

Assessment of drought impacts for Romania's water supply and sanitation sector

Meeting in Bucharest
30th - 31st October 2023

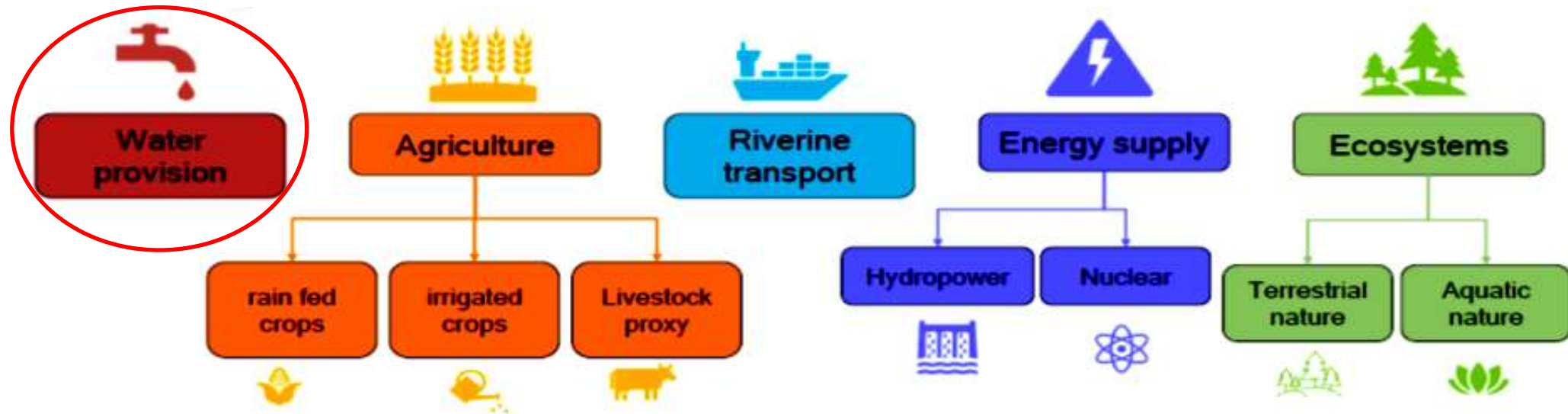
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Water

Why focusing on the water supply sector?

Many sectors are related to drought and its impacts...



... but little is known about its impacts on the water supply and wastewater sector.

Our assumption

...the Romanian water and sanitation sector is strongly impacted by the droughts.

Why?

- 200+ communities were temporarily cut from supply in 2022 and the Inspectorate for Emergency Situation (IGSU) had to deliver water.
- Any impact on the supply of the population is felt very strongly: water supply is vital and an issue of water security
- Even if water is generally available, 25% of the population still relies on private, unpredictable sources

Main impacted stakeholders of the WSS

- 1. National Administration 'Romanian Waters' (ANAR)** – as manager of the national public (bulk) water resources and infrastructure
- 2. Water Service Provider (44 ROCs and 1200+ LOCs)** – transformers of the bulk water into drinking water, distributors of the product to customers (households, businesses, institutions) and service providers for wastewater collection and treatment
- 3. Final water users** – i.e. households, businesses and institutions purchasing water and wastewater/sewage services

Note: Our impact assessment did not cover group 3.

Defining impacts we measure on the WSS

Economic impacts – i.e. beyond whether or not water supply was guaranteed.

- ANAR: restrictions to its supply (= decrease in revenue), and drought-related costs (e.g. removal of obstacles in time of low river flow)
- ROCs / LOCs: restrictions to their sales (=decrease in revenue), drought-related costs (e.g. due to changes in production processes or distribution)

Problem: economic impacts are mostly hidden under usual operational costs / revenues, not easily attributed to drought.

Impacts on the population (economic, well-being)

Methodology of the impact assessment

Data:

- drought indices
- benchmarking data for all ROCs provided by ARA
- in-depth interviews with selected ROCs and LOCs
- **Preparation:**
 - Bilateral talks with stakeholders to confirm assumption
 - Short survey to ROCs: 27/44 responded, clustering of ROCs based on water source and drought impact (for the detailed interviews)
- **Analysis of the benchmarking data for all ROCs:**
 - Correlation analysis between drought indices with data on operational costs and revenues from ROCs
- **Detailed interviews with selected Water Service Providers:**
 - Provide ROCs internal context on why they are economically impacted
 - Understand current and planned drought risk management

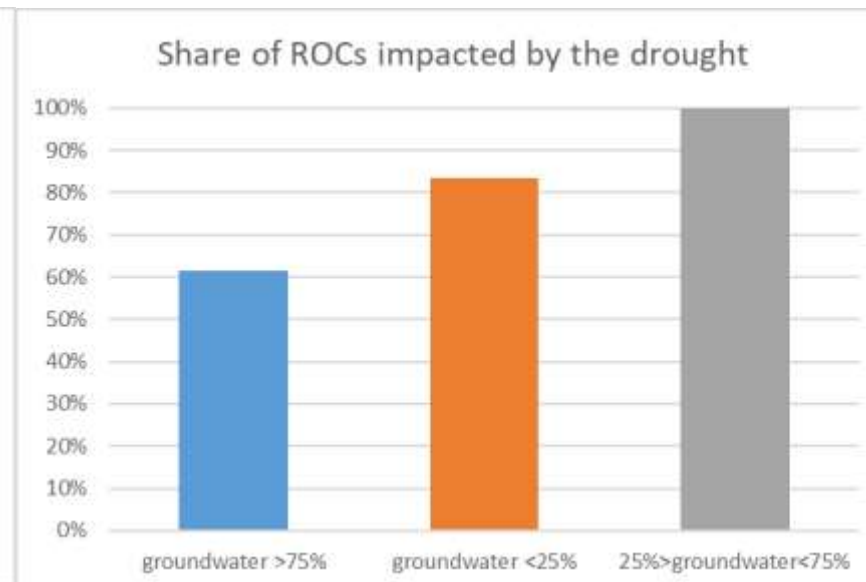
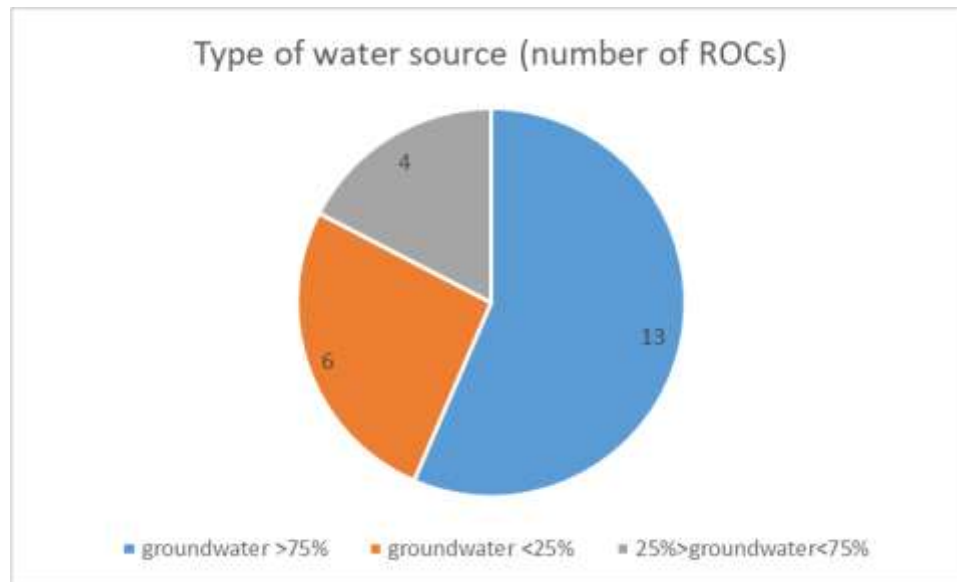
Preparation: Bilateral talks and short survey

Confirmation of our assumption:

23 ROCs provided complete answers to our short survey, and 13 stated being economically impacted by the drought;

Type of water source seems to play a role in drought impacts;

Yet other factors are critical too – covered in the benchmarking data analysis and the detailed interviews

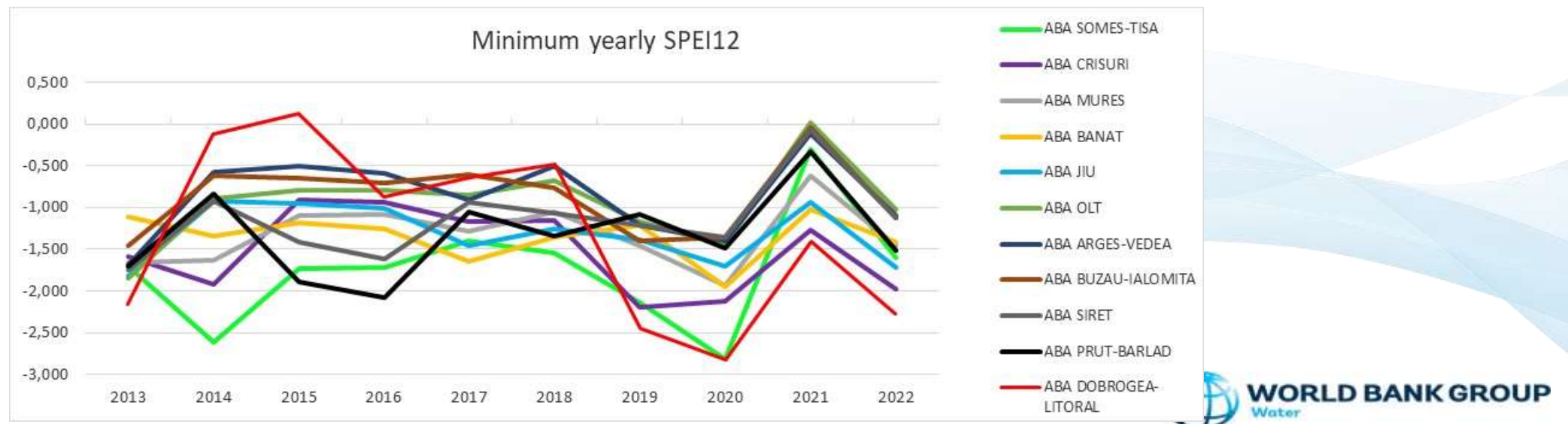


Analysis of benchmarking data (1)

Characterization of drought conditions – defining drought years

Drought indices used: yearly SPI12 and SPEI12 by RBA. Gives an indication how severe the lack of precipitation was in the most critical drought period for a given RBA.

Negative values show a water deficit.



Analysis of benchmarking data (2)

Correlations between the drought index and costs?

We do not find systematic correlation between drought and costs of the ROCs (nationally or at RBA level). E.g. RBA Ialomita-Buzau (4 ROCs)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) costs_raw_water Lei / 1000 connections	1.000							
(2) costs_treated_water Lei / 1000 connections	-0.499*** (0.001)	1.000						
(3) costs_merchandise Lei / 1000 connections	0.169 (0.298)	-0.733*** (0.000)	1.000					
(4) costs_electricity Lei / 1000 connections	-0.003 (0.986)	-0.050 (0.761)	0.247 (0.124)	1.000				
(5) costs_maintenance Lei / 1000 connections	-0.006 (0.969)	-0.472*** (0.002)	0.587*** (0.000)	0.235 (0.144)	1.000			
(6) costs_external_service Lei / 1000 connections	0.029 (0.861)	0.304* (0.057)	-0.112 (0.492)	-0.201 (0.214)	-0.012 (0.940)	1.000		
(7) costs_water_activity Lei / 1000 connections	0.108 (0.506)	-0.619*** (0.000)	0.818*** (0.000)	0.367** (0.020)	0.748*** (0.000)	-0.004 (0.979)	1.000	
(8) losses_distribution M ³ / 1000 connections	0.639*** (0.000)	-0.093 (0.570)	-0.225 (0.163)	-0.043 (0.791)	-0.335** (0.035)	0.082 (0.614)	-0.356** (0.024)	1.000
(9) SPEI12	0.031 (0.851)	-0.001 (0.994)	-0.159 (0.329)	-0.360** (0.022)	-0.140 (0.389)	-0.047 (0.772)	-0.195 (0.227)	0.015 (0.927)

Interpretation: lower SPEI values (i.e. it gets drier or drought worsens) are correlated with higher electricity costs, across all ROCs in this RBA.

Analysis of benchmarking data (3)

Why the lack of correlations at RBA level?

Potential reasons:

- Even within RBA, ROCs can vary in their operations and how drought impacts them – e.g. reliance on surface vs groundwater sources, etc.
- Our drought index expresses meteorological drought – which might affect ROCs with different lags according to their characteristics
- All 10 years between 2013 and 2022 are showing negative values of SPEI – i.e. all are statistically drought years. We have no comparisons with positive SPEI years, as benchmarking data only since 2013

Analysis of benchmarking data (4)

Lessons from the benchmarking data

- The variety of confounding factors affecting the drought-economic impacts relationship is very high and specific to each ROC
- The benchmarking data is very rich and can support such detailed analysis, but its analysis needs to be complemented by expert technical knowledge from the ROCs

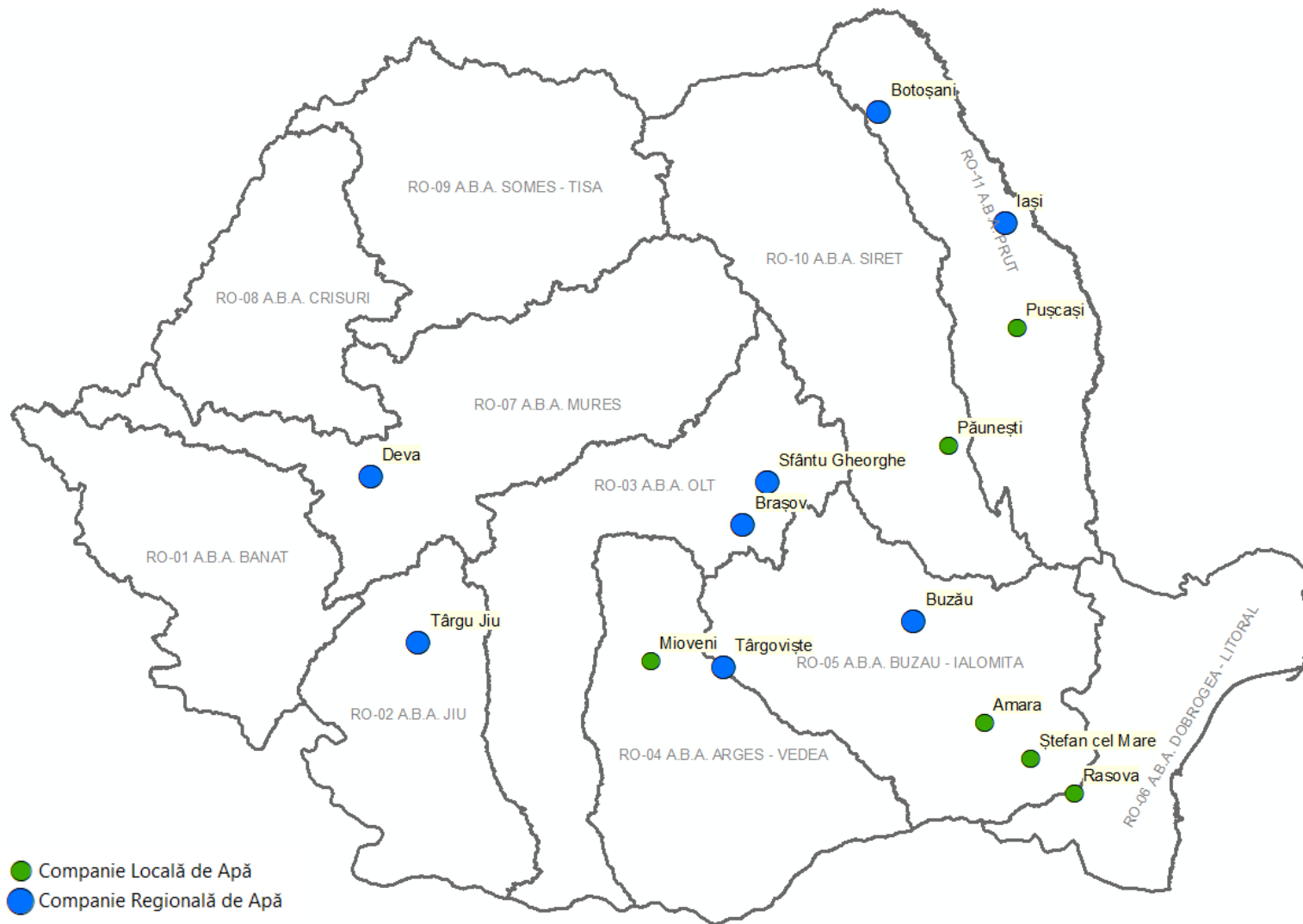
➔ look at operating companies individually, and compare

Detailed interviews: 8 ROCs (had all stated impact of the drought), and 6 LOCs

Interviews with the ROCs and LOCs

10/20/2023

Amplasament Companii de Apă respondente



Messages from the Interviews with the ROCs and LOCs (1)

- Drought = increased demand (**up to triple!**), esp. in poorer, rural areas:
 - unauthorized uses (monitoring? Structural development to address non-drinking water needs? New design standards for network, adapted to demand / drought?);
 - restrictions occur mostly in rural areas – **social equity?**
 - increased NRW volumes – **often up to 60%! When drought risk is accounted for, tackling NRW probably makes increasing economic and societal sense!**
- Significant **decrease in water levels in wells** compared to 2010:
 - Understanding of causes? Cumulative effects of repeated droughts, or unauthorized drillings?

Messages from the interviews with the ROCs and LOCs (2)

- **Competing uses of sources** and priorities are not well managed – so ROCs cannot plan efficiently (e.g. conflicts ROC vs aquaculture)
 - Better collaboration in water allocation across stakeholders, with DRM as guiding principle?
- **Water quality** - eutrophication in reservoirs / natural lakes: regulation of levels / quality **not coordinated with ROCs**
 - Better exchange of information / coordinated action on management of water reserves?

Messages from the interviews with the ROCs and LOCs (3)

- Very **low awareness** for the impacts of drought
 - on ROCs / LOCs: restrictions associated with need to refill reservoirs, de-coupled from drought itself
 - and the role of population in sustainable water usage: role for info campaigns, or is it due to lack of alternatives?
- **No Drought risk management plans by ROCs / LOCs**
 - Mostly impact mitigation; knowledge about ANAR and ARA guidelines?
 - Historical data as guide for management: reflecting new drought reality?
 - Q: *“Do you have a dedicated DRM plan in place?”*
 - A: *“No, but it is in the Water Security Plan [...]. So far, no sever drought events have been recorded and the legislation does not require so.”*
 - Need for capacity building on drought risk within ROCs / LOCs! Other support?

Messages from the interviews with the ROCs and LOCs (4)

- **Very few drought risk management measures are applied**, and limited in scope:
 - mostly monitoring (in larger ROCs) and awareness campaigns.
- **Water pricing and revisions** not regarded as tool for demand management
- Investments required in **diversification and interconnection of sources and reduction of water losses**
- **Increasing storage capacity** by ANAR and by operators

Conclusions

- Drought is a problem and will not be limited to small rural areas in the future: **need for ROCs and LOCs to assess future drought risks!**
- Small operators need financial and technical support for drought risk assessment and management.
- Drought risk needs to be integrated in all strategic and operational planning of the water supply and sanitation sector.



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Thank you!

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