

**XEROCHORE**

**SURVIVING A  
DROUGHT**

**An Exercise to Assess Research Needs  
and Policy Choices in Areas of Drought**

Background image: <http://www.kineticfaith.com/>

1.

## Outline

---

Droughts

Xerochore project

Xerochore events

Results

## 2.

# Drought coverage in NYT

## Worst Drought in Half Century Shrivels the Wheat Belt of China

By MICHAEL WINES

A normally dry rural region has been parched in recent months, aggravating economic problems facing the Beijing government.

February 25, 2009 | WORLD | NEWS

## In Parched Argentina, Worries Over Economy Grow

By ALEXEI BARRIONUEVO

In addition to double-digit inflation and growing unemployment, Argentina's worst drought in more than 50 years is magnifying the country's chances of suffering another economic crisis.

February 21, 2009 | WORLD | NEWS

BEEVILLE JOURNAL

## Texas Ranchers and Farmers Struggle in Drought

By JAMES C. MCKINLEY Jr.

Farmers have found themselves playing a guessing game amid the worst drought in nearly 100 years.

February 12, 2009 | US | NEWS

## On Parched Farms, Using Intuition to Find Water

By JESSE MCKINLEY

Scientists pooh-pooh "water witches," who claim to know where to drill for water, but the dowsers are in demand.

October 9, 2008 | US | NEWS

## Drought-Stricken South Facing Tough Choices

By BRENDA GOODMAN

A drought in the Southeastern United States has become so severe that some cities are just months away from running out of water.

October 16, 2007 | US | NEWS



## Southeast Drought Study Ties Water Shortage to Population, Not Global Warming

By CORNELIA DEAN

Researchers also concluded that rapid population growth was more responsible for the severe water shortages than rainfall patterns were.

October 2, 2009

MORE ON DROUGHT AND: GLOBAL WARMING, POPULATION, WEATHER, GEORGIA, NATIONAL WEATHER SERVICE, COLUMBIA UNIVERSITY

## Eyes Turn to Mexico as Drought Drags On

By RANDAL C. ARCHIBOLD

Drain water that used to go unwanted, creating a wetland in the Mexican desert, is now being considered to mitigate the Southwest's water shortage.

September 14, 2009

MORE ON DROUGHT AND: DESALINATION, WETLANDS, COLORADO RIVER, UNITED STATES, CALIFORNIA, SOUTHWESTERN STATES (US), ARIZONA, MEXICO, ENVIRONMENTAL DEFENSE

[Border Water Dispute Reaches New Levels](#)

## Mexico Now Enduring Worst Drought in Years

By ELISABETH MALKIN

Crops are drying up in the fields and water is being rationed in the capital as Mexico struggles with its worst drought in six decades.

September 13, 2009

MORE ON DROUGHT AND: IRRIGATION, AGRICULTURE, RATIONING AND ALLOCATION OF RESOURCES, MEXICO

## Drought Puts Focus on a Side of India Left Out of Progress

By JIM YARDLEY; HARI KUMAR CONTRIBUTED REPORTING.

The crisis has underscored the problems facing Indian agriculture as the population expands at the same time that water resources come under greater pressure.

September 5, 2009

MORE ON DROUGHT AND: POLITICS AND GOVERNMENT, ECONOMIC CONDITIONS AND TRENDS, INDIA, INDIAN NATIONAL CONGRESS



## Drought coverage in NYT (cont.)

### Iraq Suffers as the Euphrates River Dwindles

By CAMPBELL ROBERTSON; AMIR A. AL-OBEIDI, MOHAMMED HUSSEIN and ABEER MOHAMMED  
CONTRIBUTED REPORTING.

The river is drying up as a result of the water policies of Iraq's neighbors, a drought and years of misuse by Iraq.  
July 14, 2009

MORE ON DROUGHT AND: [WATER, IRAQ](#)

...> [The Shrinking Euphrates](#)



### Disaster Request for a Drought-Hit County in California

By SOLOMON MOORE

Gov. Arnold Schwarzenegger asked President Obama to declare Fresno County a federal disaster area because of a three-year drought straining the agricultural industry.

June 20, 2009

MORE ON DROUGHT AND: [AGRICULTURE, UNITED STATES ECONOMY, DISASTERS AND EMERGENCIES, UNEMPLOYMENT, CALIFORNIA, OBAMA, BARACK, SCHWARZENEGGER, ARNOLD](#)

### Study Finds Pattern of Severe Droughts in Africa

By ANDREW C. REVKIN

Researchers warned that global warming was likely to exacerbate these droughts and that there was an urgent need to help populations in harm's way.

April 17, 2009

MORE ON DROUGHT AND: [AFRICA](#)



### Fearing Wildfires, Utility Plans Power Shutdowns

By JENNIFER STEINHAUER

A disputed plan in San Diego County would shut off power for rural residents under specific weather conditions.

April 17, 2009

MORE ON DROUGHT AND: [WEATHER, BLACKOUTS AND BROWNOUTS \(ELECTRICAL\), FOREST AND BRUSH FIRES, ELECTRIC LIGHT AND POWER, RURAL AREAS, FIRES AND FIREFIGHTERS, SAN DIEGO \(CALIF\), SEMPRA ENERGY, SAN DIEGO GAS & ELECTRIC COMPANY](#)



### Hundreds Protest Cuts in Water in California

By MALIA WOLLAN

"No Water, No Jobs, No Food," read one sign, expressing the frustration of many in a region battered by a three-year drought, the national recession and surging unemployment.

April 17, 2009

MORE ON DROUGHT AND: [WEATHER, WATER, UNEMPLOYMENT, ECONOMIC CONDITIONS AND TRENDS, CENTRAL VALLEY \(CALIF\), CALIFORNIA](#)



### California Gets Federal Help to Ease Its Water Woes

By FELICITY BARRINGER and JESSE MCKINLEY; FELICITY BARRINGER REPORTED FROM RANCHO CORDOVA, and JESSE MCKINLEY FROM SAN FRANCISCO.

As part of the federal stimulus plan, the interior secretary offered California \$260 million to patch the Central Valley's decrepit water-delivery system and protect its threatened fish.

April 16, 2009



# 4.

## Drought in pictures



Prix Pictet photography award winner Benoit Aquin  
"The Chinese Dust Bowl". <http://www.benoitaquin.com/>

5.

## Drought in pictures (cont.)



Prix Pictet photography award winner Benoit Aquin  
"The Chinese Dust Bowl". <http://www.benoitaquin.com/>

6.

## Drought in pictures (cont. 2)



Prix Pictet photography award winner Benoit Aquin  
"The Chinese Dust Bowl". <http://www.benoitaquin.com/>

7.

## Drought in pictures (cont. 3)



Prix Pictet photography award winner Benoit Aquin  
"The Chinese Dust Bowl". <http://www.benoitaquin.com/>

## 8.

## Future outlook

---

**Citation:** Feyen, L., and R. Dankers (2009), Impact of global warming on streamflow drought in Europe, *J. Geophys. Res.*, *114*, D17116, doi:10.1029/2008JD011438.

- In the frost-free season streamflow droughts will become more severe and persistent in most parts of Europe by the end of this century, except in the most northern and northeastern regions.
- In the frost season, streamflow drought conditions will be of less importance under future climate conditions

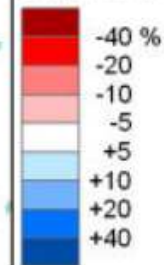
# 9.

## Future outlook (cont.)



Feyen and Dankers (2009)

Change in minimum flow  
Relative change in 7-day minimum flow with a recurrence interval of 10 years in the scenario run (2071-2100) relative to the control run (1961-1990). Simulations are based on the SRES A2 scenario. Only the non-frost season is considered.

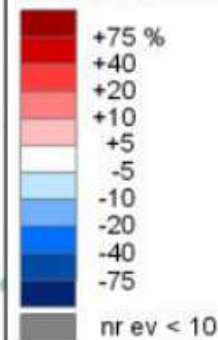




Feyen and Dankers (2009)

#### Change in deficit volume

Relative change in flow deficit volumes with a recurrence interval of 10 years in the scenario run (2071-2100) relative to the control run (1961-1990). Simulations are based on the SRES A2 scenario. Only the non-frost season is considered. Thin gray lines indicate river sections where the number of events in the scenario period was less than 10 and no GP distribution was fitted.



# EU Drought Policy



COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 18.7.2007  
COM(2007) 414 final

**COMMUNICA  
TO THE EUROPEA**

**Addressing the challenge of w**



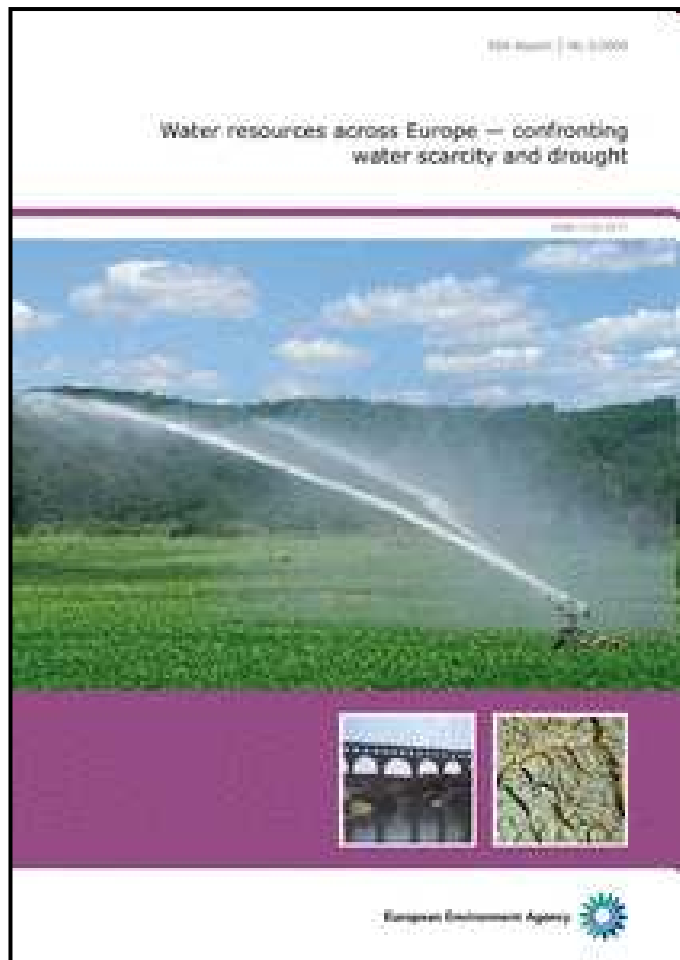
COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 19.12.2008  
COM(2008) 875 final

**REPORT FROM THE COMMISSION TO THE COUNCIL  
AND THE EUROPEAN PARLIAMENT**

**Follow up Report to the Communication on water scarcity and droughts in the  
European Union COM(2007) 414 final**

# EU Drought Policy



## XEROCHORE project

---



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

<b>Instrument:</b>	FP7 – Support Action	<b>Starting date:</b> 01/05/2008
<b>EC contribution:</b>	1,500,889.00	<b>Duration:</b> 18 months (extended by 6 months)
<b>Organisation:</b>	Fondazione Eni Enrico Mattei	
<b>Co-ordinator:</b>	Prof. Anil Markandya (anil.markandya@feem.it)	
<b>Project manager:</b>	Ms. Monica Eberle (tel. 39 041 2711458, e-mail monica.eberle@feem.it)	
<b>EC officer:</b>	Philippe Quevauviller (Philippe.Quevauviller@ec.europa.eu)	

---

## Objectives

---

- To synthesize knowledge on physical causes, human influences and impacts
- To compile a roadmap on research needs and steps forward to fill them,
- To provide guidance for policy makers and stakeholders in drought management,
- To initiate a platform (i.e. extended European Drought Centre EDC) of drought related research and policy making

## Xerochore Partners

---

- 1 Prof. Anil Markandya Fondazione Eni Enrico Mattei
- 2 Dr. Henny A.J. van Lanen Wageningen Universiteit
- 3 Mr Oliver Olsson Water Management Center GbR
- 4 Prof. Lena M. Tallaksen Universitetet i Oslo
- 5 Dr. Giorgio Pineschi Ministero dell'Ambiente, della Tutela del Territorio e del Mare
- 7 Dr. Gwyn Rees Natural Environment Research Council
- 8 Prof. Dionysis Assimacopoulos National Technical University of Athens
- 9 Dr. Stefan Niemeyer DG Joint Research Centre, European Commission
- 10 Dr. Eric Sauquet Centre National du Machinisme Agricole, du Genie Rural, des eaux et des Forets
- 11 Dr. Ger Bergkamp The International Union for Conservation of Nature and Natural Resources

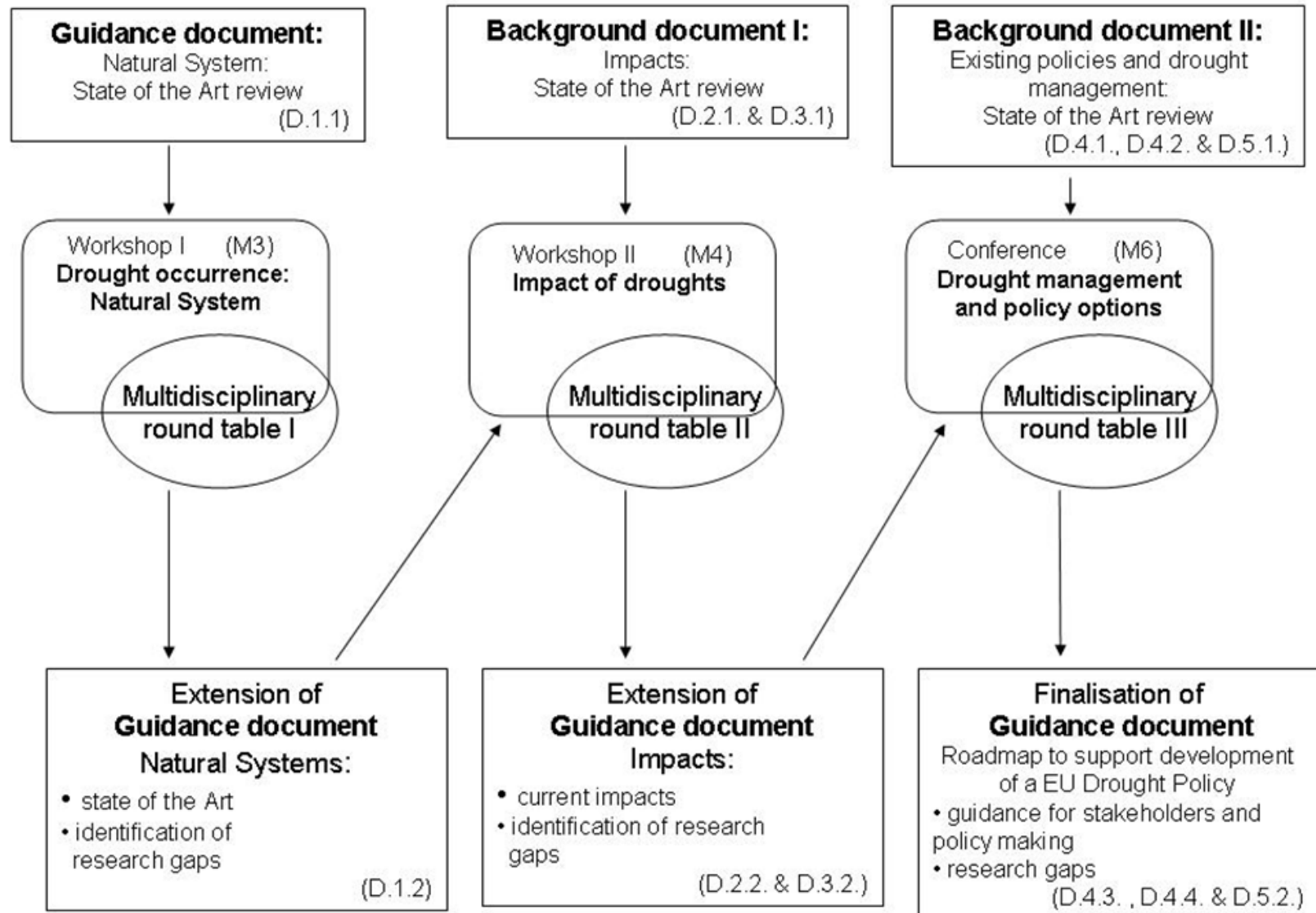
15.

## Project structure

---

WP 1: Natural system,  
impact of climate and  
hydrology on drought

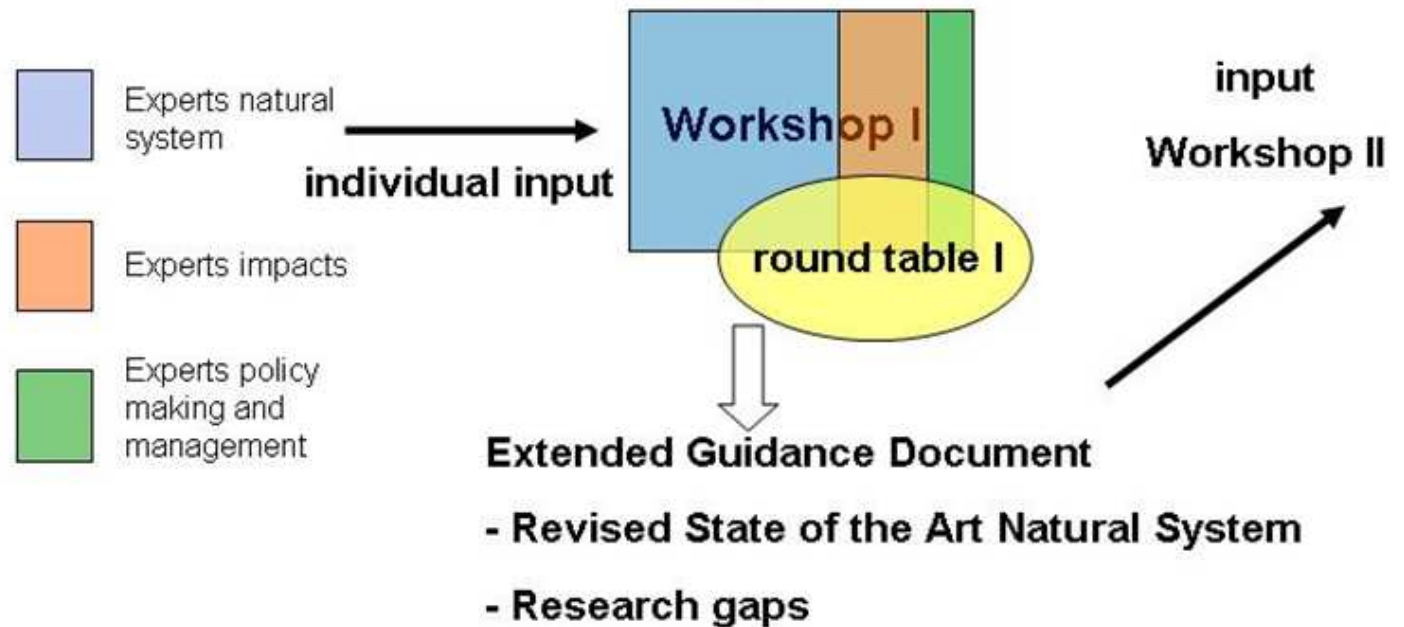
## Xerochore events



## Xerochore events (cont.)

### Events:

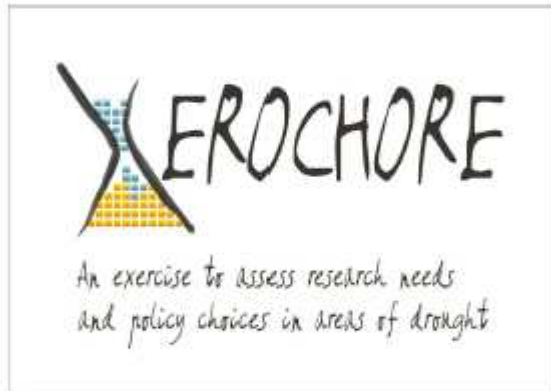
- Workshop I: Drought occurrence  
– Natural system
- Workshop II: Impacts of droughts
- Conference: Drought management and policy options



## Preliminary outputs

7<sup>TH</sup> FRAMEWORK PROGRAMME  
THEME 6  
Environment (Including Climate Change)

FP7-ENV-2007-1 (ENV.2007.1.3.3.3.)  
Grant agreement no.: 211837



**Extended Guidance Document on  
the Natural System & Drought (D.1.2)**

part of  
Work Package 1: Natural System

7<sup>TH</sup> FRAMEWORK PROGRAMME  
THEME 6  
Environment (Including Climate Change)

FP7-ENV-2007-1 (ENV.2007.1.3.3.3.)  
Grant agreement no.: 211837



**Background Document on Economic and Social  
Impacts of Droughts,  
Demand and Supply-side Options  
State of the Art review (D.2.1)**

**Background Document on Environmental  
Impacts of droughts - State of the art review  
(D.3.1)**

Work Package 3

<http://www.feem-project.net/xerochore>

AN EXERCISE TO ASSESS RESEARCH NEEDS AND  
POLICY CHOICES IN AREAS OF DROUGHT




HOME

project description

partners

events

downloads

links



#### XEROCHORE NEWS



04/09/09

2<sup>nd</sup> Xerochore  
Workshop  
5-7 October  
2009, Venice  
Italy

[» read more](#)



#### WELCOME TO XEROCHORE WEB SITE

XEROCHORE is a Support Action aimed at assisting in the development of a European Drought Policy in accordance with the EU-Water Framework Directive (EU-WFD).

#### Funded by EU FP7



XEROCHORE is a Support Action founded by European Commission under the FP7 - Theme 6, Environment (Including Climate Change)

XEROCHORE SA (An Exercise to Assess Research Needs and Policy Choices in Areas of Drought) aims to mitigate and to adapt to droughts, and hence reduce the risks they pose in Europe.

XEROCHORE SA compiles a roadmap that comprises of:

- 1) a state-of-the-art review and identification of the research gaps in the natural system, in impact assessment, in policy-making and in integrated water resources management, and
- 2) an assessment of the possible impacts of droughts and guidance on appropriate responses for stakeholders.

# European Drought Centre

<http://www.geo.uio.no/edc/>

**edc** EUROPEAN DROUGHT CENTRE

**Home** 

EUROPEAN DROUGHT CENTRE WEBSITE

The European Drought Centre (EDC) is a virtual centre of European drought research and drought management organisations to promote collaboration and capacity building between scientists and the user community. The long term objective of the centre is to enhance European co-operation in order to mitigate the impacts of droughts on society, economy and the environment. Although the EDC primarily has a European dimension, it will also link with other international projects, organisations and experts outside Europe. You are invited to sign up.

**EDC NEWS**

- **FRIEND 2010: Sixth World FRIEND Conference in 2010. Global Change: Facing Risks and Threats to Water Resources, Fez, Morocco, 25-29 October 2010. Call for abstracts (deadline 30 September 2009).**
  - › [First call for papers and provisional registration \(pdf\)](#)
- **XEROCHORE library with references on on drought management and mitigation**
- **Conclusions and Recommendations (pdf): UNESCO EURO-FRIEND International Workshop on Low Flow and Drought, Comenius University, Bratislava, Slovakia, 10-12 November 2008**
- **Report (pdf): WATCH International Summer School on Hydrological Drought and Global Change, ICTP, Trieste, Italy, 22-27 June 2008**

**Navigation Menu:**

- Home
- EDC
- Drought
- Resources:
  - Europe Today
  - World Today
  - EDC Archive
  - Downloads
  - Links
  - References
- Activities:
  - Events
  - Projects
  - Network Groups
- Organisation:
  - Core-Group
  - Members
  - Joining
  - Contact



**Thank you for your attention**