Understanding vulnerability and response to drought: from a local to a pan-European scale

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Drought Vulnerability & Responses

Patton (2010)
Drought Vulnerability & Responses

**European analysis**

- Pan-EU - Mapping of vulnerability factors
- Country – Evaluation of past responses (& vulnerability analysis)
- RB: Evaluation of past responses (& vulnerability analysis)
- Local: past responses (& vulnerability analysis)

**Spain**

- Country: Discourse & content analysis of exceptional laws
- River Basin: Evaluation of past responses
- Farmers’ perception & local strategies
Pan-European mapping of vulnerability

Literature review
• Over 180 Applied Vulnerability assessments
• Over 80 theoretical papers
• Systematic review of 71 applied drought vulnerability assessments

Impacts reported in the European Drought Impact Inventory (EDII)

Adaptive Capacity
Legal/Institutional factors
Socio/Cultural factors
Water Development factors
Financial/Economic factors

Exposure factors
Sensitivity factors

Case Study past responses
Case Study vulnerability analysis

Situations of vulnerability to water shortage
Drought Vulnerability & Responses

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The analysis in Spain

Country: SPAIN

River Basin: JÚCAR
Local IRRIGATION DISTRICTS
Perception and local strategies

PROBLEM DEFINITION

- Definition
  - Experience
  - Memory

behaviour

RESPONSE TO DROUGHT

- Farmers’ actions
  - Other measures implemented by other actors at different levels

VULNERABILITY FACTORS
Perception and local strategies

**Different perceptions of drought**
- “There is no water in the channel”
- “We didn’t plant vegetables”
- “Irrigation shifts lasted 40 days”
- “Someone lost the entire harvest”
- “There is no water in the reservoirs”
- “We have drought every summer”
- “It doesn’t rain in the mountains”
- “We have never had restrictions”

**Different factors of vulnerability**
- Crop type (GW/SW)
- Water quality (GW)
- Irrigation timing (SW)
- Diversification of sources (SW/GW)
- Location within the system (SW)
- Revised Irrigation shifts (SW)
- Cost sharing (energy, wells) (GW/SW)
- Joint Interface with the RBO (GW/SW)
- Internal water transfers (GW)

**Collective strategies**
- Internal water transfers (GW)
- Revised Irrigation shifts (SW)
- Cost sharing (energy, wells) (GW/SW)
- Joint Interface with the RBO (GW/SW)
What can we learn from all this?

Different scales = different perspectives

Inconsistencies across scales

Response and vulnerability evolve over time
Scale matters

EUROPEAN:
• Mapping of vulnerability factors
• Standards for data collection

NATIONAL:
• Regulatory framework (e.g. exceptional laws)
• Official discourse, dominant paradigms in water management

RIVER BASIN:
• Understanding of the water system
• Water allocation among users and infrastructures development

LOCAL:
• Stakeholders perception and vulnerability factors at a local level
• Strategies to address drought individually and collectively

Coarse mapping to inform EU decisions
Policies are often designed at a national level
Policies are often implemented at a sub-national level
Detailed analysis of drought measures and their relation to the larger context
Inconsistencies in drought perception

**SPAIN (NATIONAL)** = Stress the natural origin; alarmist terms and exceptionality; Definitions based on rainfall > storage > impacts

**JUCAR RB** = References to hydrological drought, which causes impacts on water users

**IRRIGATION DISTRICTS** = Definitions are based on storage levels (19/24) > impacts (17/24) >> rainfall (7/24) or drought is not perceived (7/24)

Drought is NOT “normal”

Drought is “normal”
Operational definitions are used

The boundaries between water scarcity and drought is sometime blurry

Different approaches to drought management→ Risk approach (RB) – Crisis approach (Nat) – Mixed (L)
Inconsistencies in responses

- Spatial disconnect: national measures are promoted also in areas not affected by drought
- Temporal disconnect: long time span between drought relief needs and delivery of the response
- Different use of indicators: drought indicators at RB level ignored at the other levels
Evolution over time

*Comparing different drought events at the same place*

‘Fast’ changes in vulnerability are mainly achieved through changes in adaptive capacity

• Júcar RB = change after drought in the 1990s
  Shift toward proactive approach & development of Drought Management Plans

• Irrigation districts = change after drought in the 1990s
  Diversification of water sources
  Modernization of irrigation systems
Concluding Remarks: methodology

• Comparision is useful:
  • Comparing different case studies according to a set of common criteria
  • Comparing different drought events at the same place
  • Analysing a single event form different perspectives and scales

  Still, assessing measures and vulnerability across scales is challenging

• The analysis of discourses is useful to understand the underlying logic that affects drought actions at the different levels

• Stakeholders input is essential to really understand vulnerability and response to drought
Concluding Remarks: gaps

- Need to improve communication across scales so that efforts made at a certain level positively impact also the other levels
- Need to increase the consistency of the official discourse around drought
- Need to address inconsistencies between policy objectives and implemented measures
- Need to enhance data collection and data access (transparency)
  - Lack of impact data
  - No fully reliable data on water use by sectors, water rights, etc.
- Need to systematically evaluate response to drought