

Sustainable Adaptation in the Water Sector through Systemic, Dissipative, and Open Water Management Including a Participative Water Law in Mexico

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1. Research Questions



1. Research questions

How can a dissipative, self-regulating and open system of water management promote a sustainable adaptation of water in Mexico?

How can people living with environmental and social vulnerability reduce their risks related to climate change through a participative water law in Mexico?

2. Water security is a human security issue



Water security relates to human security

(Brauch, 2005, 2009, Oswald 2011)

- 1. “Freedom from fear”** aims to reduce the environmental vulnerability, associated with social conflicts and the dangers of being killed due to risky conditions (droughts) that may also force people to migrate (UNESCO, HSN) : Human Security Report
- 2. “Freedom from want”** focuses on limiting the social vulnerability through poverty reduction, education, respect for human rights and equality and equity policies (UNDP 1994, CHS 2003: Ogata / Sen: Human Security Now) Japanese Approach;
- 3. “Freedom from disaster impacts”**, addresses reducing the dual vulnerability and its negative interaction, thus social vulnerability and the possibility of extreme natural events may result in social disasters (Bogardi/Brauch 2005; Brauch 2005a, 2005b; Oswald 2008, 2010, 2011, 2013; UNU-EHS) through mitigation, adaptation and resilience-building.

Security del Agua integral



- Garantizar supervivencia (seguridad **societal**)
- Asegurar alimentación (seguridad **alimentaria**)
- Protección ecosistemas (seguridad **ambiental**)
- Compartir recursos agua (seguridad **política**)
- Manejo de riesgo (seguridad **humana** y de **género**)
- Valorar el agua (seguridad **económica**)
- Gobernanza del agua (seguridad **política**)
- Proteger salud (seguridad de **salud**)

Water security and human security

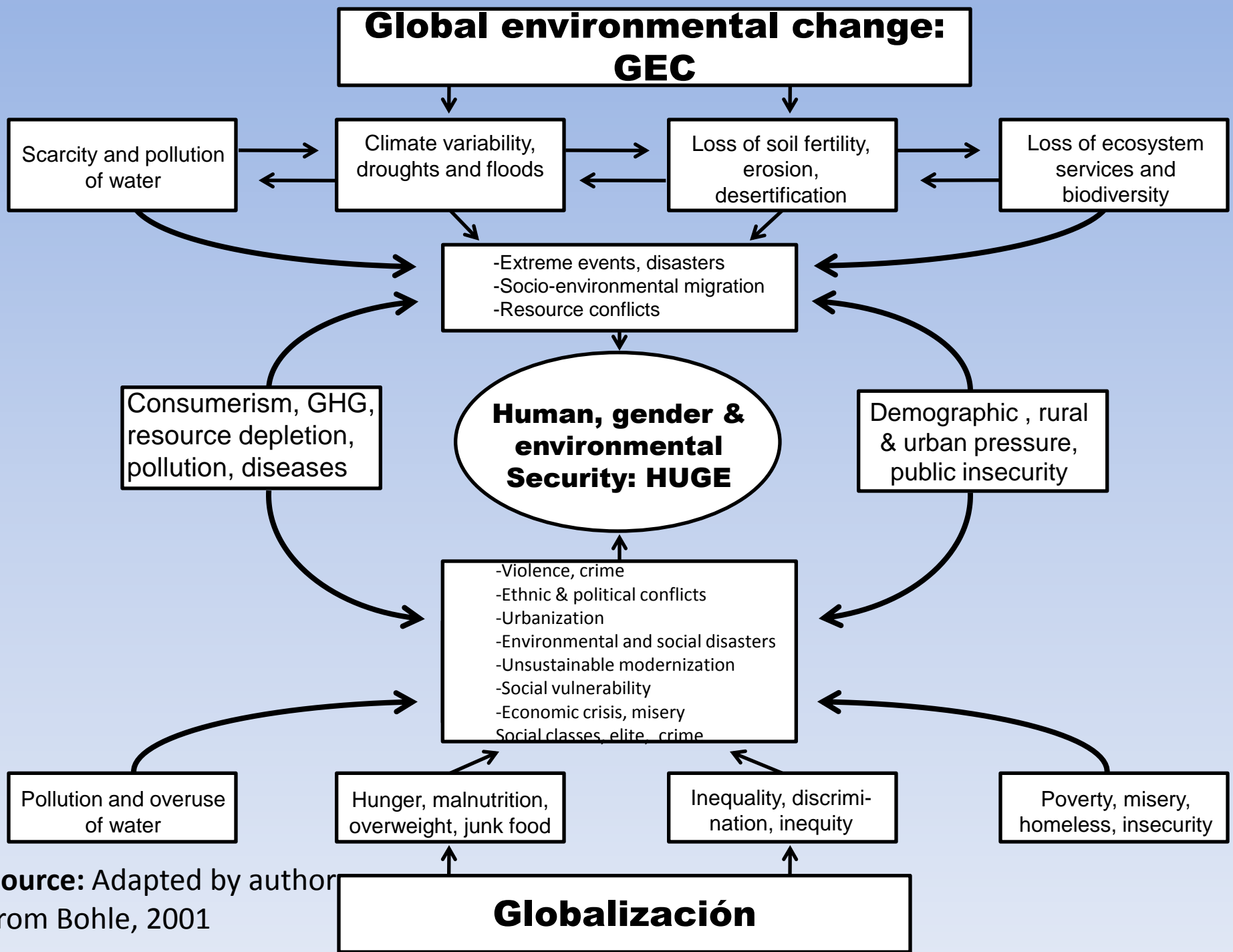


Includes water security

- Water is vital for the life and health of people and ecosystems
- **One common goal:** *to provide water security in the 21st Century (Ministerial Declaration The Hague:*
 - 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.**

3 Dual vulnerability: environmental and social vulnerability



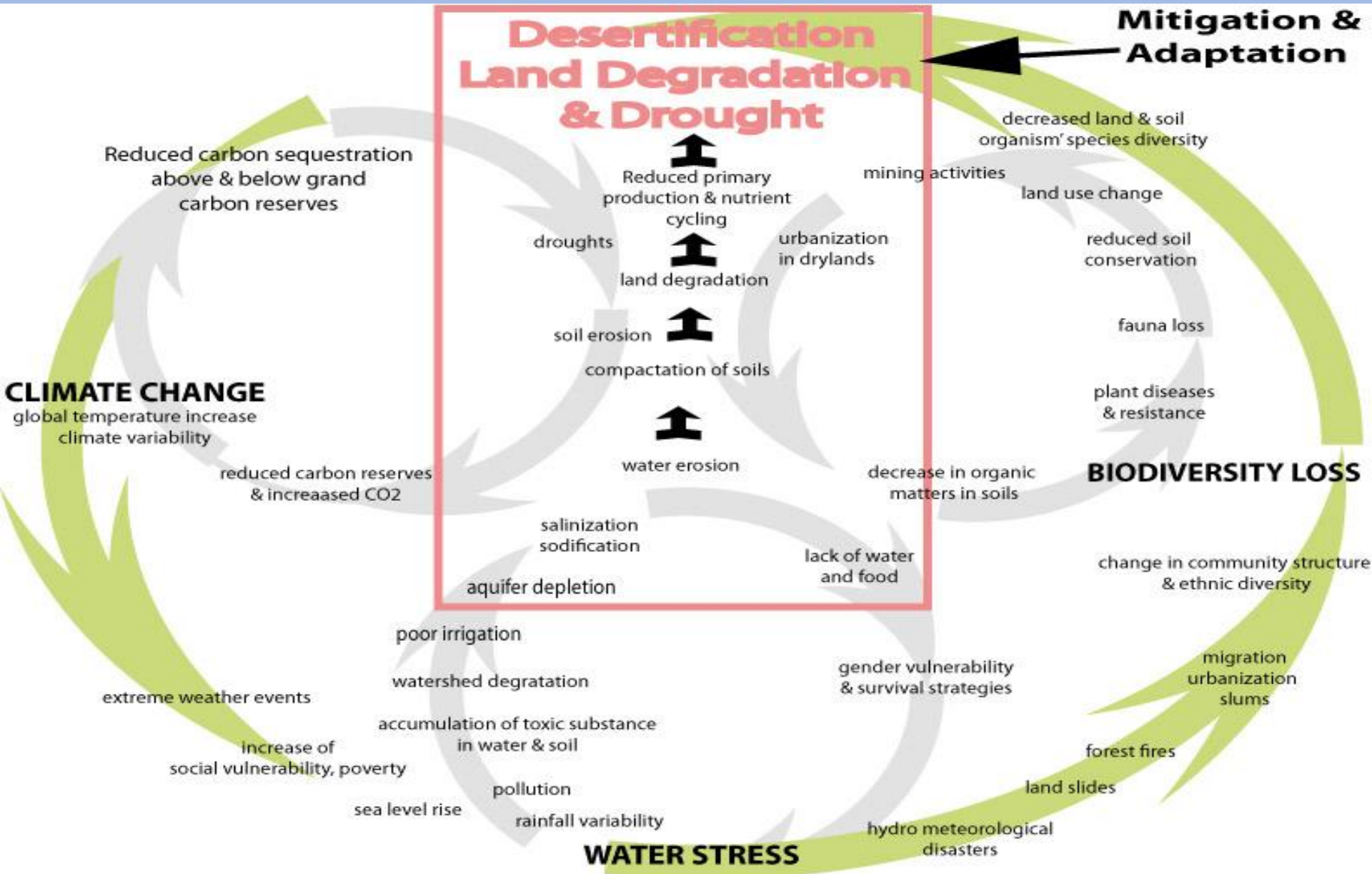


Source: Adapted by author from Bohle, 2001

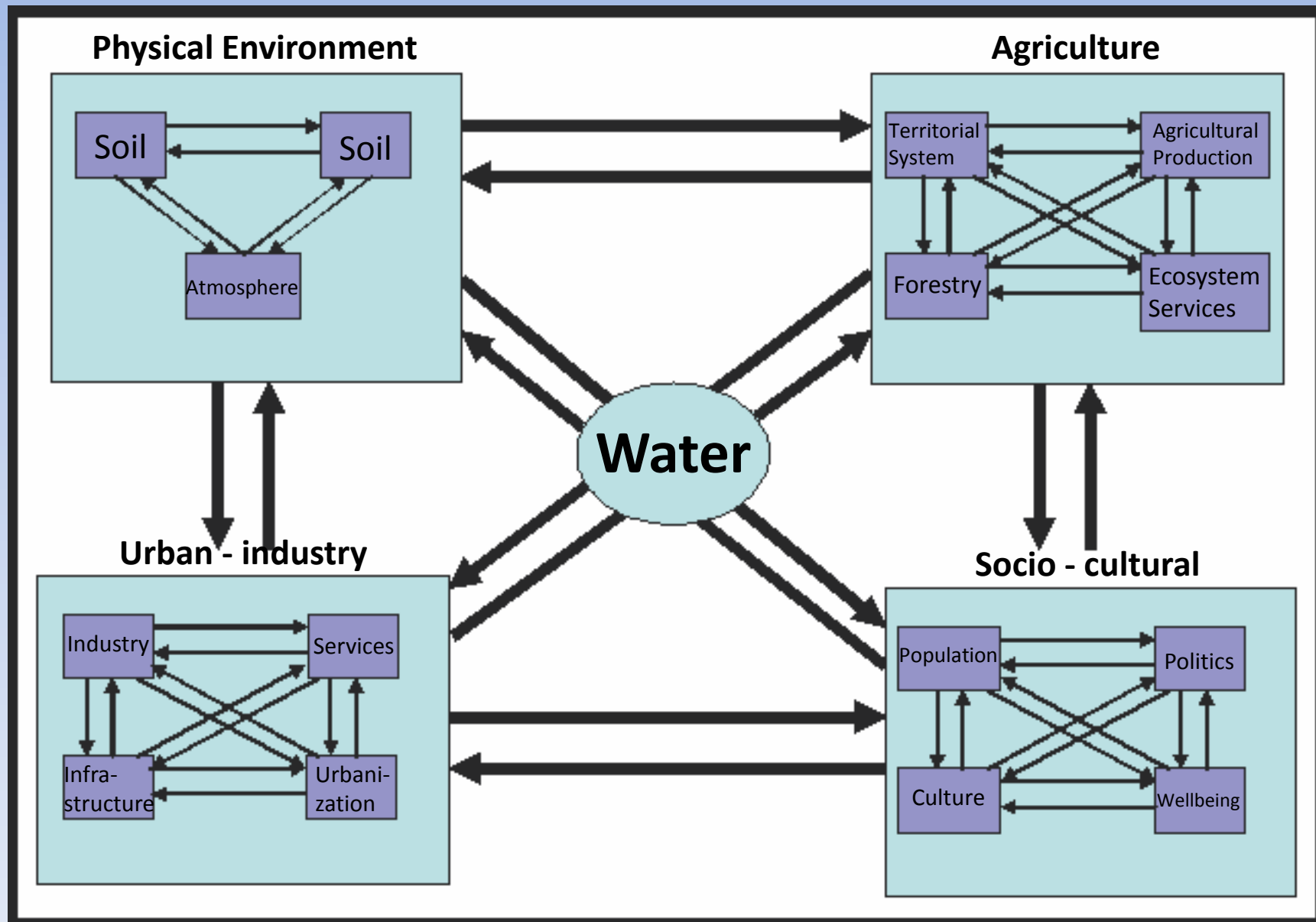
4. System model of water management



Complex interactions of GEC

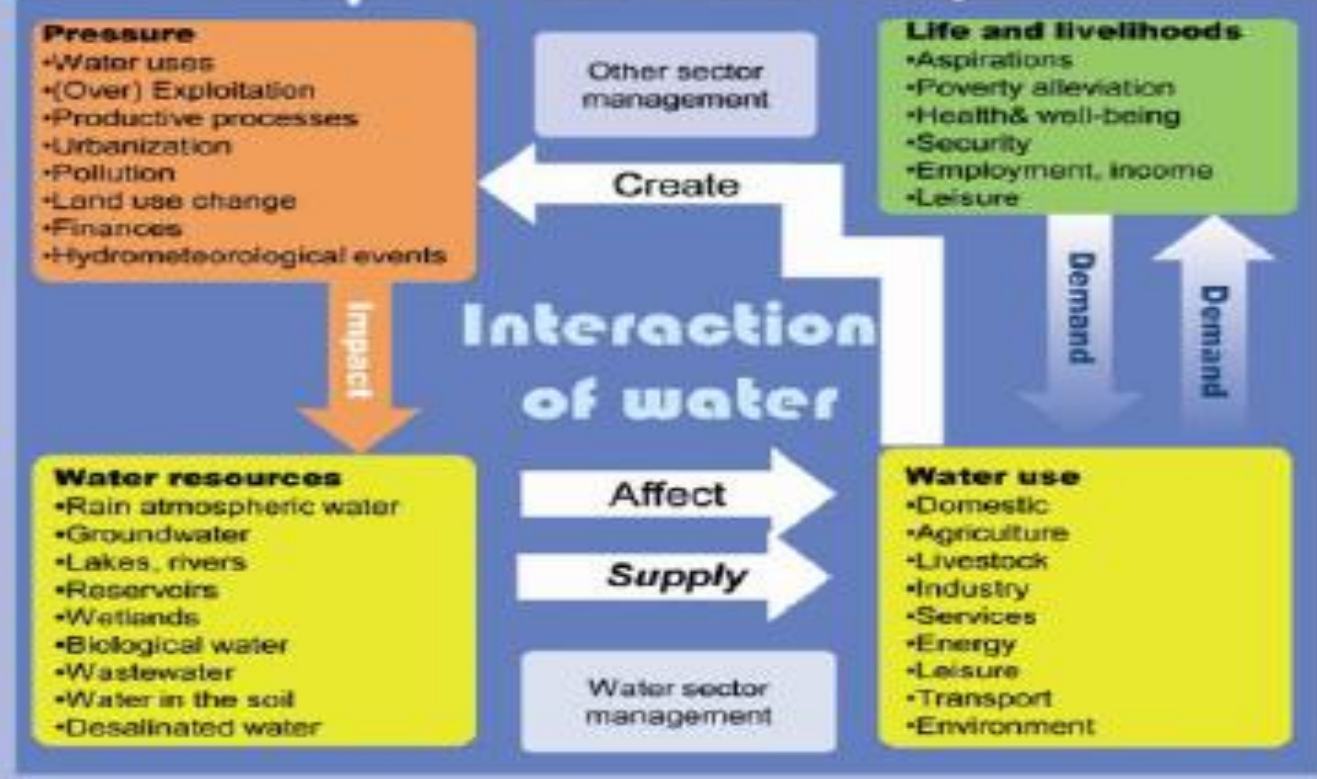


System approach of an integral water management and sustainable development

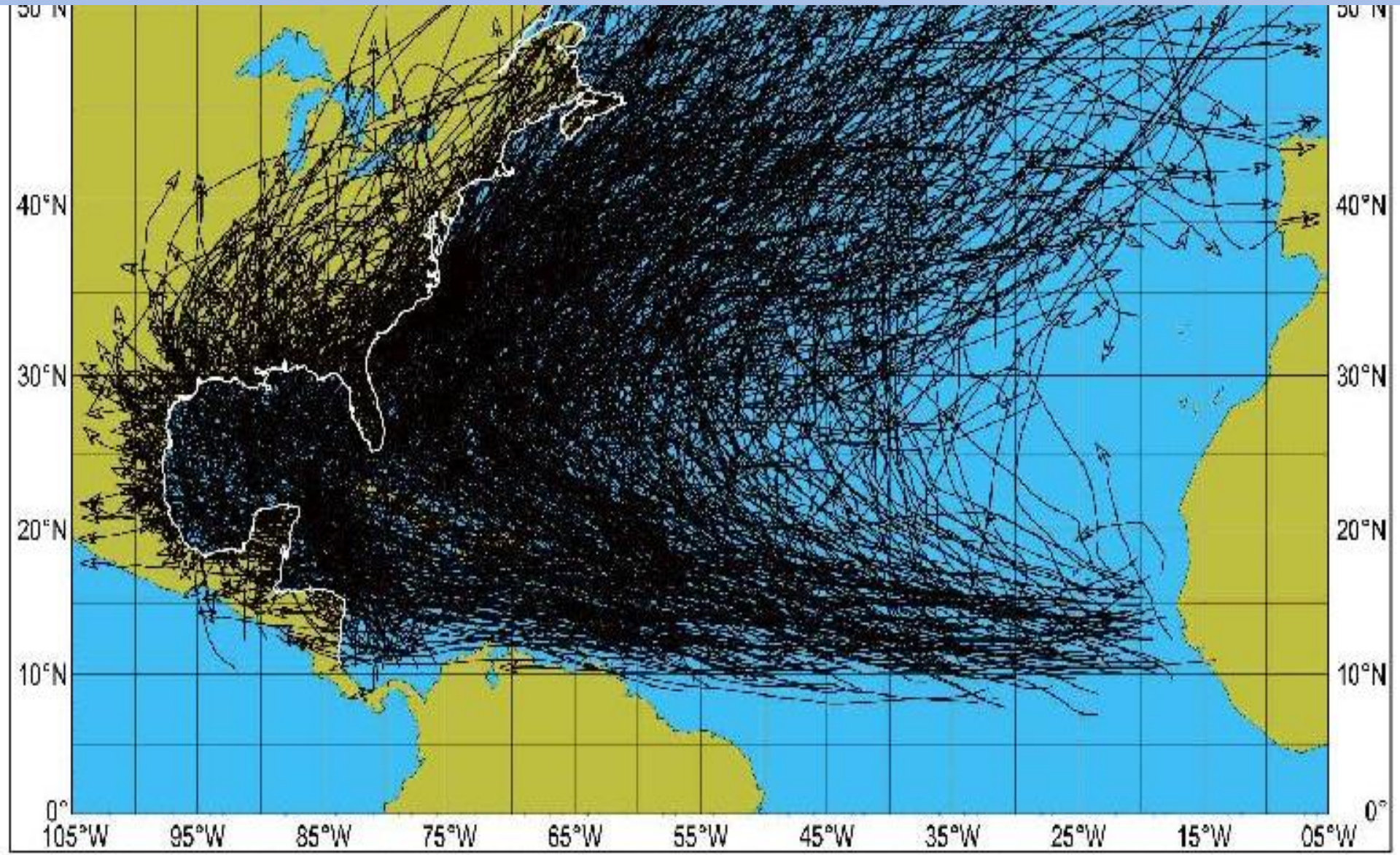


CEG: Global Environmental Change:

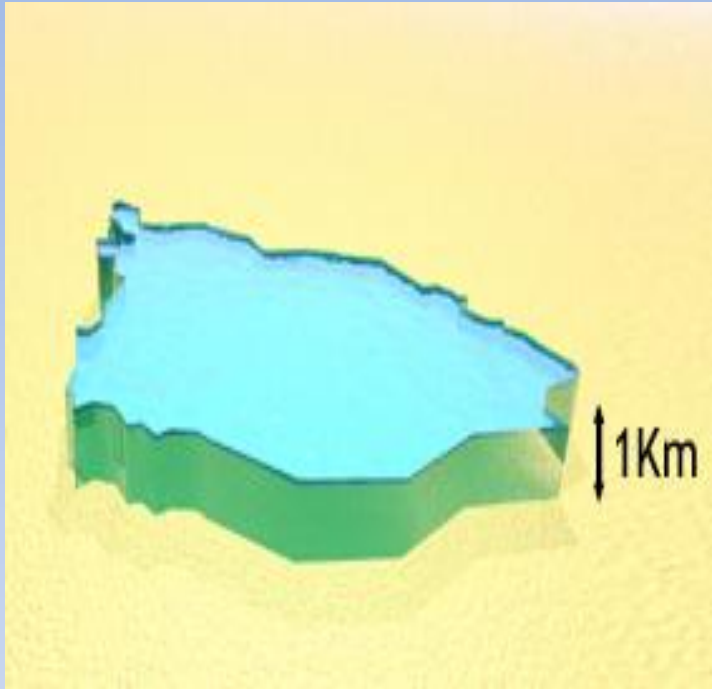
- Demographic
- Urbanization
- Food
- Social organization
- Economy and finance
- Policy & law
- Technology
- Environment
- Hydrometeorological events



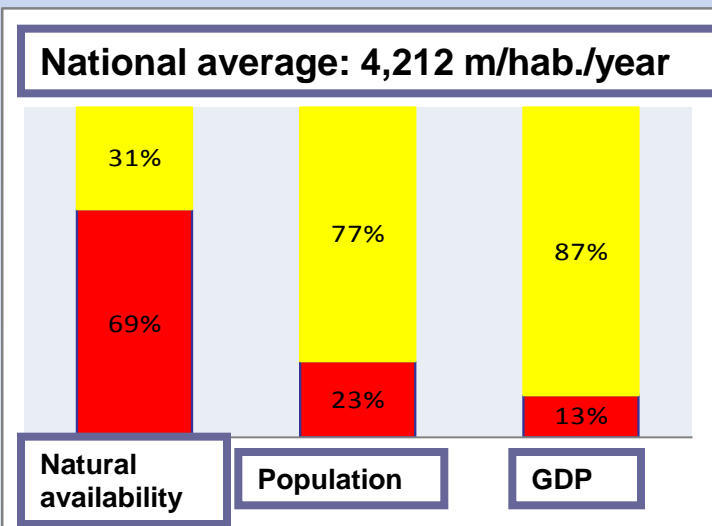
5. Climate change, water and adaptation in Mexico



Precipitation, population and use of water

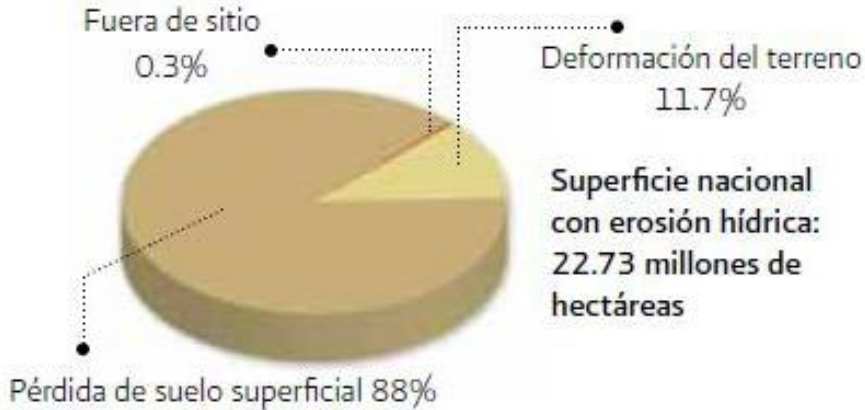


- Precipitation average per year in Mexico: 1522 km³ equivalent to a swimming pool of 1 km deep and the extension of Mexico City.
- **72%** (1084 km³) of this water evaporates
- Average: **711 mm/year**
- North: only **25%** of precipitation
- 27.5% get to south and south-east; **49.6%** in the poor states of Chiapas, Oaxaca, Campeche, Quintana Roo, Yucatán, Veracruz and Tabasco
- 67% of rain during **June to September**

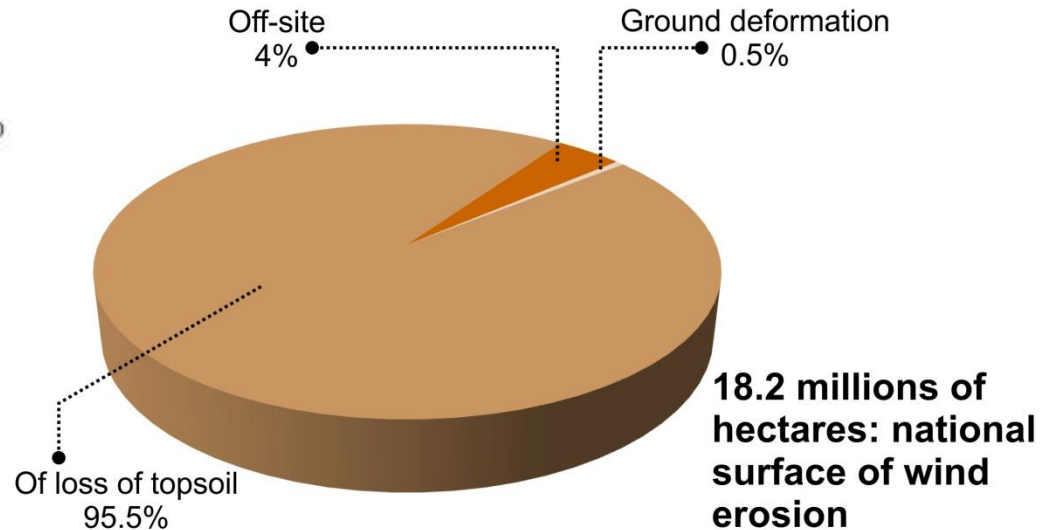


Soil degradation

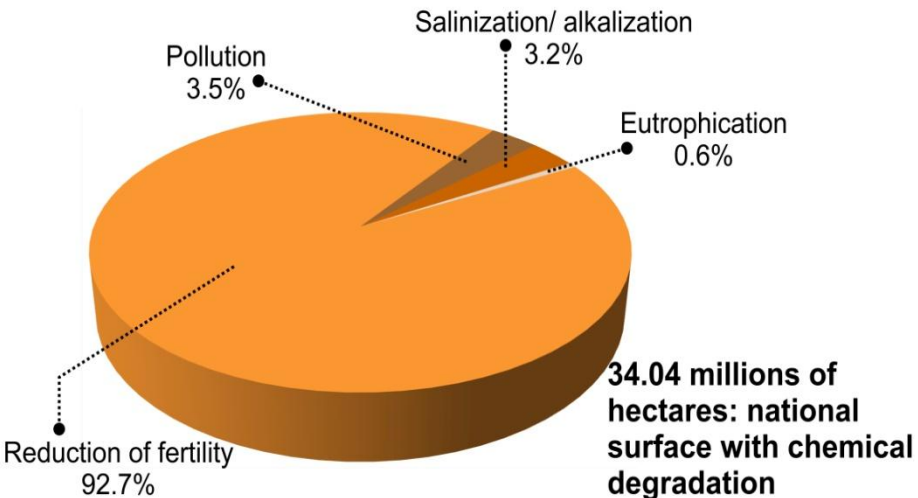
Water erosion



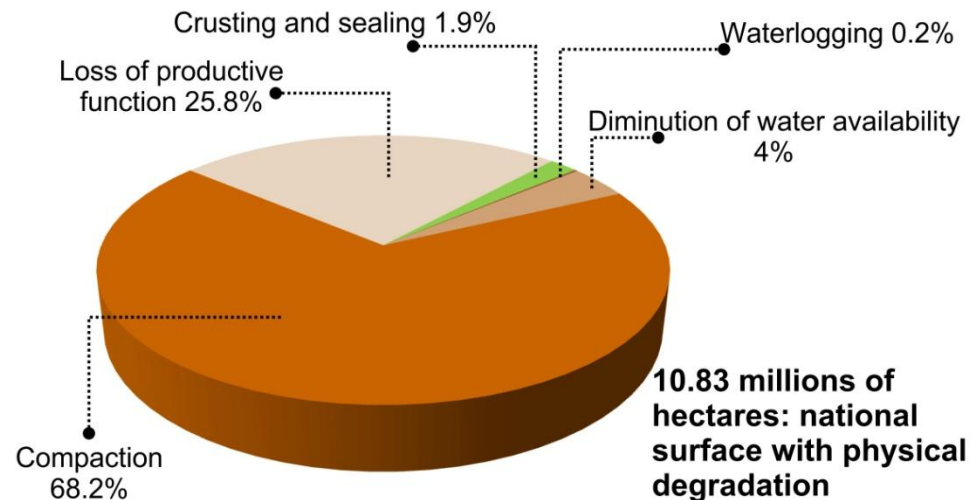
Wind erosion



Chemical degradation

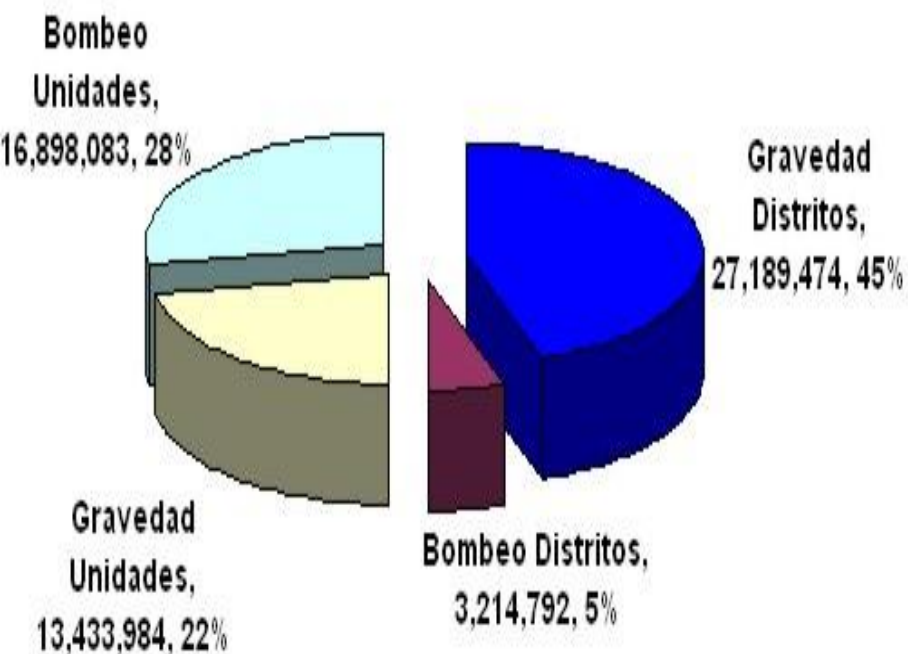


Physical degradation

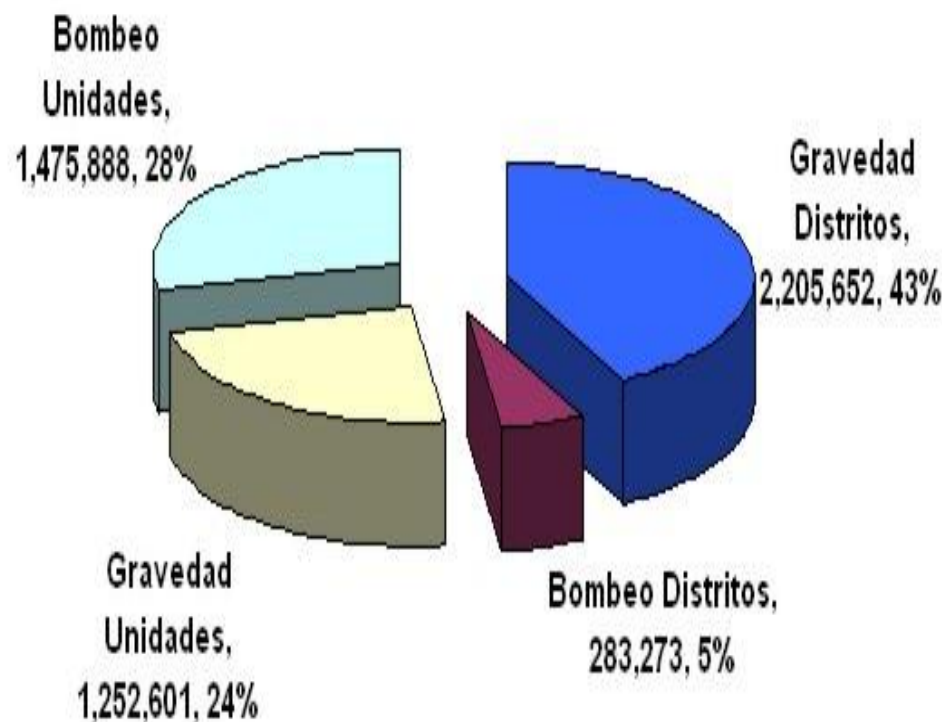


Use of water in agriculture: 77%

Volúmenes (Mm3) 2006



Areas Regadas (ha) 2006



6. Participative general water law: GWL



Water as a basic human right

- Water is crucial for ecosystems
- Safe water and sewage is a basic human right for everybody
- Water for food security
- Surface and groundwater cannot be polluted
- End of overexploitation of surface and groundwater
- Basin cannot be destroyed and must be restored
- Reduction of risks and disasters related to mismanagement of water and territory

Water as human security: GWL

To negotiate peacefully the existing water conflicts the Global Water Law of Mexico must change priorities to resolve water scarcity with engineering tools (aqueducts, dams).

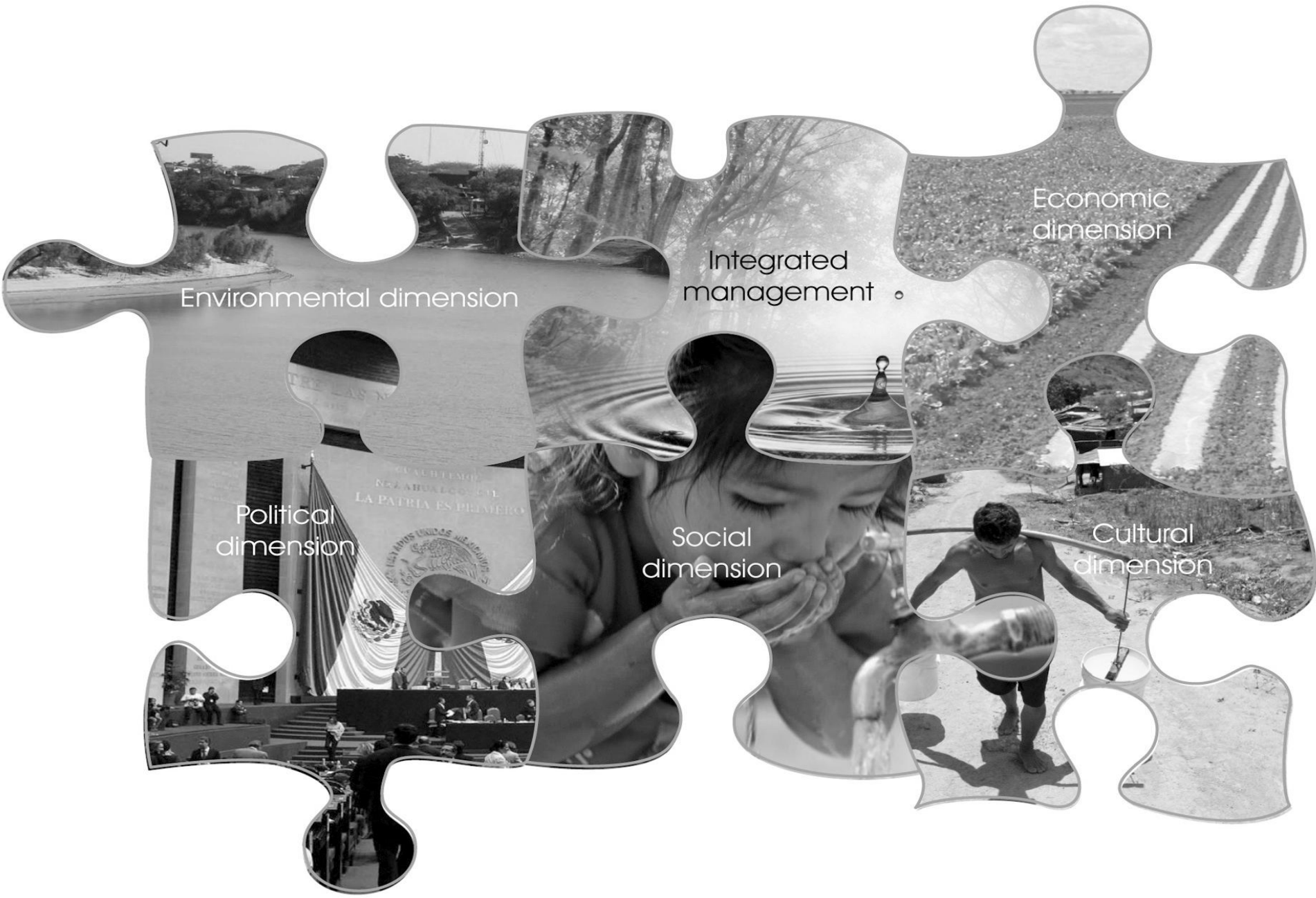
Only when all stakeholders, nature & water conservation are taken into account and the livelihood for the most vulnerable people is granted, then basic human rights are respected.

This means granting sufficient, safe and permanent water for each citizen for its personal consumption and her/his survival, offering nature the water for the maintenance of the ecosystem services and only then use water for cash crops and industrial production.

Participative General Water Law

- Water as **human right for current and future generations** depends on a **planned and democratic management** of watersheds and water and sanitation systems
- **Watershed and groundwater flow restoration** is achieved through changes in consumption, production and urbanization patterns, along with public and community works to manage local and regional water cycles
- Maximization of **stormwater storage** in natural areas feasible for low investment
- A **National Watershed Council** (citizen-government) is a **binding instance** composed by elected representatives from all citizen watershed councils in the country
- **National Water Program** is negotiated from the local basin to the national level to define sustainable goals
- In each basin, specialists, users and affected people (by **overexploitation, lack of water**) **determine the availability of water** and distribute the supply first to citizens and ecosystems, then to agriculture and industry. **First priority** is a minimal amount of **drinking water** for everybody; second, food sovereignty; third, other uses
- In **15 years** an integrated water management is aimed to reach that is able to avoid the transfers among basins by aqueducts and overexploitation of aquifers
- A **National Commission on Human Right to Water and Sanitation** invests directly with a multiannual fund in people who lack water services and promotes their participation. A **Citizen Controller** with the support of the National Commission of Human Rights is required to establish a transparent register of vulnerable people and the improvement of their water services.

Integrated water management



Environmental dimension

Integrated management ◦

Economic dimension

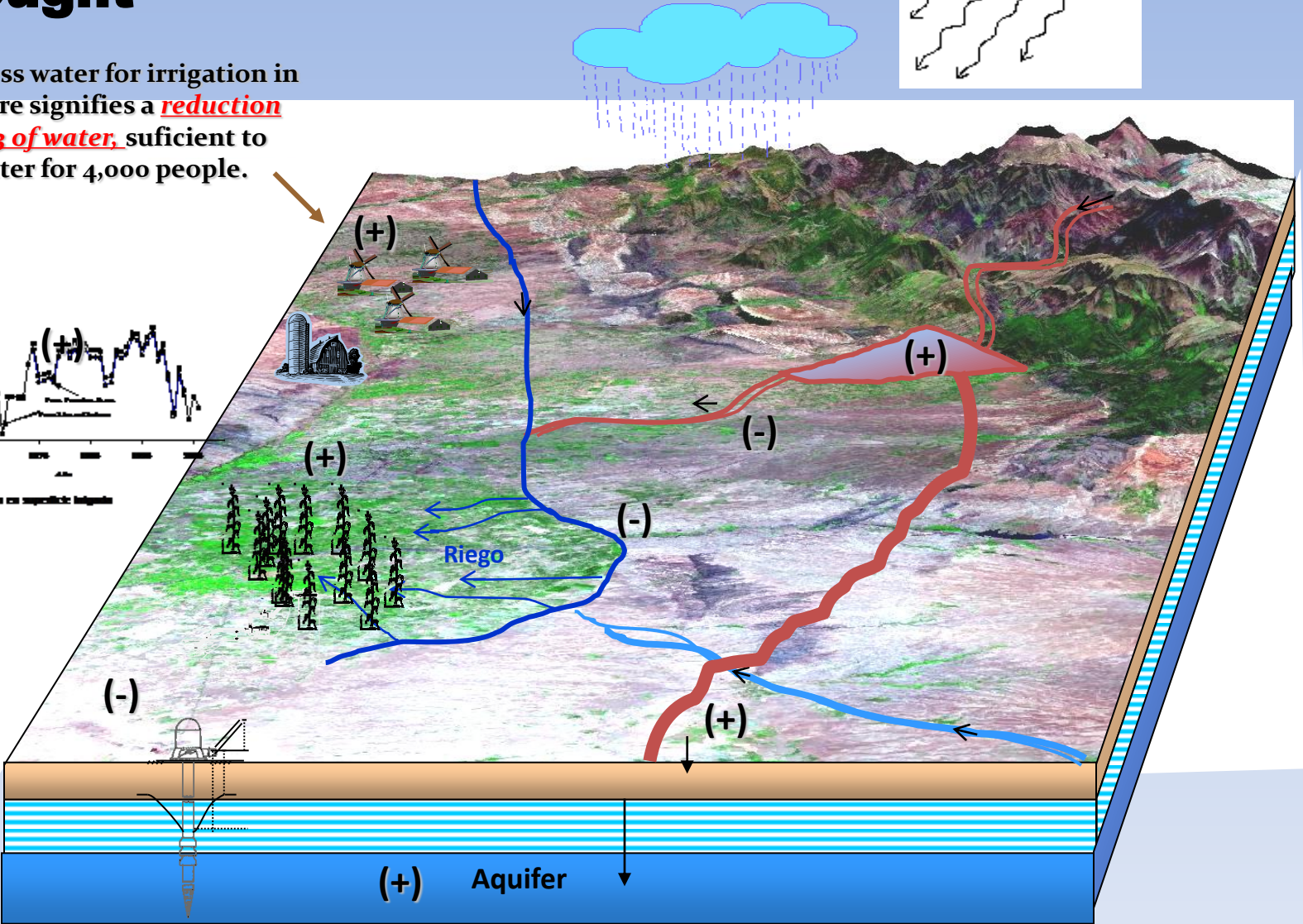
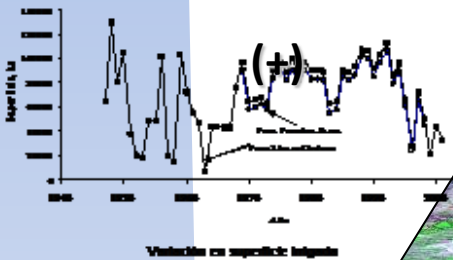
Political dimension

Social dimension

Cultural dimension

Cascade impacts: Crops resistant to drought

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



Relationship among: biotechnology, genetic, hydrology, agricultutre sociology, economy, health, livelihood, poverty alleviation, etc.



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Editor



**Thank you
for your
attention**

Water Resources in Mexico

Scarcity, Degradation, Stress, Conflicts,
Management, and Policy