

# 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 [Po River Basin District](#) (P-RBD) comprises to a large extent densely developed territory of 71,057 km<sup>2</sup> and is home to some 16 million people. With a natural endowment amounting to some 78 billion cubic meters annually, the basin is one of the water-richest in Italy. Around a fourth of it is withdrawn for anthropic uses, especially irrigated agriculture, the largest consumptive water use in the basin. The severe droughts experienced the 2000s, in particular in [2003 and 2006-2007](#), have underlined the basin's vulnerability to water stress, driven by overexploitation of water resources and at least partly by the

observed alteration of water regime. Over the past decade, the government-declared state-of-emergency persisted for twenty-one months, and exceptional meteorological conditions in parts of the basin were attested for eight out of ten years, paving so the way for agricultural aid programs. The most extreme climate projection foresee a substantial increase in temperature, significant changes to snow pack and melting patterns, and a substantial decline of annual, and even more, of seasonal precipitation. Despite the pervasive [uncertainty](#), there is good confidence that precipitation will slightly increase in winter and decrease in all other seasons, especially in summer. In contrast, the future water demand in baseline scenario is likely to increase due to population growth, increased reliance on irrigation, and water- intensive energy generation.

## PROJECT'S KEY OUTCOMES

### Economic and social impacts

Over the past decade, the drought-induced water stress affected all economic sectors, notably [agriculture](#) and energy production, to a lesser extent the domestic water supply. The actual and potential economic losses are underestimated.

The econometric analysis performed using a representative set of farms confirmed higher losses in agricultural sector in 2003 than in 2006-07. In 2003 wheat production decreased by 10 per cent and maize by almost 5 per cent. Farm average income reduced by 6 per cent but labour increased by 28 per cent, because of the need for land use extension (aiming to have the same production) and the recourse to additional irrigation practices. This event induced in the sector a sort of auto-adaptation processes: improved efficiency in farming technologies, increased irrigation intensity, diffusion of groundwater exploitation, provision of alternative source of income, such as energy production from biomasses.

The reduced amount of water and the modification of the water cycle during a drought period, provoke costly losses to the [hydropower](#) generation system. It was estimated that accounting for missing production the amount the losses in the sector amounted to 280 million Euro in 2003 and 670 million Euro in 2007. Increasing urbanization, changing in the demographic composition and lack of financing instruments, poses the civil water provision sector under serious threat from climate change. Degraded environment from water scarcity affects both [tourism](#) and recreational activities. Even if this study identified only few urban water restrictions, potential social impacts could be very high.

## LIMITATIONS IDENTIFIED

### Effectiveness of the existing policy responses

Water governance model of the basin is unnecessary fragmented and subject to many reforms whose implementation is slow and inconstant. The role and operation of the many actors is poorly coordinated. Although the former basin authority (RBA) installed by the law 183/1989, now replaced by the legislative decree 152/2006, was formally abolished in 2006, it still performs the role of the river basin district authority (RBDA) foreseen by the current legislation but not yet (after six years) installed. The seven Regions and an Autonomous Province whose territory is comprised in the basin hold great deal of competence for water management but the respective Water Protection Plans (Piani di Tutela delle Acque, PTA) are loosely coordinated. The scenarios of water availability and use are inconsistent and the likely effects of climate change are to a large extent neglected.

Still, the coordinated response to drought emergency under the auspices of the RBA and the Department for Civil Protection (DPC) has proven effective in re-allocating the remaining water resources and in preventing even larger economic losses. The Steering Committee (Cabina di Regia) that involves the key players from among the legislators, regulators and users was first experimented in 2003 and conveyed ever since when concerns arose is a best

practice example for a coordinated and participative drought emergency response, worth to be followed elsewhere. The monitoring and surveillance service provided by the regional nature protection agencies (Agenzia Regionale *per la Protezione dell'Ambiente*, ARPA) and closely integrated in the Italian model of civil protection service (Centri Funzionali Meteo-Idro) is instrumental in detecting the on-set and break of drought spells and informing the management decisions.

The water entitlements and concessions are partly expired and necessitate a consolidation. The recent efforts to update the Water Balance Plan are laudable.

The economic incentives for water conservation are not fully explored. The current regulatory model of civil water provision and supply, successful in organisational transformation, has not encouraged sustainable investments in water infrastructure, hence leading to different price-consumption patterns across the basin. Public campaigns scored good results but their impacts are not well understood.

## MAIN RECOMMENDATIONS

### Prospective WS/D policies and measures

**WATER GOVERNANCE** within the basin should to be simplified and better coordinated, both horizontally and vertically. The regional Water Protection Plans (PTA) should pay more attention to water scarcity and droughts, employ a coherent set of basin-wide scenarios of future water availability and demand, and harmonize the water conservation policies and measures across the whole basin. River Basin District Authority (RBDA) should be installed and equipped with sufficient resources. Enforcement of existing legislation and regulation should be improved. Preventive risk reduction policies should hold sway over ad-hoc crisis driven responses, the formidable civil protection mechanism should be activated only in cases when all ordinary means of risk management have been exhausted. Water entitlements and rights should be revised, made clear and verifiable for monitoring.

**KNOWLEDGE** base for the water management can and should be improved under the leadership of the RBDA. A joint, publicly accessible data and knowledge platform/portal will increase public awareness and support scientific research. Assessment of the natural causes of drought and water scarcity, along with their environmental, economic and social impacts will contribute to a smarter (transparent and more effective) regulation. A single district-based knowledge platform should be installed for achieving Regional data and for simulating future scenarios suitable for operational and planning purposes.

**ECONOMIC INCENTIVES** can play a major role in reducing water withdrawal/consumption. Water tariffs for domestic water uses will increase in short to medium term as a result of the indispensable investments in water infrastructure, leading to sizeable reduction of pro-capita water consumption in the upstream part of the basin. In the downstream part the water saving will be smaller, if any, hence the investment driven increase of water tariffs should be compensated by social welfare measures aimed at socially vulnerable groups. Water tariffs including performance indicators for water utilities, to improve quality of service, security of water supply to costumers and reduce losses, is a good practice, which should spread across the basin. In agriculture volumetric pricing hold great promises for farm modernisation and deployment of efficient irrigation techniques but the reform should be complemented with by sustained investments from the National Irrigation Plans to serve flood risk reduction and irrigation purposes. Water transfer and trading (WTT) scheme is possible within the basin, a pilot study should explore the potential benefits of such a scheme.

Improving **WATER EFFICIENCY** in public water supply, agriculture and energy sectors is an effective policy to mitigate the impacts of water scarcity and drought. Voluntary sector-specific efficiency targets should be encouraged.

## WATER2ADAPT PROJECT

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

### Participating institutions

Fondazione Eni Enrico Mattei  
(FEEM) [Coordinating entity]  
Isola di S.Giorgio Maggiore, Venice,  
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Wilhelm-Seedorf Str. 1-3, 29525  
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[www.lwk-niedersachsen.de](http://www.lwk-niedersachsen.de)

Seeconsult (Society-Economy-  
Ecology-Consulting) GmbH  
Wissenschaftspark Osnabrück  
Sedanstr. 61, 49076  
Osnabrück, Germany  
[www.seeconsult.org](http://www.seeconsult.org)

### Type of R&D:

Policy-applied research project

### Funded under:

IWRM-net 2nd Common Call by the  
Bundesministerium für Bildung und  
Forschung (Germany), Ministerio de  
Ciencia e Innovación (Spain), and  
ISPRA - Istituto Superiore per la  
Protezione e la Ricerca Ambientale  
(Italy).

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## ADDITIONAL TECHNICAL/SCIENTIFIC INFORMATION

Mysiak J, Puma F, Pecora S, Carrera L, Farinosi F, Amadio A, Cappuccini E, Balzarolo D, Alessandrini C, Vezzani C, de Salvo M (2013) Italian National Strategy for Climate Adaptation: The Po River Basin District. Forthcoming.

Logar I, van den Bergh JCJM (2012) Methods for Assessment of the Costs of Droughts. Report of the Conhaz project.

The EU FP7 project XEROCHORE (An Exercise to Assess Research Needs and Policy Choices in Areas of Drought; [www.feem-project.net/xerochore](http://www.feem-project.net/xerochore)), has produced three Guidance documents:

Mysiak J, Markandya A, Palatnik R, Breil M, Balzarolo D, Colonna P, Martin-Ortega J, Niemeyer S, Rossi S (2011) Guidance Document on Economic and Social Impacts of Droughts, Demand and Supply-side Options. Report of the Xerochore project.

Olsson O, Bauer M, Barchiesi S, Dalton J, Froebrich J, Schrevel A, Sauquet E, Ramos MH (2011) Guidance Document on Environmental Impacts of Drought. Report of the Xerochore project.

Wipfler L, van Lanen HAJ, Ludwig F, Tallaksen LM, Fleig AK, Niemeyer S, Sauquet E, Ramos MH (2011) Guidance Document on Natural causes of Drought. Report of the Xerochore project.

## SELECTED RELATED PROJECTS/ACTIVITIES

The other 2<sup>nd</sup> Call IWRM-net projects with Italian partners involved **are ‘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](http://www.capandtrade.acteon-environment.eu)) and **‘Icarus’** (WRM for Climate Change Adaptation in Rural Social Ecosystems in Southern Europe, [www.cmcc.it/research/research-projects/icarus-1/icarus](http://www.cmcc.it/research/research-projects/icarus-1/icarus)).

The Epi-Water (Evaluating Economic Policy Instruments for Sustainable Water Management in Europe; [www.epi-water.eu](http://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](http://www.feem-project.net/preempt)) project coordinated by FEEM and funded by the European Commission under the Financial Instrument for Civil Protection.

The WaterClic (Water Against Climate Change; [www.wataclic.eu](http://www.wataclic.eu)), funded under the LIFE+ Programme and co-funded by the Region Emilia Romagna.

The WATERCoRe (Water Scarcity and Droughts: Coordinated Actions in European Regions; [www.watercore.eu](http://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](http://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](http://www.feem-project.net/xerochore)) FP7 funded coordination action.

The Conhaz project (Costs of Natural Hazards; [conhaz.org](http://conhaz.org)), FP7 coordination action.