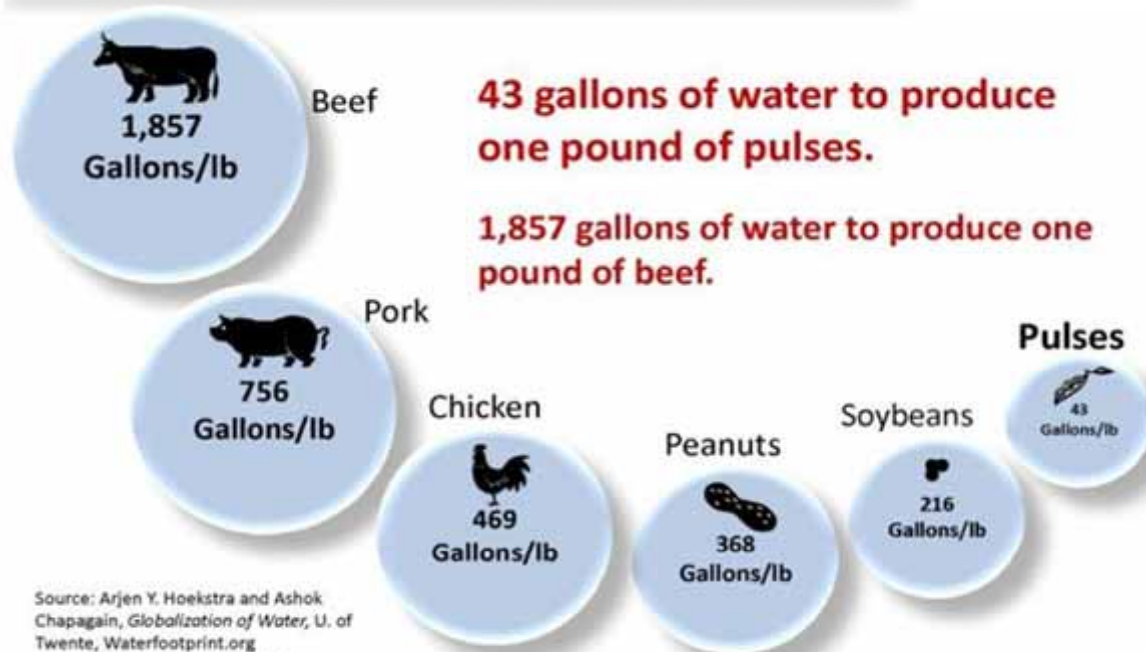


Source: FAO food balance sheet

How much water is needed for food production?



Water Footprint



Source: Arjen Y. Hoekstra and Ashok Chapagain, *Globalization of Water*, U. of Twente, Waterfootprint.org
National Geographic, April 2010

THE WAY FORWARD

THE FUTURE WE WANT – RIO+20

■ Generic

- Promoting sustainable patterns of consumption and production (para 4)

■ Water

- At the core of sustainable development: importance of integrating water in sustainable development (para 119)
- Addressing the balance between supply and demand (para 123)

■ Agriculture

- Access to safe, sufficient and nutritious food (para 108)

SUMMARIZING

- Managing water resources
 - Knowledge of availability of resources, agricultural systems, implementation and management of required infrastructure - taking into account the challenges,
- Understanding global lifestyle changes
 - Promoting sustainable patterns of consumption and production: integrated within our global limiting natural resources: land, water, energy, etc
- Governance
 - Through national governments, over long-term future and present trends

COHERENT NATIONAL POLICY ISSUES

- **National Development Policies on water resources management**
 - Integration over multiple sectors: agriculture, industries, services etc
 - Responding to changes in environment: climate change, aging infrastructure and greying farmers
 - In trans-boundary waters, ensuring sustainability through integration and harmonising the different national development plans
- **Agricultural development goals at all levels, over various planning horizons**
 - Coherent in sectoral approaches – eg % targeted food security levels
 - Organising the required investments for higher productivity, including diversification of crops
 - Planning for the full cycle of development –end to end

THANK YOU