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CHAPTER: WATER SECURITY

MEAK1003: Environmental Management and Sustainability

Master Eng. (Environmental Management)

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TOPIC: WATER SECURITY

MEAK1003: Environmental Management and Sustainability

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TOPIC: WATER SECURITY

MEAK1003: Environmental Management and Sustainability

COURSE COORDINATOR:
Dr Mohd Badruddin Mohd Yusof
mbadruddin@utm.my

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TOPIC: WATER SECURITY

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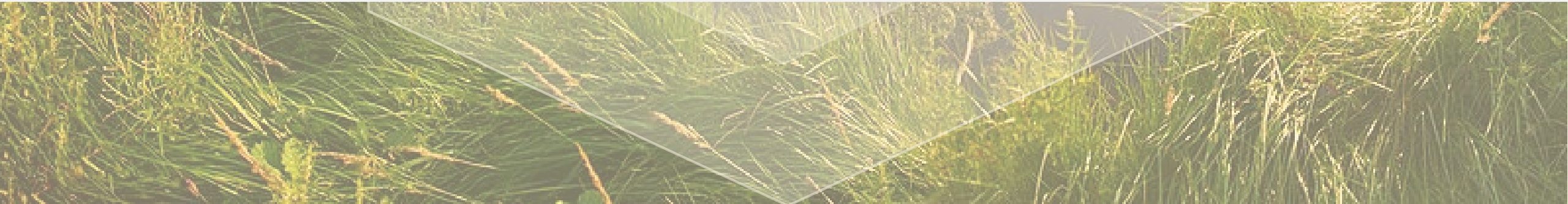
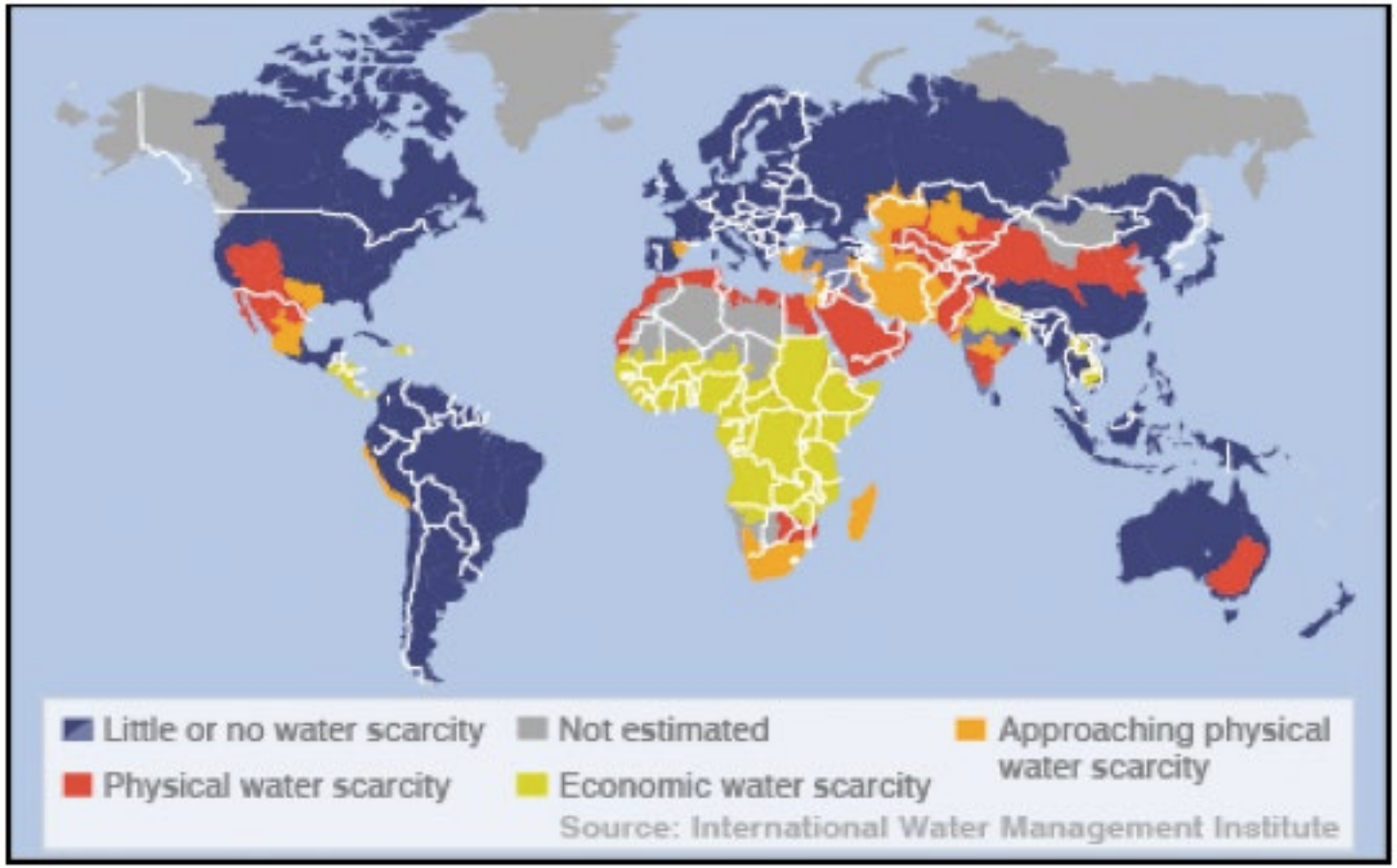
WHAT IS WATER SECURITY?



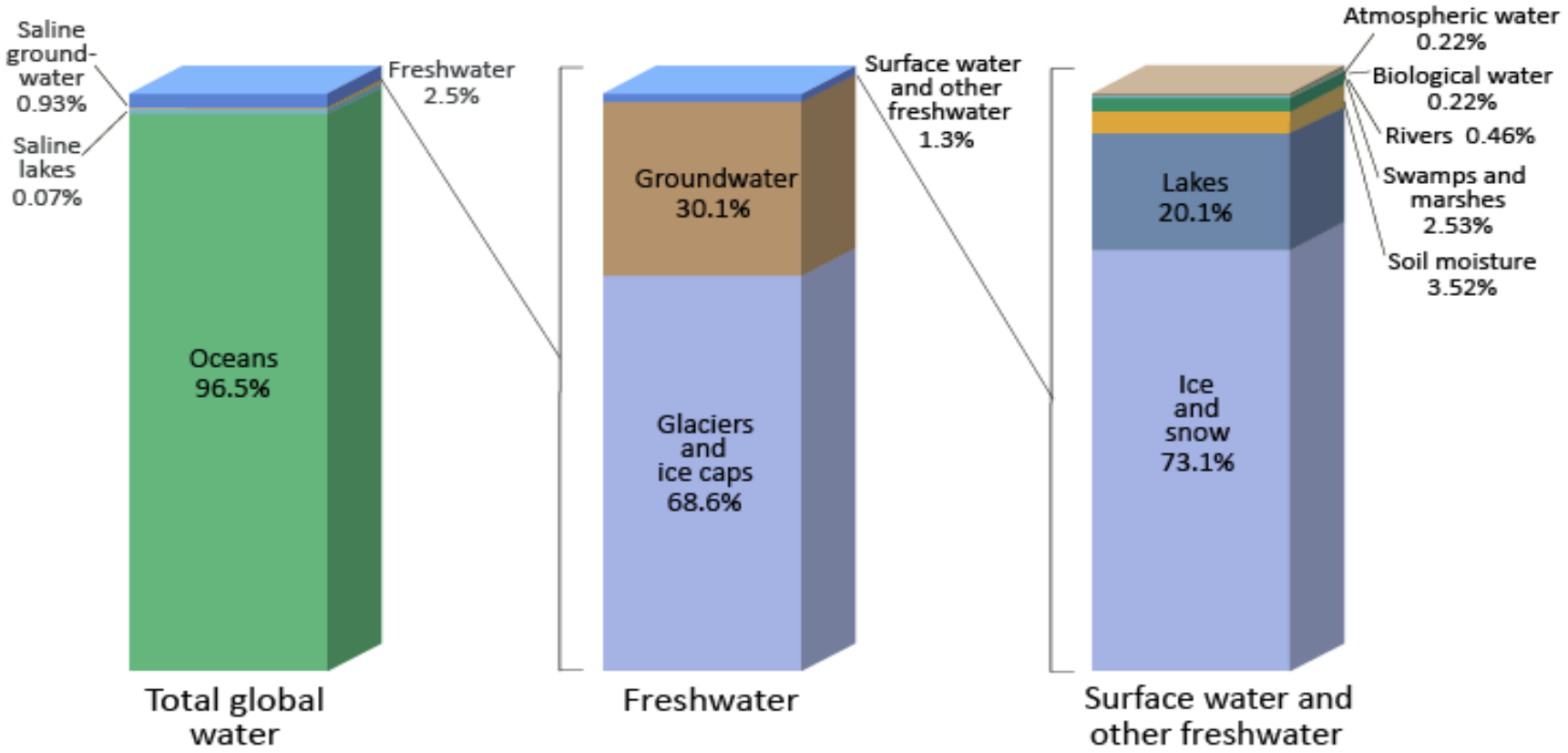
1. WATER SECURITY is a peoples' ability to maintain a constant and sufficient supply of safe, clean water without negatively impacting the peoples and environment around them.

2. WATER SECURITY is a population's ability to protect and maintain enough access to clean, use-able water necessary for human health, economy, safety, and stability.

PEAK WATER ?


Little or no water scarcity
Not estimated
Approaching physical water scarcity
Physical water scarcity
Economic water scarcity
Source: International Water Management Institute

DISTRIBUTION OF EARTH'S WATER ?



Source: Igor Shiklomanov's chapter "World fresh water resources" in Peter H. Gleick (editor), 1993, Water in Crisis: A Guide to the World's Fresh Water Resources.

http://ga.water.usgs.gov/edu/earthwherewater.html

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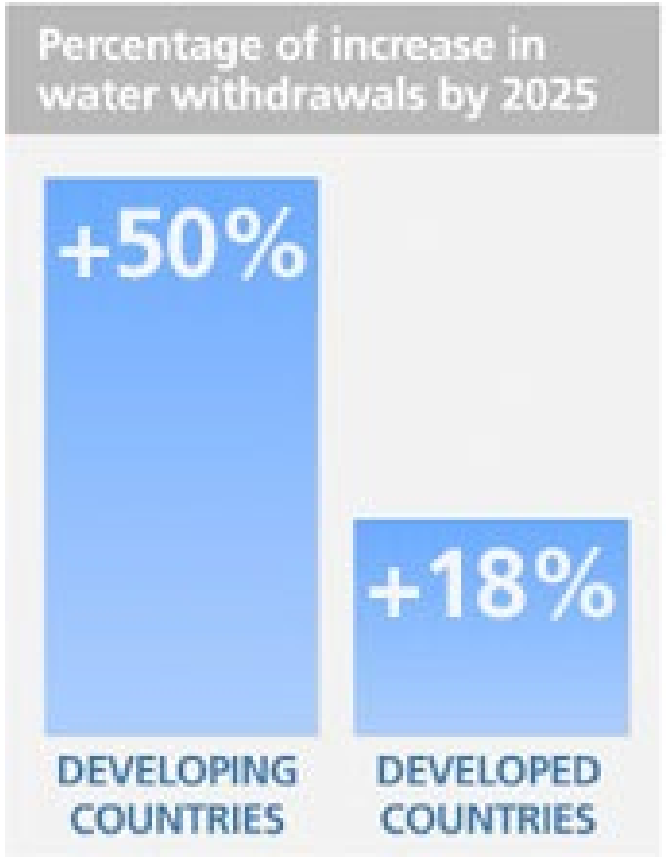
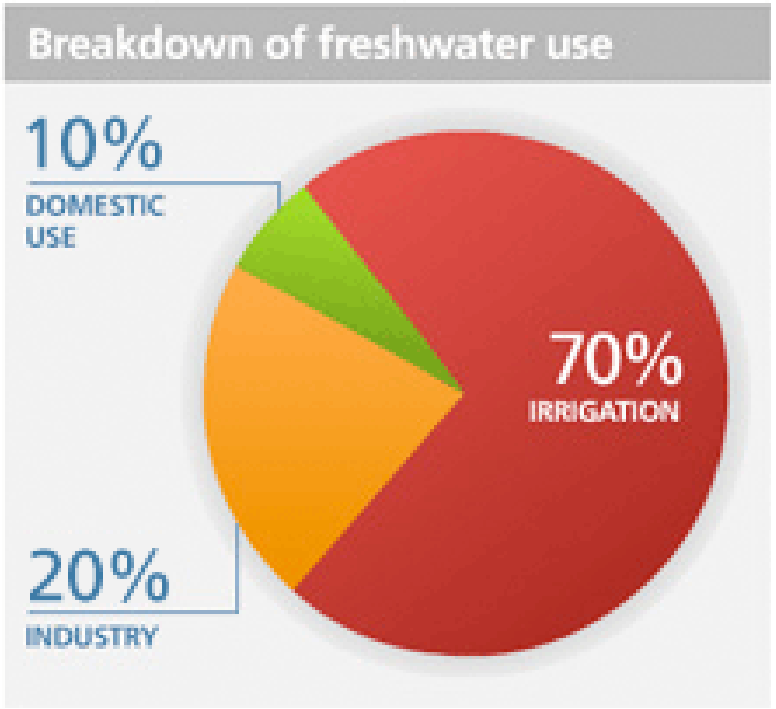
GLOBAL WATER USE





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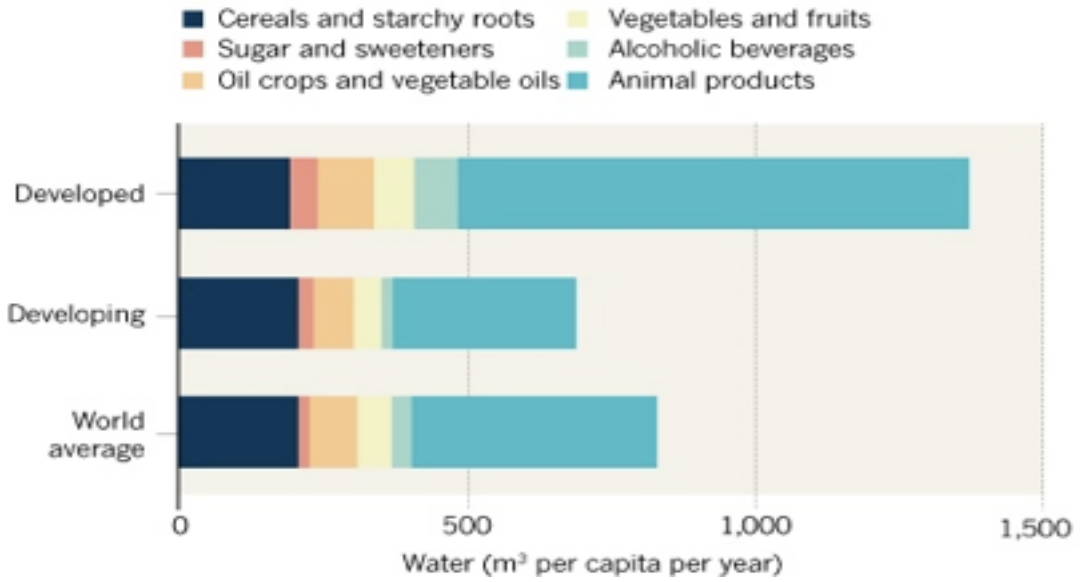
WATER IN AGRICULTURE

ON THE FARM

Agriculture consumes almost 70% of all extracted water. Animal husbandry is the most water-intensive aspect of farming, and causes the greatest disparity in water consumption between the developed and developing worlds. The United States leads the world in per capita water use attributable to animal products, with each person consuming the equivalent of about 1,200 m^3 per year.



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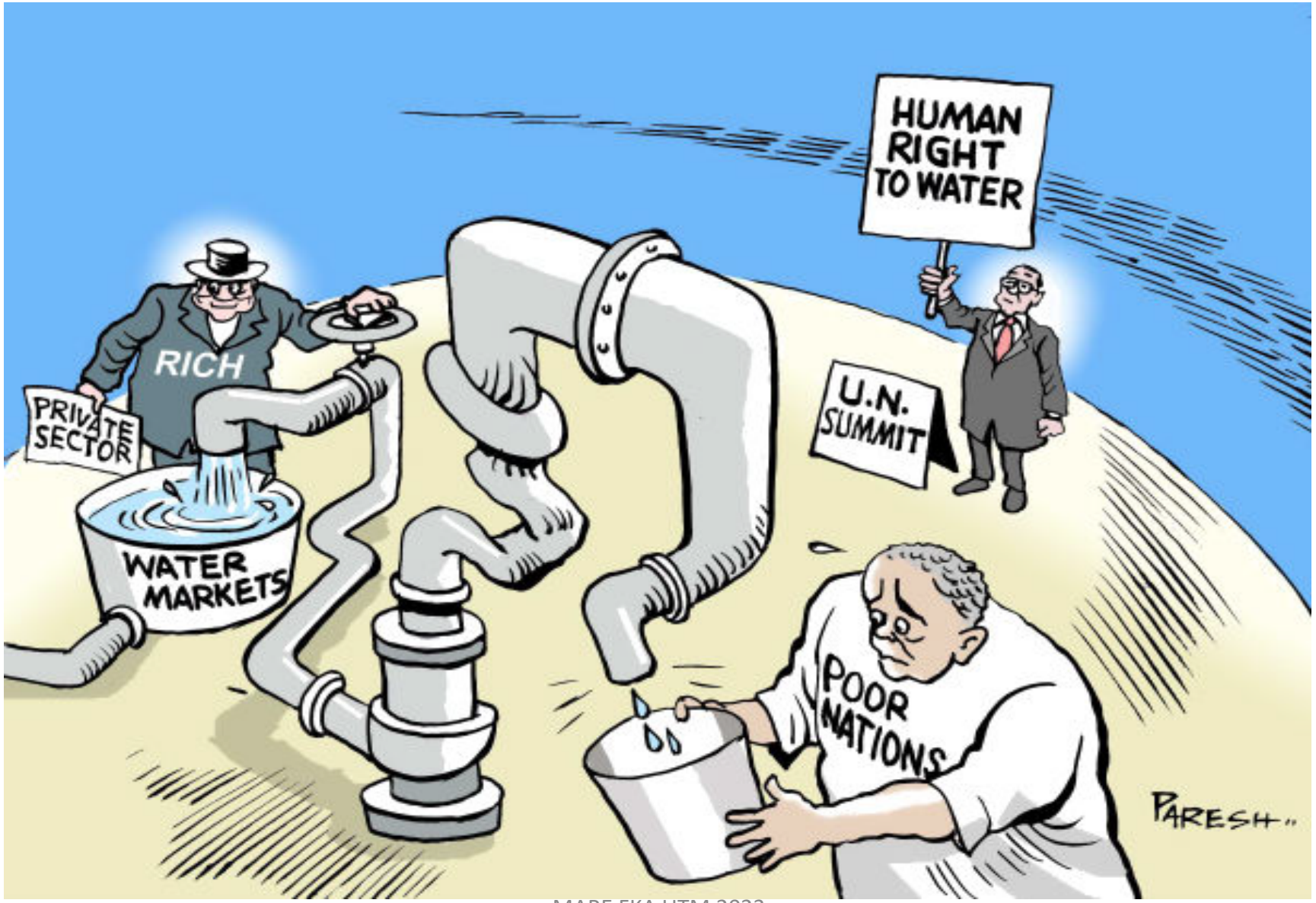
WORLDWIDE PROGRESS TOWARDS THE TARGET: ENVIRONMENTAL SUSTAINABILITY

Goals and Targets	Africa		Asia				Oceania	Latin America & the Caribbean	Caucasus & Central Asia
	Northern	Sub-Saharan	Eastern	South-Eastern	Southern	Western			
GOAL 7 | Ensure environmental sustainability									
Halve proportion of population without improved drinking water	high coverage	low coverage	high coverage	moderate coverage	high coverage	high coverage	low coverage	high coverage	moderate coverage
Halve proportion of population without sanitation	high coverage	very low coverage	low coverage	low coverage	very low coverage	moderate coverage	very low coverage	moderate coverage	high coverage
Improve the lives of slum-dwellers	moderate proportion of slum-dwellers	very high proportion of slum-dwellers	moderate proportion of slum-dwellers	high proportion of slum-dwellers	high proportion of slum-dwellers	moderate proportion of slum-dwellers	moderate proportion of slum-dwellers	moderate proportion of slum-dwellers	—

The progress chart operates on two levels. The words in each box indicate the present degree of compliance with the target. The colours show progress towards the target according to the legend below:

- Target already met or expected to be met by 2015.
- Progress insufficient to reach the target if prevailing trends persist.
- No progress or deterioration.
- Missing or insufficient data.

* Poverty progress for Eastern Asia is assessed based on China's data only.


HUMAN RIGHT TO WATER
RICH
PRIVATE SECTOR
WATER MARKETS
U.N. SUMMIT
POOR NATIONS
PARESH

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A LOOMING WATER CRISIS

- 2.8 billion people live in areas of high water stress
- 2.5 billion people don't have access to adequate sanitation
- 1.3 billion people continue to live without access to electricity world wide
- 805 million people are chronically undernourished
- 780 million people do not have access to safe drinking water

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DEFINITION: WATER SECURITY

Many definitions exist and most have a certain sector bias

The capacity of a population to safeguard *sustainable access* to *adequate quantities* of and *acceptable quality* water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring *protection against water-borne pollution* and *water-related disasters*, and for *preserving ecosystems* in a climate of *peace* and political *stability* (UN Water)

OECD: *Water security is about learning to live with an acceptable level of water risk*

Key Dimensions of Water Security
(Asian Water Development Outlook, 2016)

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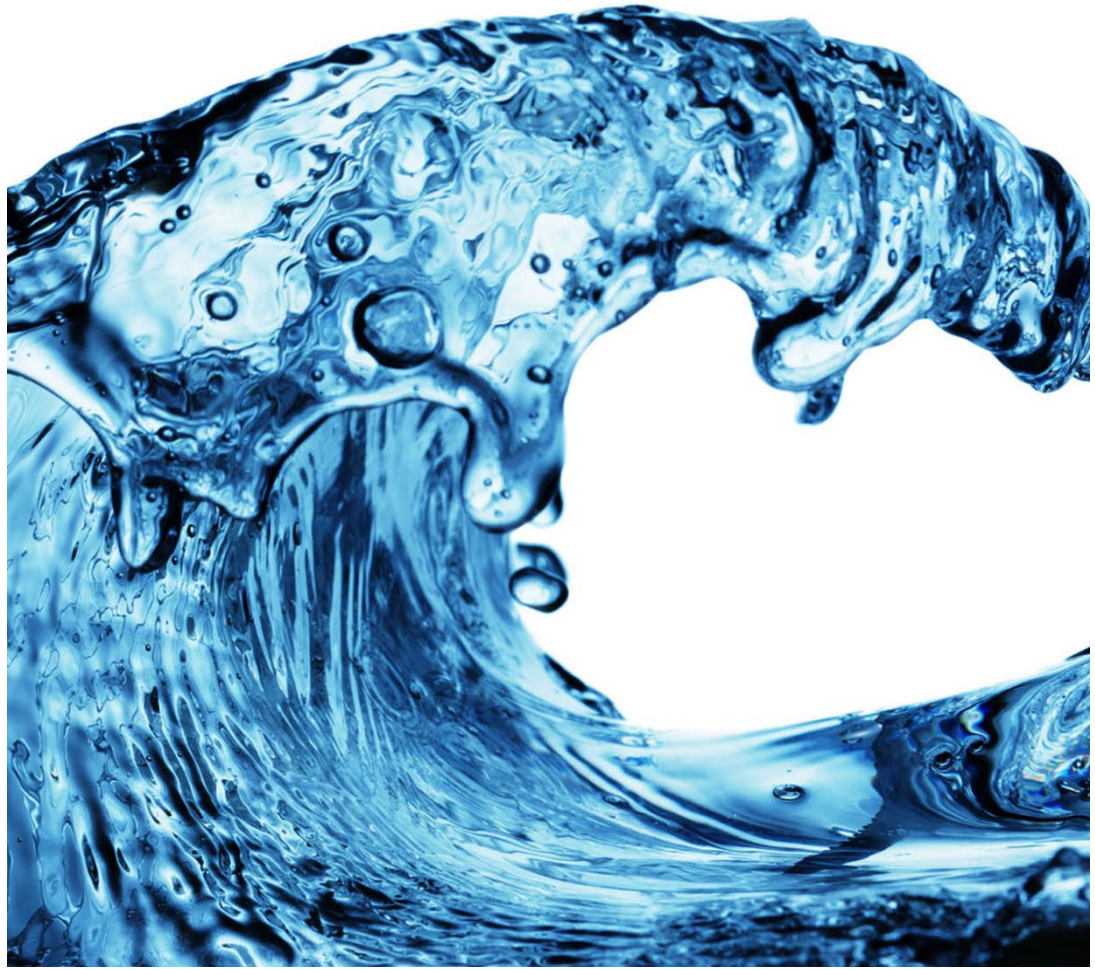
WATER SECURITY: CHALLENGE OF 21ST CENTURY

Water security is defined as

"the capacity of a population to safeguard access to adequate quantities of water of ***acceptable quality*** *for sustaining human and ecosystem health on a watershed basis, and to ensure efficient protection of life and property against water related hazards – floods, landslides, land subsidence, and droughts"*



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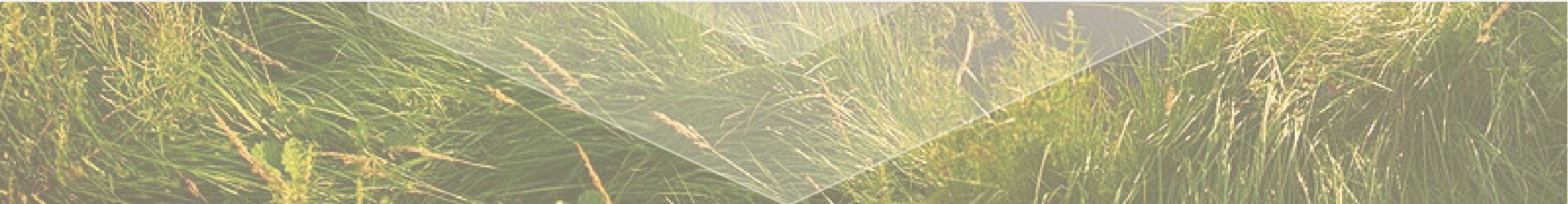
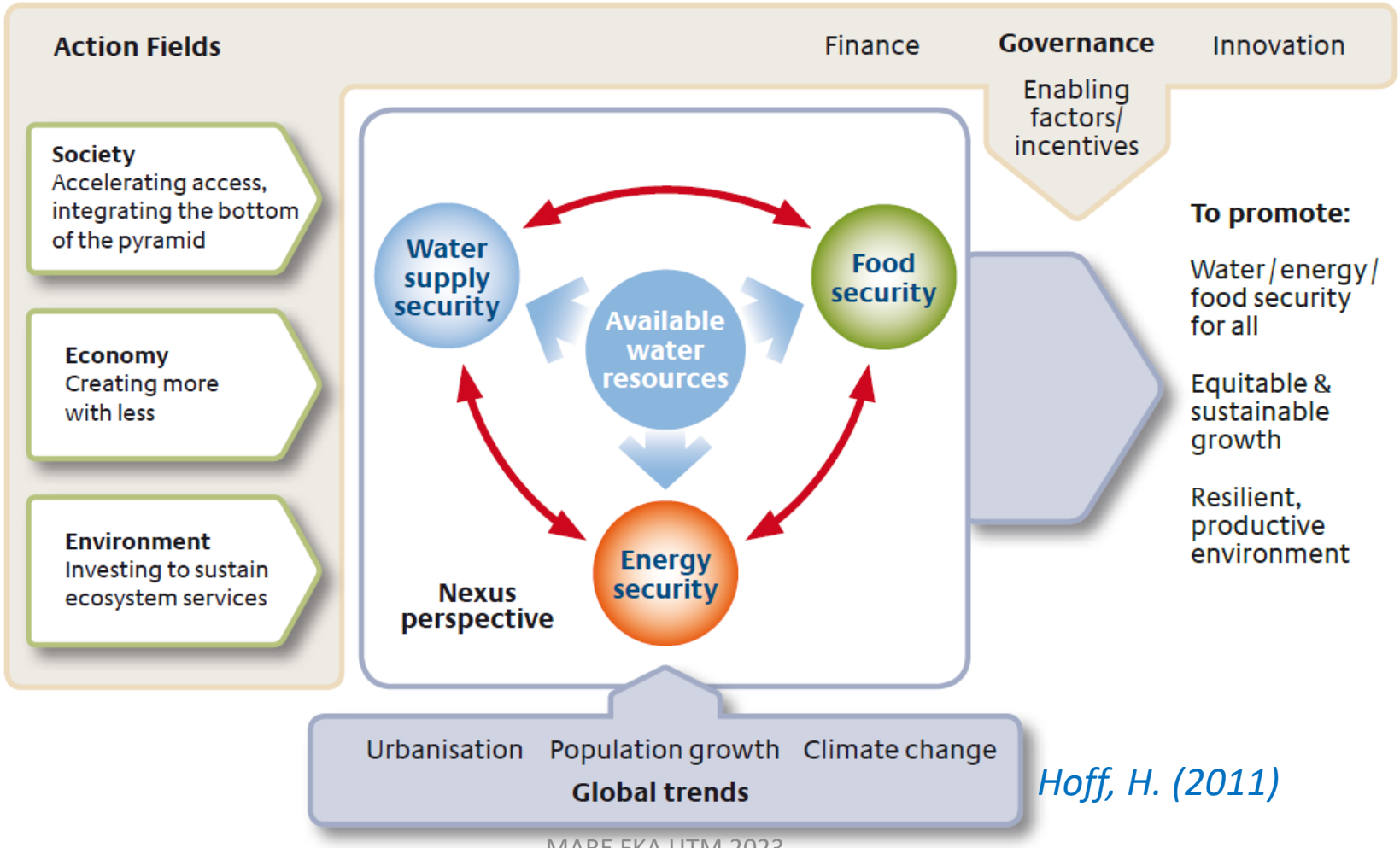
WATER SECURITY IN A CHANGING WORLD



WATER SECURITY IN A CHANGING WORLD



Hoff, H. (2011)

UNESCO'S WATER STRATEGIC PLAN: IHP PHASE 8, WATER SECURITY

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OUR WORLD RIGHT NOW

Water connects all aspects of growth and development

	Health and human settlements	Food and agriculture	Energy and industry	Environment
DEMAND INCREASE				
	Changing settlement patterns, with a 2004-15 to see 40% increase in urban population without basic WSS access	70% increase in food production will be required in 40 years	Global energy consumption expected to increase by ~40% from 2007-2030	Over-consumption of water and water pollution results in loss of massive ecosystem benefits
IMPACTS ON GROWTH	**Lack of sanitation access can cost countries up to 6% of GDP**	**Unreliable water supply can deprive farmers of 2/3 of their potential income**	**Energy security is threatened by water challenges**	**Losses of ecosystem services with increasingly visible economic cost**

THE ROLE OF WATER SECURITY

SECURING **WATER TO ENSURE A BETTER FUTURE** FOR THE **GENERATIONS** TO COME

THE PACT FOR WATER SECURITY

Bringing people together through ***active hydro-politics***

Exploring ***ideas and concepts***

Catalyzing collective action during and in between each ***World Water Forum***

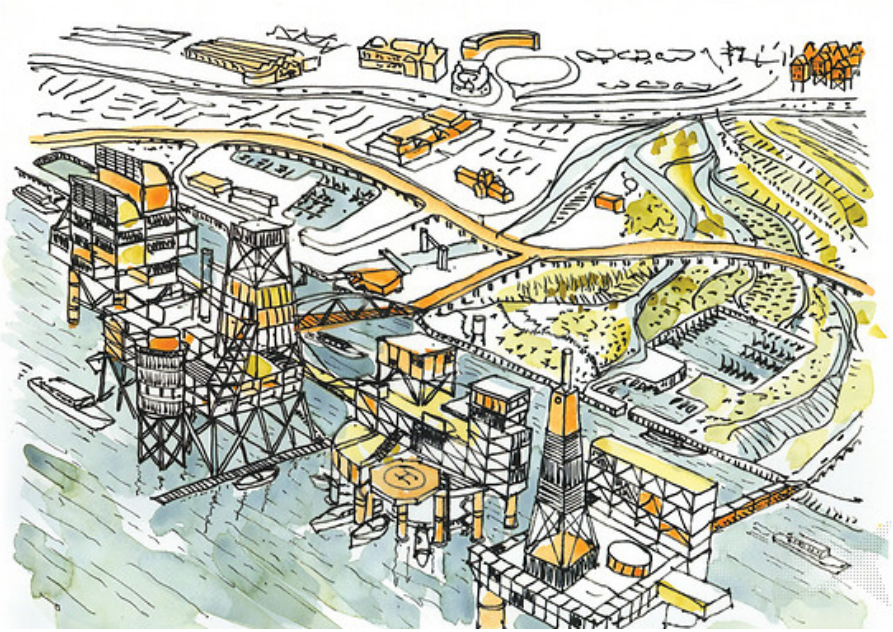
A STRATEGIC APPROACH

Active hydro-politics

- The United Nations system
- International Organizations
- National Governments
- Parliamentarians
- Local Authorities

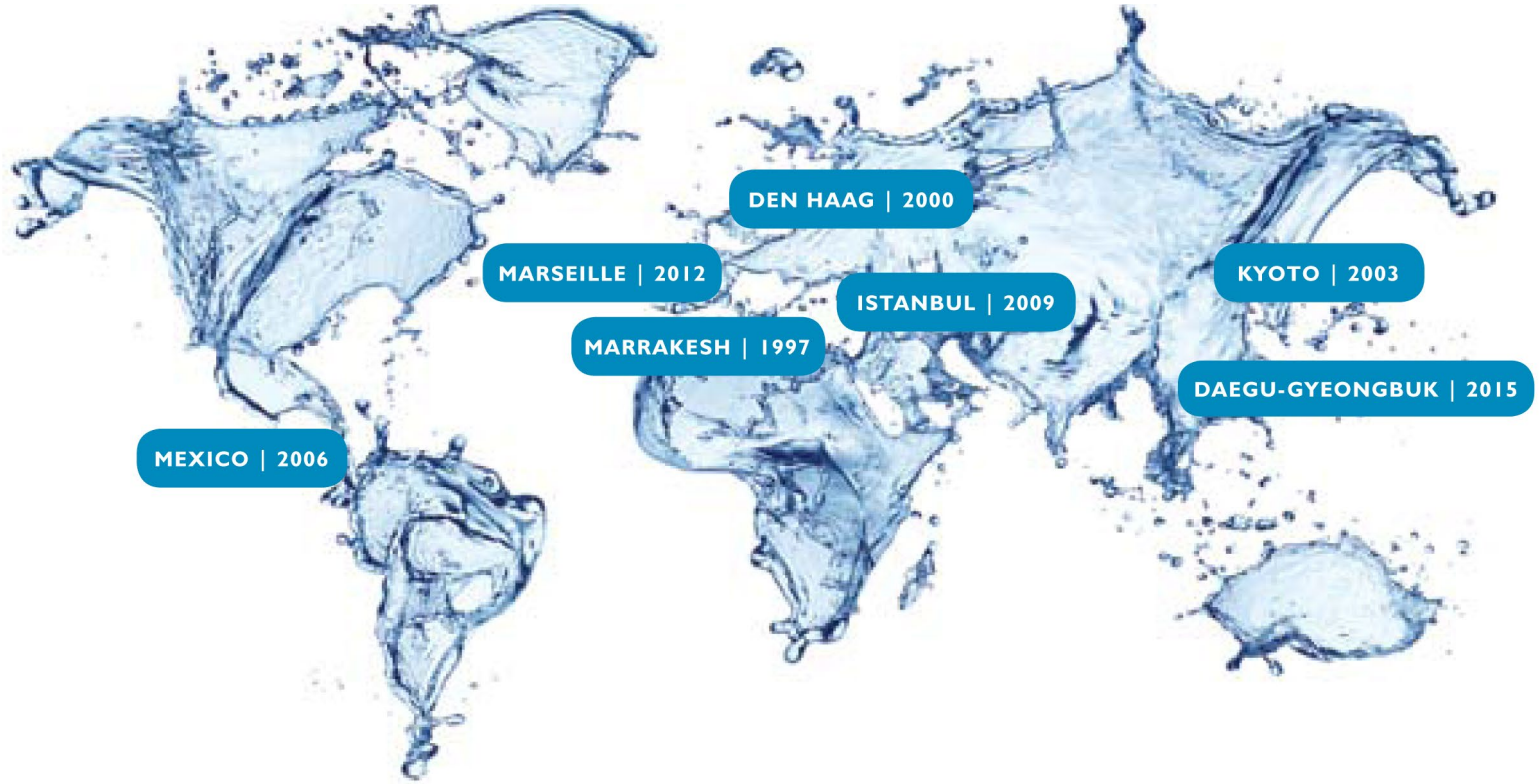
A STRATEGIC APPROACH

Ideas and concepts



- Water and Green Growth
- Water Infrastructure Financing
- Water and Food
- Water and Energy
- Climate change
- Water-related disasters
- IWRM

THE WORLD WATER FORUM



THE WORLD WATER COUNCIL

A worldwide **network** with wide-ranging **competencies** that facilitates water **policy dialogue** and motivates **actions**

COUNCIL MEMBERS

Governments, Ministries and Agencies

Local and Regional Authorities

Intergovernmental Organizations

International Organizations

Private/Public/ Academic Groups and Businesses

UN Agencies

300 organizations from more than **50** countries

ASSIGNMENT

Water Conflict/ Problem Areas

- China and Trans-boundary issues
  - (a) China and India
  - (b) China – Mekong river delta
- Nile River conflicts among Egypt, Ethiopia, and Sudan
- Aral Sea (Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan and Kyrgyzstan)
- Middle East disputes
  - Euphrates and Tigris Rivers among Turkey, Syria, and Iraq;
  - Jordan River conflict among Israel, Lebanon, Jordan and the State of Palestine)
- Cochabamba protests in Bolivia

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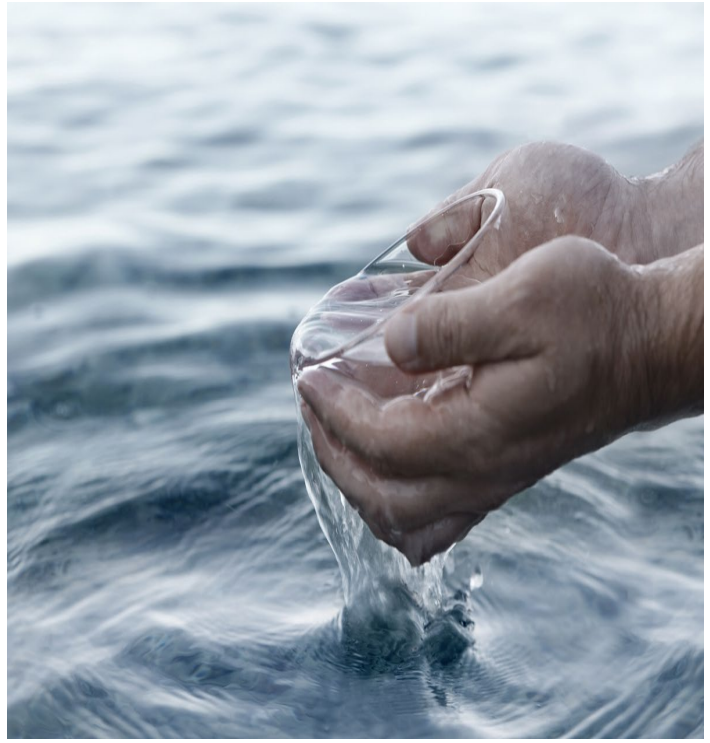
WATER SCARCITY

Water scarcity can result from two mechanisms:

1. Physical water scarcity - Around one fifth of the world's population currently live in regions affected by where there is inadequate water resources to meet a country's or regional demand, including the water needed to fulfill the demand of ecosystems to function effectively.
2. Economic water scarcity is caused by a lack of investment in infrastructure or technology to draw water from rivers, aquifers or other water sources, or insufficient human capacity to satisfy the demand for water. One quarter of the world's population is affected by economic water scarcity.



WAYS TO DEAL WITH WATER SECURITY

- Oceans are a good source of usable water, but the amount of energy needed to convert saline water to potable water is prohibitive with conventional approaches, explaining why only a very small fraction of the world's water supply is derived from desalination.
- However, modern technologies, such as the Seawater Greenhouse, use solar energy to desalinate seawater for agriculture and drinking uses in an extremely cost-effective manner.
- Early and accurate contamination detection-The EPA has issued advisory material and guidelines for contamination warning systems to be implemented in water utilities and supplies.

WAYS TO DEAL WITH WATER SECURITY

Specific technologies involved in water security

- Scada
- GIS (Geographic Information System)
- Online (Real-time) Water Quality Monitoring Devices
- Contamination Warning Systems
- Contamination Warning Systems
- Intrusion Detection Systems (IDS)
- Contamination Detection Devices
- Security Valves
- Security Cameras And Fences
- Situation Management/Emergency Management Software, Emergency Supply Tanks
- Manned (Or Human) Security Personnel, Personal Purification Devices, And Counter-terrorism Intelligence

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- 4. Kerr, J.A. Introduction to Energy and Climate: Developing a Sustainable Environment. CRC Tailor and Francis Group. 2017.

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