The Botín Foundation and the International Rosenberg Forum on Water Policy

Managing Drought and Scarcity in Semi-Arid Lands: The cases of California and Spain

Botín Foundation, Madrid, January 29, 2015

The Waters of Spain and Their Management: An Overview

Nuria Hernández-Mora
Universidad de Sevilla

Lucia De Stefano
Universidad Complutense, Water Observatory-Fundación Botín

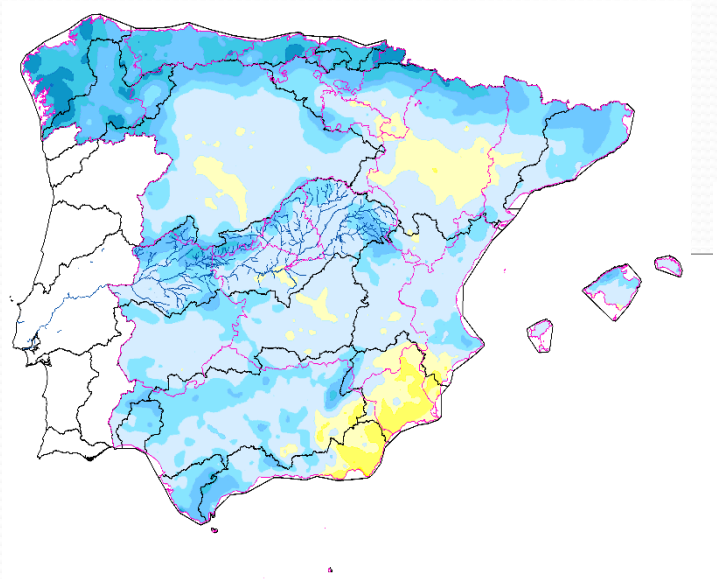
Alberto Garrido
CEIGRAM-Universidad Politécnica de Madrid,
Water Observatory-Botin Foundation

Barbara Willaarts
CEIGRAM-Universidad Politécnica de Madrid, Water Observatory-Botin Foundation

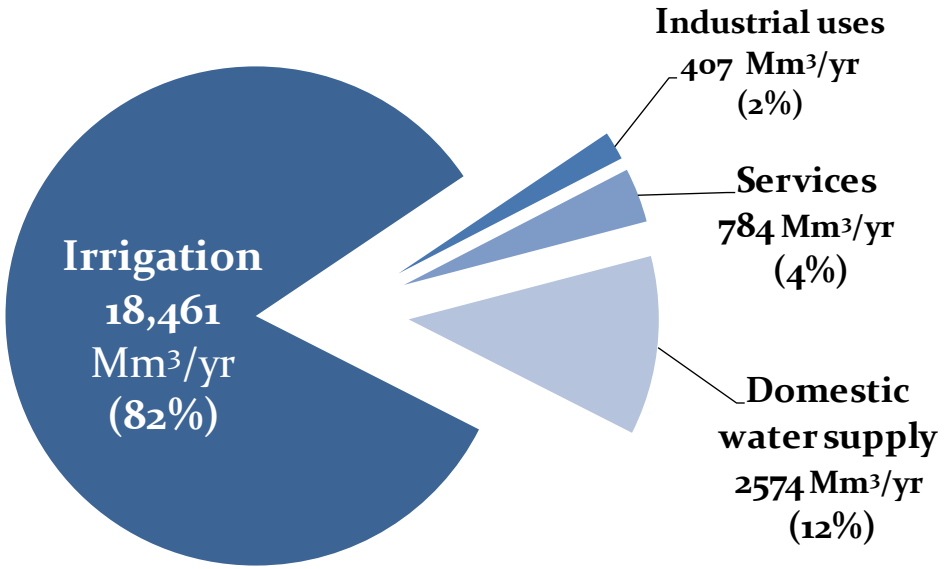
Some basic facts

	Surface area (km^2)	Population (million)	Total managed water (Mm^3)
Spain	504.645	47,27	55.000
California	423.970	38,33	49.000

Precipitation

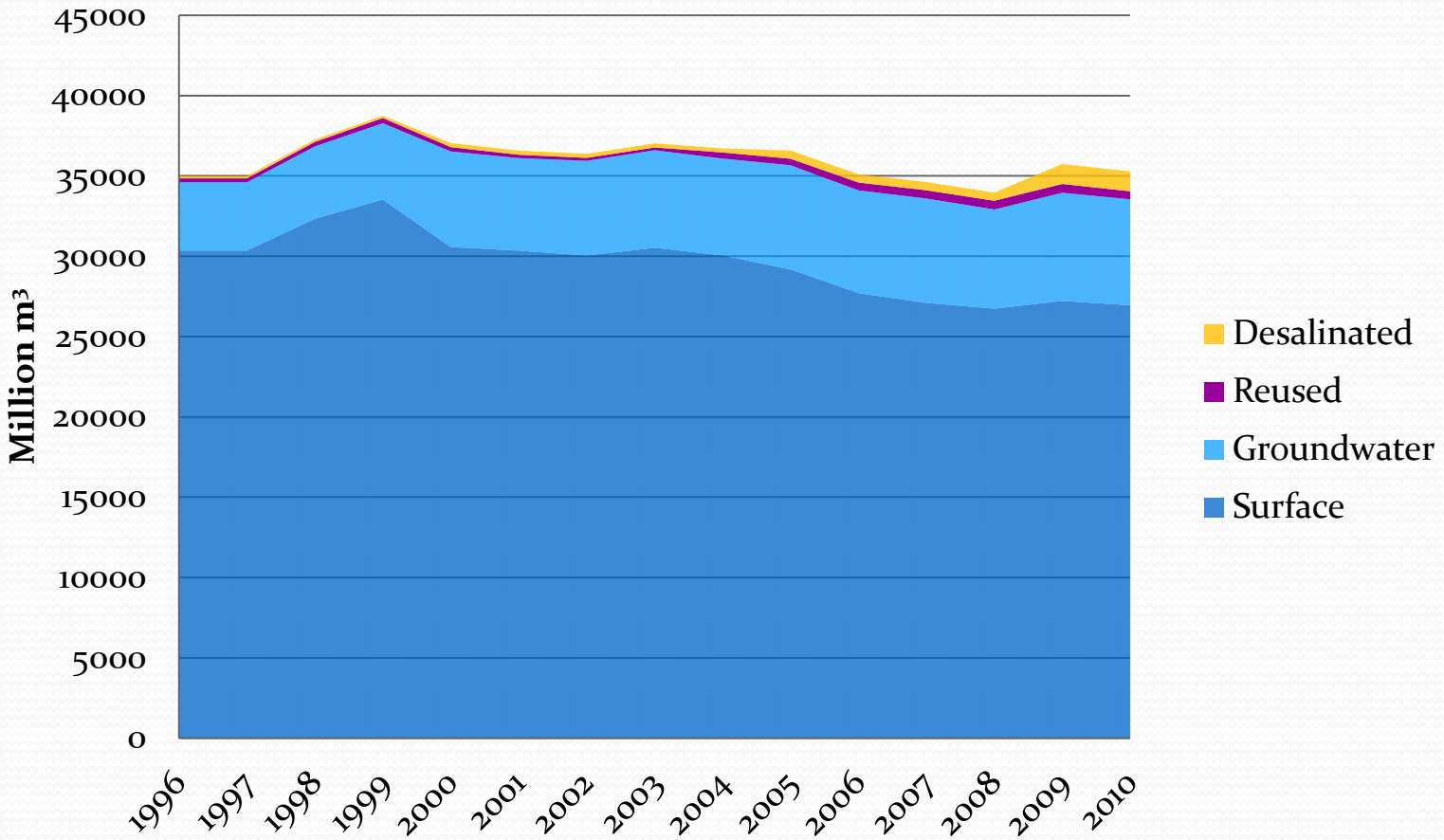


Main consumptive water uses

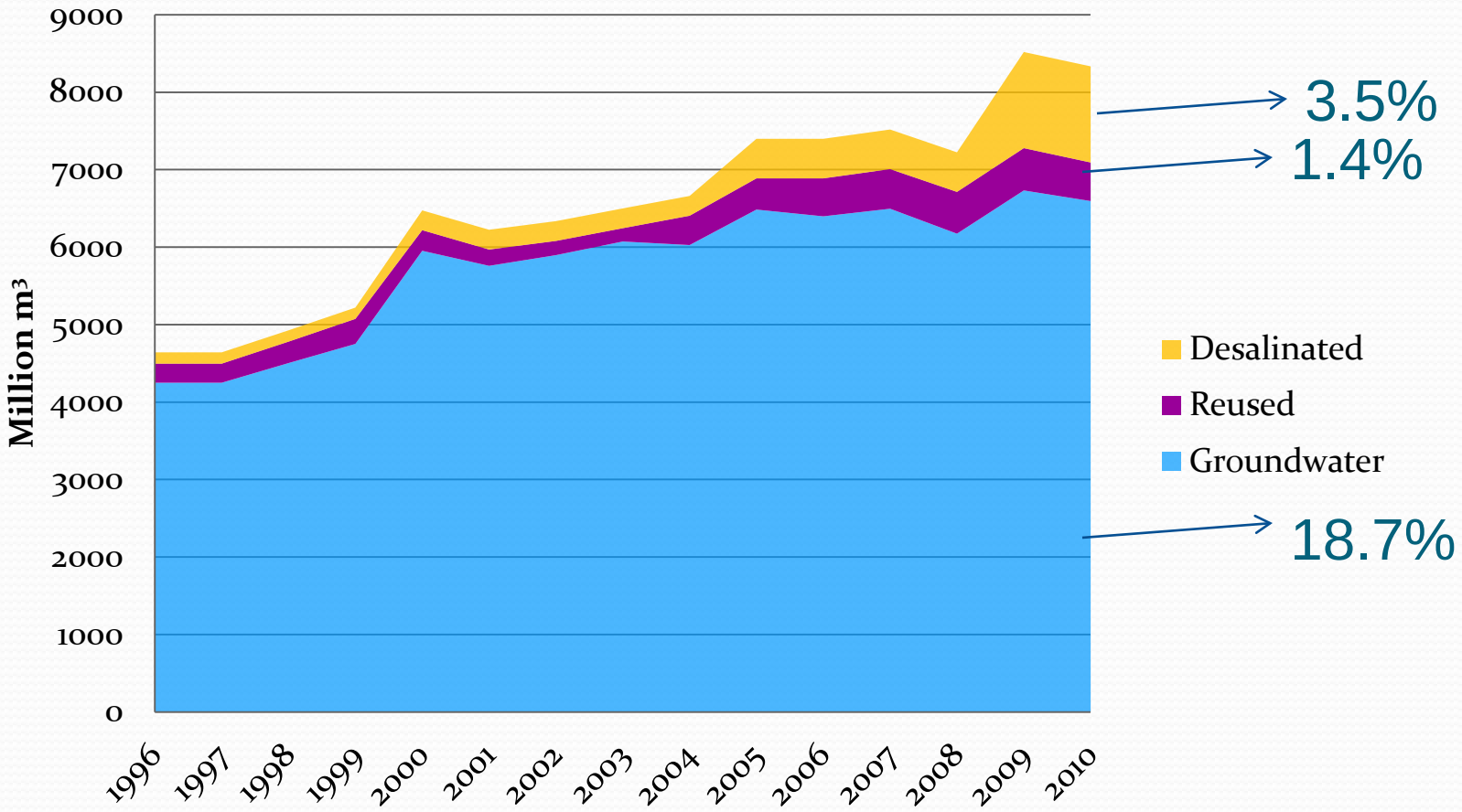


Hydroelectricity:
22,000 Mm^3 stored capacity (40% of all stored water)

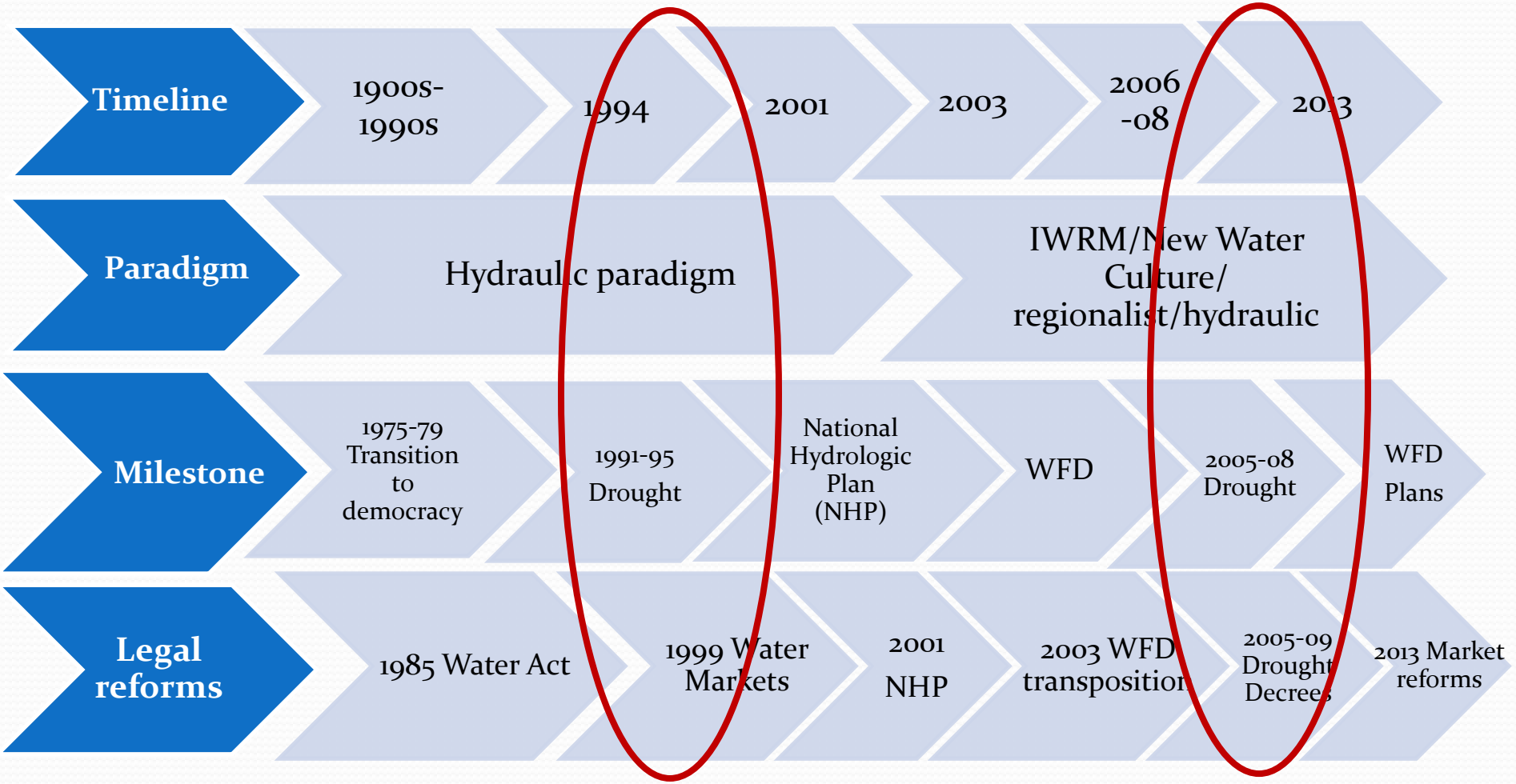
Evolution of water abstraction



Evolution of water abstraction

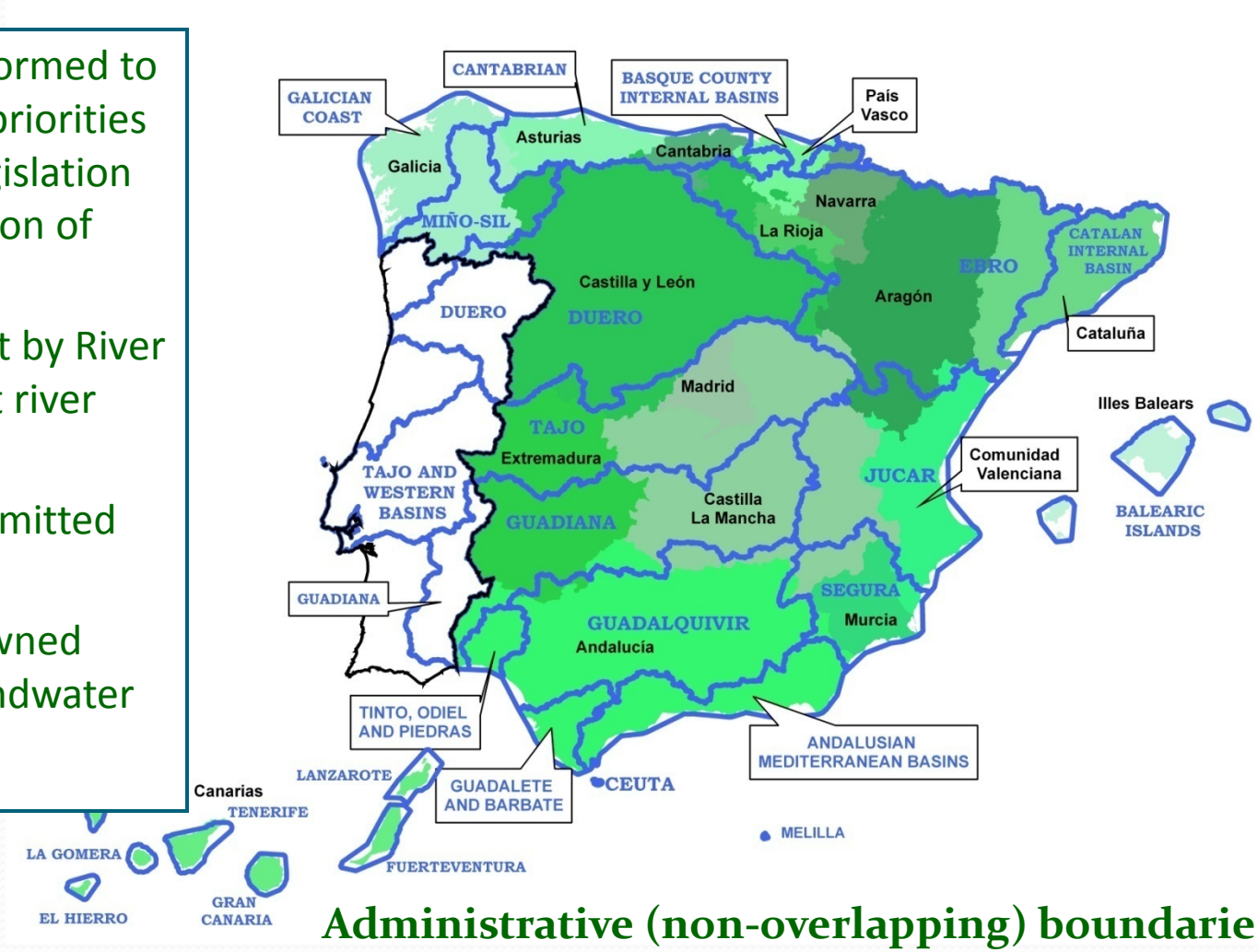


Paradigms, milestones and laws



Spanish water law & institutions

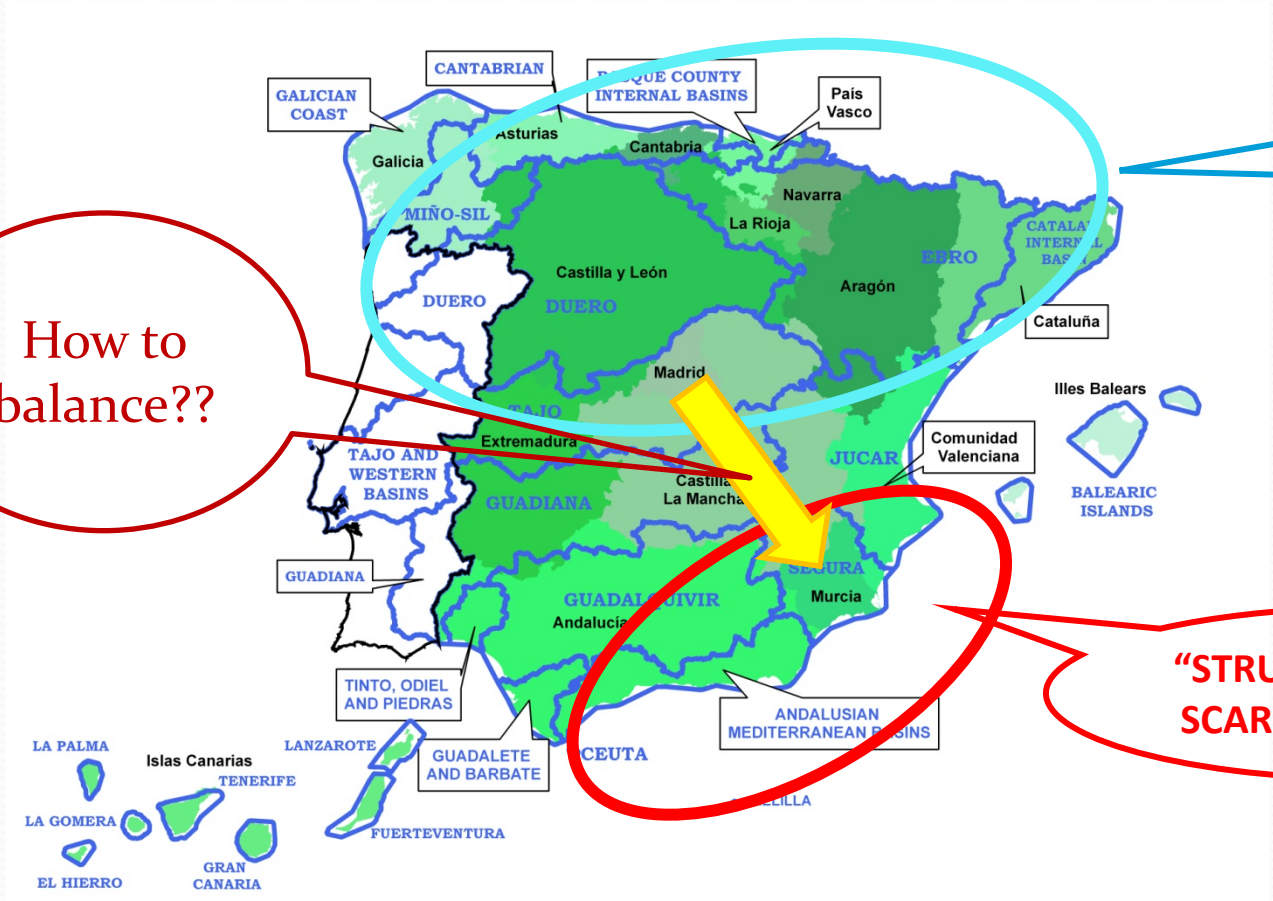
- 1985 Water Act reformed to adapt to changing priorities and evolving EU legislation (in 2003 transposition of WFD)
- Water management by River Basin Authorities at river basin scale
- Participation of permitted water users
- Water is publicly owned (except some groundwater resources)



Administrative (non-overlapping) boundaries

17 autonomous regions
14+9 river basin regions
14+9 river basin authorities

Dominating discourse in water resources management in Spain



How to balance??

"SURPLUS WATER" RIVER BASINS

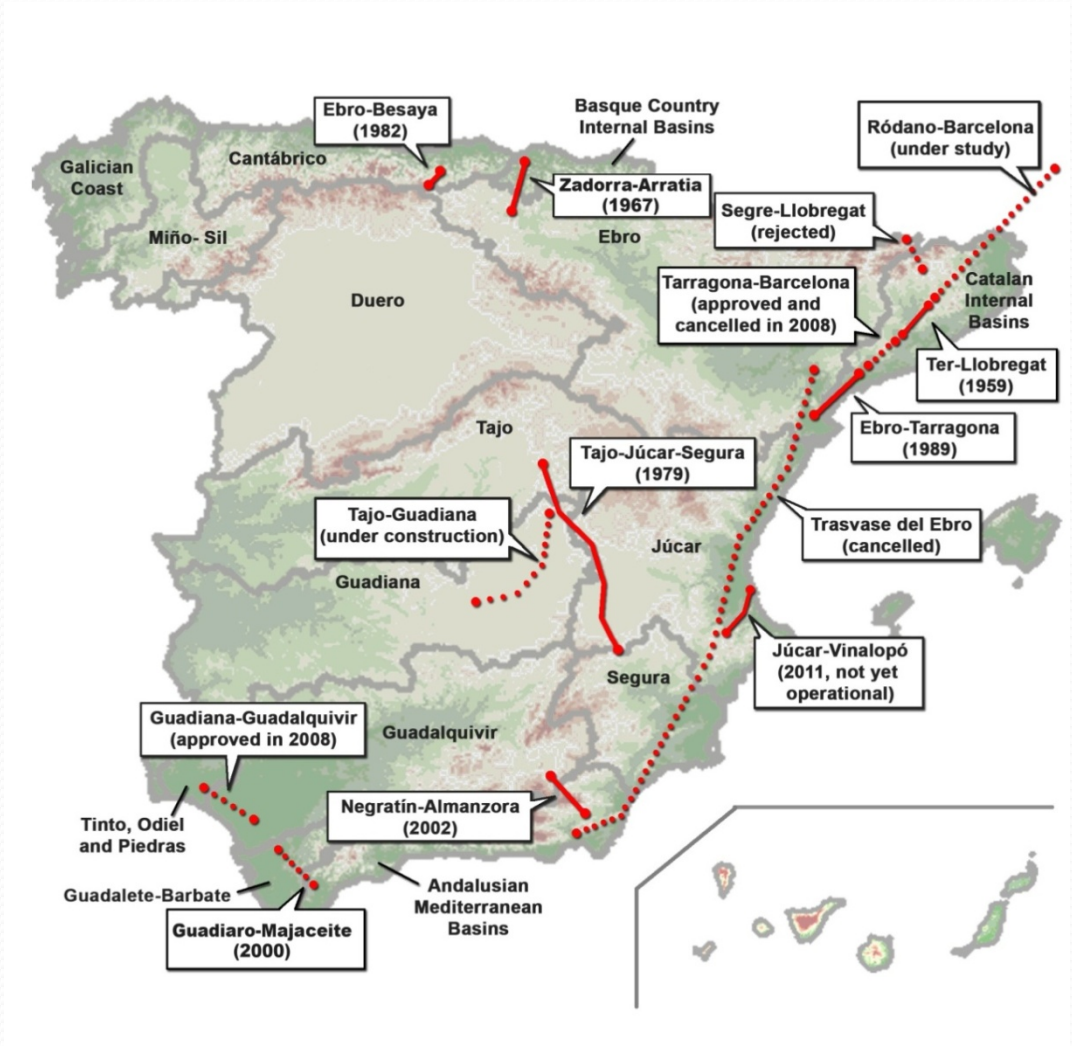
"STRUCTURALLY WATER SCARCE" RIVER BASINS

Administrative mechanisms for water allocation

Spatial scale	Characterization	Legal/administrative instrument	Dominant allocation criteria
International	Spain shares four major river basins with Portugal (40 % of country's territory)	Albufeira Convention	Guarantee hydroelectric production, water supply, flood protection and environmental flows.
Country	Allocation of water resources among river basin districts	National Hydrologic Plan	"National hydrological balance" for economic and territorial strategies
River Basin District	Allocation of water to different users	Basin Hydrologic Plan	Regional economic and sectoral development.
User	Holder of water use rights	Water use permits (*concessions, private groundwater rights, historical irrigators)*	Existing rights

Source: Adapted from Hernández-Mora et al. (2014)

Interbasin water transfers in Spain



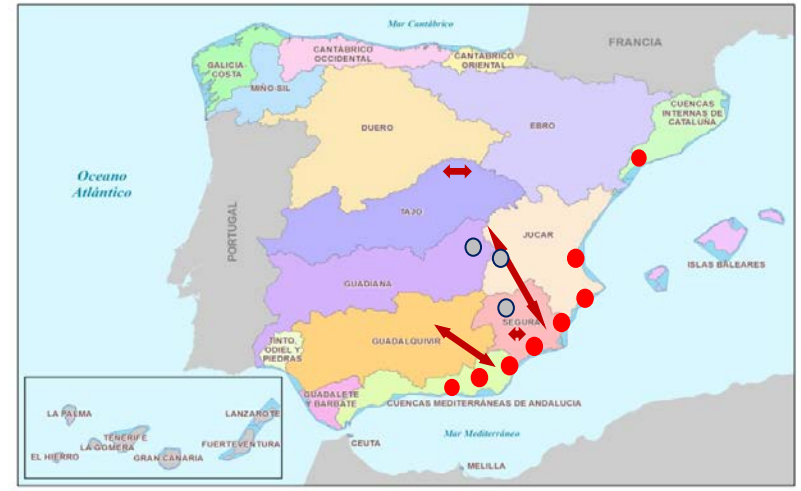
Source: Hernández-Mora et al. (2014)

SOME OBSERVATIONS ON IWT

- They can help solve regional water scarcity problems
- As the geographical scale increases, so do the social, environmental and political implications (& conflicts)
- Often IWT transfer scarcity problems from one basin to another
- The existence of transfer infrastructures can heavily condition water management decisions in both linked river basins
- On average 500 Mm^3 are transferred annually (in California about 10,000 Mm^3)

Water markets in Spain

- 1999 introduction of 2 possible market mechanisms:
  - Public water banks
  - Temporary trading of water use permits
- Highly regulated but progressively liberalized
- Small volumes traded but regionally significant (mostly interbasin permit sales)



Informal water markets
Public water banks
Water use permit trading

Source: Hernández-Mora & De Stefano (2013)

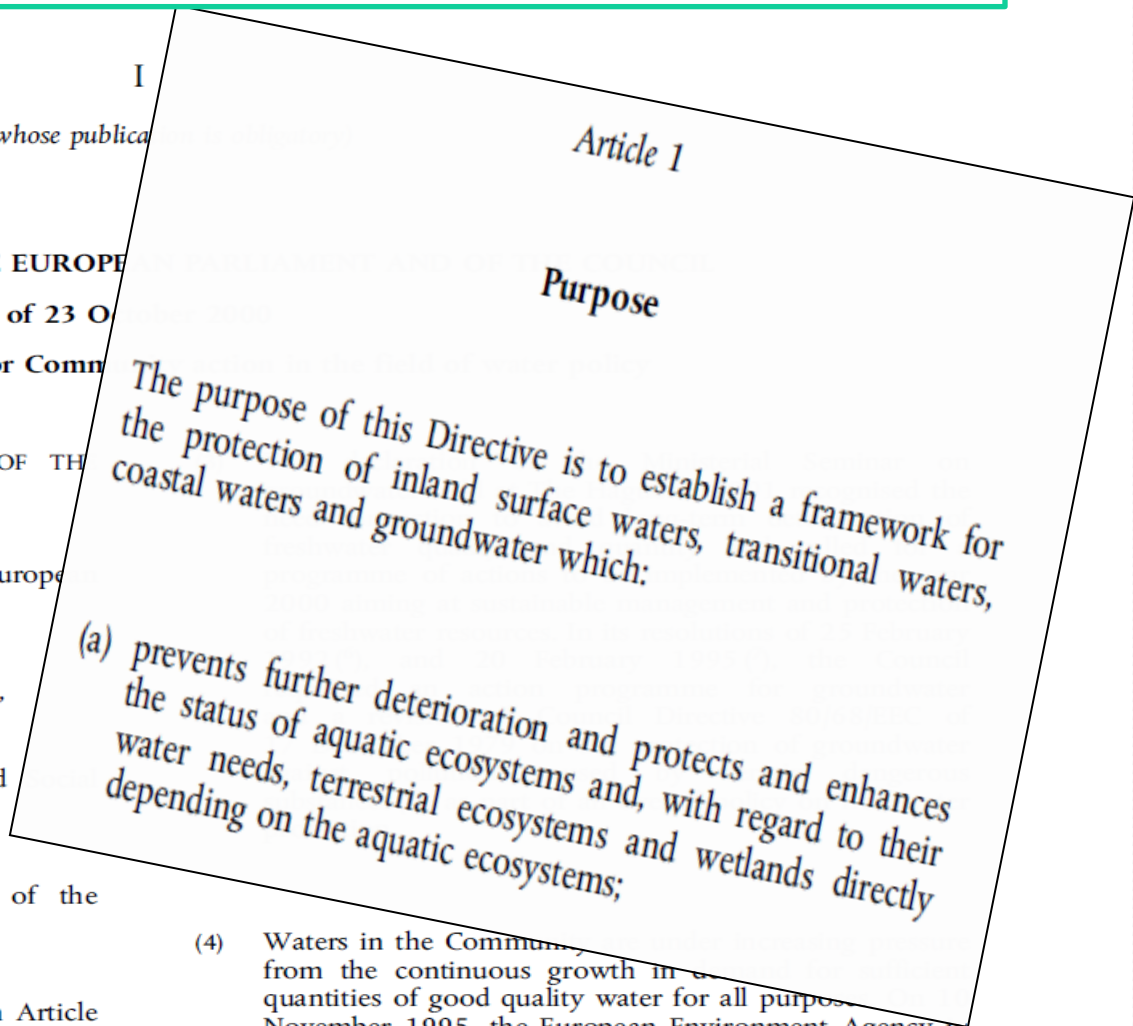
Water trading in different river basins in 2007 (Mm^3)

River basin district	Intra-basin permit sales	Inter-basin permit sales	Public water banks	Volume traded/Total consumption (%)
Guadalquivir		-33.21		0.88
Tajo		- 68.40		2.42
Segura	2.40	+74.50	9.52	4.39
M. Andaluzas	0.90	+ 33.21		2.55
Júcar		- 6.10	126.00	4.21
Guadiana			3.00	0.42

Source: Palomo and Gómez Limón (2013)

DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 Oct. 2000
establishing a framework for Community action in the field of water policy

'Water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such' (Statement 1, WFD)



I

(Acts whose publica

DIRECTIVE 2000/60/EC OF THE EUROPE

of 23 O

establishing a framework for Comm

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF TH
EUROPEAN UNION,

Having regard to the Treaty establishing the Europe
Community, and in particular Article 175(1) thereof,

Having regard to the proposal from the Commission (1),

Having regard to the opinion of the Economic and
Committee (2),

Having regard to the opinion of the Committee of the
Regions (3),

Acting in accordance with the procedure laid down in Article

Article 1

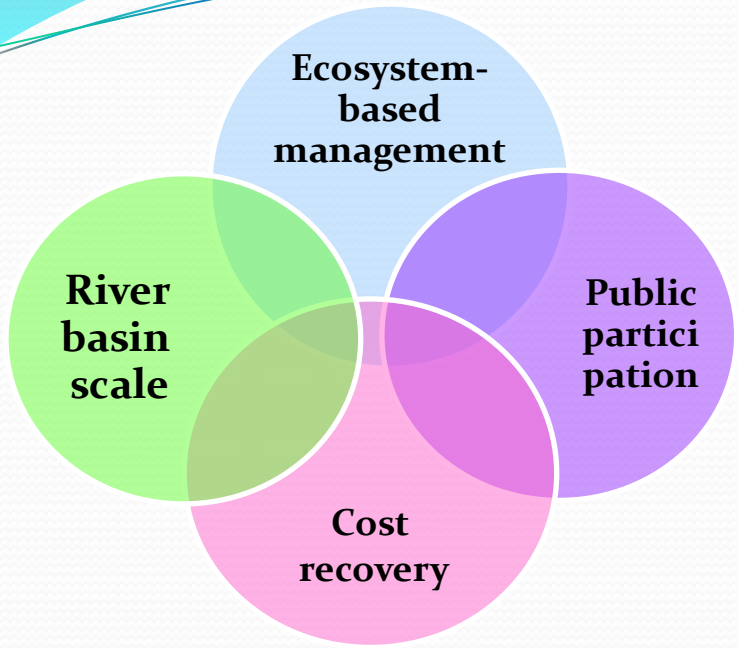
Purpose

The purpose of this Directive is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater which:

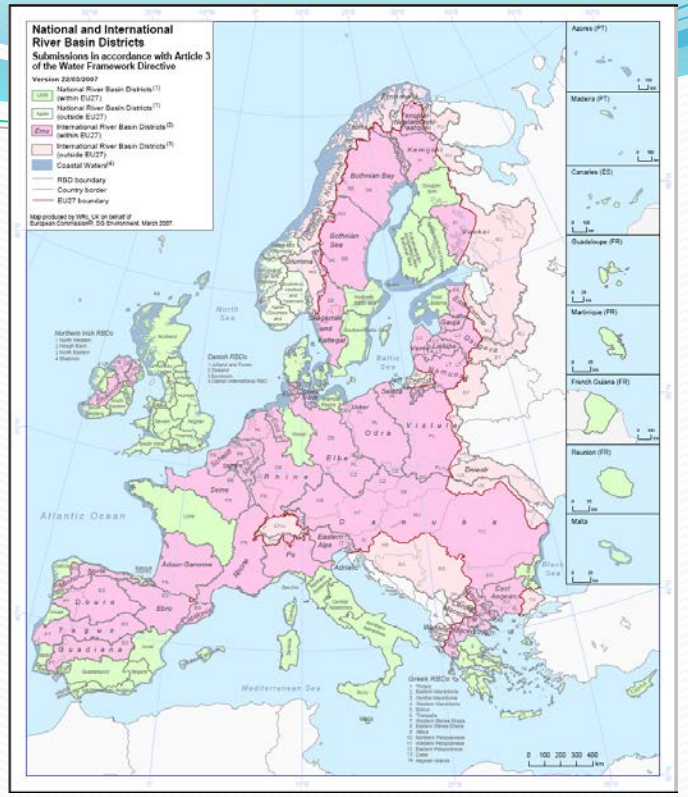
(a) prevents further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems;

(4) Waters in the Commu
from the continuous growth in
quantities of good quality water for all purpo
November 1995, the European Environment Agency

The building blocks of the WFD



THE RIVER BASIN AS THE UNITY FOR HYDROLOGICAL ANALYSIS AND WATER GOVERNANCE



WFD ECONOMICS: Cost Recovery & polluter pays

Article 5:
Economic analysis of water use

Article 9:
Water pricing policies that encourage efficient use

'adequate contribution' from water uses to water service costs

Member States shall take account of the principle of recovery of the costs of water services, including environmental and resource costs, having regard to the economic analysis conducted

INFORMATION & PUBLIC PARTICIPATION REQUIREMENTS

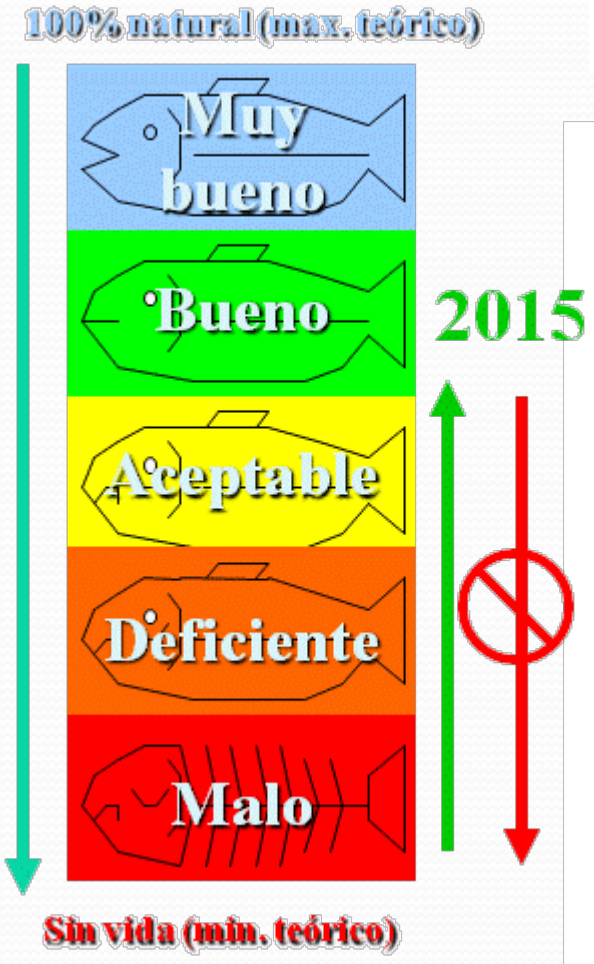
Whereas 14,

The success of this Directive relies on close cooperation and coherent action at Community, Member State and local level as well as on information, consultation and involvement of the public, "including users".

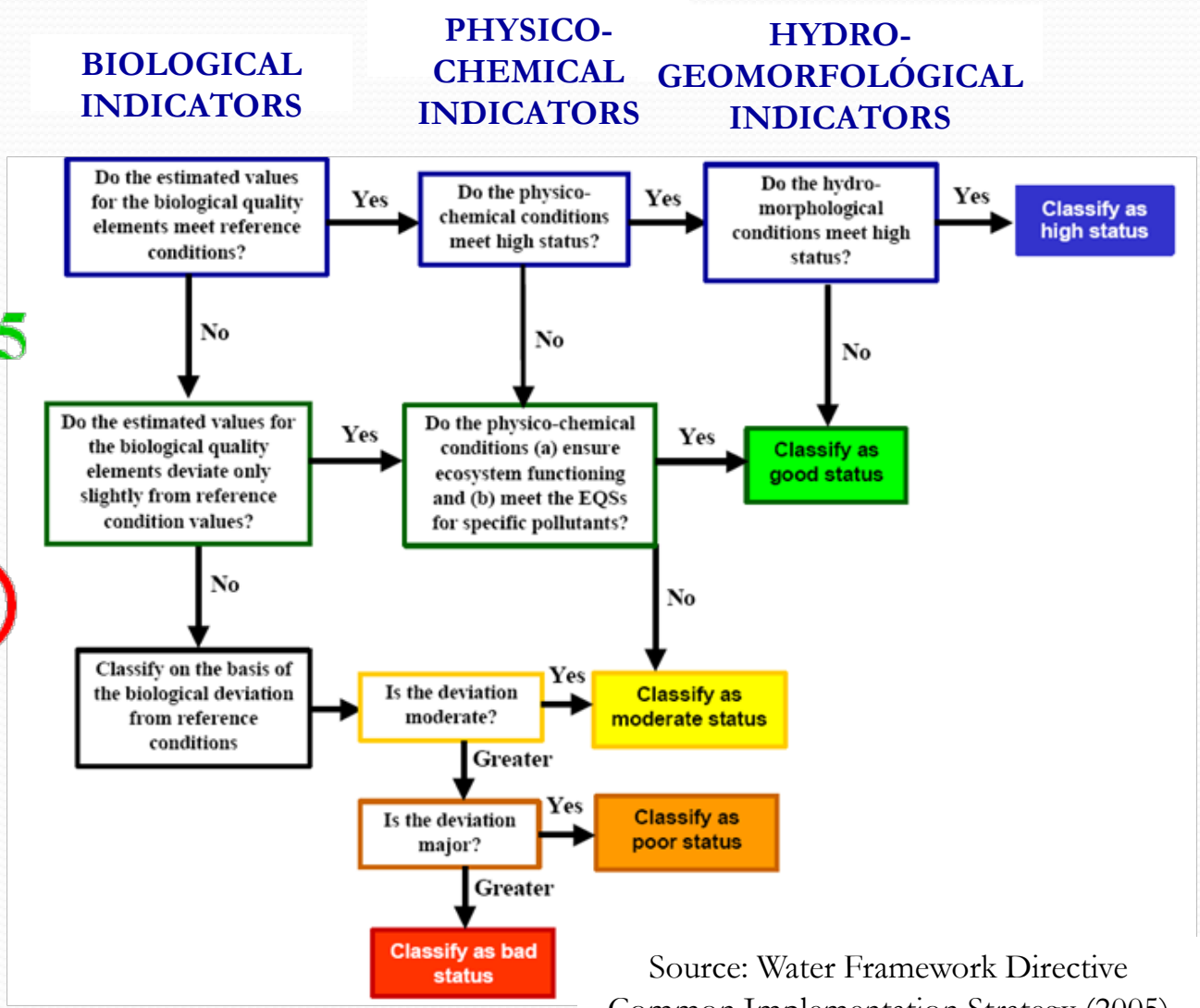
Article 14 Public information and consultation

1. Member States shall encourage the active involvement of all interested parties in the implementation of this Directive,

WFD Planning: Determining status and management goals

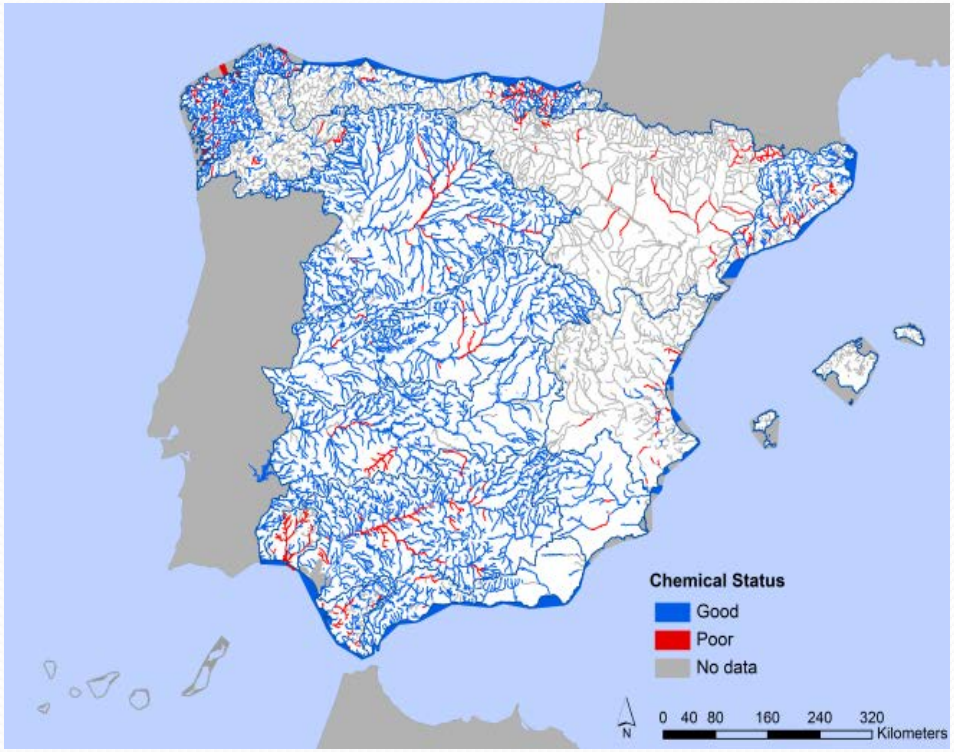


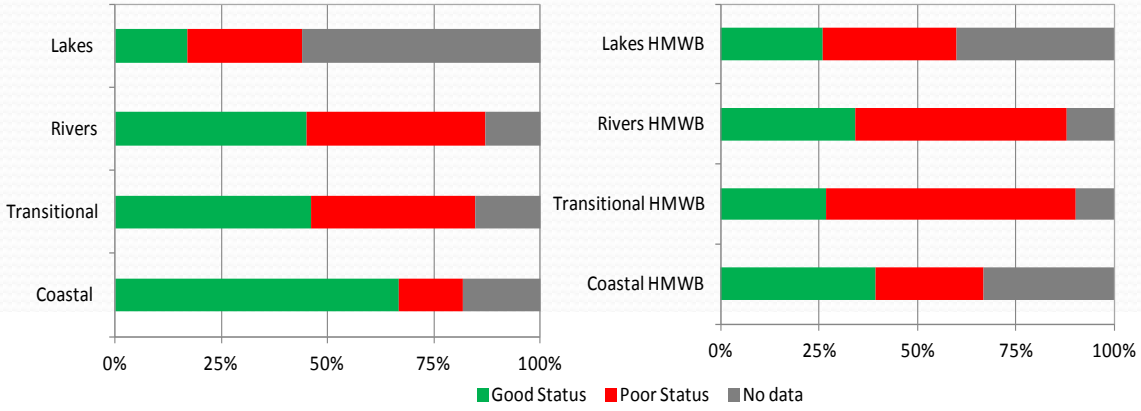
Fuente: Peter Pollard, SEPA citec by D. Howell. SEO/BirdLife



Source: Water Framework Directive Common Implementation Strategy (2005)

Status of surface water in Spain (2009-2015)

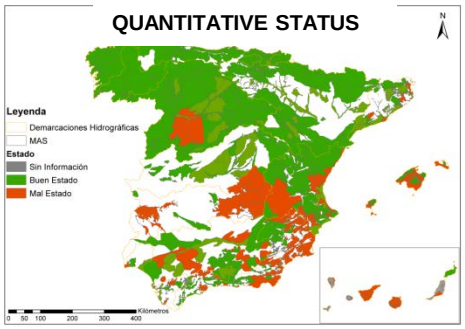


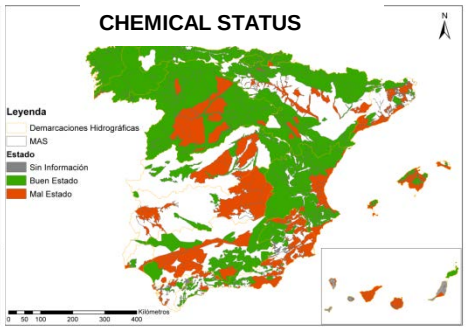


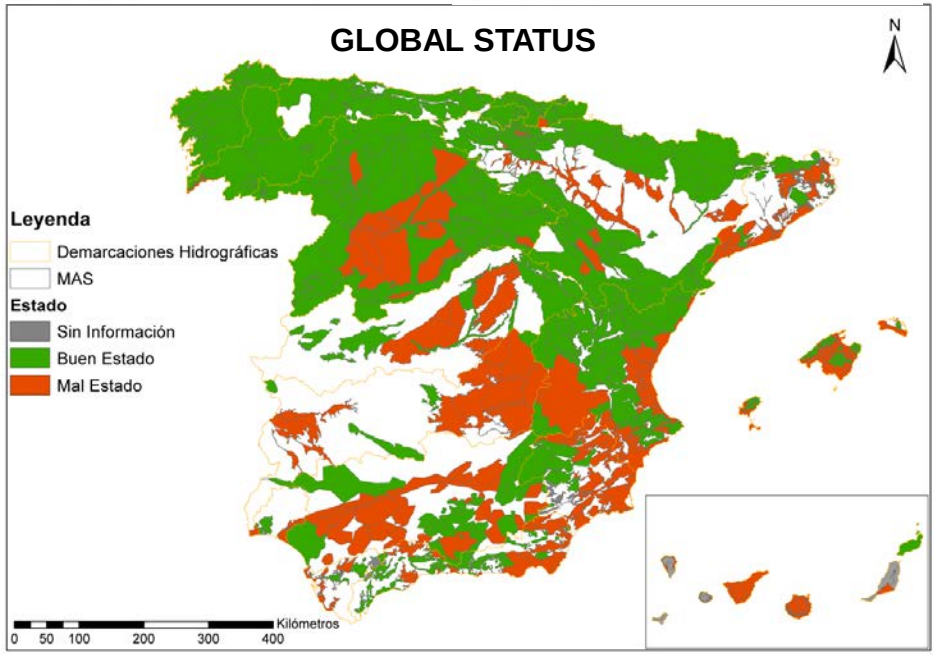
- Less than 50% in good status
- Insufficient information–water bodies with undeterminate status (50% lakes, 20% rivers, 50% chemical status)
- Main challenge is ecological status of surface water bodies

Source: Willaarts, Ballesteros & Hernández-Mora (2013)

Status of groundwater in Spain and planning goals





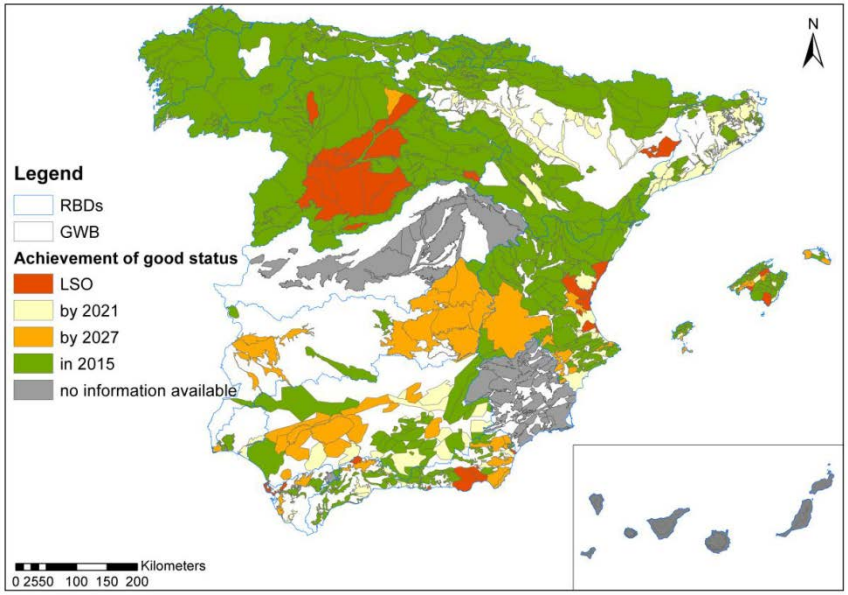


DIAGNOSIS

55% good status

42% less than good (88% poor chemical status)

3% not enough information



PLANNING GOALS (2015/2021/2027)

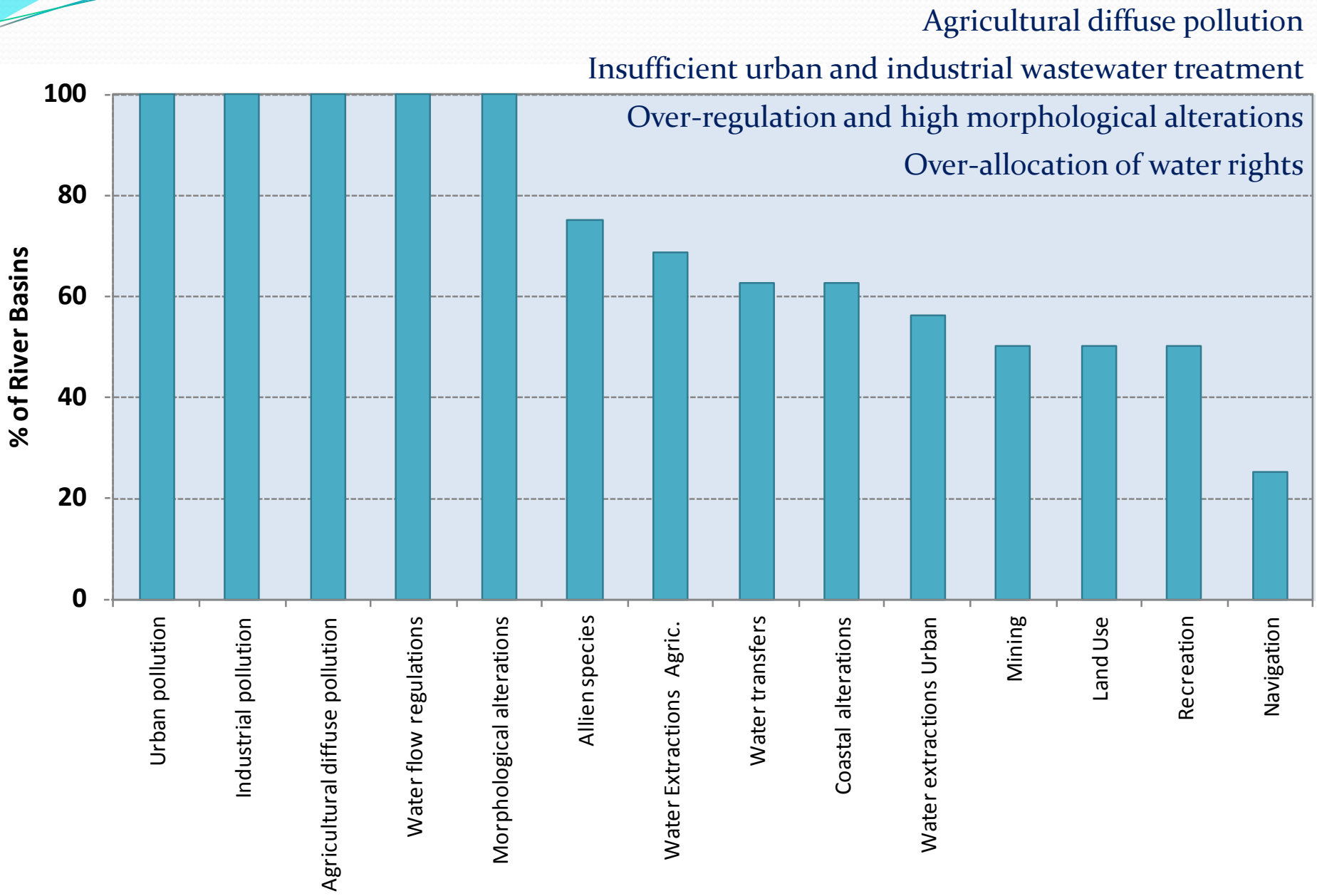
80% in good status by 2027

16% insufficient information

4% less rigorous objectives

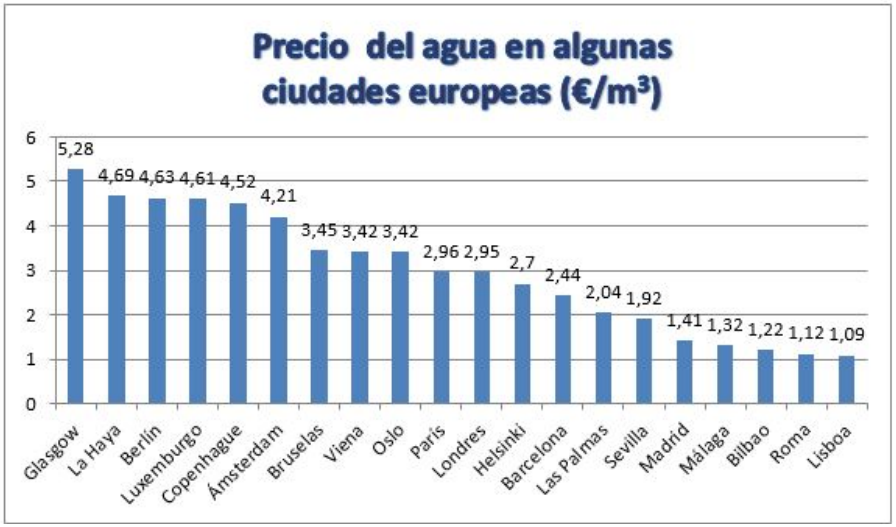
Fuente: De Stefano et al. (2013)

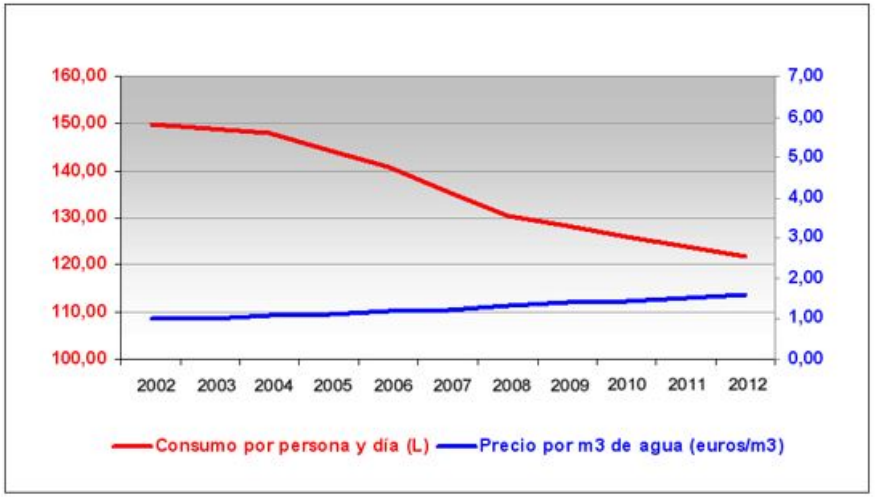
Main pressures on surface water bodies



Water quality & water pricing: A pending challenge

- Cost recovery of urban water services for water supply but not for agricultural uses or wastewater treatment
- Resistance to increase agricultural water pricing
- Resistance to apply the polluter pays principle
- Spain condemned by the EU for non-compliance with wastewater Directive
  - Inadequate wastewater treatment approaches in many cases
  - No more EU funds for wastewater treatment plants
  - Current economic crisis challenges family's ability to pay and access to public funding





Source: AEAS-AGA 2013 (data 2012)

Strengths of Spanish water management & future opportunities

- Improved understanding of the ecological functions and status of continental and coastal waters
- Improved transparency in water resources planning and management
- Cutting-edge scientific and technological innovation
- Long history of planning and well-developed drought preparedness
- Development of non-conventional water sources (desalination, water reutilization…)
- Large agricultural uses that can provide flexibility in water reallocation
- Agricultural sector in a trend to lower consumption, and increased efficiency (energy cost, being a big deterrent) – rebound effect?

Main challenges moving forward

- Need to “catch-up” with WFD implementation program and fully incorporate its goals and philosophy:
  - Incomplete transition from the hydraulic to the sustainability paradigm: river basin management plans have dual and contradictory goals
  - The traditional “water policy community” continues to dominate water management – necessary transition toward open and participatory management approaches
  - Pending integration of sectoral policies and water management
  - Insufficient information and investment in knowledge and governance
- “Patched” water law and enforcement problems (illegal water uses, insufficient monitoring and control, etc.)
- Inter-regional water-related conflicts exacerbated by the political instrumentation of water policies and a continued focus on supply augmentation

References cited

AEAS-AGA 2013 El agua en España: Estudio 2013. Available at:

De Stefano, L. (2013) Easier said than done? The establishment of baseline groundwater conditions for the implementation of the Water Framework Directive in Spain. *Water Resources Management*

Hernández-Mora, N., L. del Moral, F. La Roca, A. La Calle, y G. Schmidt (2014) Interbasin water transfers in Spain. Interregional conflicts and governance responses. In: "Globalized water: A question of governance" G. Schneider-Madanes (ed). Dordrecht, Springer. Pp: 175-194.

Hernández-Mora, N. y L. De Stefano (2013) Los mercados informales de agua en España: Una primera aproximación. In: A. Embid Irujo (dir), *Usos del agua. Concesiones, autorizaciones y mercados del agua*, Thomson-Reuters, Cizur Menor, pp. 375-407.

Palomo and Gómez Limón (2014) El papel de los mercados como instrumento para la reasignación del agua en España. *Agua y Territorio* 2:78-92.

Willaarts, B., M. Ballesteros y N. Hernández-Mora (2014) Ten years of the Water Framework Directive in Spain: An overview of the ecological and chemical status of surface water bodies. In: Martínez-Santos P., Aldaya M.M. & Llamas MR (eds), *Integrated Water Resources Management in the 21st Century: Revisiting the paradigm.* CRC-Press, pp: 99-120.

Thank you very much

Nuria Hernández-Mora
Universidad de Sevilla

Lucia De Stefano
Universidad Complutense, Water Observatory, Fundación Botín

Alberto Garrido
Universidad Politécnica de Madrid, and Water Observatory-Botin Foundation

Barbara Willaarts
CEIGRAM-Universidad Politécnica de Madrid, Water Observatory-Botin Foundation