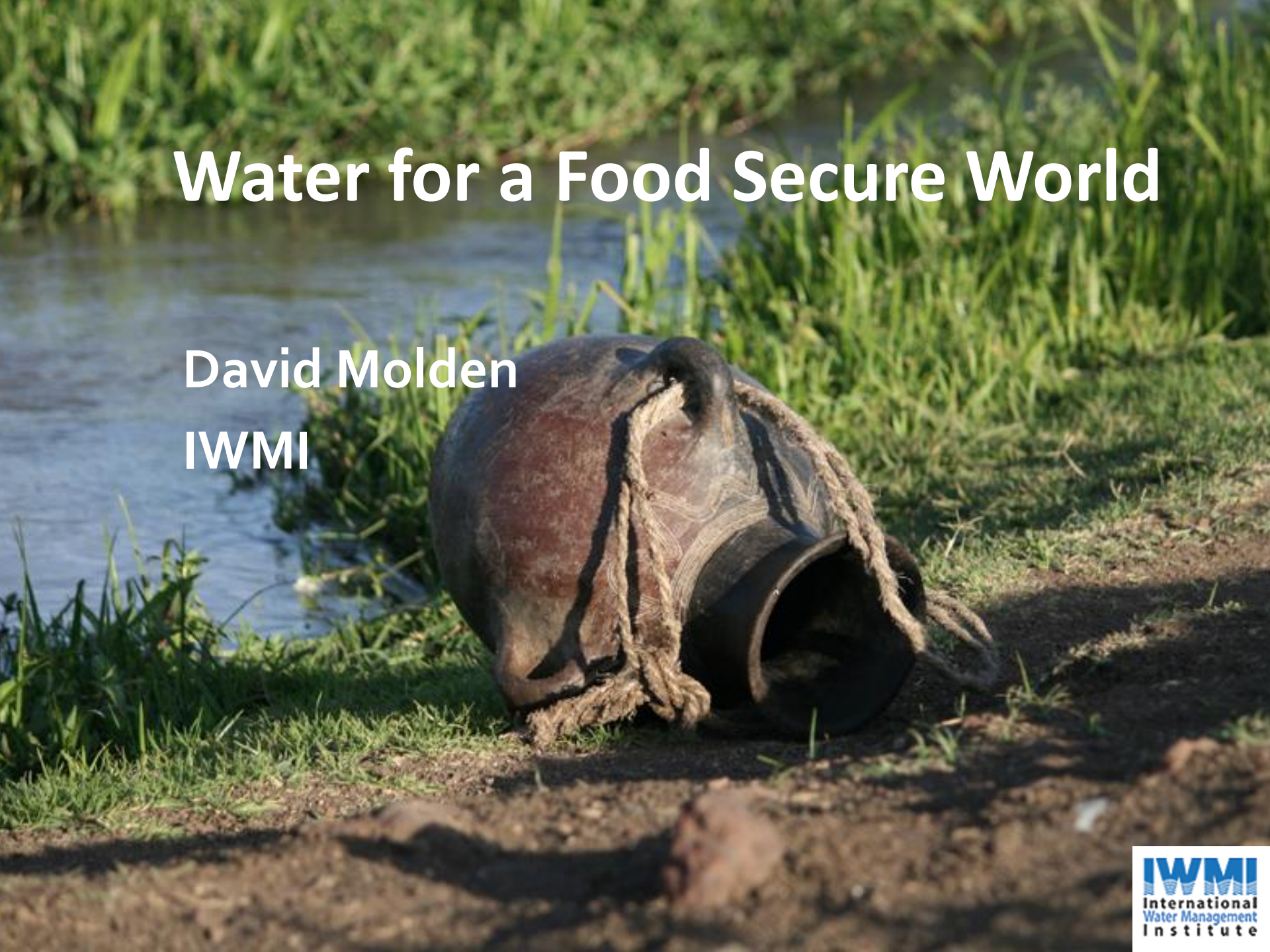
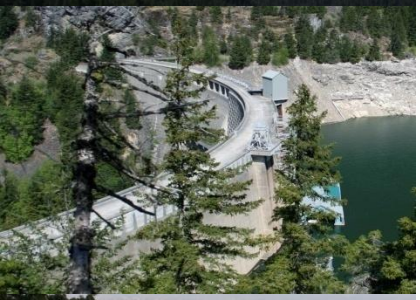


Water for a Food Secure World

David Molden

IWMI

IWMI International Water Management Institute


Presentation

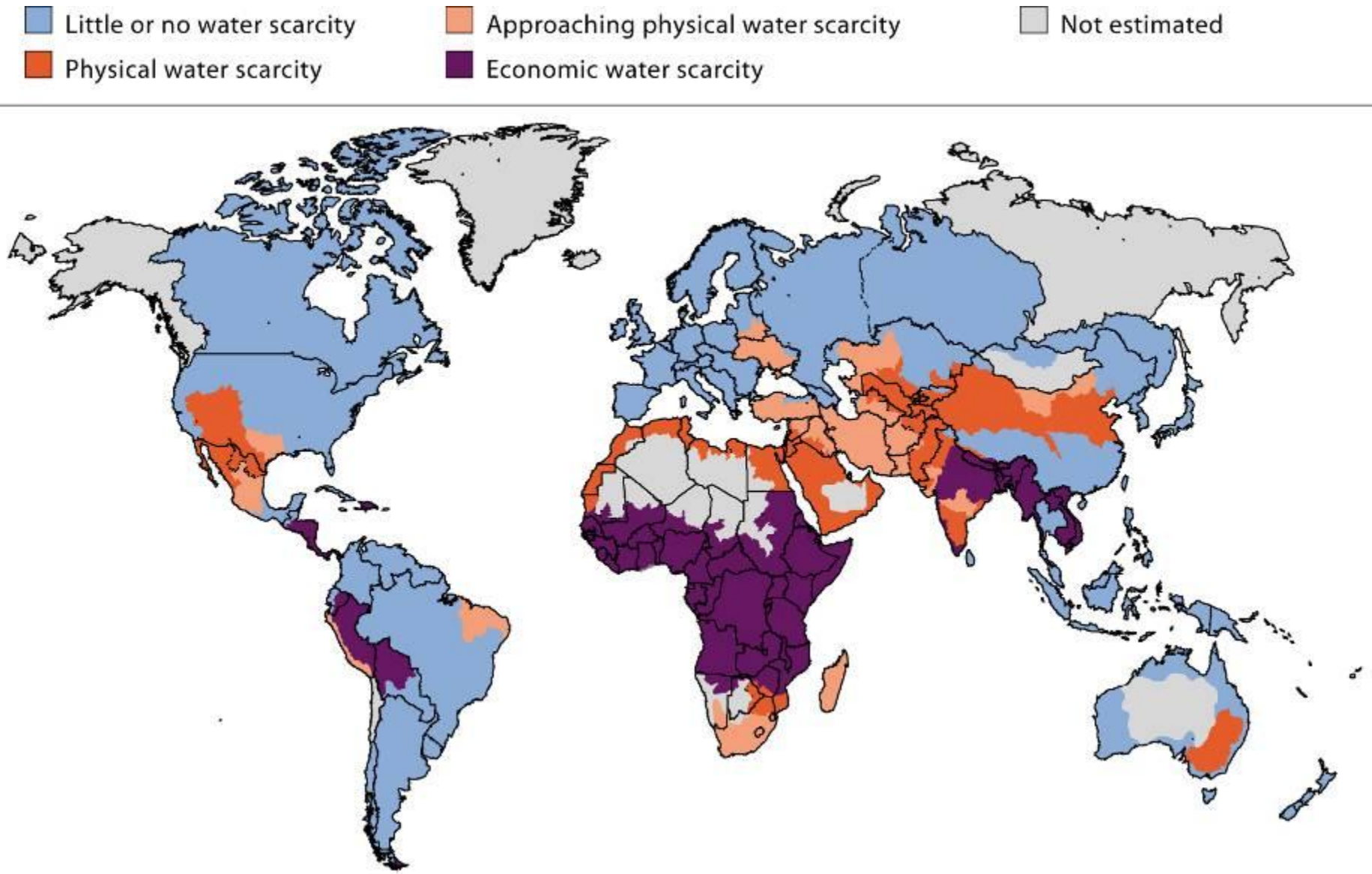
Explores water and food relations

- ✓ Water Scarcity
- ✓ Key Trends
- ✓ Future Outlook
- ✓ Key Strategies

How much water do you eat?

Drinking water	– 2 to 5 liters per day
Household Use	– 20 to 2,000 liters per day
1 kg rice	– 500 to 3,000 liters
1 kg beef	– 5,000 to 20,000 liters
Daily Diet	– 2,000 to 5,000 liters per day depending on diets and how food is produced

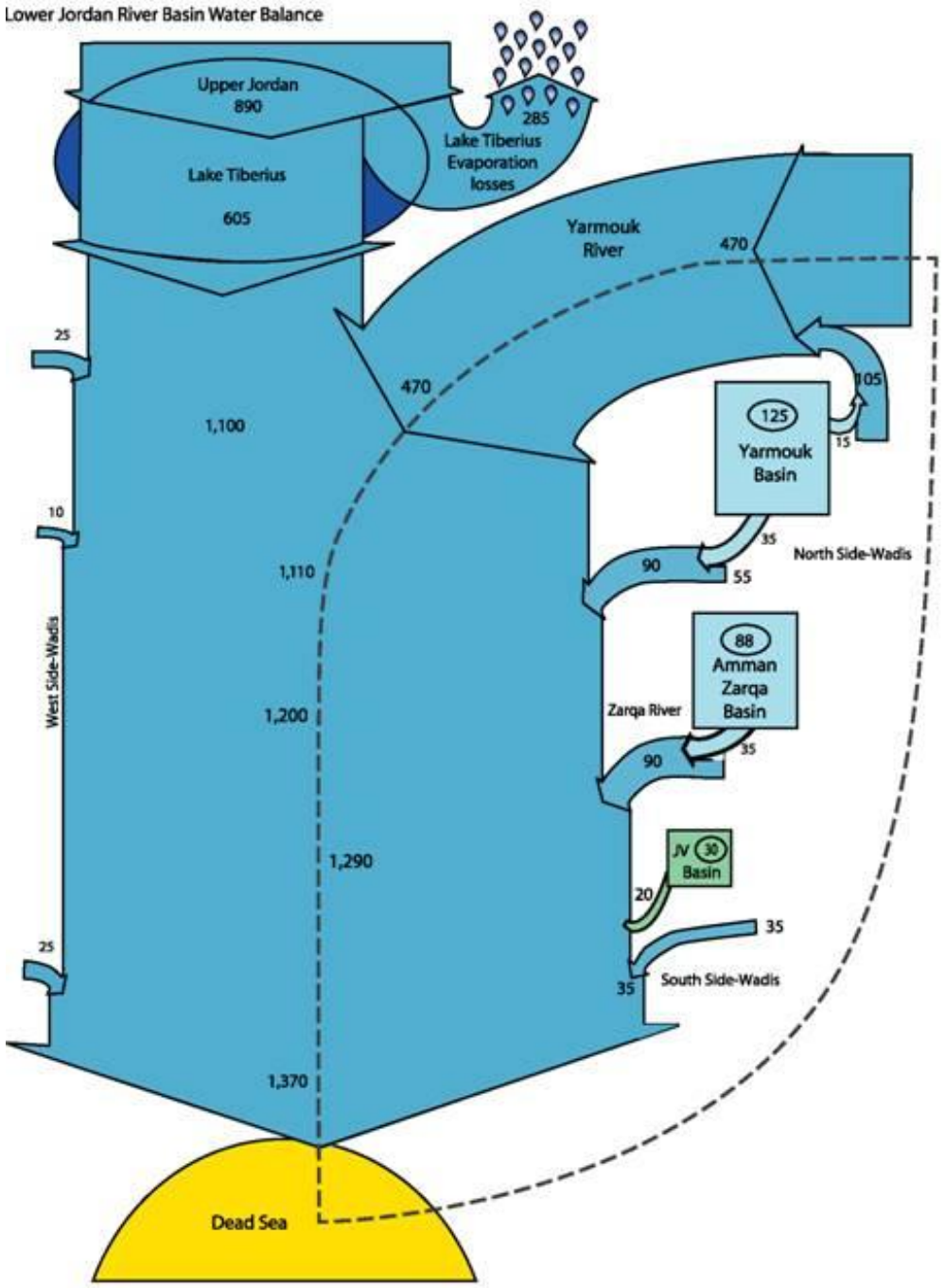
Water Scarcity 2000



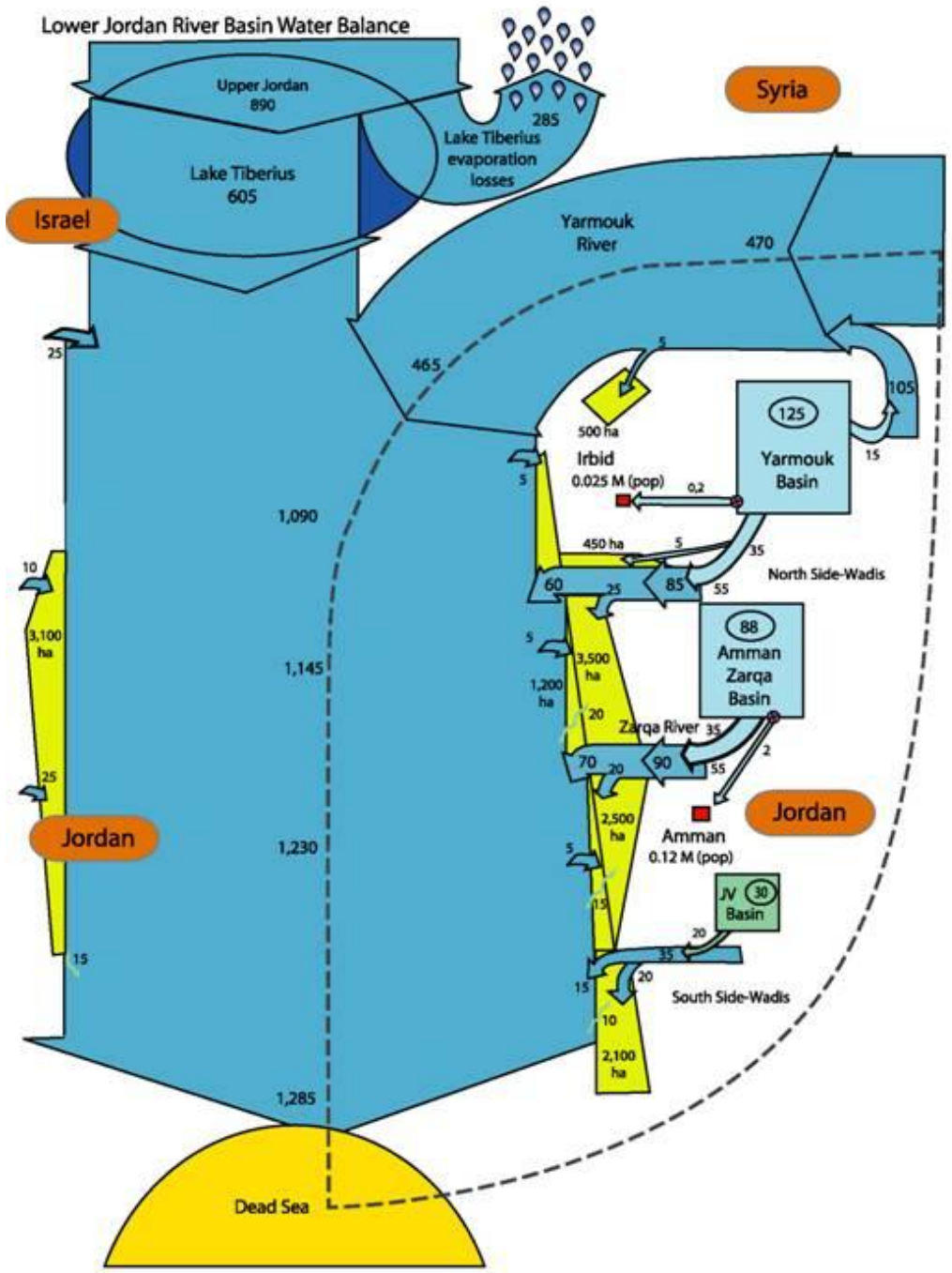
1/3 of the world's population live in basins that have to deal with water scarcity

Jordan River

Original Hydrology



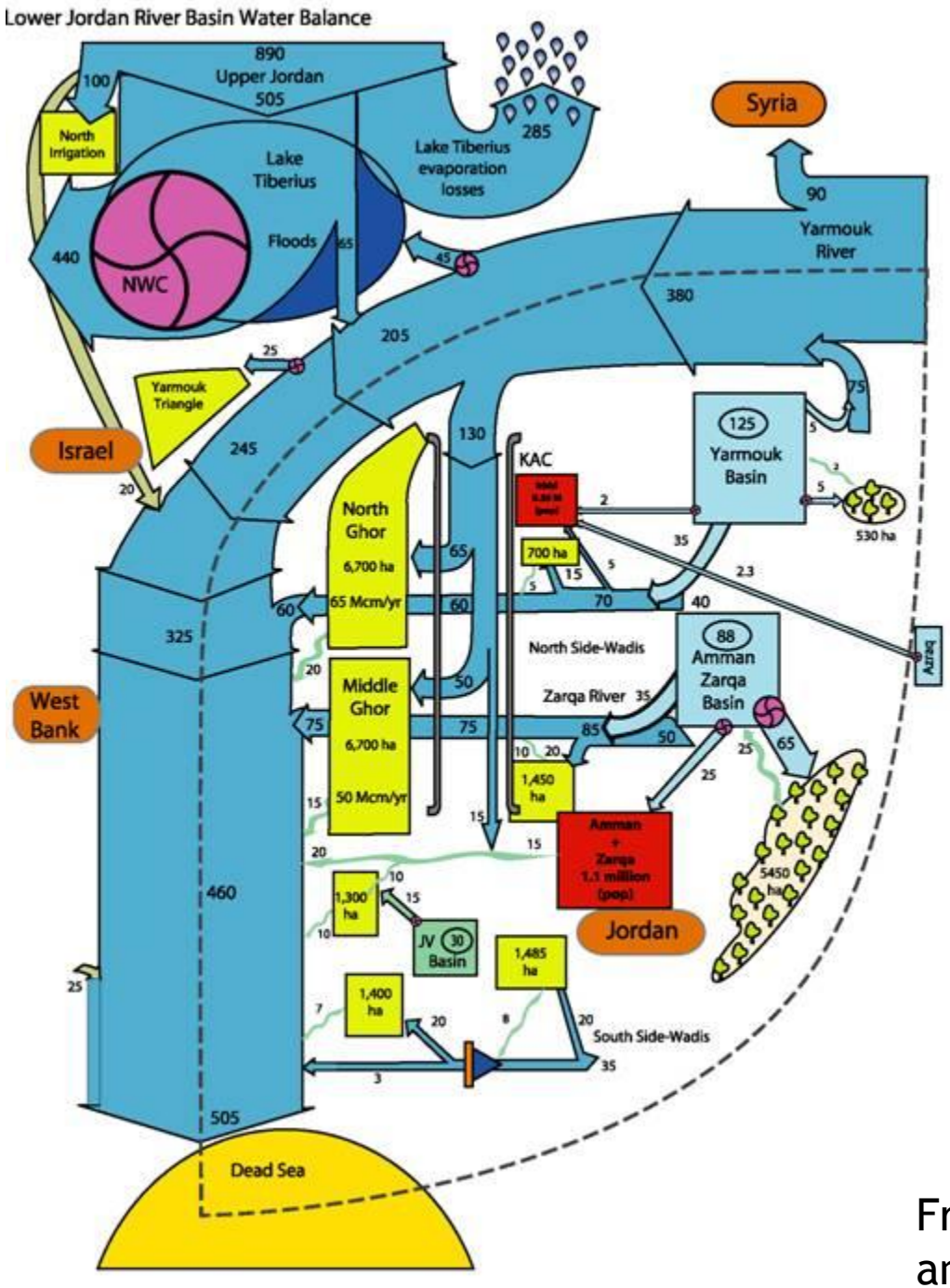
From Venot, Courcier and Molle (CA RR 9)



Jordan River

1950

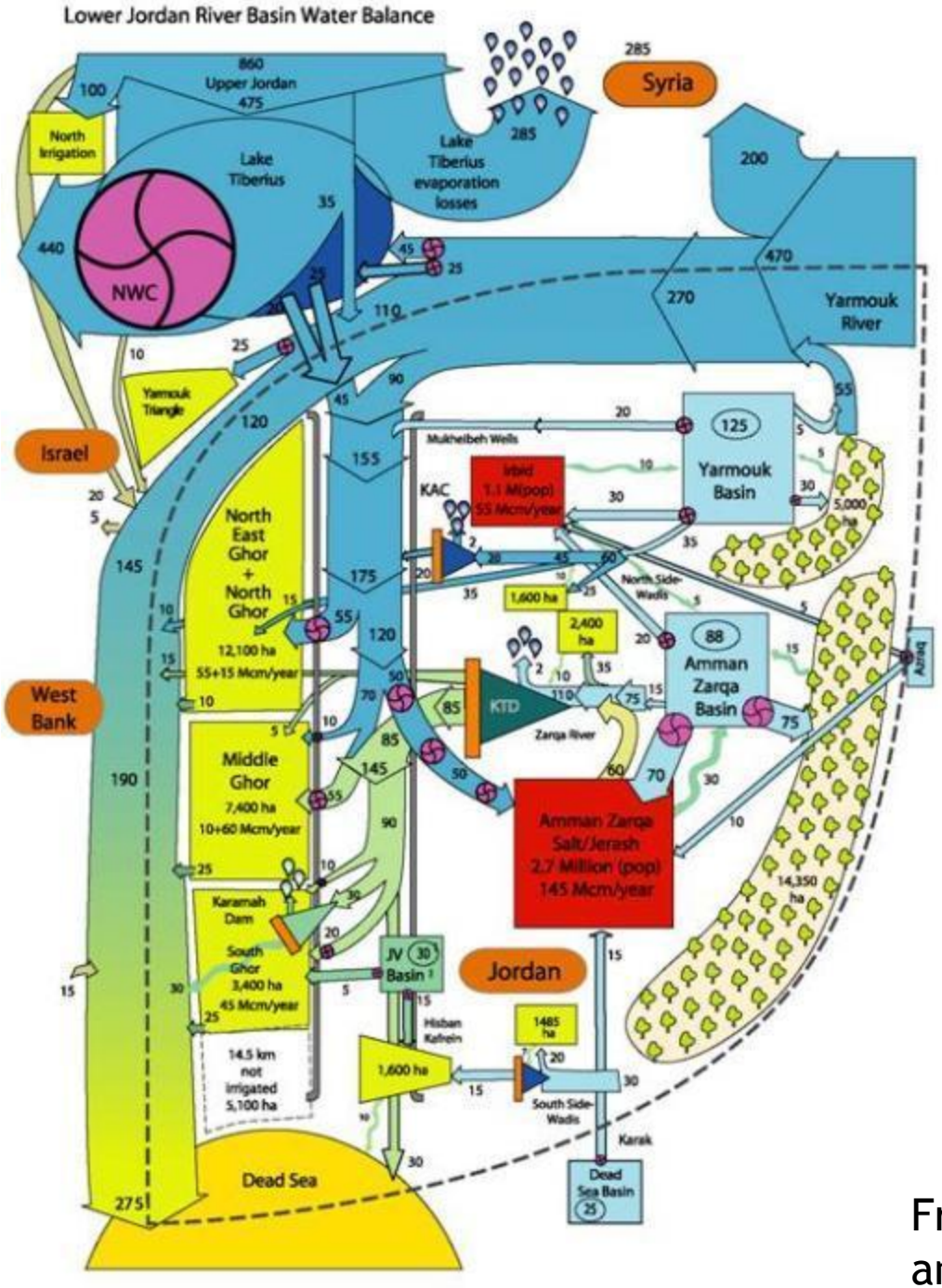
From Venot, Courcier and Molle (CA RR 9)



Jordan River

1975

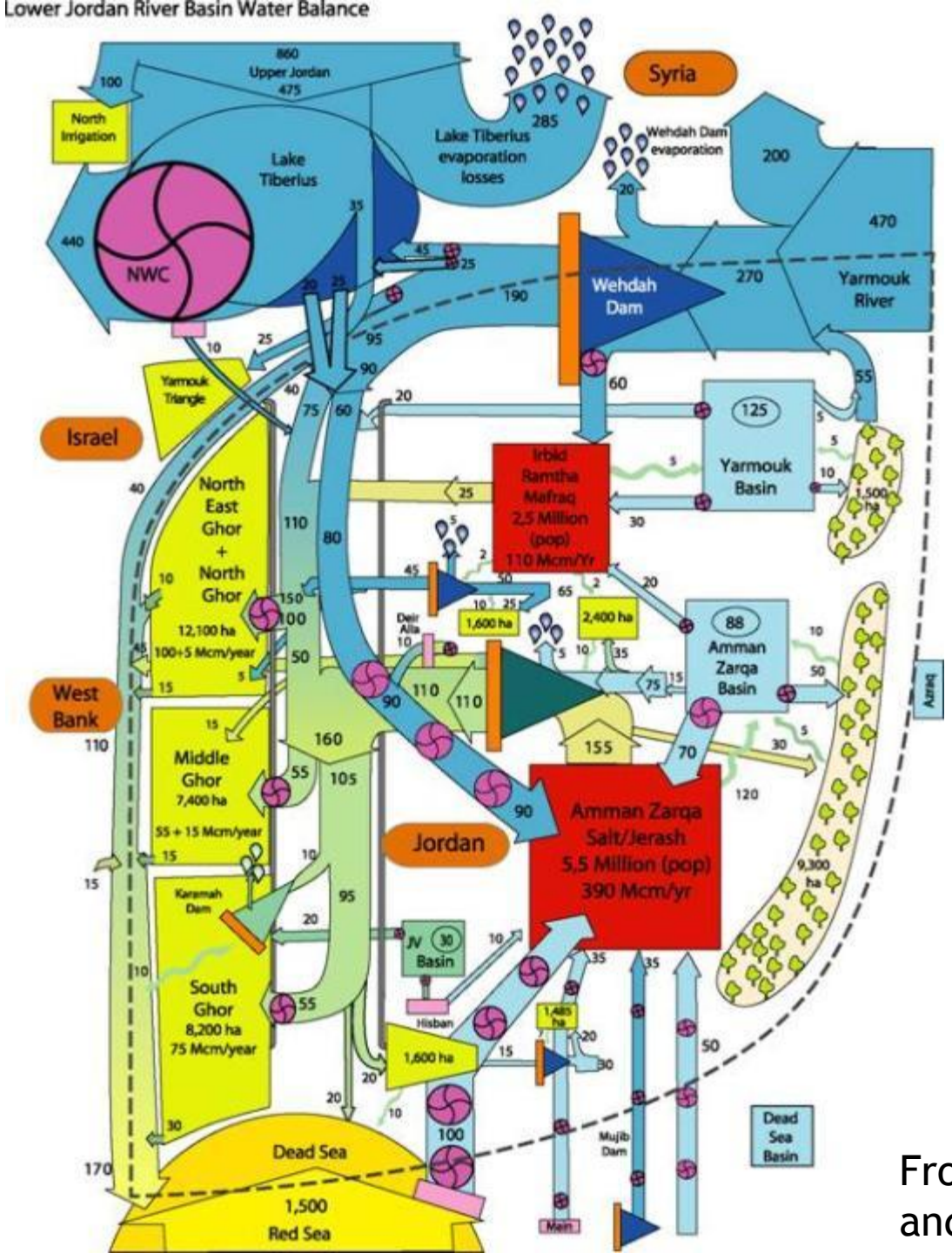
From Venot, Courcier and Molle (CA RR 9)



Jordan River

2000

From Venot, Courcier and Molle (CA RR 9)



Jordan River

2025?

From Venot, Courcier and Molle (CA RR 9)

Limits – Reached or Breached

Land degradation – limits productivity

River basins closed – Colorado, Murray Darling, Yellow, Indus, Amu Darya …… no additional water left

Groundwater overdraft – in agricultural breadbaskets

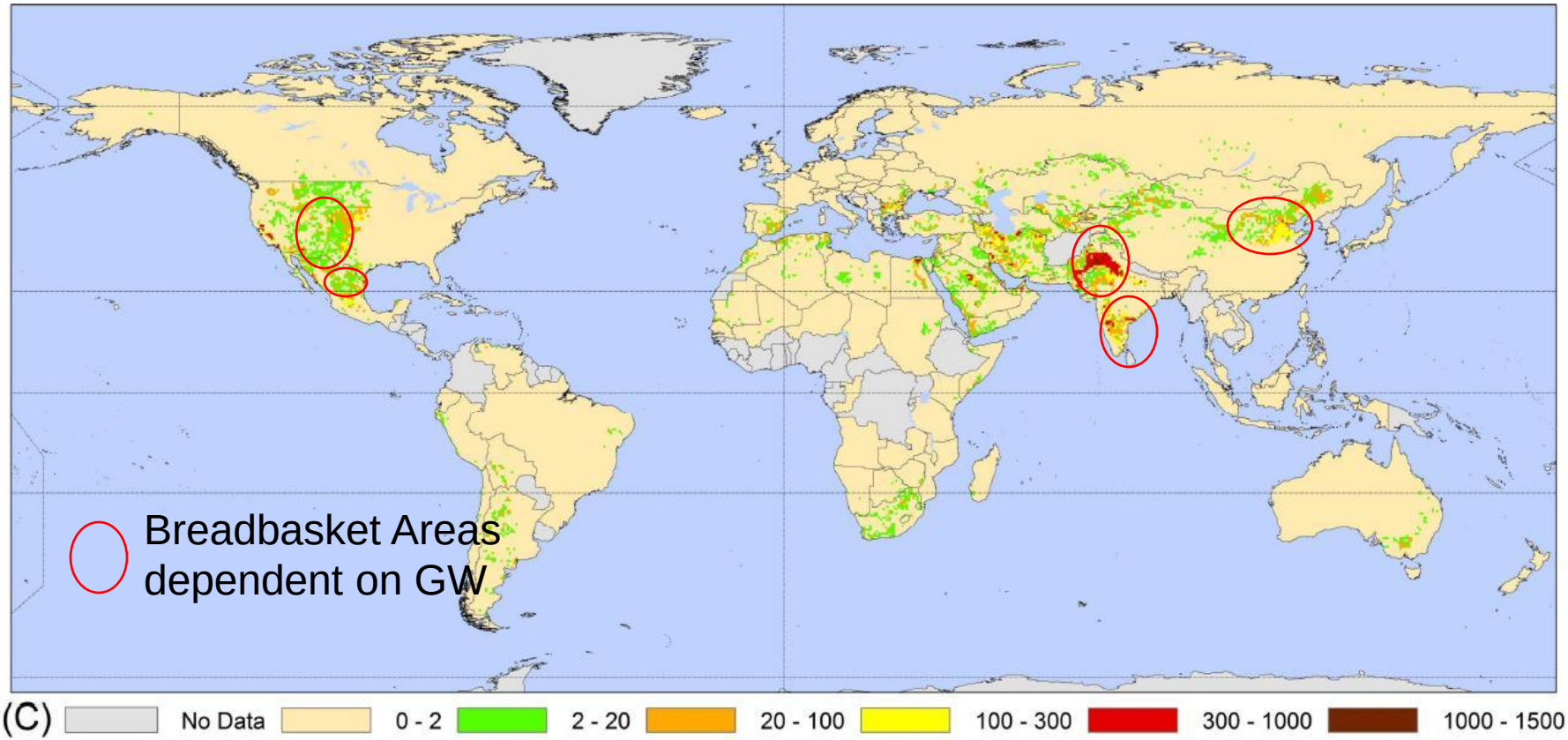
Fisheries – ocean and freshwater at a limit, aquaculture will become more prevalent

Livestock – limit on extent of grazing land, more will come from mixed and industrialized production



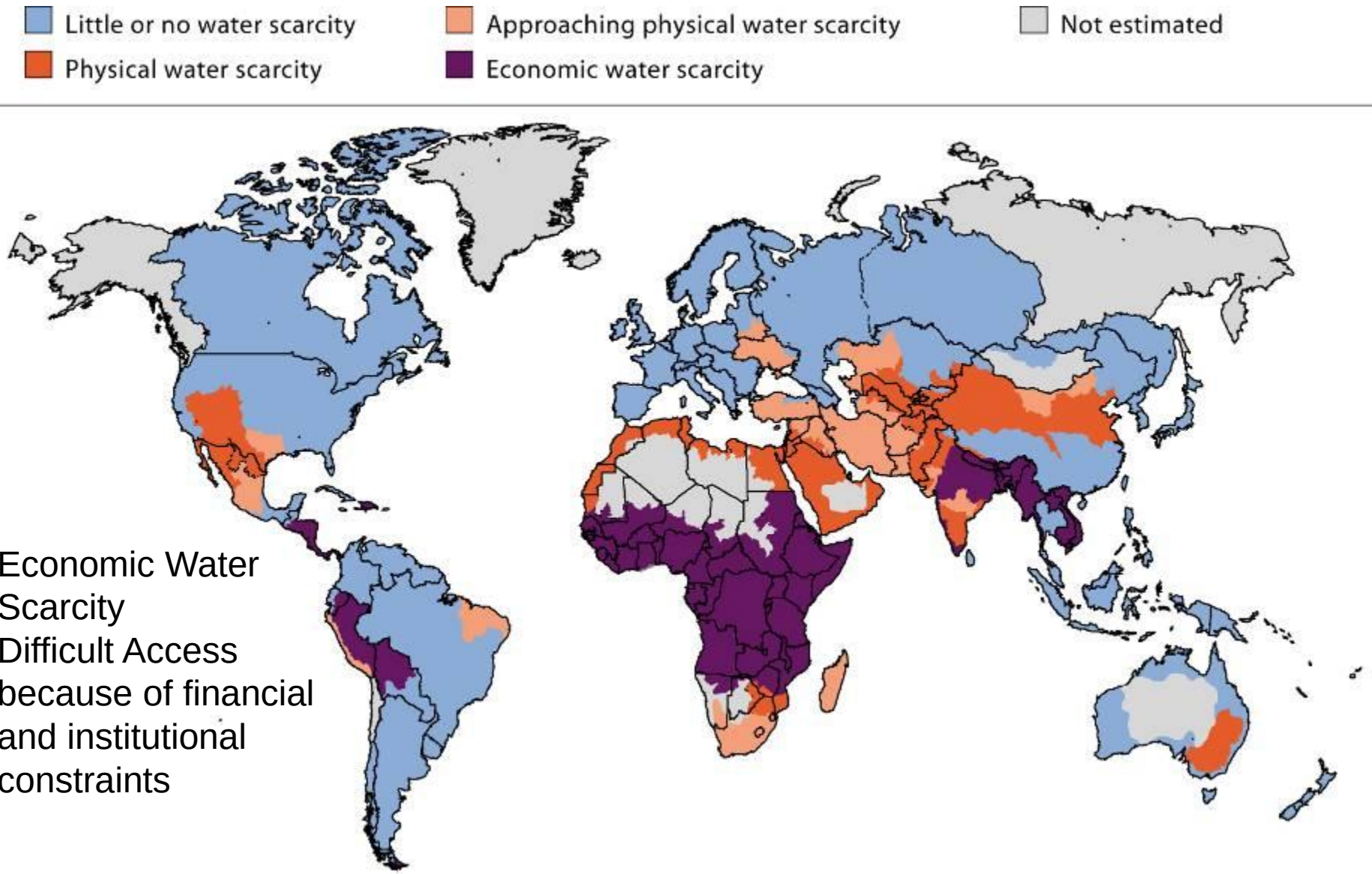

Groundwater

Overexploitation, but also opportunities for use



Global map of groundwater depletion, where 1000 on the legend is equal to one cubic kilometer of depletion per year. Source: Wada, Y., van Beek, L.P.H., van Kempen, C.M., Reckman, J.W.T.M., Vasak, S. and Bierkens, M.F.P. (2010) Global depletion of groundwater resources. Geophysical Research Letters, VOL. 37, L20402, doi:10.1029/2010GL044571

Water Scarcity 2000



Economic Water Scarcity
Difficult Access because of financial and institutional constraints

1.6 billion people live in economically water scarce areas

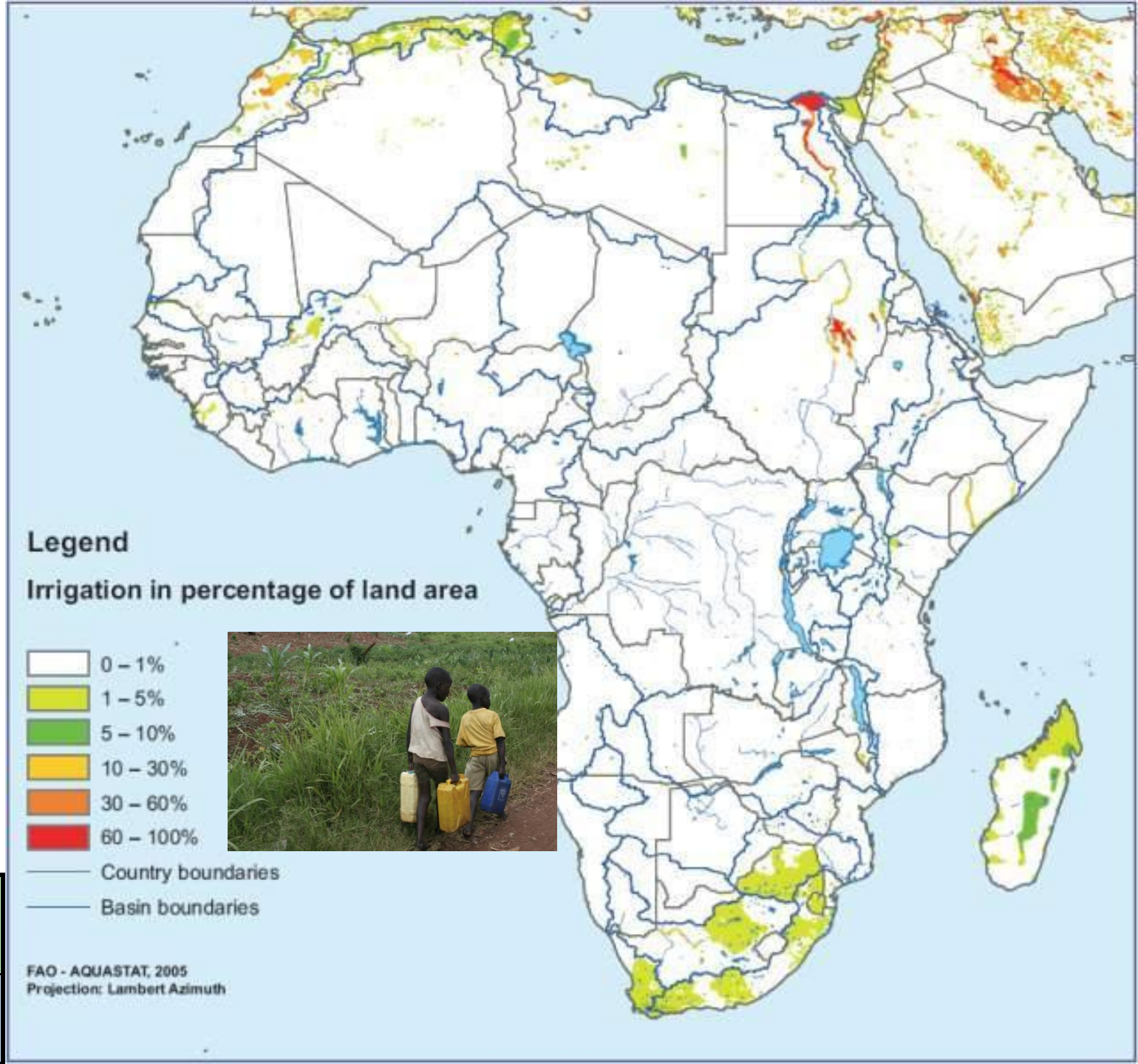
Irrigation potential developed:

Egypt, Morocco, Somalia, South Africa > 75%

Botswana, Sudan, Zimbabwe, Madagascar, Mali, Malawi, Uganda 50-75%

Rest < 50%

% Irrigated Land	
INDIA: ~50	SSA: 5



Key Trends

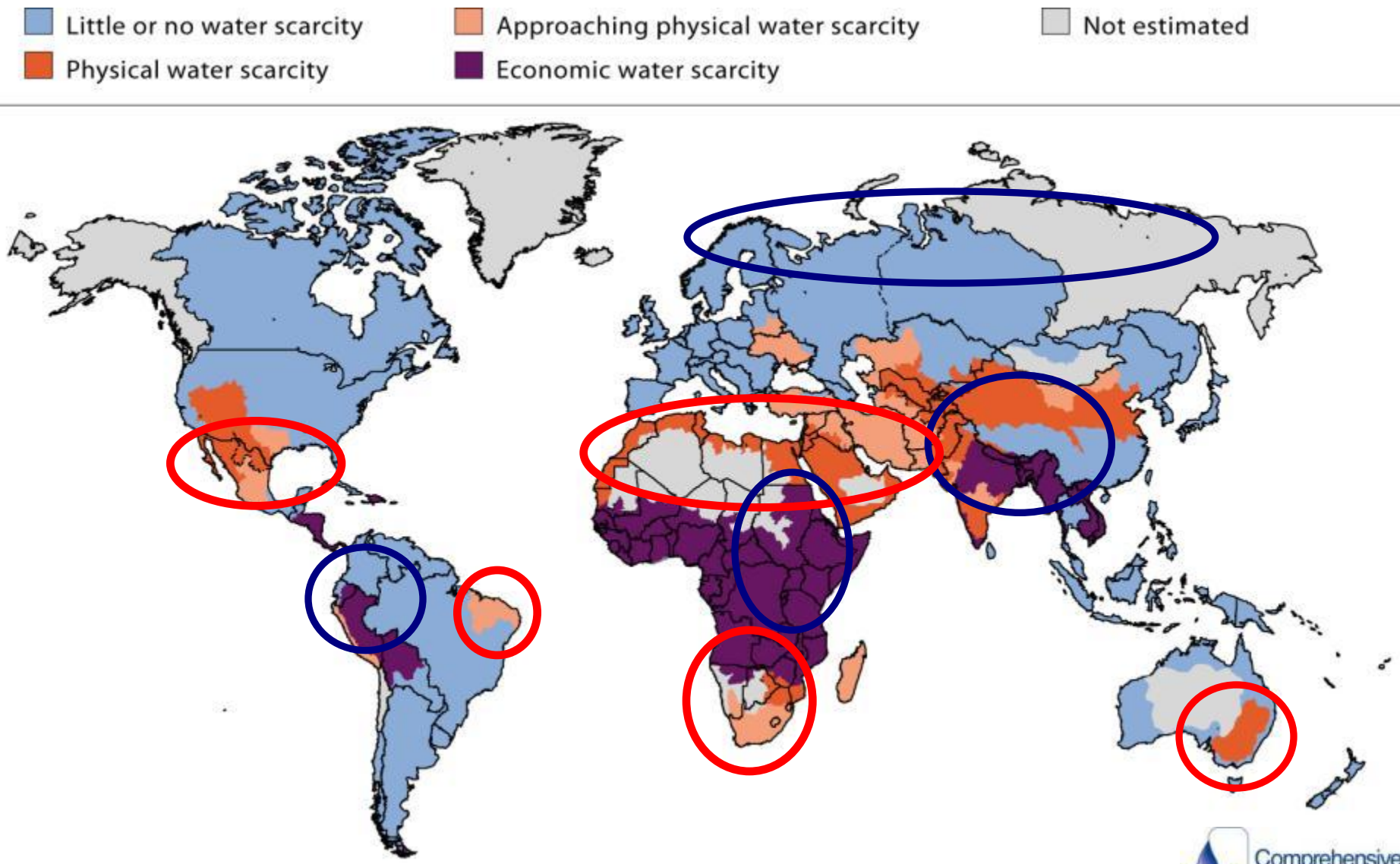
- Rapid Water Development
  2nd "boom" in dam construction
- The role of China
- "Land and Water Grabs"
- Entry of Private sector in water discourse
- Growth of informal water economies

Informal Water Economies

Big Dam Boom
Nile Basin Countries

Before 2000	**9**
After 2000	**11**
Under Construction	**7**
Planned	**11**

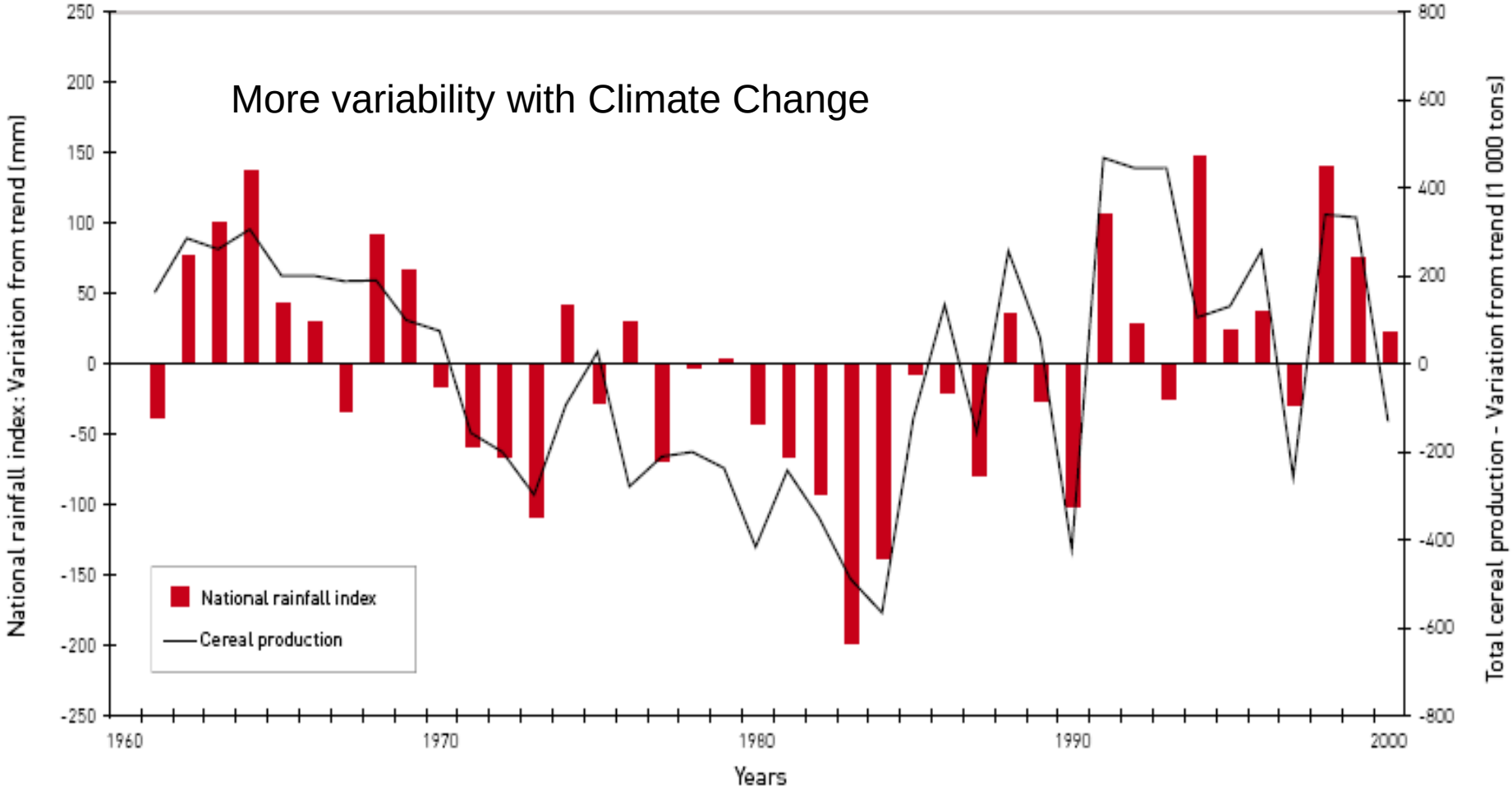
Water Scarcity and Climate Change



Hotter, more rainfall variability, some areas wetter, some areas drier

Comprehensive assessment of water management in agriculture

Rainfall & Cereal Production in Burkina Faso



Source: FAO for Comprehensive Assessment of Water Management in Agriculture

Will there be enough water?

Drivers of Land & Water Use

Population & Diet – food grain production projected to increase by over 70% by 2050

Urbanization - Cities are projected to use 150% more water in 2025, encroach on ag land

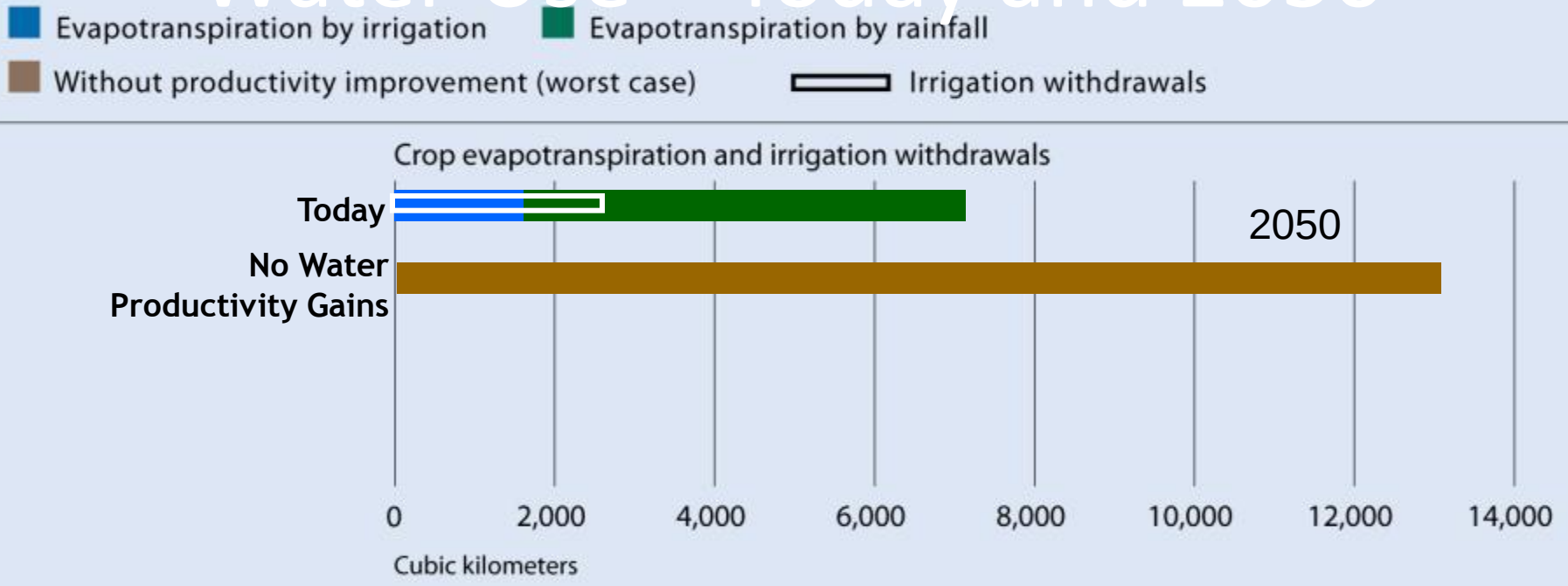
Agriculture – Increased water use and land expansion behind production increases

Energy **–** Hydropower and biofuels compete for water and land

Climate Change **–** Shifting patterns of water availability –

More people – 6.5 to 9 billion people by 2050
More calories & more meat, fish, milk
More food production –grain production increase 70 to 100% by 2050

Water Use – Today and 2050



Based on IWMI WaterSim analysis for the CA

Without Water Productivity Gains,

Crop ET doubles by 2050

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Comprehensive assessment of water management in agriculture

Water Management

Strategies

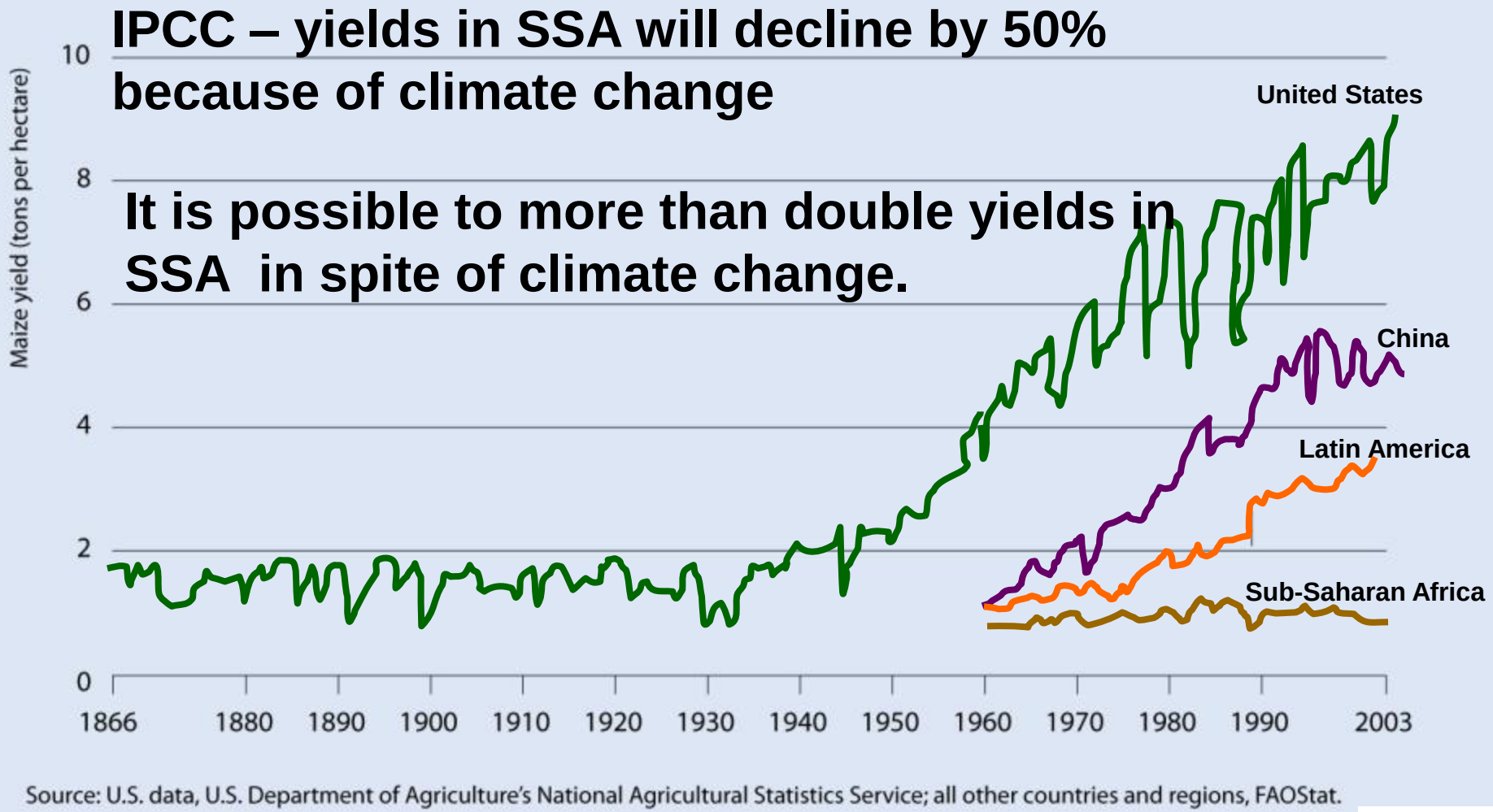
IWMI International Water Management Institute

Olivia Maldon

Major Pathways
to Meet Future Food & Water Demands

1. Improve water productivity (more food/water)
   - Irrigation systems
   - Rainfed systems
2. Expand irrigated & rainfed agriculture
3. Promote trade from highly productive to less productive regions
4. Manage demand, consume and waste less

Growth in Yields



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

Comprehensive assessment of water management in agriculture

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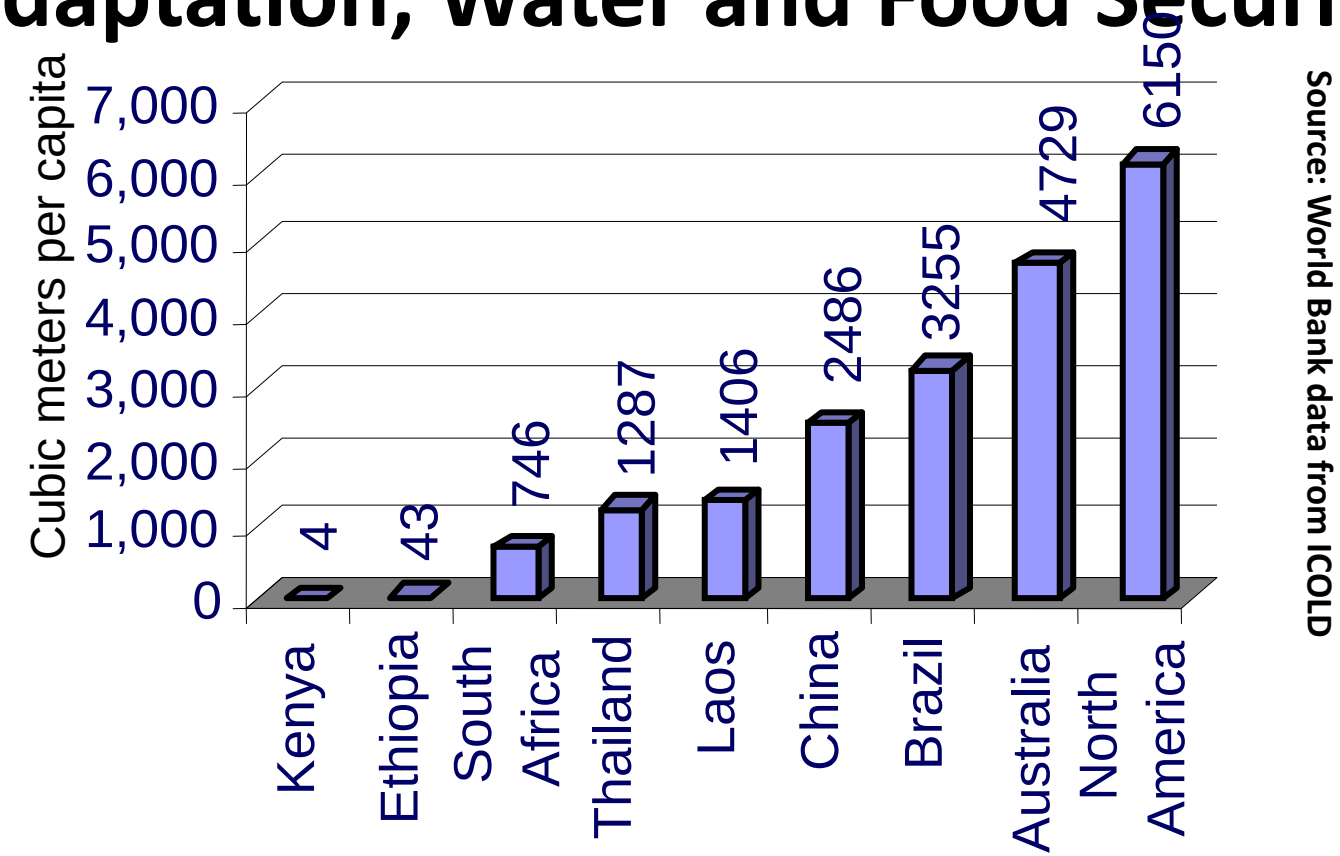
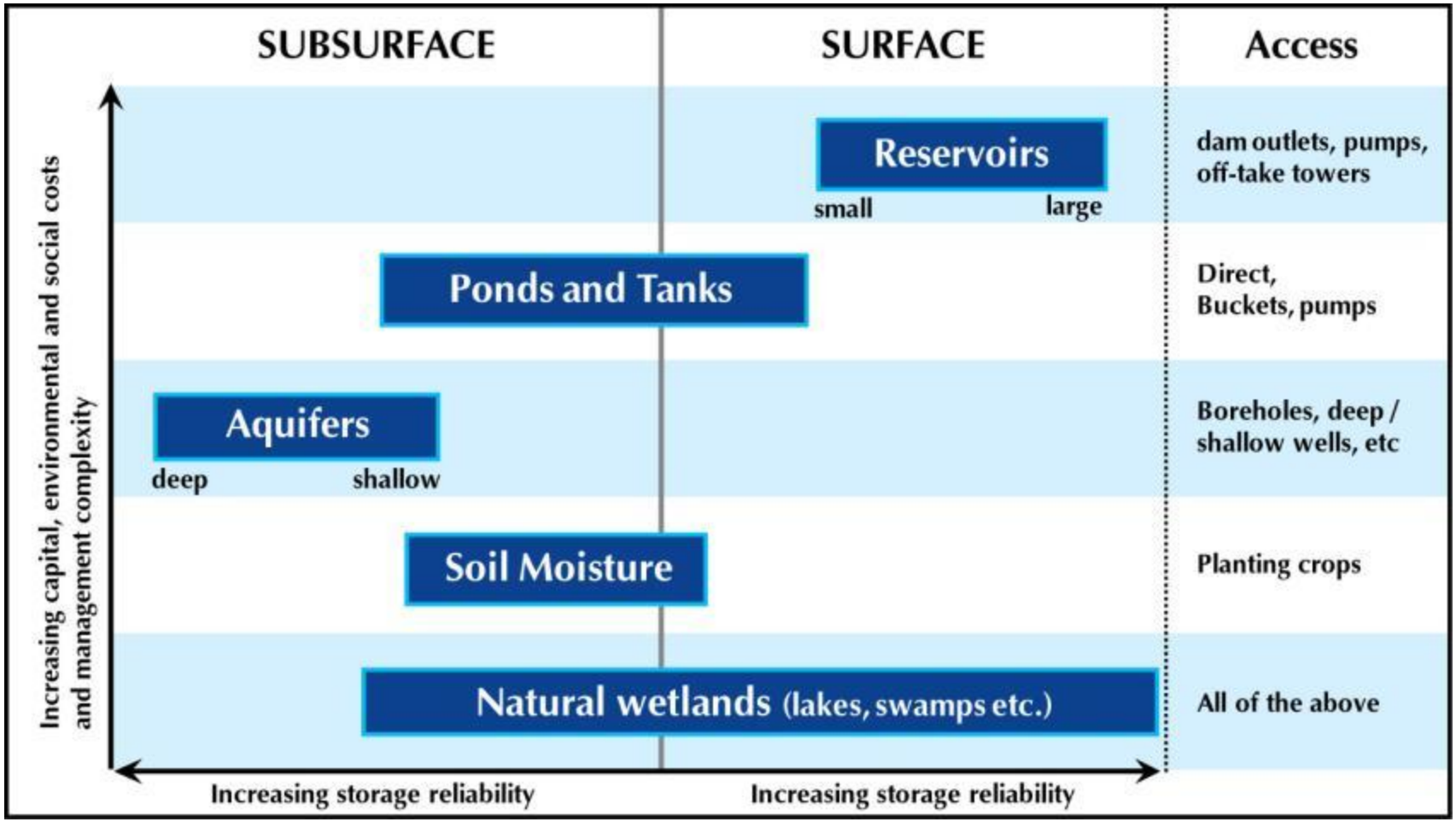
Re-think Water Storage for Climate Change Adaptation, Water and Food Security



But need to re-think water storage: role of groundwater and soil moisture.

And beyond: insurance, local trade, …

Physical Water Storage Continuum



Making it happen

- Water governance & management
- Incentives to signal scarcity
- Its not just about technologies, but about markets, institutions, capacity
- Seek opportunities:
  - Integration
  - Focus on women
  - Agricultural Water Mmgnt falls between institutional cracks

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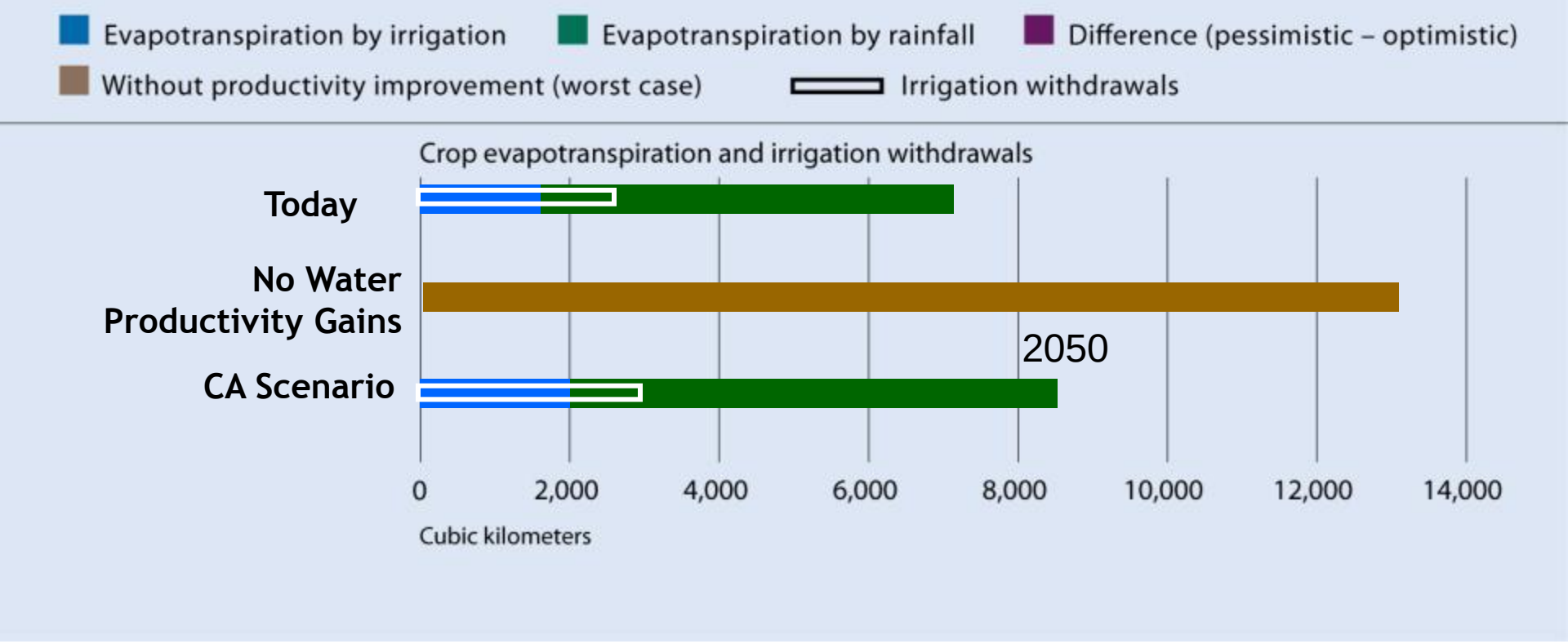
Water Use – Today and 2050



CA Scenario: Policies for productivity gains, upgrading rainfed, revitalized irrigation, trade; reducing waste can further reduce water needs

Based on WaterSim analysis for the CA

Water and Food Agenda

- Transform water governance for food, livelihoods & environment
  - Adapt to rapid change and climate change
  - Groundwater governance
- Data and monitoring to support adaption
- Rethink water storage
- Manage water demand
- Grow more food per unit of water
- Revitalize irrigation, upgrade rainfed ag

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Thank you