



## Assessing future drought impacts and vulnerability through scenario analysis in Portugal under DROUGHT- R&SPI

Vanda Acácio, Susana Dias, Francisco Rego, Carlo Bifulco



Centro de Ecologia Aplicada Prof. Baeta Neves - Instituto Superior de Agronomia, UTL  
Tapada da Ajuda 1349 - 017 Lisboa PORTUGAL

[vanda\\_acacio@yahoo.com](mailto:vanda_acacio@yahoo.com)

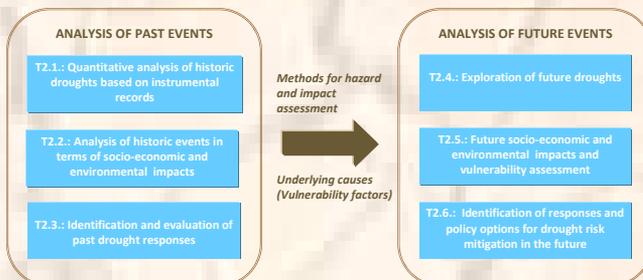


DROUGHT-R&SPI is a European research project (2011-2014) with 12 partners from 9 European countries, aiming at improving drought preparedness across Europe (<http://www.eu-drought.org/>).

### PROJECT PARTNERS

Wageningen University, Hydrology and Quantitative Water Management Group (NETHERLANDS)	Eidgenössische Technische Hochschule Zürich, Institute of Atmospheric and Climate Science (SWITZERLAND)
National Technical University of Athens, School of Chemical Engineering (GREECE)	Universidad Complutense de Madrid, Geodynamic Department (SPAIN)
Universitetet i Oslo, Department of Geosciences (NORWAY)	Università Commerciale "Luigi Bocconi", Center for Research in Regional Economics, Transport and Tourism (ITALY)
Albert-Ludwigs-Universität Freiburg, Institute of Hydrology (GERMANY)	Université de Caen Basse Normandie, Centre de recherche d'histoire quantitative (FRANCE)
Universidad Politécnica de Valencia, Institute of Water and Environmental Engineering (SPAIN)	Stichting Delta Landbouwkundig Onderzoek, Integrated Water and Resource Team (NETHERLANDS)
Instituto Superior de Agronomia, The Centre for Applied Ecology (PORTUGAL)	Eidgenössische Forschungsanstalt WSL, Economics and Social Sciences (SWITZERLAND)

### Structure and interaction of Project Tasks (T)

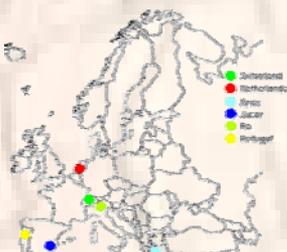


The project will use information on past drought events, past drought impacts, and factors that determined past impact magnitude (vulnerability) to explore impacts and vulnerability of future droughts for case studies.



### SIX CASE STUDIES

DROUGHT-R&SPI combines research for six selected case studies (national, basin and local scales) with research at the pan-European scale.



### SCIENCE-POLICY DIALOGUE FOR SCENARIO DEVELOPMENT

#### How will current vulnerability factors evolve?

The potential impacts of future drought events depend not only on the type of the natural hazard, but also on the characteristics of the local system. Such characteristics will most likely change in the future and should be taken into account when estimating potential future impacts. A commonly used approach for considering such changes is the development of scenarios, which will be analysed in a participatory way through the Case Study Forum.

<b>Portugal Drought-R &amp; SPI Case Study Forum</b> Collaboration between government stakeholders, water users and risk experts
<b>National authorities</b> Instituto da Água (INAG/APA) Autoridade Nacional de Protecção Civil (ANPC) (HFA Focal Point) Direcção Geral de Agricultura e Desenvolvimento Rural (DGADR) Direcção Geral de Saúde (DGS)
<b>Regional authorities</b> Administrações das Regiões Hidrográficas
<b>Water users</b> Entidade Reguladora dos Serviços de Águas e Resíduos (ERSAR) Empresa Portuguesa das Águas Livres (EPAL) Federação Nacional de Regantes de Portugal (FENAREG) Energias de Portugal (EDP)
<b>Other risk experts</b> Instituto de Meteorologia (IM) Laboratório Nacional de Engenharia Civil (LNEC) Comissão Nacional de Combate à Desertificação (CNCD/AFN) Universities
<b>NGOs</b> WWF (Mediterranean Program) Liga para a protecção da Natureza (LPN)



### EXPLORATION OF FUTURE DROUGHTS The WATCH Project

Data generated in the FP6 WATCH (WATER and global Change) Project (2007-2011; <http://www.eu-watch.org/>) will be used to assess characteristics of future droughts. Gridded (50x50km) time series of WATCH Future Forcing Data (1960-2100) of meteorological and hydrological variables (precipitation, temperature and daily runoff) will be analysed with a multi-model and multi-scenario.

### QUANTIFICATION OF FUTURE DROUGHT IMPACTS AND VULNERABILITY ASSESSMENT

The quantification of future impacts will be based on:

- Projections of future droughts (WATCH data);
- Scenario analysis on the non-climatic drivers, which define the future vulnerability of the studied system;
- Previous analysis of drought impacts occurred in the past.

Quantification of future drought impacts will be used to develop profiles on future vulnerability, through the definition of indicators for: exposure to the natural hazard, sensitivity of the different sectors, and adaptive capacity.



Transboundary water resources are one of the most important factors determining vulnerability to droughts in Portugal (Douro valley)



Water demand has been increasing due to an expansion of irrigated area (olive cultivation, Guadiana basin)