



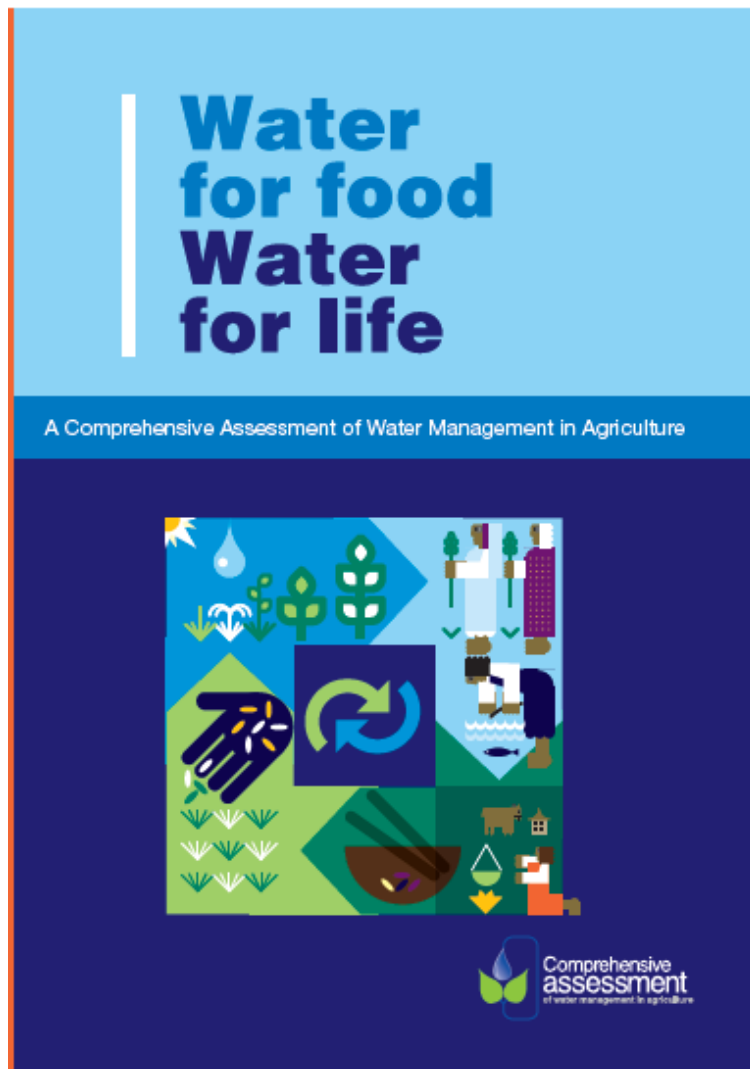
# **Will there be enough water?**

## **What the Comprehensive Assessment of Water Management in Agriculture says.**

**Deborah Bossio, David Molden**

**International Water Management Institute**

# Will there be enough water?



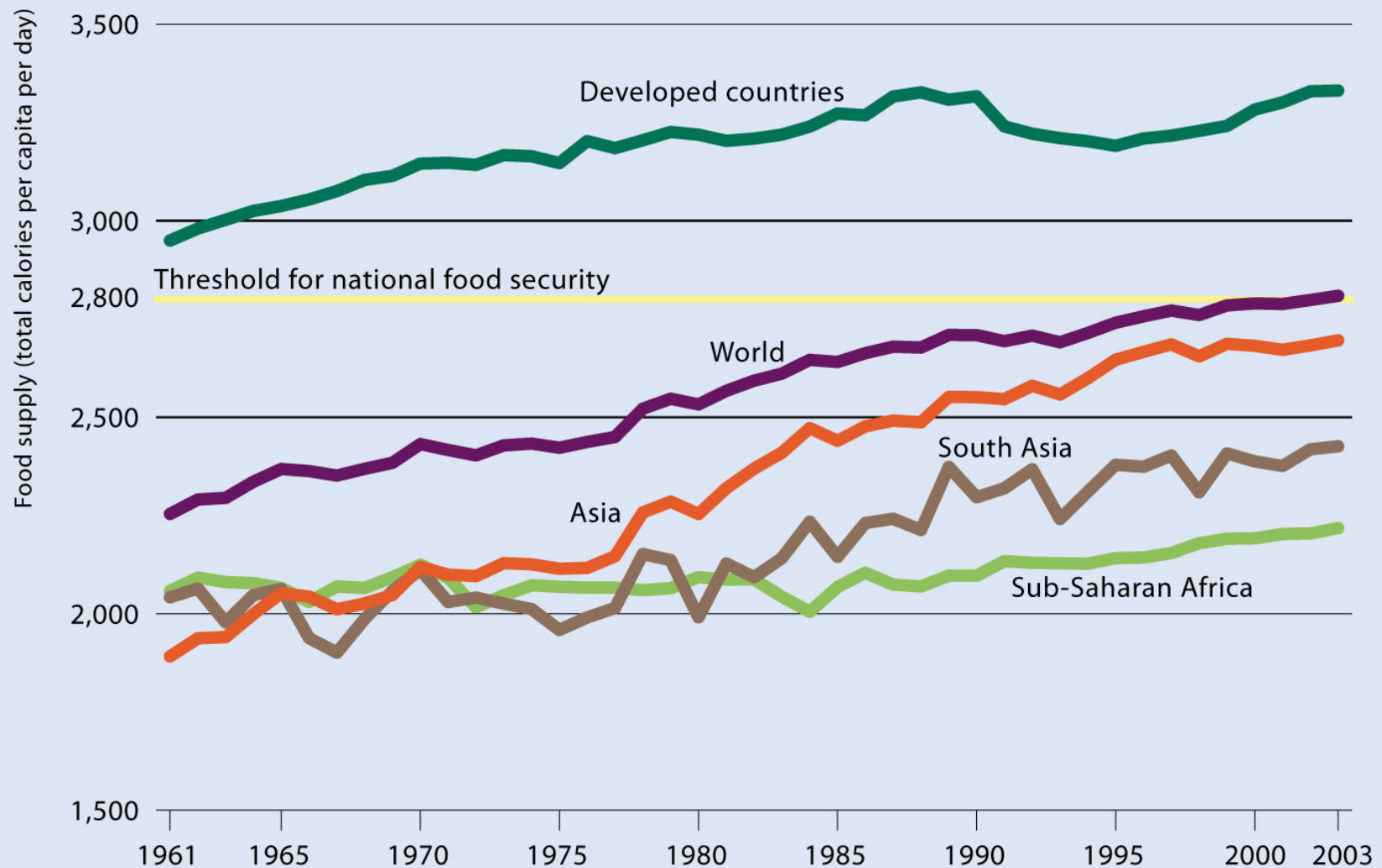
A question posed to 700 researchers and practitioners who put together the Comprehensive Assessment of Water Management in Agriculture.





# Setting the Water Scene

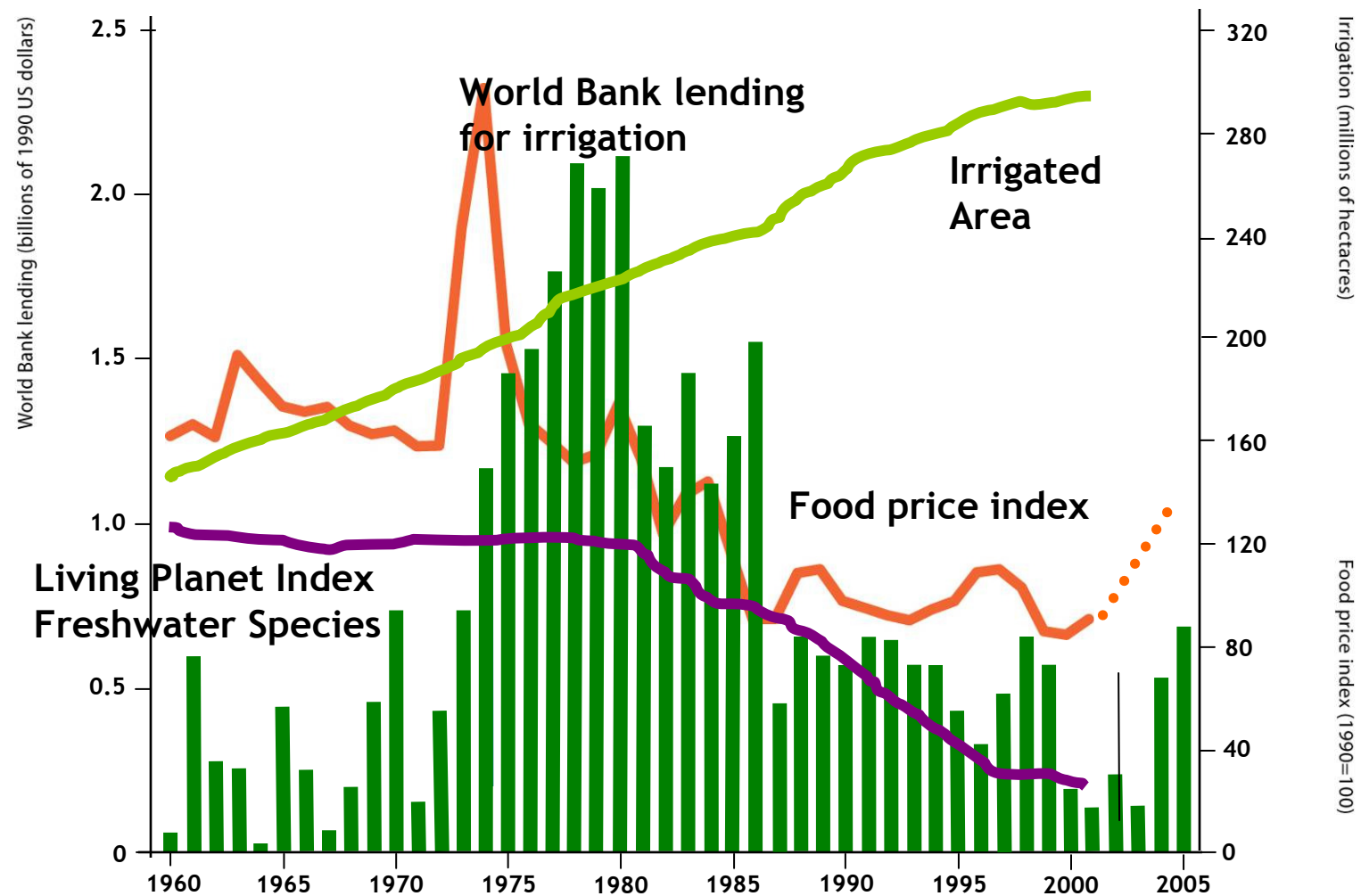




Source: FAO 2006b.

**It takes a litre of water to produce every calorie, on average**

# Investing in Irrigation



Source: Based on World Bank and Food and Agriculture Organization data.

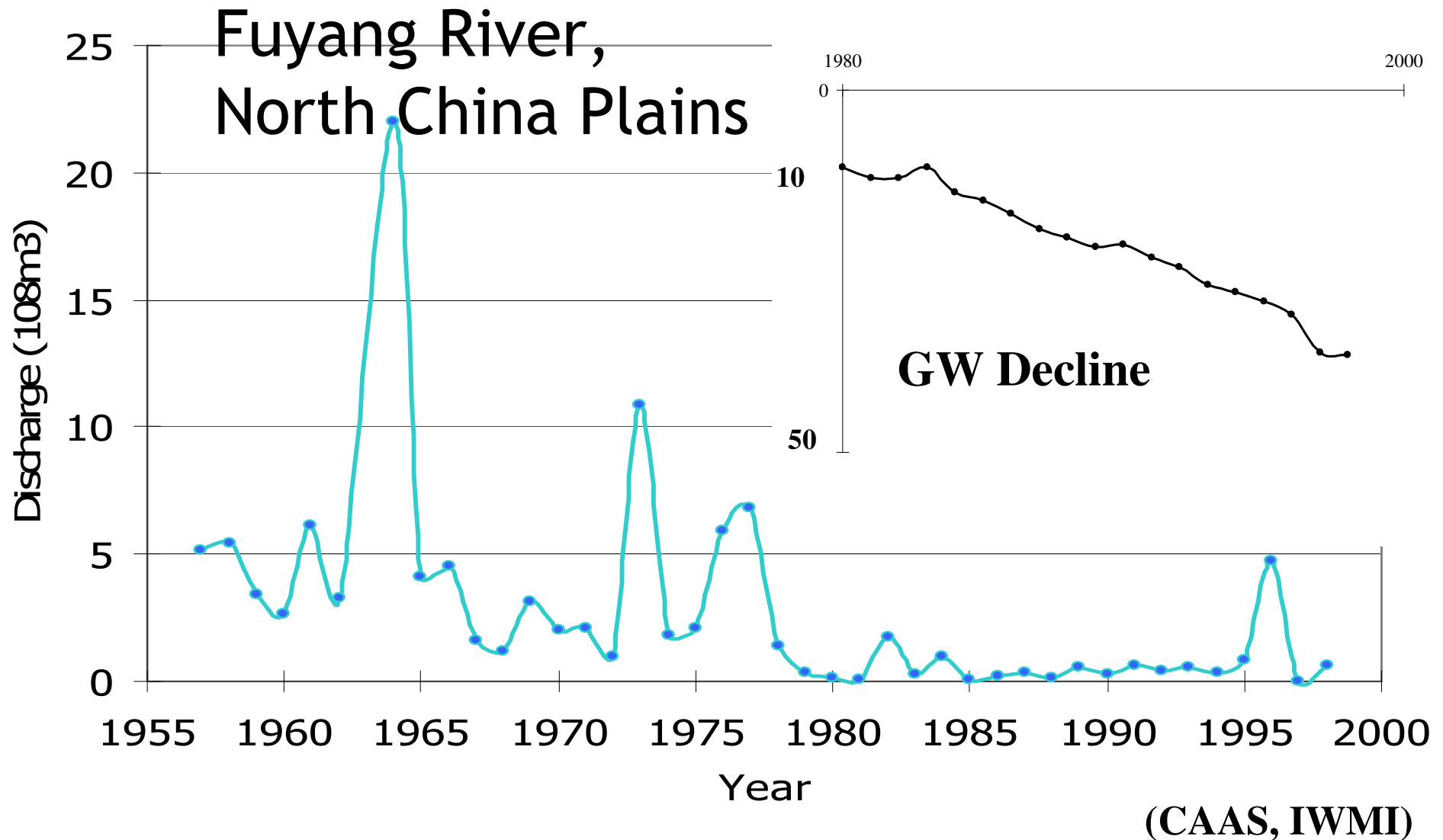




# Drivers of Water Use

- ***Urbanization*** - Cities are projected to use 150% more water in 2025
- ***Land Degradation*** - limits further productivity increases
- ***Climate Change*** - shifting patterns of water availability
- ***Energy*** - production and use by agriculture, competition with hydropower

# Increased Water Use

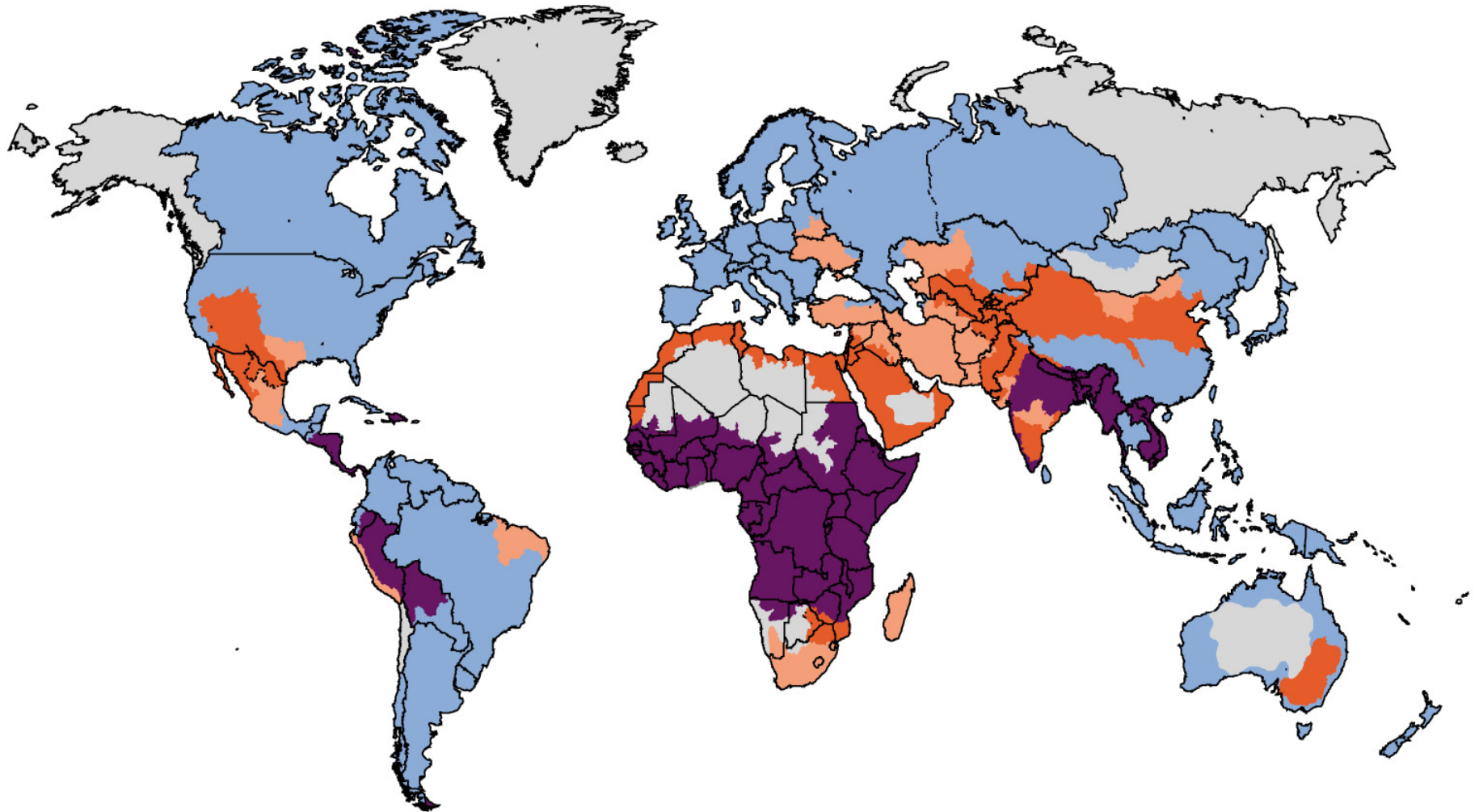
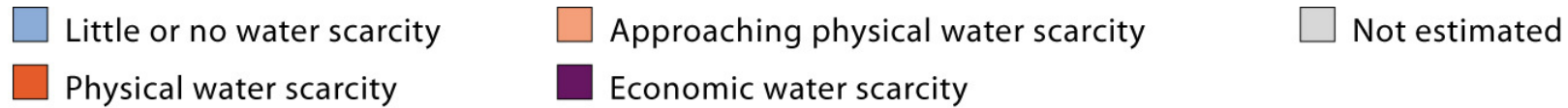


## Limits - reached or breached

- River basins overused - Colorado, Murray Darling, Yellow, Indus, Amu Darya .....
- 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



# Water Scarcity 2000



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

*Answer from the Comprehensive Assessment -*

*Will there be enough water to grow  
food and support wetlands and  
biodiversity?*

*No*

*unless ....*

*We change the way we think  
and act on water issues.*

# What of the future?





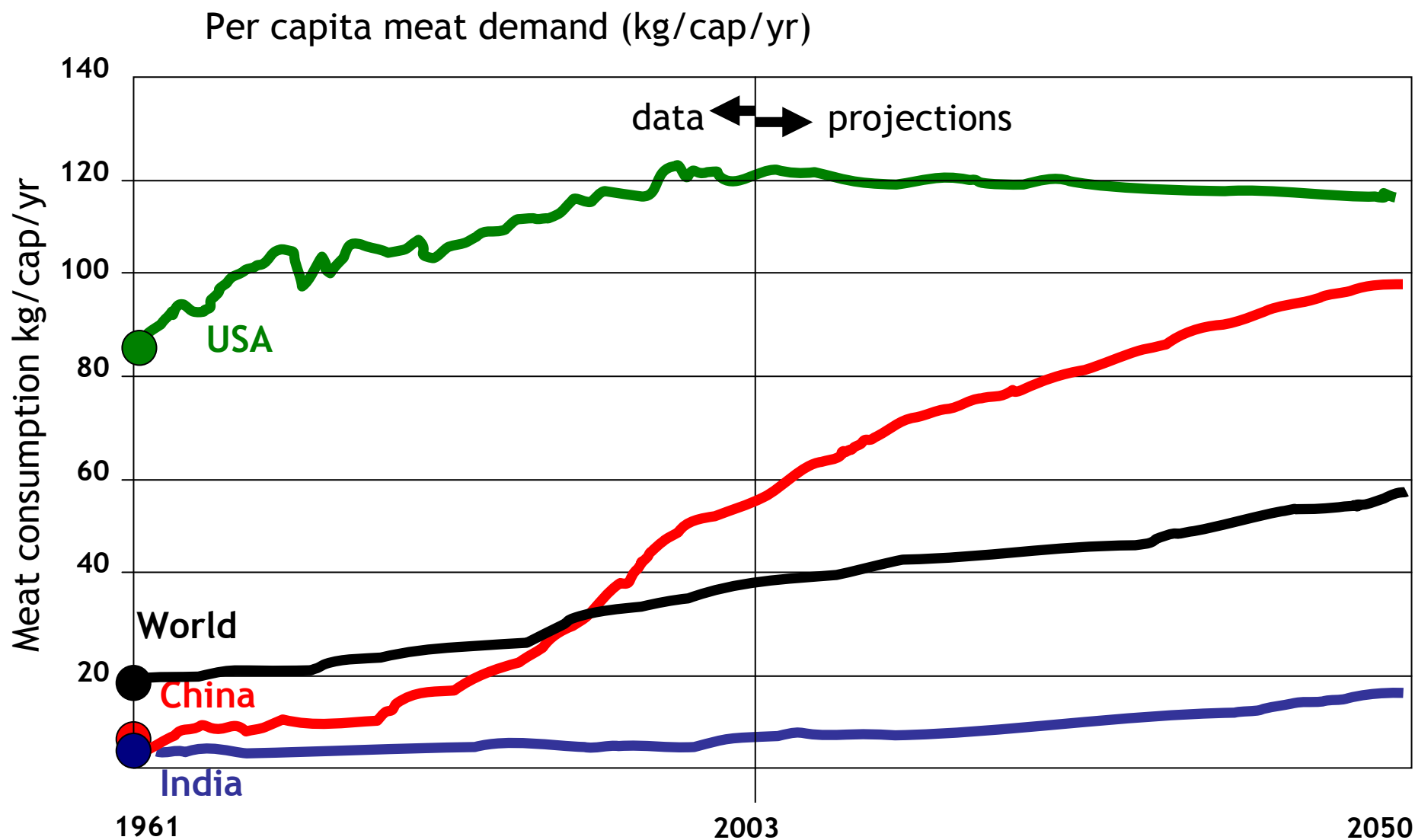
# Diets and water

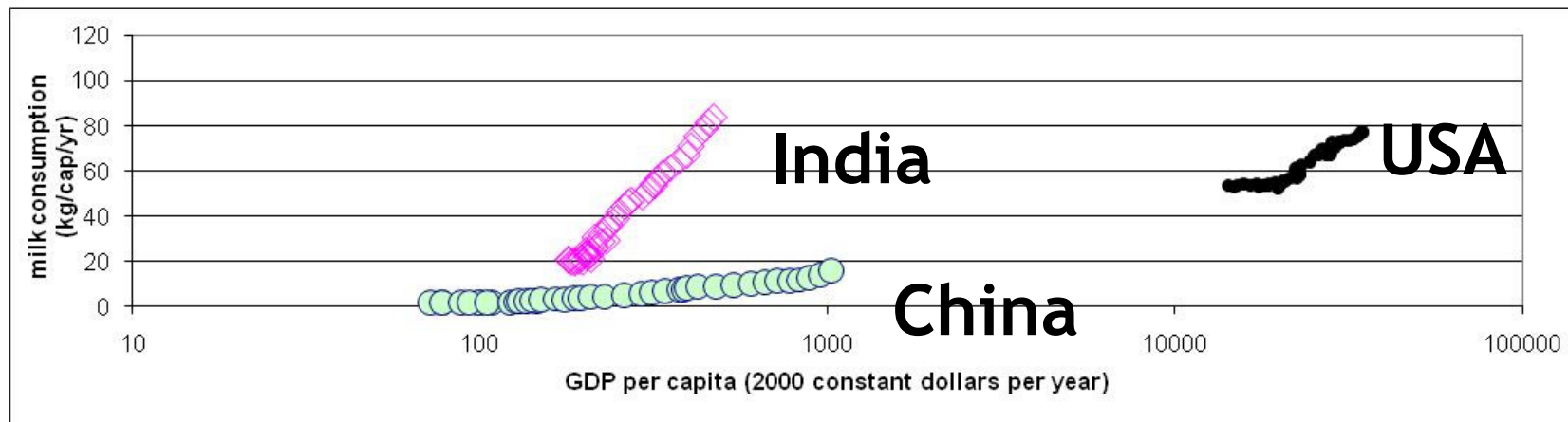
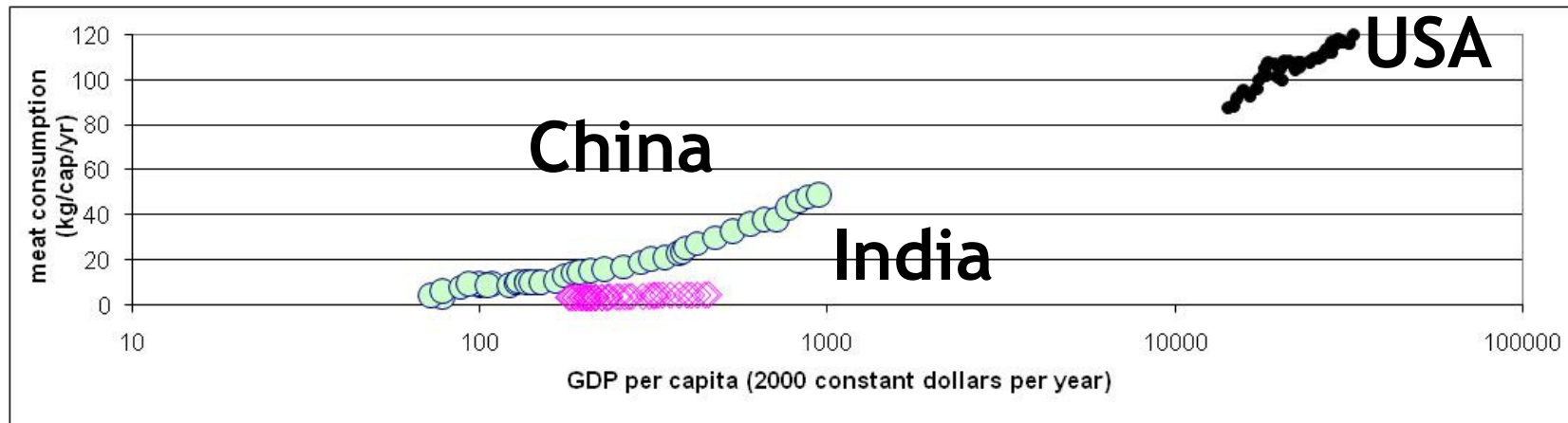
Between 2,000 and 5,000 liters per person per day - depending on type and amount of food eaten and how it is produced





# Consumption of Animal Products





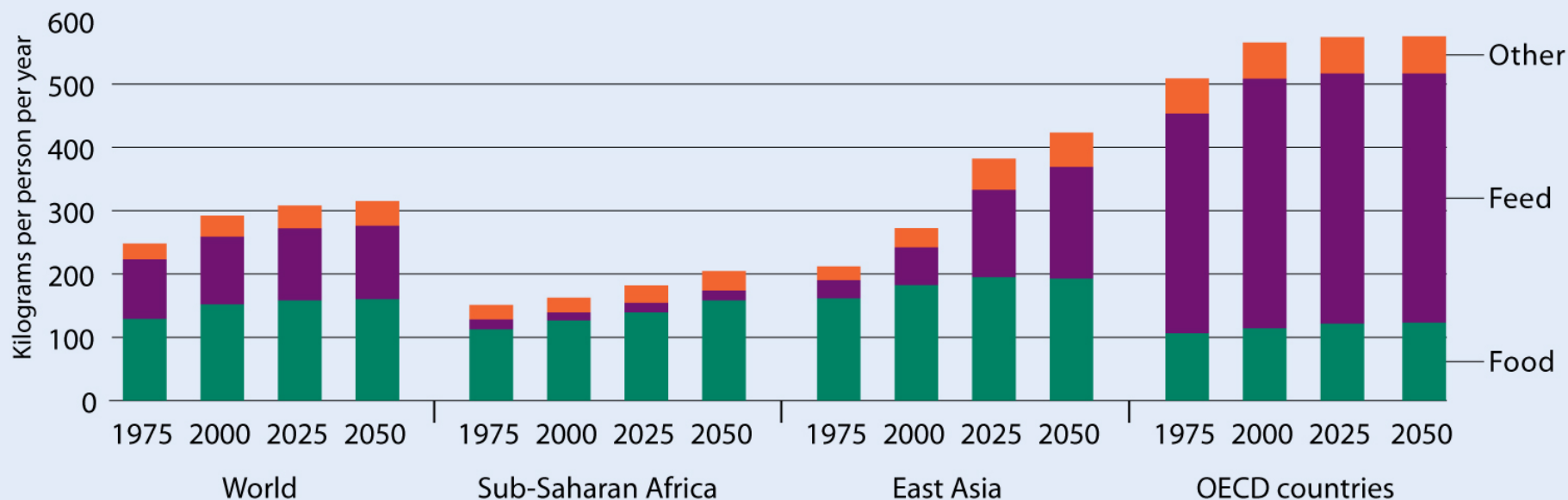
Per capita meat supply versus income in India (pink), China (green) and USA (black) over the period 1961-2003

# Water for Biofuels

## Water use per liter of biofuel production

	liters of ET	Liters of Irrigation water
China	3800	2500
India	4100	3500
US	1750	300
Brazil	2250	200

# How much more cereals?



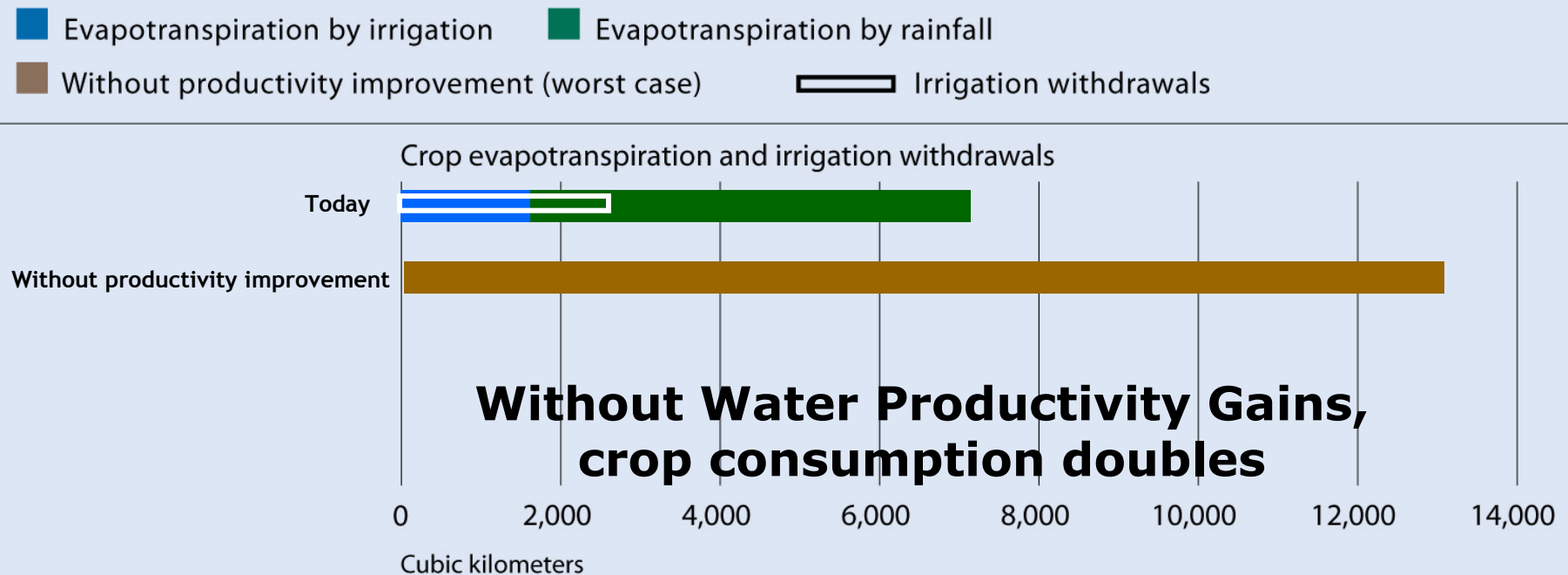
Source: For 1975 and 2000, FAOSTAT 2006; for 2025 and 2050, International Water Management Institute analysis done for the Comprehensive Assessment of Water Management in Agriculture using the Watersim model.

**Food demand doubles over the next 50 because of diet and population**

**Water Needs (ET) will double – without water productivity gains**



# Crop water consumption to 2050



Based on IWMI WaterSim analysis for the CA

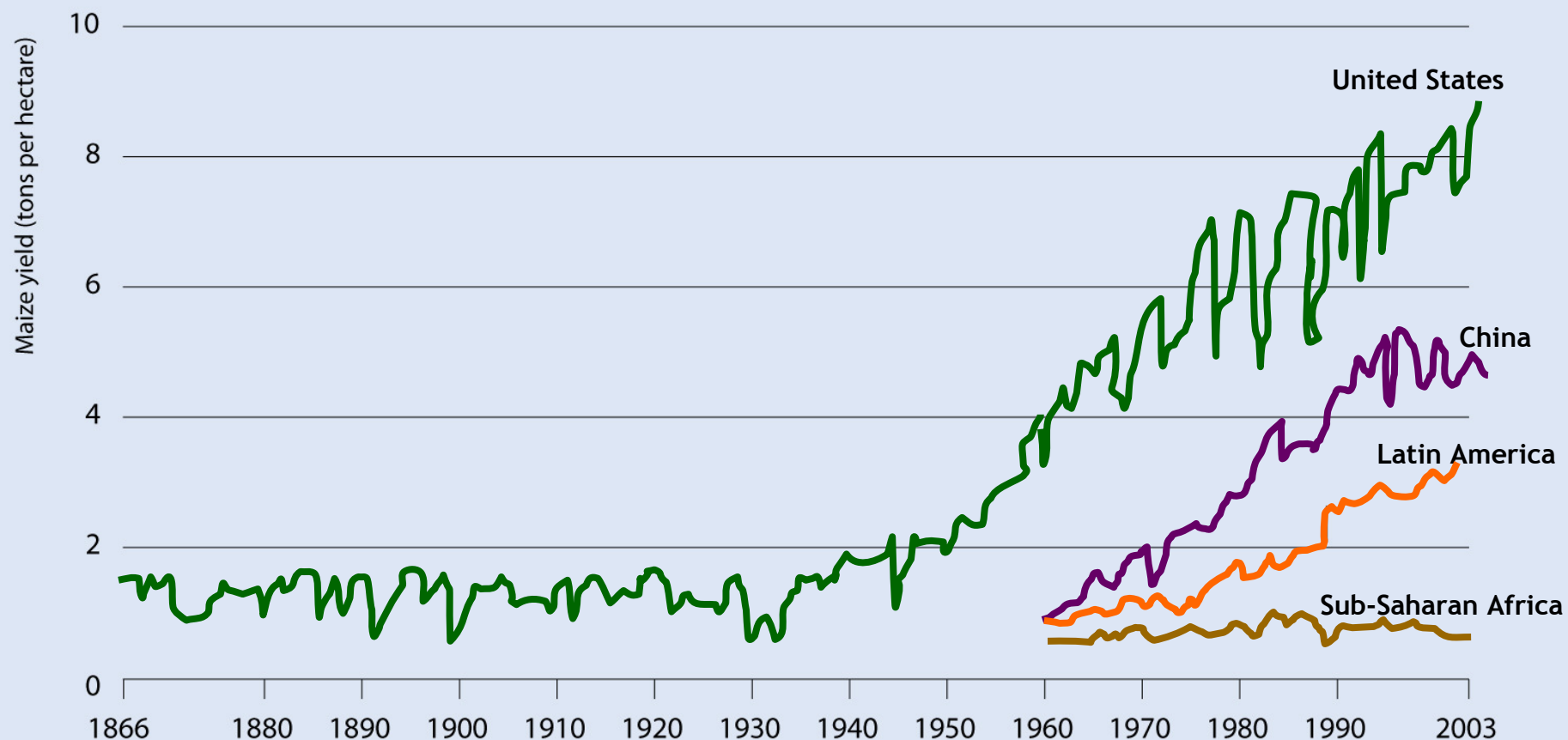


# Where is there hope?

Selected Policy Agenda from the  
Comprehensive Assessment

## Increase water productivity

### Growth in yields



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



# Manage agriculture for ecosystem services

- Landscape Mosaics
- Follow water flow paths
- Environmental flows
- Habitat integrity and connectivity
- Community participation



Maintain  
Corridors

b



# water and poverty

Get water to poor people, use it better

*Around 70% of the world's under-nourished live in rural areas where non-agricultural livelihood options are limited.*



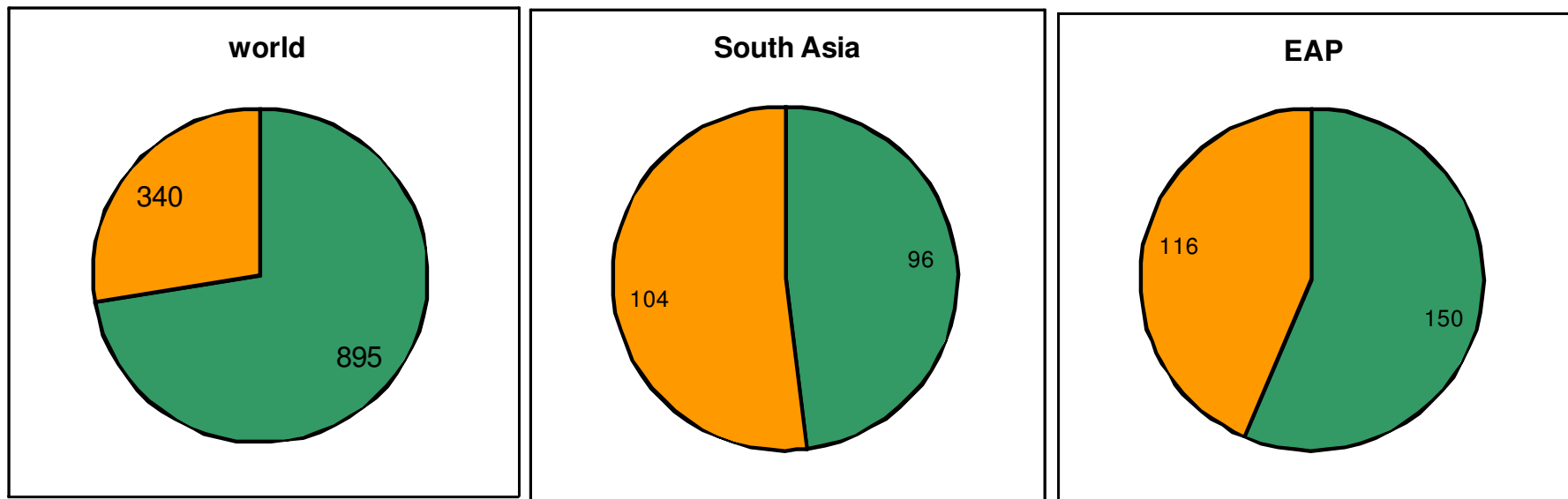
Low cost technologies  
increase WP

## Reform the policy reform process

- *Poverty, hunger, gender inequality, and ecosystem degradation continue*
  - *not because of technical failings but because of political and institutional failings*
- No blueprints - need to craft local solutions

# Don't ignore rainfed agriculture and land management

**Irrigated and rainfed harvested area in South Asia and East Asia  
Compared with world totals (in million hectares)**



Orange = irrigated; green = rainfed;



## Cars, Carnivores and Water

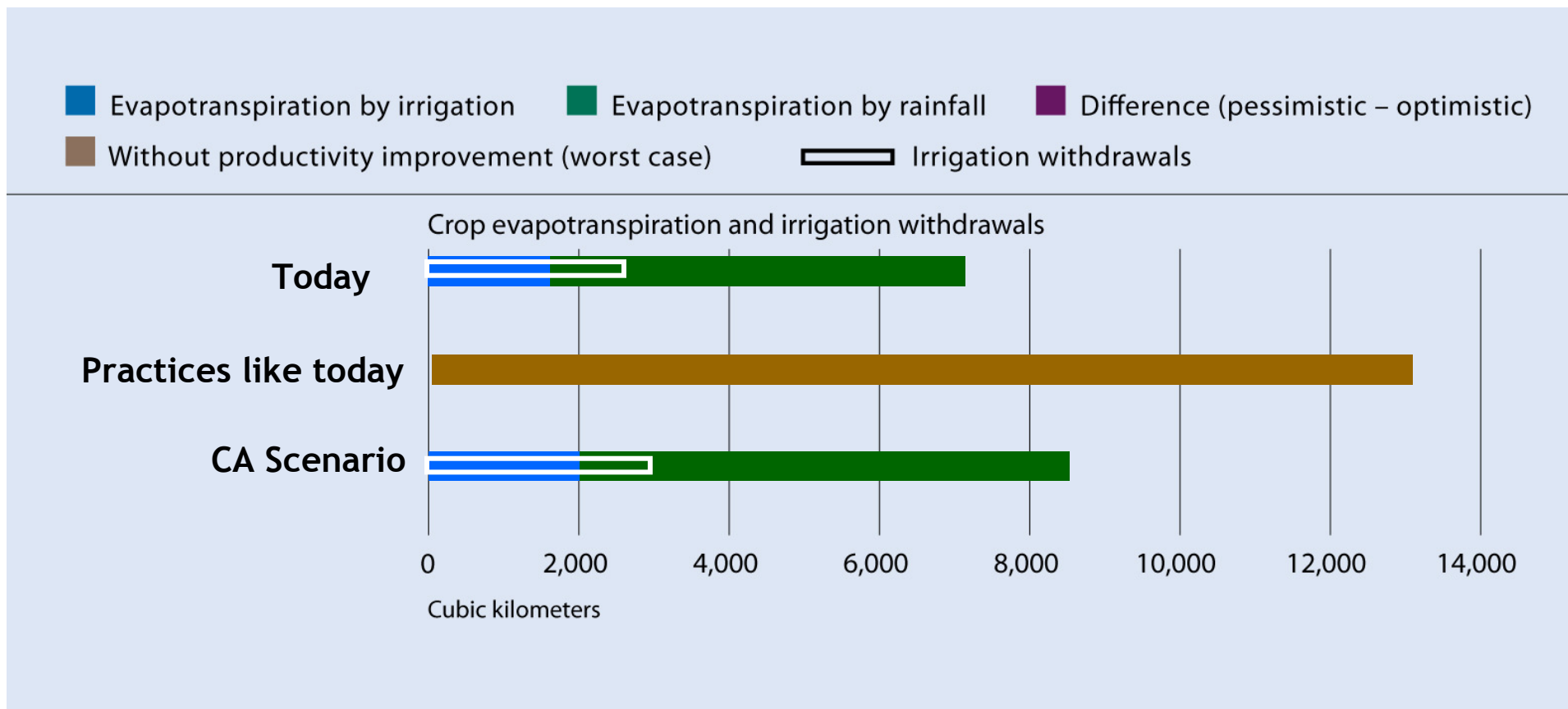
Our actions outside the water sector, have a profound impact on water and agriculture

- Trade
- Response to climate change
- Diets
- Energy/biofuels





# Take action to deal with the water crisis



**CA Scenario: Policies for productivity gains, upgrading rainfed, revitalized irrigation, trade**

Based on WaterSim analysis for the CA

# Reflections

All scenarios point to more irrigation - but this could be many types - large or small scale, groundwater, or small supplemental systems

Water storage becomes an important investment with climate change, but there are many types of storage - large, small, GW, etc.

# Reflections

Water and land productivity gains are a key  
- but will require actions outside of water  
management

Highly productive, flexible, diverse systems  
will require better water management,  
but the water investments may have to  
follow other changes.

# Reflections

There is high uncertainty in the short and long term...

Water systems - physical infrastructure & institutions - have to be able to respond to many changes.

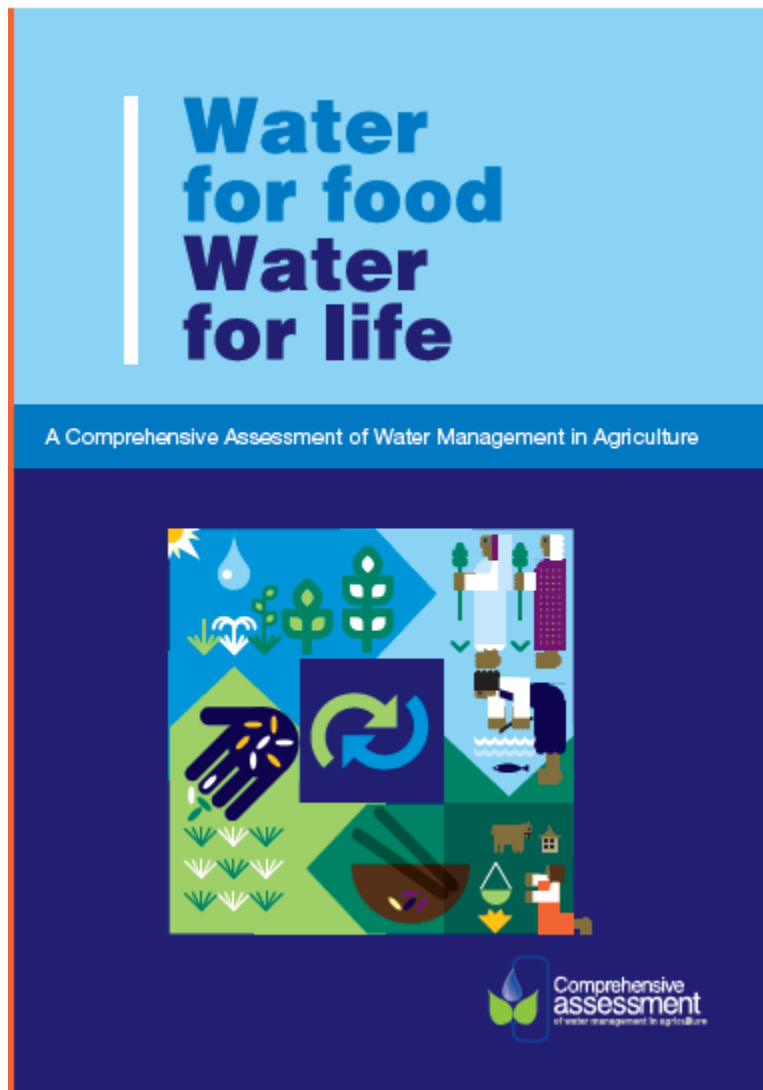
## Make difficult choices now, not later:

### Choices:

- Which investments - for production, adapting to climate change
- Water storage for agriculture - water for environment
- Upstream - downstream
- Productivity - Equity
- This generation - the next one (GW decline)
- Our consumption patterns and their impact



# Water for Food - Water for Life



**Available at:**

**[www.earthscan.com](http://www.earthscan.com)**

**Assessment summary and  
results at:**

**[www.iwmi.org/assessment](http://www.iwmi.org/assessment)**