

Operational framework and tools for a proactive drought risk management



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Outline and policy needs

 In recent decades Italy has experienced extreme droughts both in semiarid southern regions and in the humid northern regions

It's assessed that since 2000 the cost of drought losses in Italy has amounted to \in 30 billion (with 1/3 just in the last 3 years)

✓ The prevailing reactive (crisis management) response to droughts by national and regional governments is usually costly, insufficient and poorly effective

A change of paradigm towards a proactive (drought risk management) approach at the political level cannot be further delayed

Implementation of a proactive approach to drought management

A drought risk management approach requires:

- ✓ A specific legislative and institutional framework
- ✓ Planning tools for drought preparedness and mitigation of water shortages in water supply systems
- ✓ Water resources monitoring and drought early warning
- ✓ Drought risk assessment
- Implementation of preparedness measures
- ✓ Management of emergencies and recovery

Unconditional Vs. conditional drought risk assessment in water supply systems

Drought risk in water supply systems can be assessed in terms of probabilistic features of water shortages through Monte Carlo simulation under the following frameworks:

Unconditional risk assessment

- No regard to the initial state/condition of the system
- Provides information on what could happen at any time over a long-term time horizon
- Useful for long-term planning purposes

Conditional risk assessment

- The initial condition of the system is required
- Provides information on what could happen at a specific time in the near future
- Useful for <u>short-term operational purposes</u>, early warning, etc.

Takehome messages for policymakers

- ✓ The potential for intensifying droughts and increasing water scarcity, also due to climate change, demands a new paradigm for water management based on proactivity and preparedness and prioritizes holistic and integrated solutions
- ✓ A specific institutional and legal framework for coping with drought is required to avoid a lack of coordination between the involved institutions
- ✓ Public and private bodies managing water supply systems should define in advance measures to face water shortage risk





Droughts in Northern Italy in 2022 and in Southern Italy in 2024 have damaged the agricultural and livestock sectors for more than € 11 billion



A shift towards a risk management approach, based on pre-established mitigation measures, is advocated by several International and European recommendations. Although drought management plans have been developed, their implementation and integration with other planning documents remain limited



A proactive approach consists of two main phases: preparedness of plans that allow to avoid and/or reduce water emergency consequences and implementation of such plans before, during and after a drought event



- ✓ The combination of long-term and short-term measures should be co-designed with the involved stakeholders
- ✓ Effective drought early warning systems can support timely implementation of contrasting measures
- ✓ Decision Support Tools integrating appropriate simulation models for the unconditional and conditional risk assessment can help water managers to reduce water shortage risk in the future and to adapt operating rules to the actual conditions of the water supply system based on triggering levels