ICID 18 Congress and 53 IEC Meeting
Montreal July 21-28 ,2002

Web site : www.cancid.org , e-mail : montreal2002@cancid.org

People

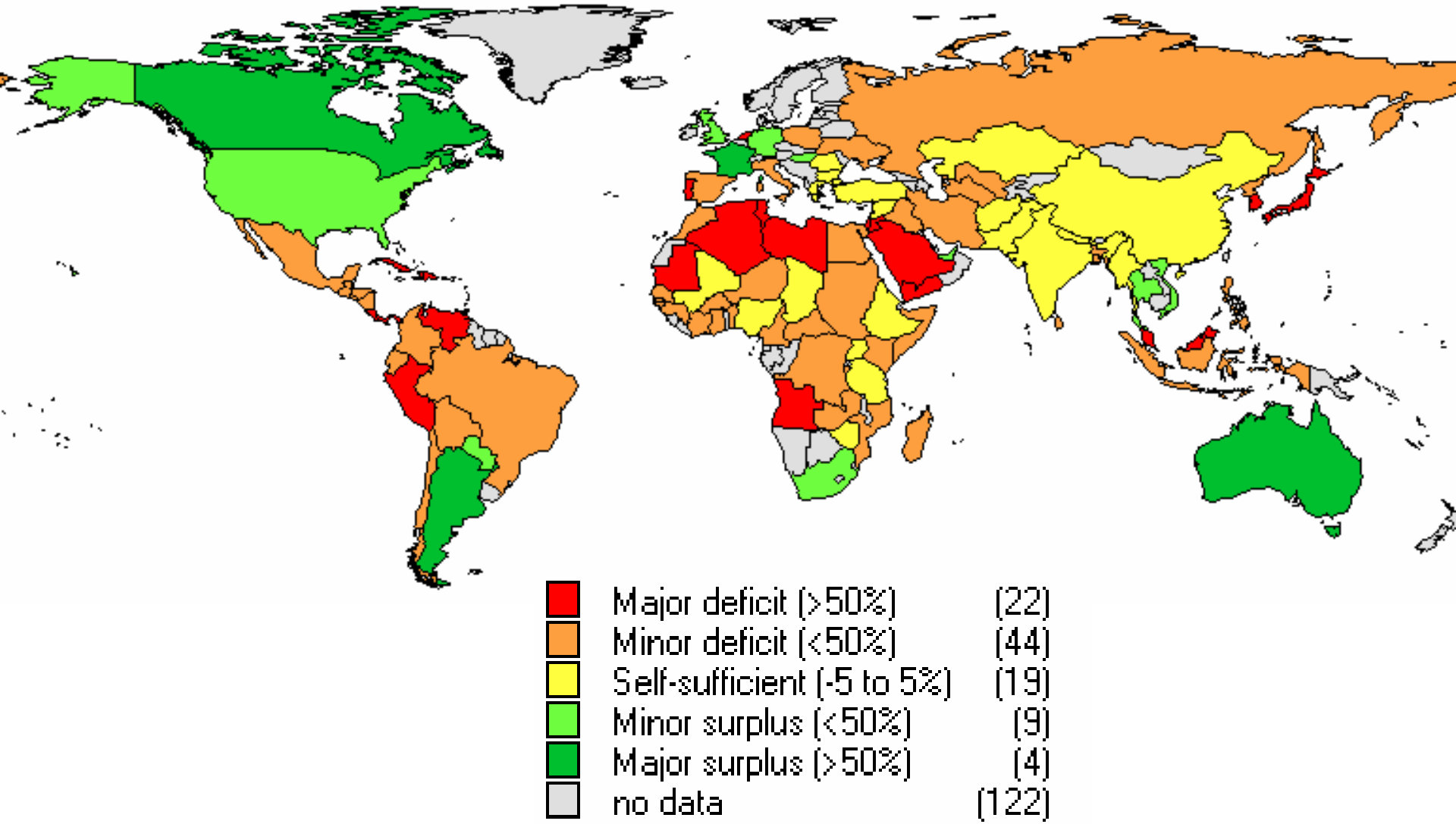
MONTRÉAL 2002

World Food Outlook

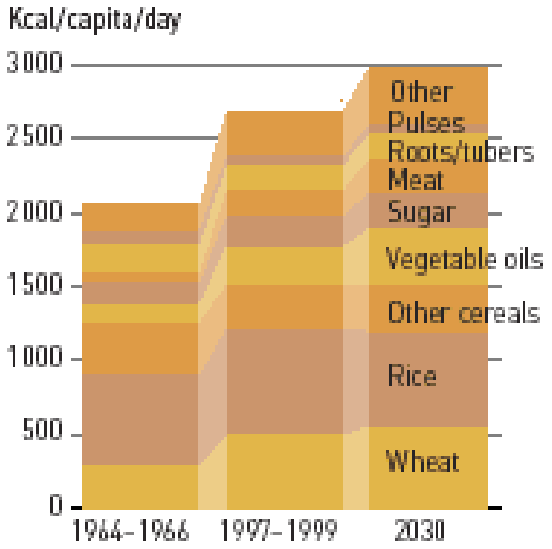
Poverty , Food and Water

Desire to alleviate poverty and hunger especially in rural areas

Food surplus and deficit in 1995

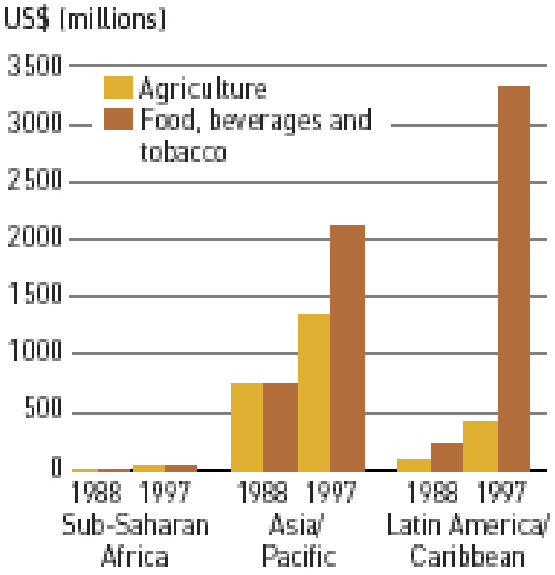


Changing diets in developing countries, 1964–1966 to 2030



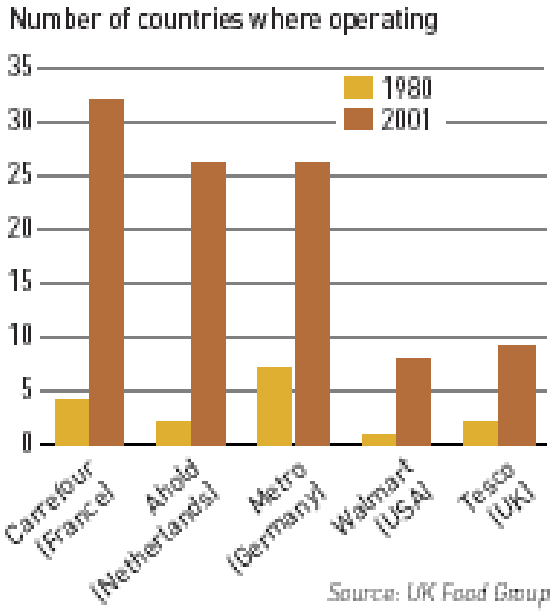
Source: FAO

Foreign investment in agriculture and the food industry, 1988–1997

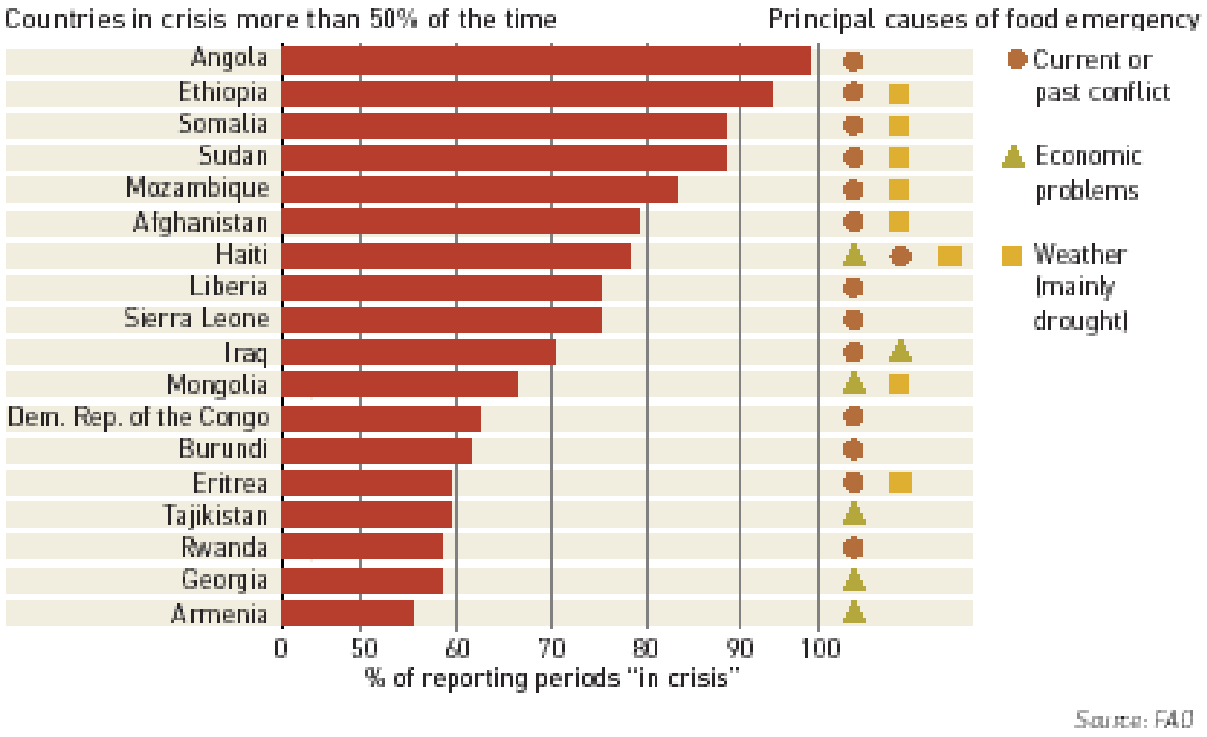


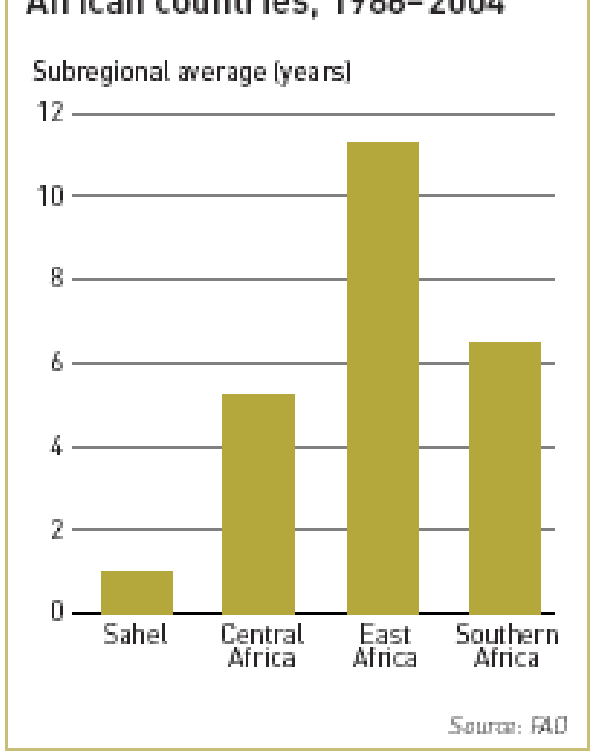
Source: FAO

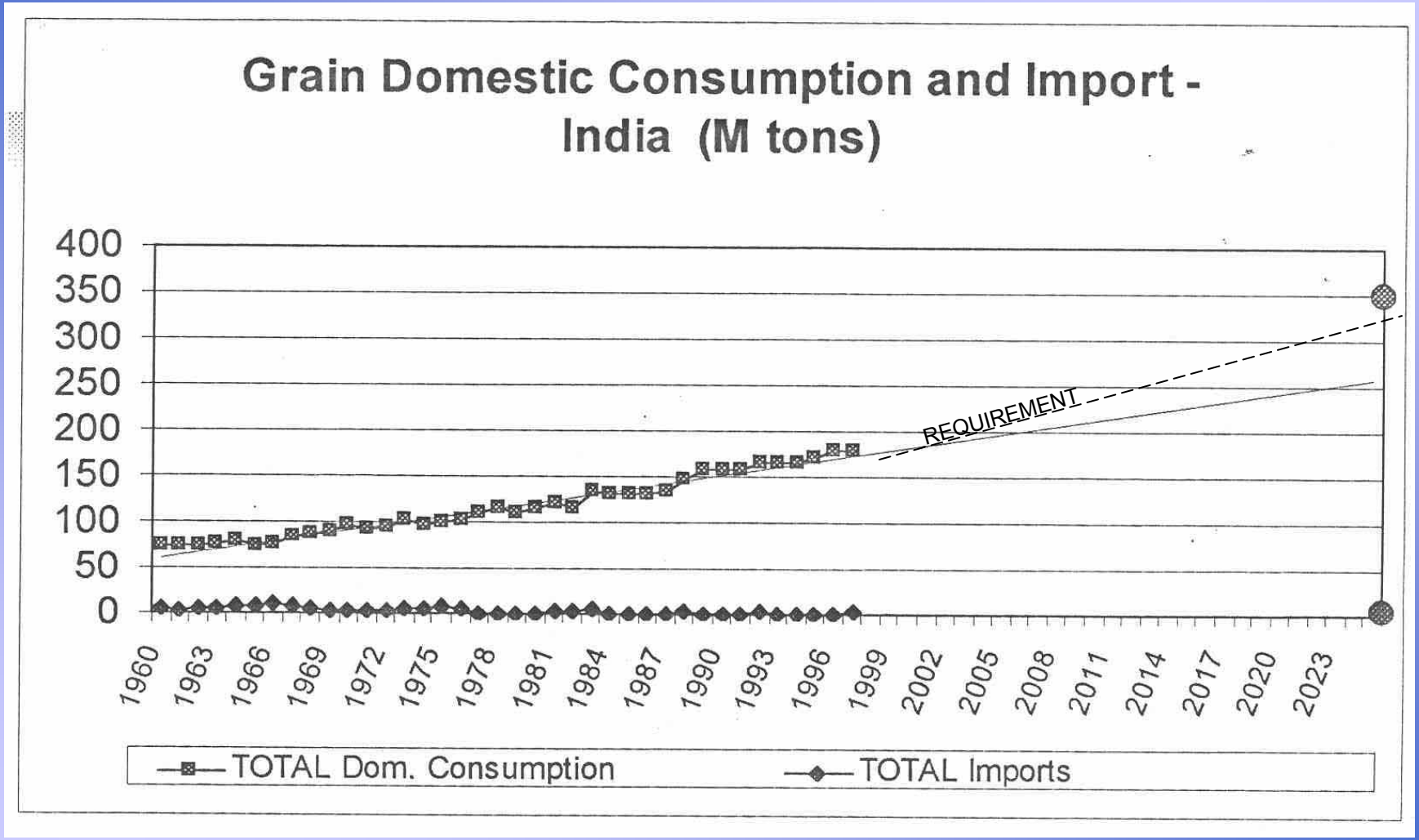
Global expansion of transnational supermarkets, 1980–2001



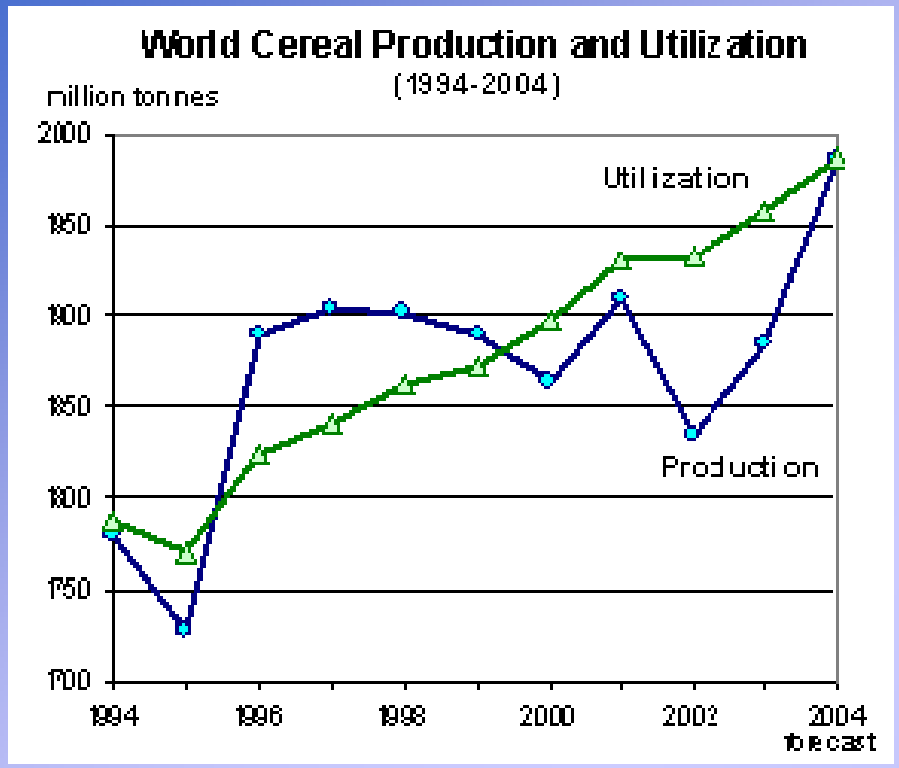
Source: UK Food Group

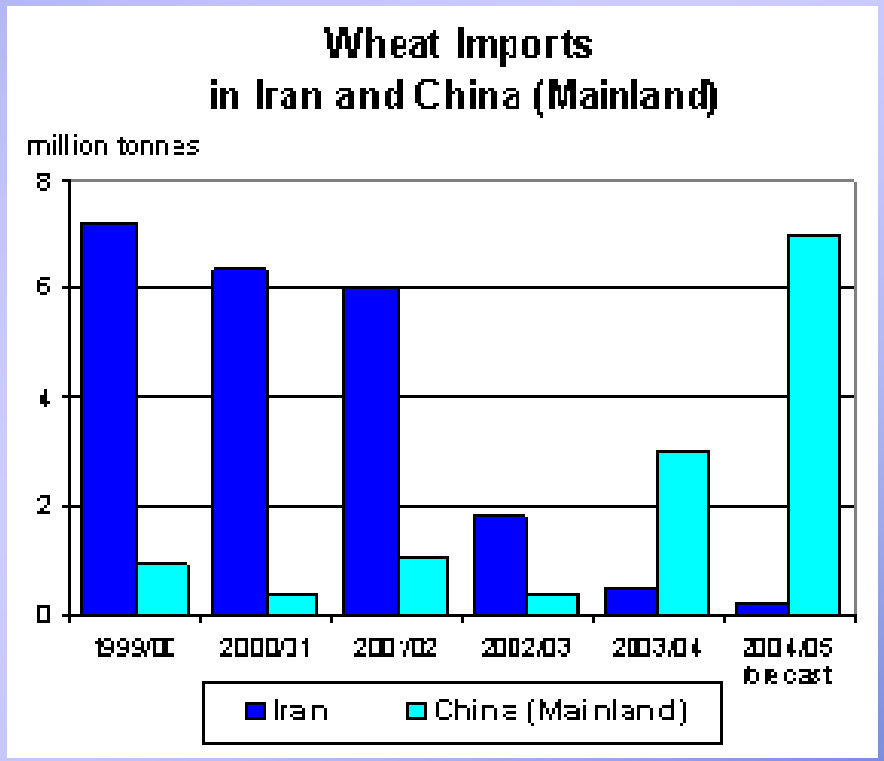

Frequency and primary causes of chronic food emergency, 1986–2004
Countries in crisis more than 50% of the time
Principal causes of food emergency
Angola
Ethiopia
Somalia
Sudan
Mozambique
Afghanistan
Haiti
Liberia
Sierra Leone
Iraq
Mongolia
Dem. Rep. of the Congo
Burundi
Eritrea
Tajikistan
Rwanda
Georgia
Armenia
0
50
60
70
80
90
100
% of reporting periods "in crisis"
Current or past conflict
Economic problems
Weather (mainly drought)
Source: FAO


Duration of longest crises in African countries, 1986–2004
Subregional average (years)
12
10
8
6
4
2
0
Sahel
Central Africa
East Africa
Southern Africa
Source: FAO



Increase irrigated area, productivity, water use efficiency



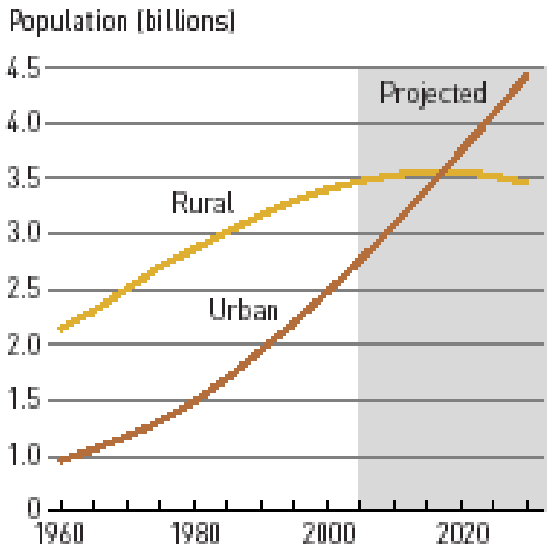


World cereal production = consumption = 2000 M metric tons

[2 B tons for 6 B persons]

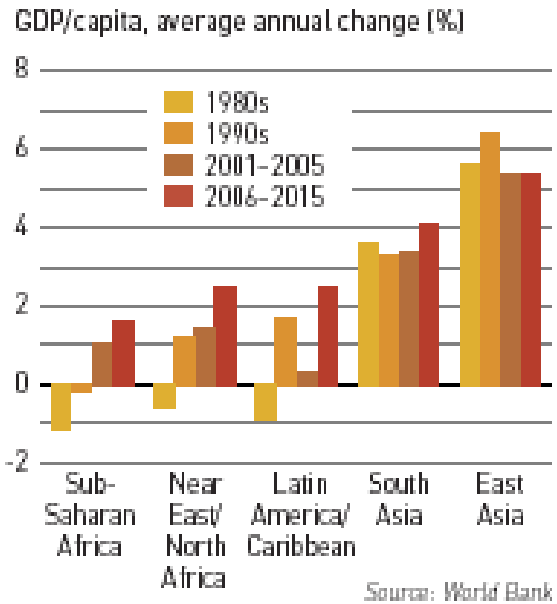
1 ton of cereals = 3-5 barrels of oil

Urbanization in developing countries, 1960–2030



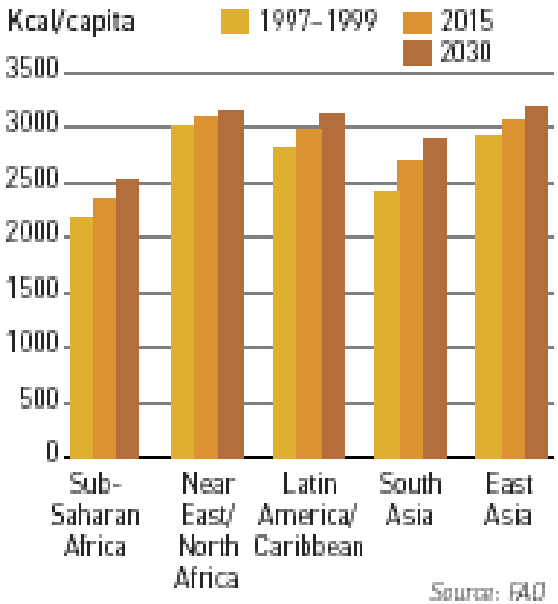
Source: UN

Changes in GDP per capita by region, 1980–2015



Source: World Bank

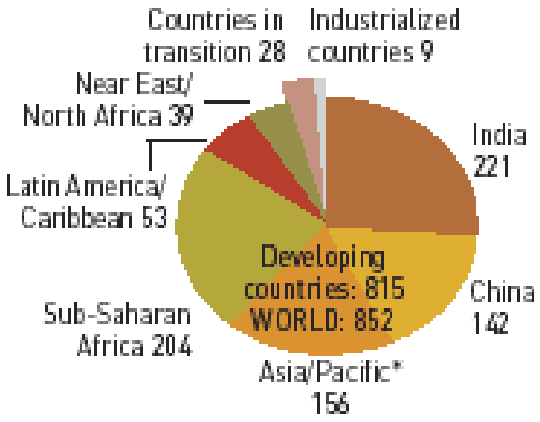
Average daily caloric intake by region, 1997–2030



Source: FAO

World Hunger Data

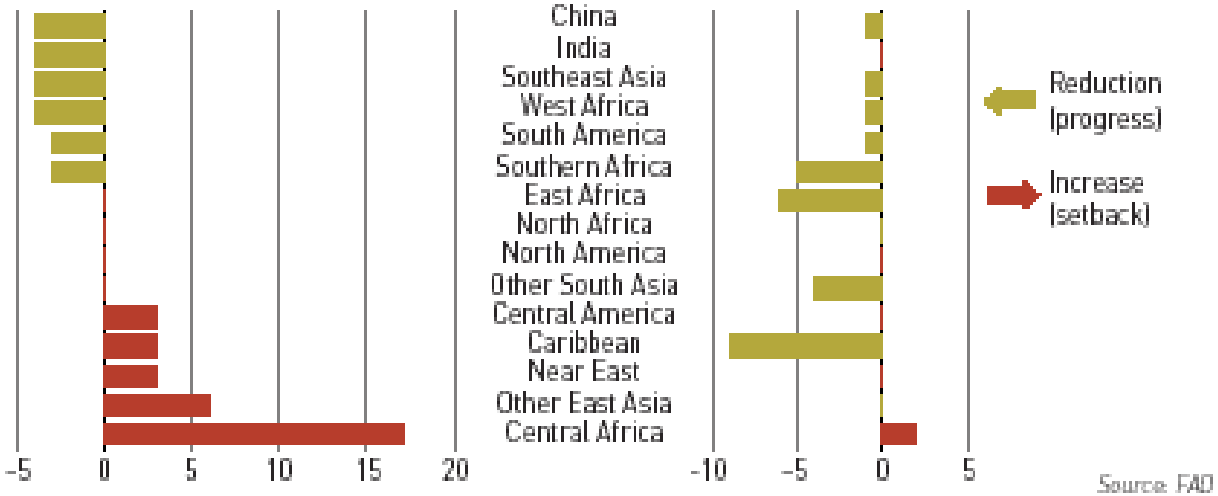
Undernourished 2000–2002
(millions)



* excl. China and India

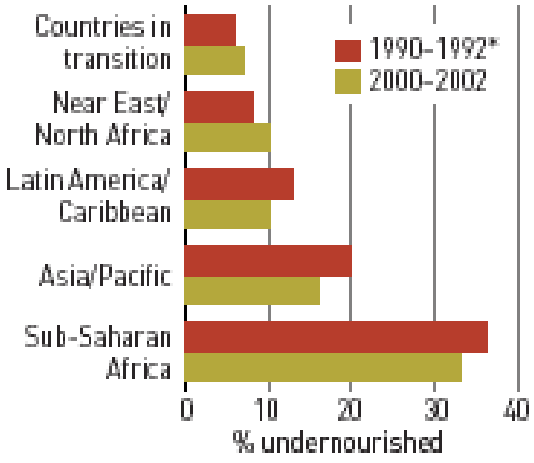
Source: FAO

Changes in proportion of undernourished in developing subregions



Source: FAO

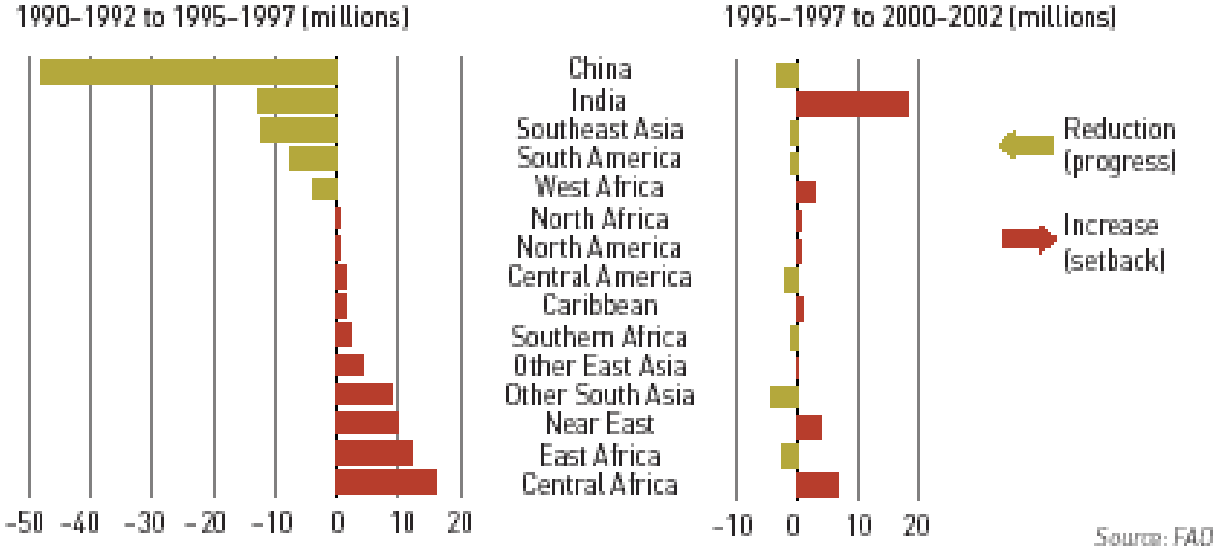
Proportion undernourished by region



* 1993–1995 for countries in transition

Source: FAO

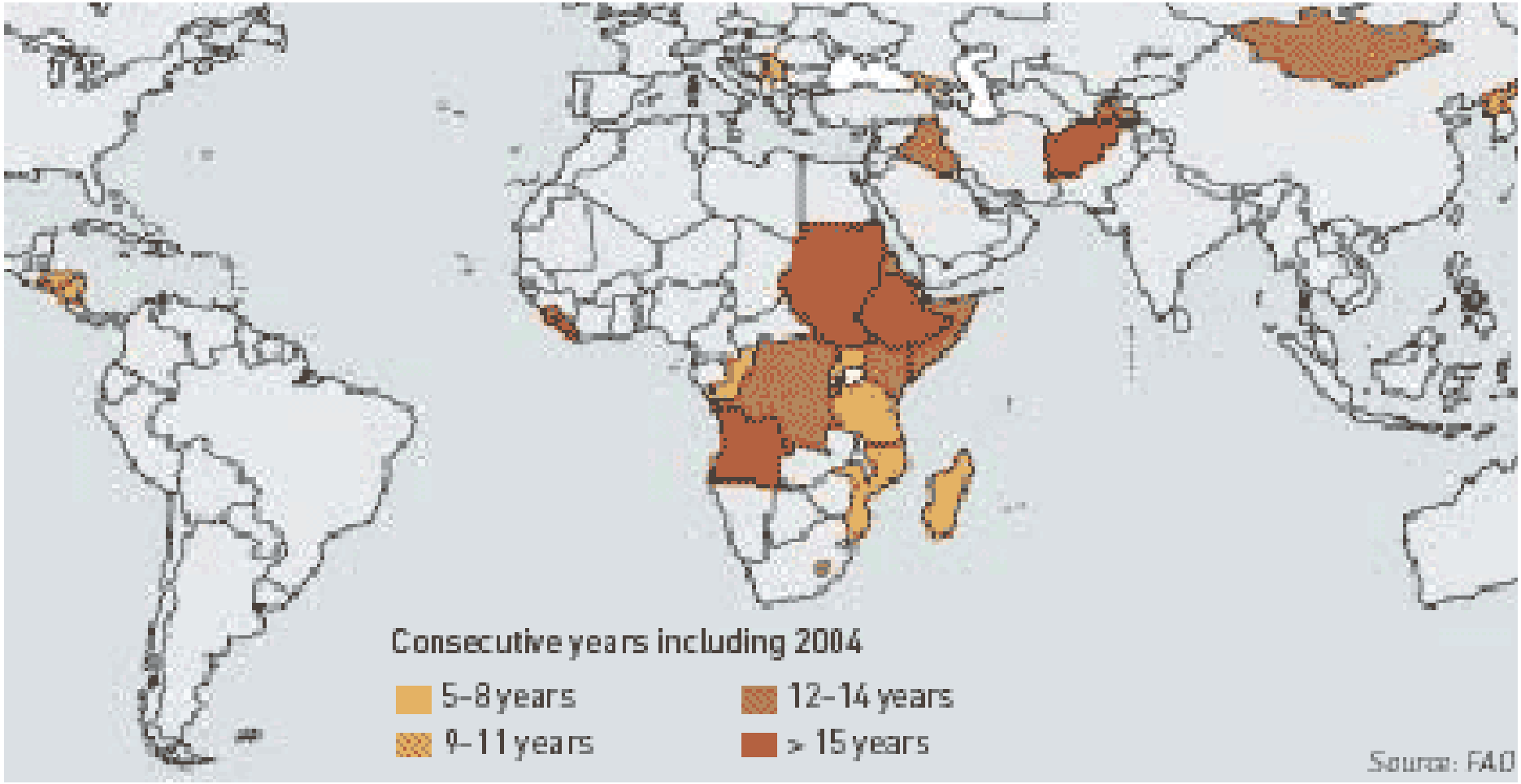
Changes in numbers of undernourished in developing subregions



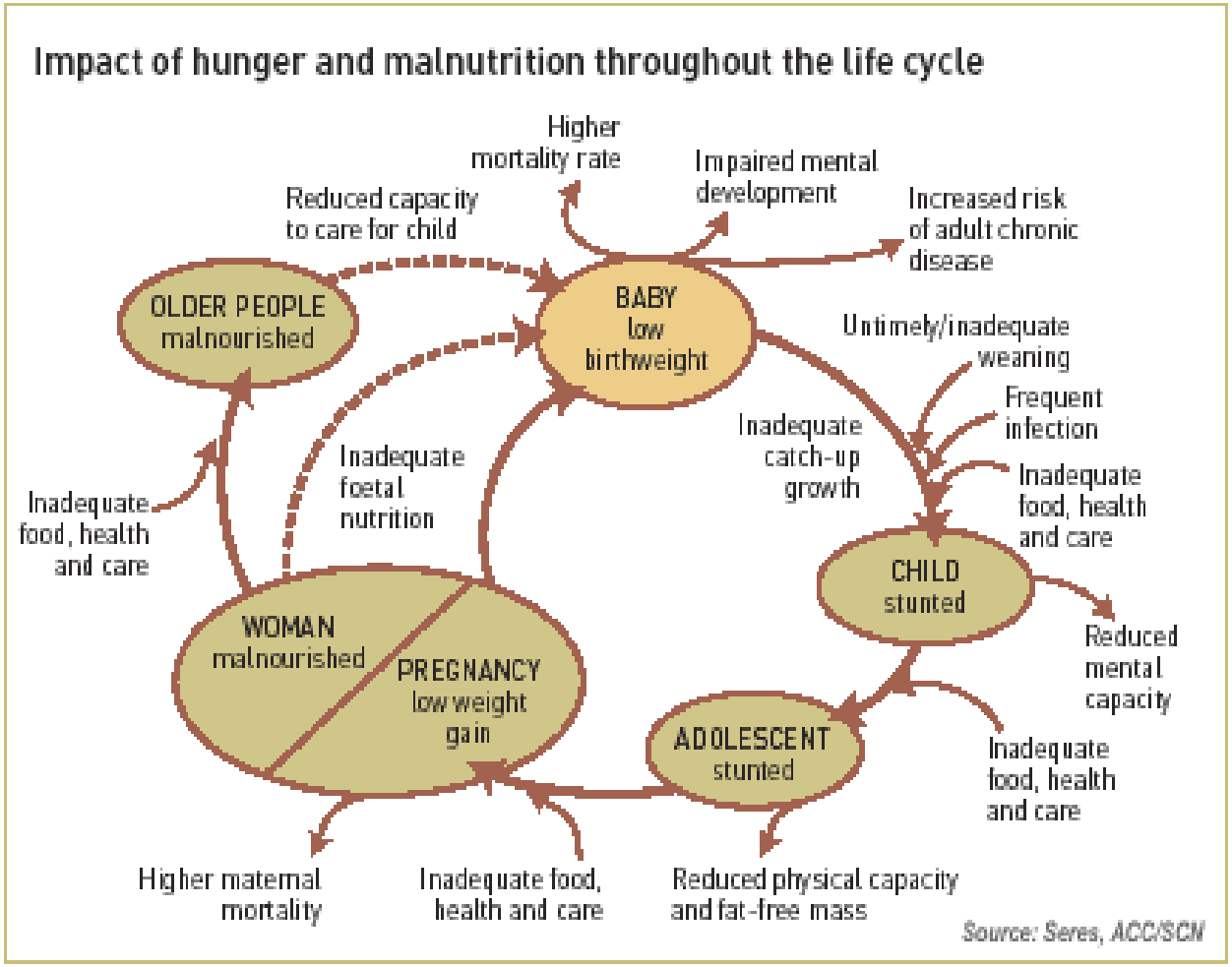
Source: FAO

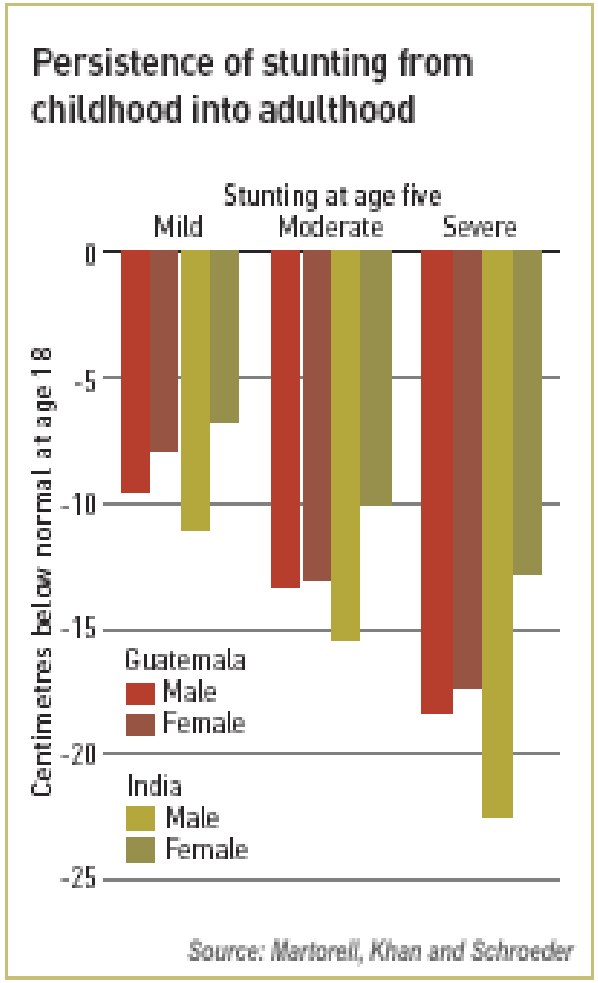
Extreme hunger and starvation in the world today

Location and duration of protracted food emergencies, 2004

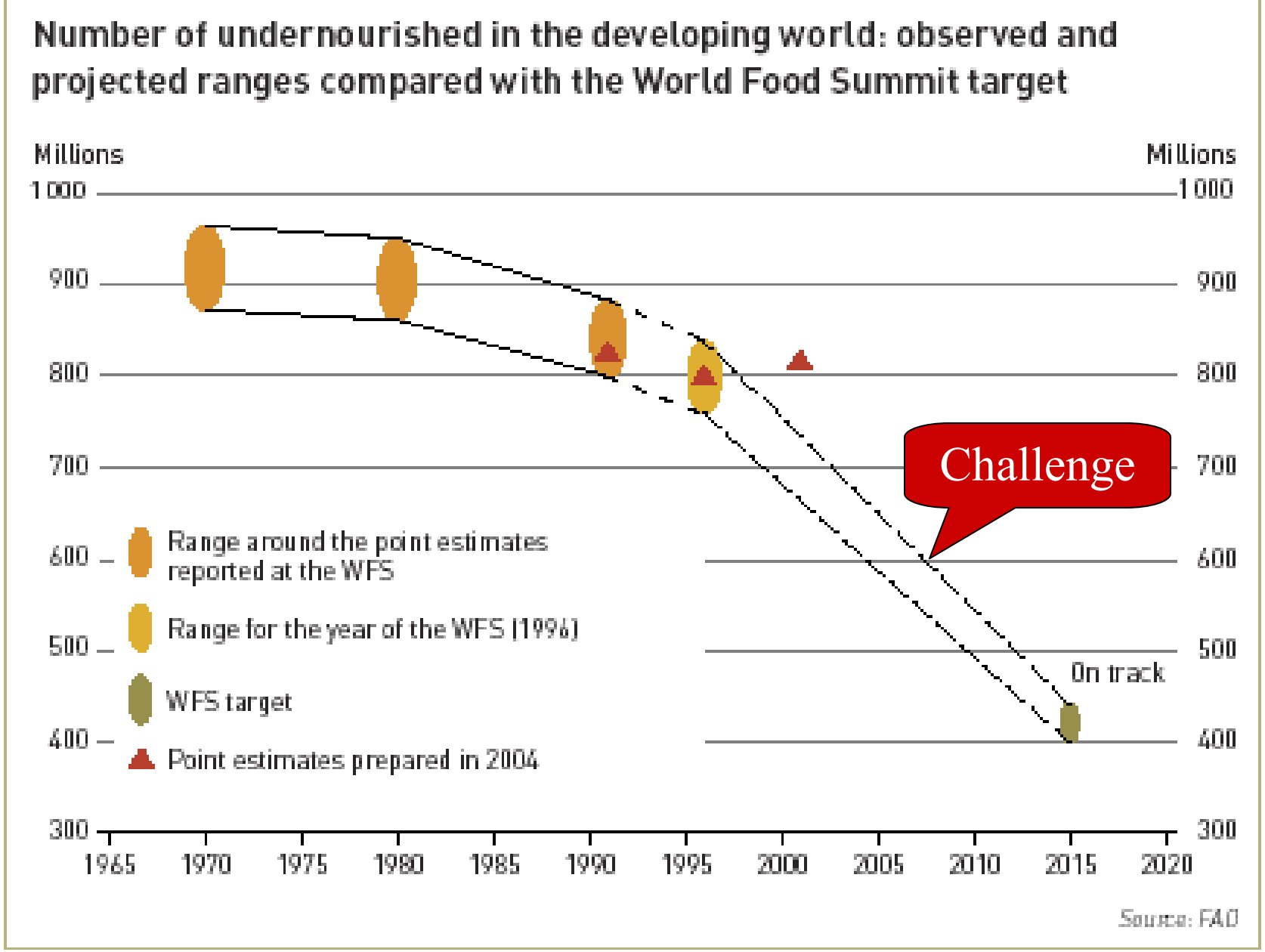


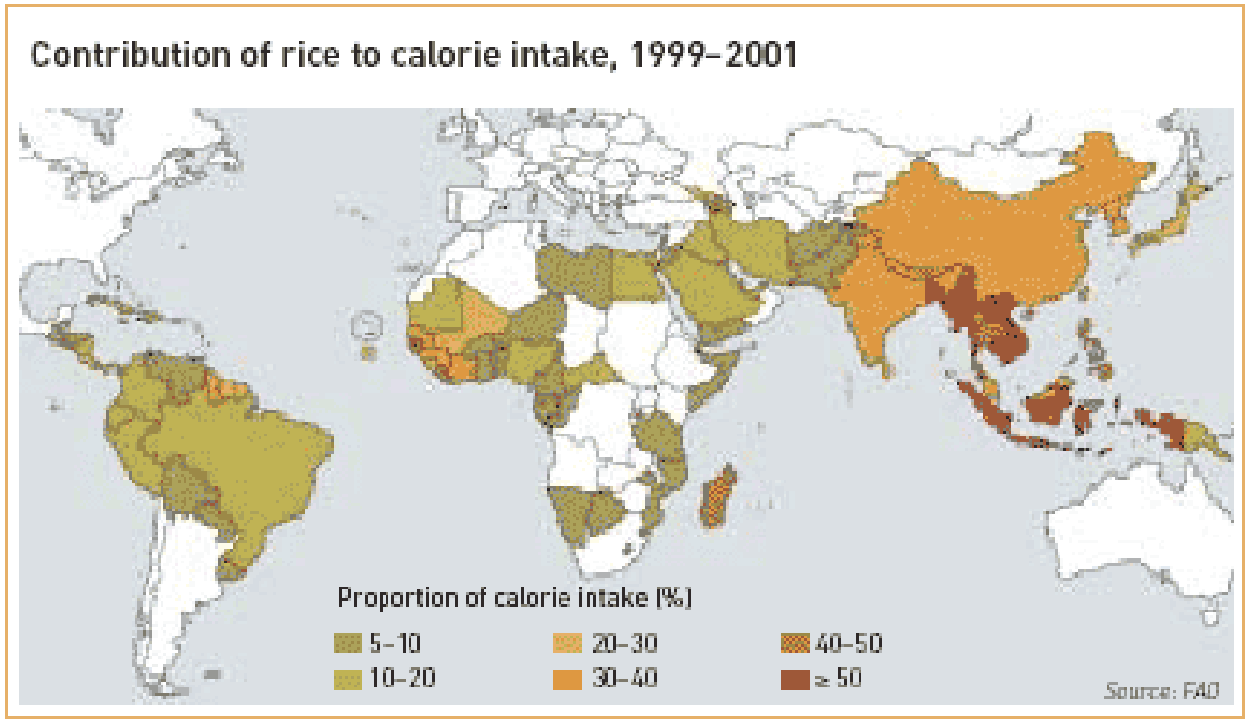
Malnutrition and children





Persisting hunger




Contribution of rice to calorie intake, 1999–2001
Proportion of calorie intake (%)
5–10
10–20
20–30
30–40
40–50
≥ 50
Source: FAO


World rice prices, 1950–1998
1997 US$
Trend 1950–1981, 1985–1998
2000
1600
1200
800
400
0
1950
1958
1966
1974
1982
1990
1998
Source: IRRI/FOB Bangkok

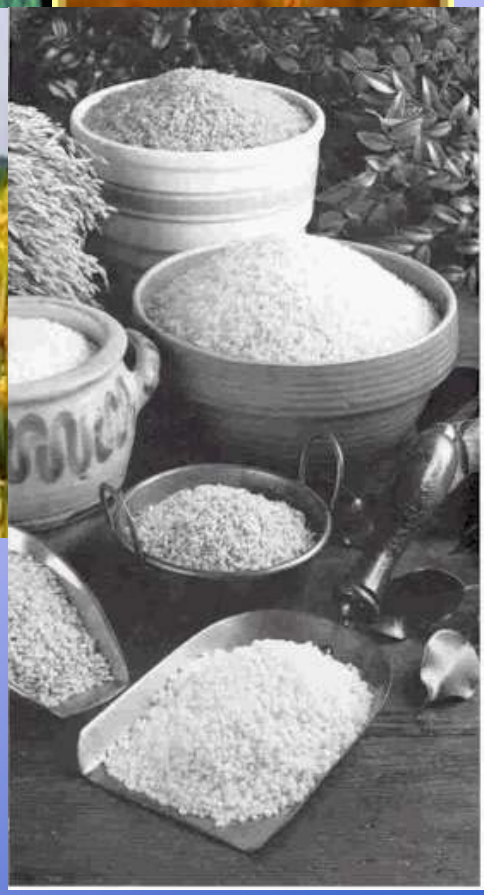
Rice = meal

Rice : Grains for half of the World









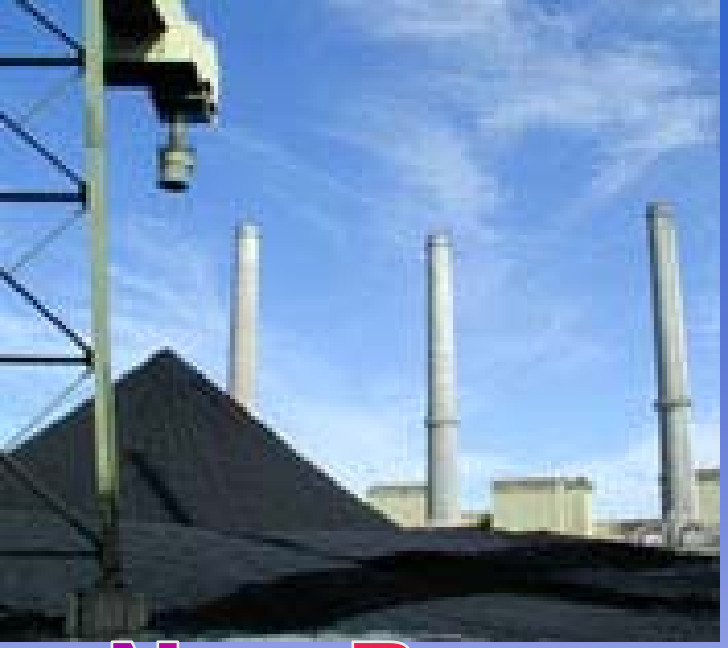
Food

From Paddy to bowl

FOOD PRODUCTION

- Land Resources
- Water Resources
- Energy
- Capital
- Labour

World Energy Outlook

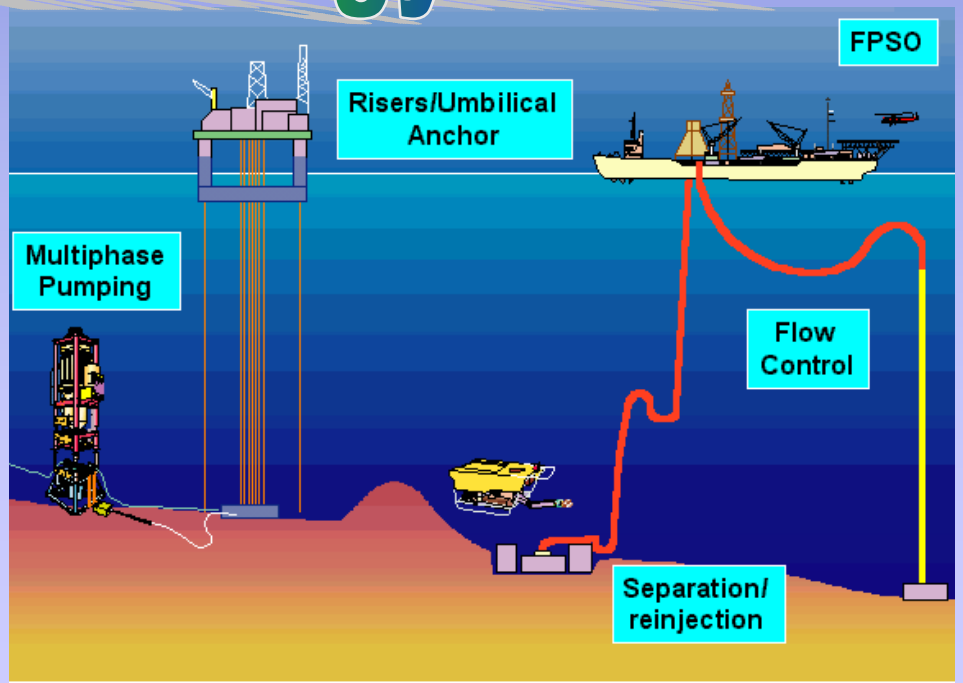


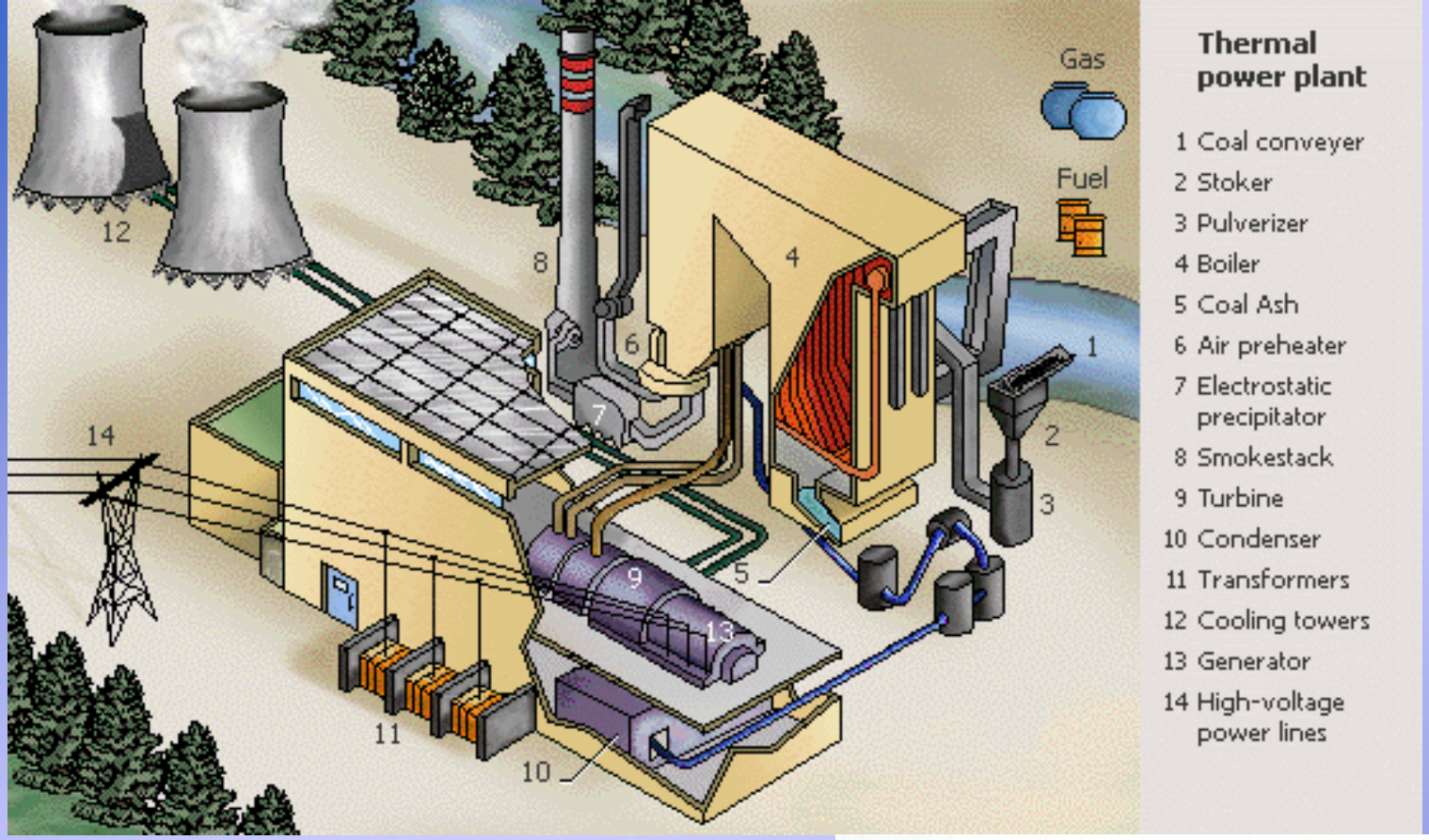
Non-Renewable Energy Sources

Coal

Oil

Gas



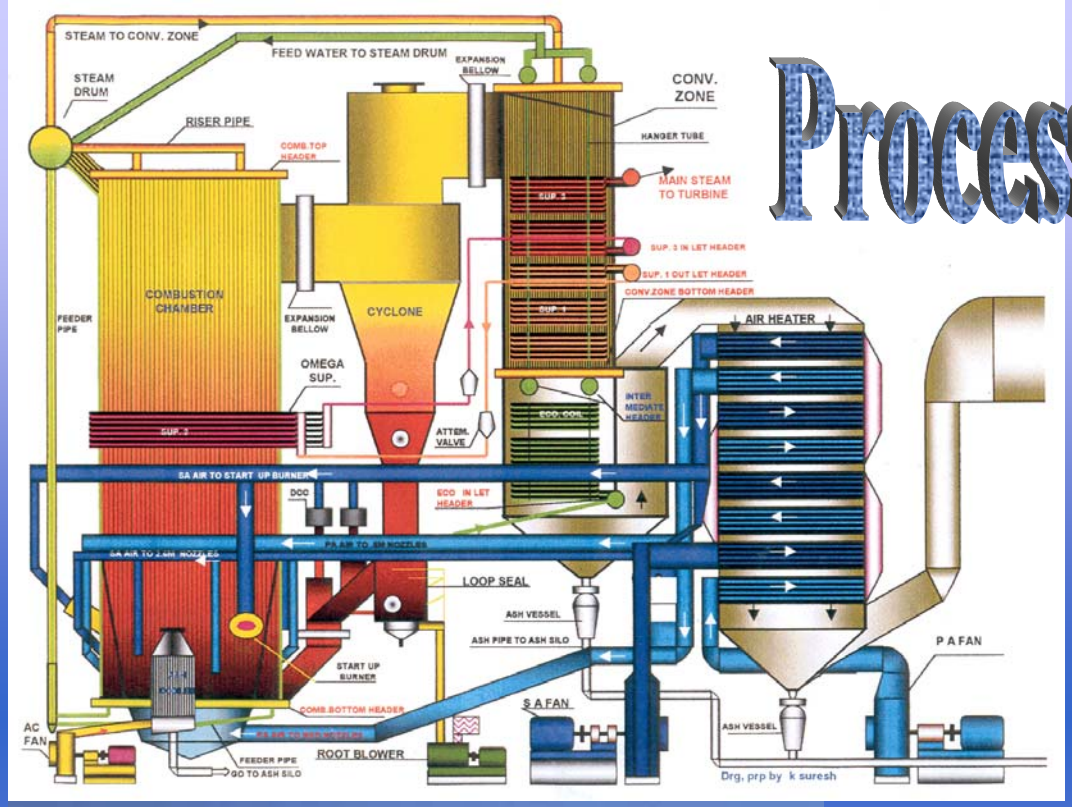


Thermal power plant

1 Coal conveyer
2 Stoker
3 Pulverizer
4 Boiler
5 Coal Ash
6 Air preheater
7 Electrostatic precipitator
8 Smokestack
9 Turbine
10 Condenser
11 Transformers
12 Cooling towers
13 Generator
14 High-voltage power lines

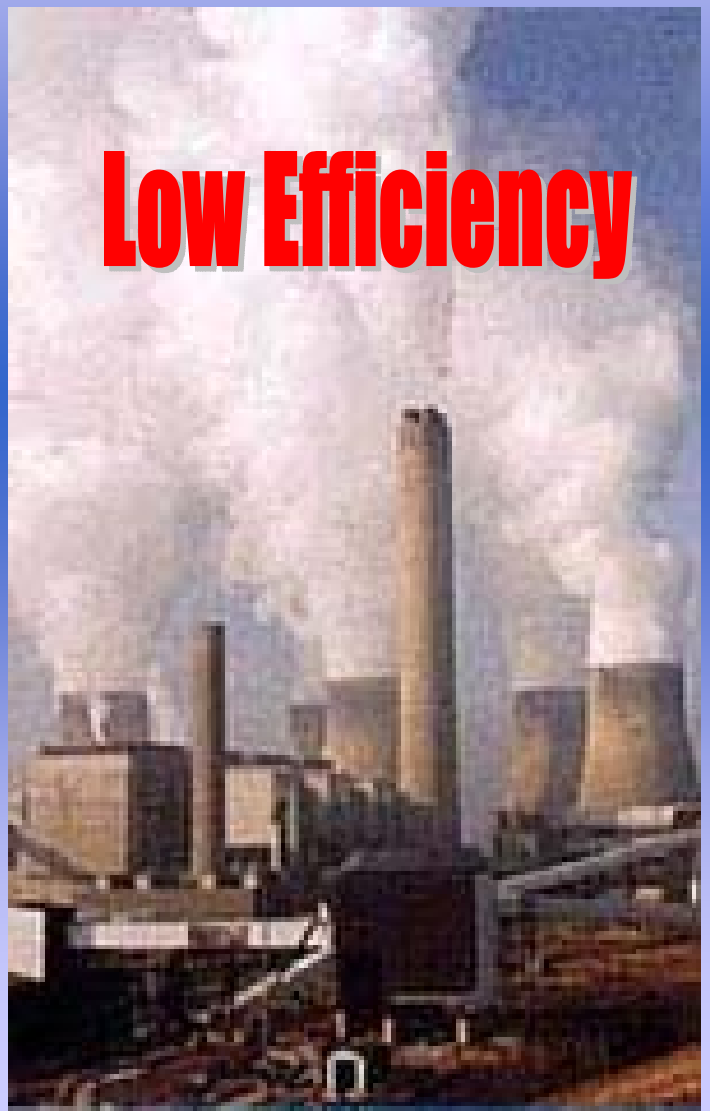
Thermal

Thermal Plant



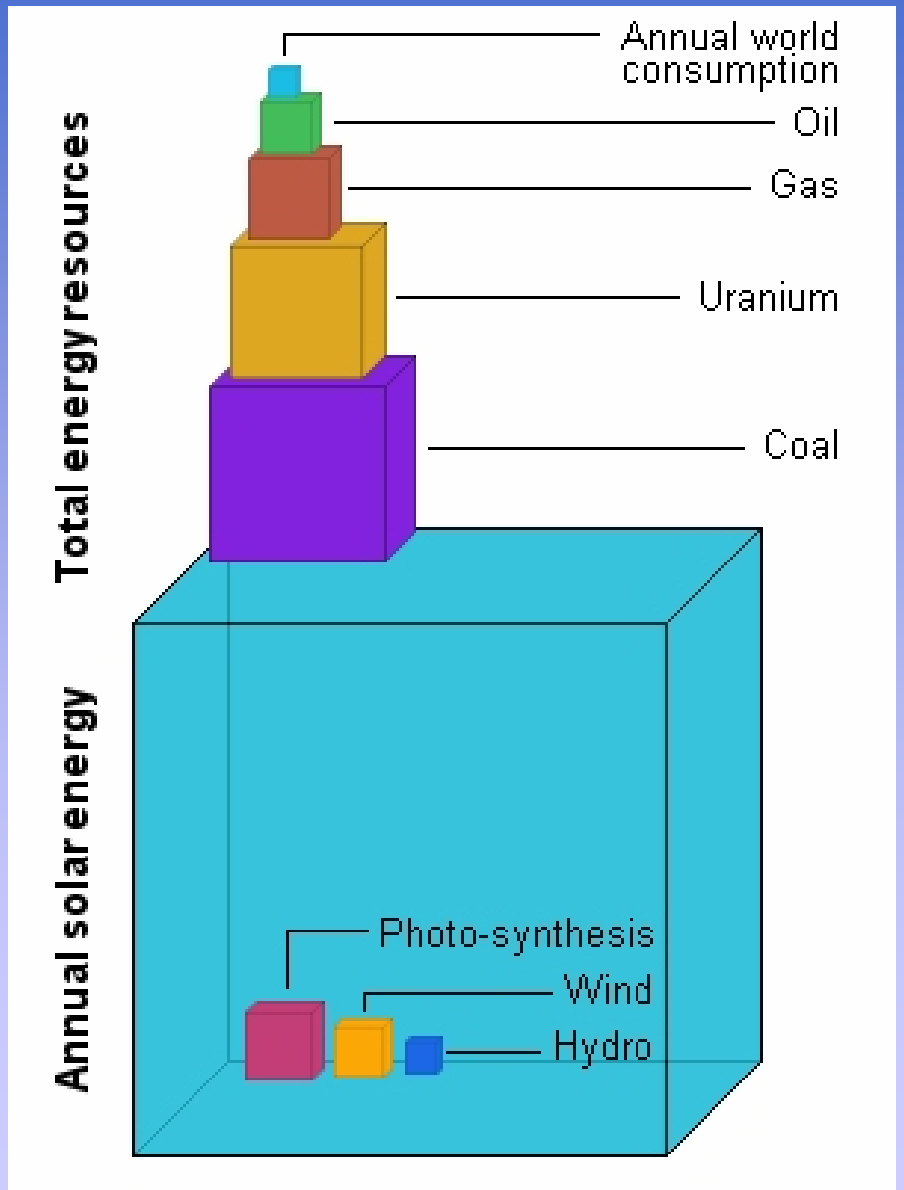
Process

Low Efficiency



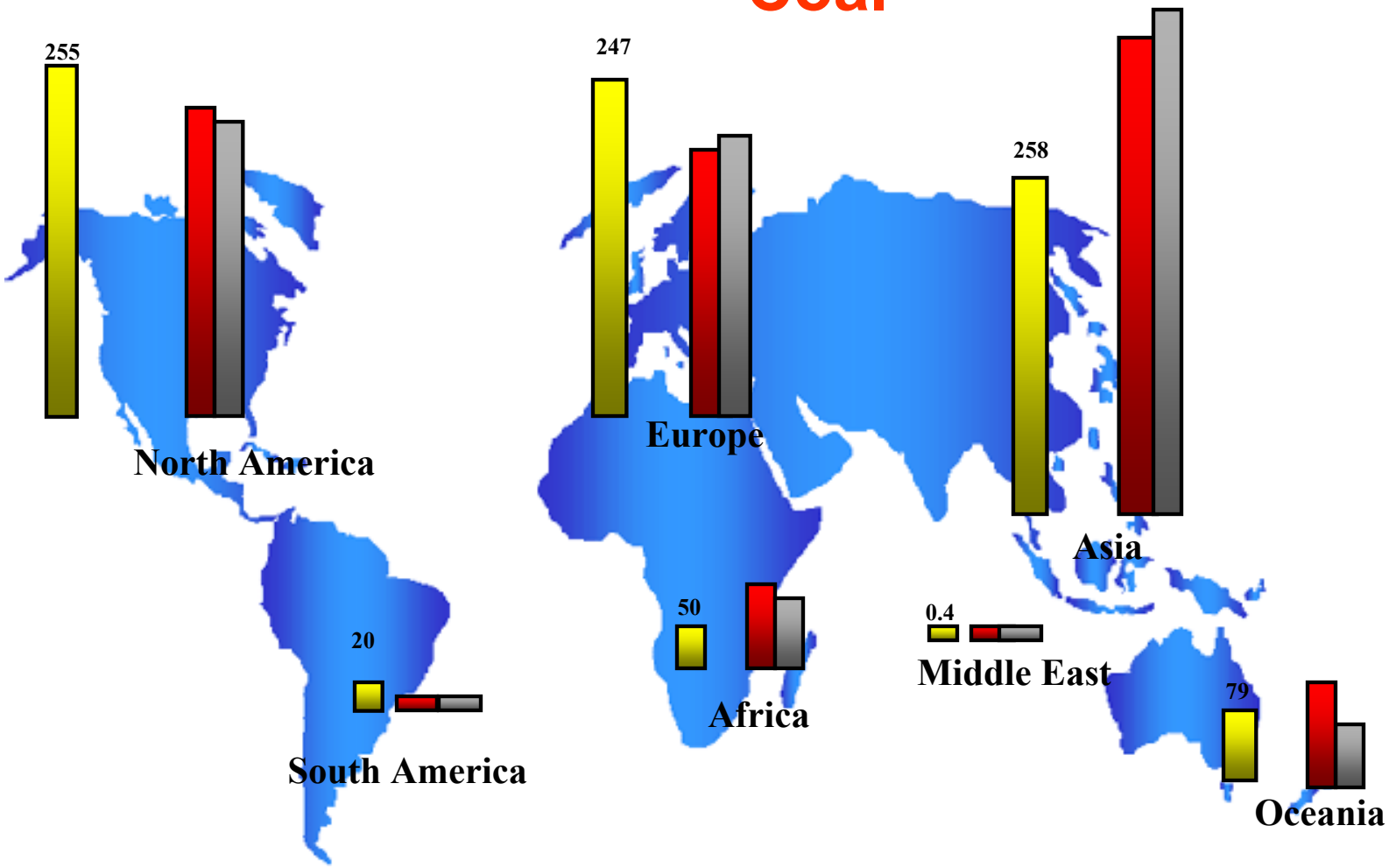
EFFICIENT

Order of Magnitude of Energy Resources



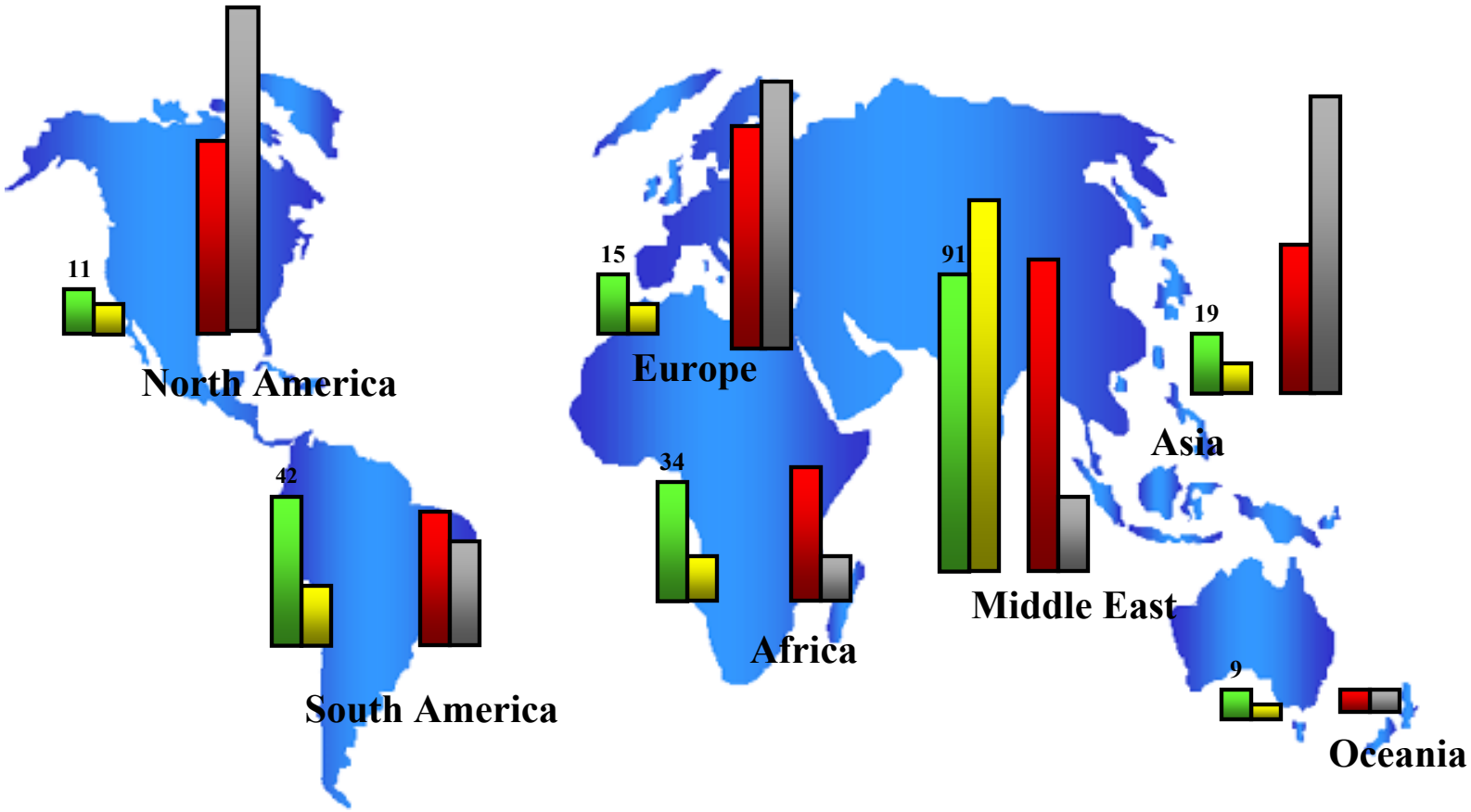
" Pick the low - hanging fruit first !"

WEC Survey of Energy Resources 2004
Coal



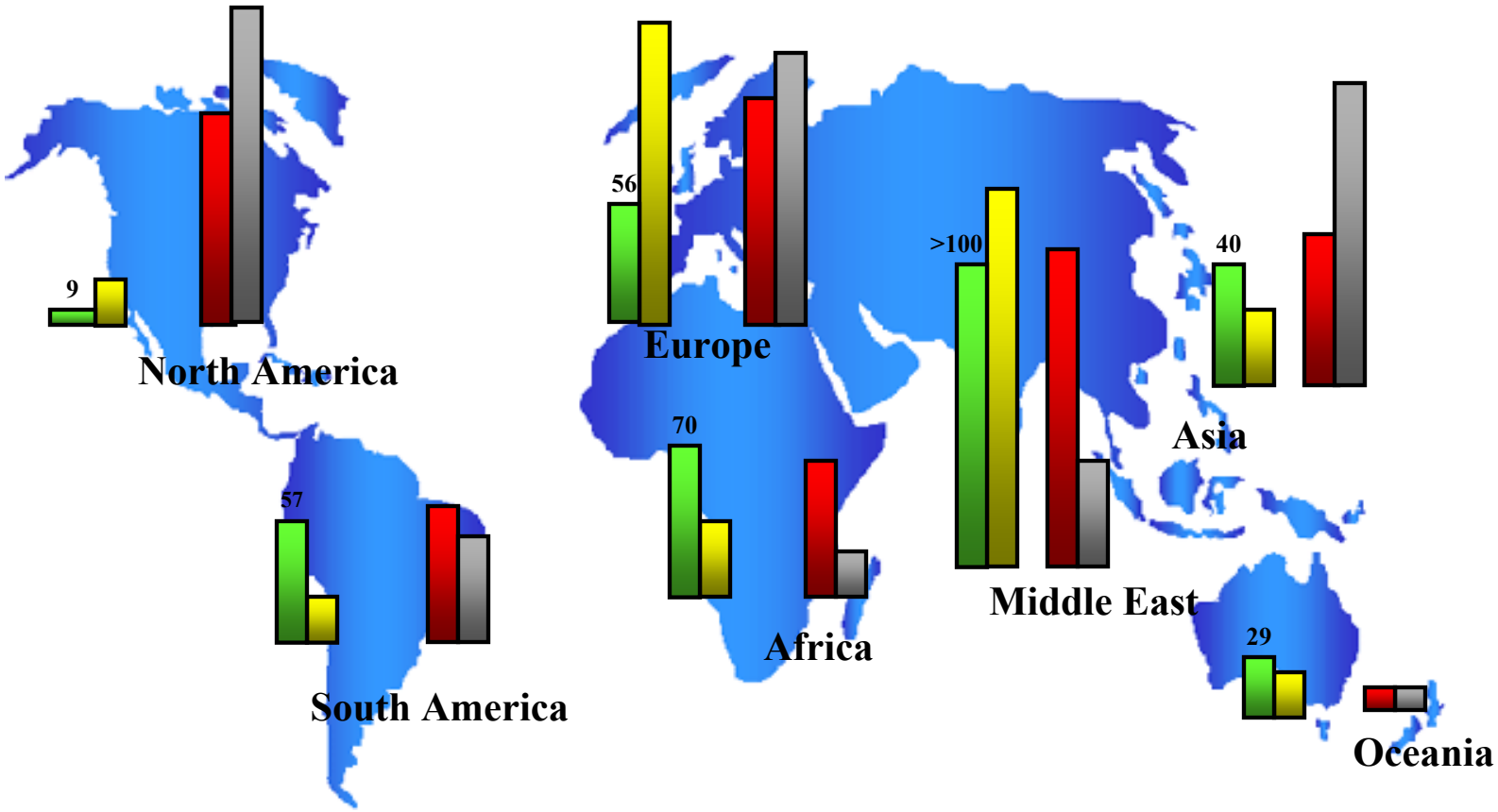
RESERVES	PRODUCTION	CONSUMPTION
909 Gt	4.8 Gt/year	4.8 Gt/year

WEC Survey of Energy Resources 2004
Oil



R/P RATIO	RESERVES	PRODUCTION	CONSUMPTION
41.2 years	148 Gt	3.5 Gt/year	3.5 Gt/year

WEC Survey of Energy Resources 2004
Natural Gas



R/P RATIO	RESERVES	PRODUCTION	CONSUMPTION
59.8 years	171 tcm	2.6 tcm/year	2.6 tcm/year

WEC Survey of Energy Resources 2004
Hydropower: Usage/Potential (2002)

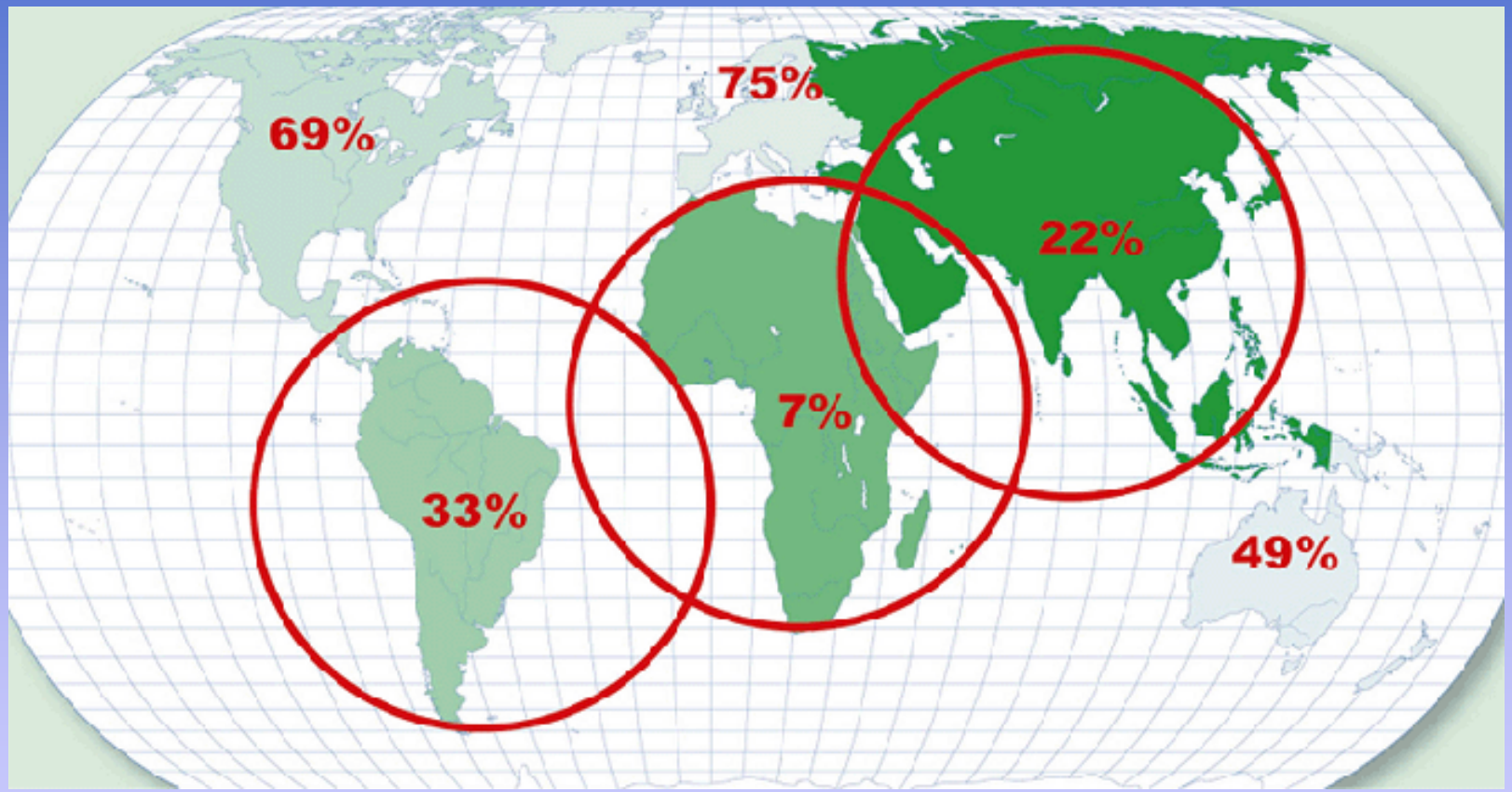


Figure 1.1: Proved coal reserves at end-1999 - regional distribution

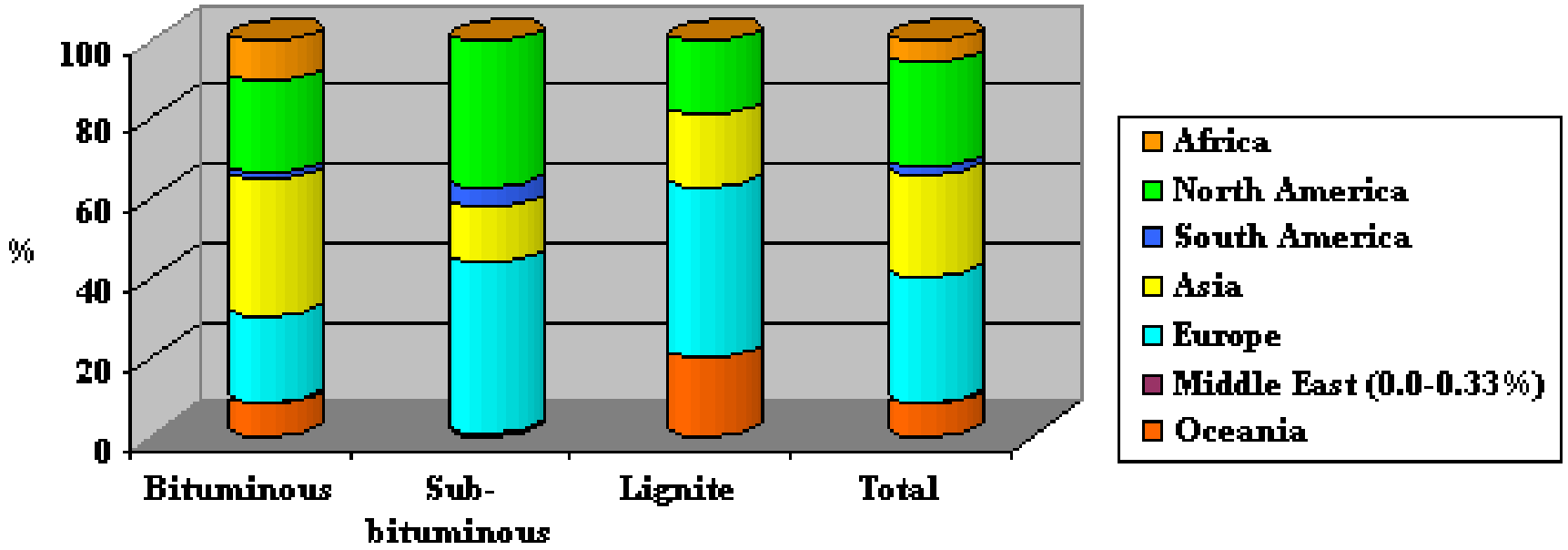
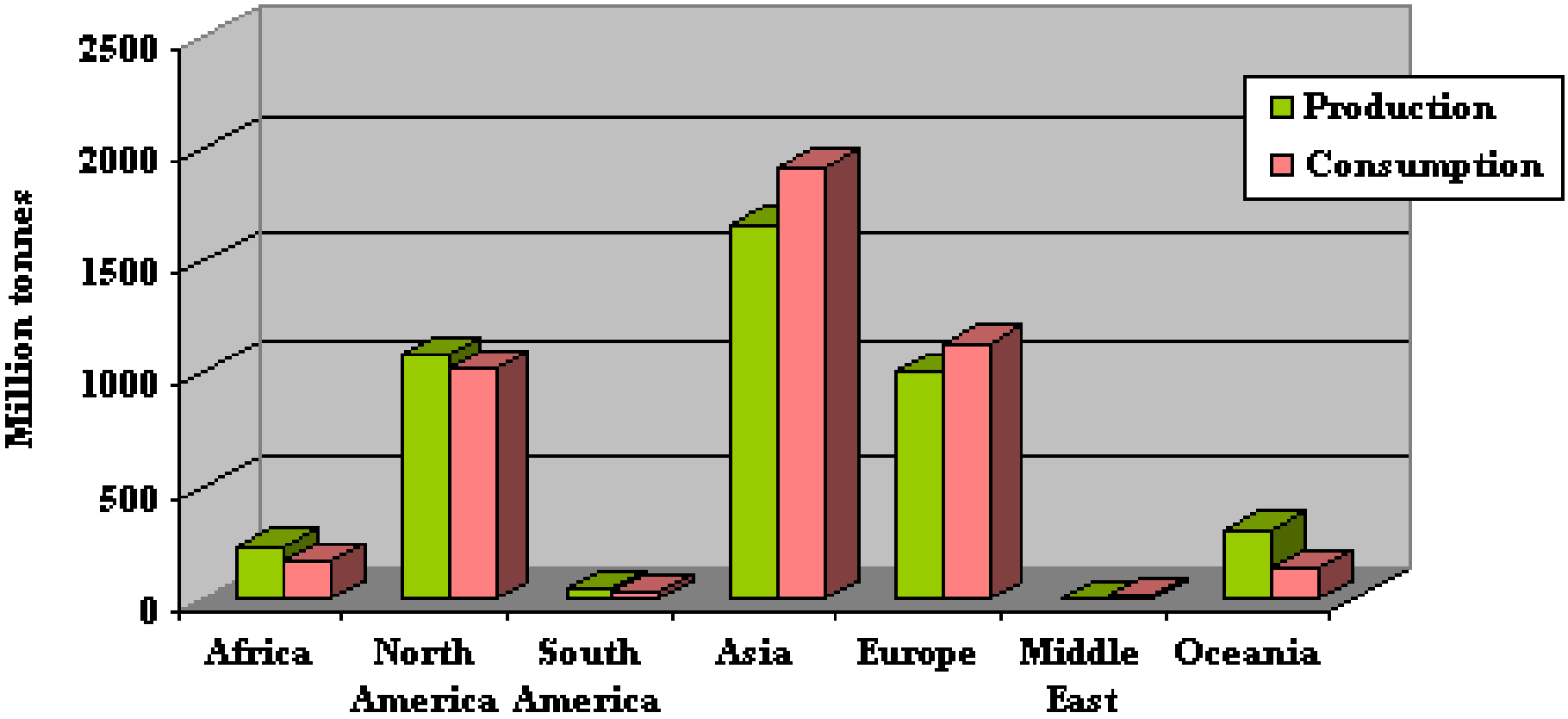


Figure 1.3: Coal production and consumption, 1999 - regional distribution



HydroPower-- Loosers and Winners ?

HydroPower-- Loosers and Winners ?

Figure 7.2: Hydropower - technically exploitable capability and 1999 generation (all schemes) - regional distribution

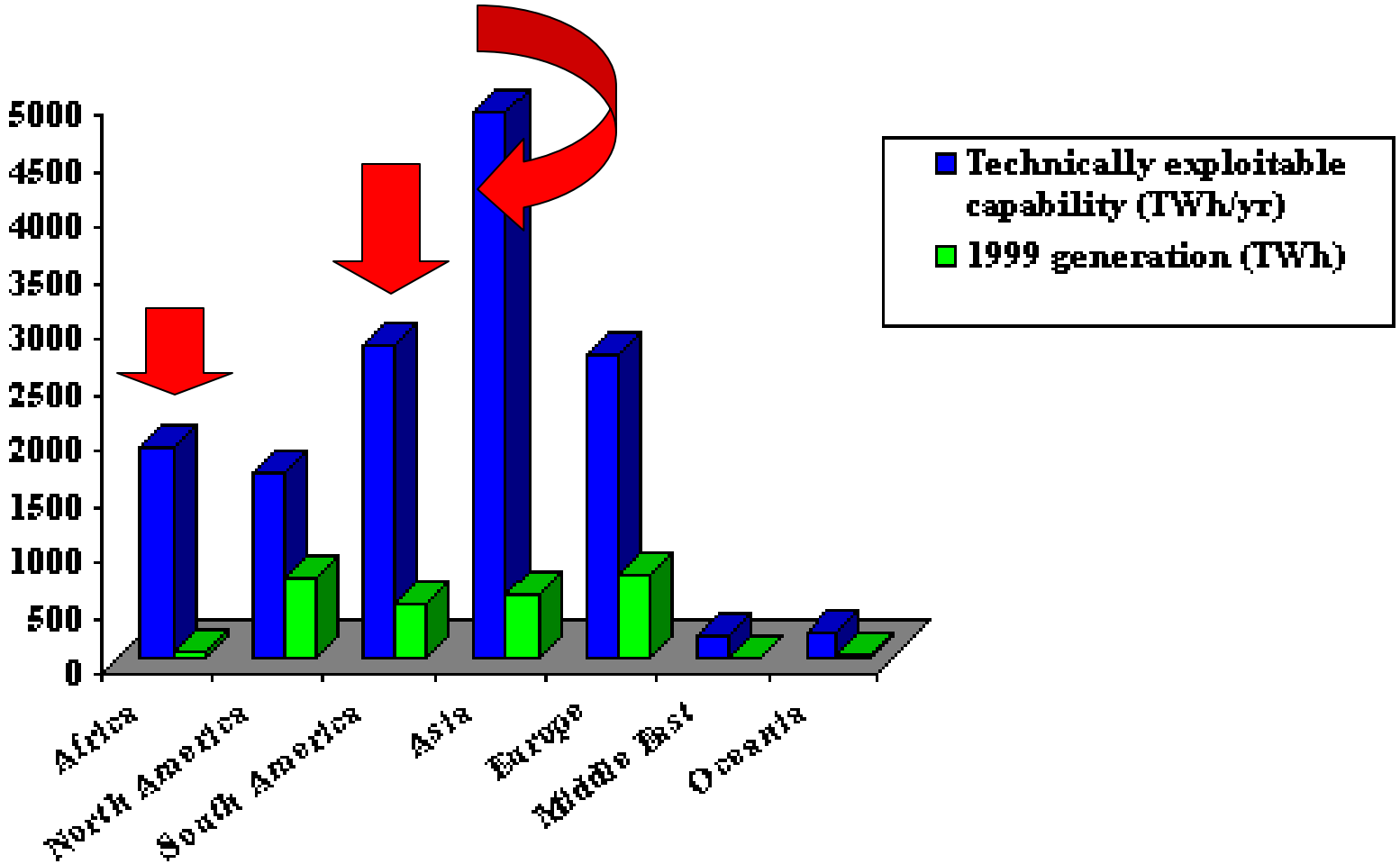
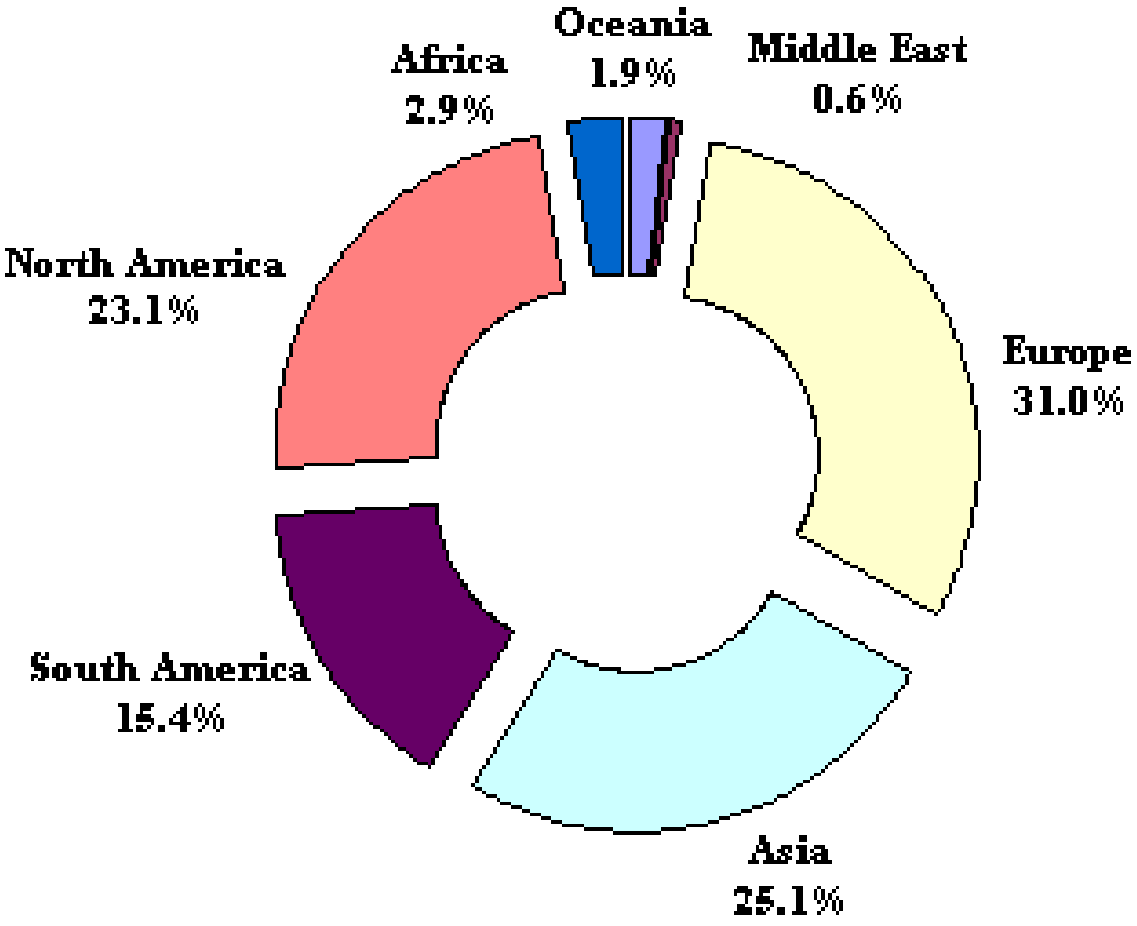


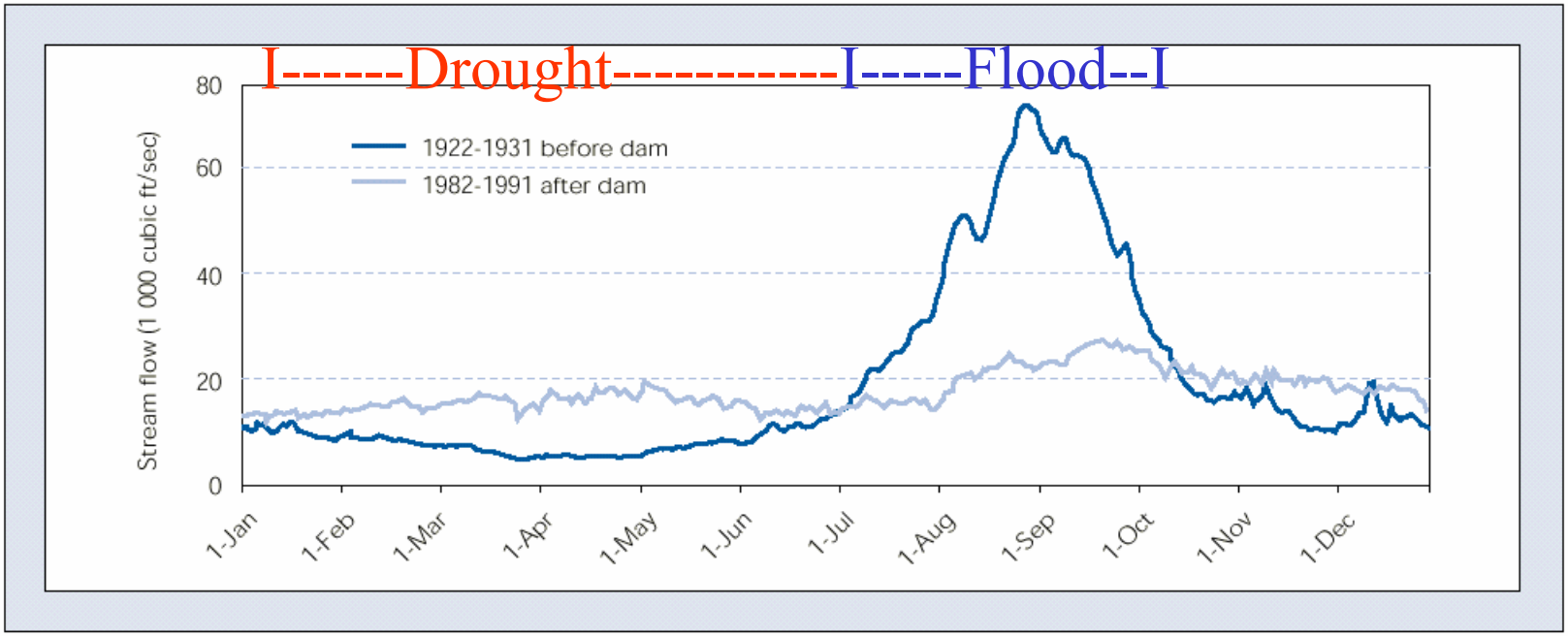
Figure 7.1: Installed hydropower capacity (all schemes) at end-1999 - regional distribution



Needs for Water Storage

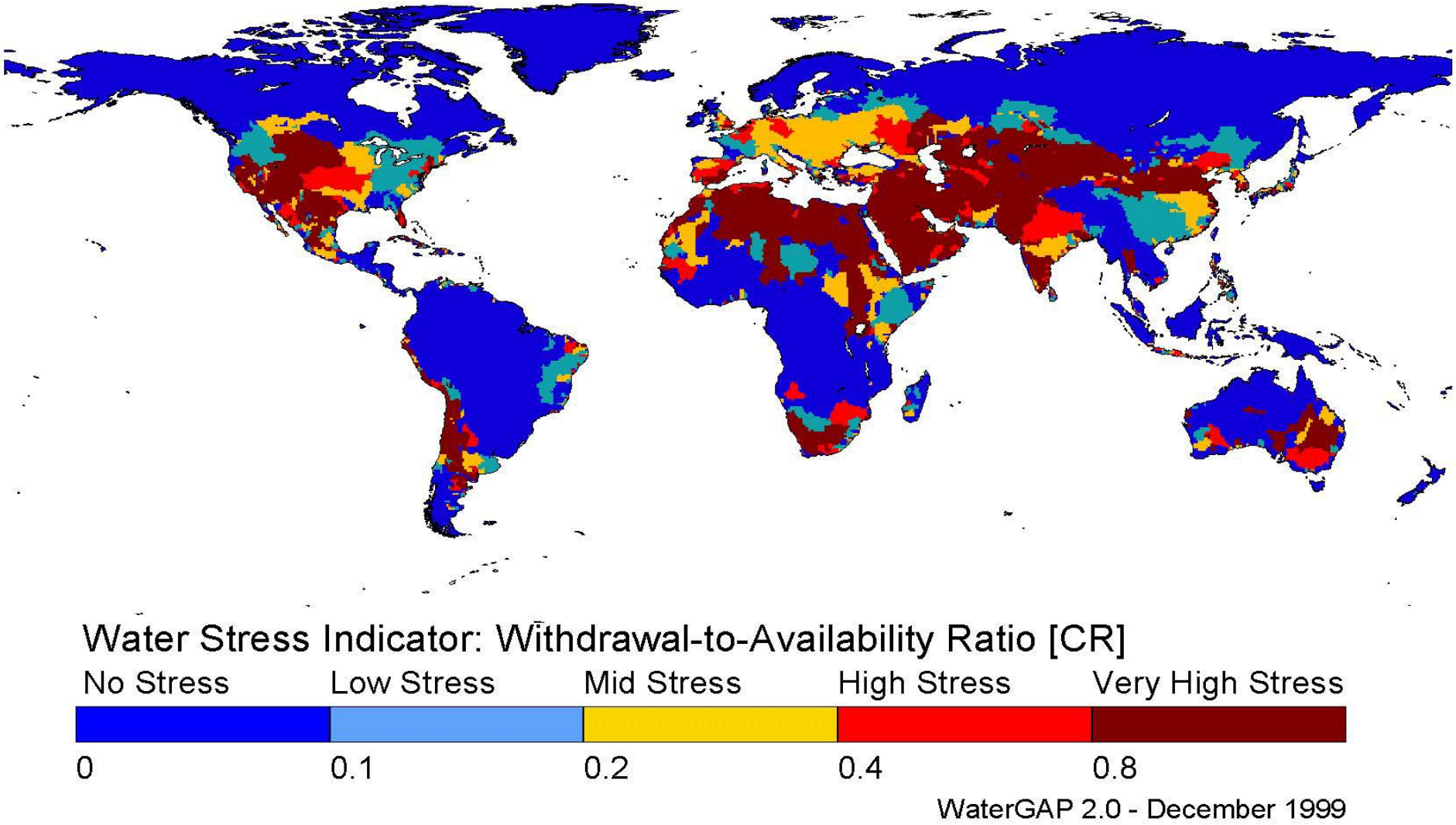
More than two thirds of the world water reservoirs are used for irrigation and food production to feed billions of the world poor and stamped out the starvation prevailed in 1950's.

Figure 3.3 Modification of annual flow regimes due to a hydropower dam, Colorado River at Lee's Ferry, United States

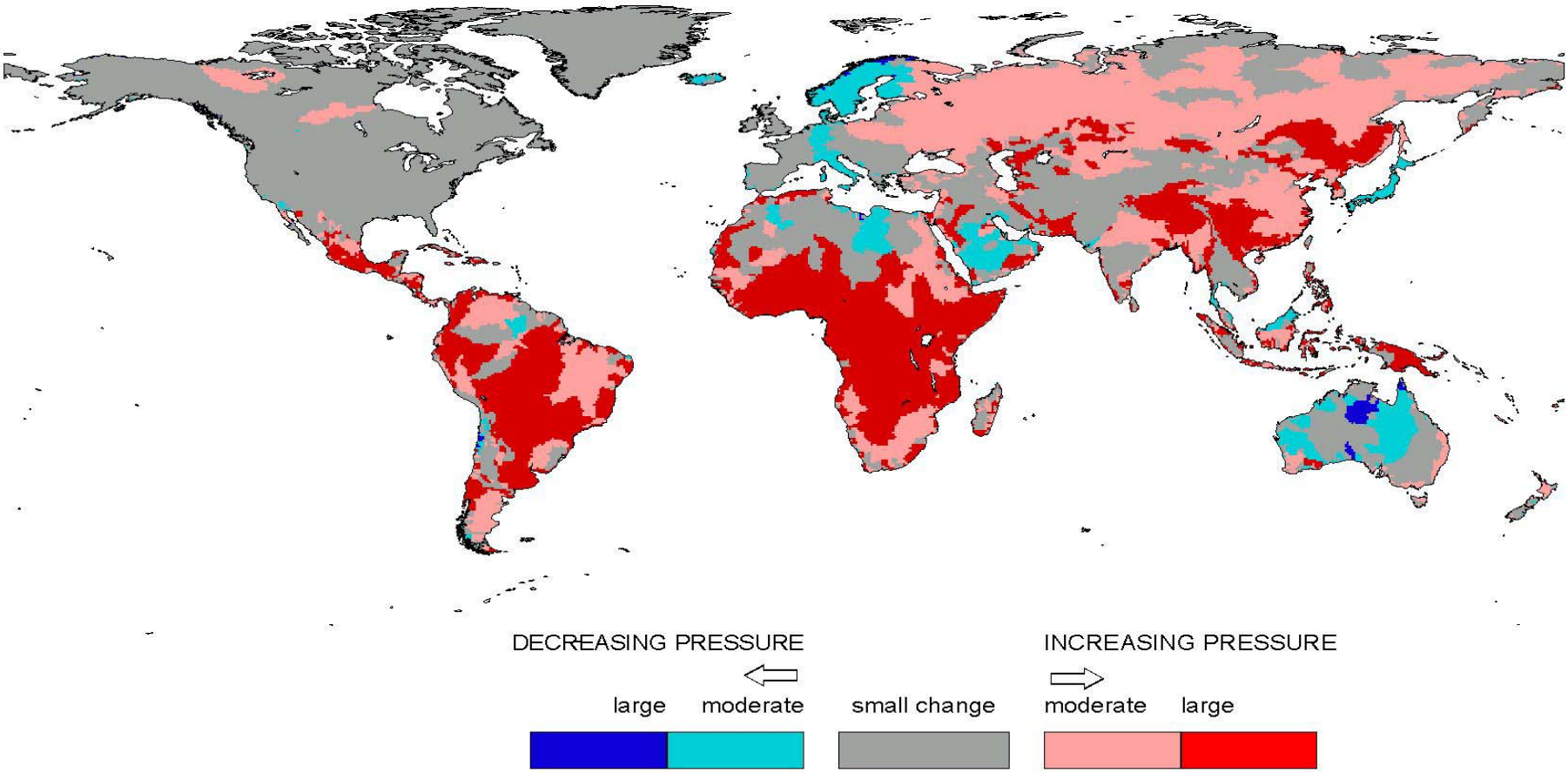


Source: Data from United States Geological Survey, 2000.

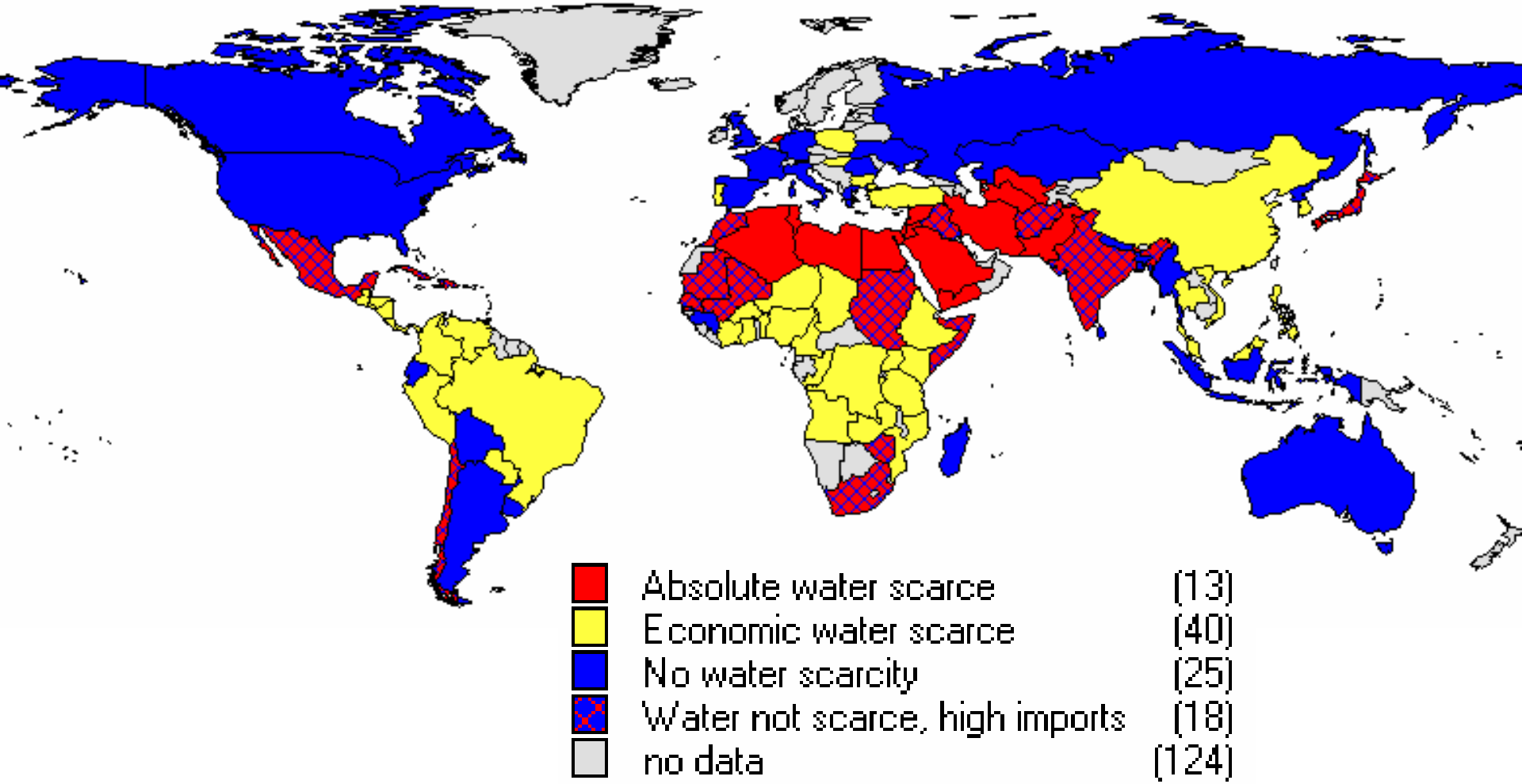
Water Stress : needs and availability

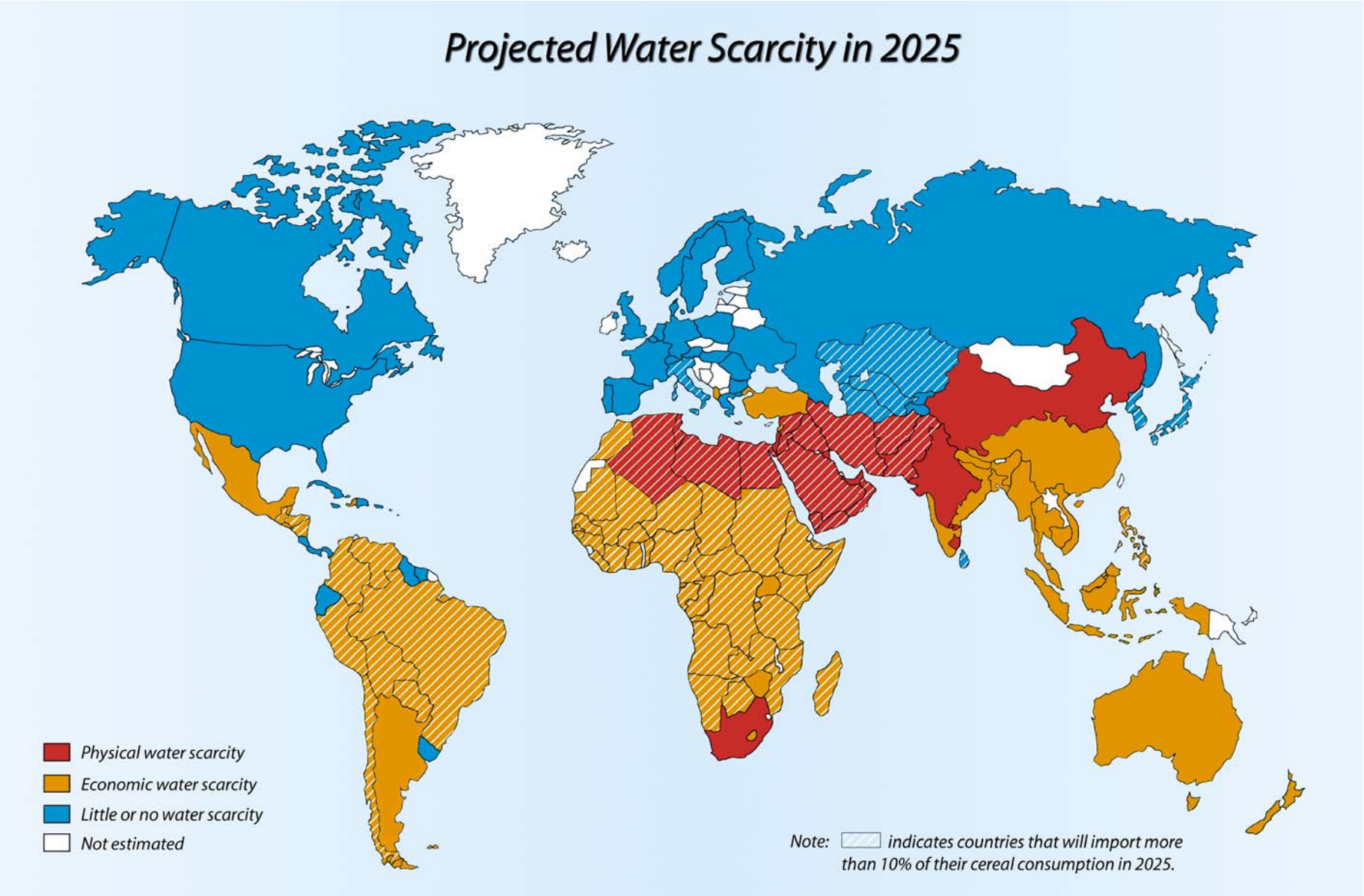


Trends of pressure on water resources



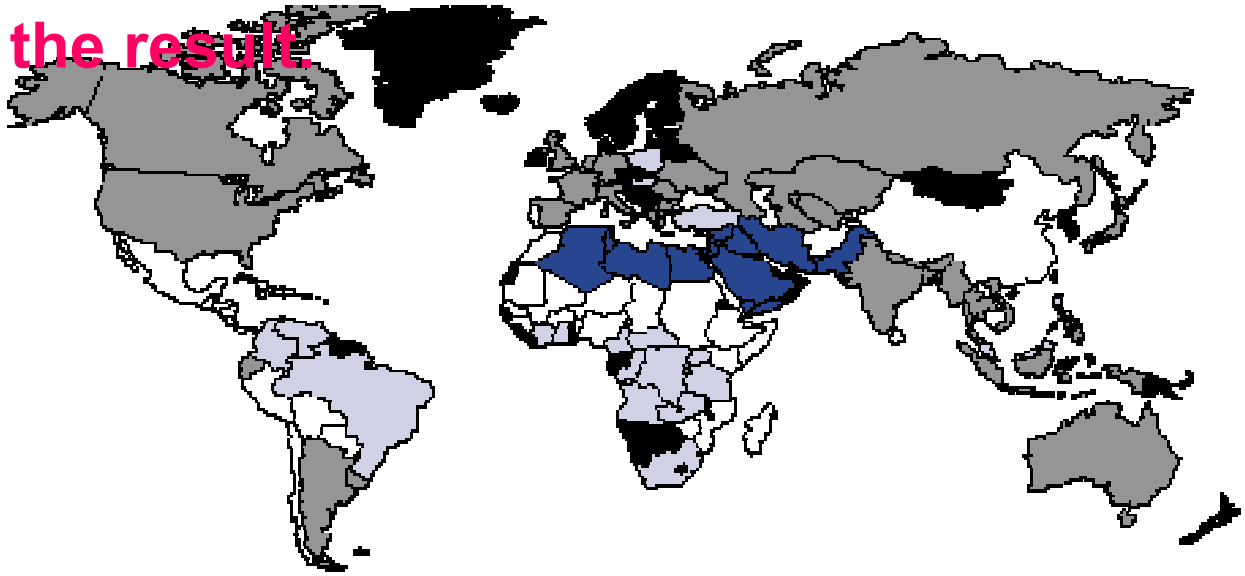
Water scarcity ranking under business as usual scenario in 2025




Projected Water Scarcity in 2025
Physical water scarcity
Economic water scarcity
Little or no water scarcity
Not estimated
Note: indicates countries that will import more than 10% of their cereal consumption in 2025.

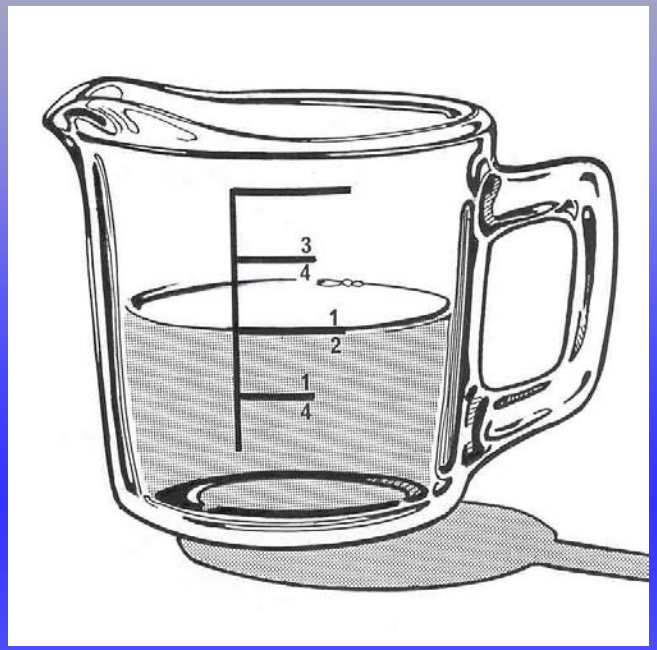
Business as usual Scenario

Limited investments in new water infrastructure reduce irrigation expansion and prevent water scarcity– but food scarcity is the result.



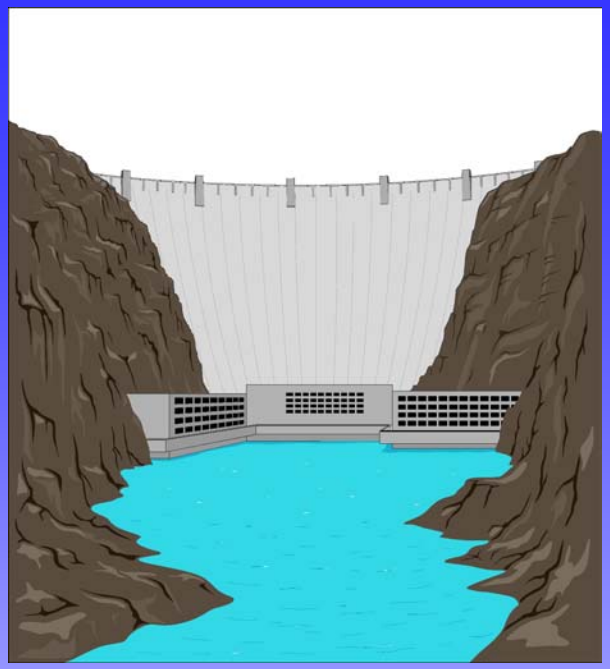
Physical water scarcity | Economic water scarcity | Production scarcity | No water scarcity | Not analysed

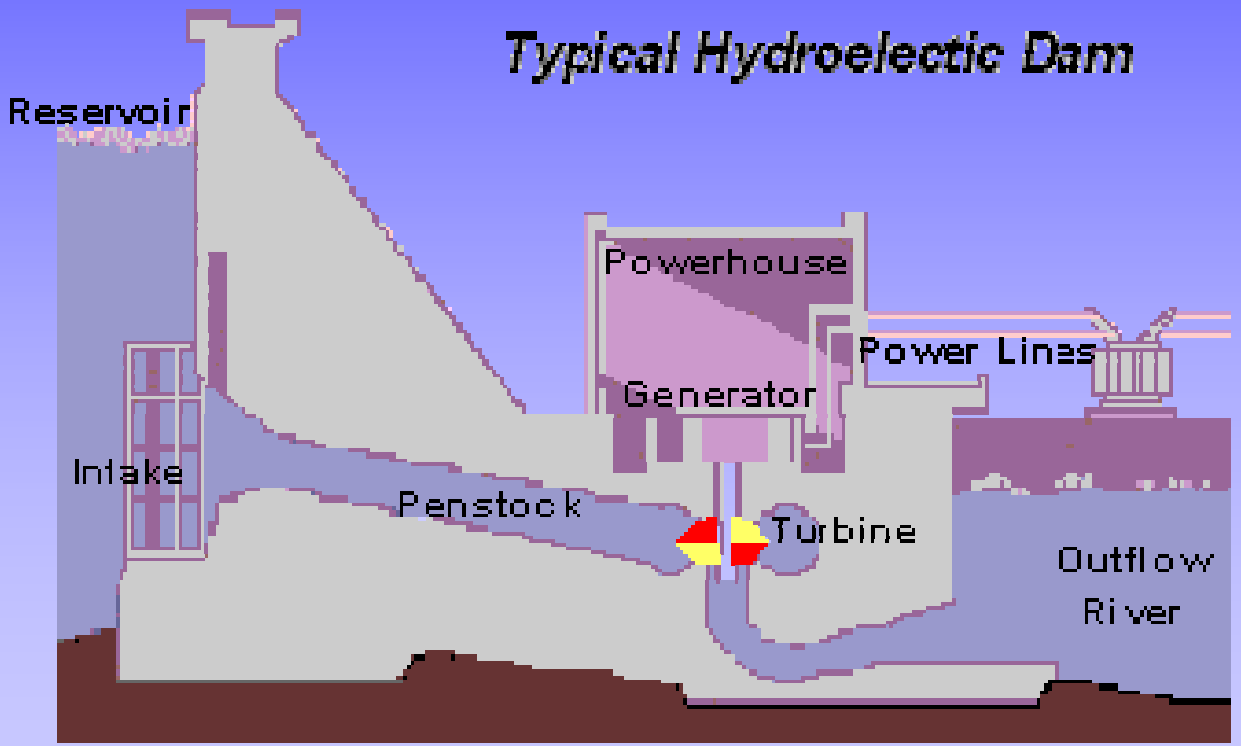
what is the question now?



What is a Dam?

There are a number of technical and legal definitions of a dam but generally it is any structure that impounds or diverts water.




Typical Hydroelectic Dam
Reservoir
Powerhouse
Power Lines
Generator
Intake
Penstock
Turbine
Outflow
River

Charateristics of dams:

ICOLD WORLD REGISTER OF DAMS CIGB REGISTRE MONDIAL DES BARRAGES

2003	Purp/Buts	H	S	C	I	N	R	F	X
PURPOSES	SUM	467	365	521	475	0	0	46	1
BUTS	multiple purpose	214	314	422	230	0	0	46	0
	single purpose	253	51	99	245	0	0	0	1

660 000	*MAX.Capacit. 10^3 m^3*	1 121	
21 563 131	**SUM. Capacit.10^3 m^3**	**RETENUES**	
23 730	*MAX.Area/Sur 10^3 m^2*	**RESERVOIRS**	
913 097	**SUM.Area/Sur 10^3 m^2**		

Second dams/barrages secondaires: 1 International 0

OUTPUTS / CONSEQUENCES

41 487	*2 700*	**SUM P (MW)**	*/MAX P (MW)*
55 532	*2 160*	**SUM E (GWh/year)**	*/MAX E (GWh/year)*
9 423	*415*	**SUM Irrigation (km^2)**	*/MAX Irrigation (km^2)*
4 068	*100*	**SUM Floodstock (hm) ^{3}**	*/MAX Floodstock (hm) ^{3}*
0	*ERR*	**SUM Resettlement**	*/MAX Resettlement*

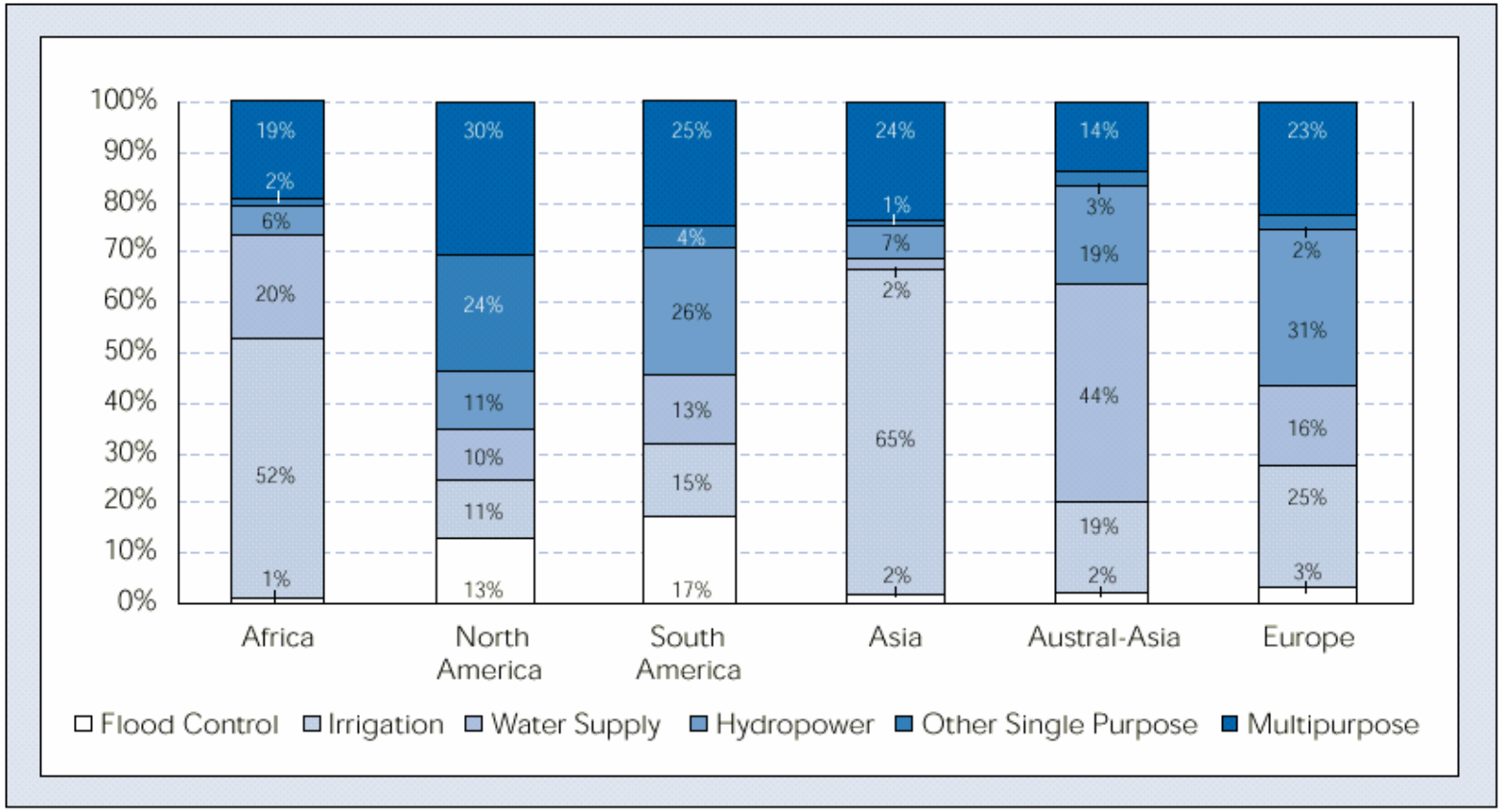
STATISTICAL TABLE **TABLE STATISTIQUE** **M. SAYAMA**

Japan **Japon**

Large Dams Predominance

IRR-----HP------ HP----- IRR----- IRR----- EVEN

Figure 1.8: Distribution of existing large dams by region and purpose

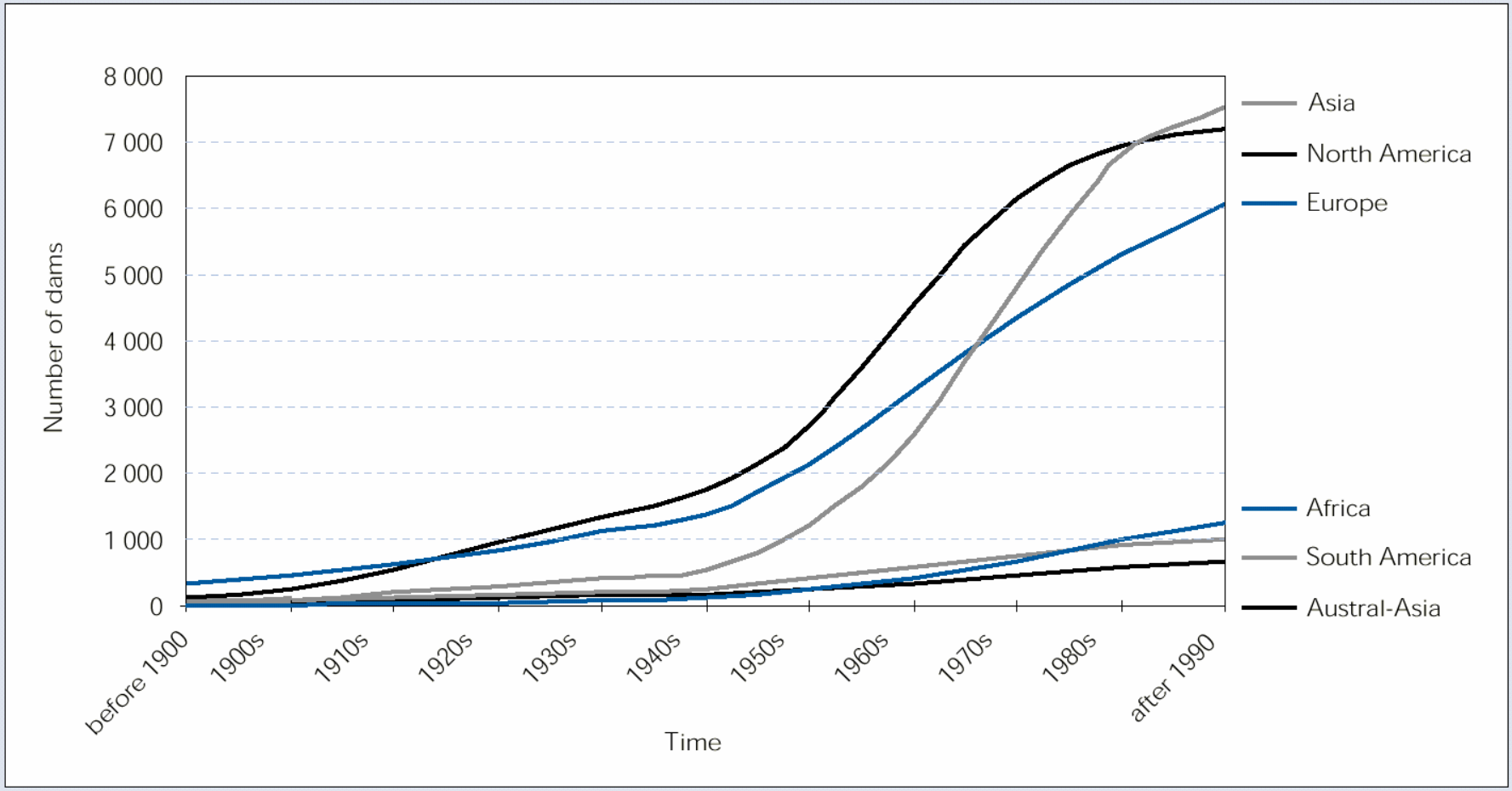


Source: Adapted from ICOLD, 1998 (See Annex V).

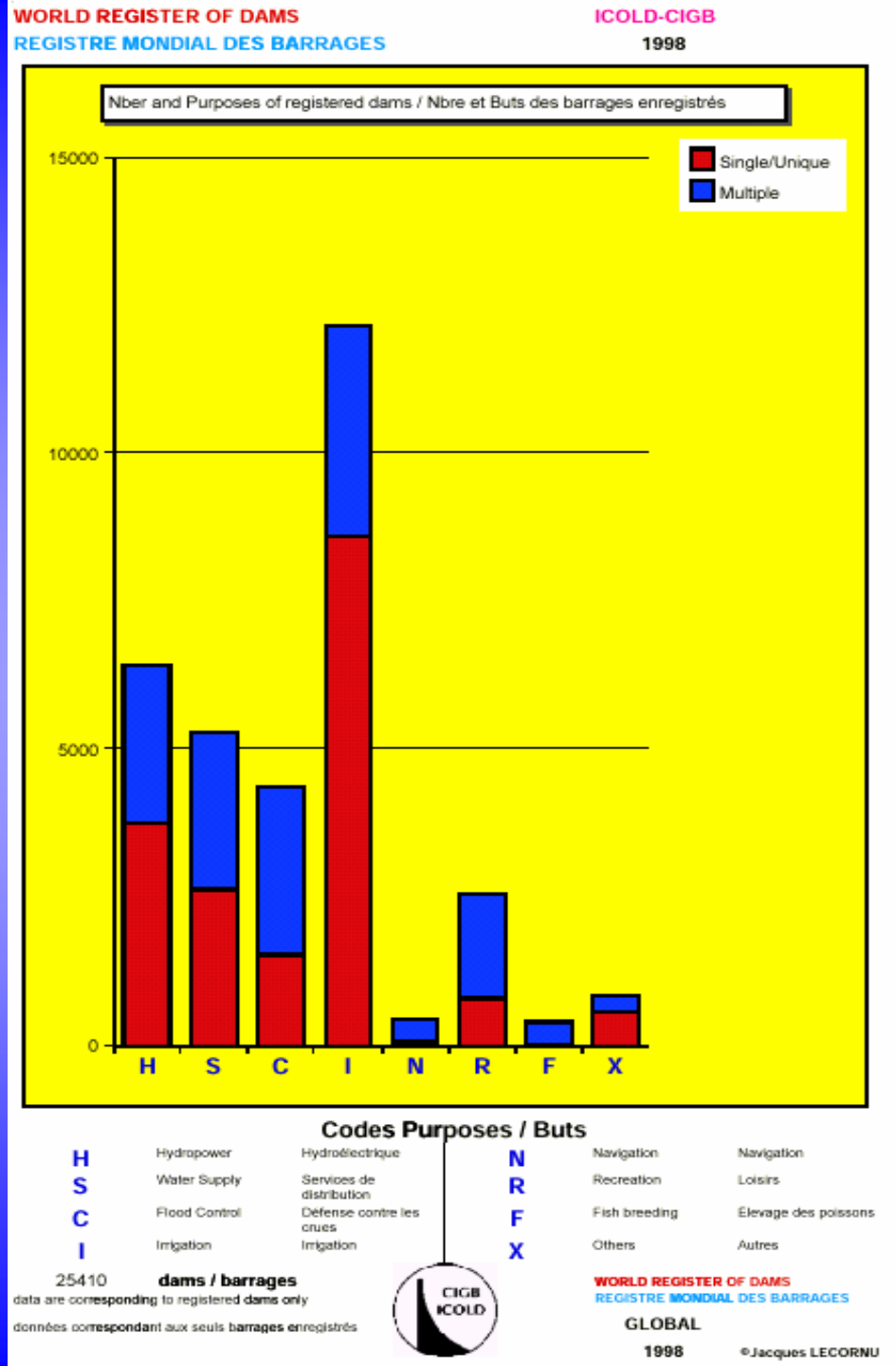
Dam building:

Asia picked up speed about a decade later. Needs resumption.

Figure 1.7: Dams constructed over time by region (1900-2000)



Source: ICOLD, 1998. Note: Information excludes the time-trend of dams in China.



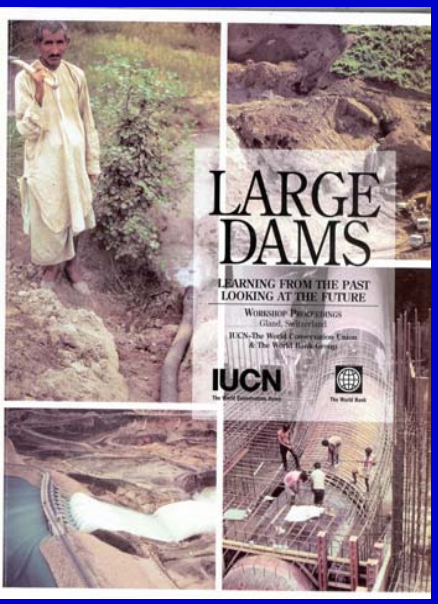
Static vision: some results

on dams , dykes , levees ?…

Statistics from

the WRD 98 on the role of dams

7 000 km3 of storage - including dead storage - built mainly during the last century

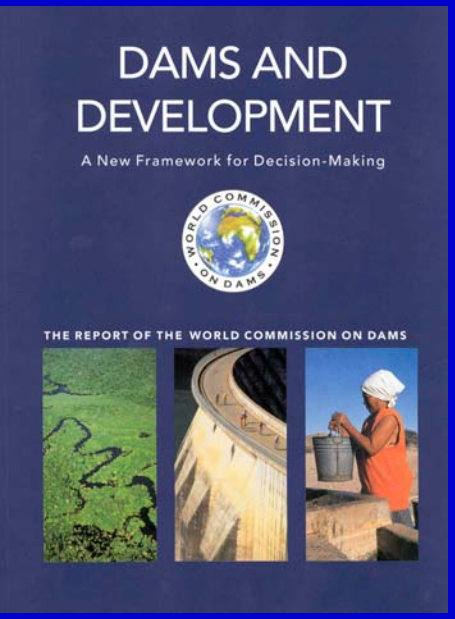


IUCN
The World Conservation Union

The World Bank

World Commission ON DAMS (1997-2000)

- A special Commission created to deal with the issues related to large dams and environmental controversies related to the safety , construction , operation and decommissioning of dams.



President of ICID statement to the WCD

ICID·CIID

Dams and Water Resources

"Irrigation, drainage and flood control of agricultural lands are no longer options. They are a necessity for feeding billions of people, providing employment for billions of the rural poor and for protecting the environment. Large dams provide large storage capacity to meet the needs during the dry period especially in the arid and semi-arid zones thus allowing for reliable delivery of water to the crops when most needed...

The determination of the size, location and type of structure depends on the economic, technical, social and environmental factors being considered by the promoter of the scheme...

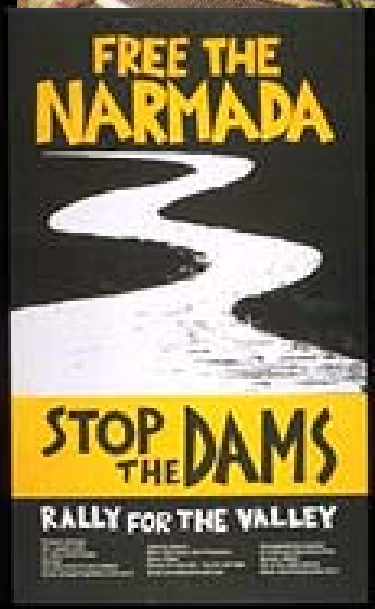
The knowledge in this respect is rapidly advancing and is likely to go further in the future."

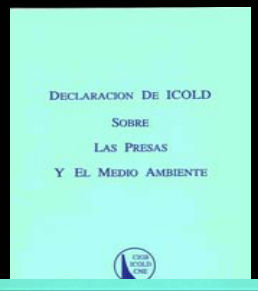
Aly Shady. President of the International Commission on Irrigation and Drainage

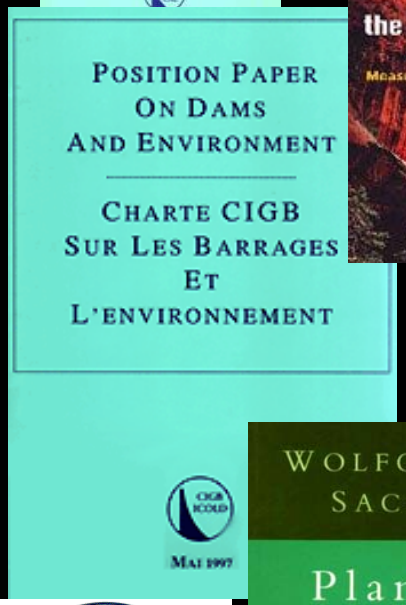
The « DIVIDE»

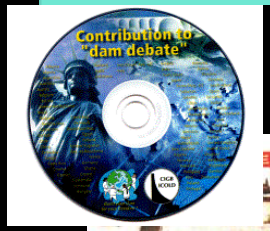
IRN
International Rivers Network

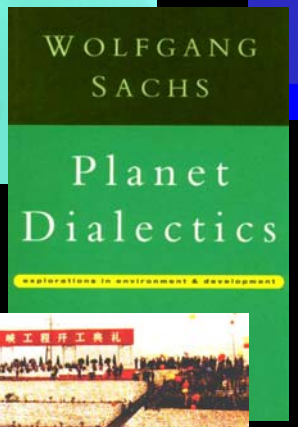
IUCN
The World Conservation Union



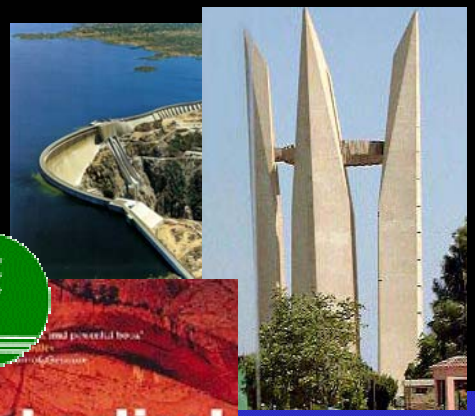


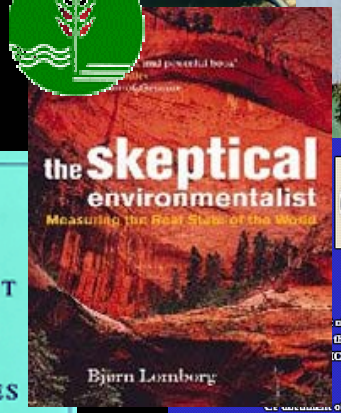


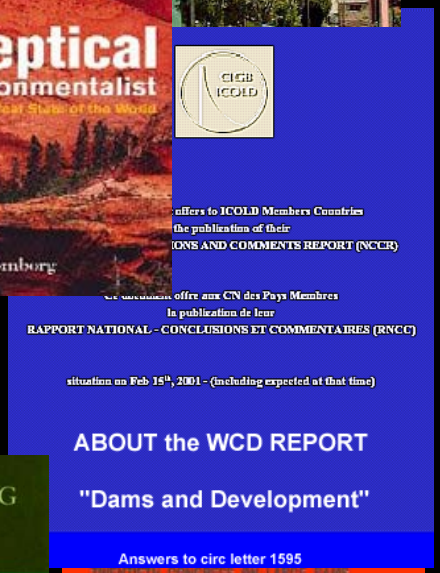


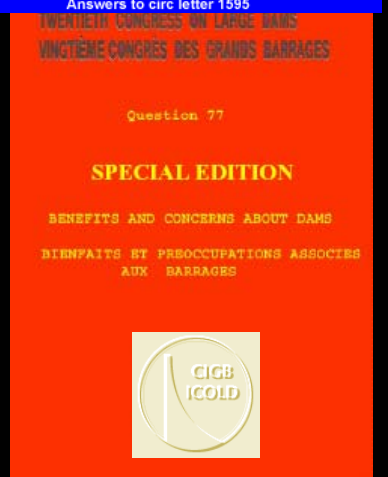



A Grand Scene of The Starting Ceremony of Three Gorges Project Construction

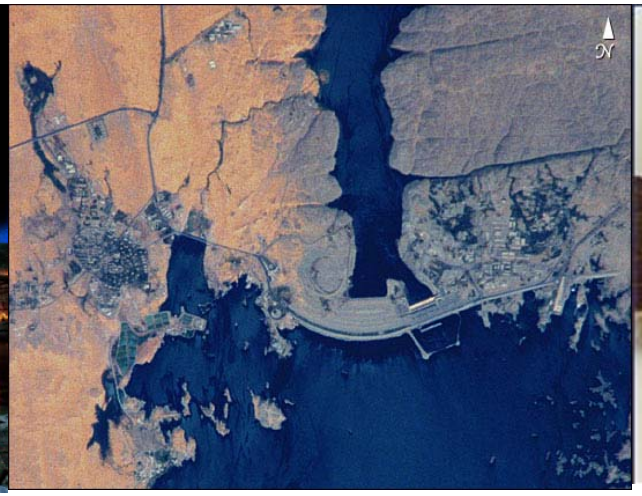








Grand Coullee



ASWAN

TARBELA

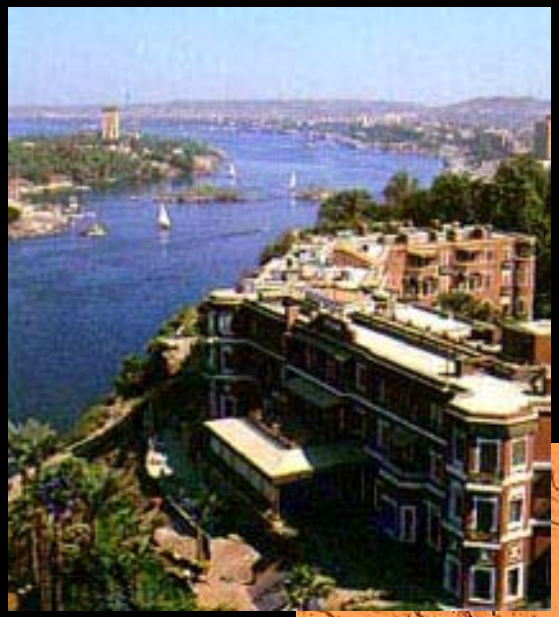
FAMOUS DAMS OF THE WORLD

INTERNATIONAL COMMISSION ON LARGE DAMS

ASWAN
a success !

Data from ICOLD CO

Environment



- Floods
- Sediment
- Drainage
- Shoreline navigation
- Resettlement
  50 000
- Fauna
- Health
- Heritage …