

Sufficient food and *water* for active living

Perspective ex:
UN Water , World Water Assessment Programme

Sufficient food and water

Water security:-

- ‘the reliable availability of an acceptable quantity and quality of water for health, livelihoods and production, coupled with an acceptable level of water-related risks.’
- Addresses both natural resource and domestic services
- Not the same as ‘food security’ and ‘energy security’,
- Also captures destructive aspects: floods and droughts

Sufficient food and water

- To achieve water security, need
 - Investments in infrastructure to store and transport water, treat and reuse waste water
 - robust institutions, able to take and implement decisions
 - information and the capacity to predict, plan and cope

Sufficient food and water

- **Some starting points:**
- Water is priority for most communities!
- Essential for life (nutrition, health)
- For domestic use (hygiene, sanitation, cooking, cleaning)
- Quality also important (water must be safe)
- Availability constrained by resources (time, money)
- “*Sufficient*”: relative, but minimum can be defined
- “**Sanitation**”, often requires water, also impacts water
 - Health an outcome but often not a driver
- **Production**, important, more difficult to define
- Also consider water related **risks**
- And water and **biodiversity**

Narrow focus: Access to sufficient safe water (for human consumption and domestic use)

- Outcome:
- *Households* uses a *safe* (either by nature of delivery technology used or environmental source) and *reliable* (no good if household often reverts to unsafe sources) *sources* of water, close enough to dwelling (otherwise rationing by time and effort) to access in *adequate quantities* (for basic domestic requirements) and in *conditions of security* (particularly for women and girls) at an *affordable* cost (relative to total income?)

Narrow focus: Access to sufficient safe water (for human consumption and domestic use)

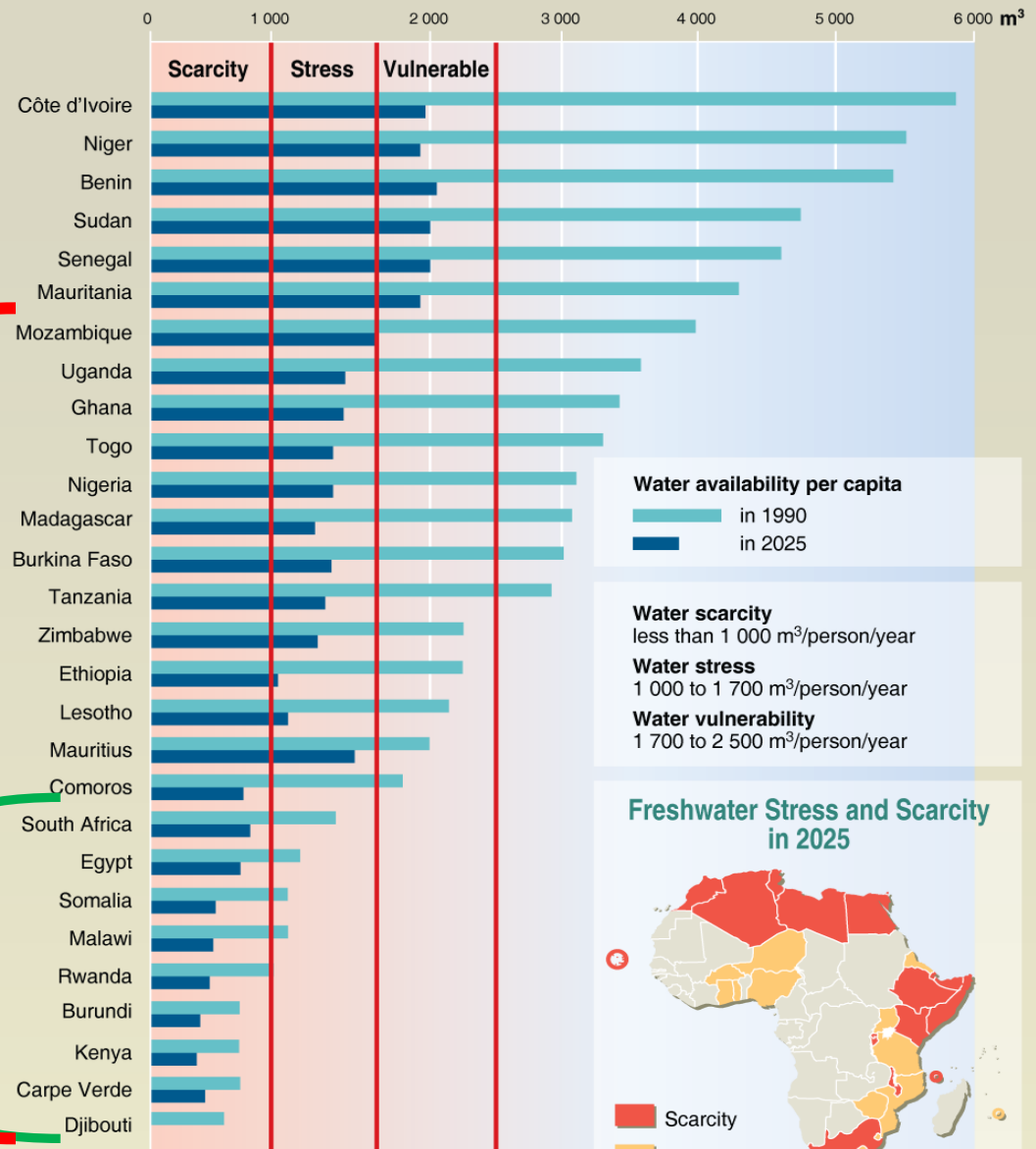
- Indicator:
- Access to a safe source (traditional)
 - availability of infrastructure but a “dry tap” problem
- Use of safe water (tweak current)
 - Proportion of households that obtained a sufficient quantity of water from a “safe” source, ***normally*** and ***yesterday*** – works in household surveys; seasonality?
 - More difficult to cheat with “dry taps”

Wider focus: water for livelihoods; safety from water-related disasters: floods and drought

- In (particularly) rural societies, water critical for food and livelihoods
- **Desired outcomes:**
- Adequate reliable water supply to meet food and livelihood needs
- **Indicators**
- Water / capita “Water scarcity indicators” of limited use
- Provide a conceptual “envelope of opportunity”
- Trends more about population than water

Is population pressure on water an issue?

Water Availability



Water availability per capita

in 1990
in 2025

Water scarcity

less than 1 000 m³/person/year

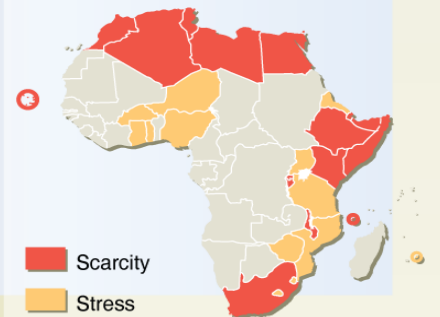
Water stress

1 000 to 1 700 m³/person/year

Water vulnerability

1 700 to 2 500 m³/person/year

Freshwater Stress and Scarcity in 2025



Scarcity
Stress

Water stressed 2025

Water stressed 1990

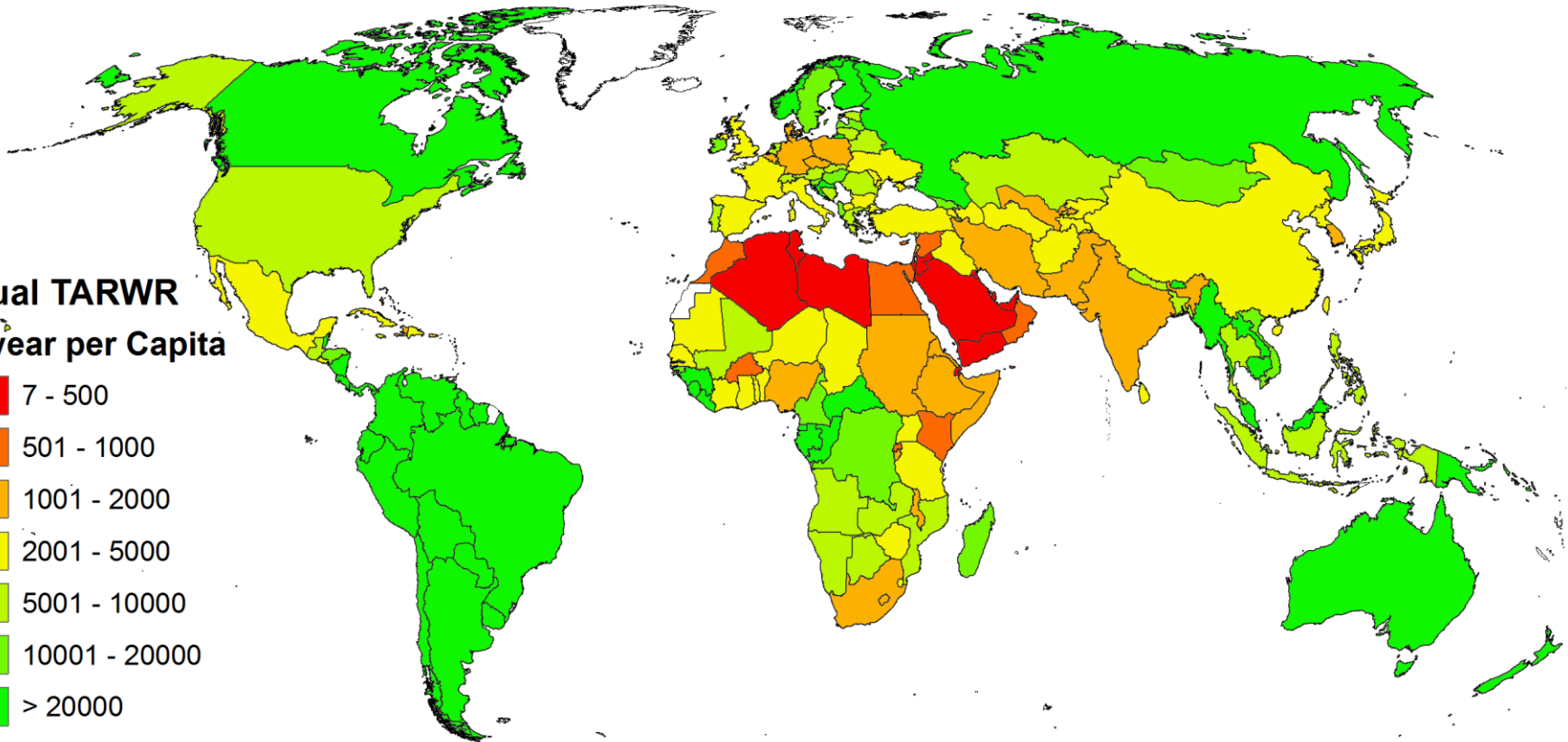
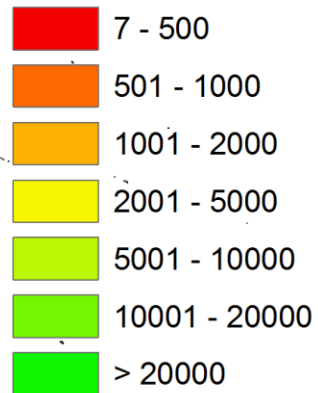
Wider focus: water for livelihoods; safety from water-related disasters: floods and drought

- **Disasters (floods, droughts)**
 - impact on food production and livelihoods
 - Impose on poor communities through damage to assets
- **Desired outcomes:**
 - Reduced vulnerability/greater resilience to drought and flood
- **Indicators for Drought and flood vulnerability**
 - Proportion of population at risk
 - Below a particular flood line (100 year, 10 year)
 - Drought risk to rain dependent livelihoods

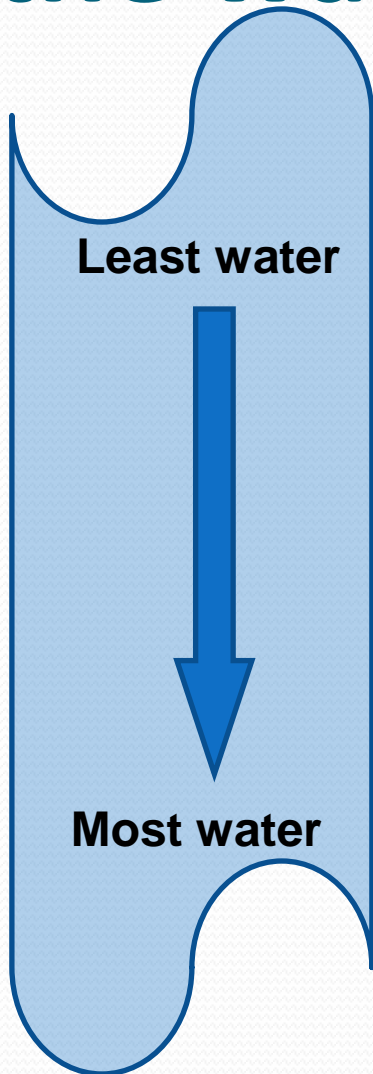
Scarcity/availability*

(* *surface water/person/year*)

**Actual TARWR
m³/year per Capita**



Who has the water?



COUNTRY	Water m ³ /p/yr
Gaza strip	41
Singapore	139
Rwanda	610
Egypt	790
Kenya	930
South Africa	1110
Denmark	1120
Korea, s	1450
Eritrea	1470
Ethiopia	1680
China	2140
Burundi	2190
United Kingdom	2460
Uganda	2470
Swaziland	4160
Botswana	6820
Namibia	8810
Zambia	9630
Mozambique	11320
DRC	23850

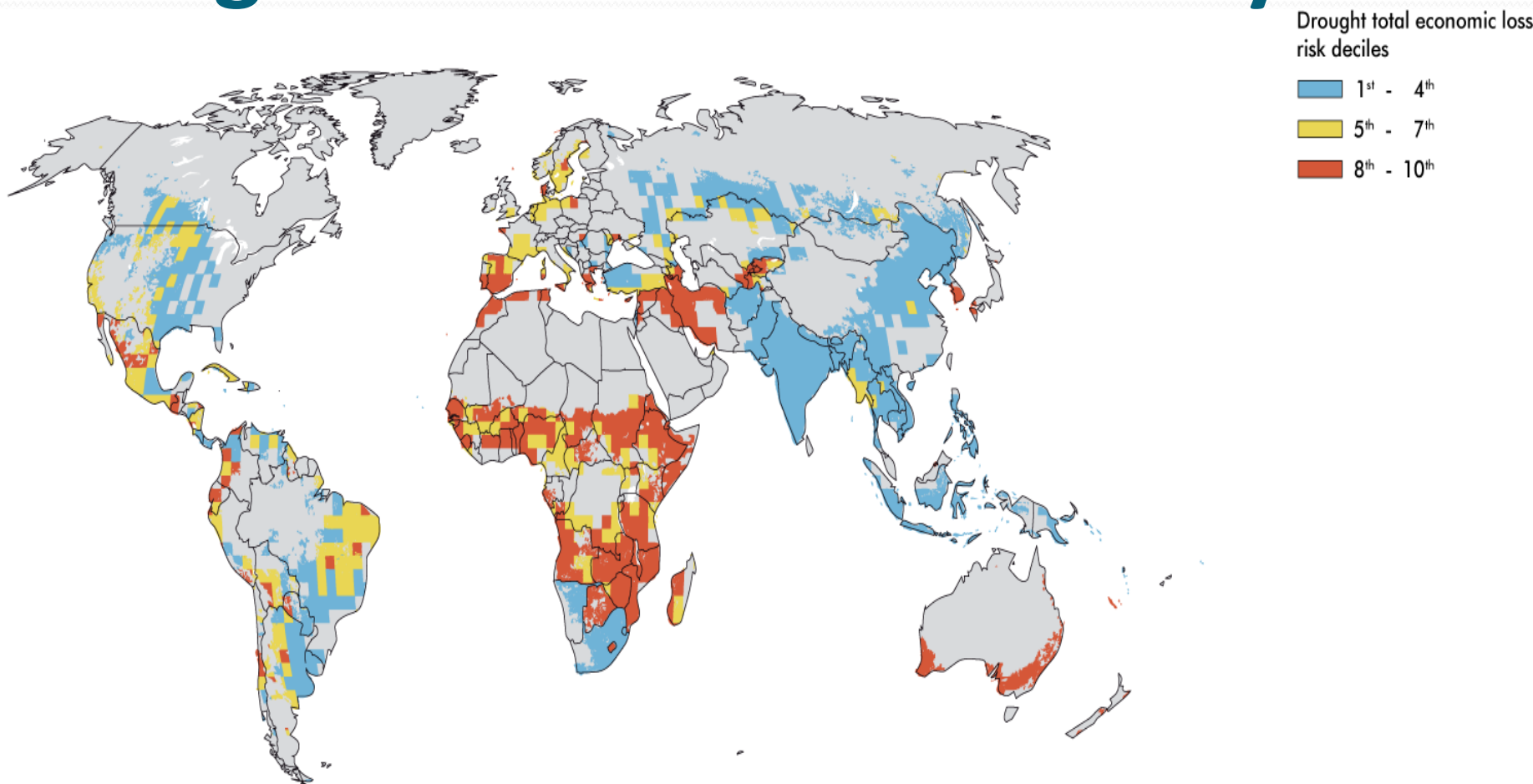
Who uses their water?

COUNTRY	AVAILABILITY M3 P/C	USE %
Angola	10510	0.2
Botswana	6820	1
Lesotho	1680	2
Malawi	1400	6
Mozambique	11320	0.3
Namibia	8810	2
South Africa	1110	31
Swaziland	4160	18
Zambia	9630	2
Zimbabwe	1584	13
DRC	23850	0.03

Who uses their water?

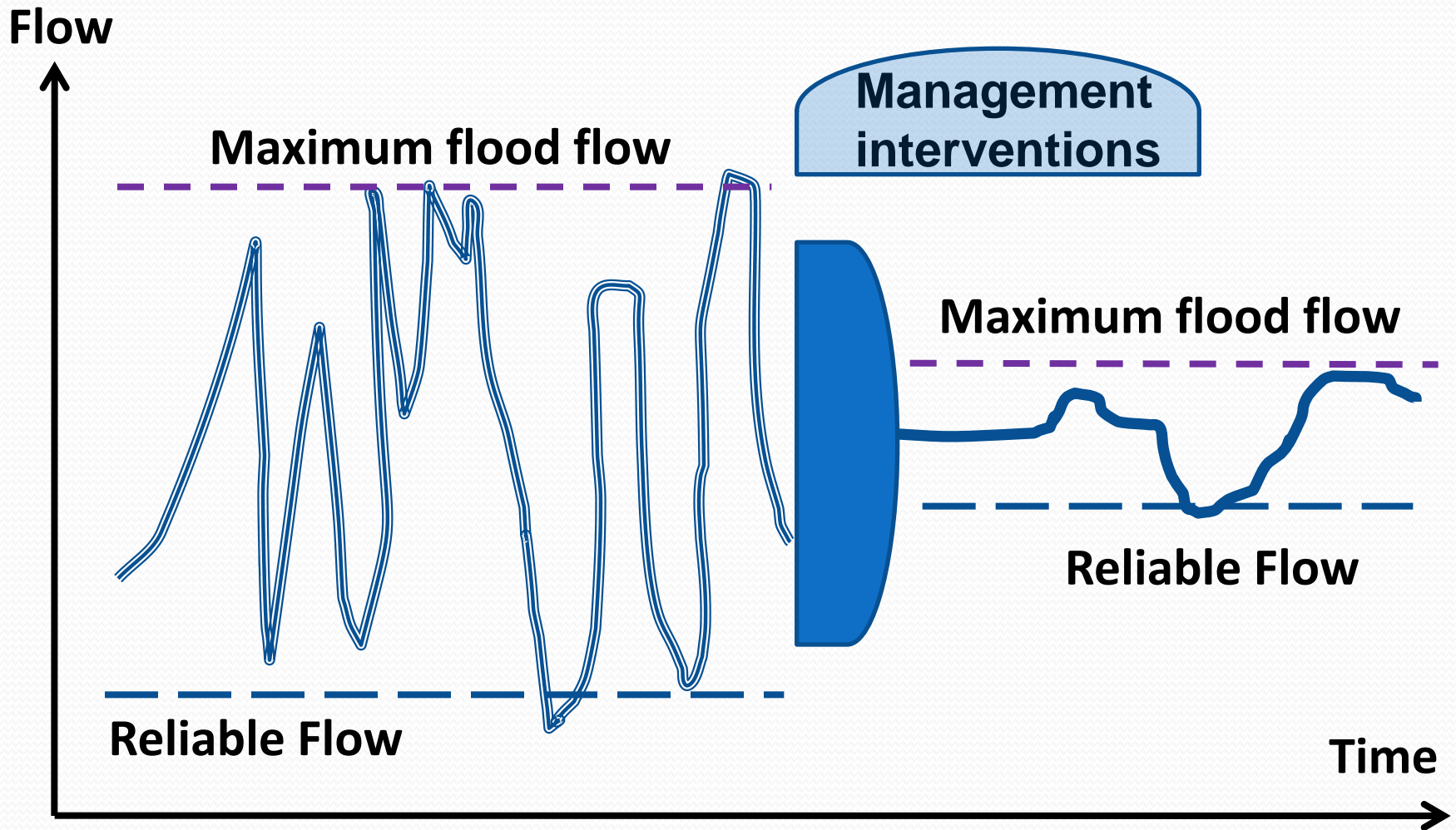
	WATER	
COUNTRY	AVAILABLE M3 P/C	USE %
Egypt	790	118
Sudan	1880	58
Ethiopia	1680	2
Eritrea	1470	5
Uganda	2470	0
Kenya	930	5
Tanzania	2420	2
Rwanda	610	1
Burundi	2190	2

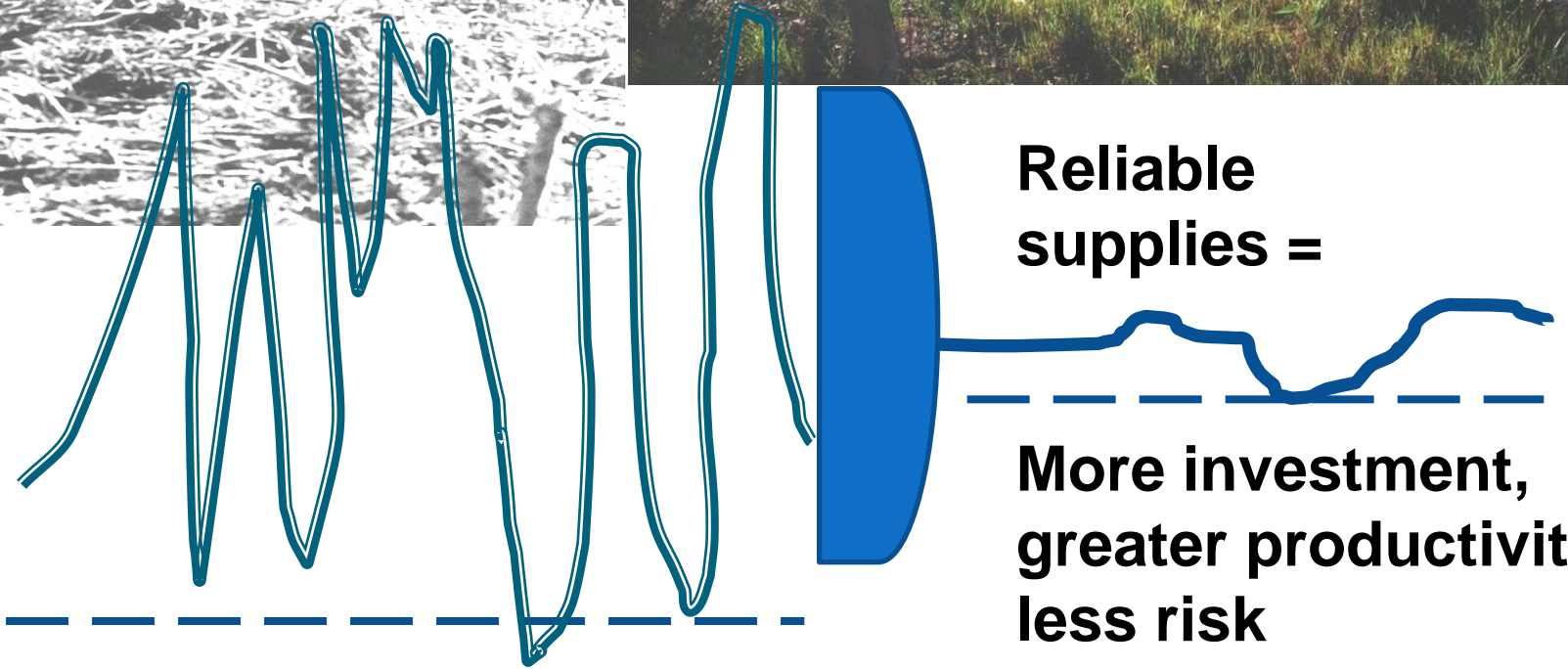
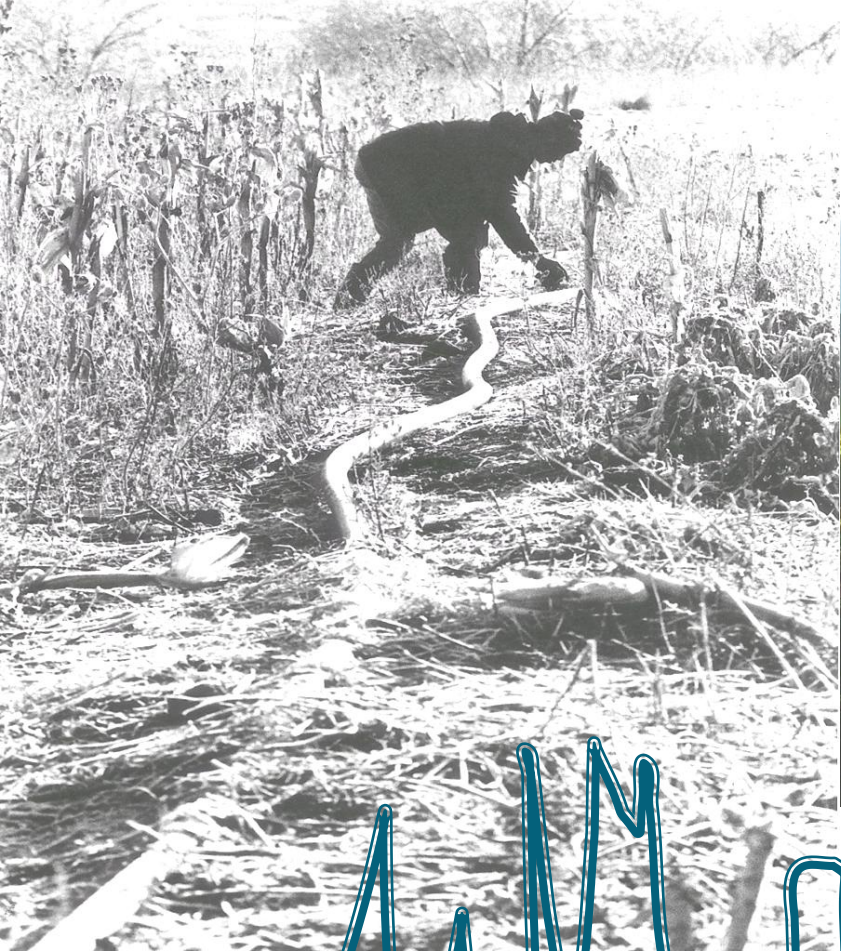
Droughts risk and vulnerability



UNEP/GRID-Arendal, Droughts - risk and vulnerability (economic loss, as a proportion of GDP density), UNEP/GRID-Arendal Maps and Graphics Library,

How water resource development & management supports economies





Money scarcity not water scarcity

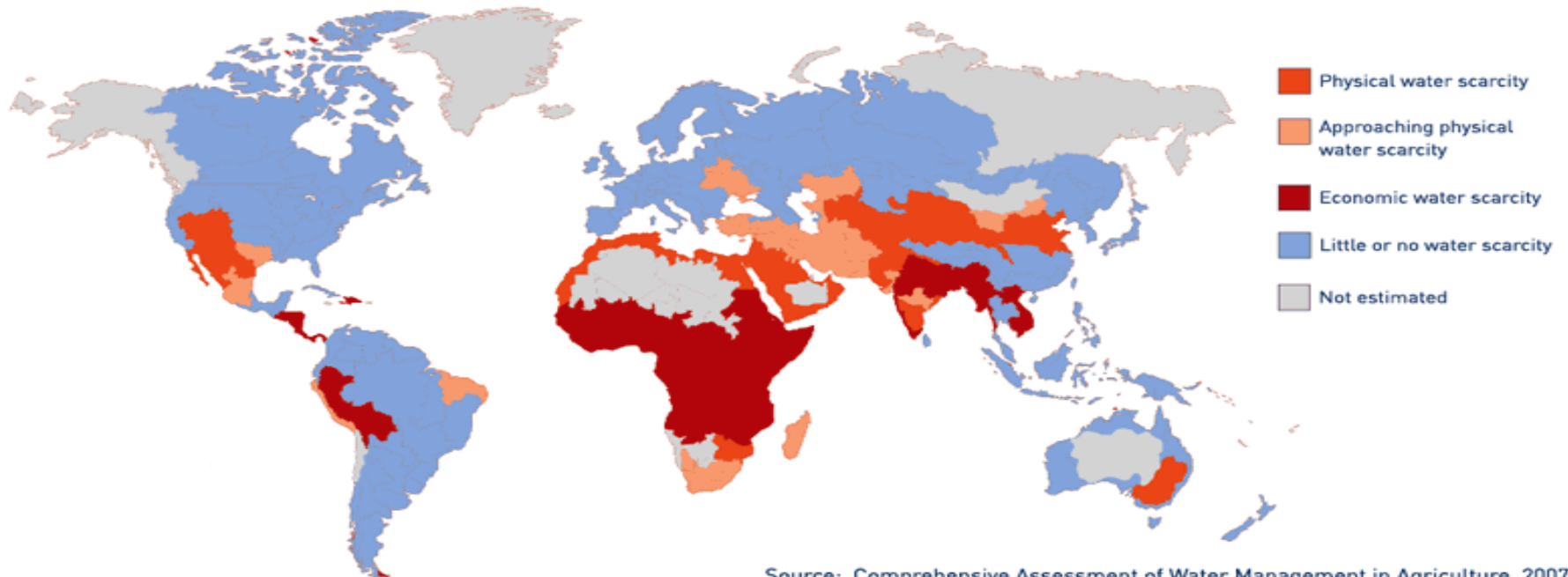
AREAS OF PHYSICAL AND ECONOMIC WATER SCARCITY

Physical water scarcity (water resources development is approaching or has exceeded sustainable limits). More than 75% of the river flows are withdrawn for agriculture, industry, and domestic purposes (accounting for recycling of return flows). This definition—relating water availability to water demand—implies that dry areas are not necessarily water scarce.

Approaching physical water scarcity. More than 60% of river flows are withdrawn. These basins will experience physical water scarcity in the near future.

Economic water scarcity (human, institutional, and financial capital limit access to water even though water in nature is available locally to meet human demands). Water resources are abundant relative to water use, with less than 25% of water from rivers withdrawn for human purposes, but malnutrition exists.

Little or no water scarcity. Abundant water resources relative to use, with less than 25% of water from rivers withdrawn for human purposes.



- National availability offers limited perspective, does not talk to uncertainty
- Availability a function of population ...
- long term physical trends << short term trends
- Proportion of available water stored is widely used by technocrats but challenged by environmentalists
- Storage limited by finance boycott, limited own funds

Emerging new practice

China's Involvement in Key African Dams

Sudan

The 1250 MW **Merowe Dam** on the fourth cataract of the Nile is Sudan's biggest hydropower project. The project was funded...

In 2010, the Sudanese government contracted the Chinese company Sinohydro to build the 360 MW **Kaibar Dam** on the Nile's third ...

In 2010, the Sudanese government also contracted two other Chinese companies to build the **Shereik Dam** on the Nile's fifth cataract, and a hydropower and irrigation ...

Zambia

The largest utility in Zambia, Zesco, announced in 2003 that it will contract with Sinohydro for the development of the 660 MW **Lower Kafue Gorge Dam**. The proposed power station would have a generating capacity of about 750 MW and the estimated cost of US \$600 million. Zambia plans

Republic of Congo

The China Exim Bank bankrolled the construction of the 120 MW **Imboulou Dam** on the Lefini river, a...

In **Gabon**, a Chinese consortium headed by China National Machinery & Equipment Import & Export Corp signed a deal in September 2006 to invest US\$3 billion to mine iron-ore for export to China - the world's largest producer of steel. The project also includes construction of railways, a port and two hydroelectric dams to be completed within three years.

Ethiopia

Chinese contractors have built the 300 MW **Tekeze hydroelectric dam**. ...

After the World Bank and many other banks declined to get involved in the **Gibe III Dam** on the Omo River, China's biggest bank ICBC approved a loan of \$500 million for a Chinese ... China's Gezhouba Water and Power Co. is building the 100 MW **Amerti-Neshe Dam hydropower dam** on the Neshi River.

Mozambique

The China Exim Bank has agreed to finance the proposed **Mphanda Nkuwa Dam** on the Zambezi... Chinese funding has also been made available for the **Boa Maria Dam** on the Pungue

Nigeria

China has expressed interest in a number of dam projects, ... [Mambila hydropower dam](#), which would increase Nigeria's electricity supply by nearly 4,000 MW, doubling its current capacity.

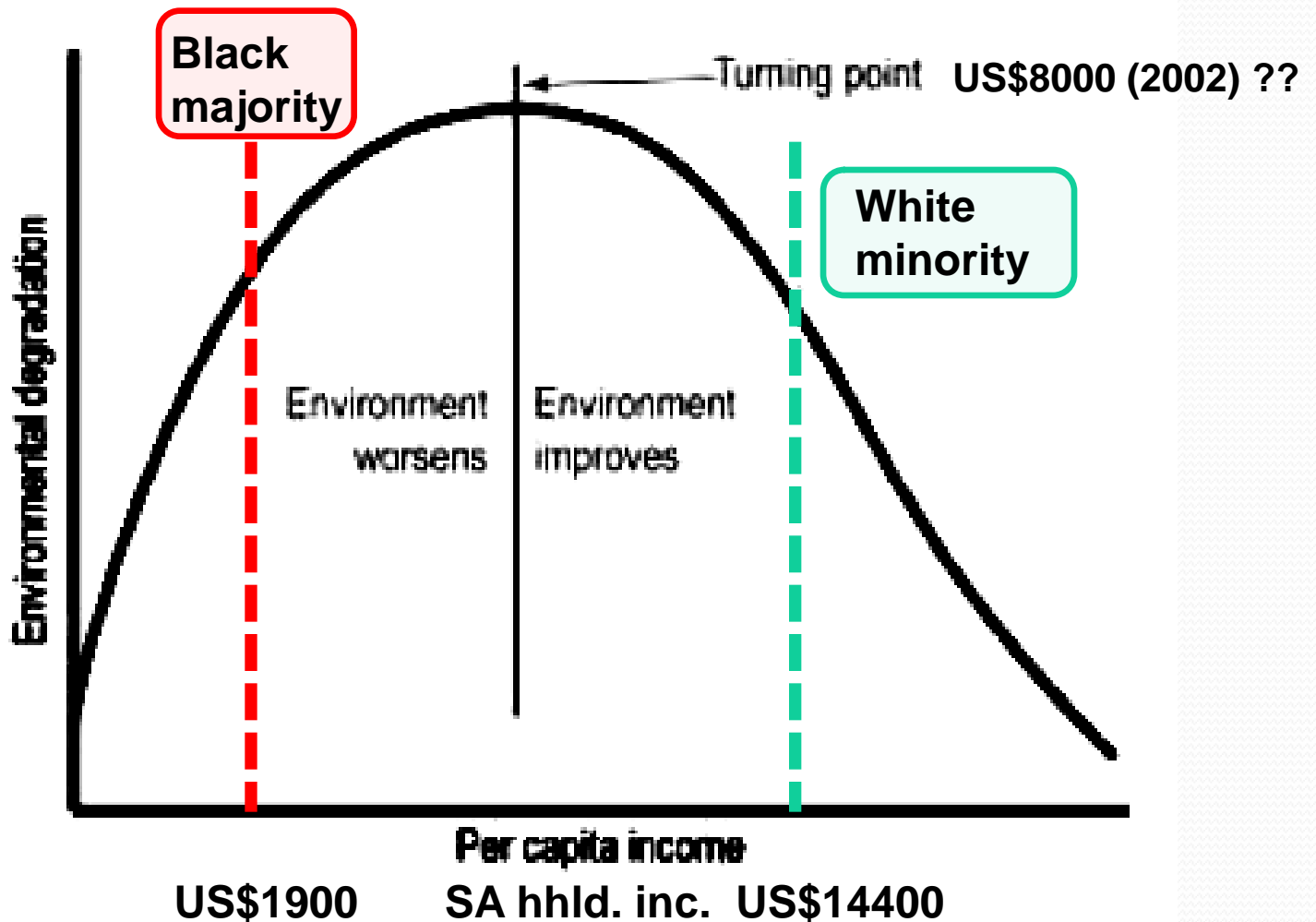
Ghana

China is building the [Bui Dam](#) Project, which is flooding nearly a quarter of the Bui National Park, destroying habitat for rare hippos, forcibly resettling 2,600 people and affecting thousands more. The project could cost

Sanitation and water pollution – the environmental Kuznets curve

- Environmental priorities change with income
- Empirically demonstrated in S Africa
- Municipal sewage treatment failing to meet standards
- Preferences and priorities change with the income of the politically dominant group
- Don't impose external environmental preferences such as “% wastewater treated” (or “no dams”)

SA's environmental Kuznet's curve



Conclusion

- Water indicators
 - Should include access to safe water
 - Sanitation improvement, as part of health
 - For reliable supply for production, consider storage
 - Floods and drought resilience, in disaster reduction
 - Pollution and related impacts, in ecosystem considerations`