Kos, 6th September 2007

WATER AGENDA (LIFE04/ENV/GR/000099)
EURO-MEDITERRANEAN COOPERATION NETWORK

Sustainable Water Management in Spain: steps forward to implement WFD in Catalonia

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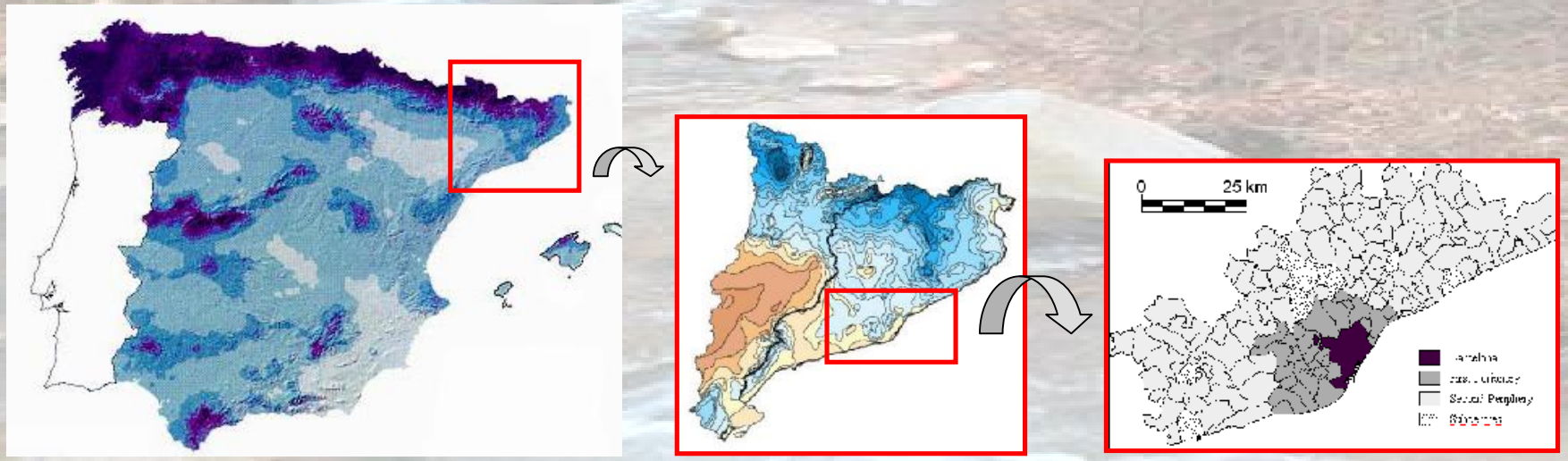
2. Contributors & Technical data
3. Theoretical and Methodological approach
4. SPANISH CONTEXT: Past and present of water management
5. WATER MANAGEMENT IN CATALONIA: Implementation of WFD
7. Conclusions


Foto: David Carrera

TECHNICAL REPORT: SPANISH CASE STUDY

OBJECTIVE

To elaborate a report under an **integrated assessment** approach (interdisciplinary perspective), considering the context of water management at **national level** (Spain), and focussing on the implementation of **WFD** and **Agenda 21** in **Catalonia**, particularly on the **Internal Basins of Catalonia** (WDIBC), and the **Metropolitan Region of Barcelona**.



National Level **Regional Level** **Local Level**

Multi-scale / Multi-level approach

TECHNICAL REPORT

WHO PARTICIPATES? Interdisciplinary group (16 contributors)

Experts in Natural Sciences: Biophysical Environment, Water Resources (Surface-, Ground-, Coastal Waters), Pressures and Impacts.

Experts in Social Sciences: Institutional frames, Water Regimes, Legislation, Economy, Public Participation, Social movements, Social Learning, Water conflicts.

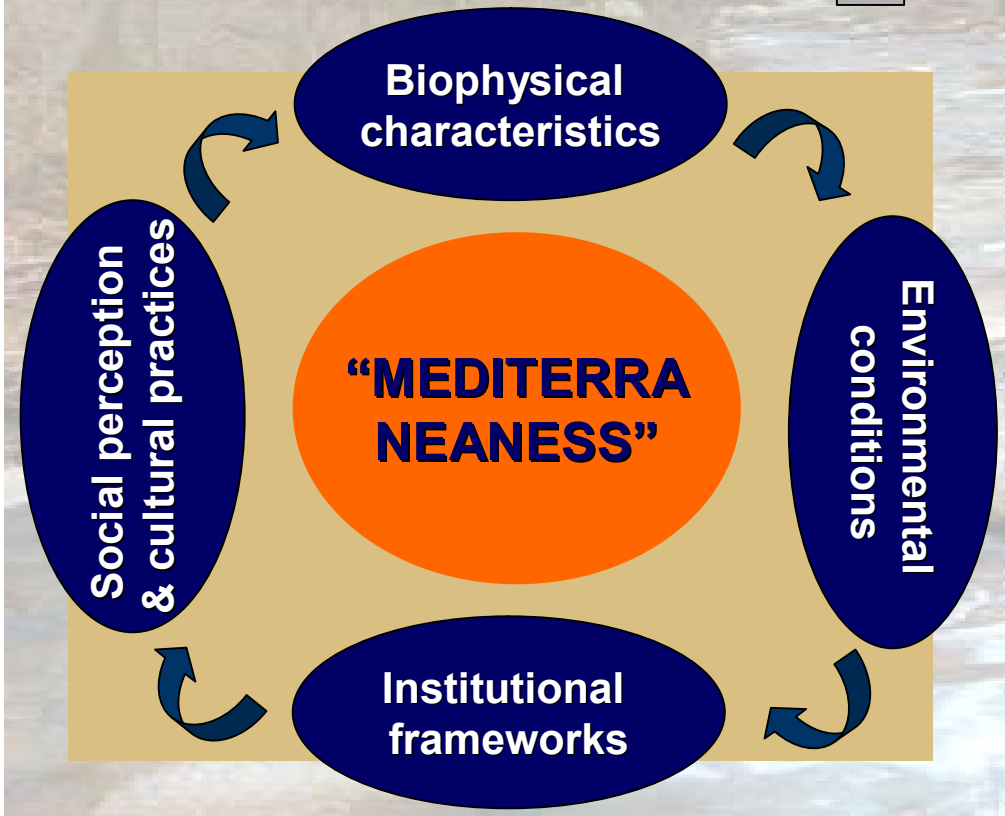
Experts in Urban Water Management: Water demand-supply in urban areas

Experts in Water Technology: Desalination

TECHNICAL DATA

- 133 pages
- 13 Case Studies (National, Regional & Local)
- 15 Boxes
- 60 Figures
- 30 Tables

THEORETICAL and METHODOLOGICAL APPROACH



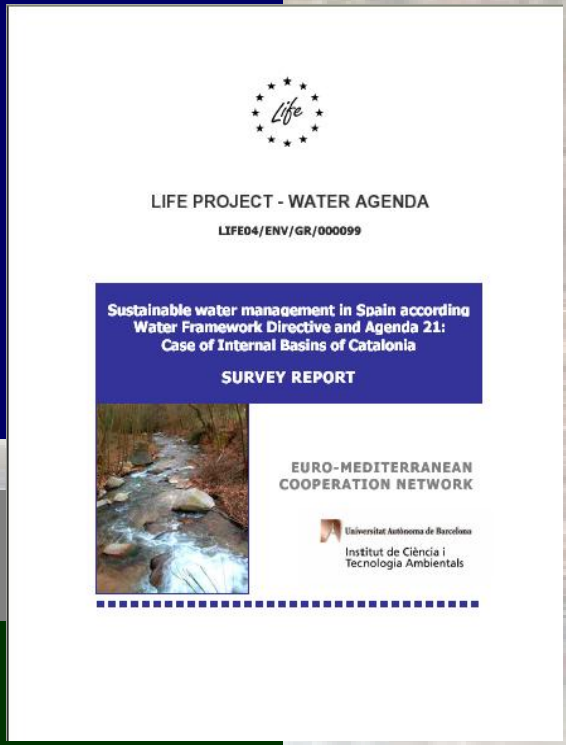
Key Sustainability issues in Mediterranean regions

- Level of Exploitation of water resources
- Role of Agriculture
- Water Quality/Quantity and Ecosystems
- Water Demand Measures
- Desalination and Wastewater
- Institutions and Legal systems
- Reallocation issues
- Water services in urban areas
- Risk Planning
- Transboundary River Basins / Aquifers

SPANISH CONTEXT - CATALAN CASE

SPANISH CONTEXT: PAST AND PRESENT OF WATER MANAGEMENT

1. Environmental Conditions
2. Socioeconomic aspects
3. Regulative frame
4. Water Regime
5. Institutional framework
6. Water Policies and Practices (Planning)
7. Towards implementation of WFD



WATER MANAGEMENT IN CATALONIA: IMPLEMENTATION OF WFD AND AGENDA 21

1. Environmental and Socioeconomic Conditions
2. Institutional framework of water management
3. Urban Water Management
4. Implementation of WFD in Internal Basins of Catalonia

SPANISH CONTEXT: PAST AND PRESENT OF WATER MANAGEMENT

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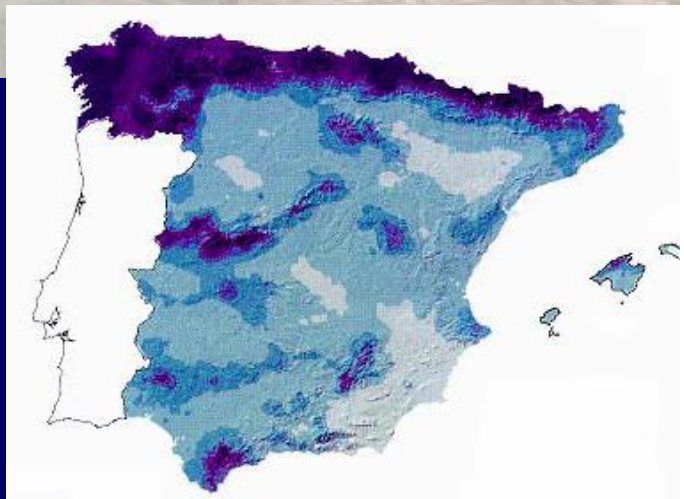
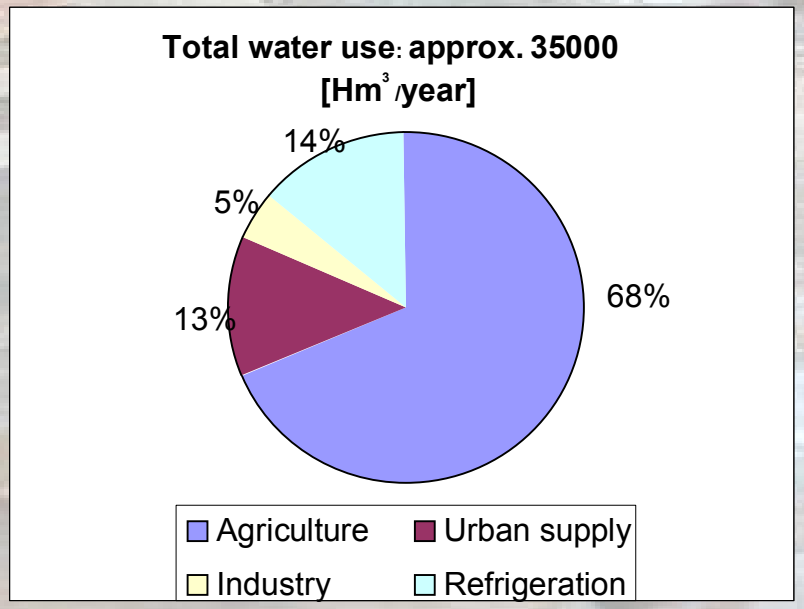
Environmental & Socioeconomic conditions

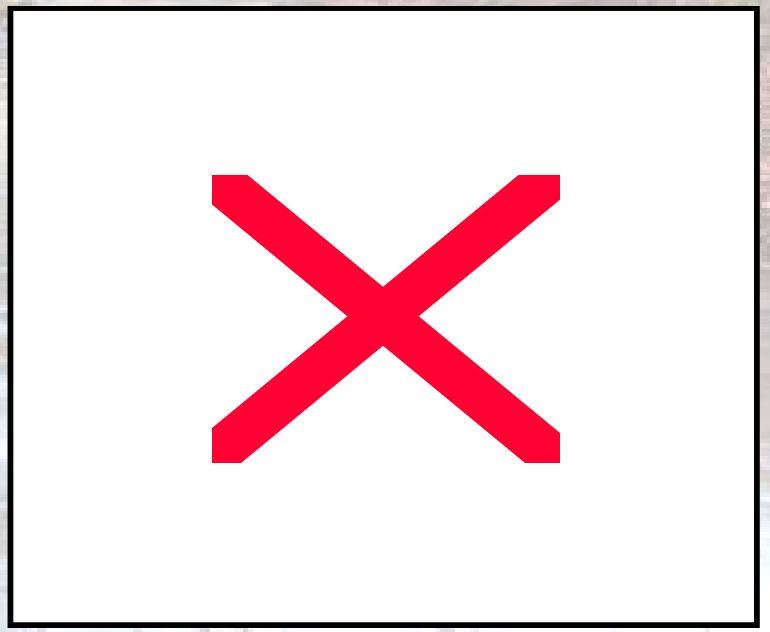
- Dry Spain vs Humid Spain
- Complex and diverse hydrological network
- From transboundary RB to small non-perenneal streams (mainly on the Mediterranean coast)
- Biodiversity richness: 124 different habitats (65% of total for Europe) > wetlands (e.g. protected areas for birds – 49 RAMSAR areas)



Environmental & Socioeconomic conditions

- Agriculture -> 70% of water uses
- Urbanisation and Tourism activities: linked to coastal areas and freshwater courses
- Surface water is the principal source of water supply (83%)





Environmental & Socioeconomic conditions

CASES STUDY

CASE STUDY 1: Virtual water exportations in intensive irrigated agricultural arid regions. GRANADA & ALMERIA (ANDALUSIAN REGION)

CASE STUDY 2: Desalinated water for tourist services. LANZAROTE (CANARY ISLANDS)

CASE STUDY 1: Virtual water exportations in intensive irrigated agricultural arid regions. GRANADA & ALMERIA (ANDALUSIAN REGION)

Context: main background information

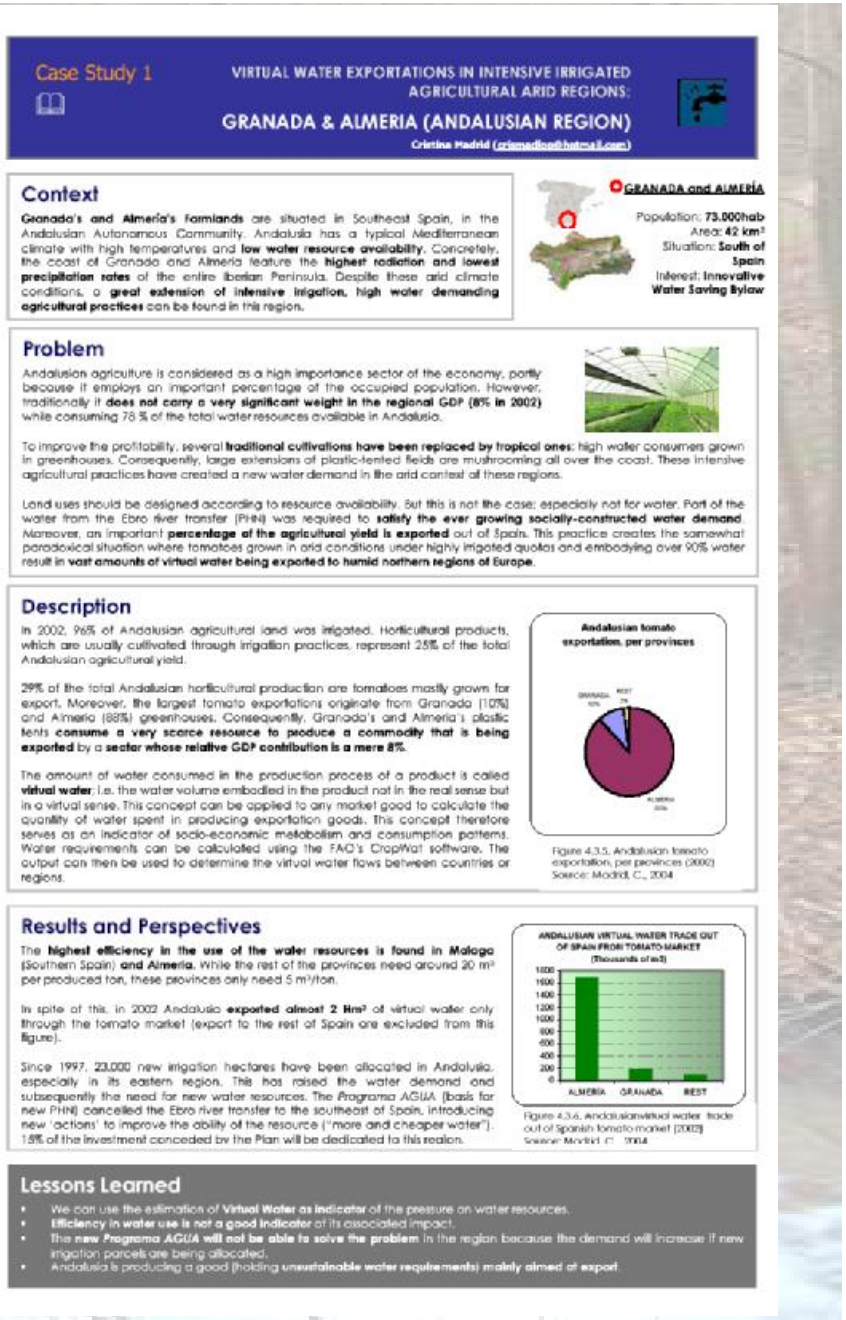
Problem: which is the conflict/problem/constraint?

Description: how was it dealt?

Results and Perspectives

Lessons Learned:

- We can use the estimation of **Virtual Water** as **indicator** of the pressure on water resources.
- **Efficiency** in water use **is not a good indicator** of its **associated impact**.
- The **new Programa AGUA will not be able to solve the problem** in the region because the demand will increase if new irrigation parcels are being allocated.
- Andalusia is producing a good (holding **unsustainable water requirements**) mainly aimed at **export**.



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Regulative Frame and Water Regime in Spain

Transposition process of the WFD into Spanish law: CRITICS

- **Public participation** process during the planning process and implementation of the WFD is **lacking**, and still based on the principle of participation of **users** instead of participation of all **interested persons**.

- The determination of the **technical conditions** defining the state of each **water body**, as well as their classification criteria are missing. Transposition of many **annexes** of the WFD has been **omitted**.

- Some of the **deadlines** established by the WFD are **omitted**.

- **Coastal waters** are **not sufficiently integrated** in the management of the water district

Source: WWF, 2004.

CASE STUDY 4 : The transformation of the traditional *Huerta* of Mula into an innovative and efficient irrigation system. MULA (MURCIA)

Institutional Frame

River Basin Authorities (*Confederaciones Hidrográficas*)

Presently **14 RBA** exist in Spain:

- **9** River Basin Authorities for the main interregional basins;
- **3** intra-regional water authorities for small rivers in Catalonia, Basque Country and Galicia;
- **2** Insular Water Authorities in the Balearic and the Canary Islands.

The **Ebro** and the **Segura River Basins** where the first River Authorities created (**1929** and **1931** respectively)

Irrigators Communities (IC)

There are around **6200 Irrigators Communities** included in the census

- **Objectives**:
  - Administration of public waters.
  - Distributing their flows.
  - Settling disputes between “commoners” (farmers) or other stakeholders.
  - Acting as policy enforcers.

Water policies (planning) and practices

Spanish Hydrological Plan (PHN) vs Programa A.G.U.A

New Water Culture

From SUPPLY- to DEMAND-based strategies

CASE STUDY 4 : The desalination technology: Brief guided tour

CASE STUDY 5 : Gender and social movements. A look at the participation of the women in the platform for the defence of the River Ebro. Terres de l'Ebre (South of Catalonia)

Towards the implementation of WFD in Spain

Pilot River Basin: JUCAR

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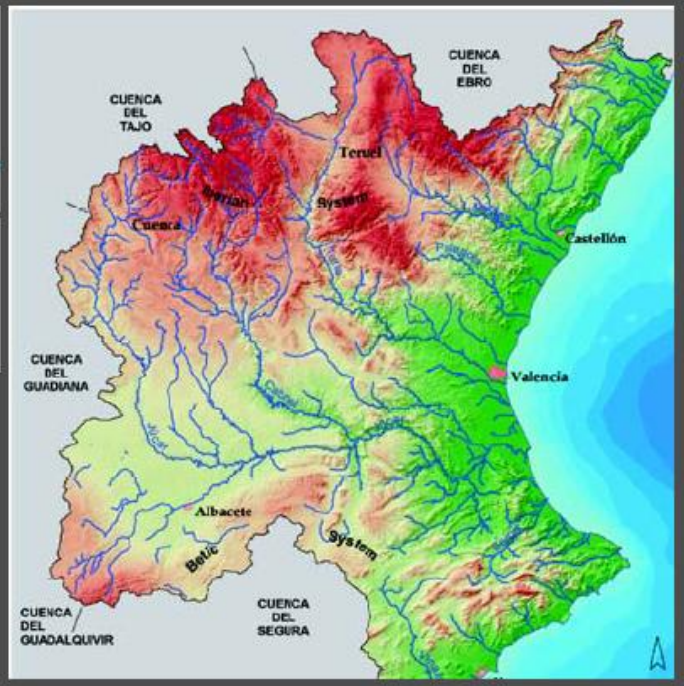

Figura 4.6.1. Jucar Pilot River Basin
Source: CHJ, 2004

WATER MANAGEMENT IN CATALONIA: IMPLEMENTATION OF WFD AND AGENDA 21

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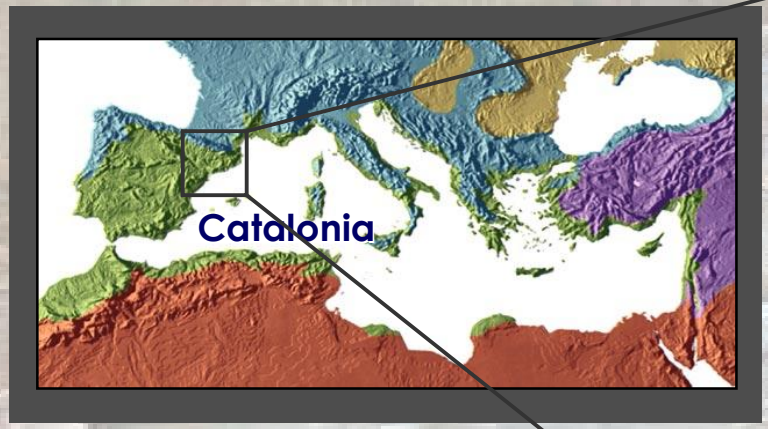
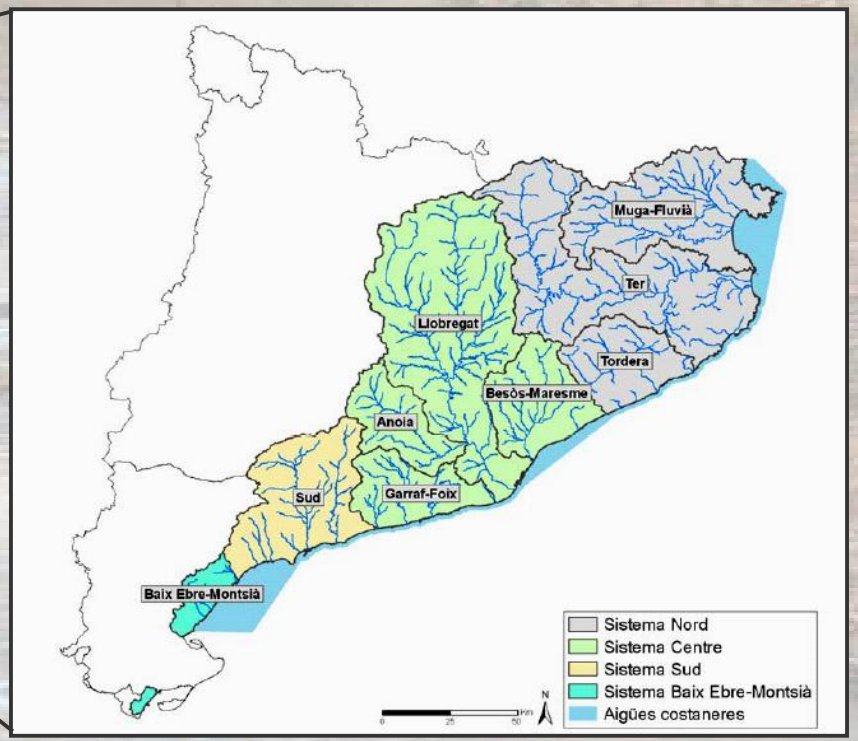
Water Management in Catalonia: Introduction





Water District of the Internal Basins of Catalonia (WDIBC)

River Basin Authority:
Agència Catalana de l'Aigua (Catalan Water Agency)

Environmental and socio-economic conditions

Characteristics

Population:	**Catalonia:**	**6,813,319**
	WDIBC:	**5,700,000**
	MAB:	**4,200,000**
Activities:	**Tourism**	
	Industry	
	Agriculture	

Precipitation: 450 to >1250 mm/yr

Water uses

Domestic (44%)	**518.8 hm³/yr**
Agriculture (35%)	**416,2 hm³/yr**
Industrial (21%)	**251.5 hm³/yr**
TOTAL	**1186.4 hm³/yr**

The black line indicates the limit between the Water District of the internal River Basins of Catalonia (to the east) and the Catalonian part belonging to the Water District of the Ebro river (to the west).

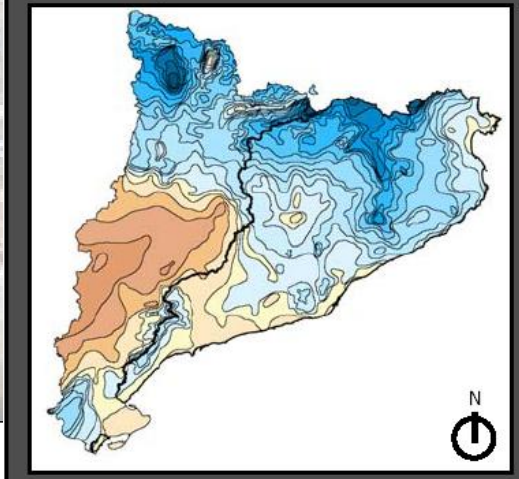
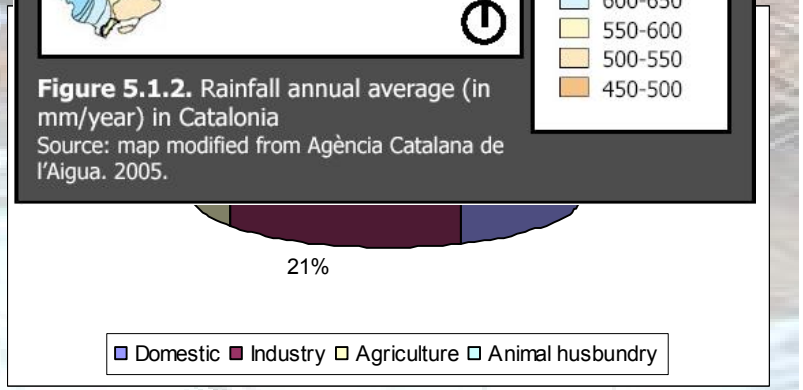
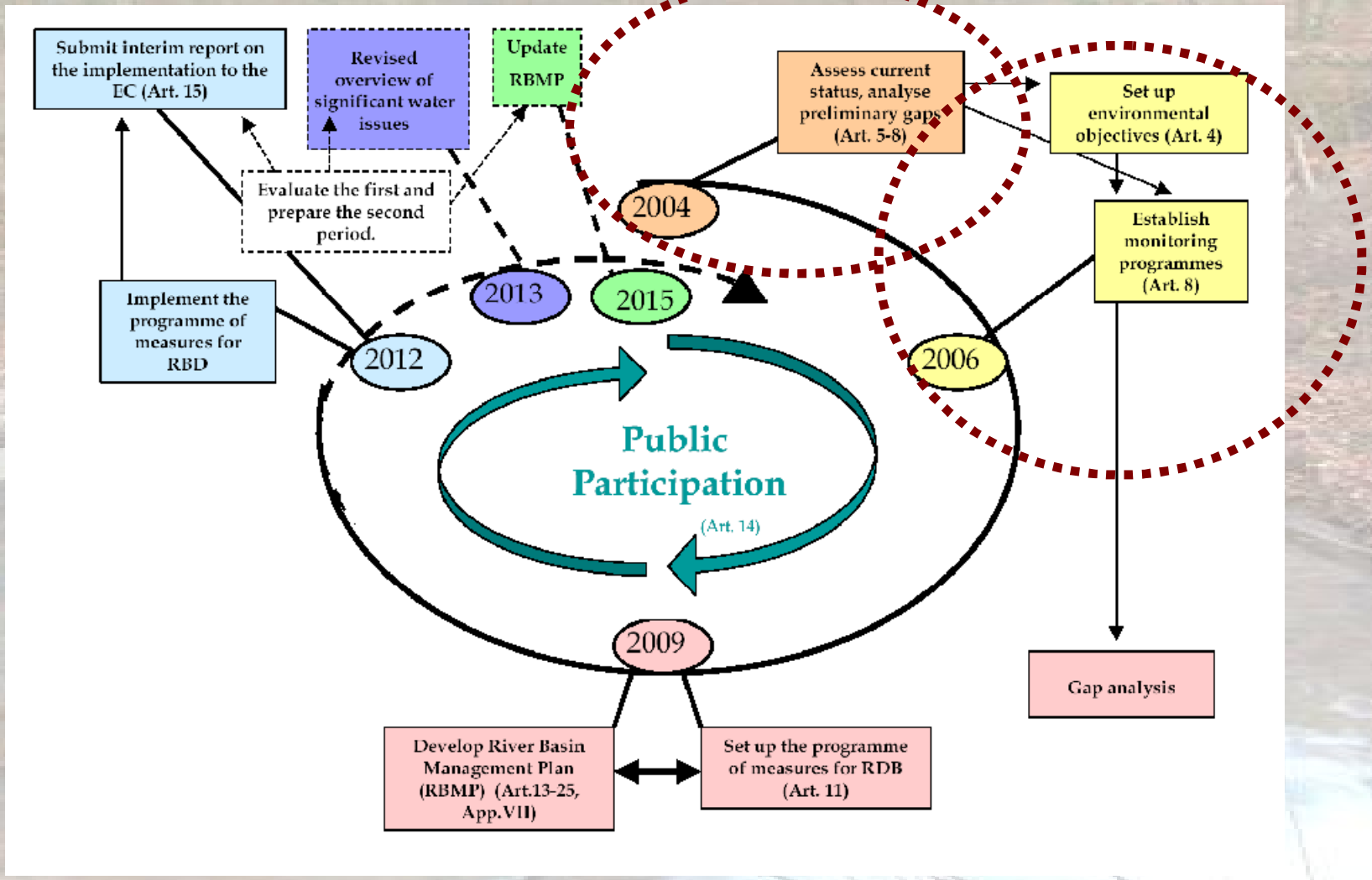


Figure 5.1.2. Rainfall annual average (in mm/year) in Catalonia
Source: map modified from Agència Catalana de l'Aigua. 2005.



Implementation process of WFD



Ecological Status of Water Bodies in IBC

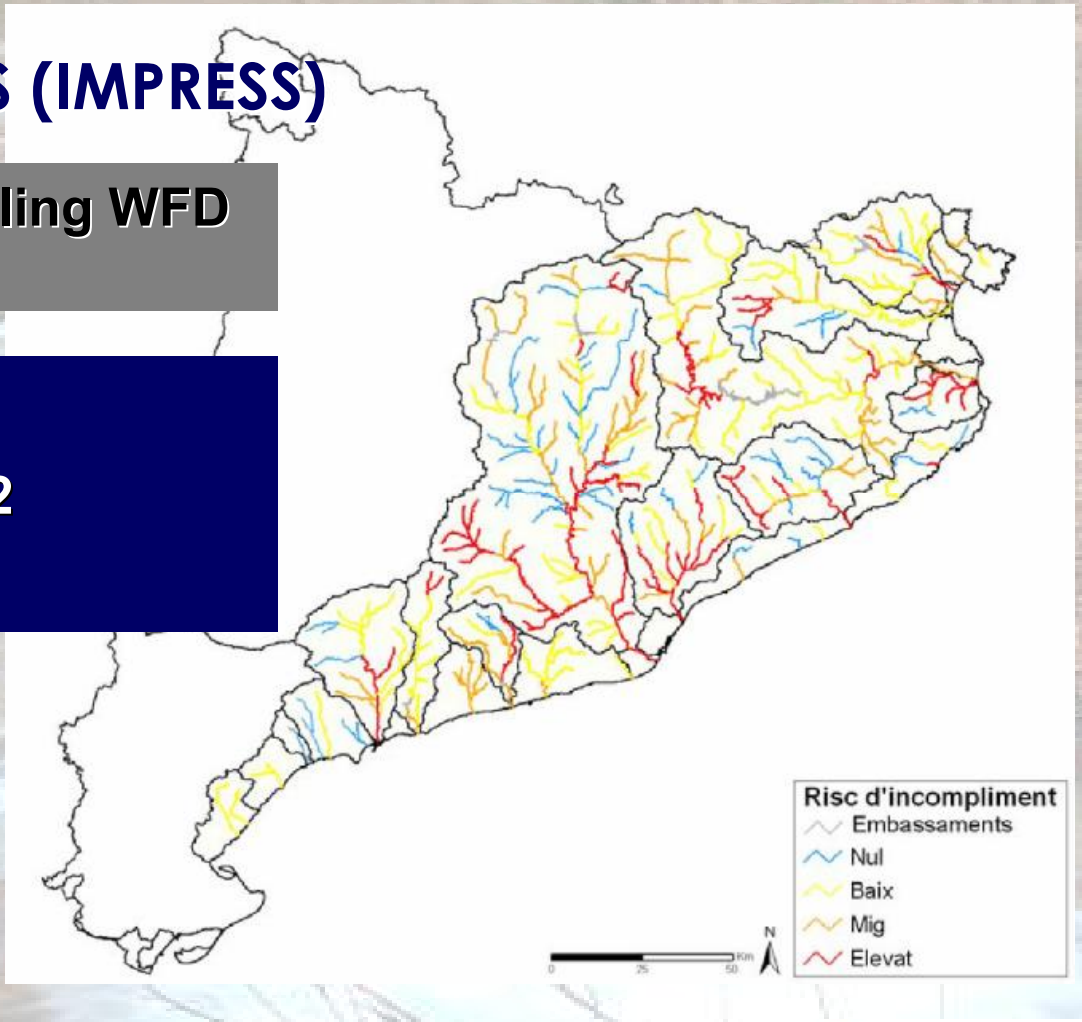
PRESSURES & IMPACTS (IMPRESS)

Medium or High risk of failing WFD goals

Rivers: 67% of 247

Coastal waters: 54% of 32

Goundwaters: 64% of 39



Full Cost Recovery in Internal Basins of Catalonia

COST RECOVERY

1. **Private Services: 100%**
   (domestic supply)
2. **Public Services (Municipalities, RBA):**

- **Environmental Costs: 50%**
- **Water Treatment: 25%**

Future Investments in water sector in IBC

	Capacity hm3/year	Invest (10€)	Unity Cost 10€/hm3
Mesures to increase availability of water resources			
Improve eficiency of exploitation of current water res	23.8	97	1.04
Improve current systems of water production	20	46	2.3
Reutilisation	11	91	8.27
Improve of groundwaters (quantity & quality)	18	22	1.22
Desalination	70	201	2.87
Connection and Improvement of current infrastructures		314	
Mesures to improve quality of water			
Water Treatment Plants (improve existing and build)		168	
Remediation of salinated discharges of Llobregat river		90	
River restoration		131	
TOTAL		1160	

Future investments to improve water supply and water quality in Internal Basins of Catalonia

90% of budget to improve water supply and water quality in IBC are destinated to **infrastructure**. Only **10%** for **river restoration** and no budget to reduce **water demand** and **public participation**.

PUBLIC PARTICIPATION

Participatory process to validate the diagnosis of pressures and impacts (IMPRESS), and to design the measures programmes (Management Plans)

River basin Councils (16 in IBC)

Participation Processes

Pilot programmes (2006-2007) in:

- **Ter River Basin**
- **Gaia-Francolí River Basin**

Successful participative processes to validate Pressures and Impacts

Not full consensus in the definition of proposals to implement the measures programme

Conclusions

- The survey report elaborated was an interdisciplinary effort to put forward an overview of the Spanish water management practices.
- Catalan government and stakeholders has make an important effort to improve the former situation of lacking of relevant data (Pressures & Impacts, and Monitoring Plan), and adequate participation processes (RB Councils).
- A broader scope (social wide agreement) based on the compromise is necessary to face current challenges on water issues in the Mediterranean region.
- We hope this contribution of information, experience and know-how on water management and the demonstration of some good practices and methods in Spain, were of interest to achieve our common objective.

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Many Thanks!

Efharisto para poli!!

Grazie mile!!!

Moltes Gràcies!!!!!

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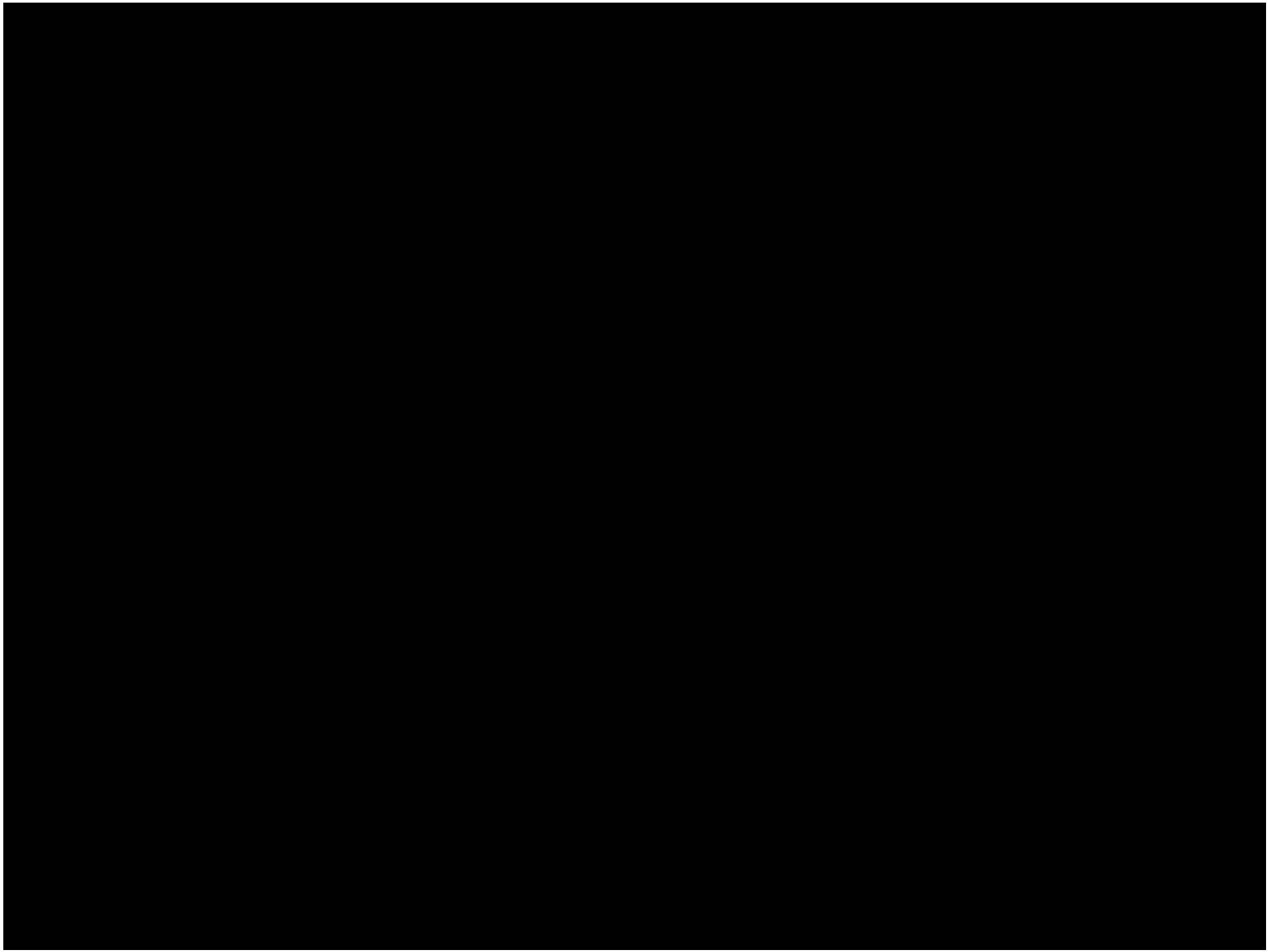


LIFE WATER AGENDA: OBJECTIVES

GENERAL OBJECTIVE

Supporting the development and implementation of **integrated water resources management** policy to Anthemountas river basin in Northern Greece through the application of a public, social wide local agreement, using the principles of **Agenda 21** and **Water Framework Directive (WFD)** 2000/60/EC.

SPECIFIC OBJECTIVE

Establishment of a **Mediterranean network on water management**. The scope of the network will be the information, experience and know-how exchange on water management and the demonstration of best administrative practices and methods.

THEORETICAL and METHODOLOGICAL APPROACH

Multi-Level / Multi-Scale

INTEGRATED ASSESSMENT

Interdisciplinarity

Integrated Water Resources Management (IWRM) vs Integrated River Basin Management (IRBM)

Sustainability

Ecological issues

Social issues

Economical issues

Different Speeds

Complexity

Compromise

Uncertainties

CASE STUDIES / EXAMPLES

LESSONS LEARNT

MEDITERRANEANESS

Urban water management in the MAB

Water demand management

1. Water pricing policies: block-pricing, wastewater tratment levies
2. Educational campaigns: indoor vs outdoor
3. Technological improvements: water saving devices
4. Use of alternative sources: groundwater and recycling for public uses

Future scenarios of water demand in the WDIBC (2025)

Present per capita consumption for domestic use: 212 l/p/d

Scenario 1: Population 10 % increase

Scenario 2: Population 18 % increase

Base scenario: present per capita demand

High water-saving scenario:

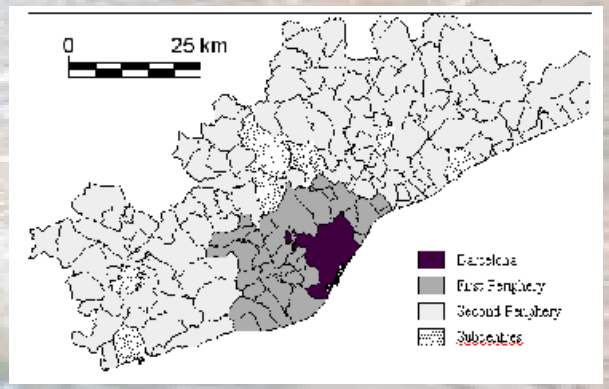
	Base Scenario			High water-saving Scenario		
	Total	Urban	Agriculture	Total	Urban	Agriculture
Scenario 1	10%	12%	7%	0,8%	-0,3%	2,4%
Scenario 2	16%	18%	10%	4,1%	4,8%	2,4%

Urban water management in the MAB

Introduction

Urban sprawl

	Population	Area(km^2)	Density (inhabitant/km^2)	Water supply (hm^3/yr)
Catalonia	6,361,365	32,106	198	2,678
CIC	5,706,812	13,628	343	1,186
MRB	4,390,413	3,241	1,354	500



Sources of water supply

	2002	Planned
Superficial	325	325
Groundwater	175	175
Other sources	0	145
Total	500	645

Implementation of the WFD in the WFIBC Groundwater

Characterization

Characterization based on existing hydrogeological areas used by the water authority since 1992.

Groundwater body- types are classified according to lithology:

- Alluvial
- Detritic of non-alluvial origin
- Carbonated
- Granites and Paleozoic material
- Grouping of local aquifers in low permeability media
- Bodies in volcanic and fluvio-volcanic material

39 groundwater bodies have been defined

Implementation of the WFD in the WFIBC Groundwater

Pressures and impacts

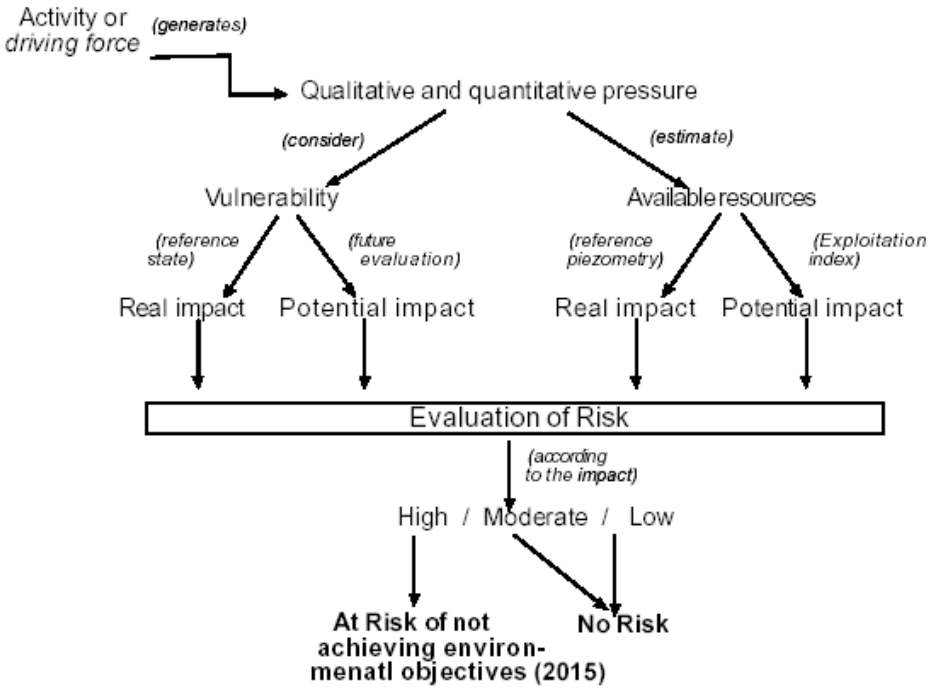
Type	Source	Pressure	Impacts
Diffuse	Agriculture and animal husbandry	Animal defecation	Nitrates of animal origin
		Fertilising and Phitosanitary	Pesticides and nutrients
		Application of sewage sludge	Components of N
		Irrigation returns	Related contaminants
	Sewage network and urban and industrial tanks	Network losses	Salinity, organic matter, microbiologic contamination, other contaminants
Point	Industrial activity	Discharges, lixiviation and losses	Contaminants of Annex VIII of WFD
		Contaminated soils	Specific contaminants of Annex VIII of [illegible]
	Waste management	Industrial, urban and special waste [illegible]	Diverse contaminants
	Underground tanks and deposits	Losses	Hydrocarbons
	Mining activity	Saline	Salinisation
	Wastewater treatment plants	Discharges	Ammonium
	Gravel extraction	Condition of the unsaturated zone	Increase in vulnerability, metals
	borehole	Water extraction	Saltwater intrusion, induced fluxes, reduction of resources

Implementation of the WFD in the WFIBC Groundwater

Risk of not achieving the environmental objectives: methodology

1. **Identify pressures on the chemical status**
2. **Identify the pressure on the quantitative status**
3. **Evaluate the intrinsic vulnerability of the water bodies**
4. **Estimate the potential impact on the chemical status**
5. **Evaluate the proven impact on the chemical status and the quantitative status**
6. **The risk of not achieving the quantitative status is estimated based on the proven impacts and the pressure on the quantitative status**
7. **The risk of not achieving the chemical status is estimated based on the potential impacts and the proven impacts**
8. **The risk that any groundwater body does not achieve the objectives of the WFD exists when either the chemical or quantitative status are at risk of not being achieved.**

RISK?		Real Impact		
		High	Moderate	low
Potential Impact	High	Yes	Yes	Yes
	Moderate	Yes	No	No
	Low	Yes	No	No



Implementation of the WFD in the WFIBC Groundwater

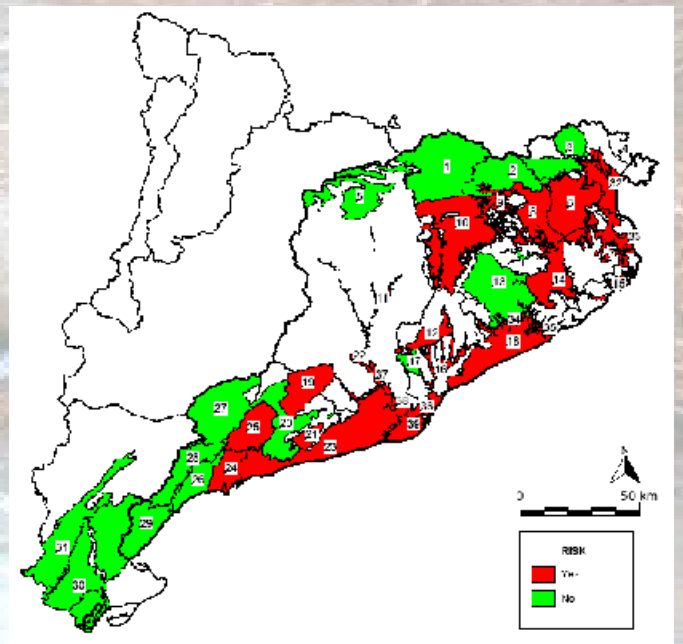
Risk of not achieving the environmental objectives: results

According to the IMPRESS report in the WDIBC the groundwater bodies at risk of not achieving the objectives established in the WFD for 2015 are:

- **25 groundwater bodies (64% of the total) <u>are at risk</u> of not achieving the objectives**
- **14 groundwater bodies (36% of the total) <u>are not at risk</u> of achieving the objectives**

Of these 25 bodies at risk:

- **10 are at risk of not achieving the <u>quantitative status</u> and**
- **23 of not achieving the chemical status. From the latter 14 are at risk due to nitrate contamination from agricultural activities and 7 due to seawater intrusion.**



Implementation of the WFD in the WFIBC Groundwater

Main risks to good status – priorities for actions

1. Nitrates of agricultural and animal husbandry origin
2. Seawater intrusion conducing to elevated concentrations of chlorides in coastal aquifers
3. Ammonium contamination from network losses and discharges to infiltrating rivers
4. Contamination of other specific elements
5. High extraction volumes that induce sinking groundwater levels
6. Extraction of aggregates in alluvial deposits with groundwater levels near the surface

Implementation of the WFD in the WDIBC Surface waters

Main risks to good status – priorities for actions

1. Density of dikes and "azudes", redirection caused by small hydroelectrical energy stations, and modification of water flows.
2. Hydromorphologic degradation, riverside forest overexploitation, and morphodynamic impacts.
3. Biodegradable and industrial point discharges in vulnerable river sections.
4. Diffuse contamination, overload of nitrogen from farms and pesticides (organic contaminants) of agricultural origin.
5. Very low quality of fish populations. Hard introduction of foreign and invasive species, and loss of river habitats.
6. Low biological quality in medium and lowlands in main rivers.
7. Concentration of priority and dangerous substances, some of them still not regulated.

Environmental and socio-economic conditions

Discussion and critics to the IMPRESS-report

- The IMPRESS contains valuable information and is a good effort to comply with the requirements of the European regulation
- Non-equivalent depth of analysis: surface water > groundwater > coastal water
- No analysis of interactions between surface-, ground- and coastal water bodies is fulfilled
- Too often expertise (subjective!) criteria and methods are used without even making it explicit
- Lacking methodological rigour may harm the transparency towards the public, which to our best knowledge has not been involved in any way

EURO-MEDITERRANEAN COOPERATION NETWORK

OBJECTIVES

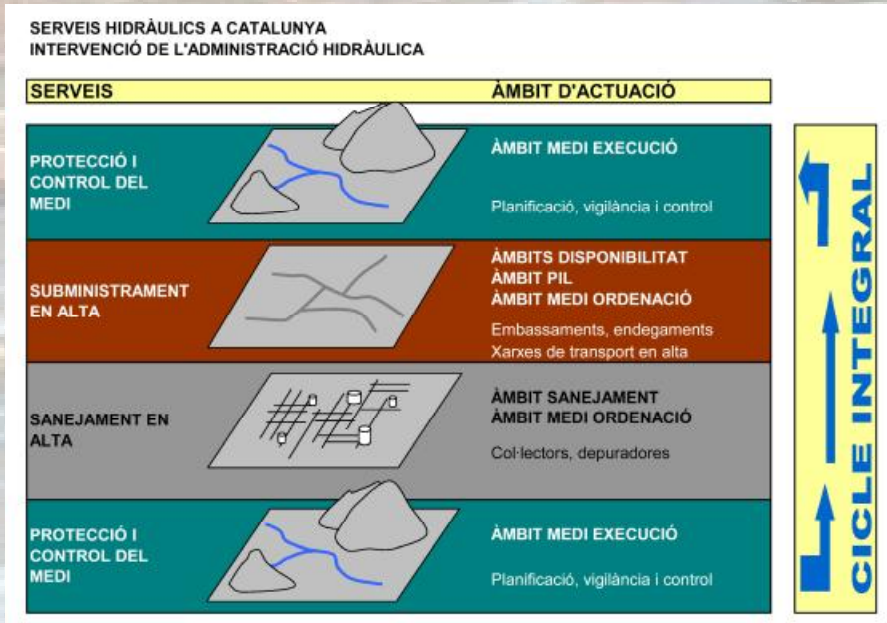
- **Sustainable policies** and **practices** on **water management**
- Application of **Directive 2000/60/EC**: Know-how, Methodology and Tools, Legal framework.
- **Administrative schemes** and **organisations of river basins management** (management bodies)
- **Practices of social agreement** in the protection of water resources (Agenda 21 Models, role and cooperation of stakeholders and NGO's)

TASKS

1. A **REPORT** for the region of each partner over the pre-mentioned objectives (state of the art, best practices, decision tools, etc).
2. Organization of a **three-day workshop** by each transnational partner.
3. Participation on the **final symposium.**

Institutional frame of water management

Agencia Catalana de l'Aigua (Catalan Water Agency)



User Communities

Comunidad de Usuarios del Delta del rio Llobregat

Water Management in Catalonia

STRUCTURE

1. Environmental and socioeconomic conditions
2. Institutional framework of water management
3. Urban Water Management
4. Implementation of WFD in the Internal Basins of Catalonia

Case studies

1. Management of groundwater with involvement of users
2. Urban water conservation campaign
3. Efficient urban water management according to Local Agenda 21
4. Urban sprawl and domestic water consumption relationships
5. Integrated environmental assessment in Mediterranean river basins: sustainability indicators monitoring
6. Sustainable management on a local scale of the alluvial aquifer of the river tordera
7. Legal implications of overexploitation of groundwater resources