



Experiences and exchanges in water planning within the Júcar River Basin Authority

- First institutional visit from “Consortio Intermunicipal de las Cuencas Hidrográficas de los Ríos Piracicaba, Capivari y Jundiaí” (PCJ) to the Júcar River Basin Authority in 1999.
- Other technical and institutional delegations have visited Spain and the Júcar River Basin Authority again in 2013, 2014 and 2017.



- Memorandum of Understanding (MoU) on cooperation in water resources management between both entities, facilitated by the Technical Secretariats of MENBO located in the Júcar River Basin Authority, and of RELOC in the PCJ Consortium

- The areas of cooperation:
 - Technical, administrative, financial and legal aspects of operation of the basin organisations,
 - Protection of the water environment in particular,
 - with the ultimate objective of improving training and qualifications of its professionals and managers.

Water planning in Spain. The case of Júcar River Basin District

Hydrological Planning Objectives

The Water Act defines the general objectives of hydrological planning:

- The good status and adequate protection of the public hydraulic domain and water
- Meeting water demands

Principles

- Plans are public and legally compulsory.
- Are approved by the government through Royal Decrees.
- Their territorial scope is the River Basin District (RBD), defined by Royal Decree.
- Their contents are set in the Water Act.

River Basin Districts in Spain



Contents of the River Basin Management Plan

- Description of the River Basin District, **including water resources inventory.**
- General description of water uses and pressures, **including priority criteria for uses, water allocation for current and future water demands and for the conservation or recovery of the natural environment (environmental flow regimes).**
- Protected areas
- Monitoring networks
- Environmental objectives
- Economic analysis of water use
- Programmes of measures

Approval of RBMPs

- The first river basin management plans were approved by Royal Decree in 1998.
- In January 2016, the plans for cycle 2015-2021 were approved by Royal Decree 1/2016.

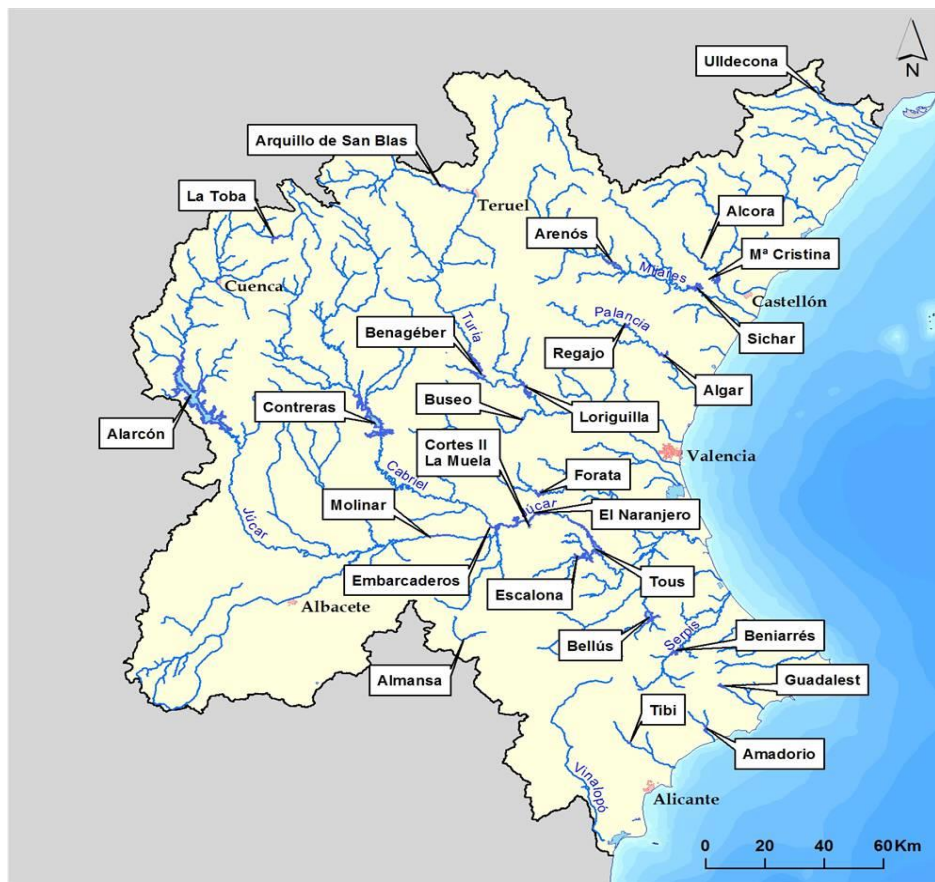
The River Basin Management Plan in the Jucar River Basin District

Description of the JRBD



Total surface(km ²)	44.871
Surface except coastal water (km ²)	42.735
Permanent population (2012)	5.178.000
Total equivalent population (2012)	5.697.000
Irrigated surface (ha)	390.000
Total inflow(hm ³ /year)	3.800
Total water demand 2012 (hm ³ /year)	3.240

Description of the JRBD

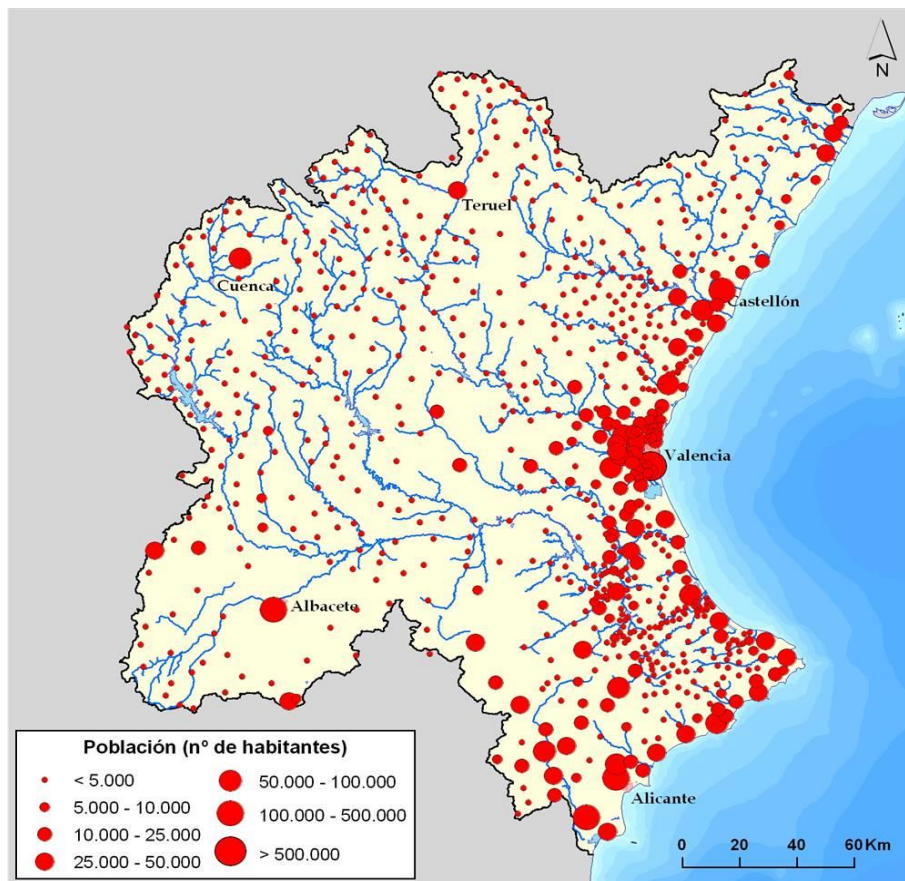


Infrastructures: dams

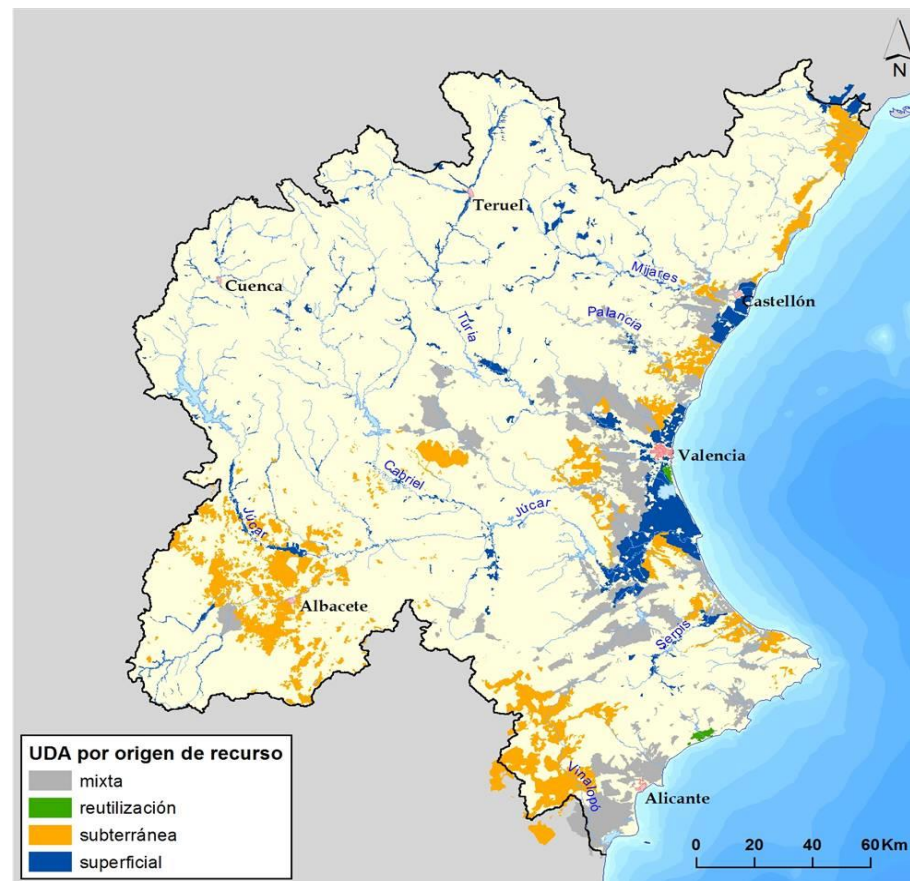


Infrastructures: channels

Water demands in the JRBD



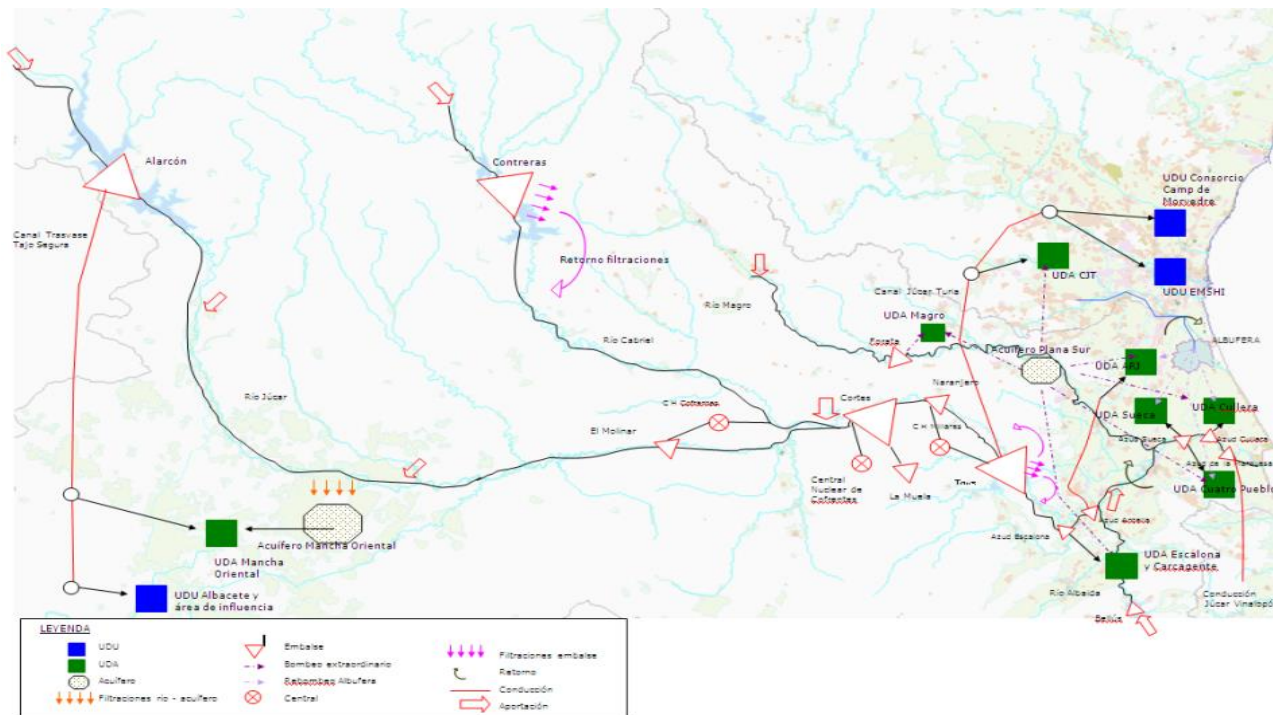
Population



Irrigation

Water allocations

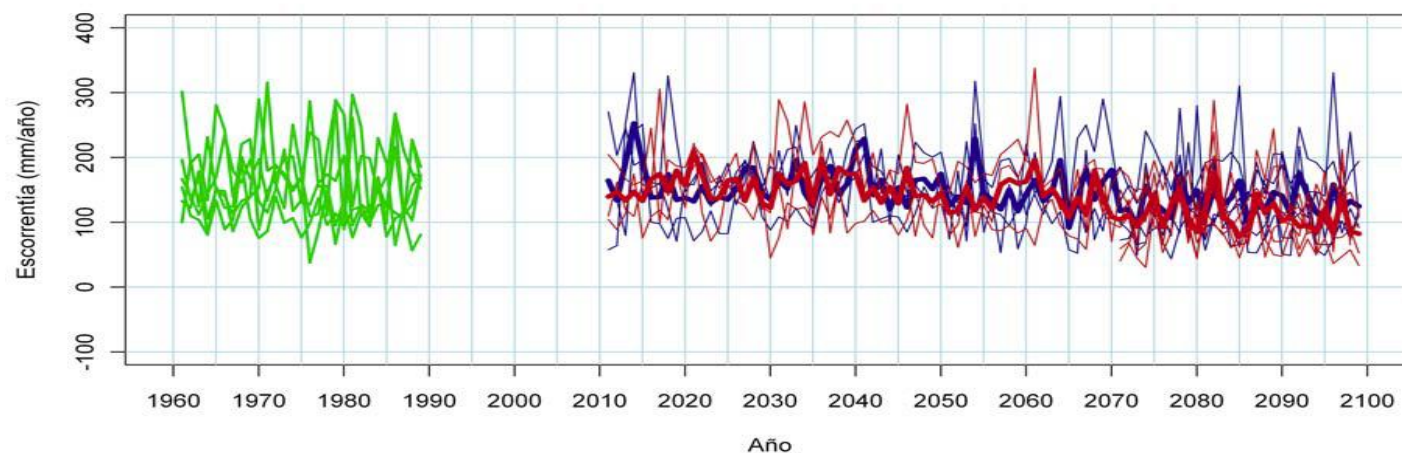
- Water resources simulation models are used to define water allocations.
- Water allocations allows to establish rights to water use.



Júcar water resource system model

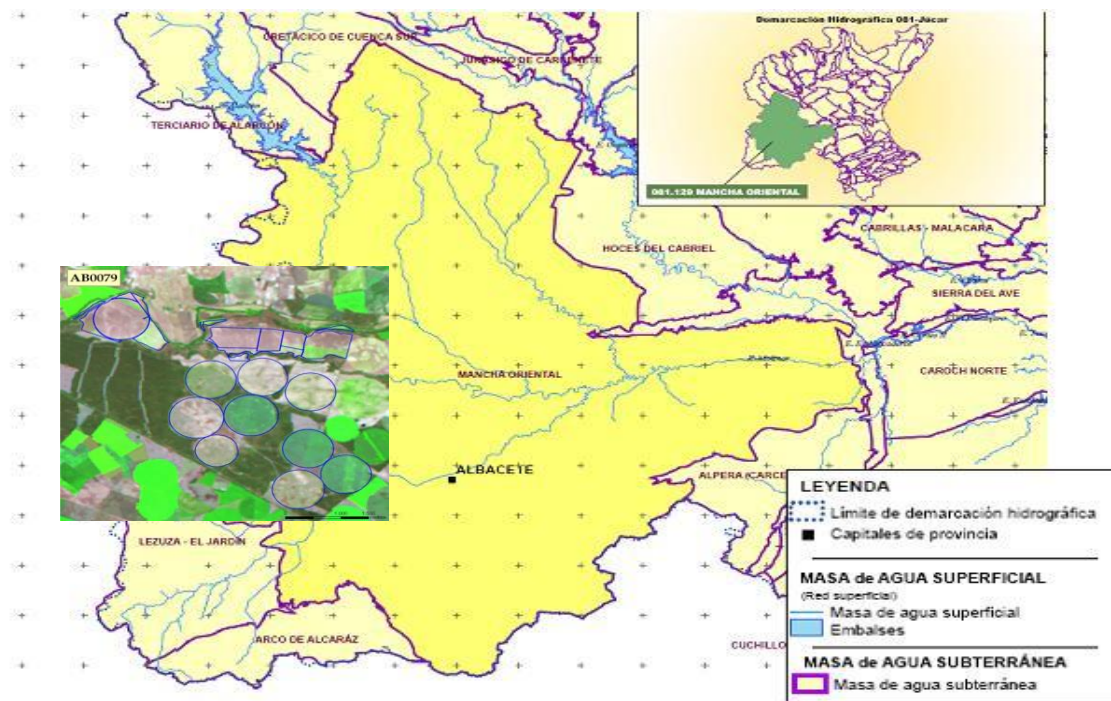
Climate change effects

- Climate change can result in a significant reduction of water resources.
- Balances in water resources systems have been carried out, to support decision-making.



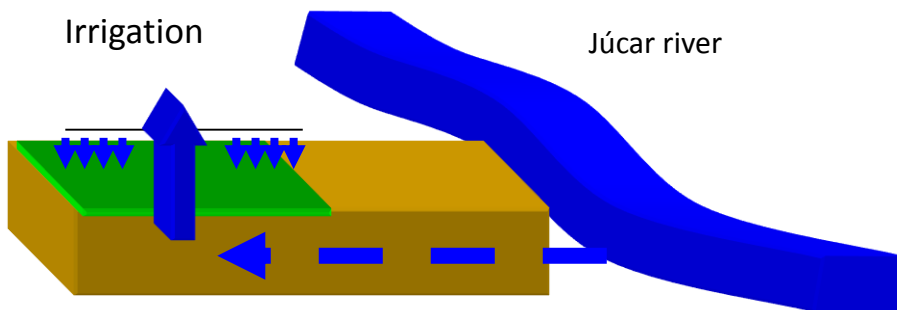
Annual runoff evolution in Spain according to different forecasts.
Control period (green); emissions scenario A2 (red); B2 (blue). Average forecast (thick red line). Source: CEDEX (2010)

Mancha Oriental aquifer and Júcar river

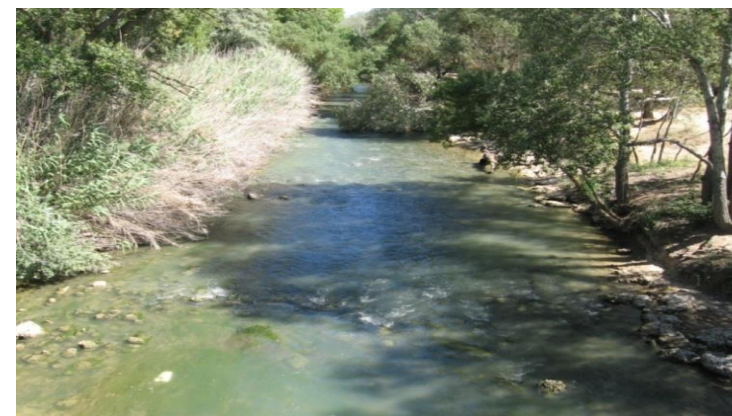


Irrigation

Júcar river



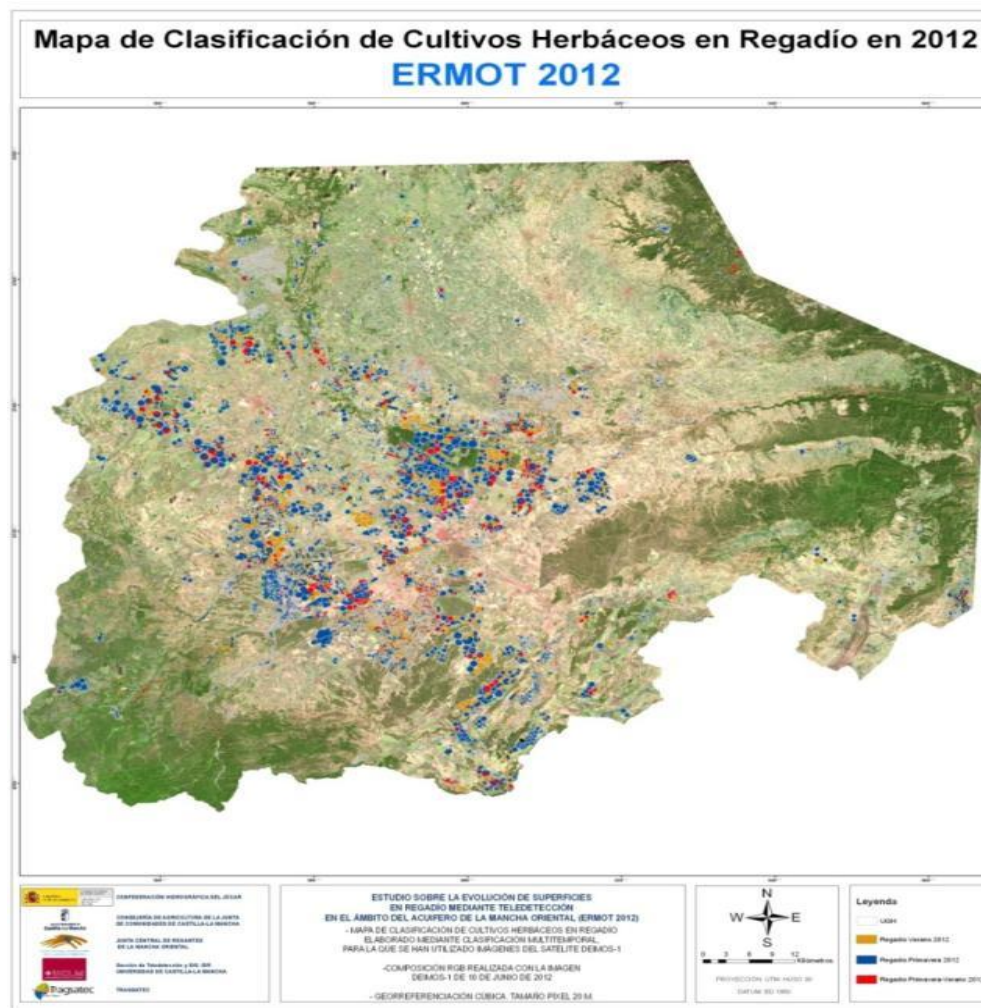
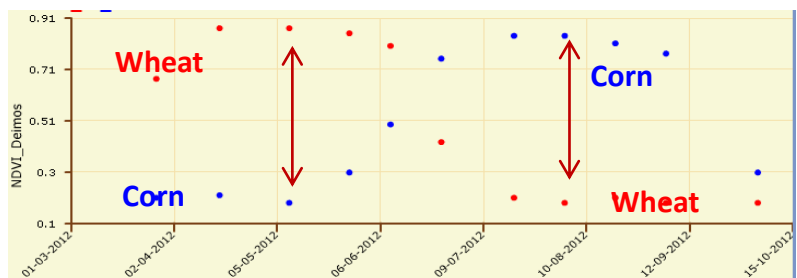
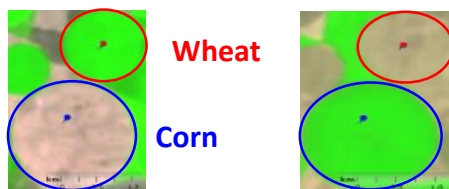
Júcar river in the summer of 1995



Júcar river in the summers of 2006 and 2007

Remote sensing techniques

- Aquifer abstractions over available resources.
- Irrigation follow-up with remote sensing for over 15 years.



Legend

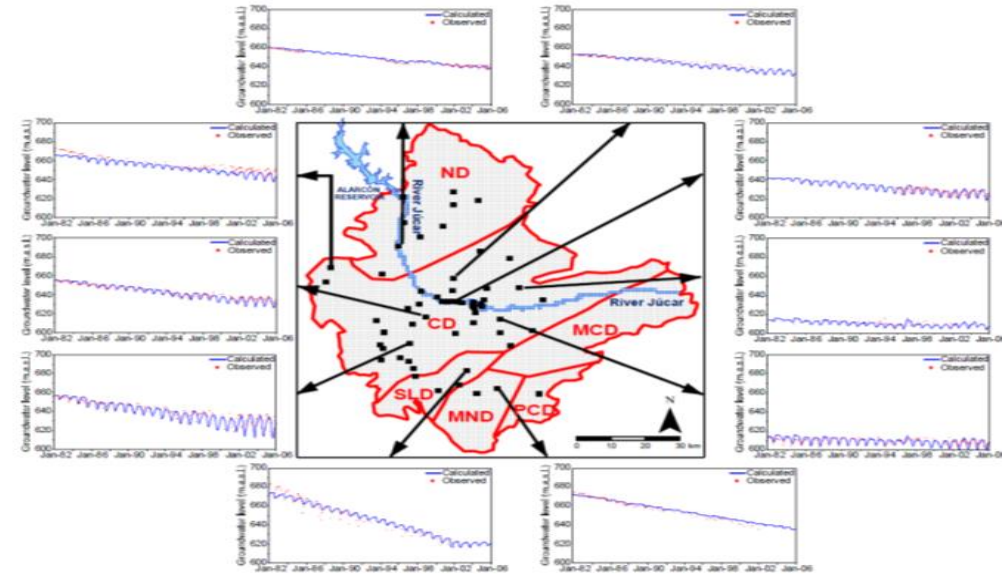
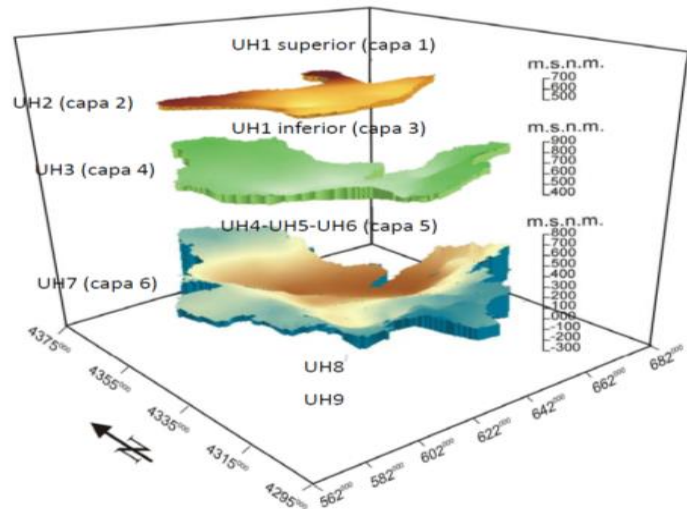
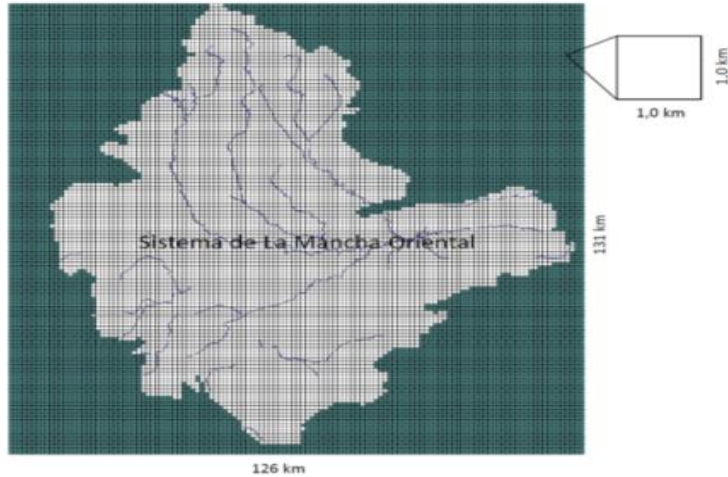
Blue: Spring crops

Orange: summer crops

Red: Alfalfa, double harvest (spring-summer)

Yellow: Ligneous Vineyard, Olive

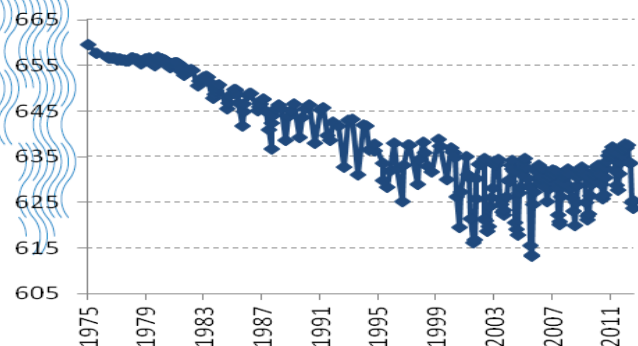
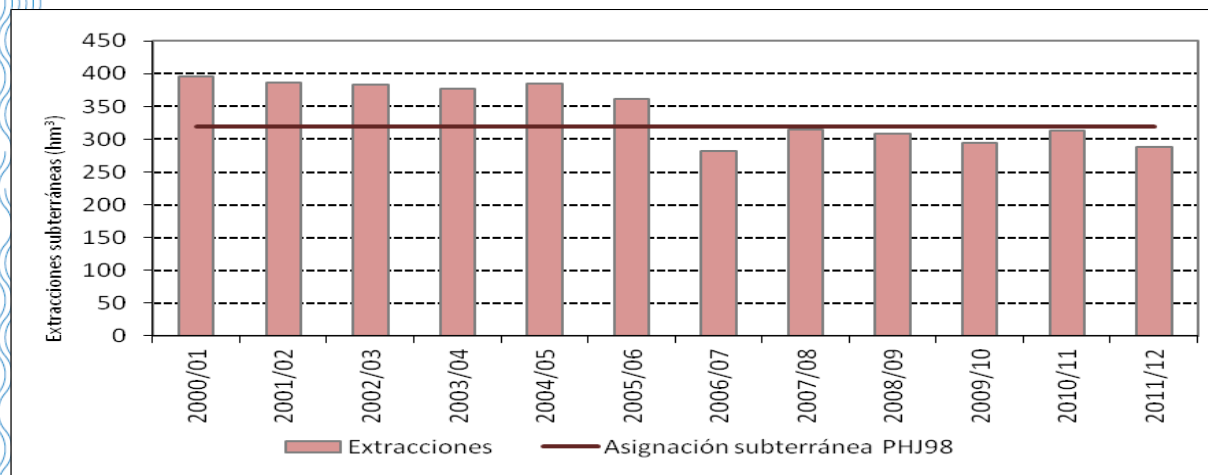
Modelling the Mancha Oriental aquifer



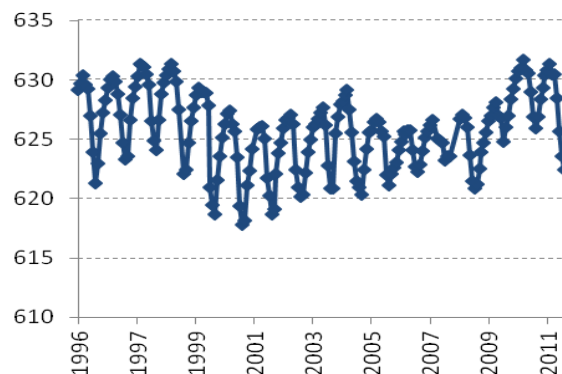
Model 3D MODFLOW
Mancha Oriental Aquifer

- Work began over 10 years ago.
- The model currently reproduces piezometry and river-aquifer relationships acceptably well.

Abstractions from Mancha Oriental aquifer



Piezometer 08.29.059.

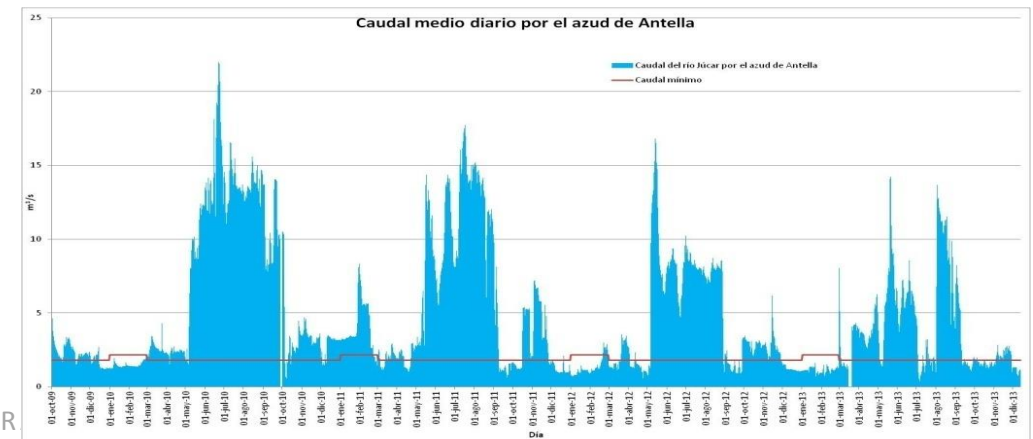


Piezometer 08.29.044.

- Significant decrease in aquifer abstractions in the past few years, below the allocation established by the 1998 RBMP (320 Hm^3/year), mainly due to changes in crop patterns.
- The regulations in the 2016 RBMP establishes that the groundwater allocation will have to be gradually reduced to reach 275 Hm^3/year in 2027.

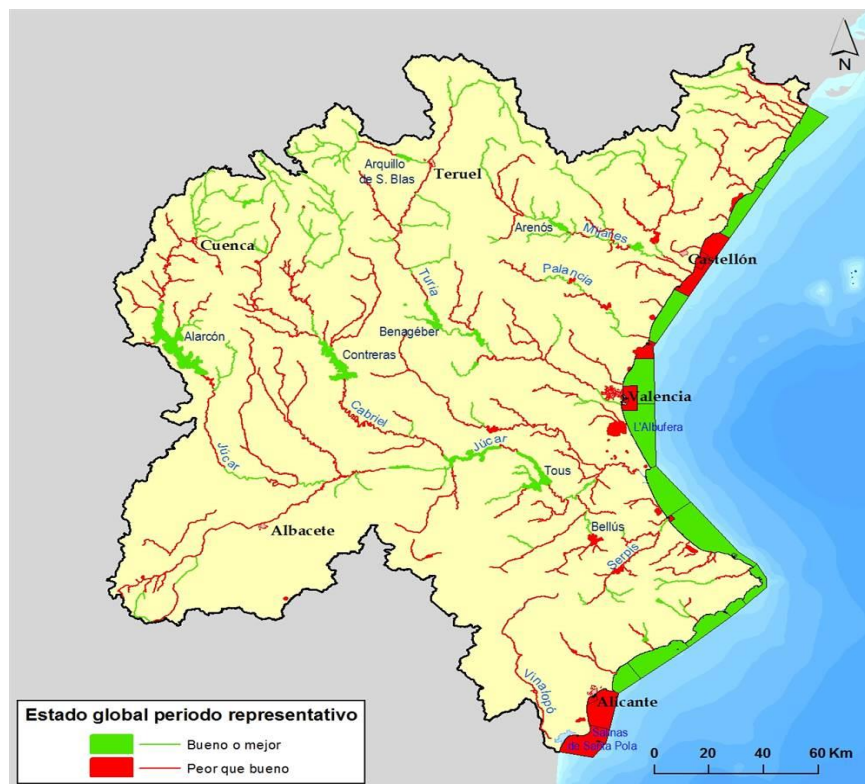
The ecological flow regime in the JRBD

- A minimum flow regime is established in most of the surface water bodies: Habitat curve for target fish species have been developed, taking into account different stages in the vital cycle of the species.
- Maximum flows and change flow rates have also been defined.



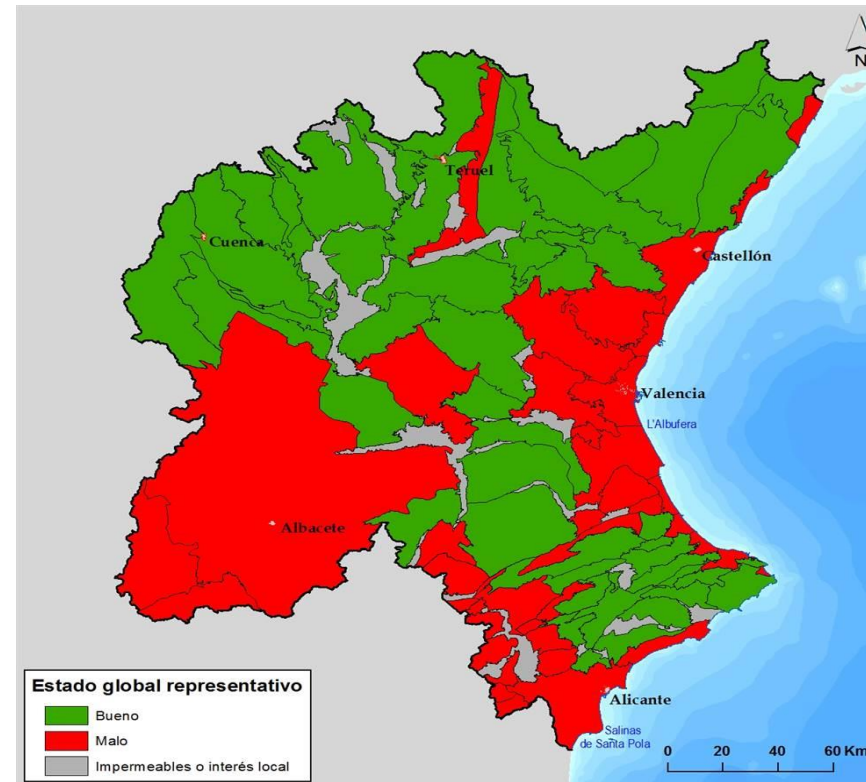
Status evaluation of water bodies

Status RBMP 2015-21



Good status 35%
Worse than good 65%

Status RBMP 2015-21



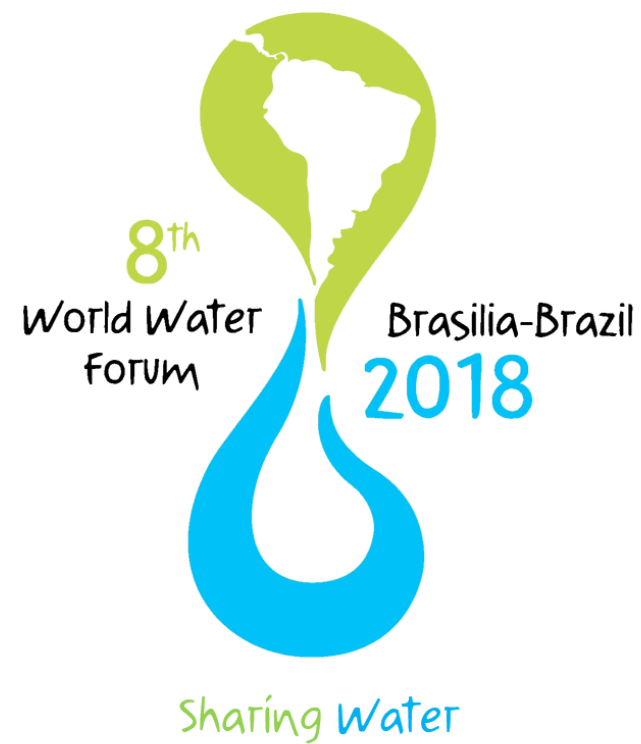
Good status 54%
Bad status 46%

The Programme of Measures

Type of measure	Investment 2016-2021 mill€	Investment 2022-2027mill€
01. Point pollution reduction	357,58	163,97
02. Diffuse pollution reduction	8,87	5,10
03. Reduction of pressure due to water abstraction	258,05	268,87
04. Morphological	68,33	67,39
05. Hydrological	6,20	0,10
06. Measures of conservation and improvement of the structure and performance of aquatic ecosystems	4,09	2,54
07. Other measures: measures linked to impacts	267,80	93,66
09. Other measures (not directly linked to pressures or impacts): specific measures for drinking water protection	135,12	128,83
10. Other measures (not directly linked to pressures or impacts): specific measures for priority substances	1,55	0,39
11. Other measures (not directly linked to pressures or impacts): governance	43,62	30,91
12. Increase of available resources	78,64	231,23
19. Measures to meet other uses linked to water	0,49	16,85
TOTAL	1.230,36	1.009,83

Lessons learnt

- Water allocations, including ecological flows, have been the main element of conflict.
- The RBMP shows it is possible to make compatible demand meeting and water bodies' protection.
- It is possible that due to the progress made in water allocations, next revisions of the RBMP will focus on the compliance of environmental objectives.



Organization



MINISTRY OF THE
ENVIRONMENT



Support

