The conflicts over the uses of water resources: economic and social aspects

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Outline

• A brief introduction

• Resource costs in the context of the Water Framework Directive

• Water scarcity and droughts

• Europe’s living up to drought risk
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Preamble

- Conflicts have negative connotation but also triggers positive social changes,
- People short of water do not necessarily fight over it,
- Economic efficiency maximises the value of water across all water uses/sectors,
- Equity criterion important - distribution of benefits and costs across society and generations,
- Access to clean water and sanitation a fundamental human right (UN Resolution in 2010)
Economic value, price and surplus

Marginal costs of supply = marginal benefits of the use
Resource and environmental costs

- Resource costs (1) - costs of foregone opportunities which the other uses suffer due to the depletion of the resources beyond its natural rate of recovery (Wateco)

- Resource costs (2) – opportunity costs of using water as a scarce resource; a difference between current and efficient allocation of water (ECO2) or with other words, costs of inefficient use of water

- Environmental costs – damage that water uses impose on the environment and ecosystems and those who use the environment

- Environmental costs may be a part of the benefits with which the resource costs are calculated, risk of double counting.
ERC in the context of WFD

- Article 9: cost recovery of water services including environmental and resource costs,
- Article 9: Water pricing policies as incentives for water users to use water resources efficiently
- Annex III and Article 11: cost-effective combination of measures in respect of water uses
- Article 4: economic justification for derogation (achievement of the environmental objectives disproportionately expensive; benefits of new modification or economic activity outweigh benefits from good water status)
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Water Scarcity & Droughts

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

Mysiak Jaroslav
Fondazione Eni Enrico Mattei

Venice
nov. 25th – 26th, 2010
Drought is a manifestation of climate variability, a prolonged period of deficient precipitation. Because precipitation replenishes soil moisture, groundwater aquifers, and surface streams, any deficit in input is eventually felt down the hydrological cycle.

Failed replenishment set off stress waves across water uses and users which quickly spread beyond the initially affected area, community or sector.

The reduced water availability and increasing demand for water in agriculture, energy production and by households will in many places already is create stress the communities have to learn to live with.

Vulnerability to drought is a function of the temporal and spatial distribution of water demand and the distribution of natural water yield. Part of the Europe's vulnerability to drought is the patchy information about the impacts of the past drought spells.
Europe’s vulnerability to drought

The warmest summer in documented history
Economic losses of approx. € 20 billion

Exceptional drought and heat wave in 2003

Source: UNEP, 2004
Average annual water stress

Base year (upper map) and under the IPCM4-A2 and MIMR-A2 climate by 2050.

The water stress index, i.e. the withdrawals-to-availability ratio indicates the amount of water abstracted each year as a proportion of total long-term freshwater resources.

Source: Floerke 2010

- Step-change to more socially-oriented responses addressing “personal, family, farm and community well-being”
- Focus on people and (the viability of) communities and not businesses
- ‘Living with dryness’, rather than responding to recurrent periods of drought
The economic impacts of droughts for the past 30 years has been estimated to top 100 billion Eur. In the most recent years the annual costs climbed to over €6.2 billion or 0.1% of EU15 GDP.

- Riebsame et al. (1991) – the 1988 drought, $39.4 billions
- FEMA – average costs 6-8 billions,
- Hayes et al (2004), the 2002 drought, > 13 billions
- Howitt et al. (2009), California 2009 drought, 2.2 billions, 80,000 jobs
- Adams et al. (2002), the 2002 drought event in Australia, 1.6% of GDP decline, 1% of unemployment
- RBA (2006), the 2006/7 drought, 20% of Farm GDP, < 1% of GDP
Social effects of droughts

- Reduced air quality by drought-exacerbated aerosolization of spores in soil, or through air-born particulates released e.g. by bushfire,
- Degraded water quality and inadequate access to sanitation services that promote spread of water-born infectious diseases such as cholera, dysentery and other diarrhoeal diseases,
- Dehydration and malnutrition
- Mental disorders such as depression and anxiety with symptoms of psychosomatic illness such as migraine, back pain and irritable bowel syndrome
Social effects of droughts (cont.)

- Effects of droughts impinge on almost any aspect of individual and social life, including nutrition, education, life satisfaction and wellbeing, social cohesion and order, relationships, population displacement, and public safety.

- Social impacts assessment are qualitative and patchy. Common set of Indicators and proxies allowing a comparison of social hardship across communities. Better understanding of the impacts of drought across social groups.

- Role of social resilience, social capital, and quality of governance in attenuating the impacts. Attribution of observed social changes to natural disasters/droughts.
FEEM’s research on water scarcity and drought

- **FP7 XEROCHORE**: An Exercise to Assess Research Needs and Policy Choices in Areas of Drought (2008-2010)
- IWRM-net **WATER2ADAPT**: Resilience enhancement and water demand management for climate change adaptation (2010 – 2012)
- **DG ECHO PREEMPT**: Policy-relevant assessment of economic and social effects of hydro-meteorological disasters (2011-2012)
- **FP7 AVERT**: Integrated impact and vulnerability assessment to drought disaster risk and policy leverage (under evaluation)
XEROCHORE has synthesized knowledge on past and future droughts and identified research gaps to support development of drought management plans (DMPs). It covered the following drought fields:

**Natural/physical System:** hydroclimatology; integrated drought assessment framework (hydrology and climate); drought monitoring (incl. early warning) and forecasting.

**Socio-economic and environmental impacts:** methodologies for impact assessment; review wide range of water demand- and supply management (WDM and WSD) instruments and recent drought cases.

**Drought management and policies:** overview of European and national policies and management efforts addressing drought. Processes for developing drought management plans (DMPs) within WFD river basin management plans; minimum required content of DMPs.
XEROCHORE has:

- provided guidance on drought to stakeholders
- significantly extended the network of drought experts through the European Drought Centre
- produced 5 Science Policy Briefs on the link between drought and the EU Water Framework Directive, i.e.:
  - characterisation of water bodies and of the analysis of pressures and impacts (Art. 5)
  - monitoring of surface water and groundwater status and of protected areas (Art. 8 - relevant also for Art. 1)
  - recovery of costs for water services (Art. 9)
  - implementing a programme of measures (Art. 11, including Annex VI part b)
  - river basin management plans (Art. 13)
Case study oriented research

EPI-Water, Water2Adapt, PREEMPT, AVERT*
- past drought events revisited: economic and social costs, vulnerability and resilience;
- water demand management option: performance, enabling conditions, uncertainty, side effects
Thank you for your attention!