INTEGRATED DROUGHT MANAGEMENT PROGRAMME

WORLD METEOROLOGICAL ORGANIZATION

Global Water Partnership

IDMP Virtual Exchange: Next-Generation Drought Monitoring

1 PM – 2:30 PM CEST - May 27, 2025

Drought Management in Brazil: Turning Monitoring into Action

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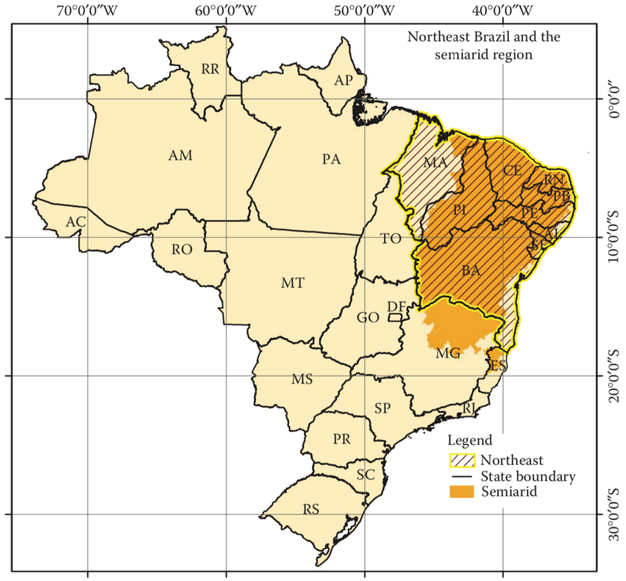
FUNCEME, CEPAS

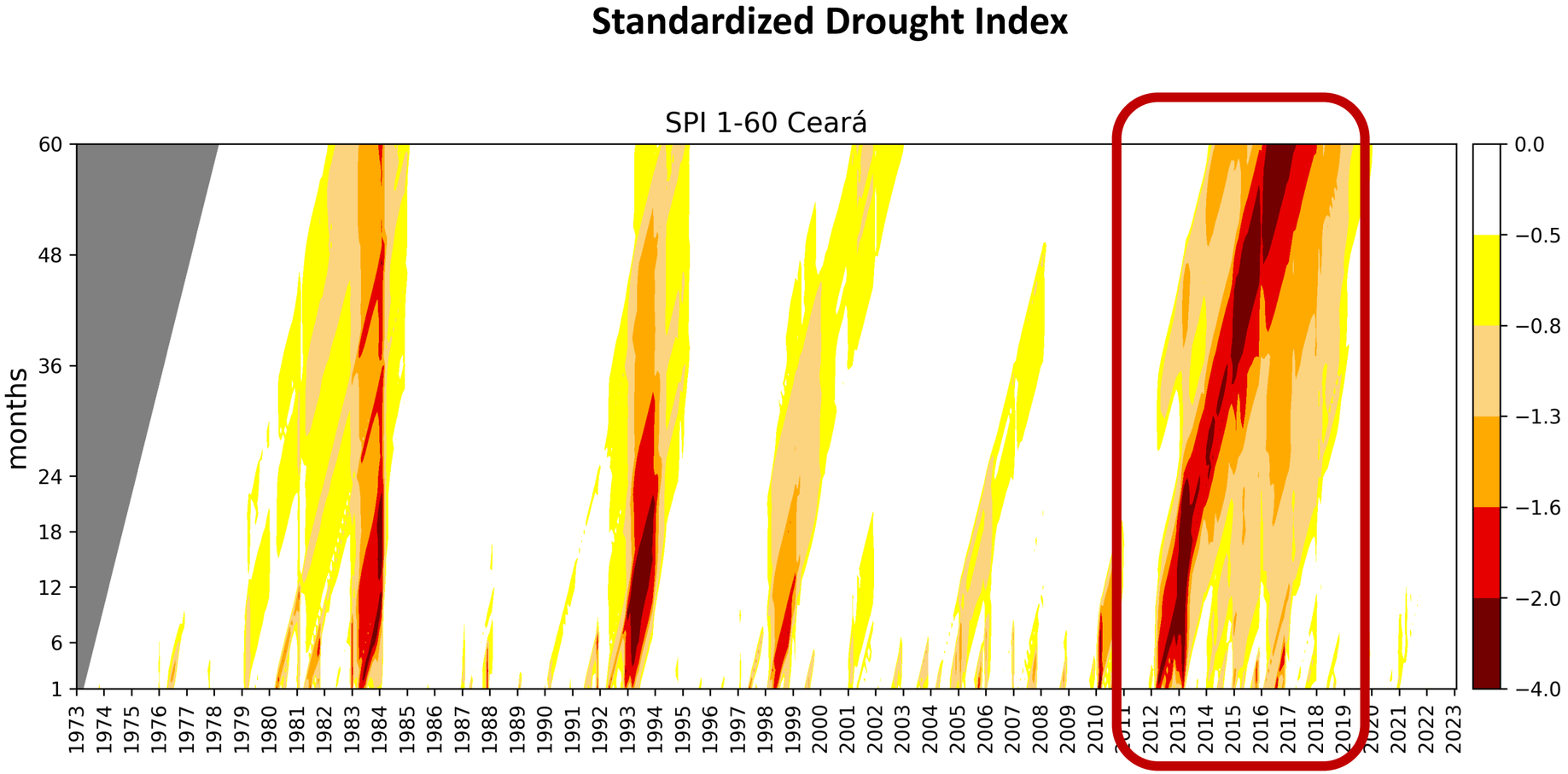
CEPAS Centro Estratégico de Excelência em Políticas de Águas e Secas

FUNCEME

ANA AGÊNCIA NACIONAL DE ÁGUAS

The most recent multiyear drought

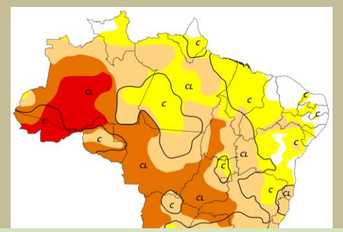




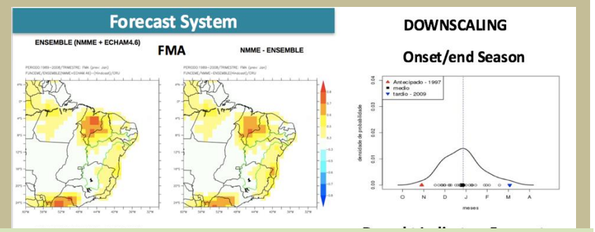
Proactive Drought Management

Three Pillars Strategy

Brazilian Drought Monitor



Brazilian Forecast System



Monitoring and forecasting/early warning

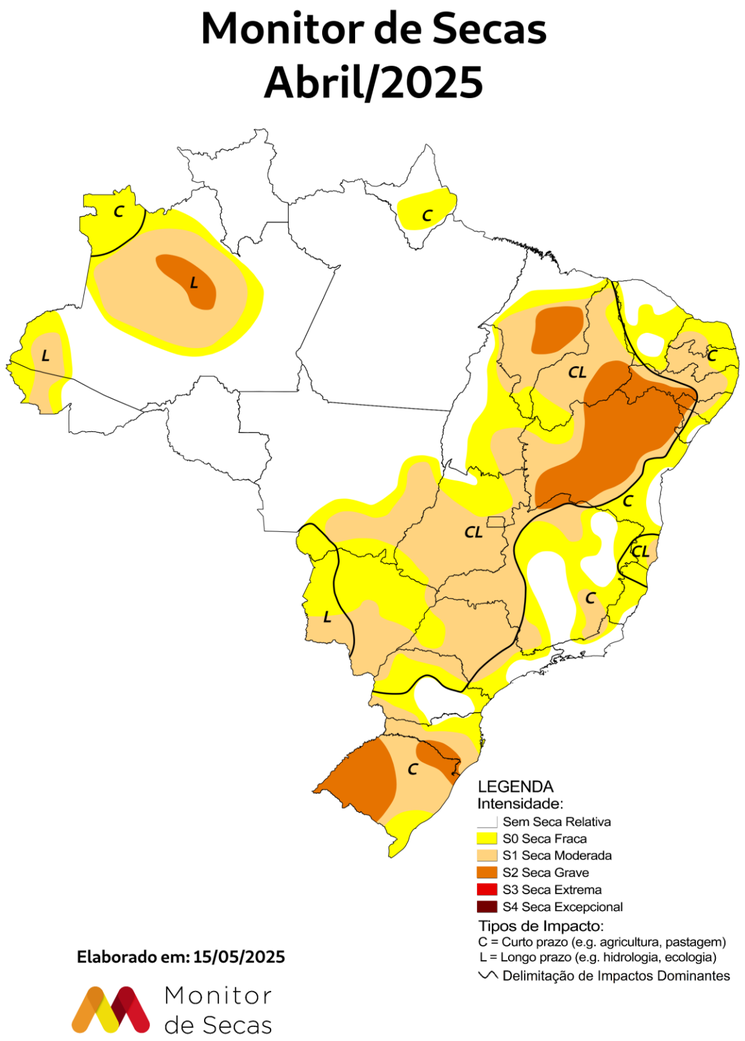
Vulnerability/resiliency and impact assessment: To identify those sectors, population groups, or regions most at risk from drought, most probable impacts, and mitigation actions that will reduce impacts to future events. **Who and what is at risk and why?**

Vulnerability/resiliency and impact assessment

Drought Plans, Contingency Sector-Specific Plans

Mitigation* and response planning and measures

Brazilian experience

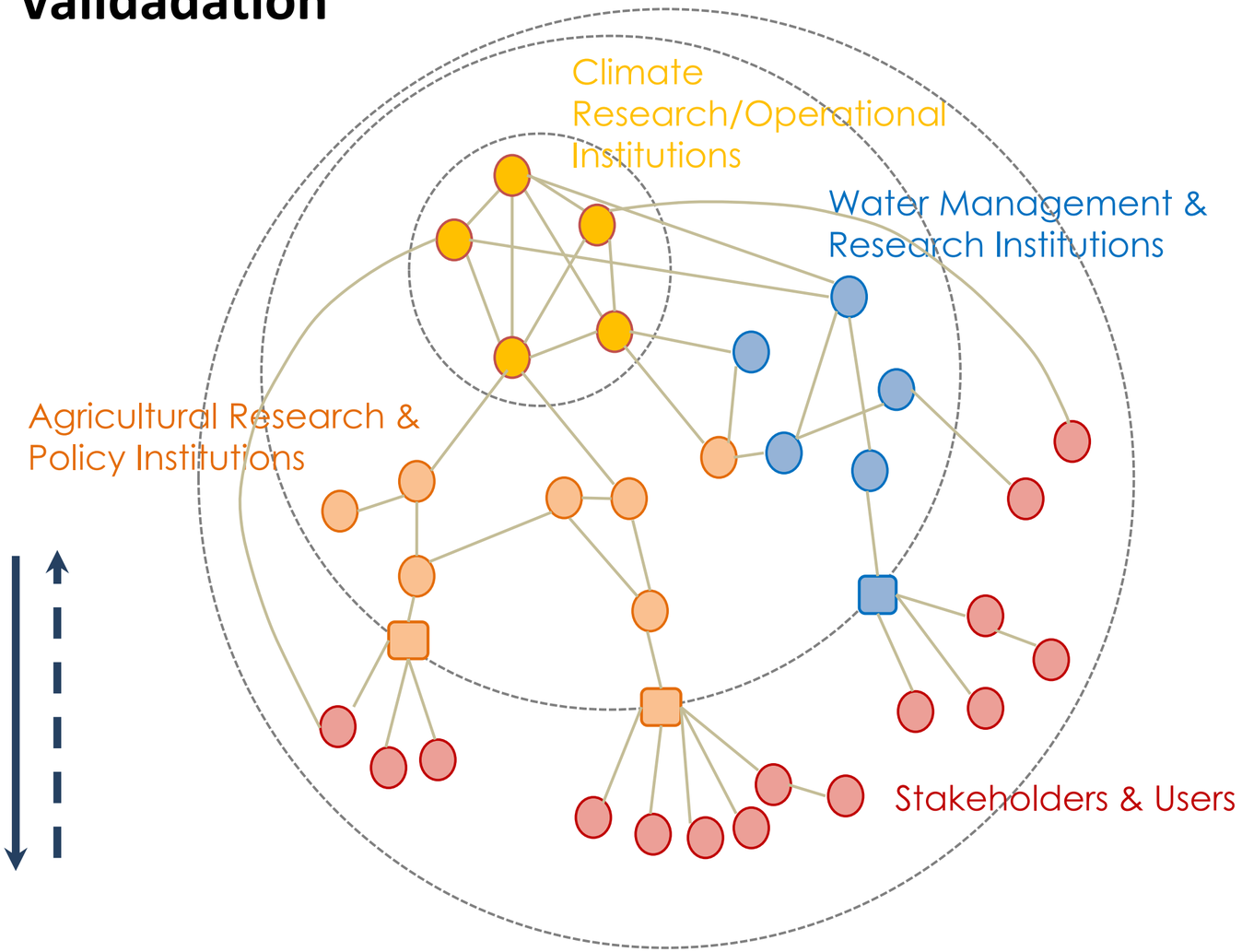


http://monitordesecas.ana.gov.br/

- **Monitoring not forecasting**
- Monthly map
- Based in the US Drought monitoring
  - Authorship
  - Validation process
- **From 9 states (NW) in 2014 to the whole country in Jan/2024 (27 states)**
- **ANA 07/2020: DM Program**

Brazilian experience - Setting up the Network

Validadation



Monitor de Secas
NORDESTE

C	FUNCEME
A	EMATERCE/CE
W	COGERH, WG Water Security
S	CEDEC-CE, SEMACE

ANA
AGÊNCIA NACIONAL DE ÁGUAS

Monitor de Secas

NDMC
NATIONAL DROUGHT MITIGATION CENTER
UNIVERSITY OF NEBRASKA

CONAGUA
COMISIÓN NACIONAL DEL AGUA

THE WORLD BANK
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Brazilian experience – Institutions involved.

- August 2014 – first map
- September **2014** - cooperation agreement MI-ANA-FUNCEME
- March 2016 – official launch
- **February 2017** - cooperation agreement ANA-UFC
- From 2018 up to Jan/2024 – Expansion to the whole country

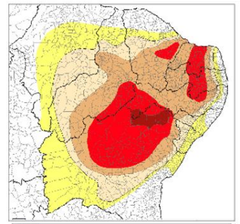
Drought Monitoring in Brazil

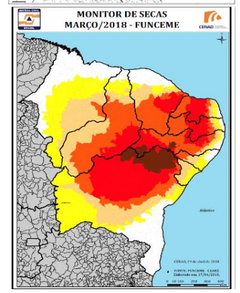
Drought Monitoring

Drought in Brazil: Proactive Management and Policy

Drought Monitoring and its Use at National Level

Drought Monitor: Decisions at National Level





National Civil Defense – Water Truck Program

If a municipality has any % of its área in D1 or above drought conditions (Moderate to Exceptional Drougth), the municipality is automatically included into the programme.

Otherwise, supplementary information should be provided by the municipalities in order to be incuded into the programme.

There are ongoing discussions about using the Drought Monitor to inform the Crop Guarantee Program.

Drought Monitor: Decisions at National Level

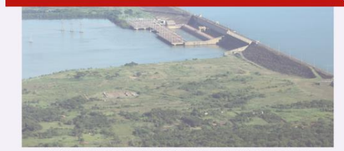
ANA declares critical situation of quantitative scarcity of water resources in the Paraná Hydrographic Region

MEDIDA BUSCA RECONHECER A SITUAÇÃO CRÍTICA E SUBSIDIAR A ADOÇÃO DE MEDIDAS TEMPORÁRIAS PARA ASSEGURAR OS USOS MÚLTIPLOS DA ÁGUA.

ANA declara situação crítica de escassez quantitativa dos recursos hídricos da Região Hidrográfica do Paraná

Publicado em 01/06/

The measure, contained in Resolution 77/2021, was taken for the first time to ensure the multiple uses of water during this period.



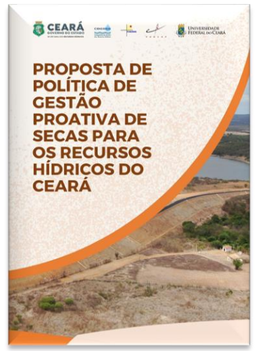
Hidrelétrica de Ilha Solteira no rio Paraná (MS/SP) - Foto: Rayllon Alves / Banco de Imagens ANA

The National Institute of Meteorology (INMET), the National Institute for Space Research (INPE) and the Management and [illegible] Protection [illegible] the Hydric [illegible]me due to [illegible] rage rainfall between May and September this year. In addition, the **Paraná Hydrographic Region has experienced a severe precipitation deficit since October 2019, according to SNM, and the Drought Monitor maps.**

Drought in Brazil: Proactive Management and Policy

Drought Monitoring

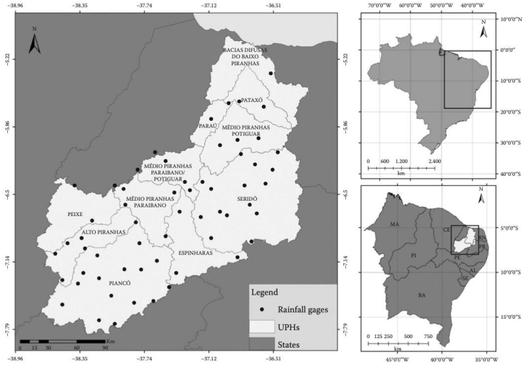
Contingency Plans



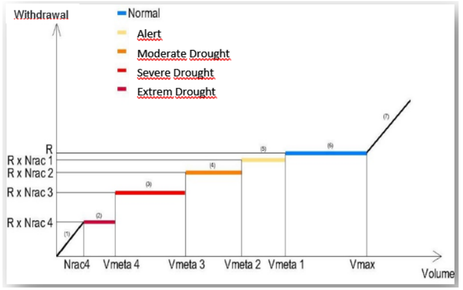
Drought Monitor: Drought Plans Decisions at System's Level

Drought Preparedness Plan

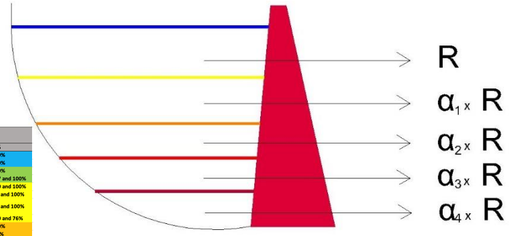
Basin



Irrigation Districts

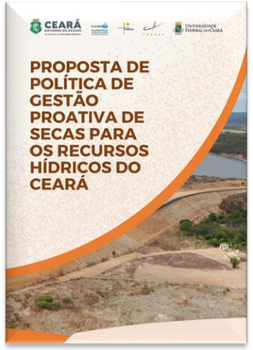


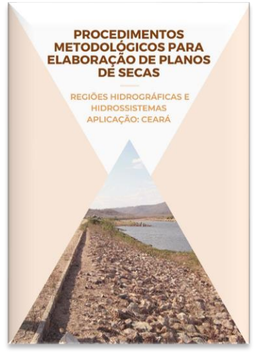
Cities &Reservoirs' Systems



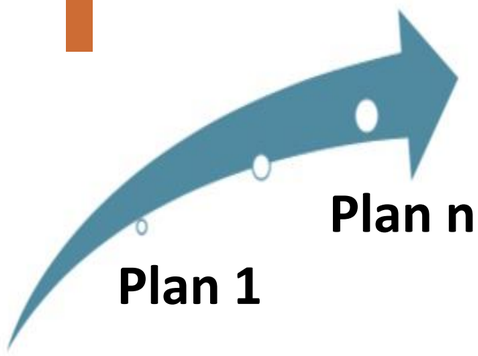
Hydrological State	Volume - May (hm3)	Level - May (m)	Use	Use Conditions	
				L/s	%
Blue	≥ 184,50 hm3	≥ 312,86 m	All	473	100%
			Transfer to São Gonçalo	2090	100%
Green	≥ 155,50 hm3	≥ 311,46 m	All	473	100%
			Transfer to São Gonçalo	Between 1590 and 2090	Between 77 and 100%
Yellow	Between 29,80 and 155,50 hm3	Between 300,97 and 311,46 m	Public Supply	Between 180 and 200	Between 90 and 100%
			Surrounding Uses	Between 0 and 5	Between 0 and 100%
			Other downstream uses (including perenization)	Between 0 and 268	Between 0 and 100%
			Transfer to São Gonçalo	Between 0 and 1590	Between 0 and 76%
Orange	82,50 hm3	306,87	Public Supply	200	100%
			Surrounding Uses	2,5	50%
			Other downstream uses (including perenization)	134	50%
			Transfer to São Gonçalo	633	30%
Red	≤ 29,80 hm3	≤ 300,97 m	Public Supply	≤ 180	≤ 90%
			Surrounding Uses	0	0%
			Other downstream uses (including perenization)	0	0%
			Transfer to São Gonçalo	0	0%

Rainfed Agriculture



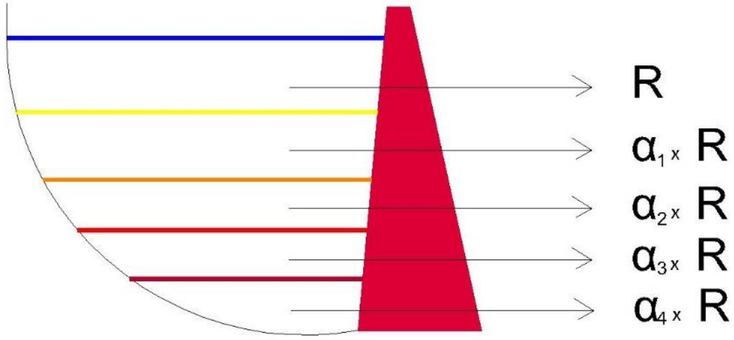


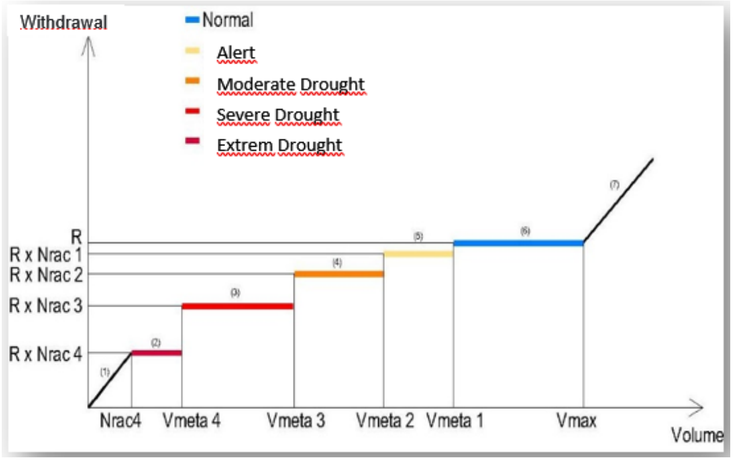
Contingency Plans at Hydrossystem Level



Hydrosystem

- Definition of risk levels taken by the decision maker.
- Definition of target volumes and levels of the reservoir.





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Drought in Play

Drought Contingency Plans – Final Thoughts

- Sector Specific (Agriculture, Water Resources, …).
- If the focus is a Managed System, the plan is also specific to that system (Urban Supply, Reservoir System, …).
- Starting the process: Choose the right cases and players to demonstrate the value of the plans.
- Build strategy with those already involved.
- The question of scale and the implications of the lack of coordination between sectors.
- The need for continuous monitoring of its implementation

Modelling for a Change:

Challenges for implementing solutions

01 Innovation Limitations Across Scales

Each governance level—from national to local—has inherent constraints that restrict the extent of innovation within existing systems.

02 Overemphasis on Infrastructure Solutions

Infrastructure is often prioritized as a **solution**. While it may offer resilience, it risks stimulating demand beyond planned capacities, triggering further infrastructure needs. Modeling must **account for potential long-term demands** and assess whether infrastructure investments enhance resilience.

03 Sectoral Policies and Program Silos

Policies and programs often operate in isolated **silos**, lacking coordination and synergy. Effective modeling requires a framework that integrates sectoral data and fosters cross-policy collaboration to prevent wasted efforts.

04 Scale and Governance Gaps

Local governance arrangements are varied or, in some cases, absent, with different communities exhibiting differing capacities for innovation. Modeling must adapt to these multi-level and context-specific governance structures to be effective.

05 Financial Constraints and Territorial Misalignment

Funding is often accompanied by **preconceptions** about **territorial issues** and **predetermined solution frameworks**, assuming homogeneous territories. Such models and funding instruments impose restrictive solutions that may not meet the diverse needs of heterogeneous regions.

06 Stationary Perspective of the Problem

Planning is frequently based on a **stationary perspective**, assuming consistent climate and land-use conditions. Incorporating adaptive, **flexible models that consider uncertainties** is essential for building resilient systems.

07 Climate Info not Used in Decision-Making

Although critical, **climate information is under- or not utilized at all in policy decisions**.

08 Mismanagement of Extremes at Local Level

In **flood years**, inadequate or non-existent infrastructure can cause disruptions, such as spoiled milk production due to impassable roads. During **drought years**, **maximizing water use can** be **economically beneficial due to commodity price incentives**.

09 Communication Gaps in Crisis Response

Clear and coordinated communication is **crucial to convey risks, mobilize resources, and engage stakeholders effectively**.

10 Political Context and Readiness

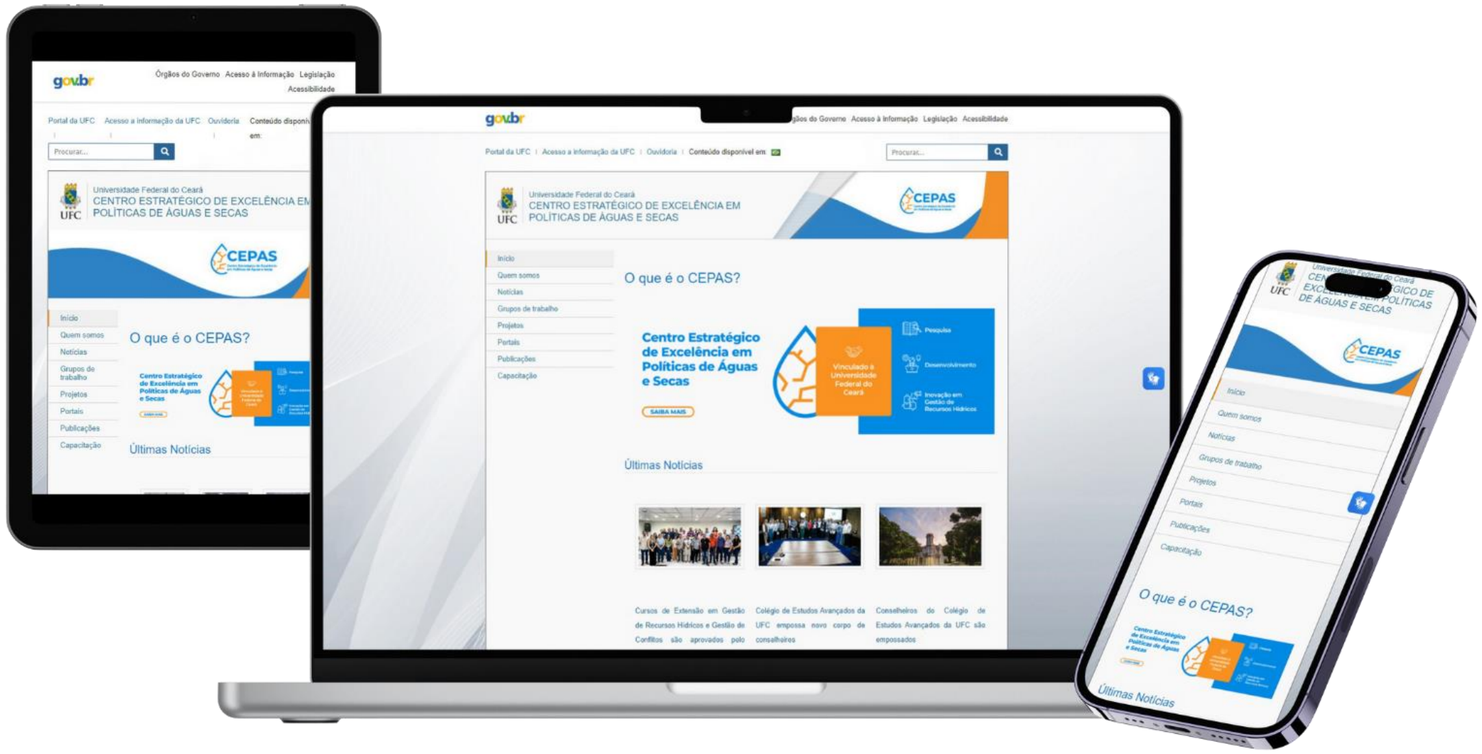
Political changes, such as local elections, can **impact response capacity**. **Transparent budgeting** and **resource information** are vital for **continuity in crisis response**, regardless of political transitions.

Information on the Strategic Center of Excellence in Water and Drought Policies - CEPAS

CEPAS
Centro Estratégico de Excelência em Políticas de Águas e Secas

SITE **https://cepas.ufc.br**

SCAN HERE



Thank you!