



RETAC
CONACYT



Water as an Environmental Security Issue

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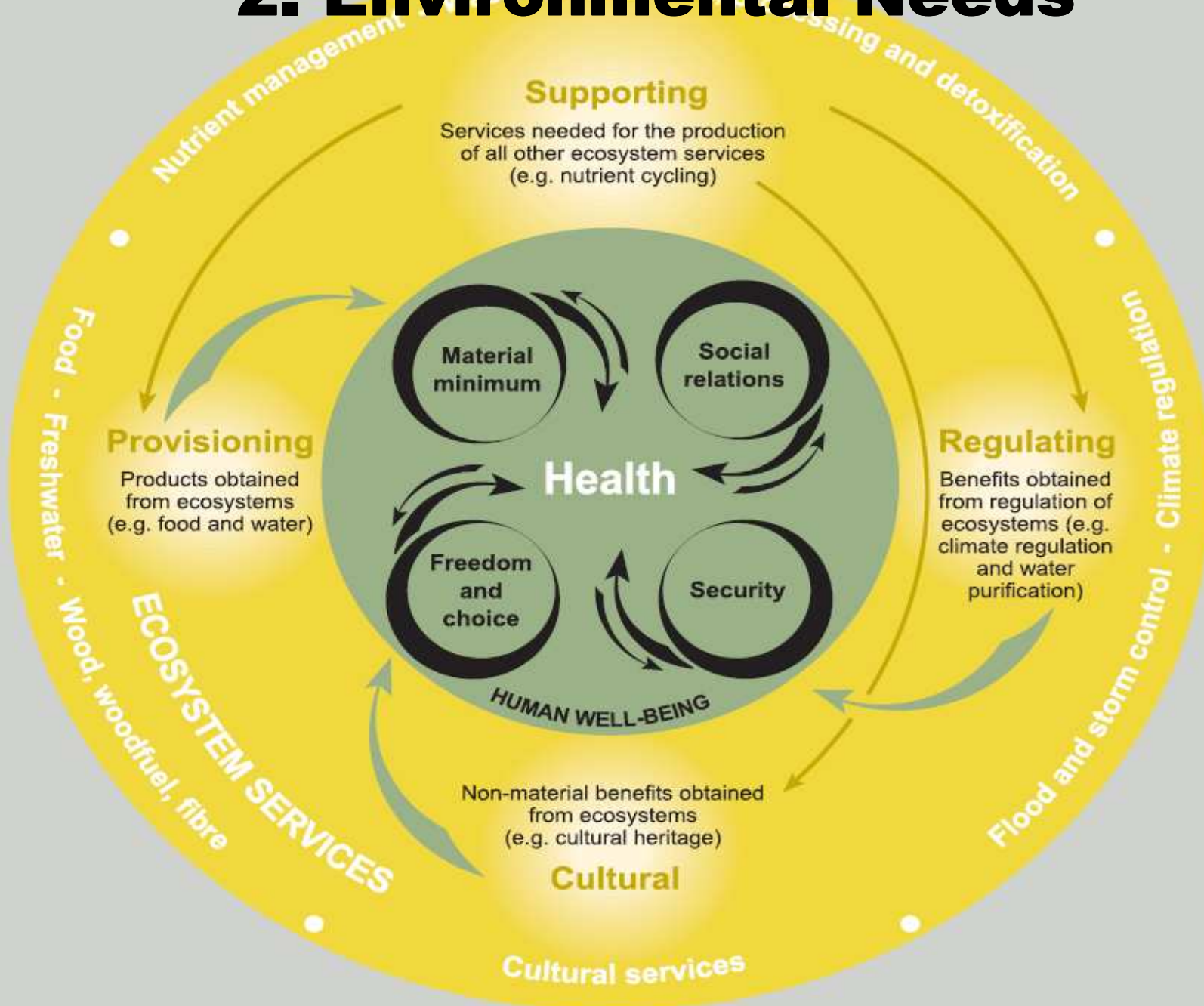
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Human and Social Right of Water

1. Water is life: basic human right: 40-50l/pers. for survival
2. Water gives services: social right
3. Water is business: economic right: 70% of extracted and river water is used for business
4. Lack of water: affects health, environment, social organization, economic development, psychological factors, violence and conflicts
5. MDG: reduce to half people without safe water: 80% of all illnesses
 - 1.1 billion without water; 2.4 billion without sanitation
 - 4 billion people with diarrhea; 10% of people in the South infected by parasites
 - 6 million blind (trachoma)
 - 200 million esquistosomiasis (20 million severe ill)
 - 10 million with arsenic pollution due to overexploitation of aquifers???
 - 50% of rural areas in poor countries missing safe water and sanitation
 - Slum dwellers missing safe water and sanitation
6. Obligation of industrialized countries:
 - Investments, transfer of technologies, advice, long term investments
7. Obligation of poor countries:
 - Decentralization of water management, clean hands, hygienic education, middle-term plans, efficient administration, clear priorities, just tariff system, adapted technology, development and maintenance of water supply system, gender sensitivity, combating corruption

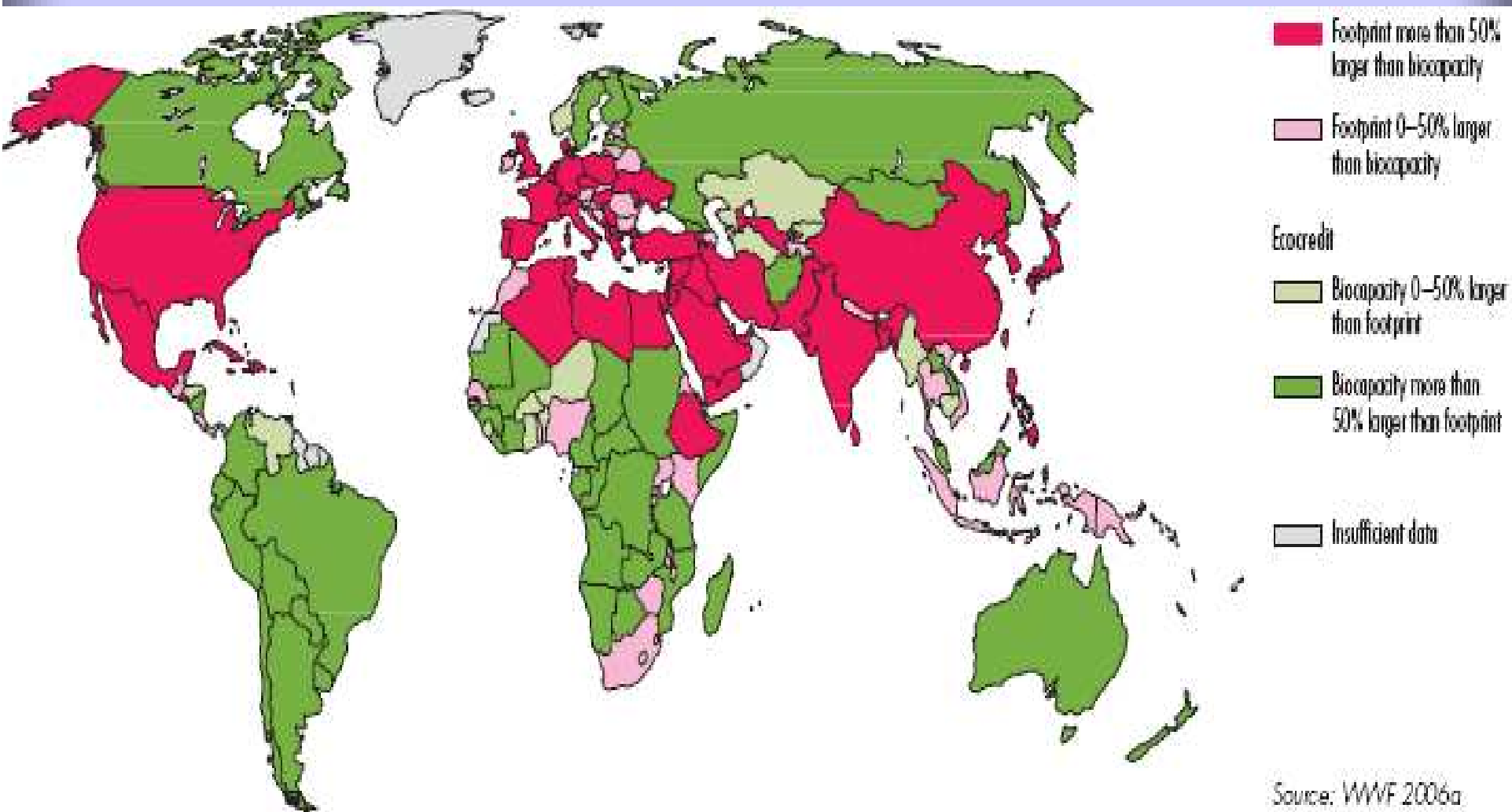
2. Environmental Needs



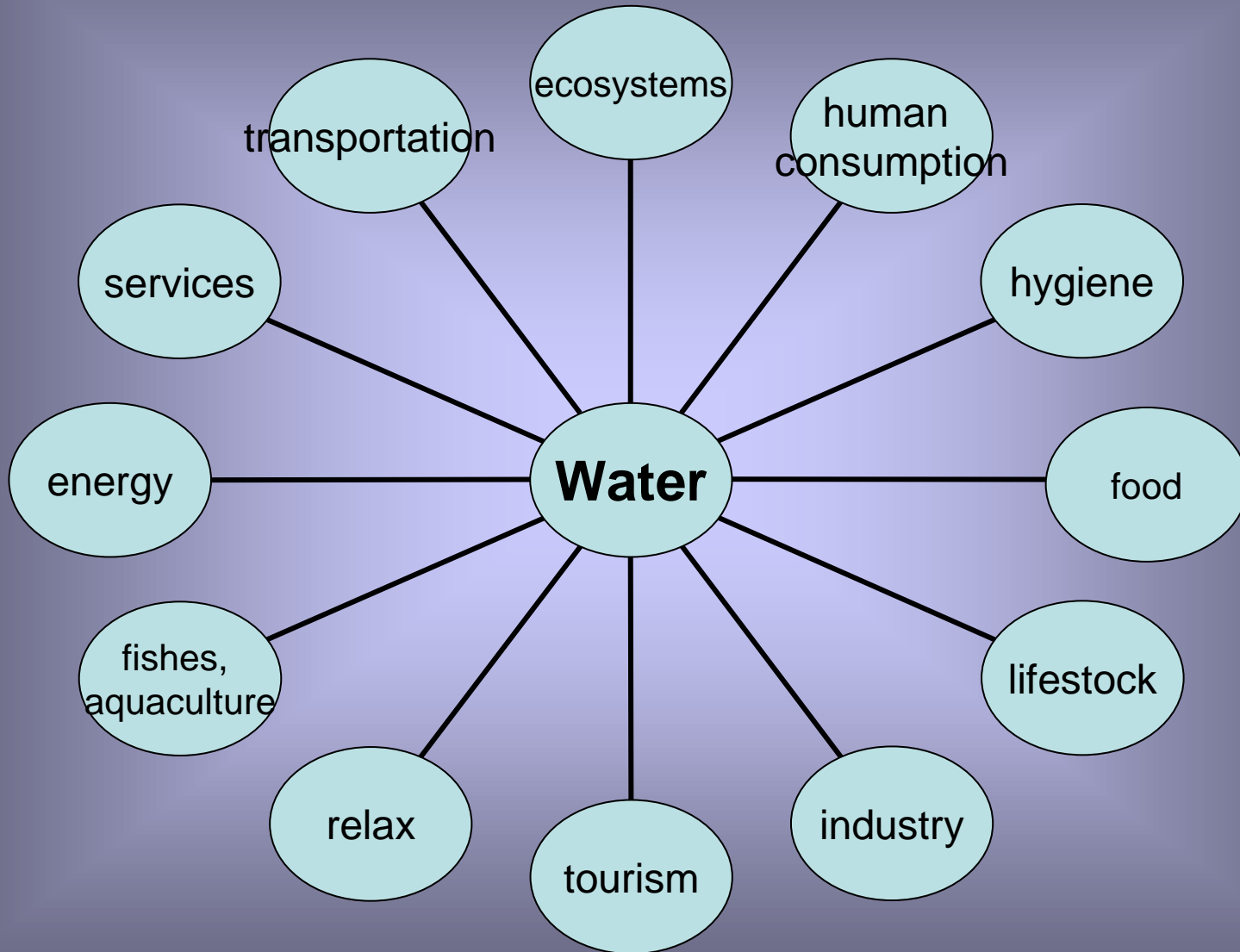
Ecosystem Services as Food and Health Providers

- Water is vital for the **life and health** of people and ecosystems
- **15 out of 24 ecosystem services** are degraded or used unsustainably
- **Soil nutrient** depletion, erosion, desertification
- Depletion of **freshwater reserves** and pollution of groundwater
- **Overfishing** is pressuring fragile soils
- **Loss of tropical forest** and of biodiversity reduces food availability
- **Urbanization** is diminishing the availability of land for food production.

Bio-capacity and bio-debt

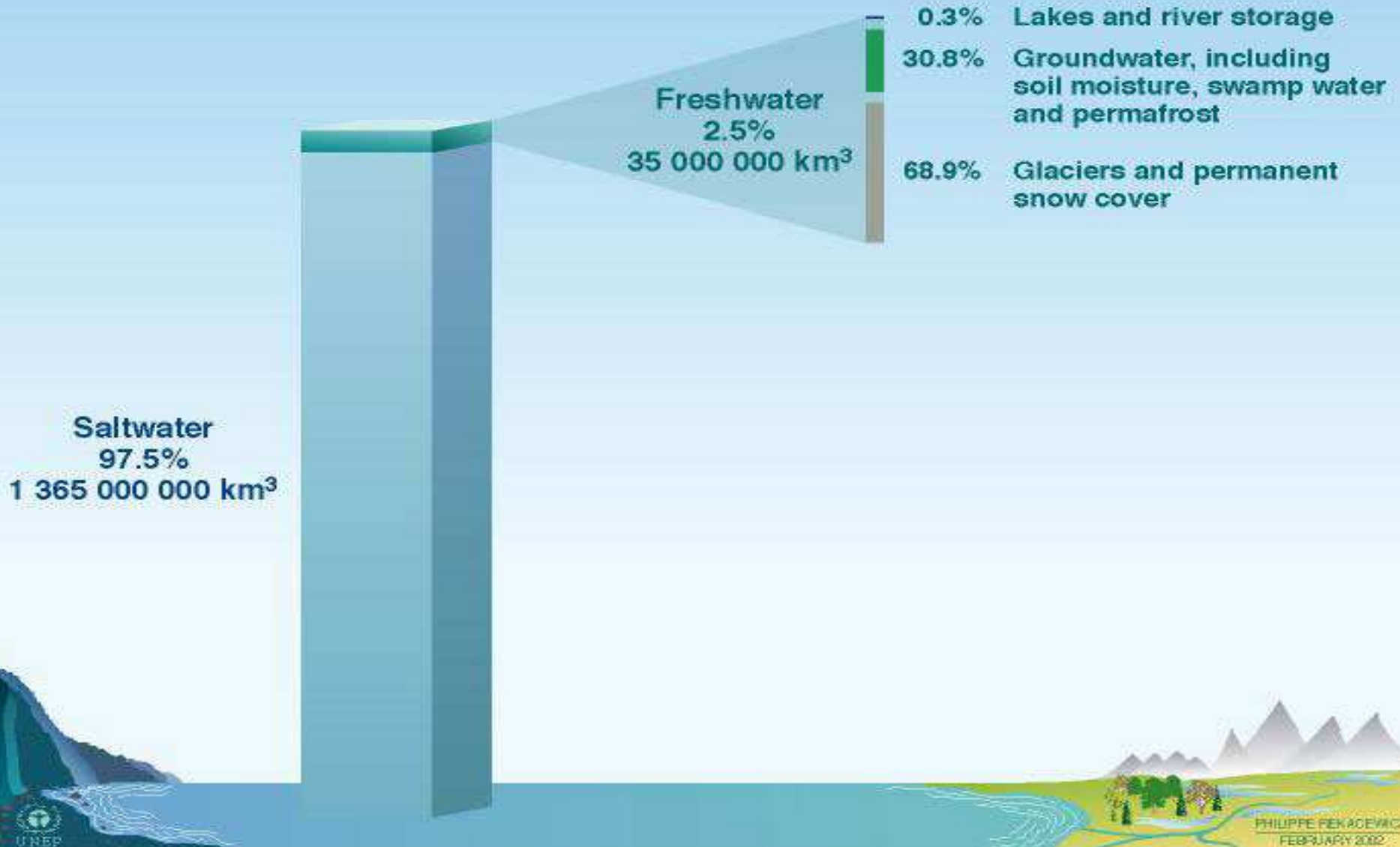


3. Use of Water



A World of Salt

Total Global Saltwater and Freshwater Estimates



Saltwater
97.5%
1 365 000 000 km³

Freshwater
2.5%
35 000 000 km³

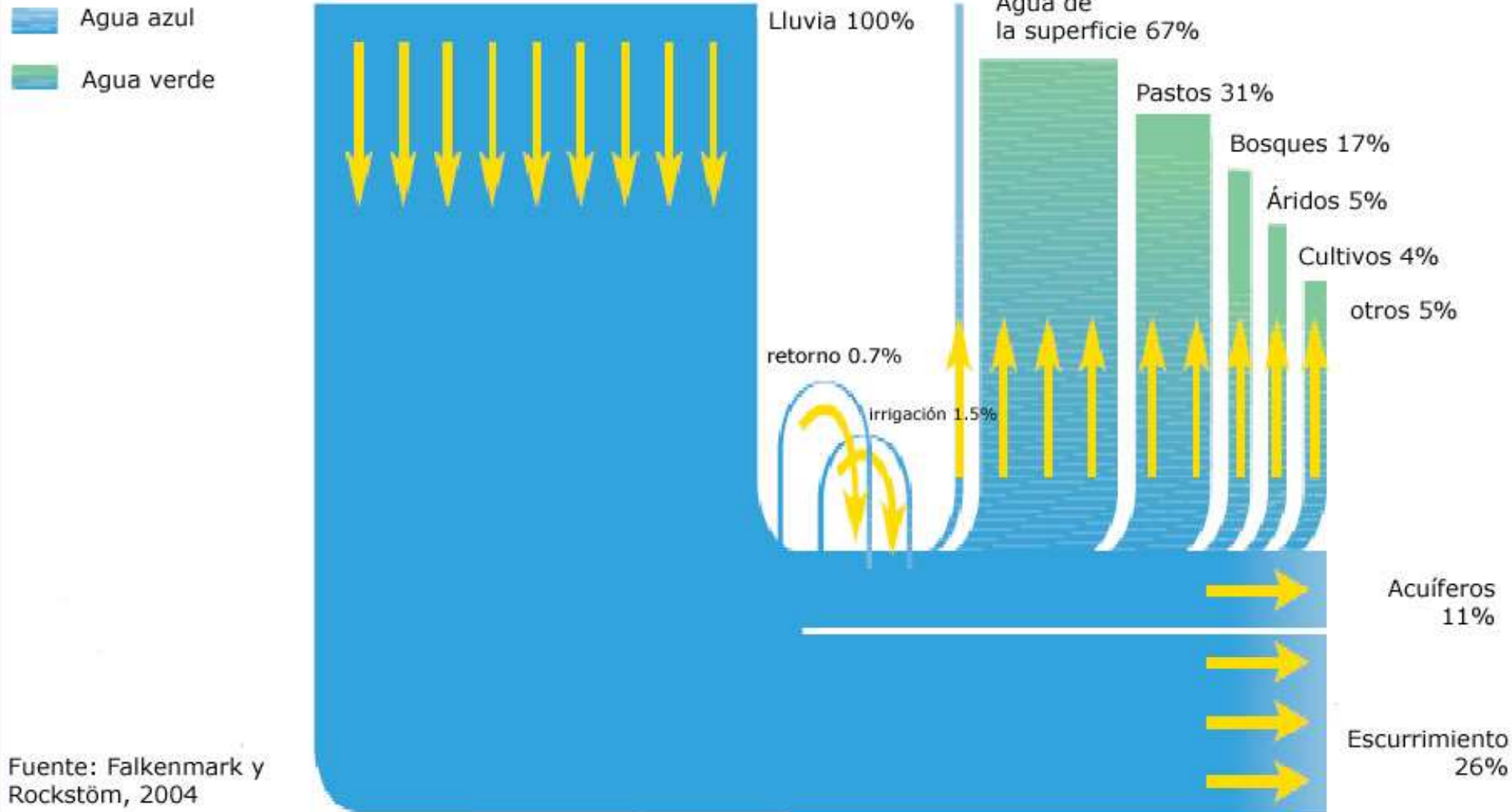
- 0.3% Lakes and river storage
- 30.8% Groundwater, including soil moisture, swamp water and permafrost
- 68.9% Glaciers and permanent snow cover



PHILIPPE PEKACEWICZ
FEBRUARY 2002

Global flow of green and blue water

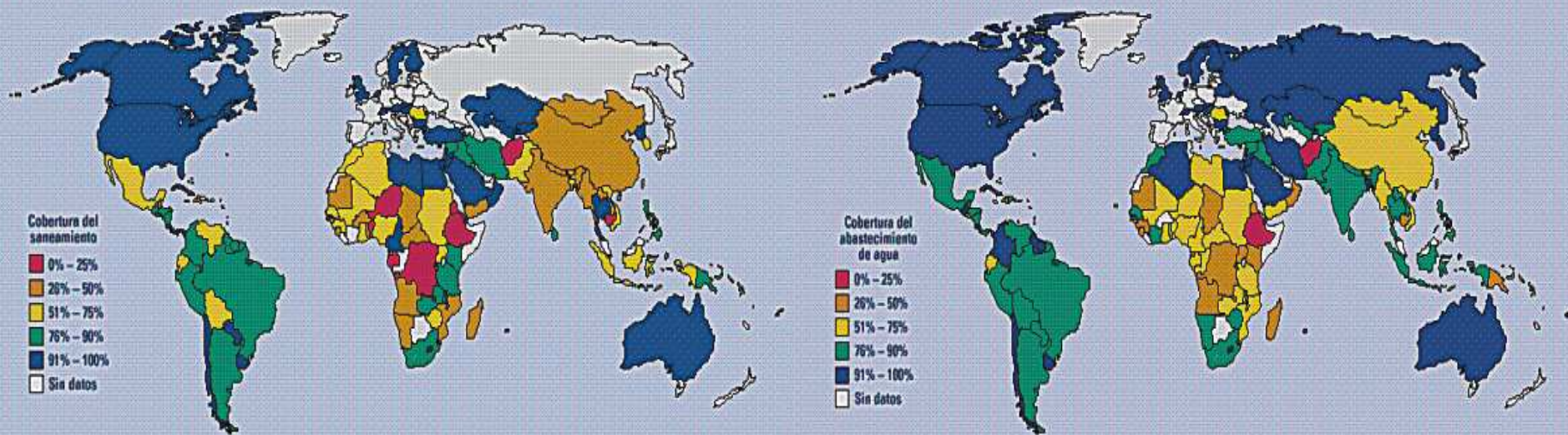
Flujos globales de agua verde y azul



4. Water Security: a controversial concept

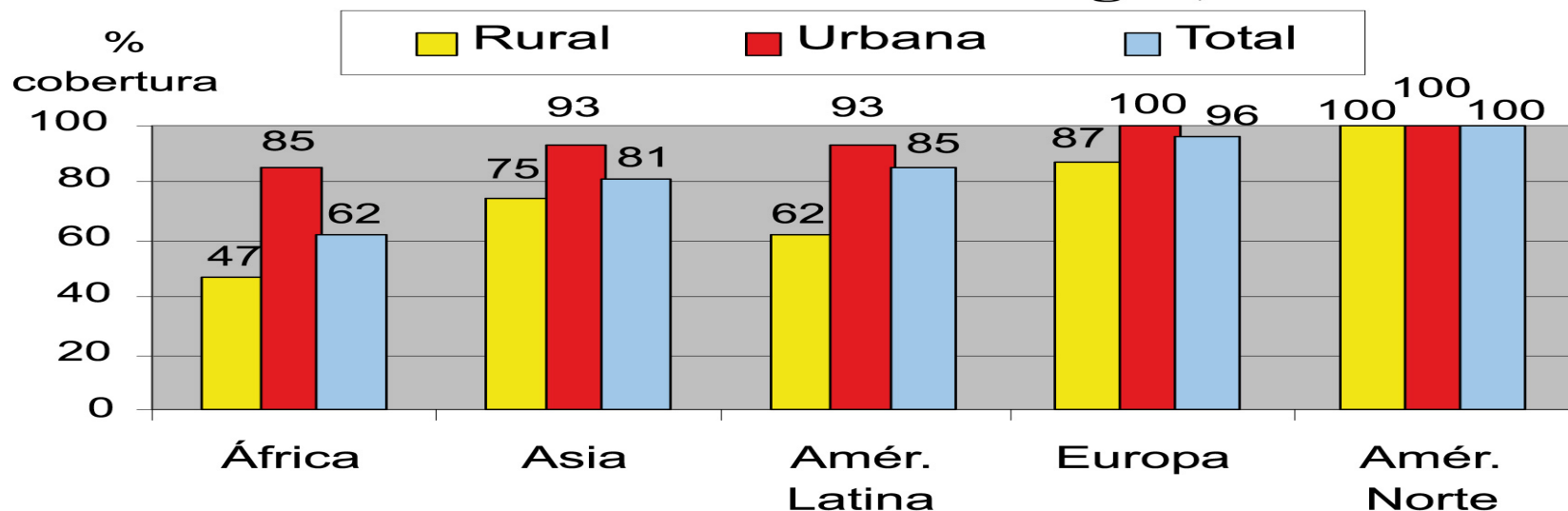
- **One common goal:** *to provide water security in the 21st Century:*
 - This means ensuring that freshwater, coastal and related ecosystems are protected and improved;
 - sustainable development and political stability are promoted;
 - every person has access to enough safe water at an affordable cost to lead a healthy and productive life
 - the vulnerable are protected from the risks of water-related hazard
- Water resources are under **threat** from pollution, overexploitation, land-use changes, unsustainable use, climate change and other anthropogenic forces.
- Links between threats and poverty: the poor who are hit first and hardest (slum dwellers without basic services).
- One simple conclusion: **business as usual is not an option.**

Safe water and sanitation

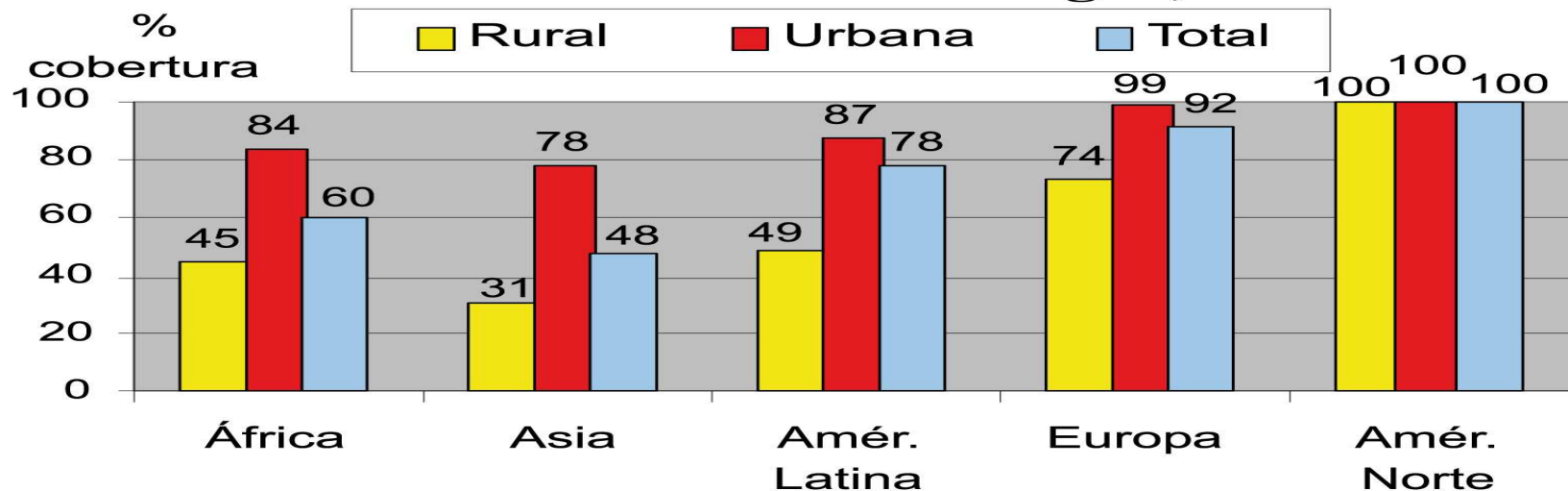


Inequality in water and sanitation

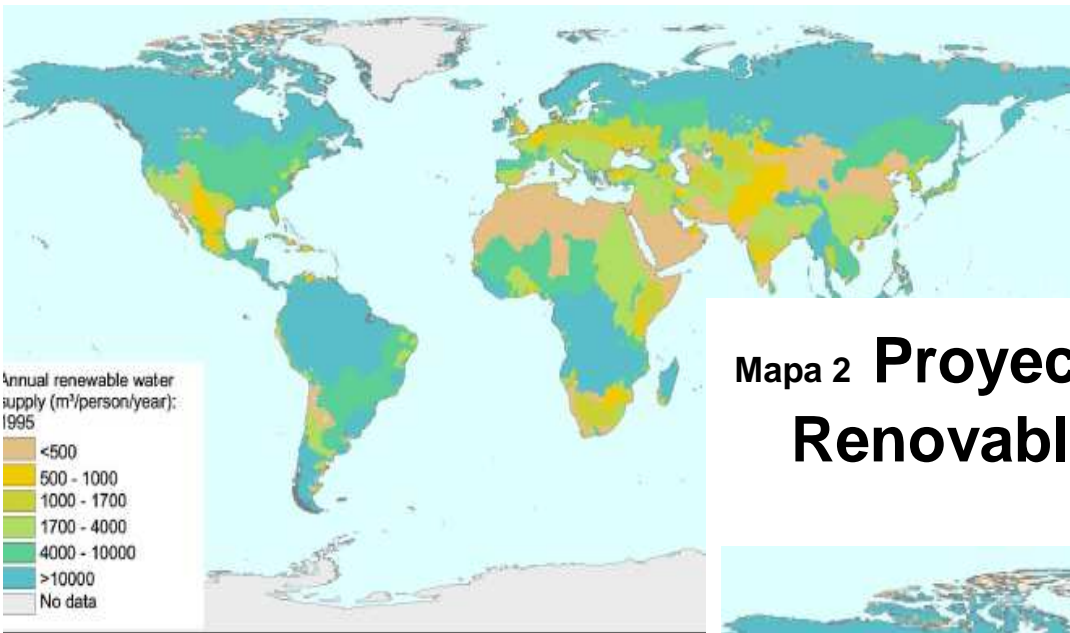
Cobertura del abastecimiento de agua, 2000



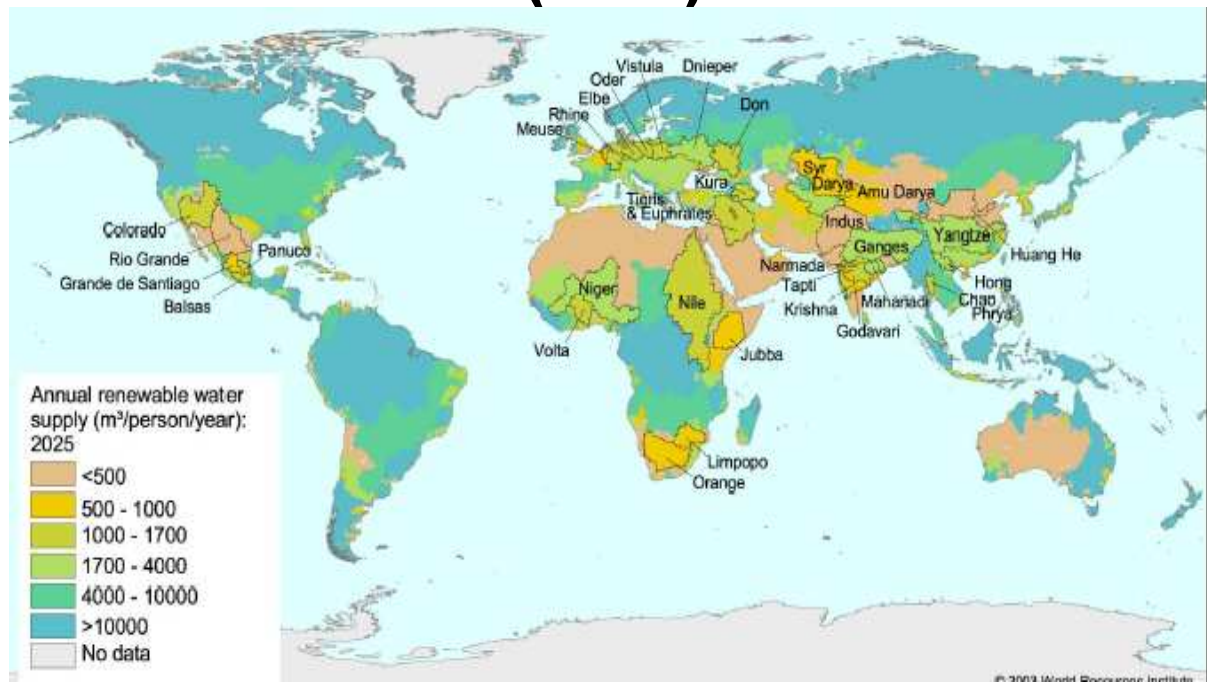
Cobertura del saneamiento de agua, 2000



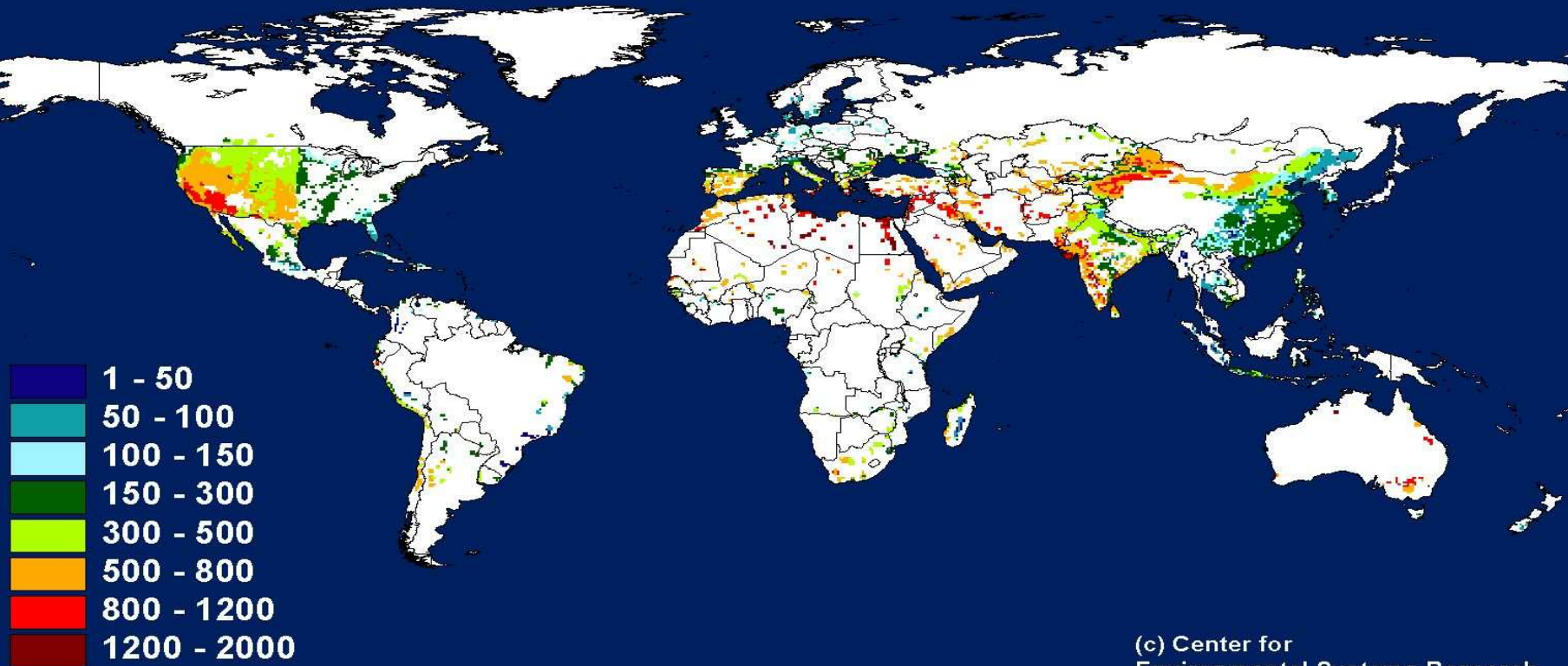
Mapa 1 Reservas de Agua Renovable por Año/Persona/Cuenca (1995)



Mapa 2 Proyecciones de Reservas de Agua Renovable por Año/Persona/Cuenca (2025)

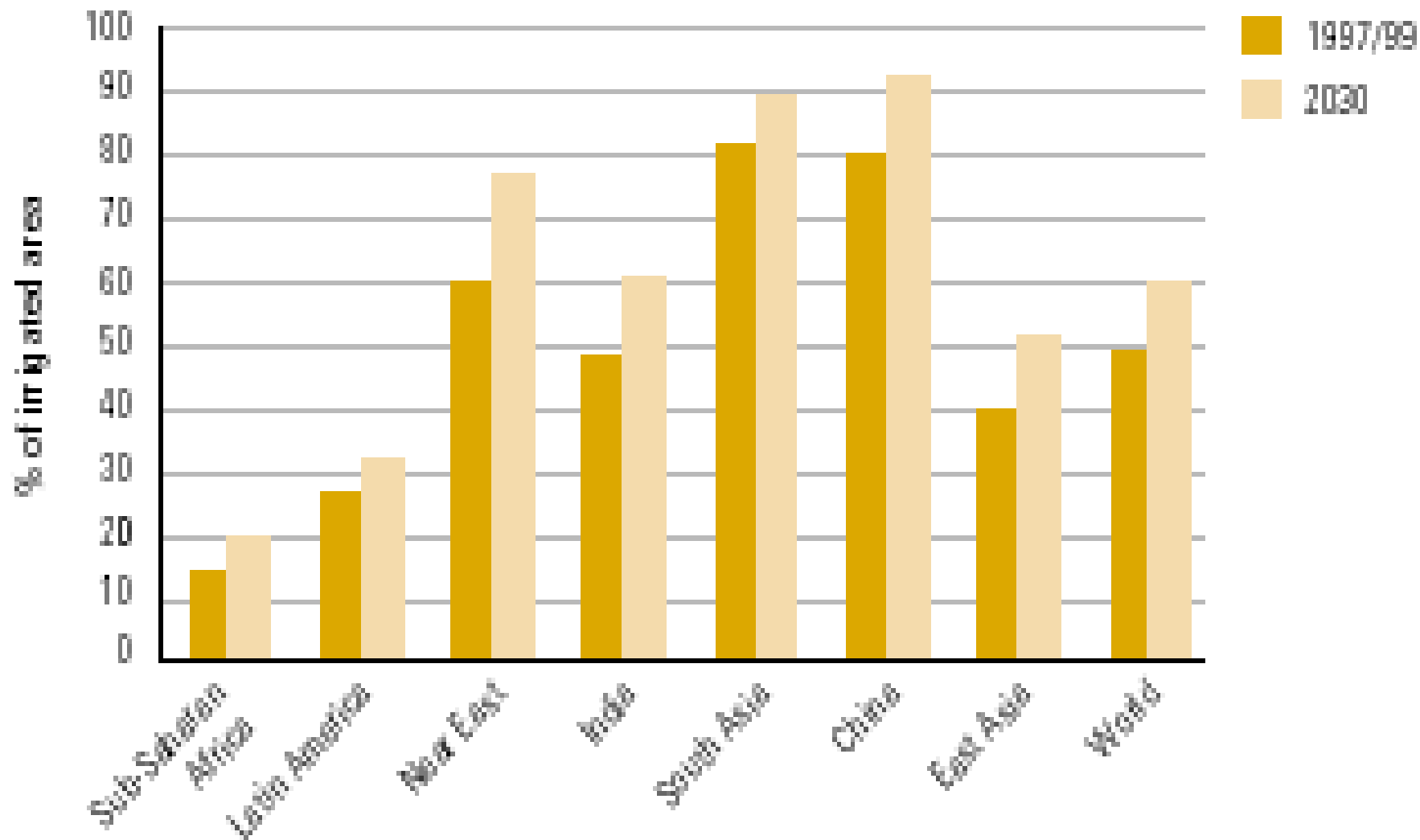


5. Water Use in Agriculture Irrigated Areas

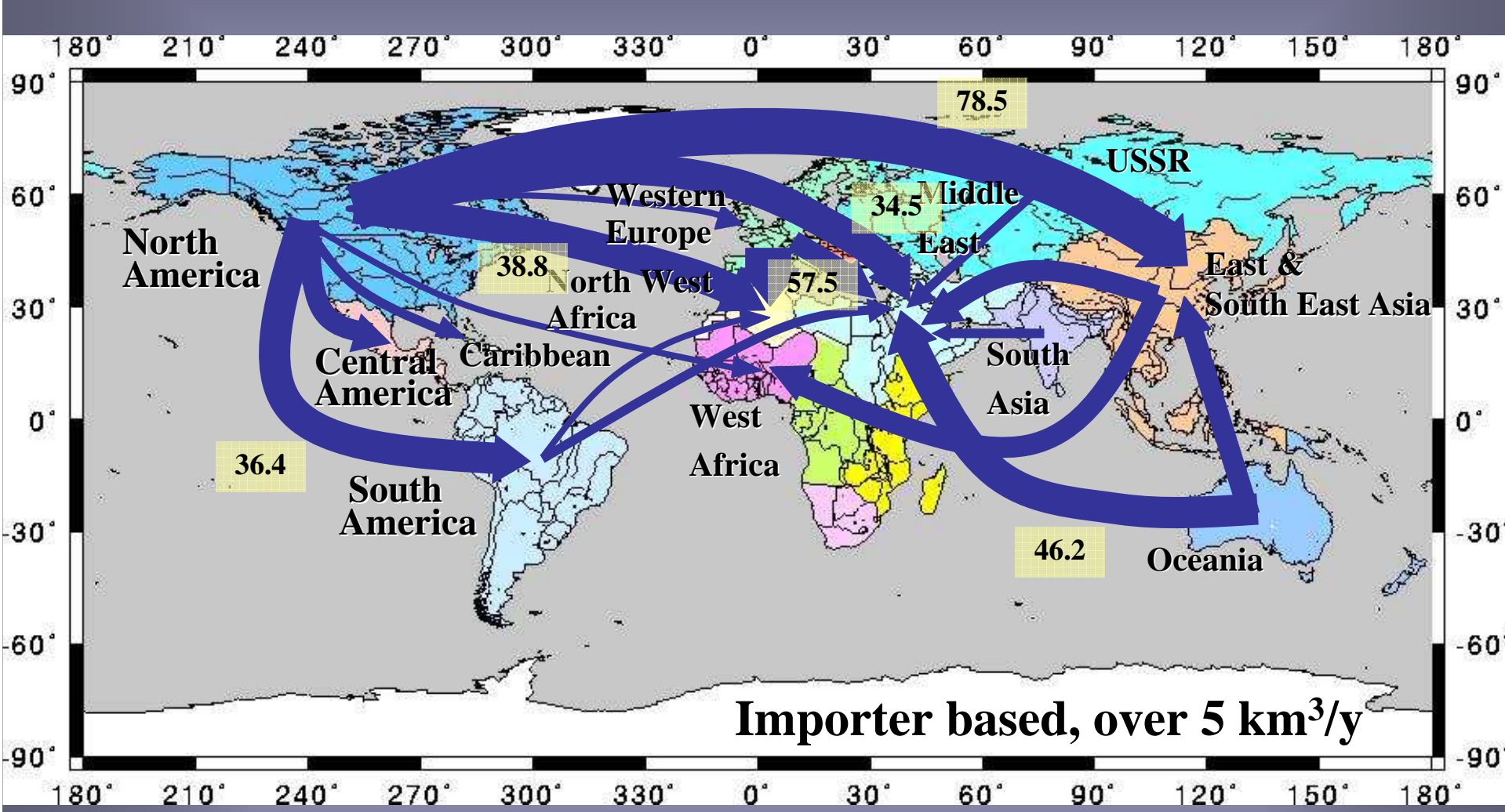


(c) Center for
Environmental Systems Research,
University of Kassel, Nov 2000

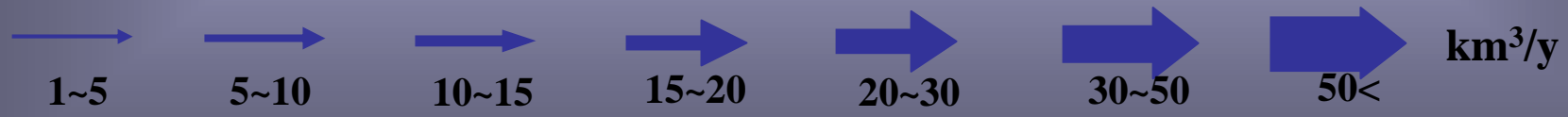
Potential of irrigation in the world



Virtual Water and Food (only grains)

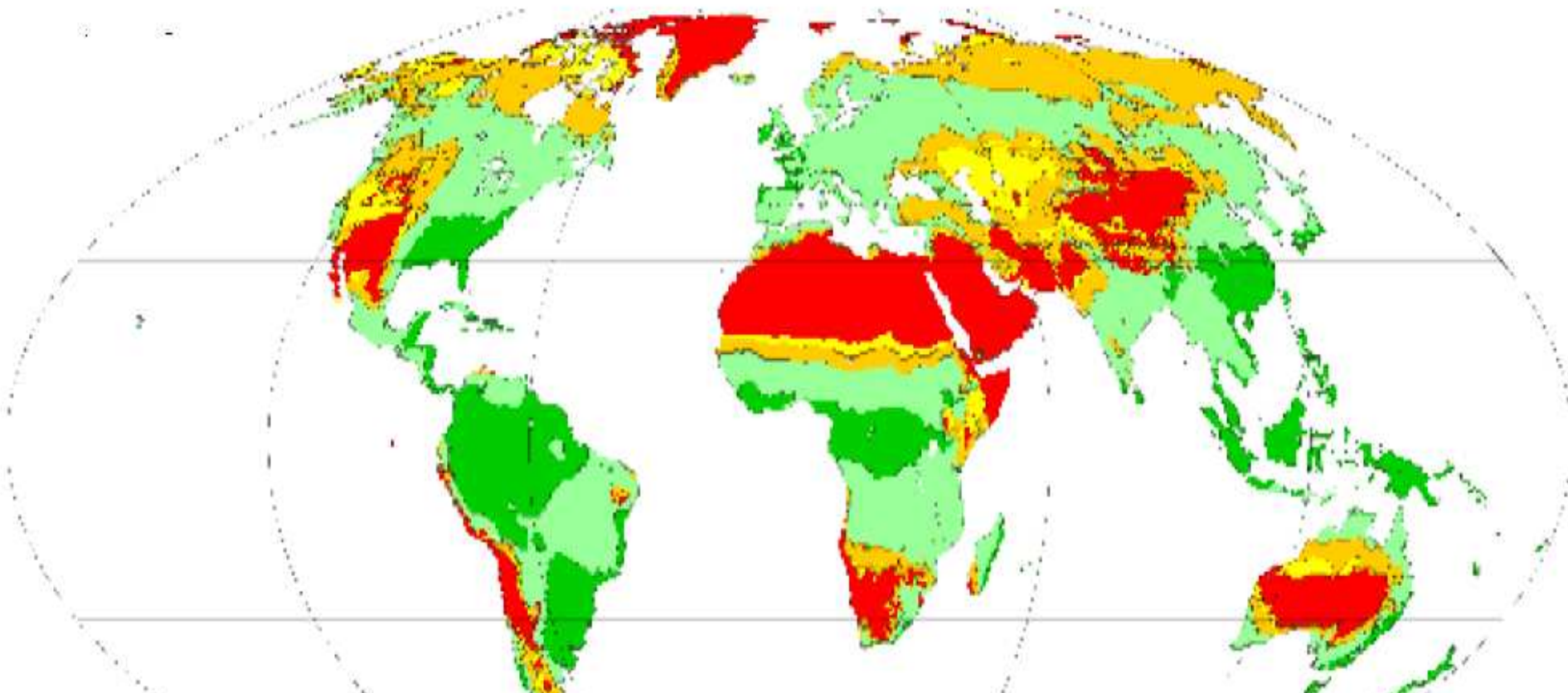


Importer based, over 5 km³/y



(Oki, et. al, 2002, IHE-UNESCO) (Based on Statistics from FAO etc., for 2000)

6. Water Stress



Kofi Annan: “Drought and desertification are threatening the well-being and livelihood of more than one billion people in 110 countries of the world”.

hyperarid arid semi-arid dry subhumid non-dryland

Freshwater stress

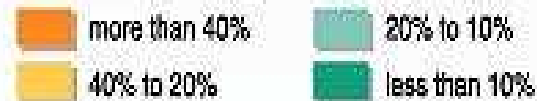


1995



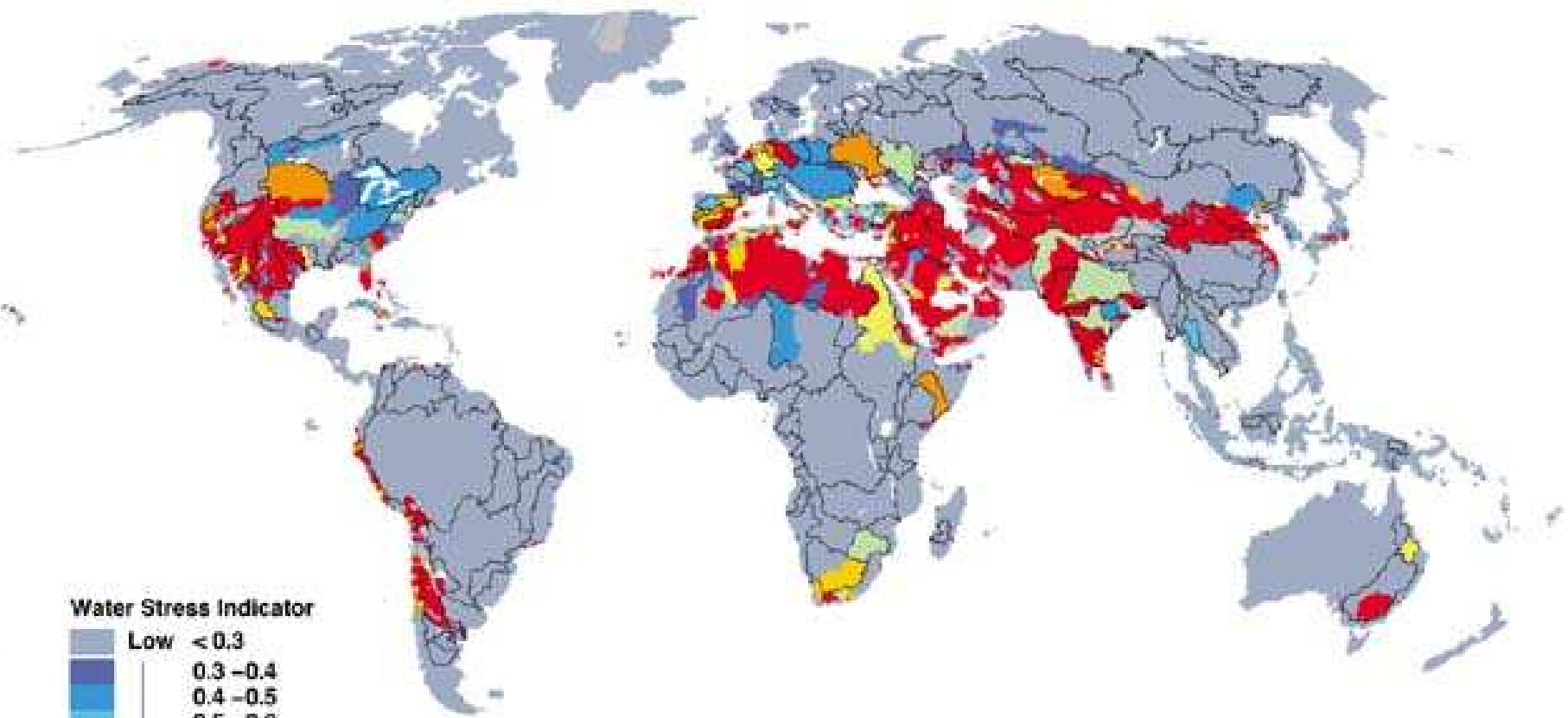
2025

water withdrawal as percentage of total available

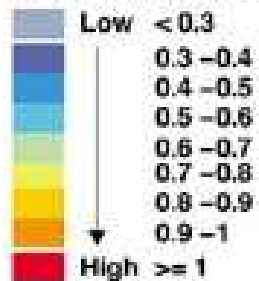


North Africa, Middle East, South Africa, India and Mexico are seriously affected by water stress from 1995 on. Climate change will increase water stress in Sudan, Kenya, Mauritania, China, Pakistan, Australia, Peru, Chile and some European countries.

Zones with Highest Water Stress

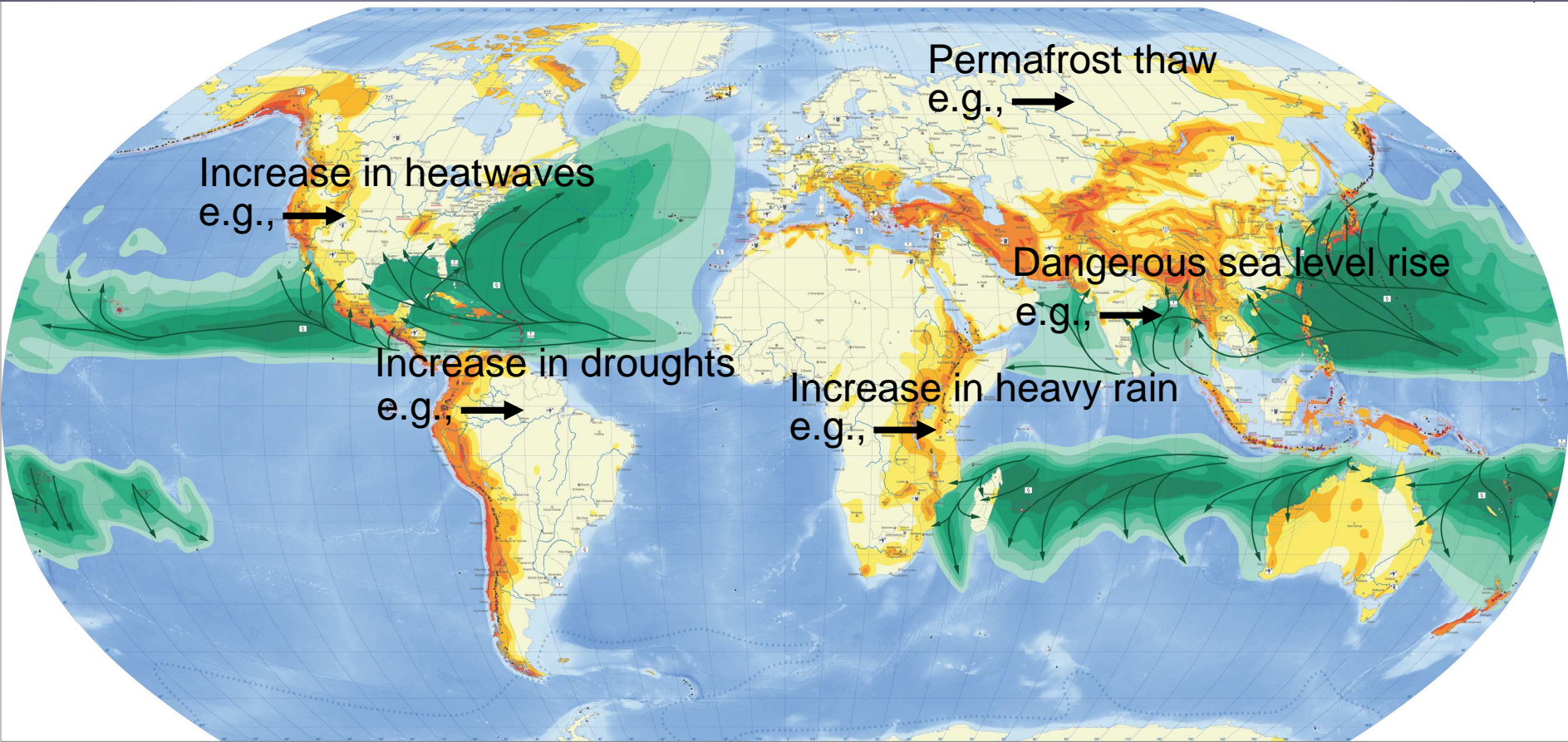


Water Stress Indicator



Grey box: No discharge
Black line: Major River Basins

7. Hydro-meteorological Extreme Events/Regional and Social Vulnerability



Temblores

	Zone 0: MM V
	Zone 1: MM VI
	Zone 2: MM VII
	Zone 3: MM VIII
	Zone 4: MM IX

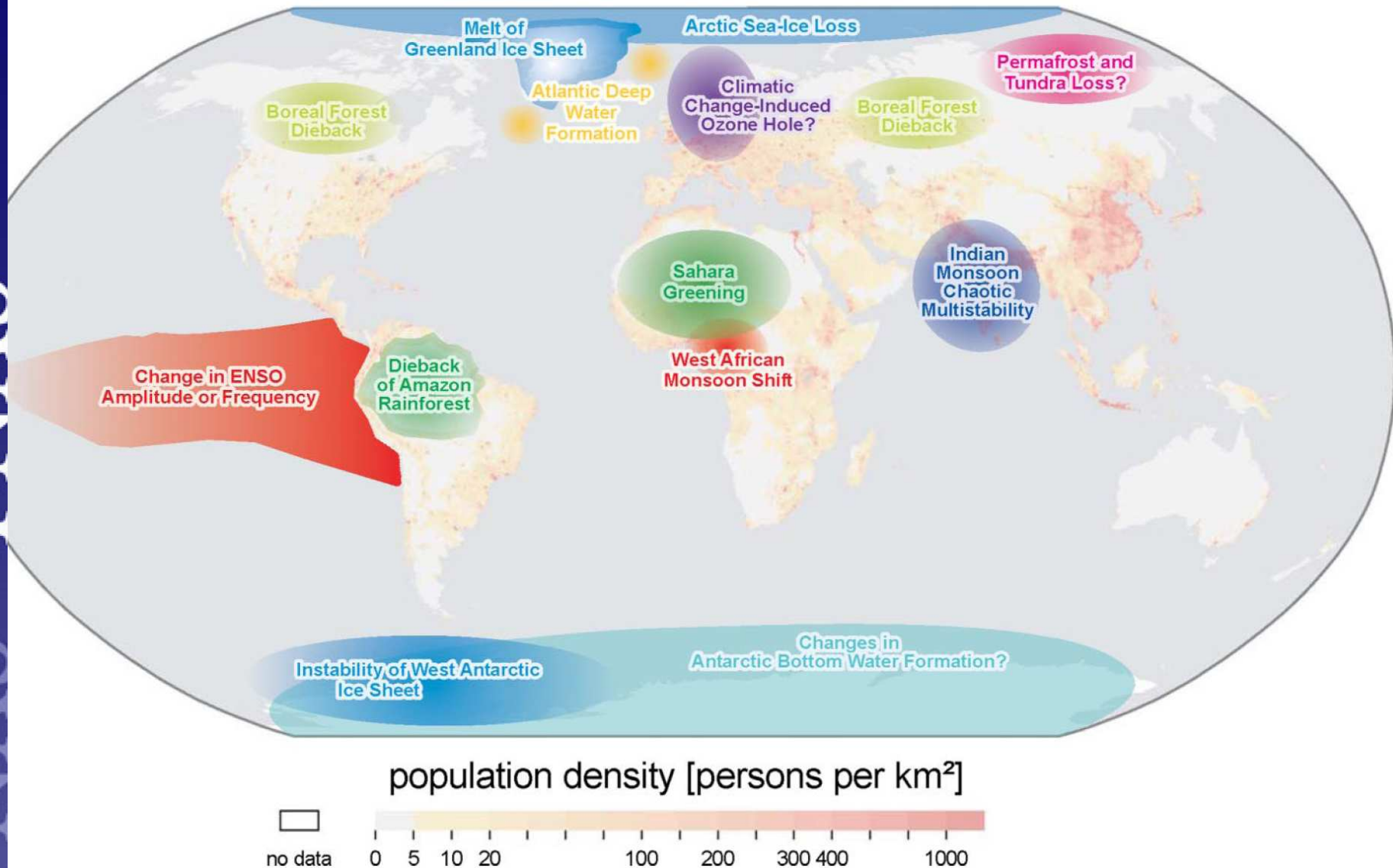
MM: modified Mercalli scale

Huracanes tropicales

	Zone 0: 76–141 km/h
	Zone 1: 142–184 km/h
	Zone 2: 185–212 km/h
	Zone 3: 213–251 km/h
	Zone 4: 252–299 km/h
	Zone 5: ≥ 300 km/h



Potential Tipping Points



8. Water research in Mexico

Elaboration of a national of the scientific and technological state of art of water research, institution, business and urgent research themes

Mexican state of art in water research

National and international sources of financing

Objetivos específicos

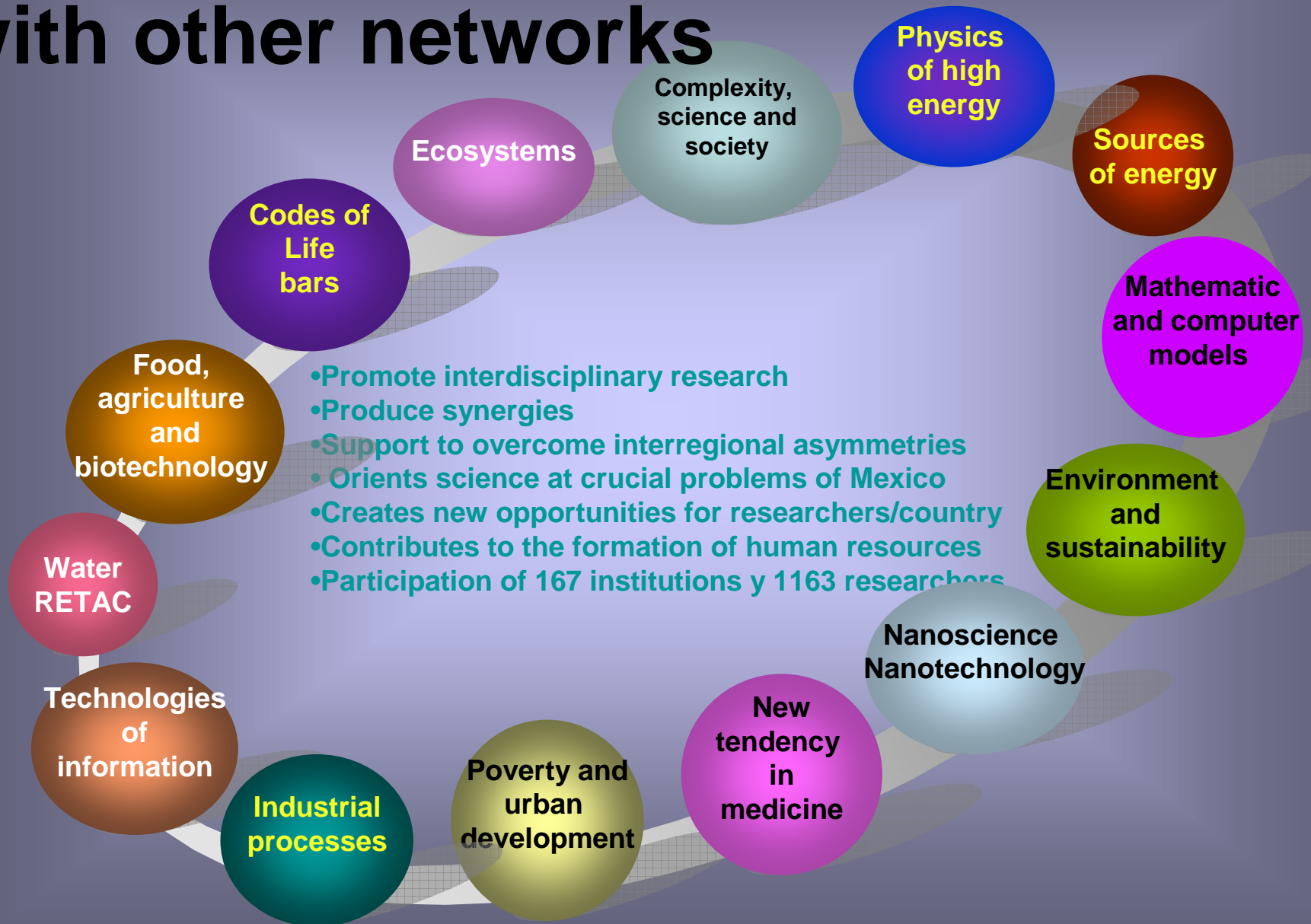
Potential projects feasible to link up with public and private sector (business with environmental ethic)

Catalogue of:
- Human resources
- Capacity for formation of new resources
- Infrastructure in collaboration with business an government

Projects oriented to resolve or create conditions to tackle strategic problems of Mexican society in cooperation with government and business in water management

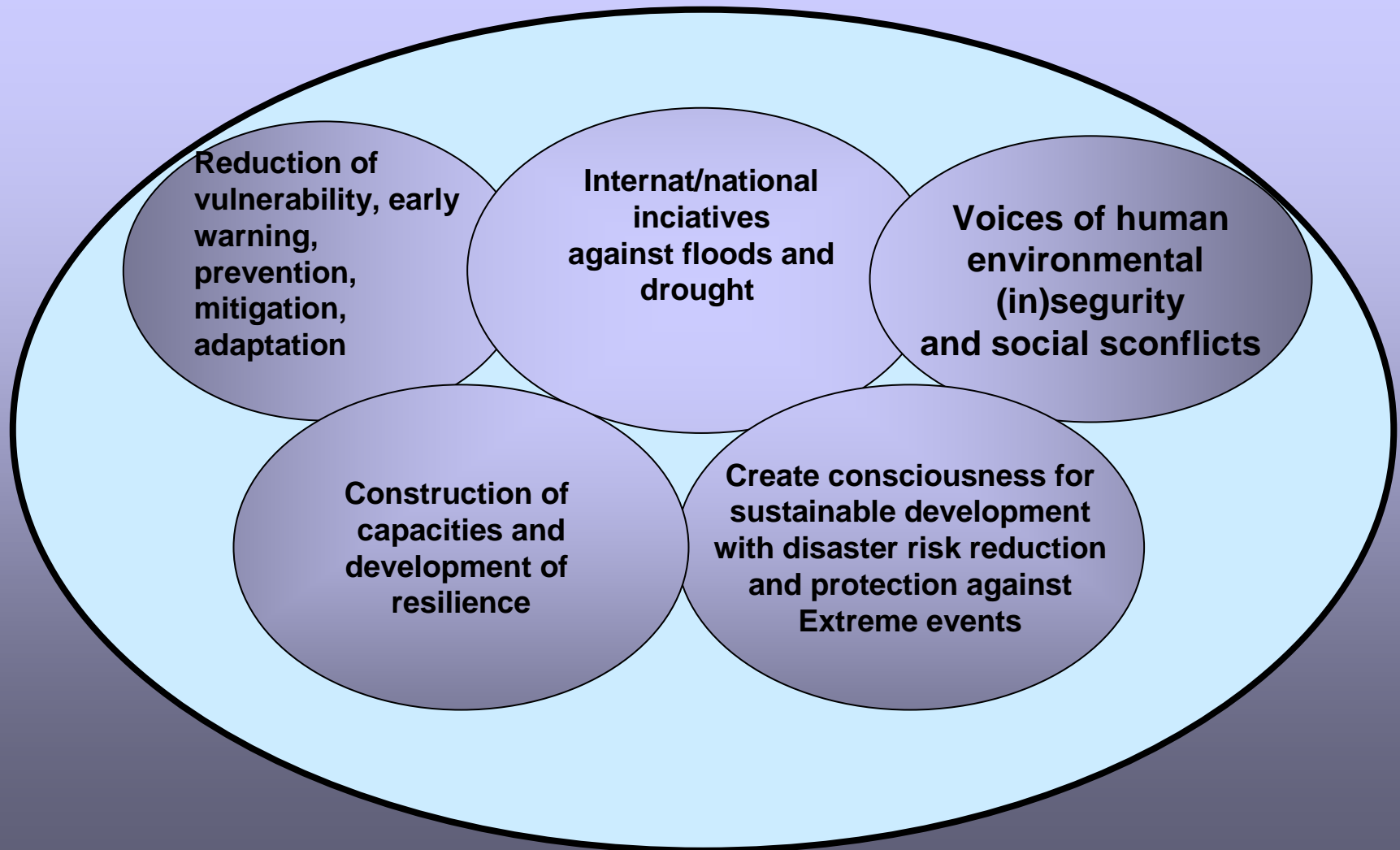
Multi-institutional and interdisciplinary projects relating problems from basic science, engineering, integral basin management, ecosystem services and water culture

Transversal interrelation of RETAC with other networks



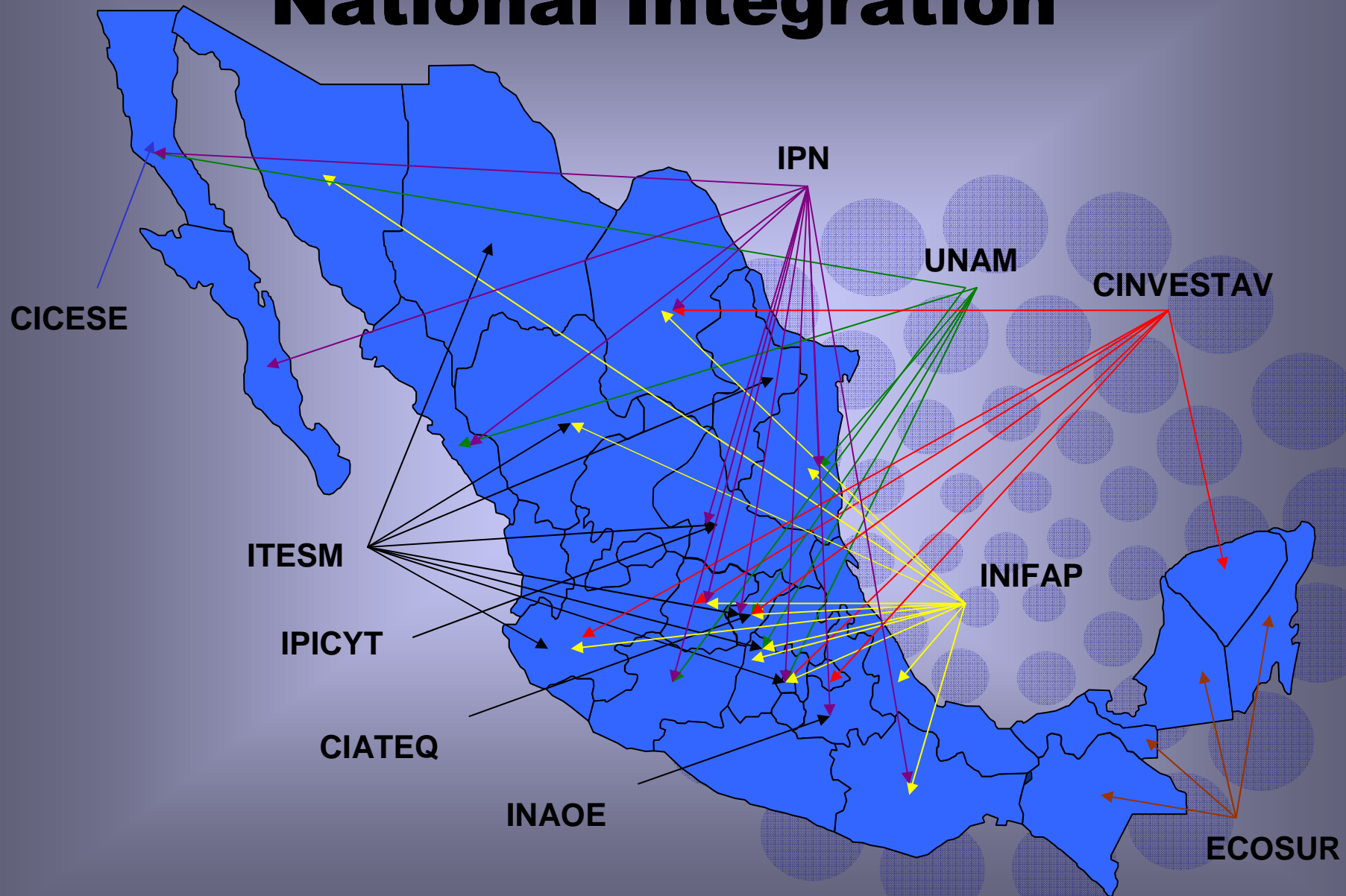
Central objectives of the research of RETAC in Mexico

The basin as a hydrological unit for planning and development of a multisectorial, multi-institutional and multidisciplinary research and actions

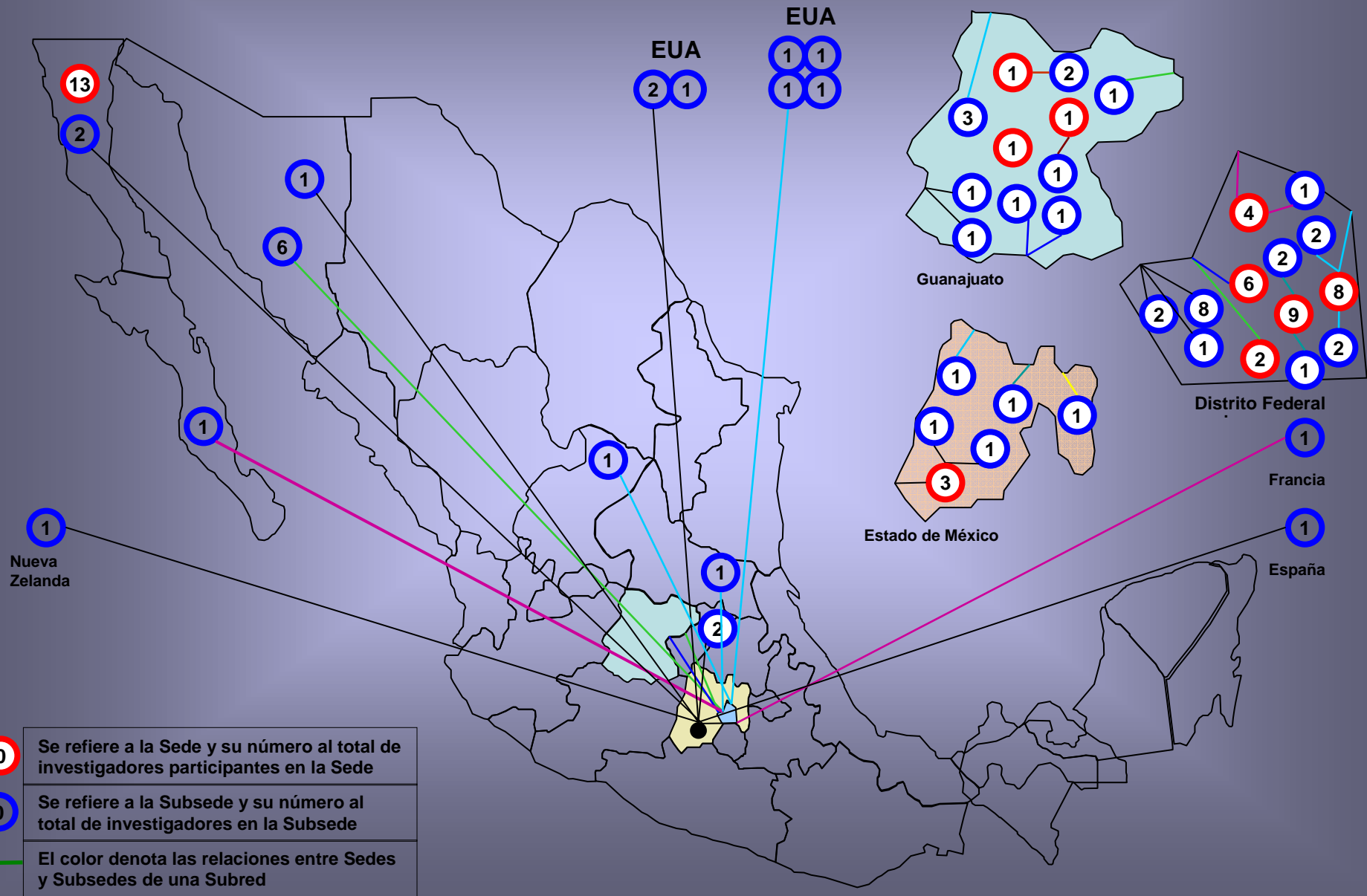


Instituciones con mayor participación en ideas para Megaproyectos

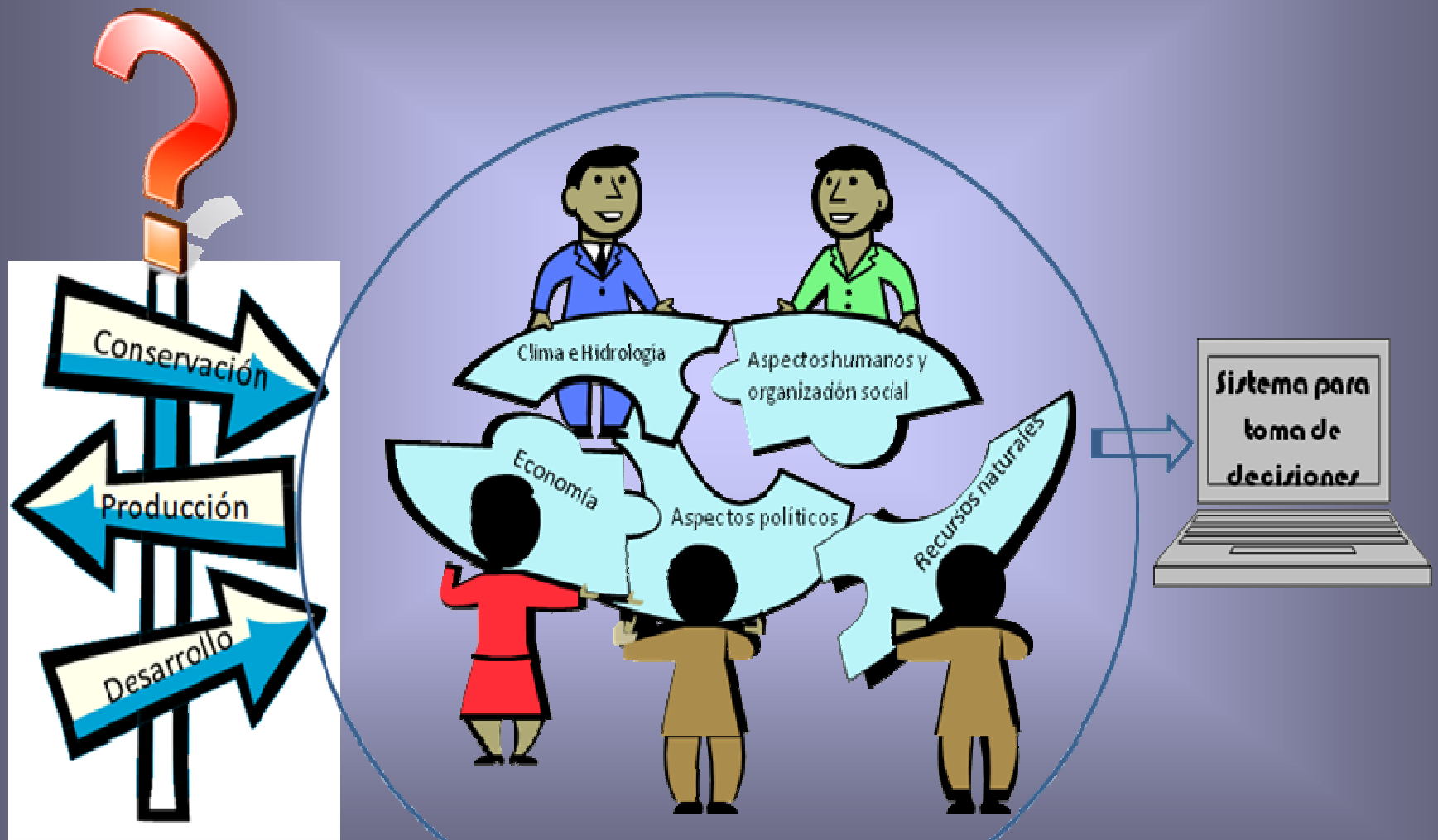
National Integration



2. ALIMENTOS, AGRICULTURA Y BIOTECNOLOGÍA

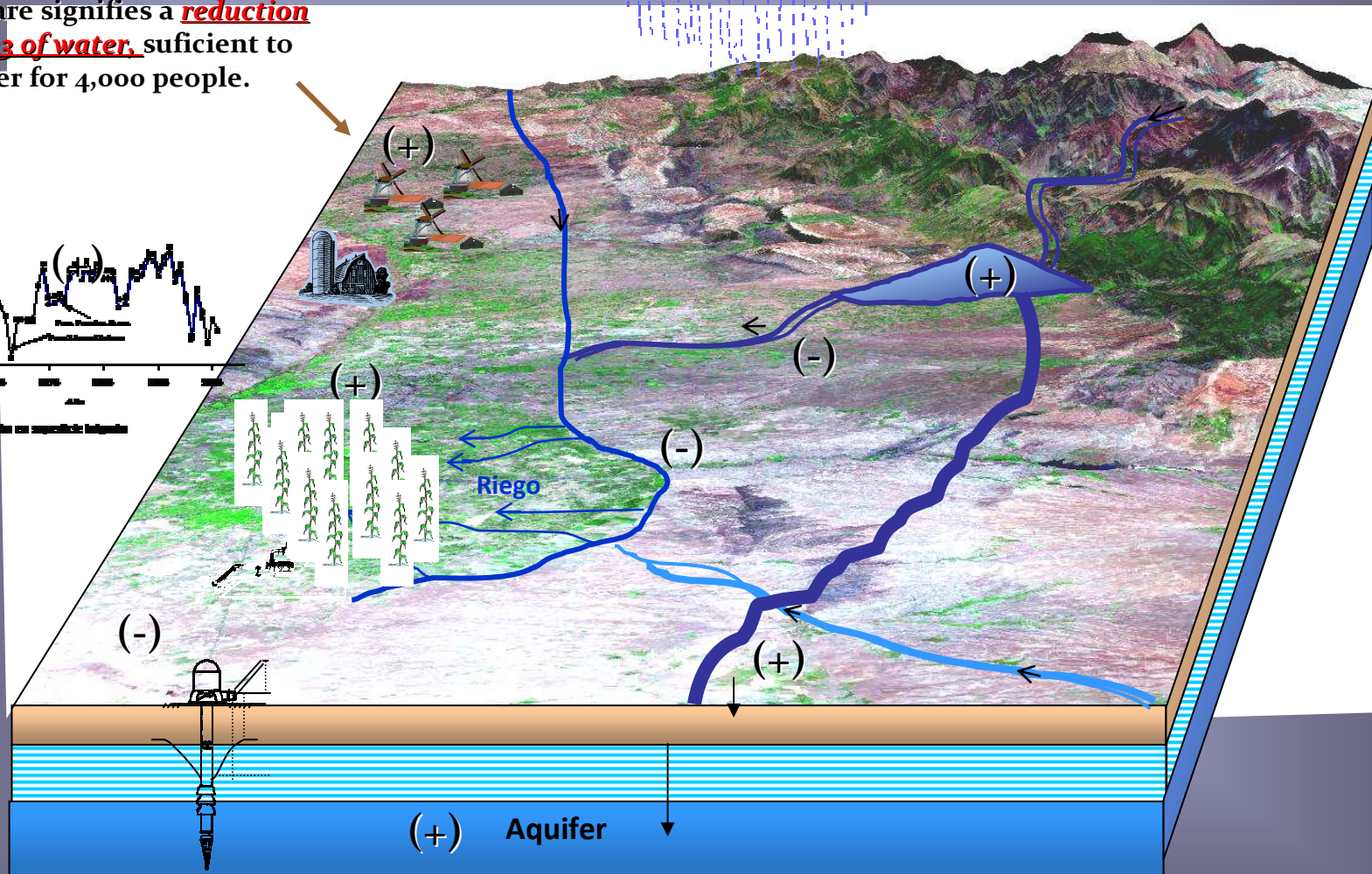
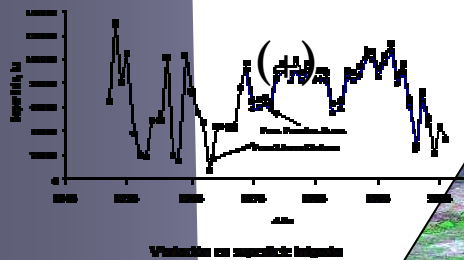
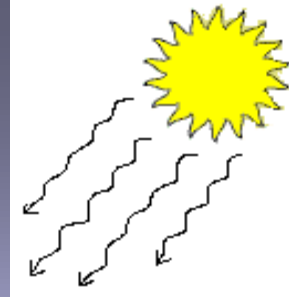


Multidisciplinary, multi-sectorial and multi-institutional research



Impact in cascade: Crops resistant to drought

10cm of less water for irrigation in one hectare signifies a **reduction of 1000 m³ of water**, sufficient to offer water for 4,000 people.



Relation: biotechnology, genetic, hydrology, agriculture sociology, economy, health, livelihood, poverty alleviation, etc.

9. Lessons learnt: Awareness Raising

- Dissemination of information on water security issues based on the scientization of water research, through cooperation with leading universities and research institutes globally.

Policy Advocacy

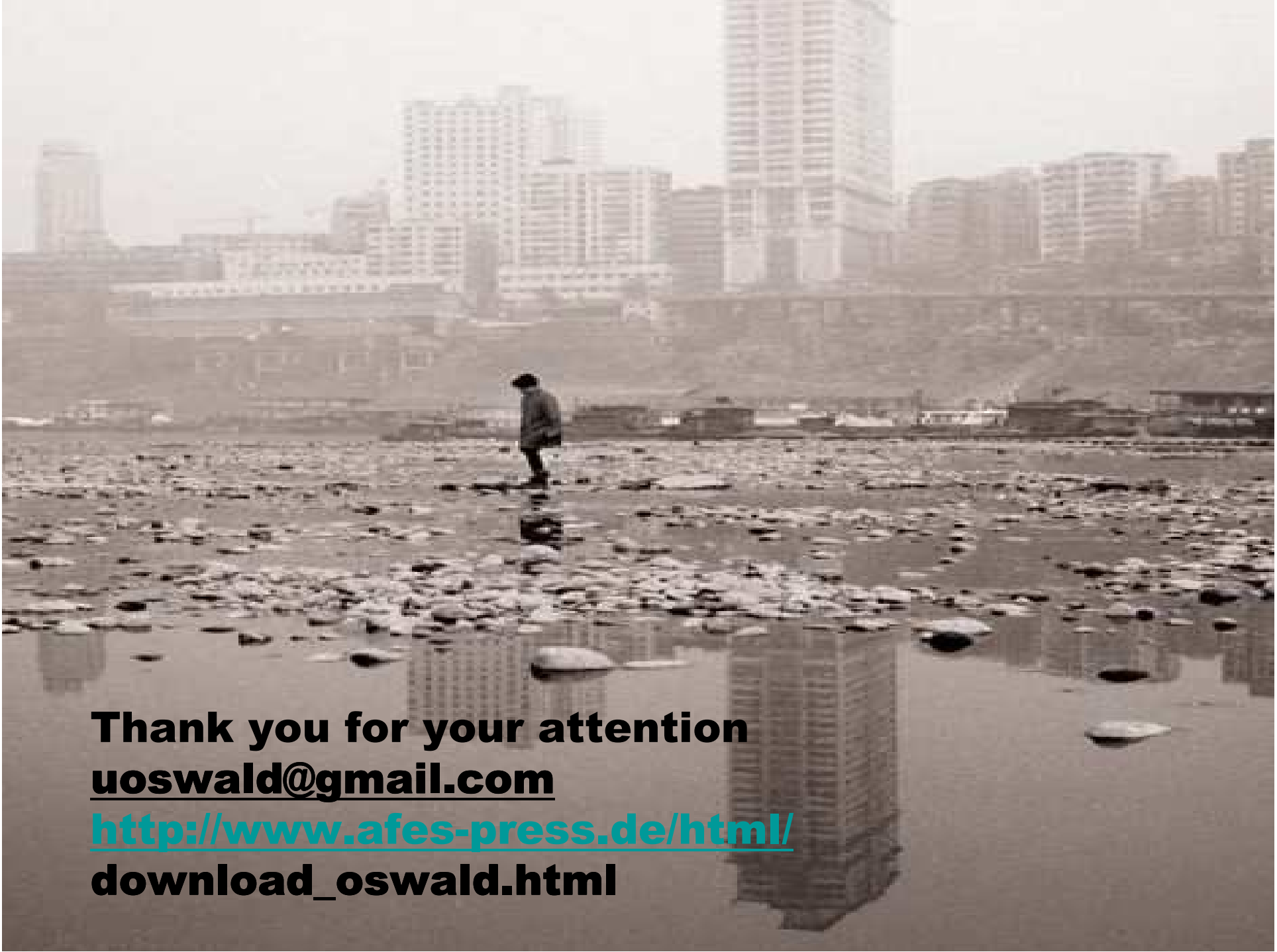
- Epistemic community to foster cooperation & bring together science and policy making on water security issues (FAO, WHO, WMO, UNDP, UNEP, UNESCO), and international workshops for systematic interchange of practical experiences for territorial governance with social cohesiveness. Pro-active strategies for adjustment and mitigation to water threats.

Capacity Building

- Strengthening traditional and innovative knowledge for embedding the assessment of levels of water security into the environmental impact and risks assessment, land use planning and environmental auditing.
- Training on best practices for conflict settlement mechanisms at the sub regional and national levels.

Financing: Channelling Resources

International, climate related financial institutions (IFAD, GEF), micro credit, insurance and land use micro investments for local development programmes and, regional organizations and national donors (ministries of development cooperation and environment) to improve policies for water security.



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