

IWRM-net POLICY brief



Water2Adapt

*Resilience enhancement
and water demand management
for climate change adaptation*

INTRODUCTION

Focus of the project

Water2Adapt is an applied-policy research project, funded under the 2nd Call of the IWRM-net (Towards a European exchange network for integrating research Efforts on Integrated Water Resources Management), an initiative of 17 partners from 14 European countries seeking to exchange good practice and to develop new IWRM methods and tools, and hence inform the on-going efforts to implement the provisions of the EU Water Framework Directive (WFD, Directive 2000/60/EC). The Water2Adapt project addressed the [impacts of droughts and water scarcity](#), exacerbated by human-induced climate change, on communities and regional economies in representative river basins in Europe: Ebro (Spain), Po (Italy), and Weser (Germany).

POLICY FOCUS

European policy on water scarcity and drought (WS&D)

While the Water Framework Directive (WFD) introduced a common policy basis for water protection and management in the European Union (EU), the issues of water scarcity and droughts have been further addressed in the [Communication of the European Commission](#) (COM (2007) 414 final) and, more recently, in the [Blueprint for Safeguard Europe's Water resources](#) (COM (2012) 673). Efficient water use is also a cornerstone of the EU Resource Efficiency Flagship initiative as a part of the Europe 2020 Strategy. Improved efficiency of water allocation and use, coherent application of water pricing and cost recovery principle, and better planning for drought spells, likely to be amplified by climate change throughout Europe are accepted as the most effective ways of adapting to climate variability and change. Responding to the knowledge needs, the Water2Adapt has analysed the direct and indirect losses caused by selected significant drought events, and examined the empirical performance of a range of water demand management policies and measures.

PURPOSE OF THIS POLICY BRIEF

Importance of WS&D in the river basin

The [Ebro river basin](#) in the area of the Basque Autonomous Country (BAC, thereafter) covers an area of 2,682 km² and mostly corresponds to the province of Álava. The annual precipitation offers a volume of 2,475 hm³ per year. The water resources are mostly originated from superficial water bodies; groundwater supplies only 6% of the demand. The main source of water is located in the Ullibarri and Urrunaga reservoirs (Zadorra system, thereafter) with a storage capacity of 180 Hm³. The singularity of this system lies in its water transfer to the Cantabric river basin in order to supply with drinking water

the city of Bilbao and its surroundings. Indeed 80% of the water stored in the Zadorra is transferred. In this context, the population supported by this resource is around 1.2 million of inhabitants. The system is a multiple user reservoirs used to satisfy the production of hydroelectricity, the urban water demand (51.5% for the economic uses, 31.7% for civil uses) and the rural demand (16.8%) is satisfied by own withdrawals.

Since 1944, 3 severe drought situations occurred in the BAC. The most severe has been [the drought of 1988-1990](#). It lasted 27 months and the water deficit reached -175 Hm³, almost all the capacity of the Zadorra reservoirs.

Climate changes at the local level remains a challenging exercise subject to [large uncertainties](#). However, some trends variation has been forecasted for the BAC. The tendency goes towards an increase in precipitation in spring and to a larger decrease in summer, so that annually the water resources are expected to decrease and its replenishment rate modified. On the demand side, the population is expected to maintain or decrease, the potential future agricultural demand could more than double and the industrial demand could increase by a 15%.

PROJECT'S KEY OUTCOMES

Economic and social impacts

During the drought of 1988-1990, severe [water restrictions](#) have been imposed to domestic uses and agricultural uses; and implemented on a voluntary basis for economic urban uses. The restrictions varied from six to twelve hours a day during the period of ten months.

These restrictions had important consequences in the economy, both in terms of social welfare changes, economic losses and costs of adaptation. Measured in terms of welfare losses, the social impacts in the residential sector have been estimated to nearly 100 million Euro, 90 Euro per capita for the ten months of restrictions. In the industrial sector, the welfare loss would amount to 32 million Euro, around 1,000 Euro per capita. This large estimated difference of per capita welfare losses would explain why the restrictions were imposed for households and remained voluntary for industries. The [hydroelectric](#) station of the Zadorra could not produce the usual 141 GWh, a loss 8.6 million Euro for the energy company. In the [agricultural](#) sector, based on water productivity the total losses amount to 2.1 million Euro or about 100 Euro per irrigated hectare.

The main [adaptation](#) response from the public authorities was the investment of 42 million Euro in groundwater prospection projects in order to find new water sources and diversify the water supply sources. Most of these projects were executed many years later.

LIMITATIONS IDENTIFIED

Effectiveness of the existing policy responses

The main responses during this drought event were emergency (i.e. non-structural) responses:

- The increase of the supply sources with groundwater prospection;
- An intensive campaign to reduce water leaks in the network;
- The restrictions imposed to manage the remaining stock of water as a way to deal with the uncertainty of the duration of the drought.

However, such measures would not be effective in preventing any other drought situation. Therefore, structural reforms of the water management system were additionally implemented in order to achieve a more efficient and fair distribution of water that accounted for drought risk. These measures included:

- The redefinition of the allocation rule between the multiple users of the Zadorra reservoirs;
- The drought emergency plan for Bilbao (2009) that defines emergency measures in case of drought, like the use of water substitution sources;
- The evolution of the pricing system (tariff structure) encouraged by the Water Framework Directive (60/2000/EC).

MAIN RECOMMENDATIONS

Prospective
WS/D policies
and measures

These policy reforms helped to improve significantly the water management system in the BAC and contributed to avoiding such extreme situation to repeat. However, some potential additional improvements of the current water management structure could help to drive the management towards more efficiency and more appraisals of risks.

- The estimated figures of uncontrolled water is still high in the BAC, around 40% of pumped water are either unmetered or lost in the network. A systematic [maintenance](#) and [water metering](#) in some sectors of the economy would help to monitor water use, the first step towards an efficient water management.
- Disparities among the two main water utilities are present in the [industrial tariffs](#), the larger uses in the BAC. A reason is that the two places face different costs recovery constraints. Another one is that tariffs for this sector are also strategic instruments of competition (are politically driven) between municipalities of the BAC. A social planner would be interested to regulate the system in order to improve efficiency gains via tariffs and give the right incentives for water resource conservation.
- The water sector is characterised by high fixed cost and increasing returns to scales, in other words the more users are in the system the better the investment is recovered. In Alava are encountered the larger number of water utilities and huge degree of dispersion of water authorities. These municipalities (and sometimes smaller administrative units) face a high financial risk and have limited room for manoeuvre to manage water demand and supply. The possibility for these municipalities to [regroup under one water utility](#) should be carefully studied.
- Finally, the allocation rule between the two main users of the Zadorra stays fixed allocation in various water scarcity scenarios. A challenging question to study would be the potential for a [regulated water market](#) in this oligopoly system to better account for climate variability in the management of drought risks.

WATER2ADAPT PROJECT

Starting/Ending date of project:
01/09/2010 to 31/10/2012

Participating institutions

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Ecology-Consulting) GmbH
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Type of R&D:

Policy-applied research project

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ADDITIONAL TECHNICAL/SCIENTIFIC INFORMATION

Water2Adapt. Deliverable 2.1. Economic costs of water scarcity and drought.

Water2Adapt. Deliverable 2.2. Analysis of the water demand by sectors.

Water2Adapt. Deliverable 3.2. Social effects of water scarcity and drought: urban communities.

Water2Adapt. Deliverable 2.3-3.3. Socio-economic resilience - recommendations for a practical implementation on river basin.

Water2Adapt. Deliverable 4.1. Water demand management in the case studies - ex-post performance assessment and lessons learned. The Case of the Ebro river basin.

Water2Adapt. Deliverable 4.2. Water demand management for climate adaptation - recommendations for a practical implementation in water management. The Case of the Ebro river basin.

Water2Adapt. Deliverable 5.3. Synthesis document for the Spanish case study and for the overall project.

*All Deliverables are available at Water2Adapt Project website: <http://www.feem-project.net/water2adapt>

SELECTED RELATED PROJECTS/ACTIVITIES

The K-EGOKITZEN (Impact and adaptation to climate change; www.neiker.net/k-egokitzen) research project, coordinated by the Unidad de Medio Ambiente de Tecnalia and funded by the Departamento de Medio Ambiente, Planificación Territorial, Agricultura y Pesca de Gobierno Vasco, and the Departamento de Industria e Innovación en el marco de Plan Vasco de Ciencia, Tecnología e Innovación 2010.

The Water Cap and Trade (Water Market scenarios for Southern Europe: new solutions for dealing with water scarcity and drought risk www.capandtrade.acteon-environment.eu), one of the other 2nd Call IWRM-net projects..

The Icarus (WRM for Climate Change Adaptation in Rural Social Ecosystems in Southern Europe, www.cmcc.it/research/research-projects/icarus-1/icarus), one of the other 2nd Call IWRM-net projects.

The Epi-Water (Evaluating Economic Policy Instruments for Sustainable Water Management in Europe; www.epi-water.eu) research project, coordinated by FEEM and funded by the EU FP7.

The Preempt (Policy-relevant assessment of economic and social effects of hydro-meteorological disasters; www.feem-project.net/preempt) project coordinated by FEEM and funded by the European Commission under the Financial Instrument for Civil Protection.

The WATERCoRe (Water Scarcity and Droughts: Coordinated Actions in European Regions; www.watercore.eu), funded under the INTERREG IVC Programme.

The Drought R&SPI (Fostering European Drought Research and Science-Policy Interfacing; www.eu-drought.org) FP7 funded research project.

The Xerochore (An Exercise to Assess Research Needs and Policy Choices in Areas of Drought; www.feem-project.net/xerochore) FP7 funded coordination action.

www.feem-project.net/water2adapt