



**Universidad  
Zaragoza**



**INSTITUTE of  
WATER POLICY**

# **Water Reforms Across the World: Policy and Technological Innovations**

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# 1. Review of policy and technological innovations in Australia, the EU, Israel and the USA

## **Policy instruments:**

- **Economic instruments: water pricing, water markets**
- **Command & control**
- **Institutional instruments: stakeholders collective action inside basin authorities**

## **Water technologies:**

- **Urban wastewater treatment**
- **Advanced irrigation technologies**
- **Seawater desalination**
- **Recycled wastewater**
- **Manure treatment or reutilization**

## **2. Implementation of policy and technological innovations**

**Australia:**

**Water markets, Irrigation technologies**

**European Union:**

**Wastewater treatment plants, Nitrates legislation, Water pricing**

**Israel:**

**Command & control, Irrigation technologies, Wastewater treatment plants, Recycled water, Privatization of water companies, Water pricing, Seawater desalination**

**United States:**

**Wastewater treatment plants, Cost recovery, Conservation programs (including irrigation technologies)**

### **3. Improvements, constraints, failures**

#### **Australia:**

**Large gains in profits (AU\$ 1 billion/year drought), fall in basin flows, huge public funds to bribe stakeholders (AU\$ 20 billion)**

#### **European Union:**

**Large abatement of urban point pollution (with € 200 billions), Failure to abate nonpoint pollution (Figure), Water pricing working in urban networks but not in agriculture (either quantity or quality). National irrigation plan in Spain (€ 6 billion)**

#### **Israel:**

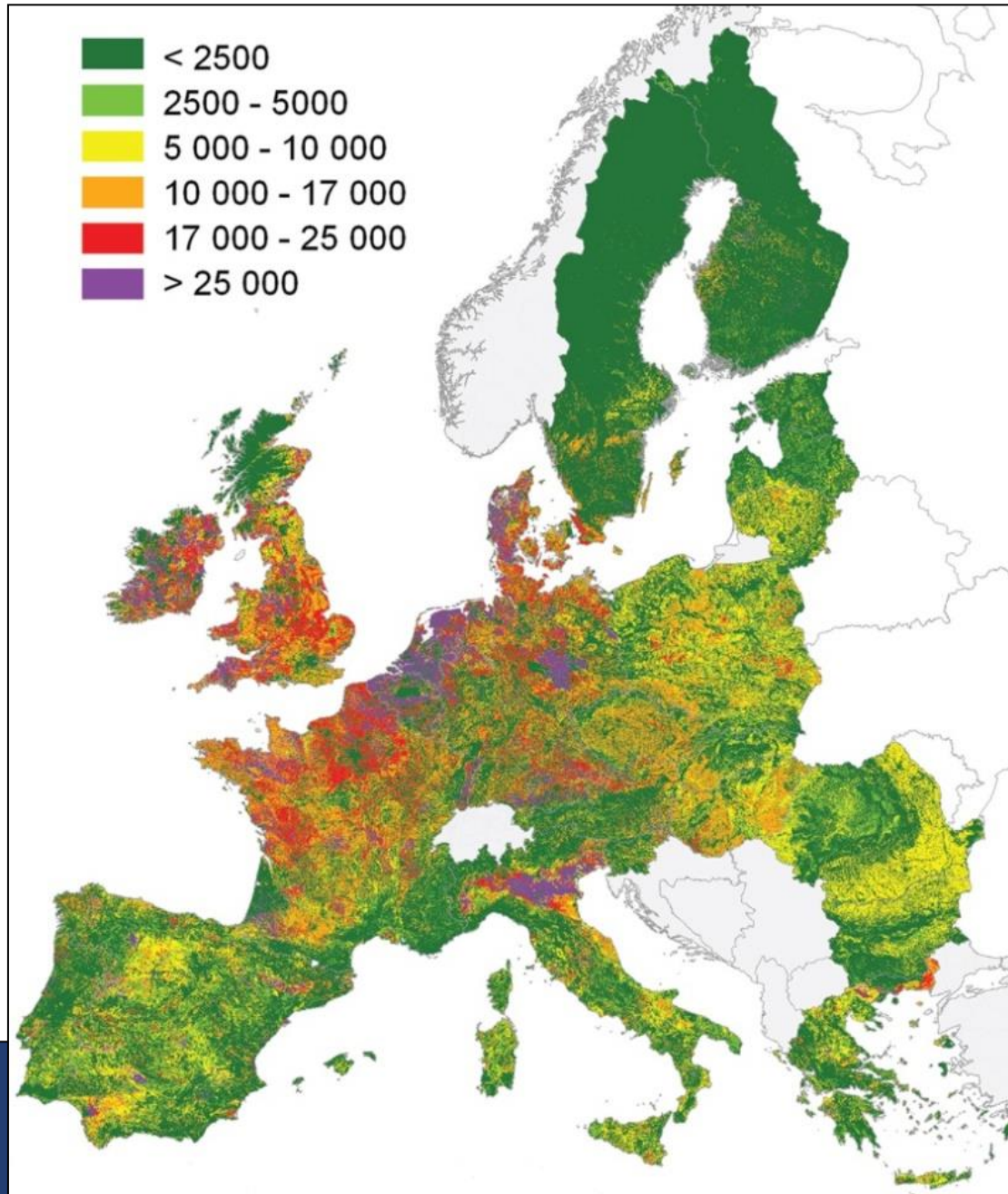
**Investments in irrigation technologies and wastewater plants failed to curb abstractions; Improvements with command & control, recycled water, privatization, water pricing, desalination**

#### **United States:**

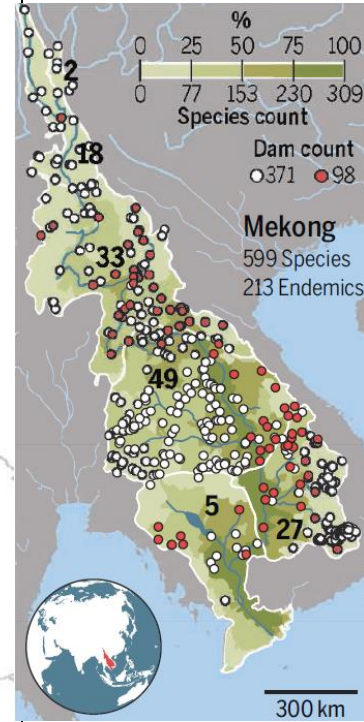
**Large abatement of urban point pollution (US\$ 90 billion), Cost recovery in water projects reduced deliveries to irrigation, Failure to abate nonpoint pollution (US\$ 100 billion funding, including 10 for irrigation technologies), stream flows and groundwater tables falling**

# Pressures from human activities

Nitrogen entry  
in soils kgN/km<sup>2</sup>



## Mekong Hydroelectric dams



## **4.-5. Context, duplication, adaptation to economic, social and environmental conditions**

**The scale of the global growing water depletion indicates that water mismanagement is quite common, and that sustainable management of basins is a complex and difficult task.**

**Political economy of water reforms: conflicts between public and special interests in the design and implementation of water reforms**

**Path dependency of institutional and policy processes (no panaceas), so water reforms adapted to country, basin and local scales.**

**Two important questions:**

**1) Efficiency gains in irrigation at plot and district levels lead to more evapotranspiration and less return flows, resulting in lower stream flows at basin level.**

**2) Nonpoint pollution is a wicked problem: many pollutants, large number of sources, highly stochastic transport and fate along different paths, heterogeneous damages across space and time**

## **6. Lessons learn, positive and negative**

**The more extensive water reforms are those of Israel and Australia, motivated by the unsustainable growth of water abstractions**

**Israel: all types of measures undertaken, command & control facilitates reallocation among sectors**

**Australia: large gains from trading, but huge public funds transferred to farmers and states. Markets and public investments in irrigation technologies reducing basin flows. Buy-back of water for the river.**

**The USA and EU: water scarcity is much less severe. Water reforms are focused on pollution abatement, which is a widespread problem in the USA and the EU. Success in urban pollution abatement, but failure in nonpoint pollution policies.**

**In the EU, water pricing working fine in urban networks but failing in agriculture for both water quantity and water quality.**

**In the USA, interest in water markets but significant barriers which are quite challenging and difficult to overcome.**