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Water security

Úrsula Oswald Spring
National Autonomous U. of Mexico (CRIM-UNAM
First MRF-Chair on Social Vulnerability of UNU-EHS
National Coordinator of Water Research in Mexico

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5. Water conflicts: the PEISOR Model
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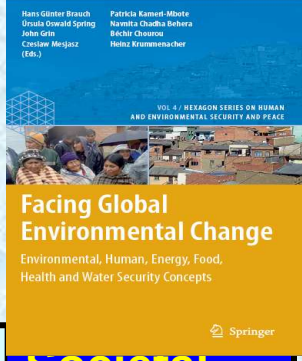
8. Science and Policy Responses
9. Conclusions. Water security with resilience-building from top-down and bottom-up for improving human, gender and environmental security: A HUGE Security

1. Why has security widened, deepened and sectorialized? Global environmental change, Cold War is over, new geopolitical powers

1. Freedom from fear. **Objective security threats**: refers to specific security dangers such as lack of water, pollution, floods, drought, landslides: **new threats**.
2. Freedom from want. **Subjective security threats**: refers to security concerns that are expressed by politicians, media, scientists, personal perceptions, such as threat to be affected by cyclones, droughts, sea level rise, erosion of basin, coastal areas, development projects, disasters, lack of food, loss of livelihood and life quality: **new unknown risks**.
3. Security concepts are thus **intersubjective** and have always been the product of orally articulated or written statements by those who use them as tools:
   - to analyze, interpret, and assess past actions, or
   - to request or legitimize present or future activities in meeting the specified security threats, challenges, vulnerabilities, and risks.

Widening, Deepening and Sectorialization of Security Threats and Risks



Security dimension ⇒ ⇓ Level of interaction	Mili-tary	Politi-cal	Economic	Environ-mental ⇓	Societal
Human and gender Human, gender security ⇒	Land mines	Failed state	Food & health security	Cause & victims	Food & health security
Community security	Border control	Public security	Water, food & health sec.	Ecosystem services	⇓⇑
National security	During Cold War shrinking (in USA since 2001 ⇑ & since 2009 ⇓)		Energy security	⇓⇑ CC, biofuels, water	Water, energy food, & health security
International and Regional security			Water security	⇓⇑ Water, CC	Water security
Global and planetary security ⇒	Terro-rism	Intern. migration	Financial crisis	CC; GEC; biodiversi-ty loss	Health security

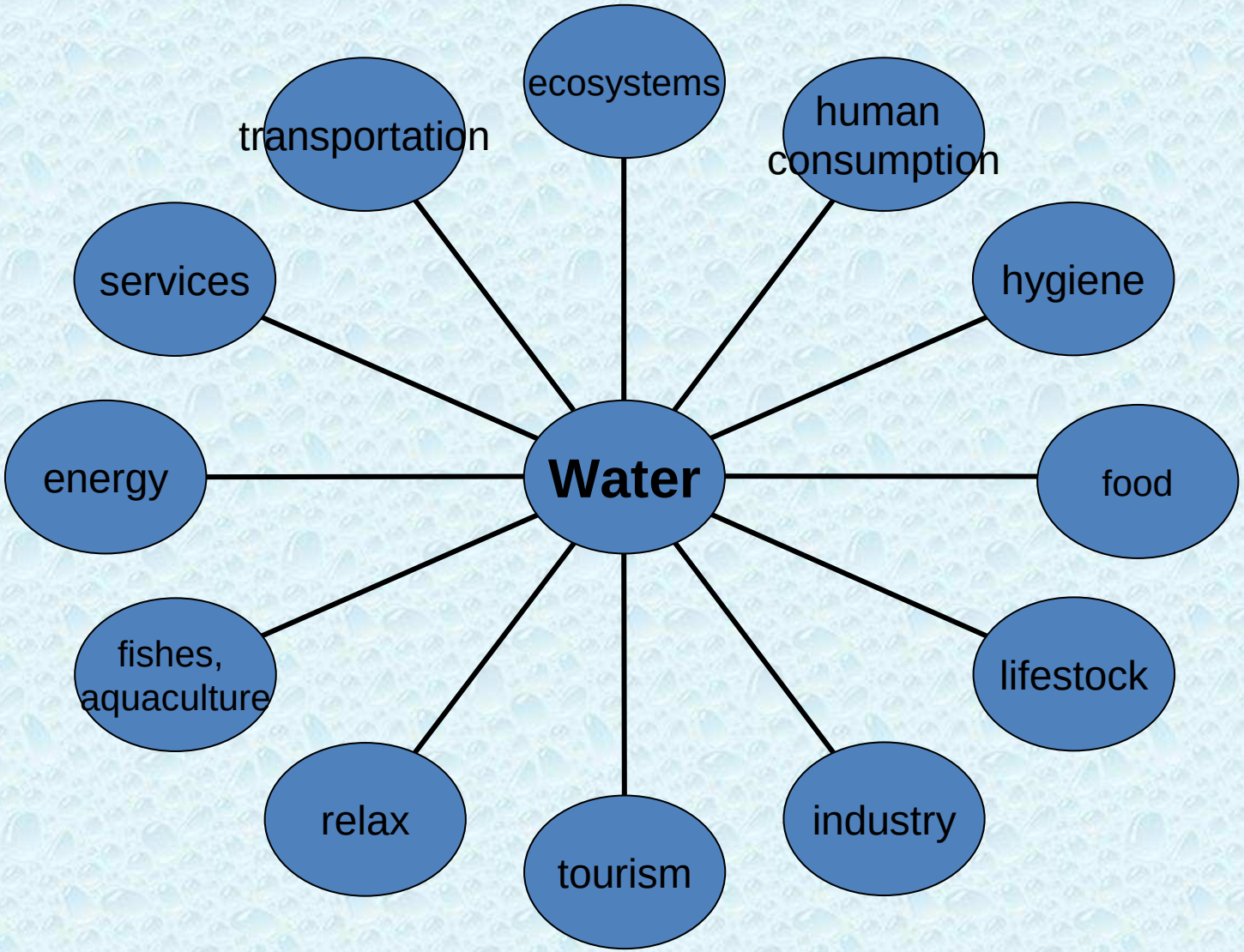
Links between ‘water’ and ‘security’ issues are complex and directly related to many other security concepts:

- Water is a major object of analysis in **environmental** security to maintain ecosystem services, and to protect the biological and hydrological cycles, the ecosphere.
- Water is a key element of **societal** security affecting wellbeing, recreation, and joy of life. It requires policy initiatives to avoid hydrological disasters and illnesses through protective and preventive, **resilience-building**, early warning, and evacuation to safe places in case of extreme weather events.
- Water is an issue of **economic** security that creates development opportunities.
- Water is a precondition for **food** security offering permanent, sufficient, accessible, safe, and nutritional food that is culturally accepted.
- Water is essential for **health** and **livelihood** security to protect people from thirst, waterborne illnesses, vector diseases, but also from floods, drought, and plagues.

2. What is water security?

- **One common goal:** ***to provide water security in the 21st Century to everybody on the planet:***
  - ensuring that **freshwater**, coastal and related ecosystems are protected and improved;
  - every person has access to enough **safe water** at an affordable cost to lead a healthy and productive life
  - sustainable development and **political stability** are promoted;
  - the vulnerable are protected from the risk 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** are hit first and hardest (slum dwellers without basic services).
- One simple conclusion: **business as usual is not an option.**

Complexity of WaterSecurity

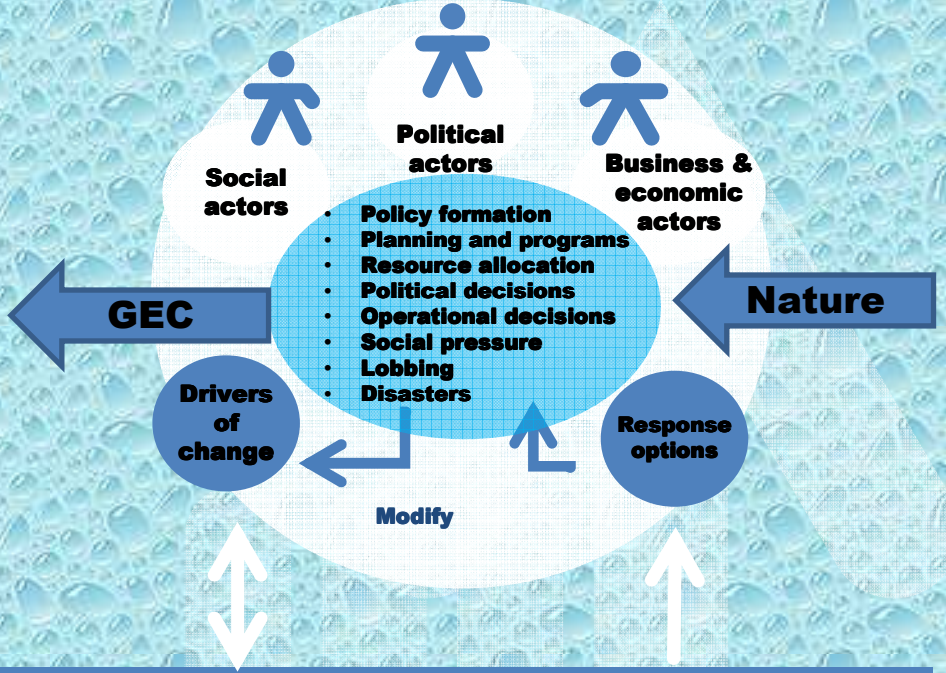


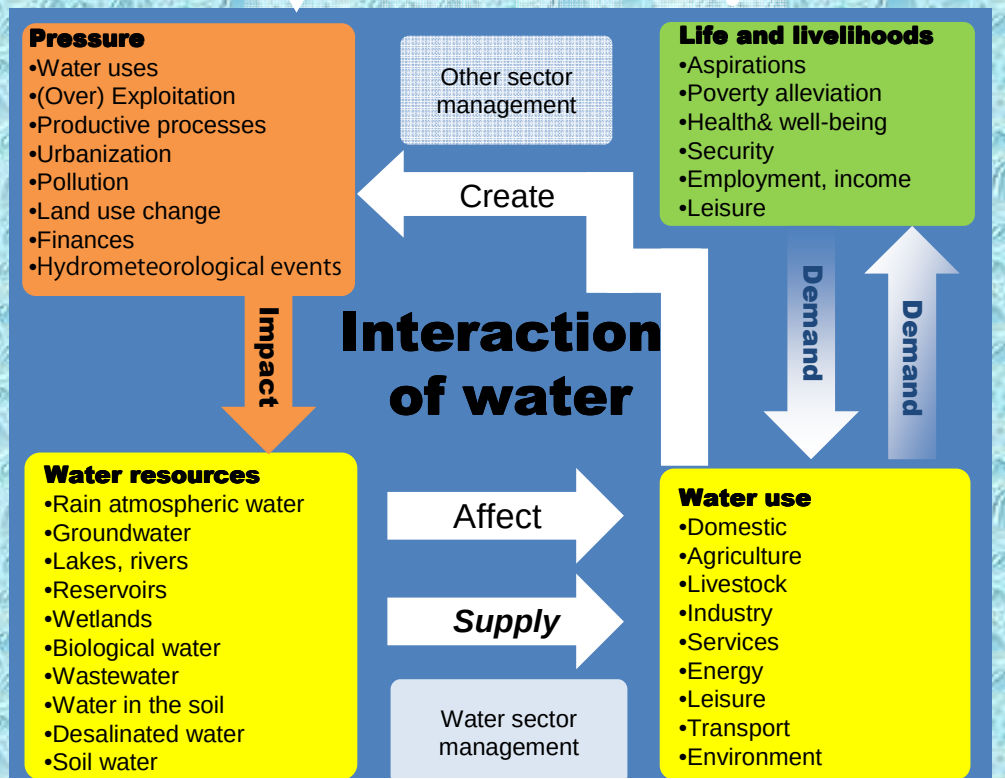
Source: Oswald 2007

3. Why is water security crucial for life?

CEG: Global Environmental Change:

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





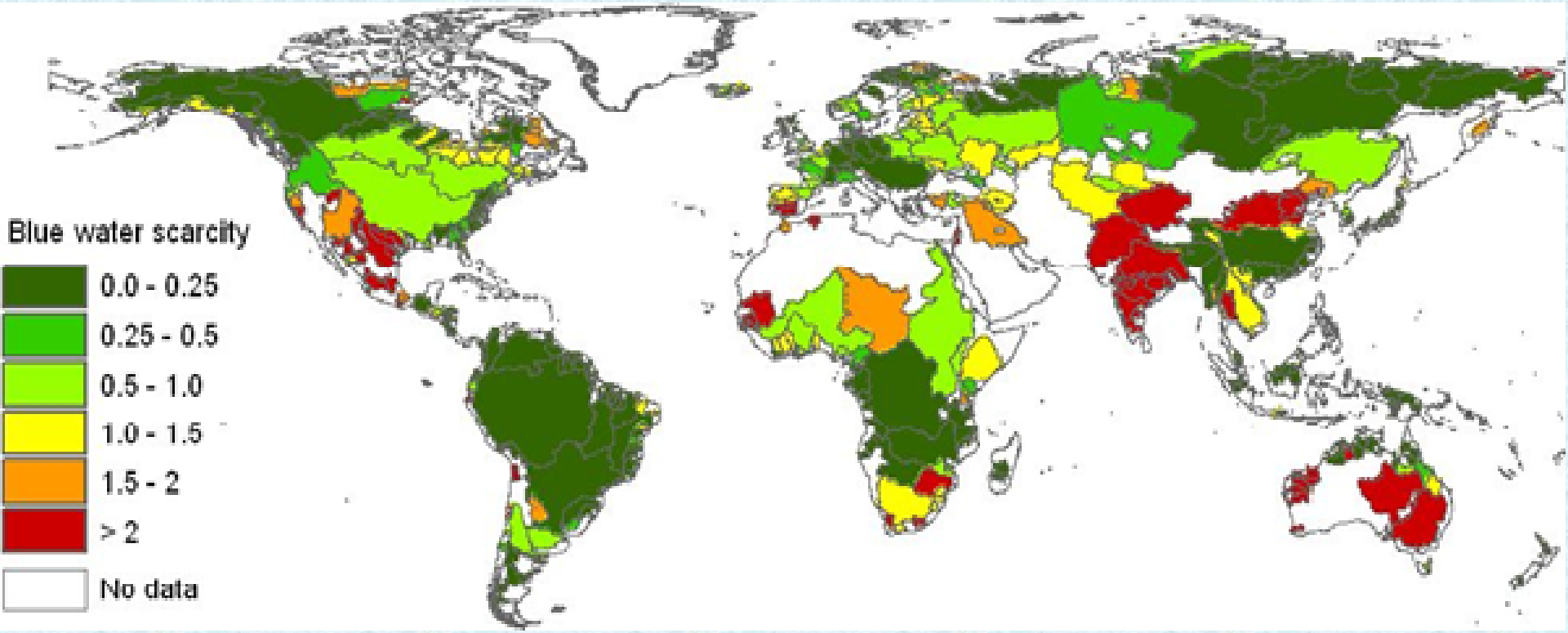
Source: based on Global Water News, #9, 2010, p. 4

Limits to Water Security

- Hydrological environment: physical stress related to supply of water, inter and intra-annual variations, spatial distribution, social differences in access, physical vulnerability and biological and physical-chemical quality of water
- Socioeconomic surrounding: economic stress due to socioeconomic structures, stakeholder behaviors (people, farmers, businessmen), values of water, costs of piping and cleaning water, social vulnerability
- Climate change impacts: socio-physical threats are reduced by mitigation and adaptation capacities, governmental response, early warning, evacuation, participative governance, resilience-building
- Conflicts: socio-political risks are prevented by water cooperation, treaties, and integrated water resource management (IWRM)

- Water is vital for **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 water and food availability
- **Urbanization** is diminishing the availability of land for water capture and food production.

Blue Water Scarcity

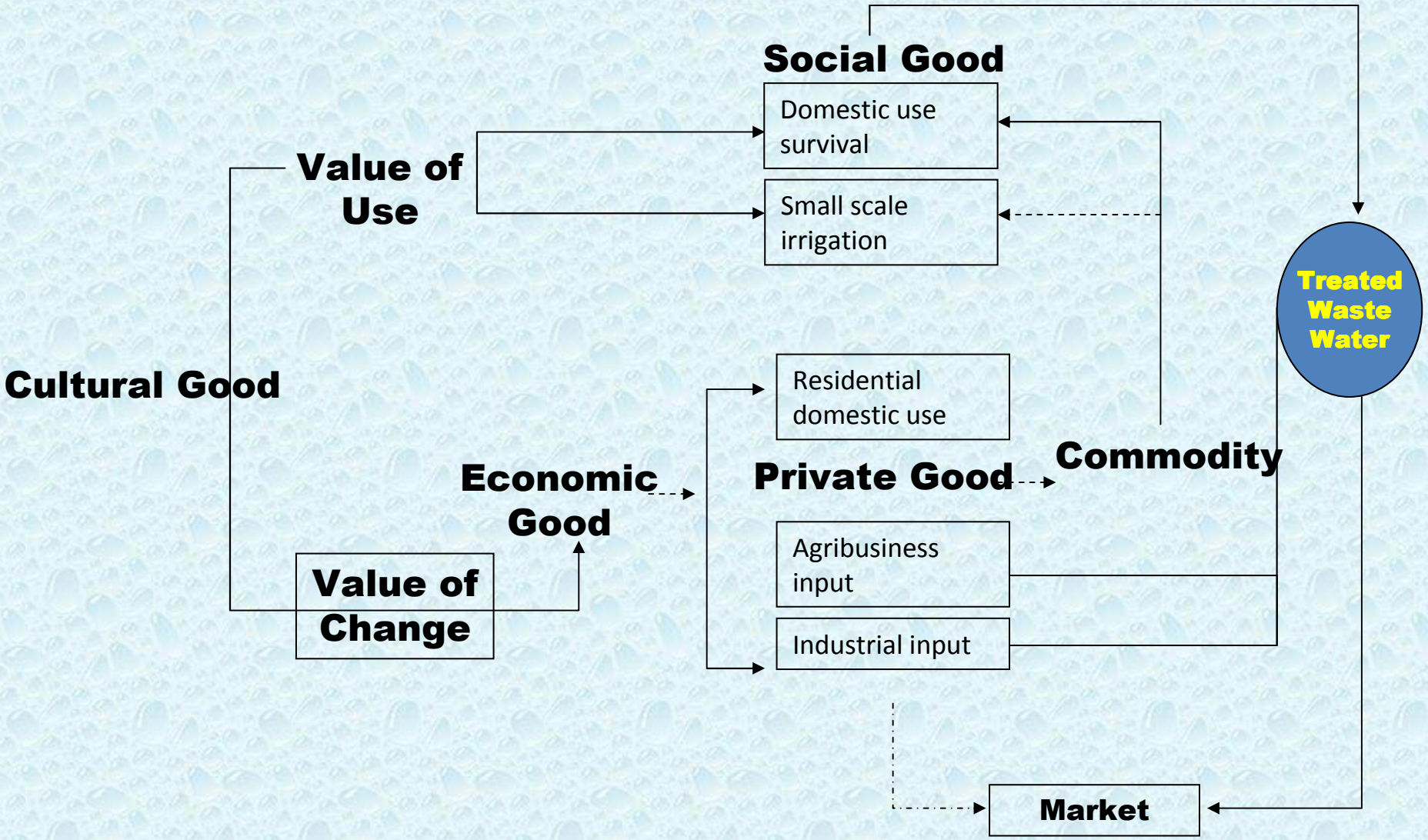


Irrigation efficiency and additional applications of water reuse could be increased by approximately 35% (GEO-5).

Source: Hoekstra/Mekonnen, 2011

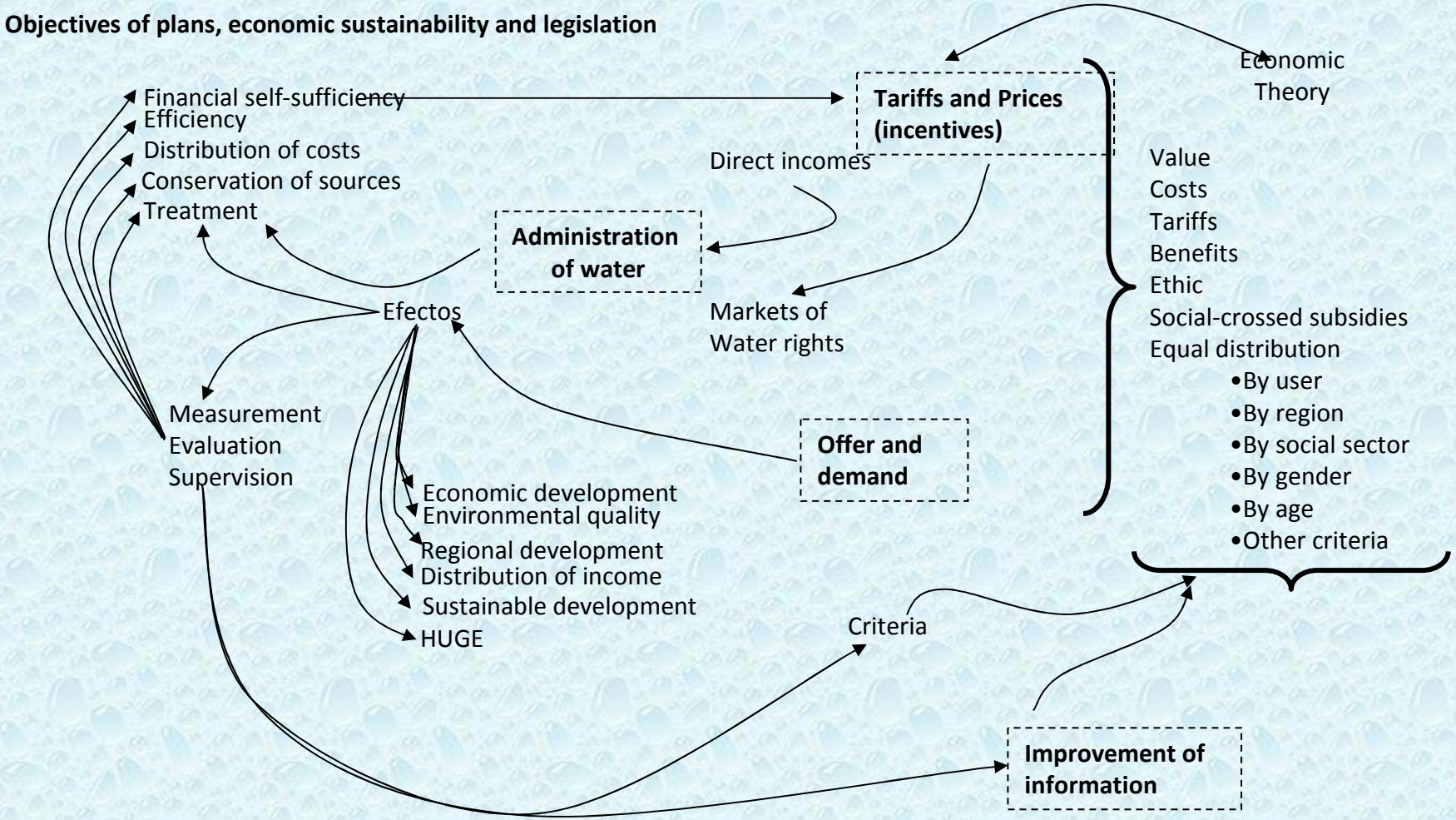

Economic Stress

Logics of Value of Water



Sources: Ramos 2004: 101 modified by Oswald 2005: 147

Economy of Water



Source: Sandoval 2000, modified by Oswald 2005: 153

Quality of water and health

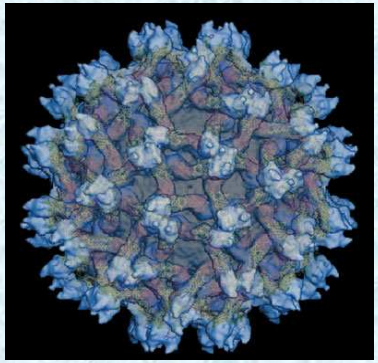
- Free of organisms
  - bacterias
  - virus
  - protozoarios
- Free from toxic substances
  - inorganic
  - organic
- Aestetically acceptable
  - flavor
  - odor
  - colour

Pollution of water

- In developing countries 2.2 million people die each year due to diseases related to lack or polluted water, inadequate sanitation and lack of hygiene.
- Over 2.5 billion people still lack access to improved sanitation. Meeting the MDG on water supply and sanitation would reduce the annual global disease burden by an estimated 10%, with an annual benefit cost ratio of approximately 7:1.
- The social and environmental costs to ignore the necessity for improved sanitation (including hygiene, recollection and treatment of sewage water) is higher than including this costs into the programs of safe water.

Dengue: vectors

Increase of population exposed to dengue: **35% - 60%** and estimations in 2085 ~ **6 billion people at risk**



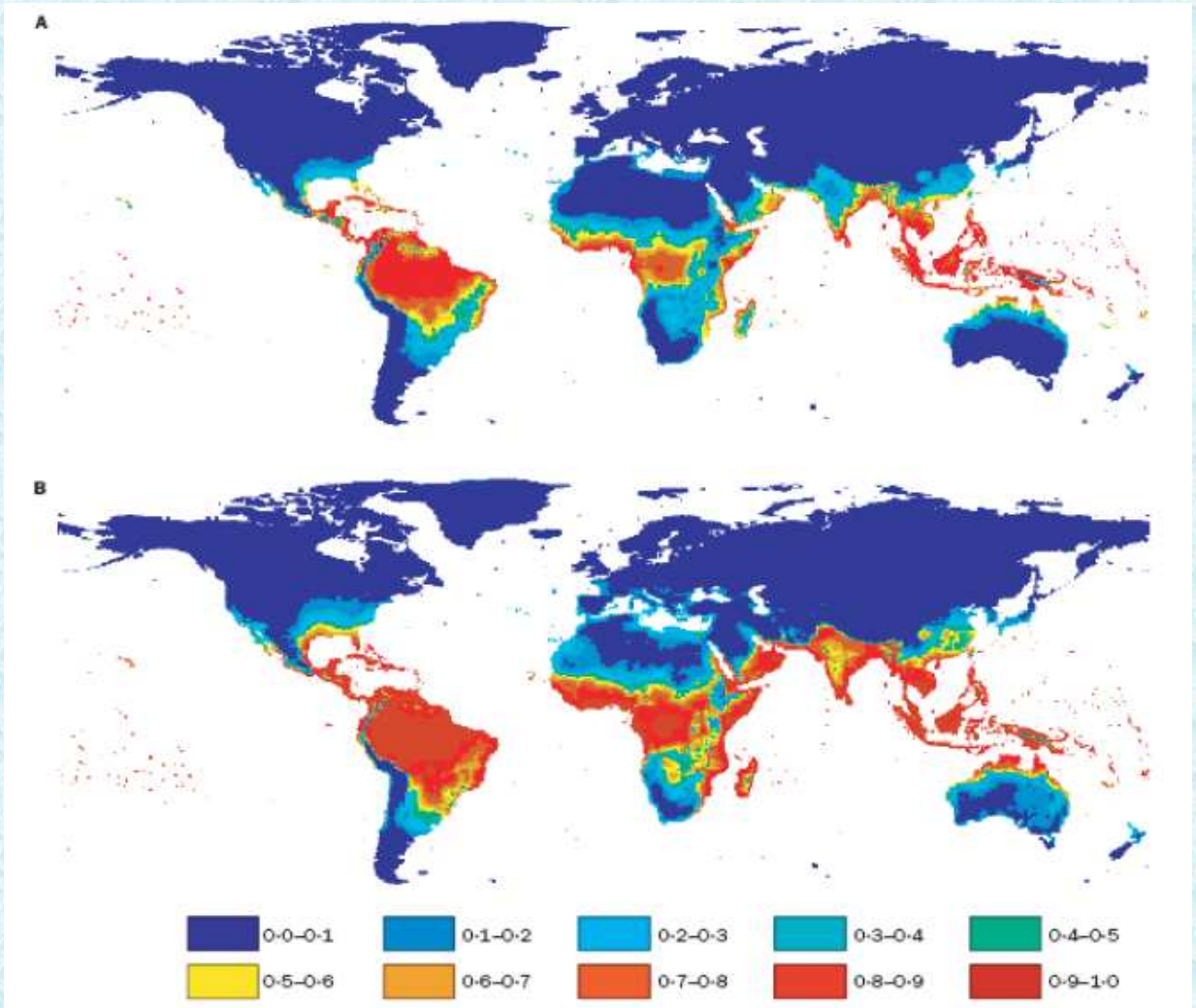
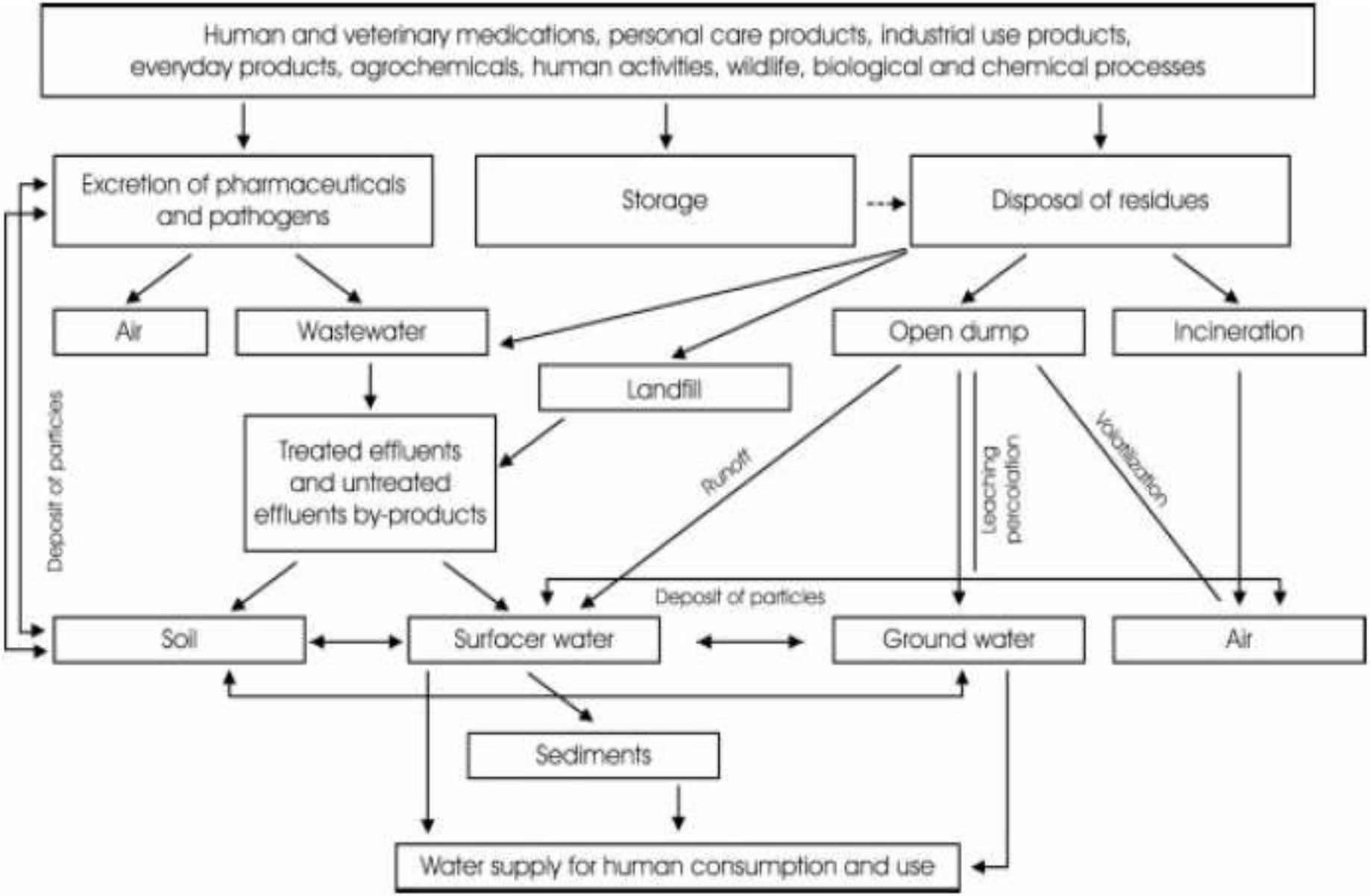


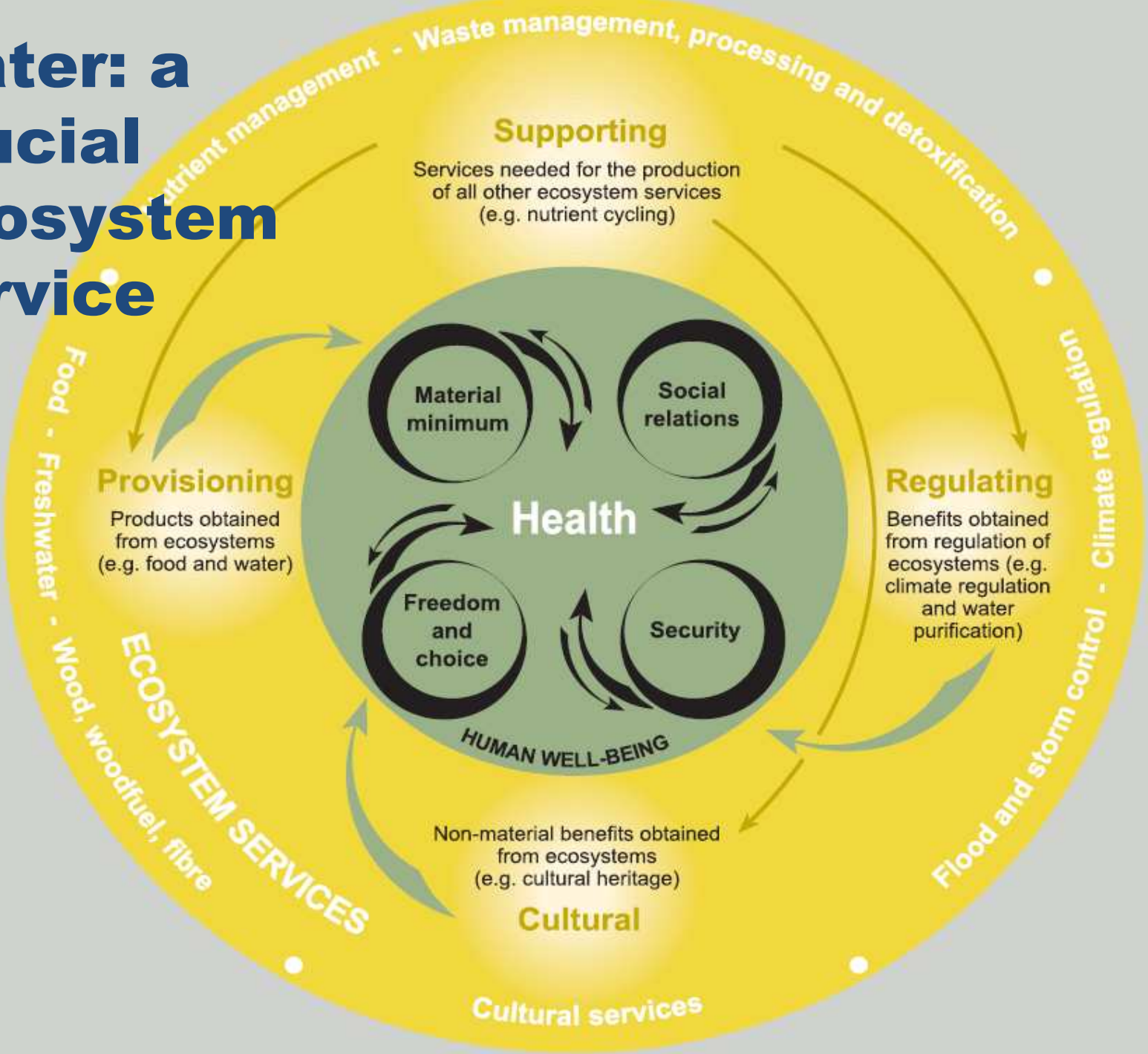
Figure 2: **Estimated baseline population at risk in 1990 (A) and estimated population at risk in 2085 (B)**

Hales et al., 2002

Processes of pollution

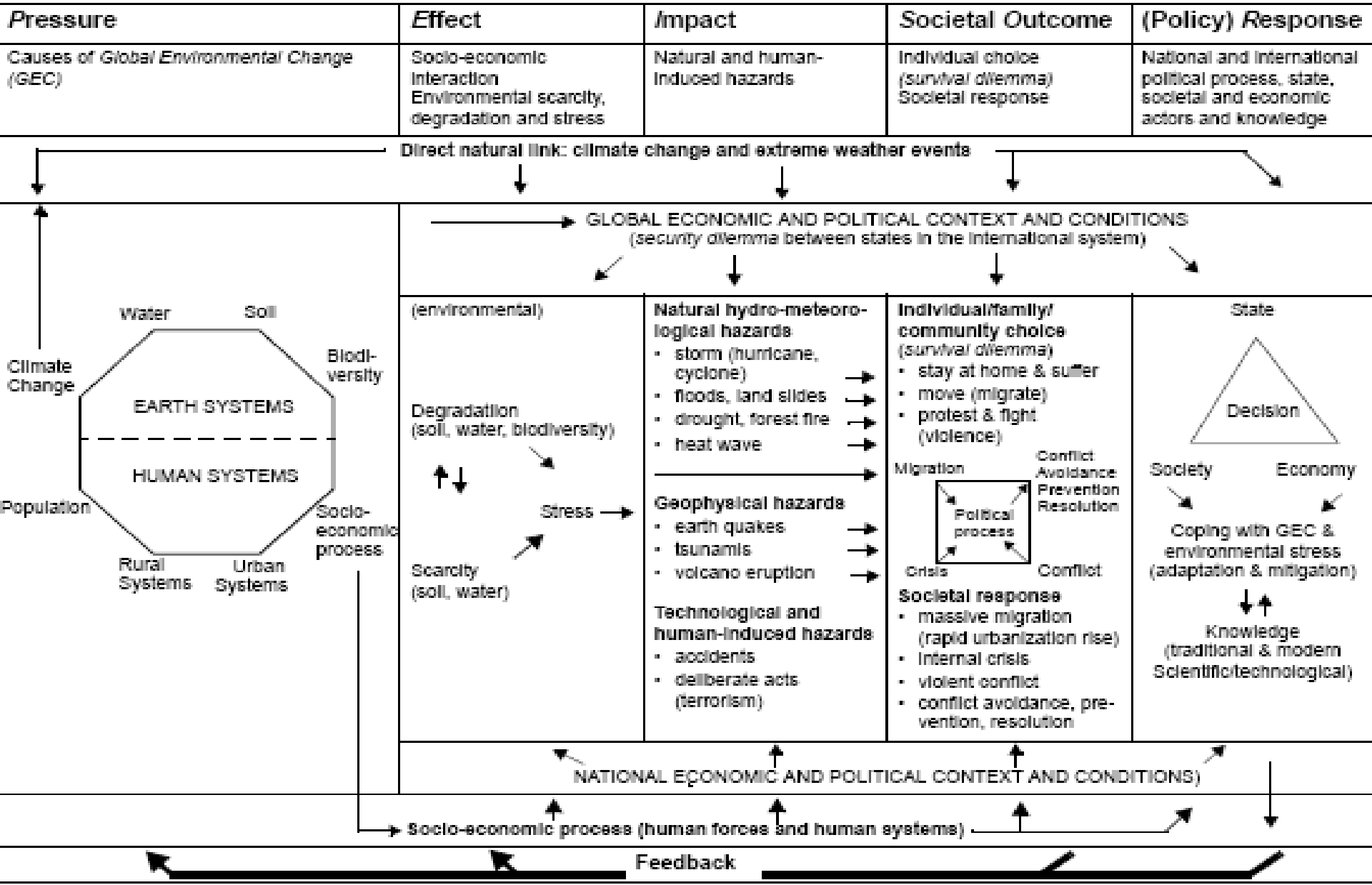


Water: a crucial ecosystem service

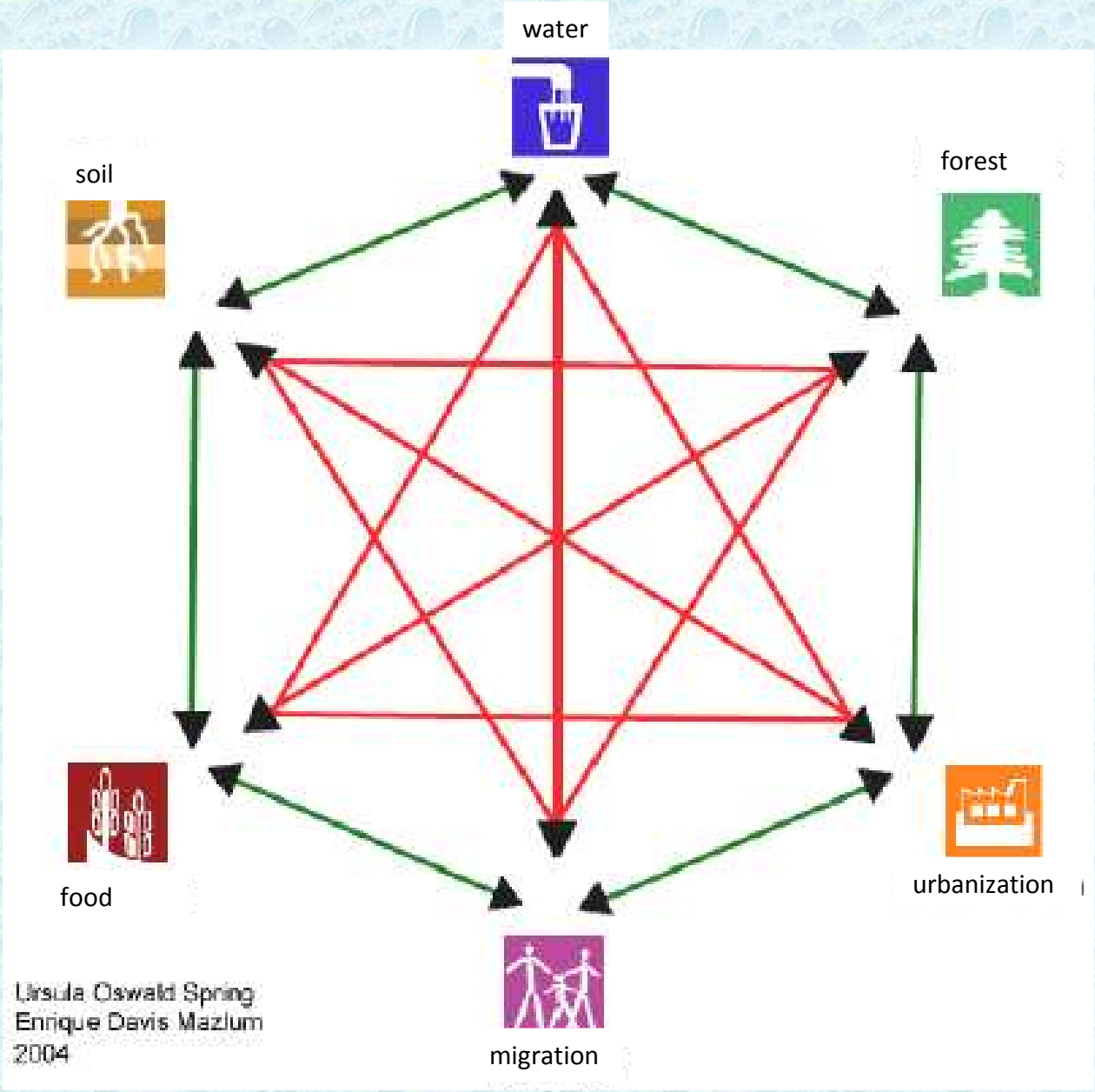


Water conflicts

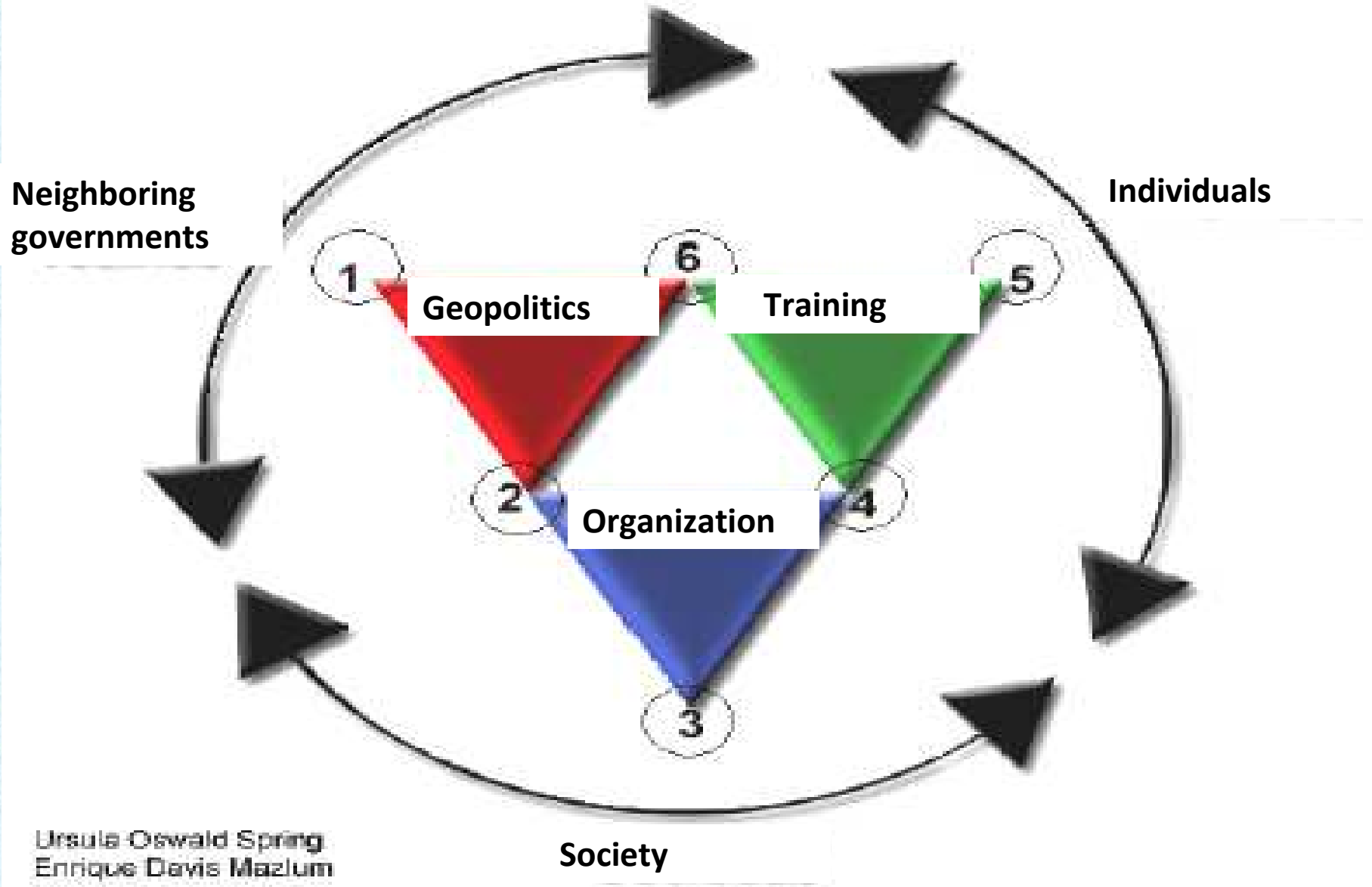
PEISOR Model Source: Brauch/Oswald, 2009: 9



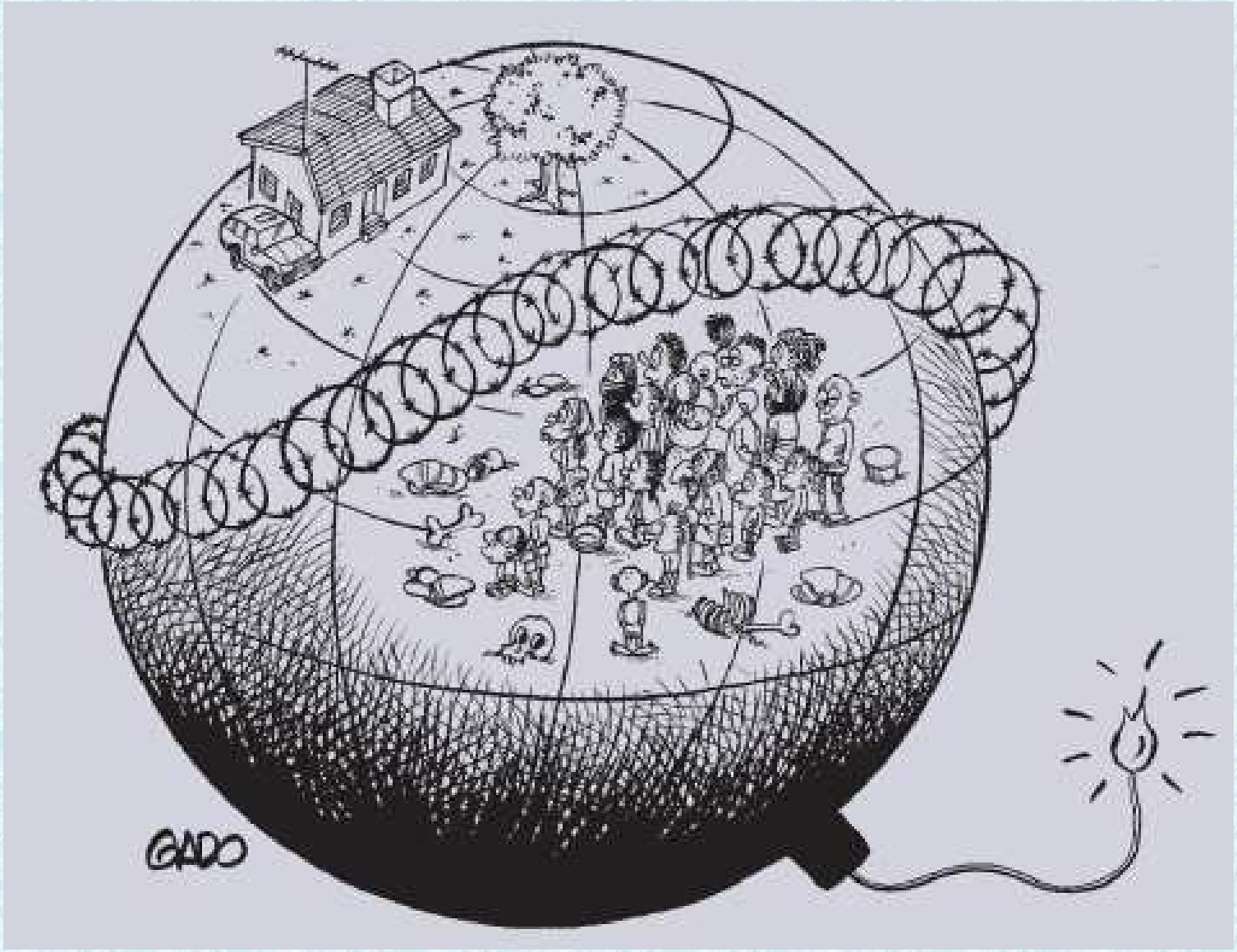
Conflicts related to water



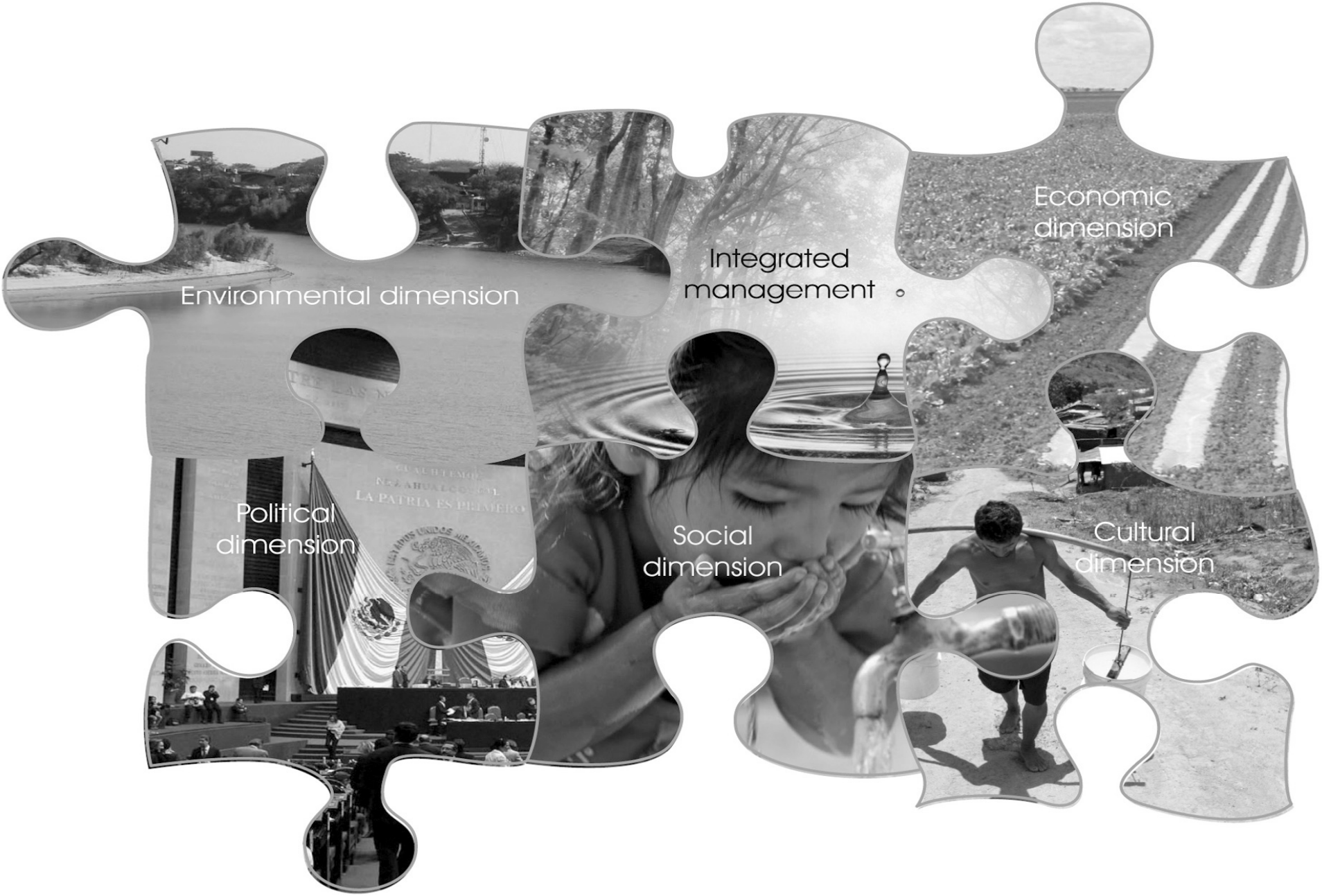
6. Hydrodiplomacy



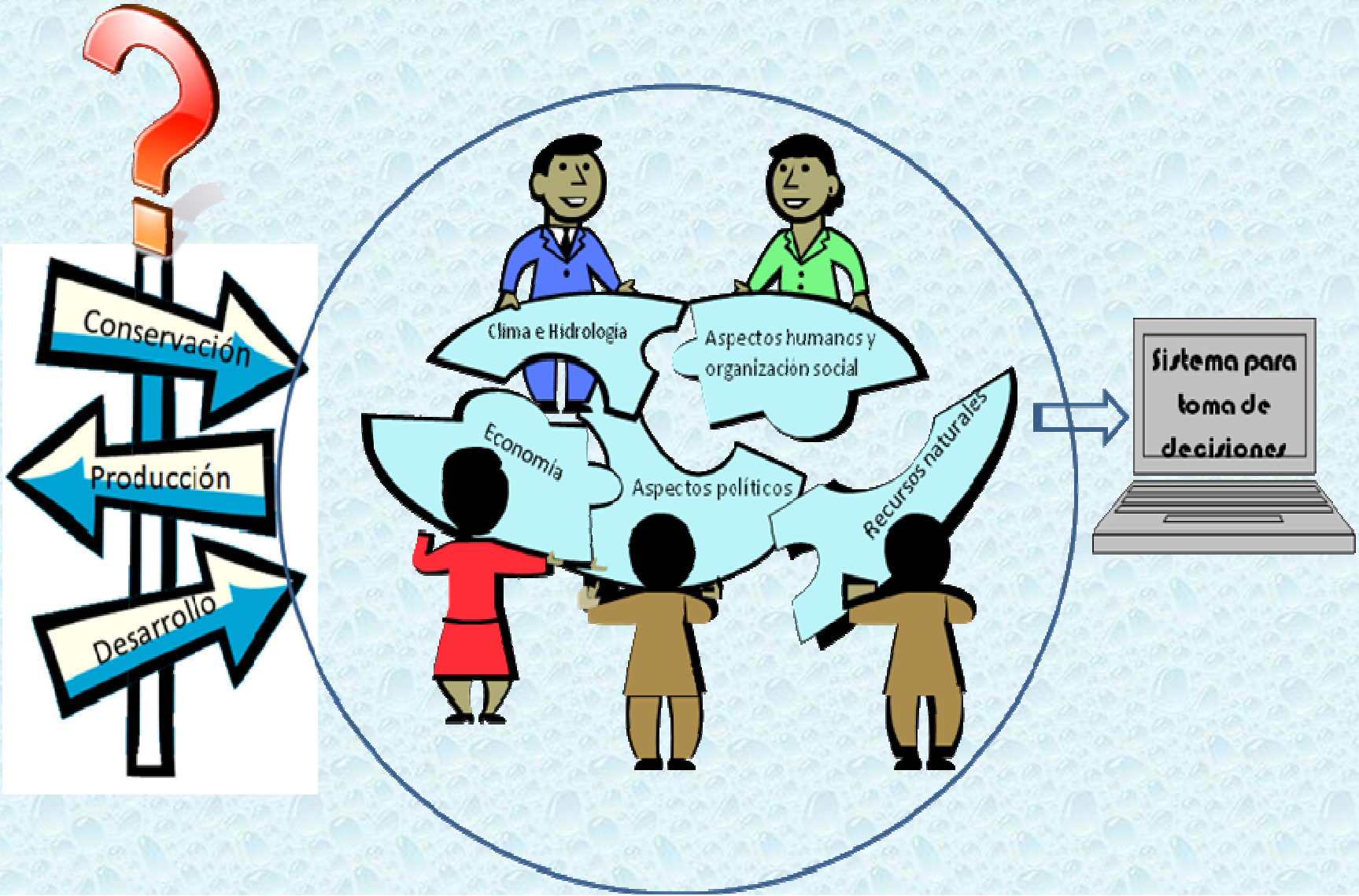
7. What kind of future do we want?



Integrated water resource management

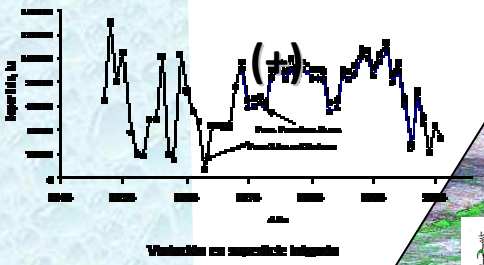


Multidisciplinary, multi-sectorial and multi-institutional research



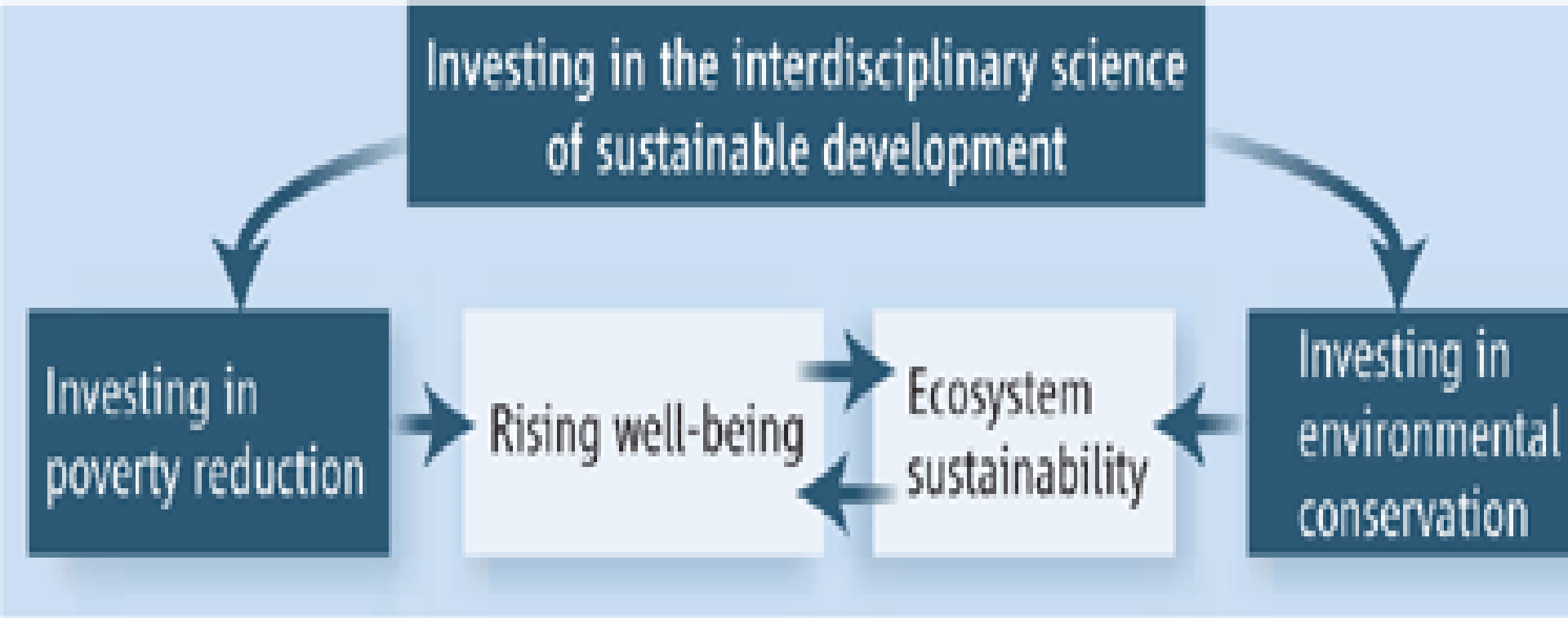
Cascading impact: Crops resistent to drought in Latin America

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.

Integral proposal of poverty alleviation and environmental recovery to reduce migration



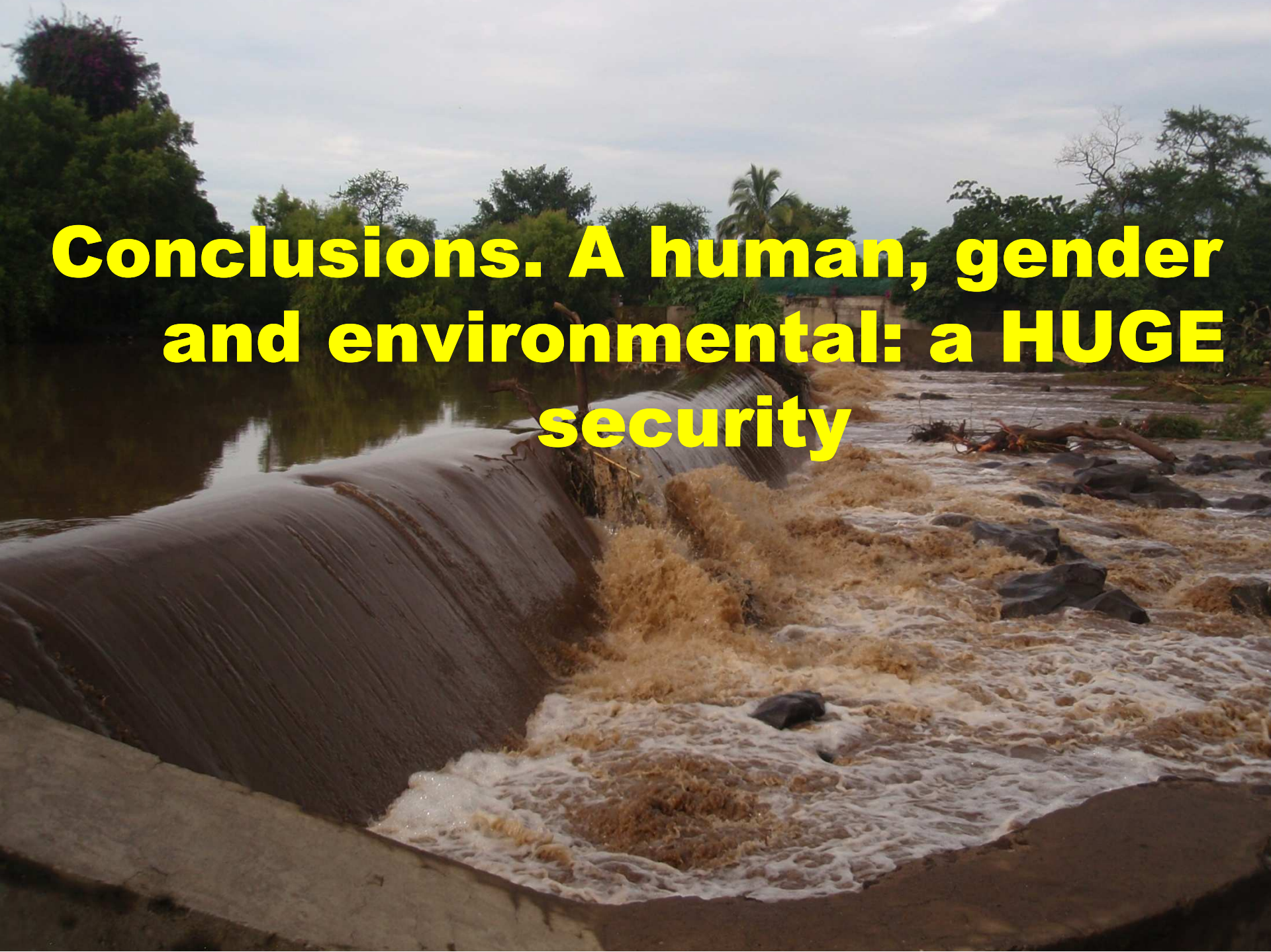
9. Policy responses

Capacity Building and Financing

- Epistemic communities fostering cooperation & bringing together science and policy for improving WS
- Strengthening traditional and innovative knowledge for embedding the assessment of levels of WS into the environmental impact and risks assessment, land use planning and environmental auditing.
- Training on best practices for conflict settlement mechanisms at the local and national levels.
- Pro-active strategies for adjustment and mitigation to water threats and preventive social learning
- Financing: Channelling Resources: International, climate related financial institutions (IFAD, GEF), local micro-credit, micro-insurance, land use conservation, micro-investments for local development programmes, reforestation, regional organizations and national donors (ministries of development cooperation and environment) to improve policies for water security.

Water security vision in 2025

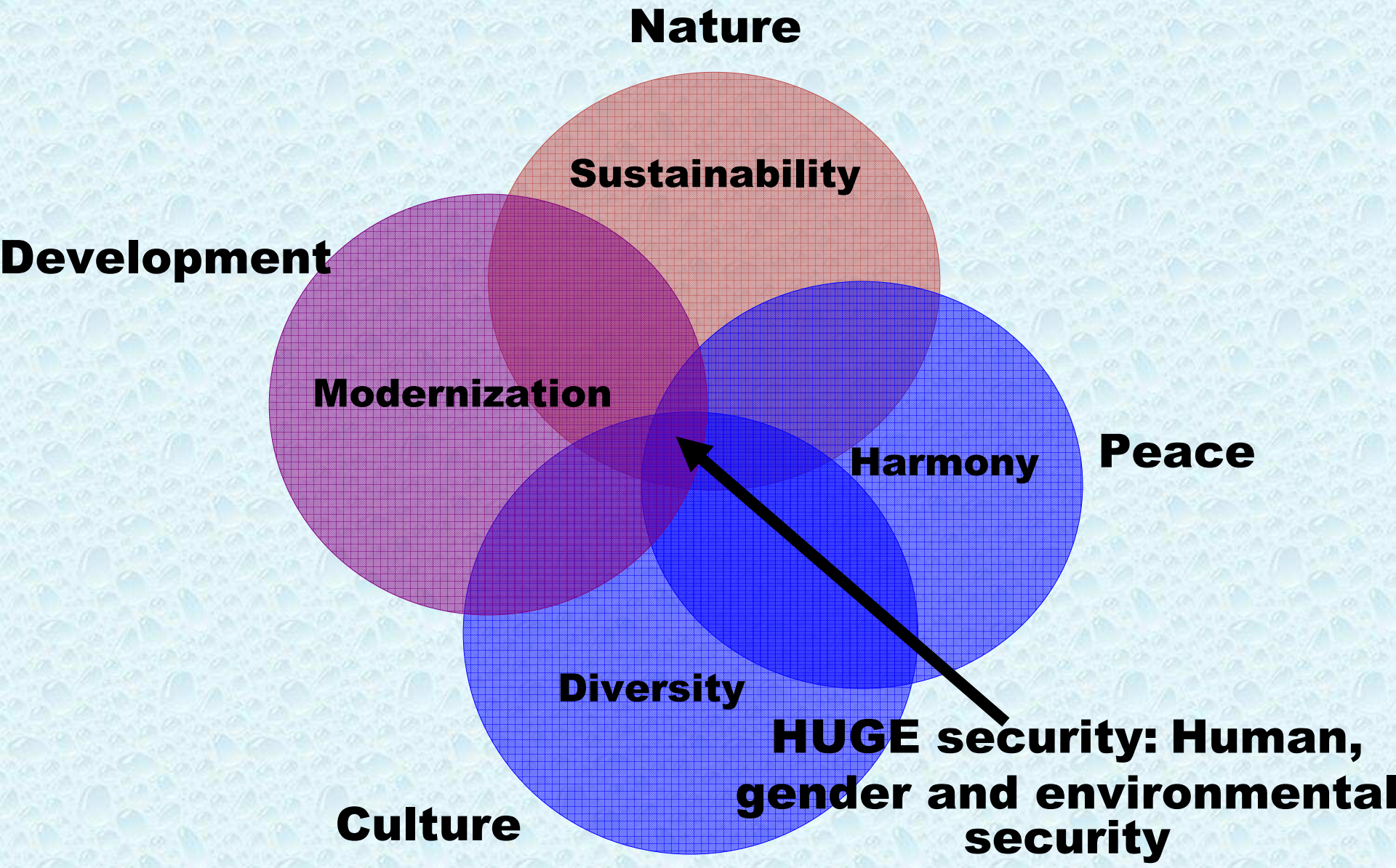
- **Empowering** women, men, and communities to decide on levels of access to safe water and hygienic living conditions, and on the **types of water used** in economic activities, and to organize to obtain them.
- **Producing more food** and creating more sustainable livelihoods per **unit of water applied** and ensuring access for all to the food required for healthy and productive lives.
- **Managing water** use to conserve the quantity and quality of freshwater and terrestrial ecosystems that provide services to humans and all living things.
- A **sustainability revolution** with deep changes in worldview, mindset, policy, governance and culture: a **new cosmovision to live with Earth in peace.**


Conclusions. A human, gender and environmental: a HUGE security

Human, Gender, Environmental Security

Determination Which security?	Reference object: Security of whom?	Value at risk: Security of what?	Source(s) of threat: Security from whom or what?
National security	The State	Territorial integrity	State, substate actors
Human security	Individual, humankind	Survival of humankind people	Natural events, state, globalization
Environmental security	Ecosystems, rural and urban systems, water and food	Sustainability, food, wellbeing, health	Humankind, extreme hydrometeorological events
Gender security	Gender relations, indigenous people, minorities	Equity, identity, social relations, solidarity, tolerance, culture	Patriarchy, totalitarian institutions (élites, governments, religious fundamentalism, dominant cultures), intolerance, violence

Water security with peace

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