



## Recent Drought Problems in Spain and the conflicts among cities. Example of Barcelona.

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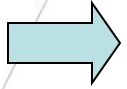
# 1.- Introduction: General aspects of draught in Spain



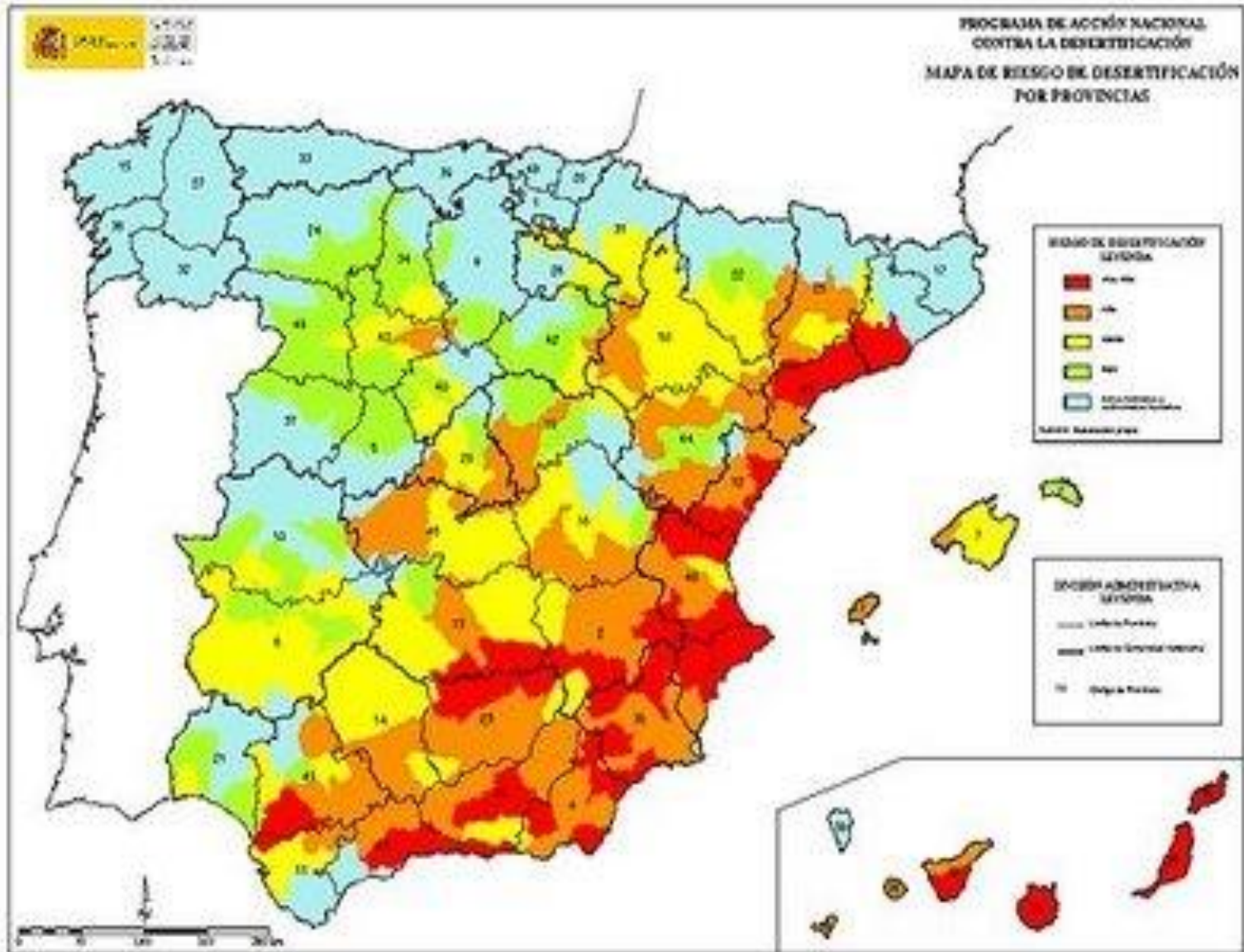
Drought is a historical problem which has intensified in recent years as a result of climate change.



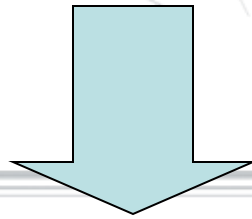




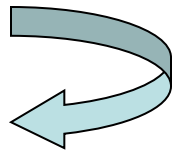
# Map of desertification risk in Spain:



Drought is a particular problem in Spain, for **two** reasons:



**First reason:** Uneven distribution of rivers in Spain, so that the Mediterranean basin drains into only one large river:

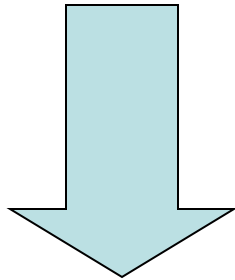


**THE EBRO**

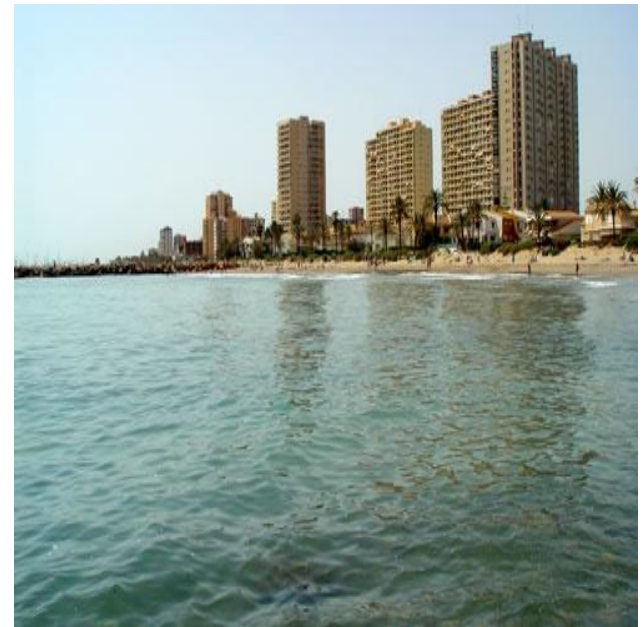


## Second reason:

### Uneven distribution of Spain's Water resources and population:



- a) Cities are located on the coast, with a very low population density inland.
- b) Economic growth has occurred mainly in coastal areas.



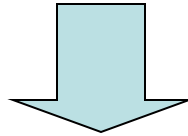


c) The population is located on the coast, where drought and water shortages are particularly severe.



➔ The Spanish water supply system is extremely **irregular**: continual alternation between **drought** and **flooding**

**Water resource planning has a long tradition**



but has **not** provided **solutions** to resolve conflict



Water policy has traditionally been based on hydraulic works, resting on **two pillars**:

**1. Construction of reservoirs and dams.**



**2. Transferring water between basins, mainly from inland to the Mediterranean coast.**





# 1.- Reservoirs and dams:

Spain has a long tradition of water regulation,

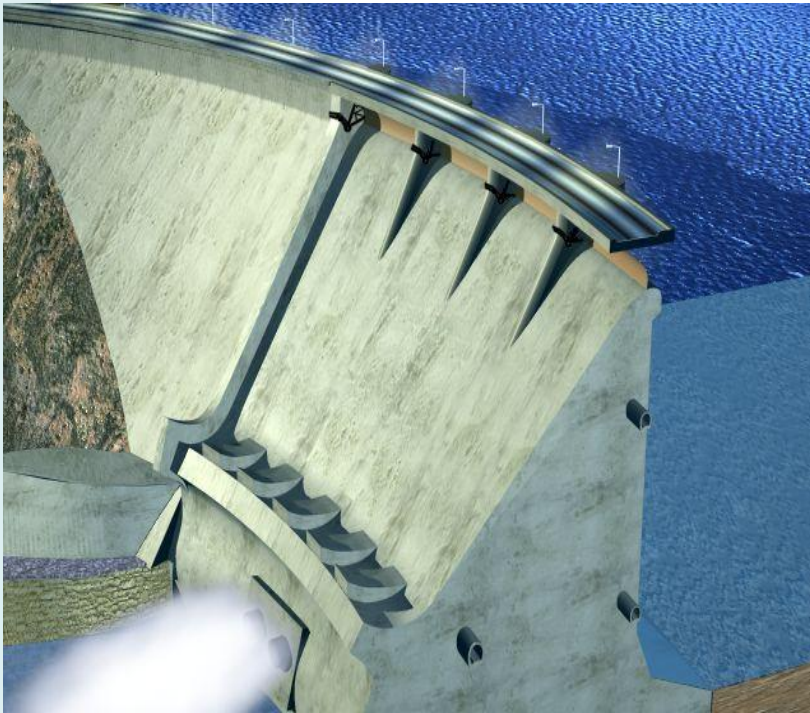
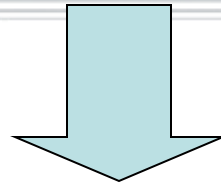
aiming to make best use of it via dam construction.



Spain today has more than **1100 large dams**,



approximate capacity of **56,000 hm<sup>3</sup>**.



## 2.- TRANSFERS :

- Tajo-Segura transfer the great hydraulic project of the 20th century.
- Ebro to Tarragona mini-transfer was approved in 1981.

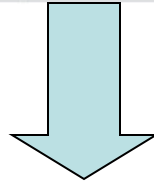




## Three problems with traditional water political



**First reason:**



Reservoir capacity has **decreased significantly**:  
capacity is currently **50.1%**



## ➔ **Second problem**

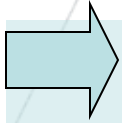
The flow of the Mediterranean rivers in the Iberian Peninsula

➔ **WILL FALL**

**by 50% over the next seventy years, due to climate change.**

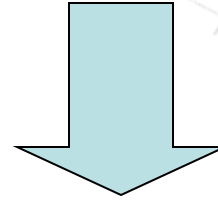


**The European Environment Agency declaration**



## Third problem

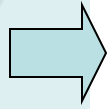
Inland regions opposition:



Aragon and Castilla-La Mancha in particular, where the PSOE is in power, have opposed the transfer.







## Because all these reasons

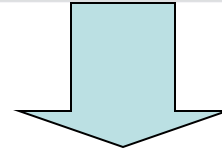
In 2004, PSOE approved Law 2/2004 of 18th June 2004

→ which replaced investment in transfers with desalination plants.



**The AGUA Programme,  
replacing the now revoked Water  
Resource Plan**

# In this context of new political Government has adopted to Transfer water to Barcelona

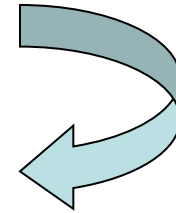
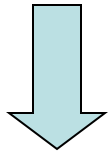


Fragility of Barcelona's water supply due to drought during the last years



On 1st April this year, the five large reservoirs in the Ter-Llobregat system were at **20.4%** joint capacity

with a total of **125.2 hm<sup>3</sup>**.



This meant that they were only four percentage points above emergency drought conditions: the threshold is 20%.



# Permanent solution proposed by AGUA Programme



Construction of  
Prat **desalination**  
plant

# Permanent solution proposed by the AGUA Programme,

Proposed investment: 238 million

Area occupied: 53 hectares

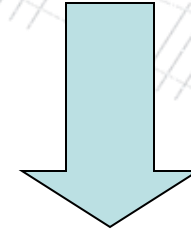
Timeframe for implementation: 24  
months

Volume of water produced: 60 hm<sup>3</sup>/year

Electrical power installed: 40 MW



# PROBLEM



The work will not be **completed**  
**until**  
**May 2009**

**Urgent temporary measures**  
are needed to supply the  
metropolitan area

**Water usage restrictions** will  
have to be imposed in Barcelona.



## GOVERNMENT PROPOSAL:

construction of a pipeline to transport water from the Ebro to Barcelona



in order to provide a temporary solution to supply problems.

## **‘mini-transfer’:**

The proposal is to transfer with a **62 km** pipeline to the Barcelona metropolitan area.

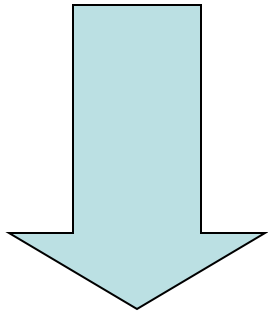


**62 km pipe running parallel to the AP-7 motorway linking Barcelona and Tarragona, supplying a flow of 3 hm<sup>3</sup>/month.**

**Cost: 160 million euros**

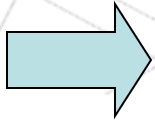
**Term:six months**

# The extension of the pipeline from Tarragona to Barcelona has renewed conflict



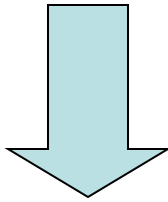
between inland cities and regions and coastal areas





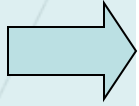
## Water War

The political controversy has arisen because the regions of Valencia and Murcia have been requesting water from the Ebro for 5 years,



Now, water is being transferred from the Ebro to Barcelona.

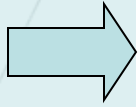




## Regions on the Mediterranean coast:

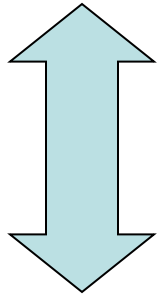
Valencia and Murcia, where the PP is in power, have supported transfers to obtain river water by developing infrastructures to transport water to cities.





## Conflict of water needs new perspectives

Up to now, debate has centred on how to supply water to populations and cities in need.

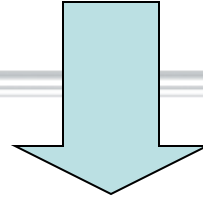


But would be possible to limit new developments when water supply is not guaranteed?





## Recently new criteria to solve water conflict:

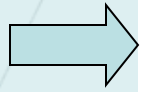


1. National Plan for  
Adaptation to Climate  
Change (2006)



2. Law 8/2007 of 28th  
May 2007 on Spanish  
town planning

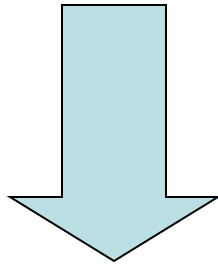




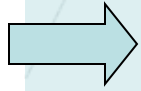
# National Plan for Adaptation to Climate Change

## - Urban growth

Town planning and urban development plans must be adequate to the effects of climate change

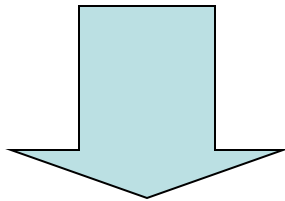


→ so that proposals for occupying land and assigning it to various uses and activities are suited.



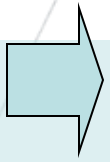
# Law 8/2007 of 28th May 2007 on Spanish town planning

1. Introduce the concept of **sustainable urban development** into town planning law for the first time



2. Introduce for the first time guarantee of sustainability establishes that urban development **plans must guarantee water supply.**





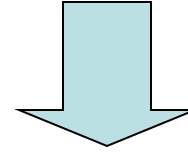
# Final considerations:

- 1. Conflict over water in Spain has been aggravated by climate change.**

This has made it necessary to take an exceptional measure to guarantee the water supply to the population of Barcelona.



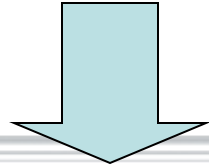
# Final considerations:



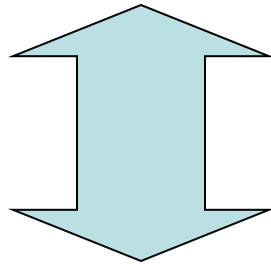
2. This measure has revived the **conflict** between **coastal** and **inland regions** over the use of the river Ebro.



# Final considerations: A New Perspective



Should development cities on the coast?



Shouldn't better to control its development and to promote development where water allow to increase population.

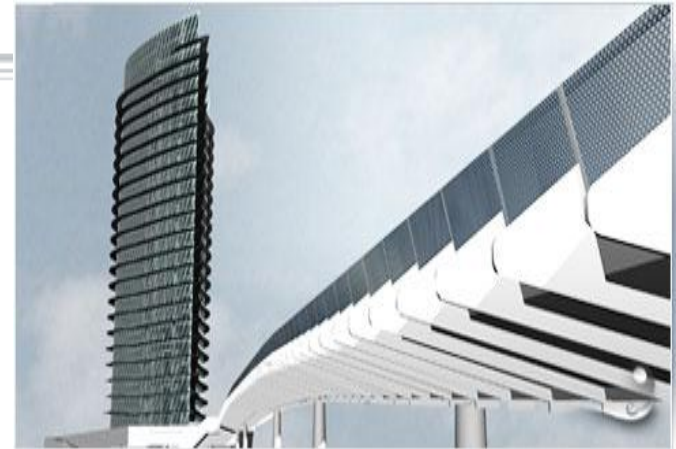


# International Expo "Water and Sustainable Development" Zaragoza from 14<sup>th</sup> June-14<sup>th</sup> September 2008. Spain





# "Water and Sustainable Development"



# Websites:

<http://www.mma.es/>

<http://www.mma.es/secciones/agua/presentacion.htm>

<http://www.acuamed.com/>

<http://www.inm.es/>

<http://local.es.eea.europa.eu>

<http://www.expozaragoza2008.es>