



*An exercise to assess research needs
and policy choices in areas of drought*

*How to deal
with drought*

science policy brief 3

Water Framework Directive 2000/60/EC: Recovery of costs for water services (Article 9)



Xerochore - An exercise to assess research needs and policy choices in areas of drought

Assessment of research needs and policy choices in the area of drought. Review of the state-of-the-art and identification of research gaps in the natural system, impact assessment, policy-making and integrated water resources management, and assessment of the possible impacts of droughts and guidance on appropriate responses.

Policy focus

Contribution to the understanding of drought and the natural system (climate and hydrology) and how it impacts on the characterisation of water bodies and pressures, socio-economic impacts and related management of drought management, environmental impacts on water availability and ecosystems.

Purpose of this science-policy brief

Over the past few decades, the European Union witnessed a striking increase in the losses caused by natural, particularly hydro-meteorological, disasters.

The knowledge about the past disasters is all but erratic and incomplete. At best, only direct losses are known and only for some of the key sectors. Little attention is paid to indirect, induced and intangible effects, albeit these together may exceed the direct losses in the case of droughts, and account of a bulk of damage in the case of flood.

As a consequence, the actual losses are underestimated and policy responses which are based on such a data are insufficient or inadequate to mitigate the future disaster risks. Often the poor assessment of inflicted losses favours primarily structural policy responses which, in long run, may increase the sensitivity to disasters and further exacerbate the problem.

The Xerochore project contributed to a better recovery of costs for water services through the description of economic and social effects inflicted by droughts; social and economic vulnerability to natural hazards; key water demand management options to deal with drought and water scarcity, their advantages and possible unintended consequences; and key water supply management options to deal with drought and water scarcity, and their assessment.

Policy milestones and relevant Xerochore key outputs

By 2010: Introduce water-pricing policies that provide adequate incentives for efficient water use (Article 9).

By 2010: Determine adequate contribution of the different water uses (industry, households and agriculture) to the recovery of the costs of water services (Article 9).

Before 2015: Justify the temporary deterioration in the status of water bodies if this is the result of circumstances of natural cause which are exceptional or could not reasonably have been foreseen, including prolonged droughts

To this end, the Xerochore project collected policy relevant knowledge on:

Direct and indirect losses (ripple effects) caused by droughts. Methodologies to estimate these losses and their limits. Range of reported losses due to drought in Europe and beyond.

Economic, social, institutional and legislative factors which mediate the magnitude of droughts' impacts (i.e. community's vulnerability and resilience).

Performance and caveats of economic instruments such as water prices, transfers, taxes, charges, subsidies or tradable permits for the management of scarce water resources. Preconditions under which economic instruments complement or perform better than other (e.g. regulatory or behavioural) instruments.

Implications of inadequate economic estimates of economic and social effects of droughts on the choices of policy to mitigate drought hazard.

Water demand and supply management options for the different water-use sectors that can be applied in addition to water pricing.

Limitations identified by Xerochore:

Economic assessment of droughts is a difficult and under researched topic, fraught with uncertainty, intrinsic complexity, methodological challenges and different conceptualisations of losses. Most studies focus on property damages and less so on higher-order, and intangible (non-market, environmental and social) impacts.

The lack of accurate estimates has two important drawbacks. First, the true challenge to sustainable development posed by droughts is understated, undermining the formulation of appropriate policy actions. Second, the undervalued costs may favour ineffective, often primarily structural and supply-led policy responses which, in long run, may increase the sensitivity to drought and by doing so further exacerbate the problem. Among the components of the cost of drought, the least well estimated are the non-market losses, arising from restrictions on water use to households, poor quality of water etc.

As droughts become more frequent and sensitivity to droughts increases, the economic effects will raise exponentially. To what extent the costs have increased over the past decades and whether climate change can be blamed remain an estimate given the current patchy empirical underpinning. Concerted actions in this respect should be taken at the European level, given the transboundary impacts of droughts.

The only available study at the EU level relies on a survey and self-reported losses that are poorly documented and rarely corroborated. Nevertheless the results from this study received prominent attention in the EC Communication on Droughts and Water scarcity.

The most effective way to address, if not to solve, the water shortages, whether permanent (water scarcity) or temporal (drought), is to increase water-use efficiency and shift to higher-value water uses. This will require considerable time to carry out, and one can expect to encounter significant resistance. Still, they are worthwhile. Essentially, efforts dedicated to mitigating impacts of droughts are investments which pay-off in terms of adaptation to climate change.

The impacts of droughts are mediated by a host of economic, social, institutional and legislative factors. As a result, the droughts of the same intensity striking different communities are most likely to lead to different damage. These factors epitomise community's vulnerability and resilience. Any prevention, relief or response action to drought disaster should take these factors into account and exploit them.

Main recommendations

A review of drought-related costs should be part of the economic analysis of water uses (Article 5 of the WFD) and monitoring campaigns (Article 8 of WFD). This should entail a comparison of the damage avoided against the costs of the measures. An urgent concerted action is to improve data collection on the economic and social costs of recent and past droughts in Europe. The study should be initiated at the level of Water Directors and in cooperation with the Civil Protection Mechanism.

Previous experience with such analysis indicates that pricing mechanisms (Article 9 of WFD) should play a significant role in encouraging water conservation and a shift to higher-value water uses). In particular, where permanent water shortages limit sustainable economic growth, the shift of water from agricultural to urban uses is likely to be cost-effective.

The water pricing schemes should include a variable 'scarcity' component which flexibly reacts to hydro-meteorological conditions, with a predetermined cap agreed beforehand.

Other instruments apart from water pricing should be exploited to address drought-contingent water shortages. These instruments, which include subsidy to modern water-conservation devices, cooperative agreement among the water users, and water transfers, should be applied in synergy with regulatory instruments and voluntary awareness-raising measures.

Further information on the XEROCHORE project:

Starting/Ending date of project:
1st May 2008 30th April 2010

Participating countries/institutes:
Fondazione Eni Enri Mattei, Italy [Coordinator]
Wageningen Universiteit, The Netherlands
Water Management Center GbR, Germany
Universitetet i Oslo, Norway
Ministero dell'Ambiente, della Tutela del Territorio e del Mare, Italy
Ministerio de Medio Ambiente, Spain
Natural Environment Research Council, United Kingdom
National Technical University of Athens, Greece
EC DG Joint Research Centre, European Commission, Italy
Centre National du Machinisme Agricole, du Genie Rural, des Eaux et des Forets, France
The International Union for Conservation of Nature and Natural Resources, Switzerland

Type of R&D:
Specific support action

Programme:
7th Framework Programme
Theme 6: Environment
(Including Climate Change)

Web-Links:
Xerochore:
<http://www.feem-project.net/xerochore/>
European Drought Center:
<http://www.geo.uio.no/edc/>
European Drought Observatory:
<http://edo.jrc.ec.europa.eu>

Additional technical / scientific information

Xerochore Extended Guidance Document on the Economic and social impacts of drought (D.2.2).

Brochure “pan-European Drought Policy Framework”.

Selected related projects / activities

WATER2ADAPT: Resilience enhancement and water demand management for climate change adaptation. Project funded under the 2nd Joint IWRM-NET funding initiative by the German Federal Ministry of Education and Research, Ministerio de Ciencia e Innovación (Spain), ISPRA - Istituto Superiore per la Protezione e la Ricerca Ambientale (Italy), and Foundation for Science and Technology (Portugal). Project coordinated by FEEM (Italy) (IWRM-net founding initiative, 2010-2012).

Climate Adaptation modelling water scenarios and sectoral impacts. Tender DG ENV.D.2/SER/2009/0034. Project coordinator CESR Center for Environmental Systems Research (Germany) (DG Environment, 2010-2011).

CapHaz-Net Social Capacity Building for Natural Hazards: Toward More Resilient Societies. FP7 project coordinated by UFZ Centre for Environmental Research, Leipzig (Germany) (FP7 2009 2011)

CONHAZ Costs of Natural Hazards. FP7 project coordinated by UFZ Centre for Environmental Research, Leipzig (Germany) (FP7, 2009-2012).