

The Global Water and Sanitation Challenge

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- **Water Resource**
 - Status
 - Water for Food
 - Water for Bioenergy
 - Migration/Urbanisation
 - Climate Change
- **Water supply and sanitation**
 - Situation

The “Global Water Crisis”

- Does it exist ?
- Is there physical scarcity or is it “only” about bad management ??

Is there a Global Water Crisis?

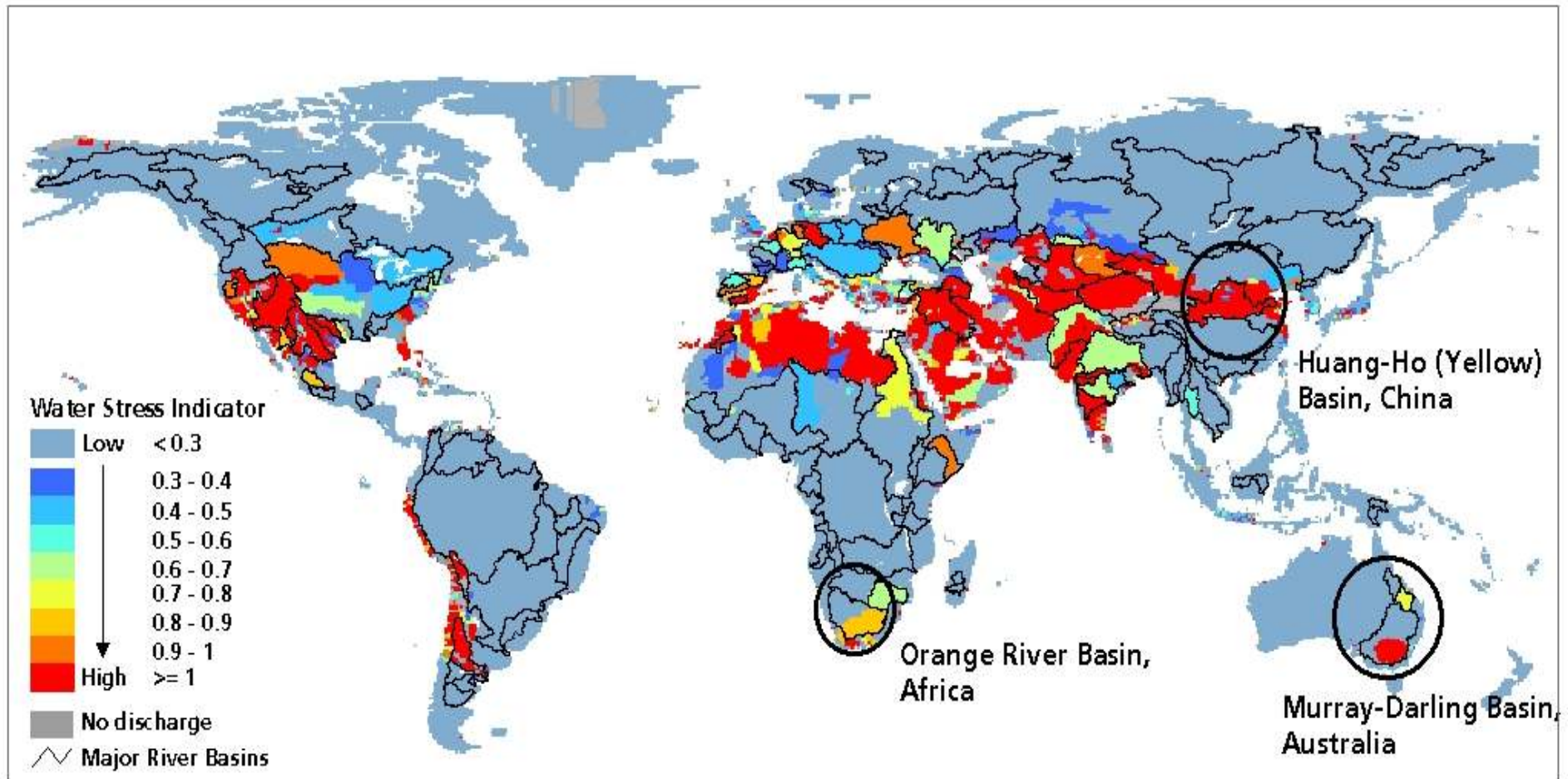
- **0.9 billion people (15%) of the world population do not have a safe supply of drinking water. (WHO)**
 - **10% in urban areas, 40% in rural areas (UNICEF)**
- **2.6 billion people (40%) lack access to basic sanitation services. (WHO)**
 - **20% in urban areas, 75% in rural areas (UNICEF)**

Need to be specific

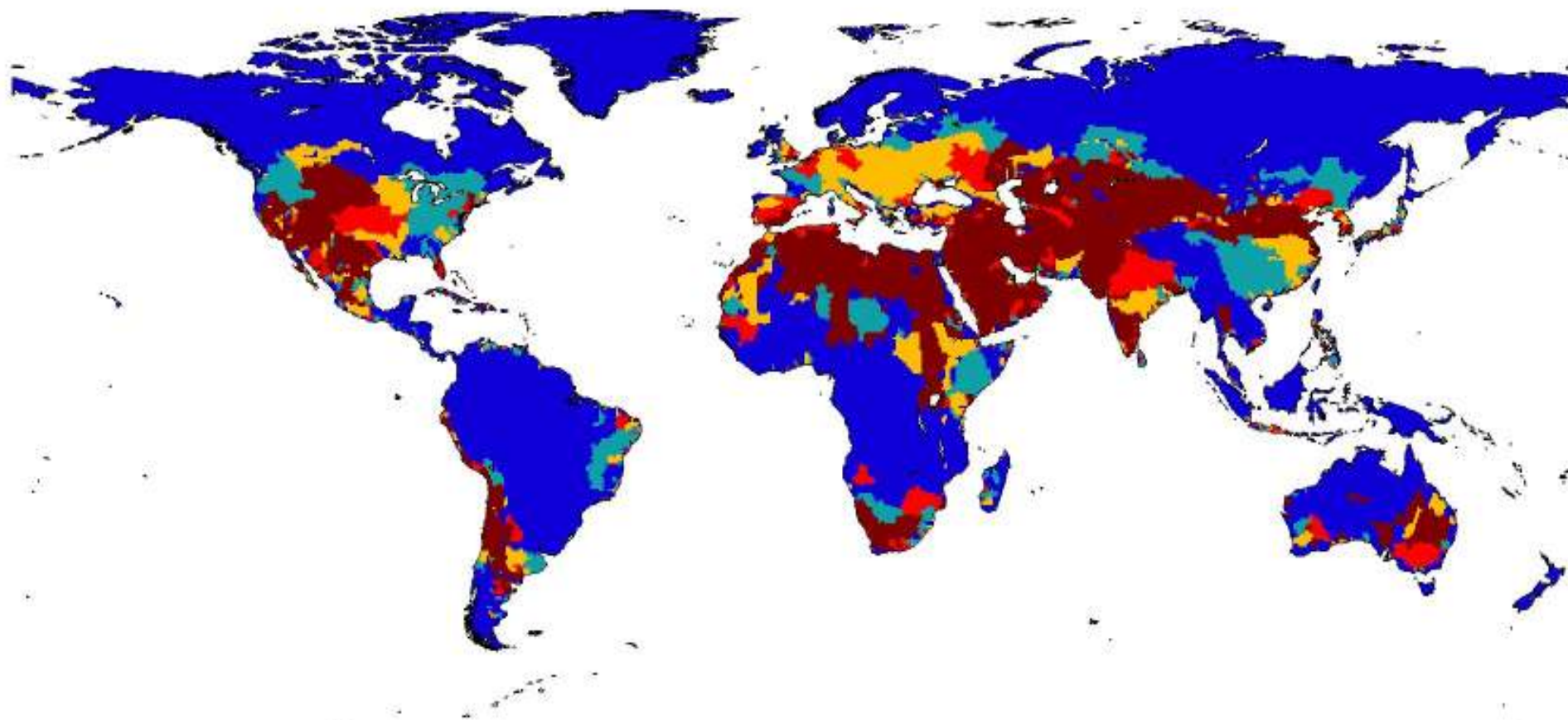
- For water supply and sanitation, it is normally not the physical water scarcity, but bad management that causes the "crisis"
 - We don't need water to address sanitation
- For the water resources however, in many cases there is a physical scarcity, a water crisis

The Water Resource

Environmental Water Stress



Source: WRI, IWMI, IUCN, Kassel, 2002



Water Stress Indicator: Withdrawal-to-Availability Ratio [CR]

No Stress Low Stress Mid Stress High Stress Very High Stress



0

0.1

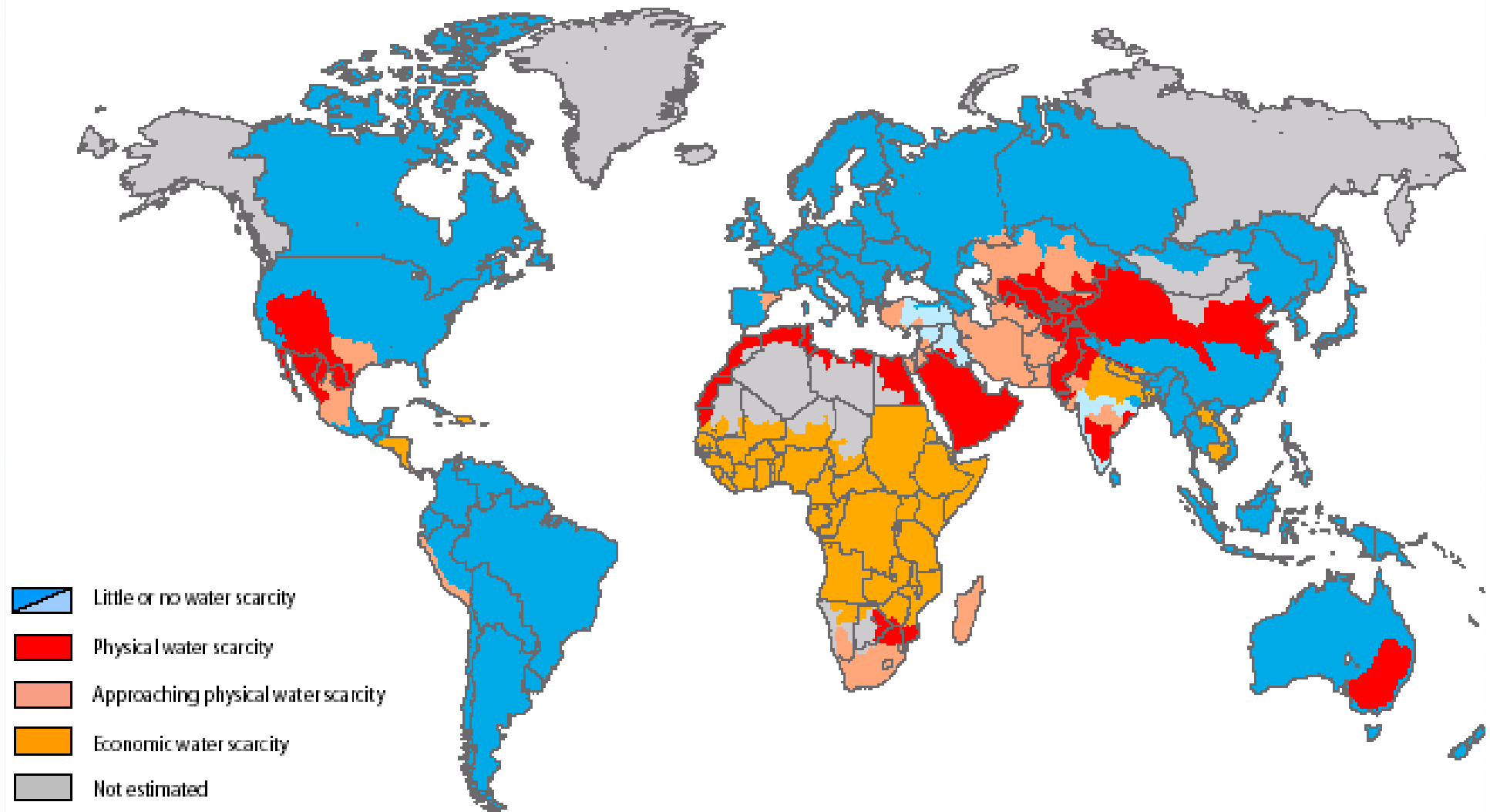
0.2

0.4

0.8

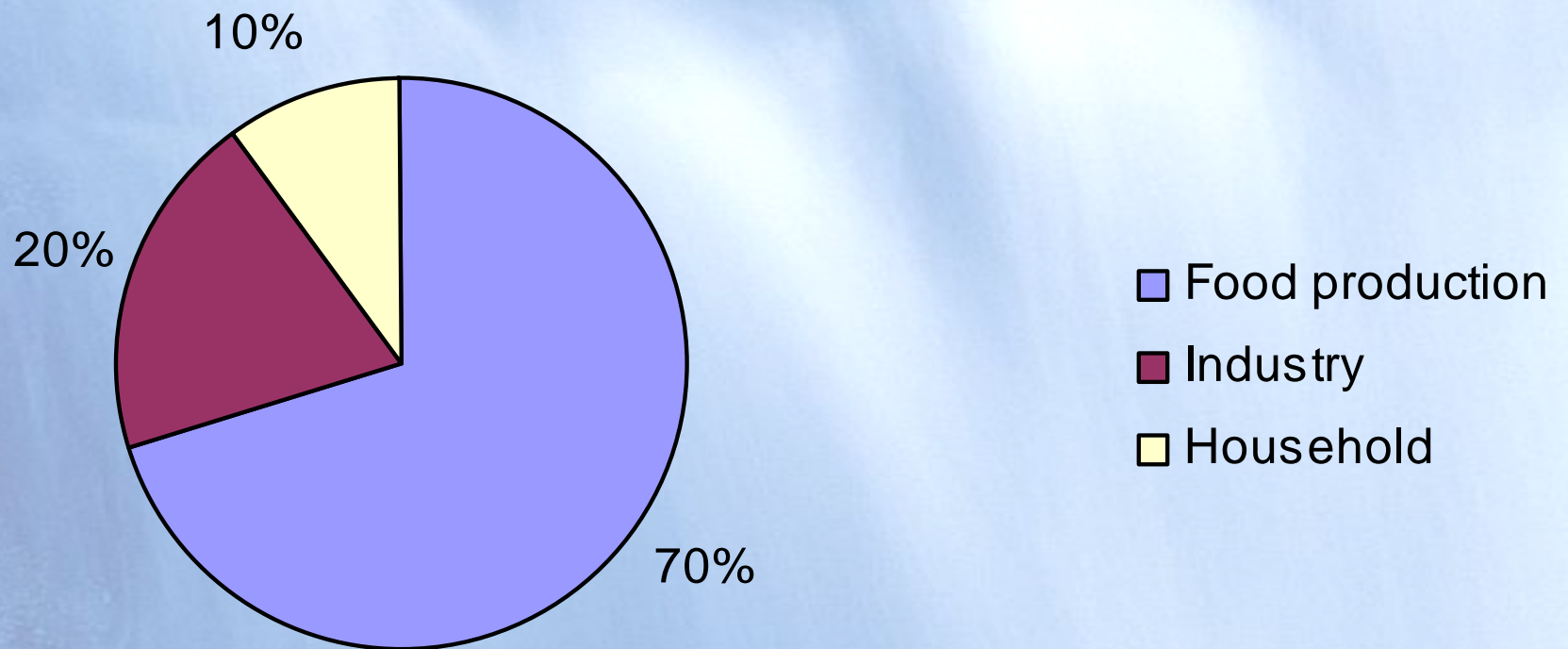
WaterGAP 2.0 - December 1999

Map 2. Areas of physical and economic water scarcity



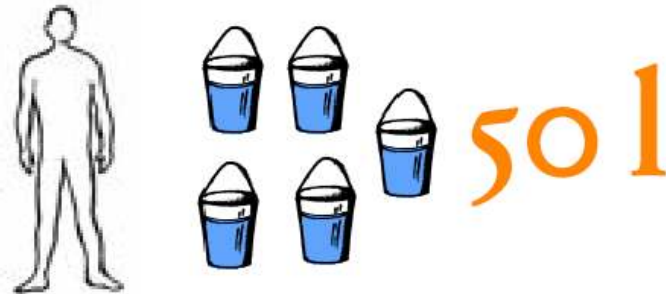
Why? Food production!

Withdrawals of Water from rivers, lakes, groundwater - "Blue" water

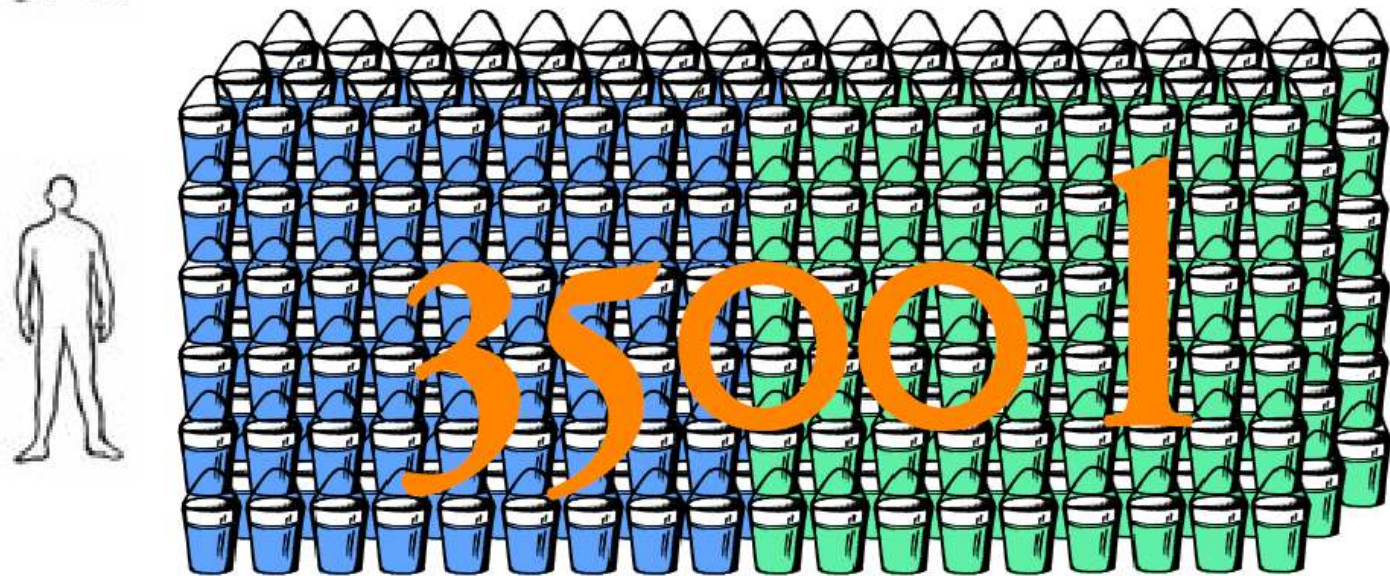


We are focusing on < 10% of the problem

Household/day



Food production /day



The hidden water footprint behind our consumption

Virtual Water in different products (l)

1 glass beer (250ml) 75

1 glass wine (125ml) 120

1 cup tea (125ml) 35

1 potato (100g) 25

1 hamburger (150g) 2400

1 cotton T-shirt (medium, 500g) 4100

1 page A4 paper (80g/m²) 10

1 pair of shoes (bovine leather) 8000

1 microchip (2g) 32

1 glass milk (200ml) 200

1 cup coffee (125ml) 140

1 piece bread (30g) 40

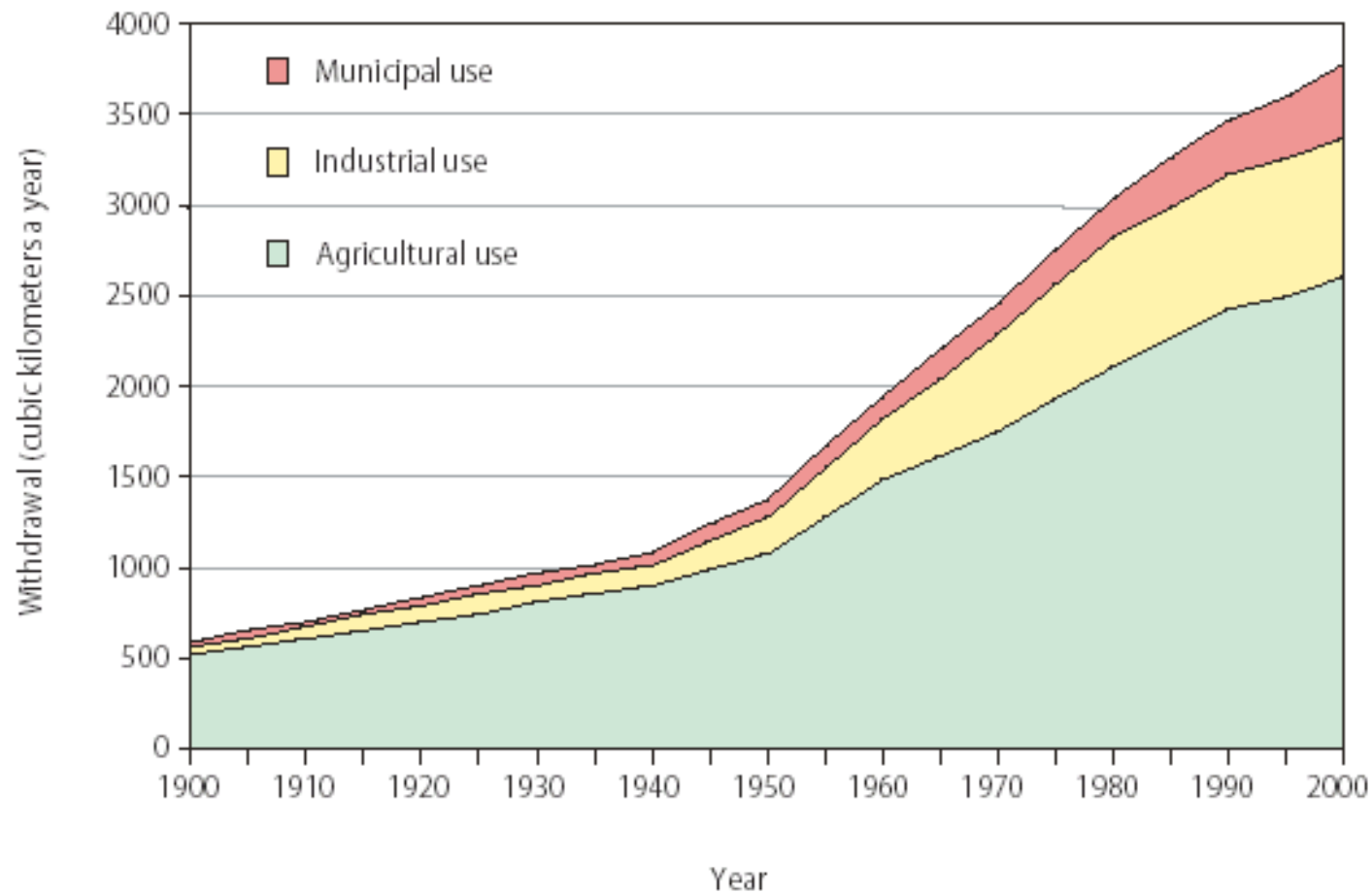
1 egg (40g) 135

1 kg wheat 3000

1 kg meat 15000



Figure 3. Rapidly increasing withdrawals of blue water for human use, mostly agriculture

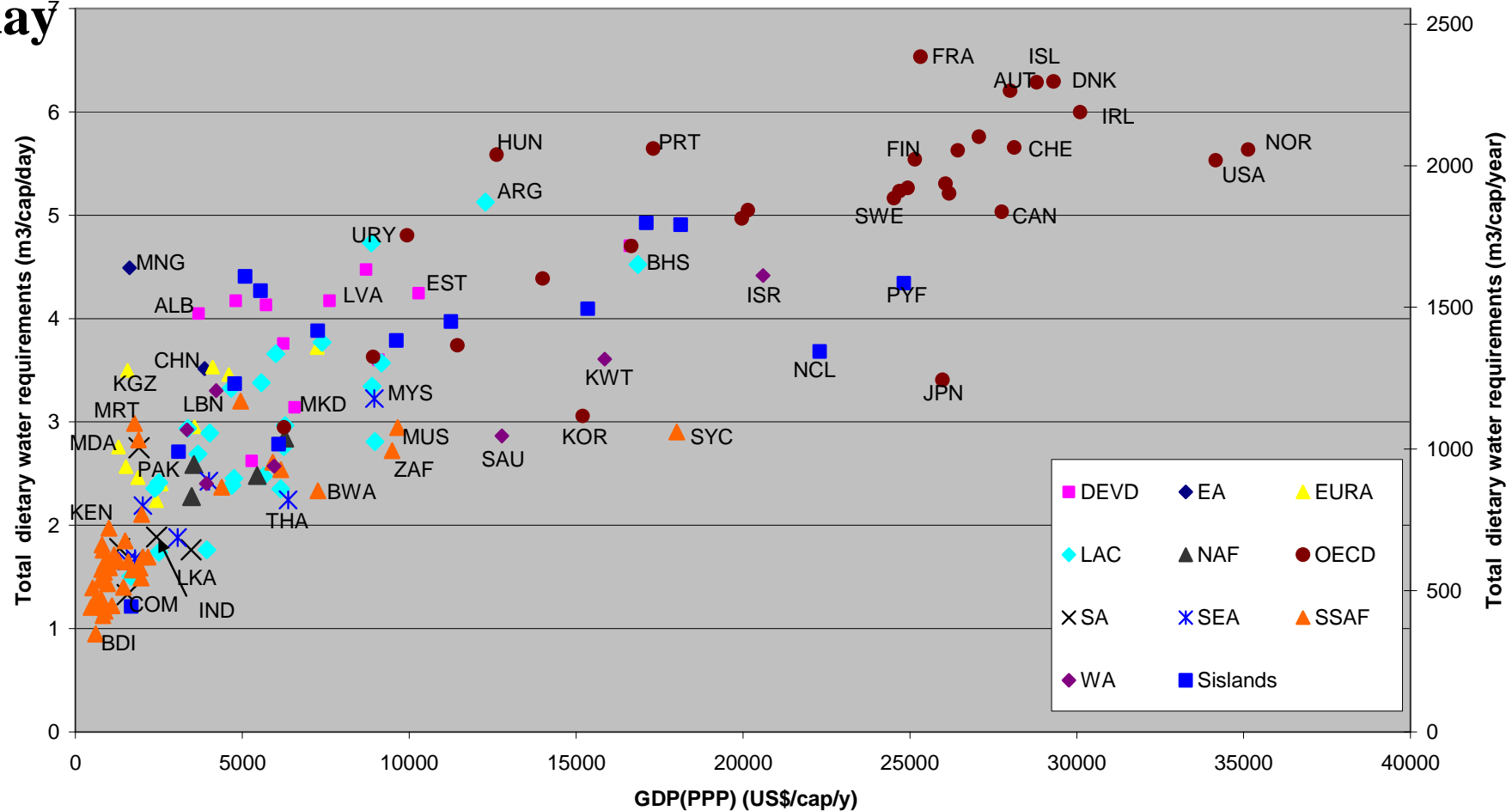


Based on Shiklomanov, I., IWRA Water International Vol 25 (1), March 2000

Consumptive water use (Et), GDP & food supply 2000

m³/cap
/day⁷

Water requirements for diets vs GDP(PPP) for year 2000



Increased Demand for Water 2005 – 2045 (GDPpppp & demography)

- Increased demand for food:
from ca 6,800 km³ to ca 12,400 km³
- Now, add Bio-fuels:
Difficult with projections: estimates of increased demands in a “post peak-oil situation” suggest same level of water requirements as for food
- Other:
Commercial agricultural products, household sector, industry, “environmental flow”, climate change & global warming



Impossible equation

Urbanisation

YEAR 1970

63% RURAL

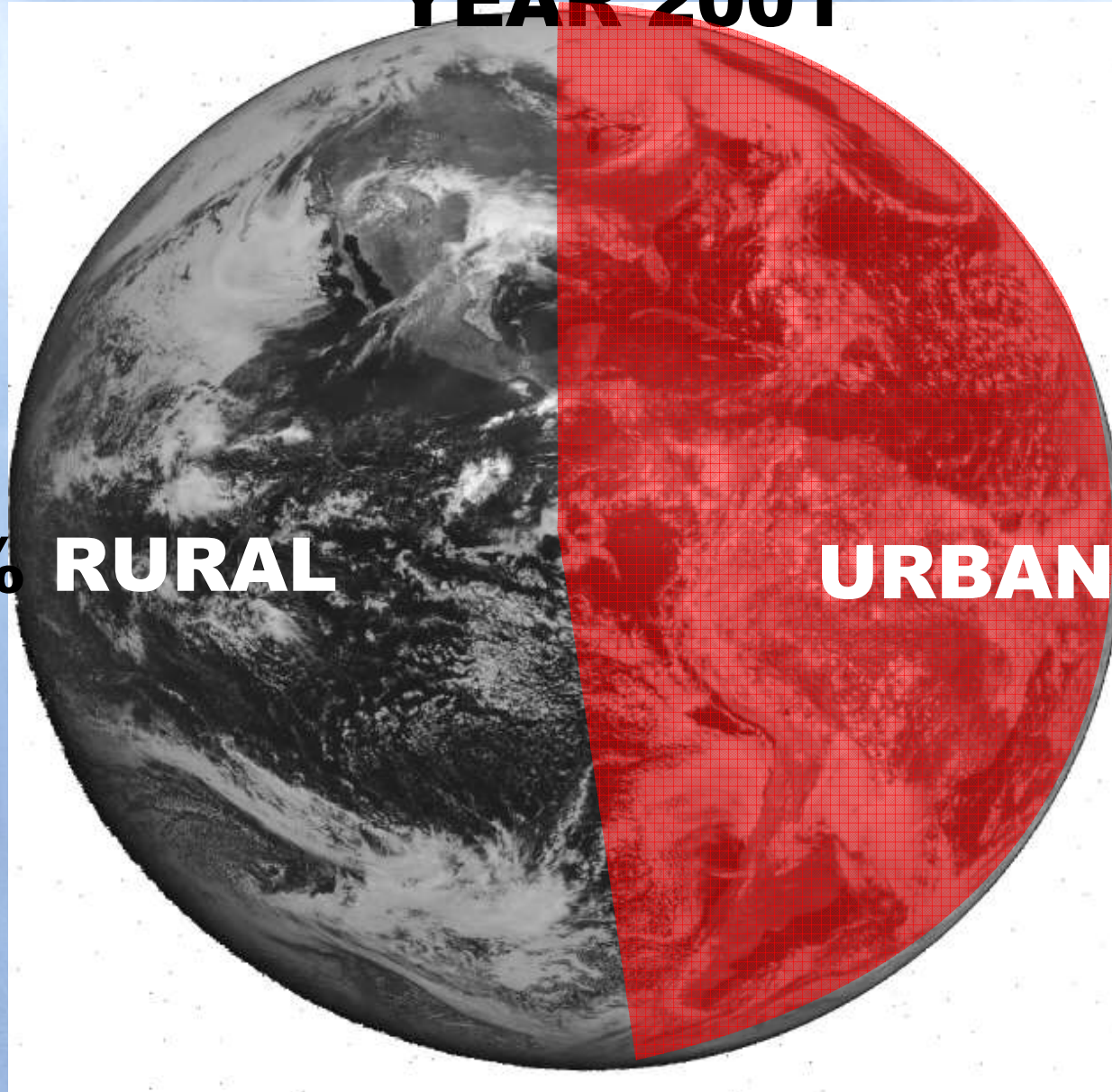
URBAN 37%



YEAR 2001

53% RURAL

URBAN 47%



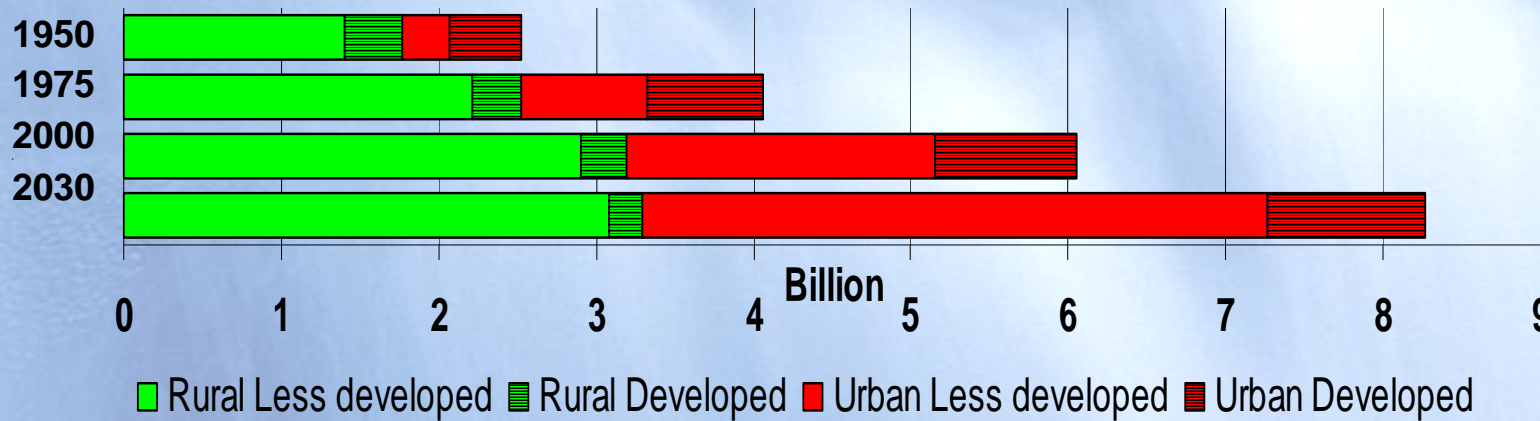
YEAR 2020

44% RURAL

URBAN 56%



Rapid Urbanisation in poor countries



- **Additional urban population, 2000-2030, > 2 billion**

Significance in GDP and Government revenue and level of water demand

Example:

	India 2001
• Total population:	1.012 Billion
• % <u>urban</u> of total population:	29%
• Contribution of <u>urban</u> sector to GDP:	> 50%
• Contribution of <u>urban</u> sector to central Government revenue:	> 90%
• % <u>urban</u> of total water withdrawals:	17%

Water for rural areas or for expanding cities?



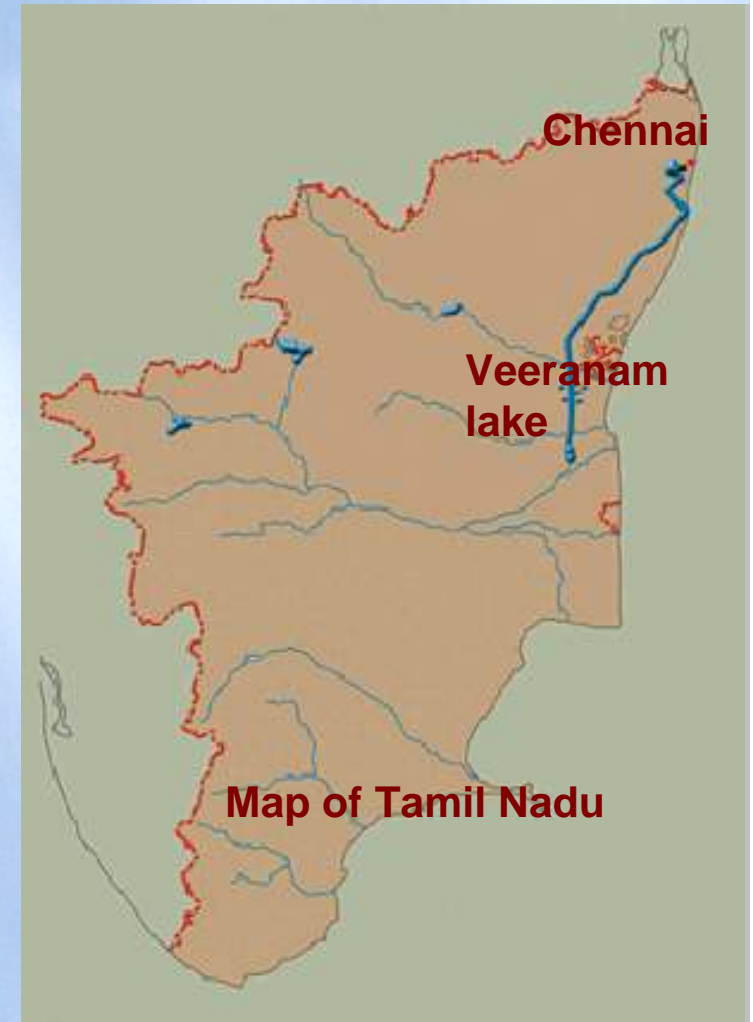
Cities in search for water

Chennai: **235 km**
(Veeranam lake) and now planning to go
farther 300 Km (Veeranam extension
project).

Bangalore: **95 km**
(Cauvery) pumping 1000 m elevation.

Delhi: **450 to 500 km**
(from Tehri dam)

Source:
CSE



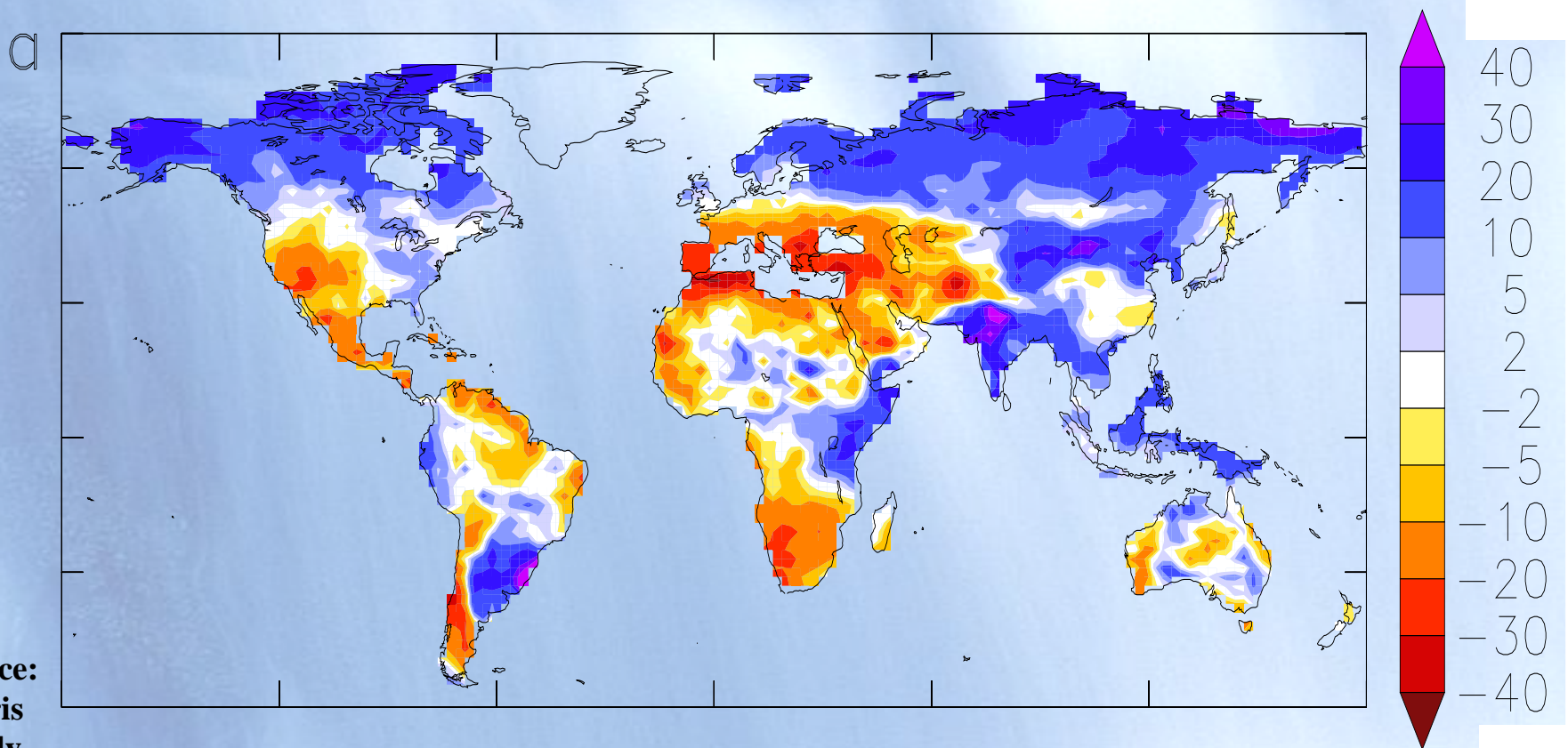
“Water Is No Longer Moving With Gravity but Moving Towards Money”

- **“The concept and application of river basin management needs to be re-examined, because the management of megacities is jurisdictional and not at the river basin level, and because of the increasing interbasin transfers.” (from WorldWaterWeek in Stockholm 2006)**
- **In some countries (USA and Australia) there are already examples of cities buying water (rights) from farmers**
 - Decreased agricultural production
 - Increased water efficiency in agriculture
- **The economic value of water in cities will always be higher than in rural areas**
- **The economy of cities is better than the rural economy**
- **20% of electricity in California is used for pumping water**

Add Climate Change

Projected percentage changes in runoff 2090-99 vs 1980-99

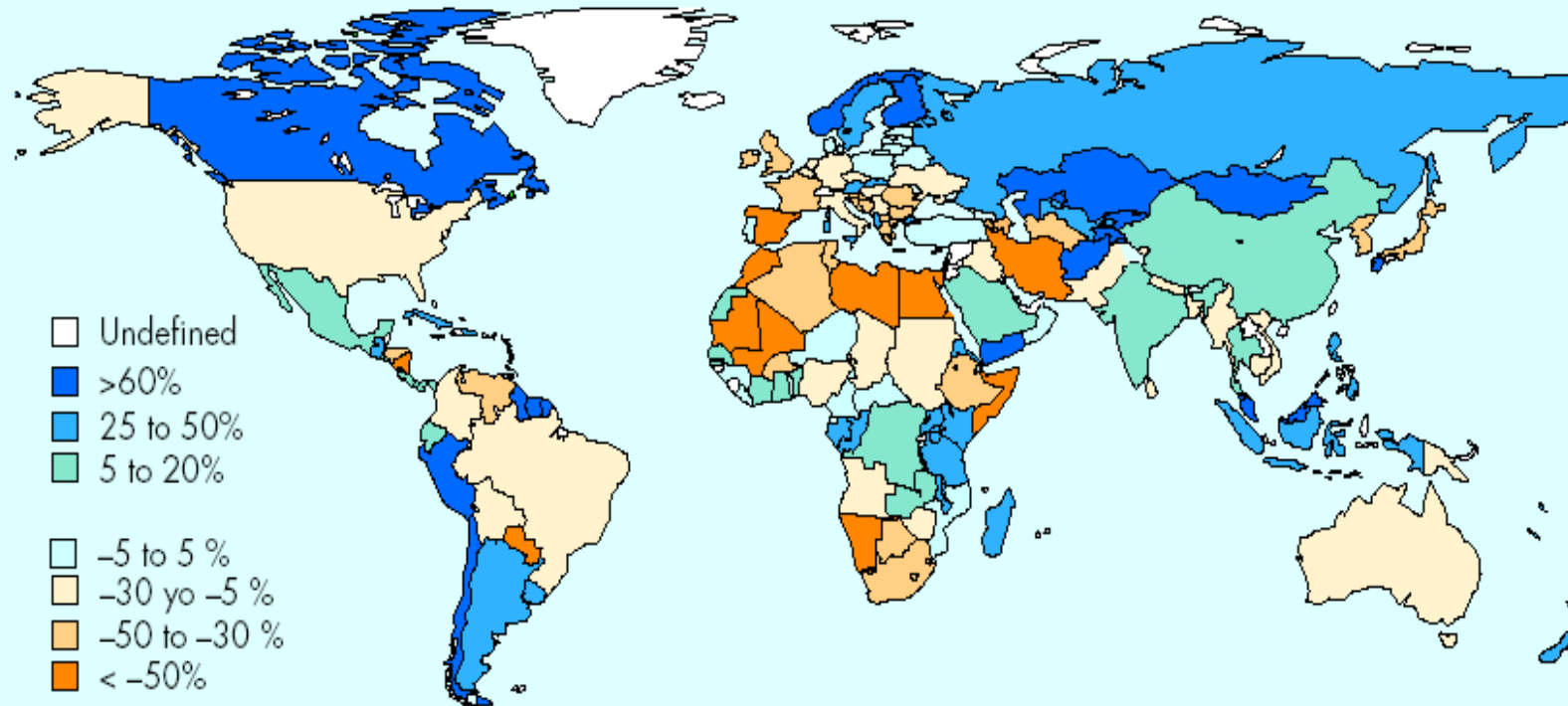
(median of ensemble of 12 models)



Source:
Chris
Milly

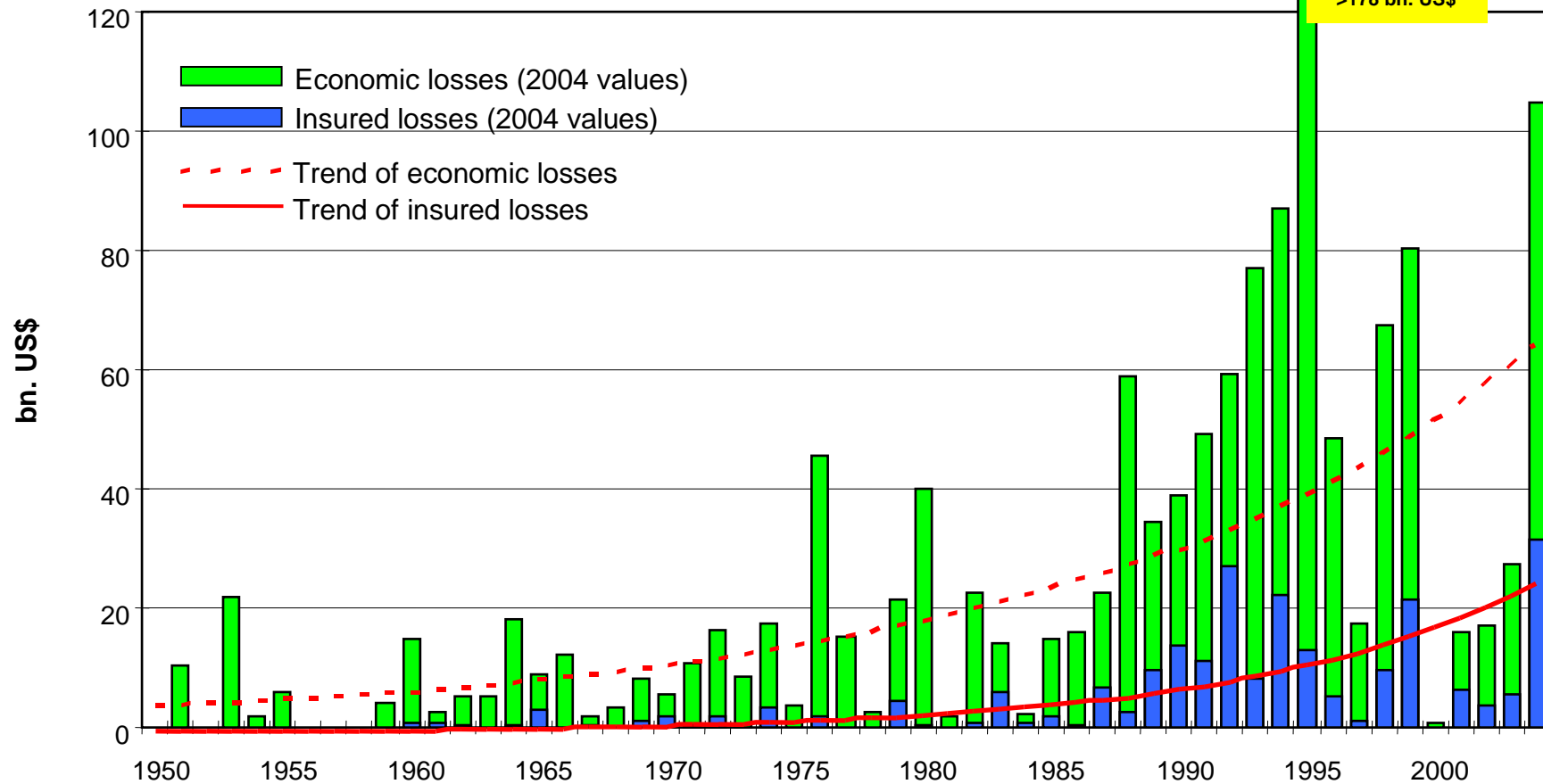
Quantitative changes of precipitation

Projected Impacts of Climate Change



Source: IIASA

High Costs if risks are not considered... considerable gains if they are!



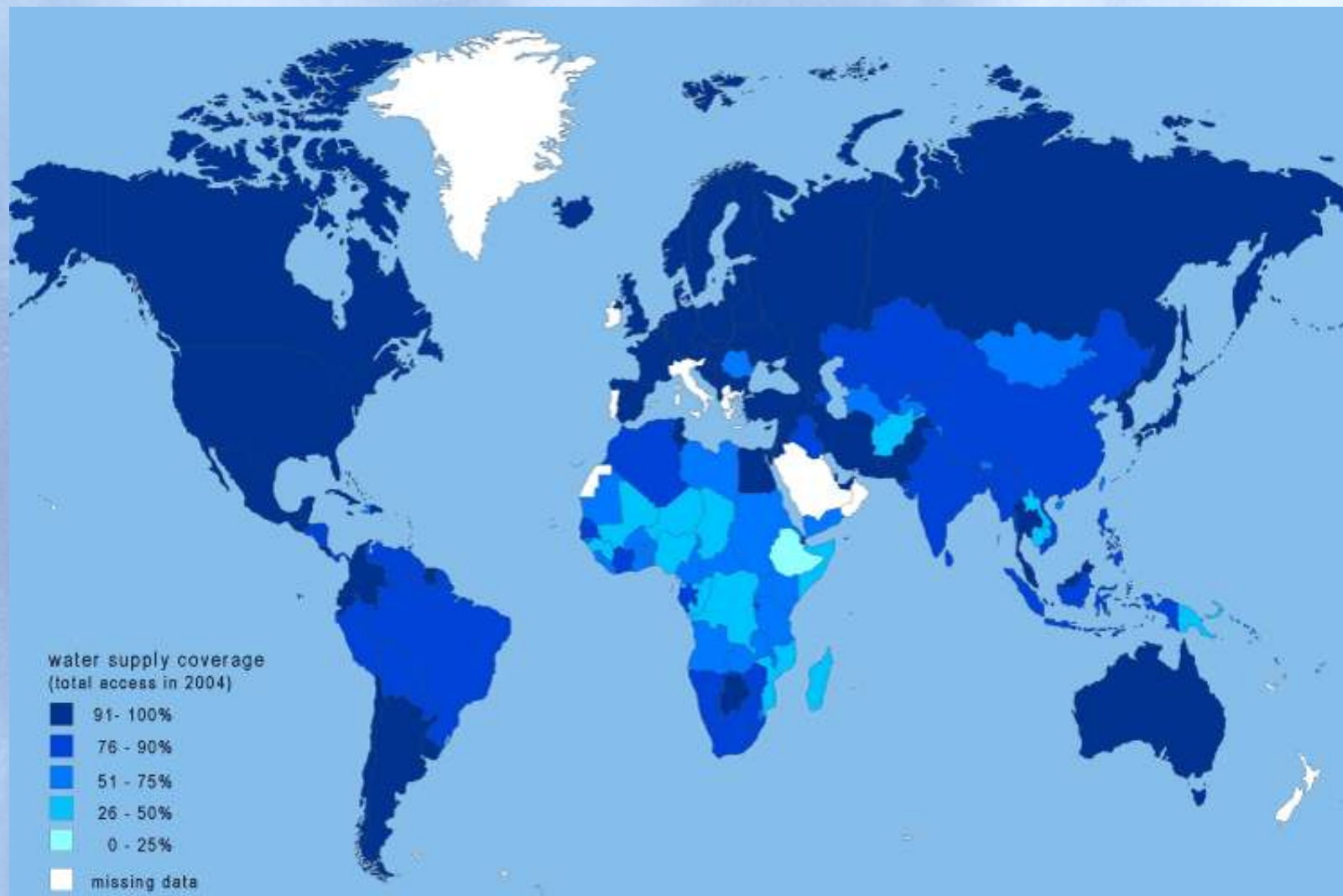
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Limits – reached or breached

- **Closed basins – no water left for more development – Yellow River, Colorado, Amu/Syr Darya, Murray-Darling, Egypt's Nile, Lerma-Chapala, Jordan, Gediz, Zayanda Rud, Indus, Cauvery, Krishna, Chao Phraya,....**
- **Groundwater overdraft – in many regions**
- **By 2025 more than 3 billion people could be living in water-stress countries – and 14 countries will slip from water stress to water scarcity.**
- **The share of the population of Sub-Saharan Africa living in water stressed countries will rise from 30 to 85%**
- **In the Arab States average water availability will fall by more than a quarter.**
- **High population countries such as China and India will be entering the global water-stress league.**

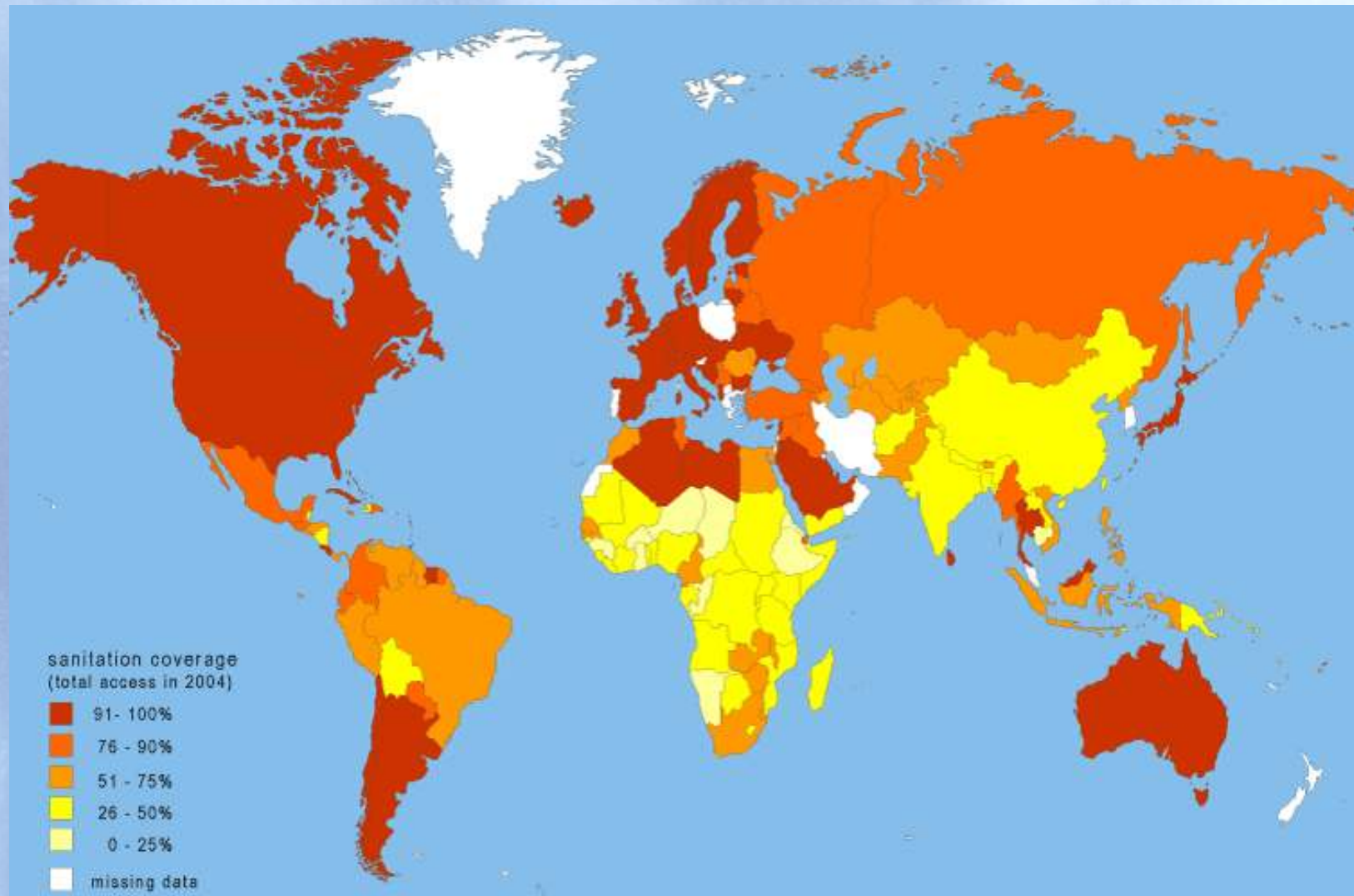
Water supply and sanitation

Present situation, drinking water

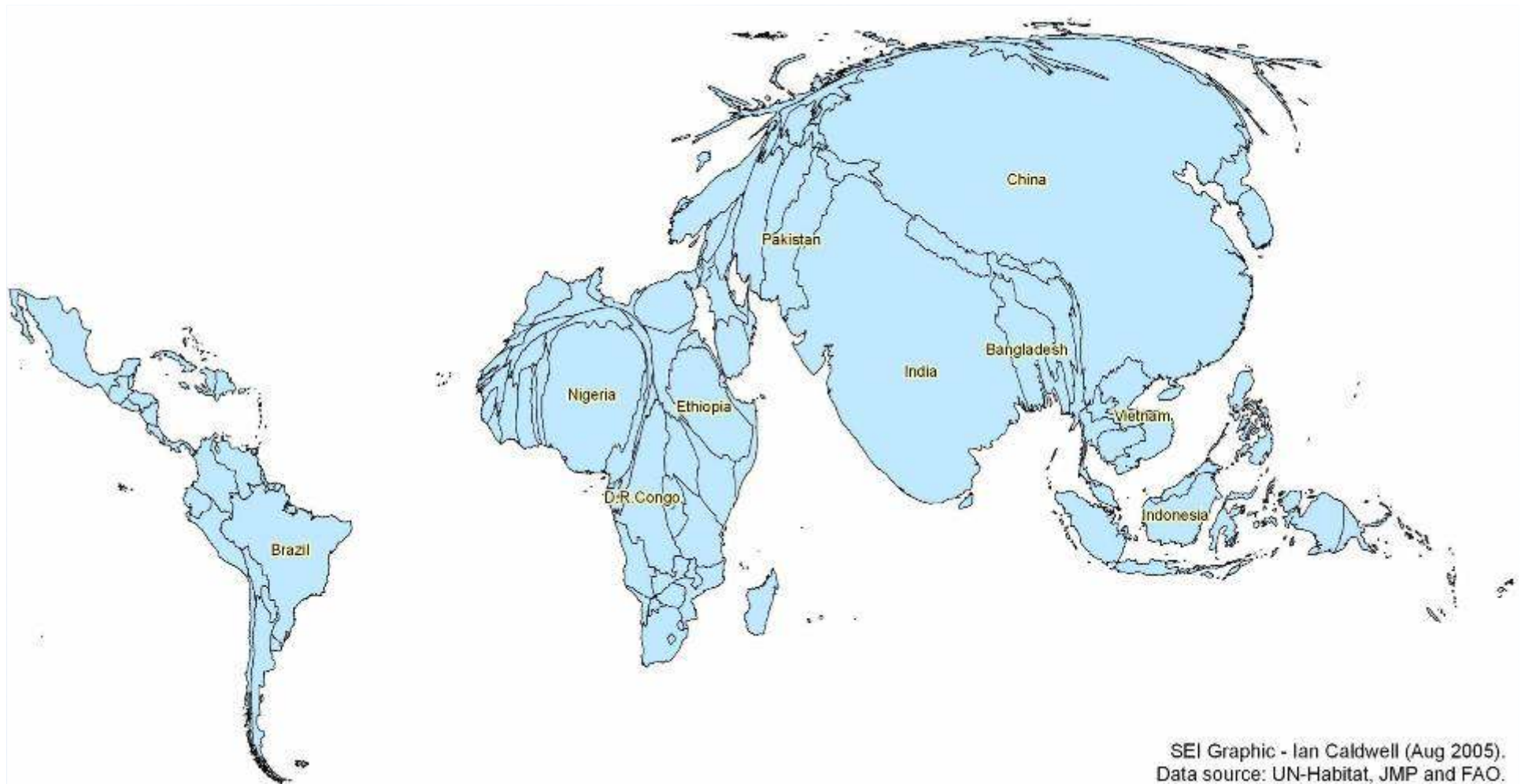


Source:
Joint
Monitoring
Programme

Present situation, sanitation



Source:
Joint
Monitoring
Programme



Map showing the relative size of the MDG sanitation target for each country based on the number of installations required through to 2015

- 450 000 people served /day to reach the Millennium Development Goal
- 90 000 toilets/day?
- 60 % urban

Not only a poverty-related problem

- Drinking water

	Living in low-income countries	Living in middle-income countries	Total
Living below the poverty line	320	96	416
Living above the poverty line	30	259	289
Total	350	355	705

Table 2.1 Distribution of the global population without access to safe water supply. Figures in millions.

- Sanitation

	Living in low-income countries	Living in middle-income countries	Total
Living below the poverty line	540	93	633
Living above the poverty line	565	730	1295
Total	1,105	823	1,928

Table 2.2 Distribution of the global population without access to basic sanitation. Figures in millions.

- **2.6 billion people—half the developing world's population--lack access to sanitation**
- **On average, only about 1 person in 3 in South Asia and in Sub-Saharan Africa has access—in Ethiopia, it is 1 in 7.**
- **Access to sanitation is one of the strongest determinants of child survival: the transition from unimproved to improved sanitation reduces child mortality by a third**

What to do?

- **Water supply and sanitation:**
 - Improve management, financing and knowledge
- **Food production and consumption:**
 - Increase water efficiency in agriculture (reduce losses through evapotranspiration)
 - Reduce losses of food in the food-chain
 - Reduce your water footprint
 - Use trade as an instrument