

WATER SECURITY IN THE DISTRITO FEDERAL, BRAZIL

A NEXUS Assessment

World Water Forum 2022
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MEIO AMBIENTE

Atenção e cuidado com a água durante a estiagem no DF

Especialistas veem como improvável crise hídrica como a que ocorreu entre 2016 e 2018, no DF. Eles destacam, entretanto, que é preciso manter o alerta ligado. Obras de Corumbá IV, que podem aliviar o problema, estão mais perto da conclusão



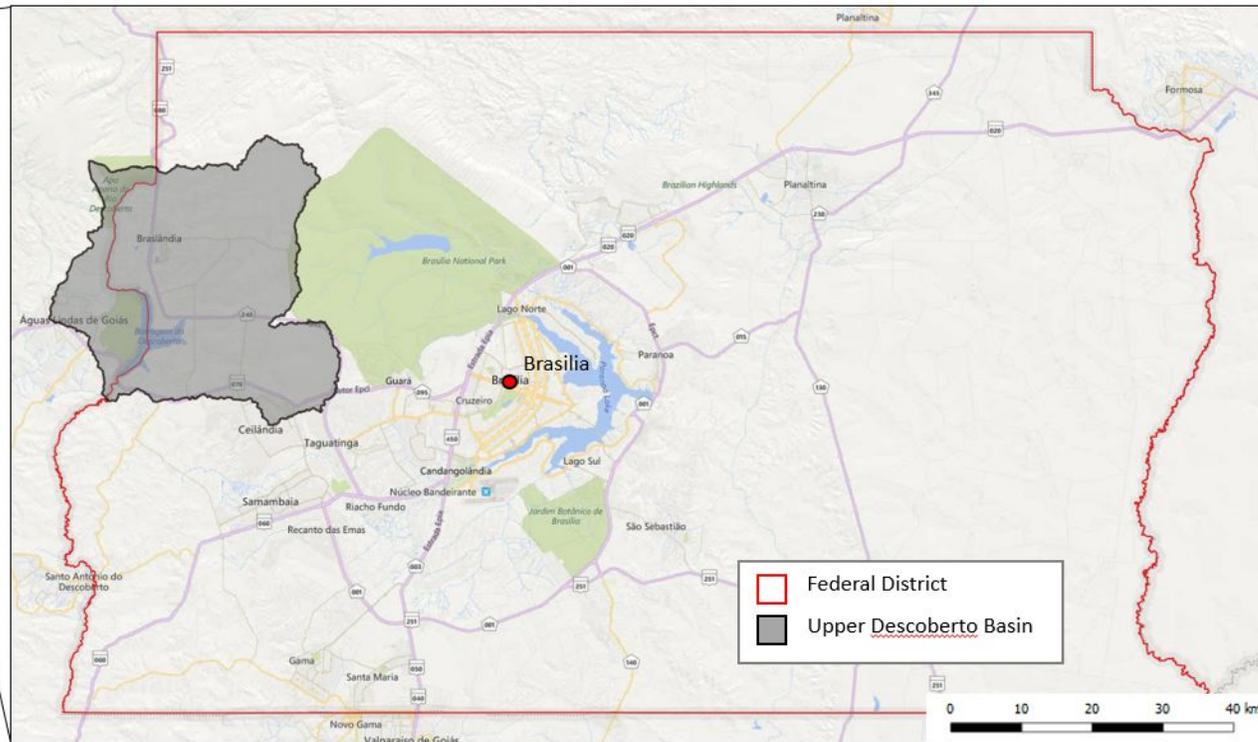
(crédito: Ed Alves/CB/D.A Press)

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Study Area



Upper Basin of the Descoberto River



- Drainage area of 439 km², (30% in the state of Goiás and 70% in the Federal District).
- The Descoberto reservoir is the most important water body in the basin, supplying more than 50% of the water for the DF.
- It includes two main sectors of water demand in the DF, municipal (55%) and agricultural (45% for irrigation).

Configuration of the Hydrological Network and Data Management System

- Permissions processed at each node are displayed in WaterALLOC

Set Node Demand

Node Name: 400065418_DoDEM
Description: Demanda domestica agregada por COMID:400065418

Demand | TimeSeries | Plot | Economics

Total population: 747.929

Area Label	Area population (%)	Annual Demand (gpcd)	TS Pattern ID
56	0.457	61.512	Dom_16
62	0.291	61.512	Dom_16
86	99.252	61.512	Dom_86

Monthly pattern (%): Dom_16

Months	% Value
1	8.493
2	7.671
3	8.493
4	8.219
5	8.493
6	8.219
7	8.493
8	8.493

OK Cancel

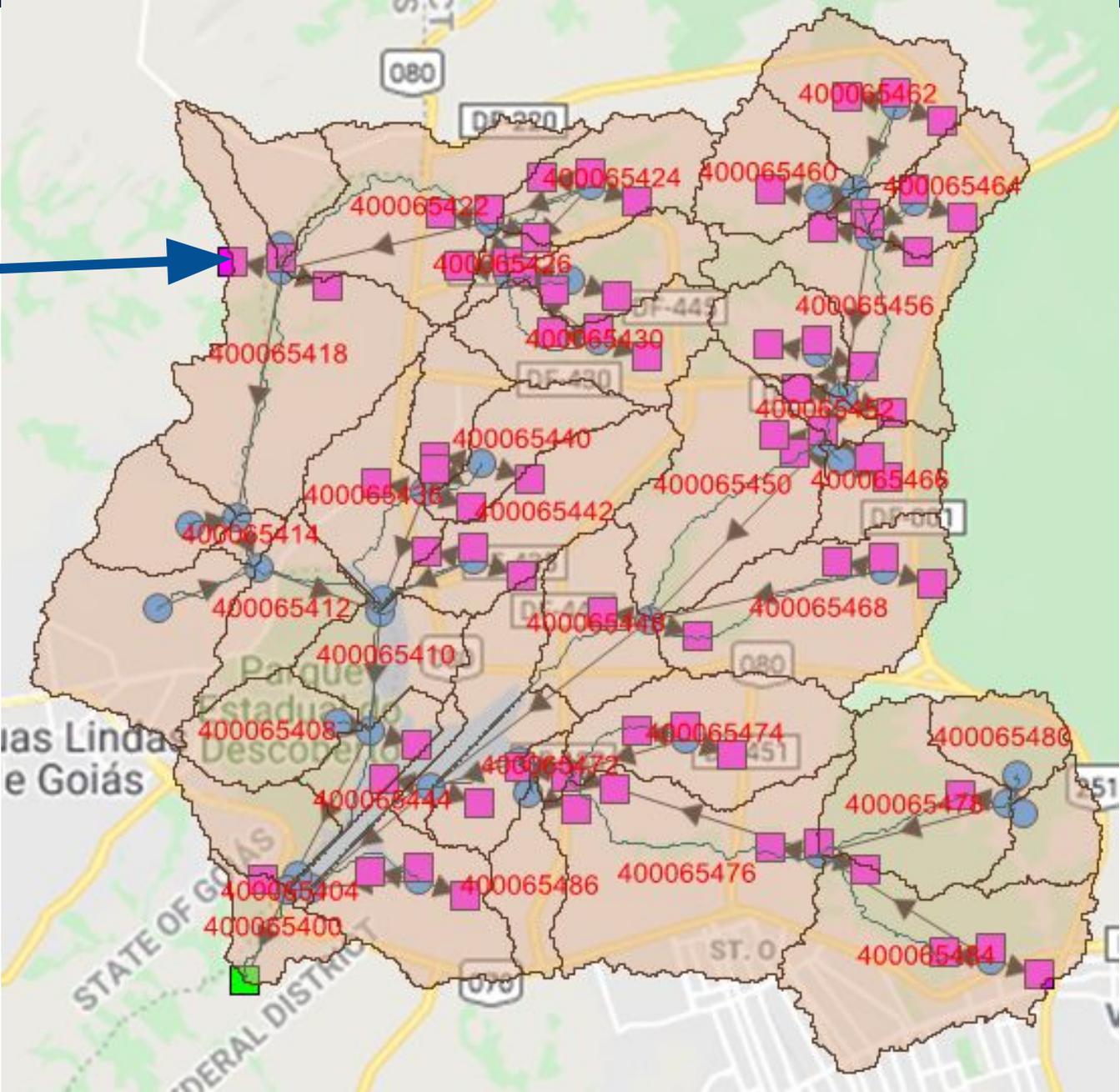
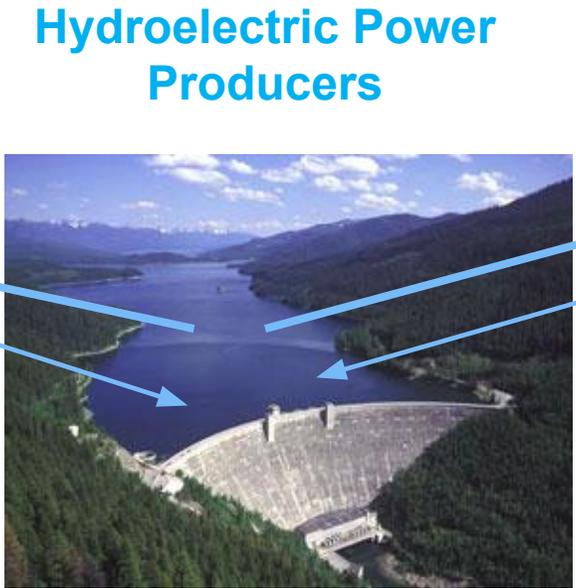


Illustration of Hydro-Economic Analysis



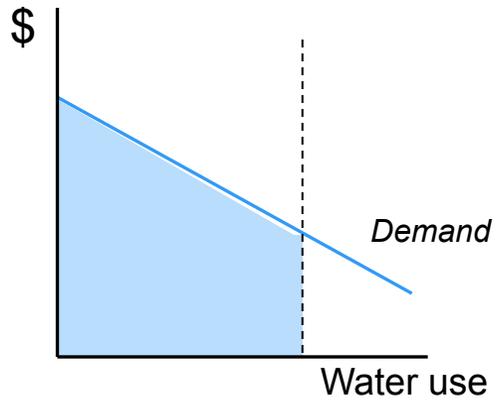
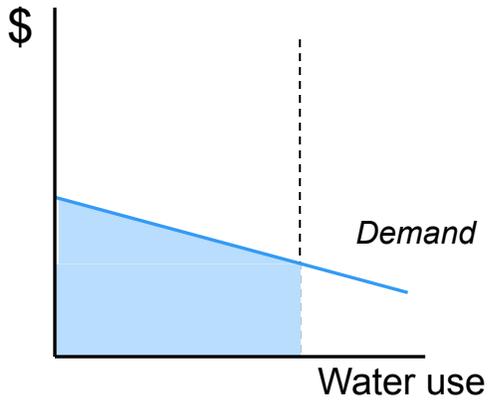
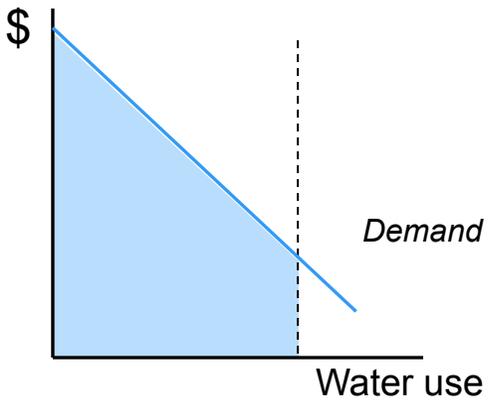
Public Water Supply Systems



Hydroelectric Power Producers



Agricultural Producers



Planning Scenarios Development Workshop

Determination of
uncertainty factors

Categorization of
uncertainty factors

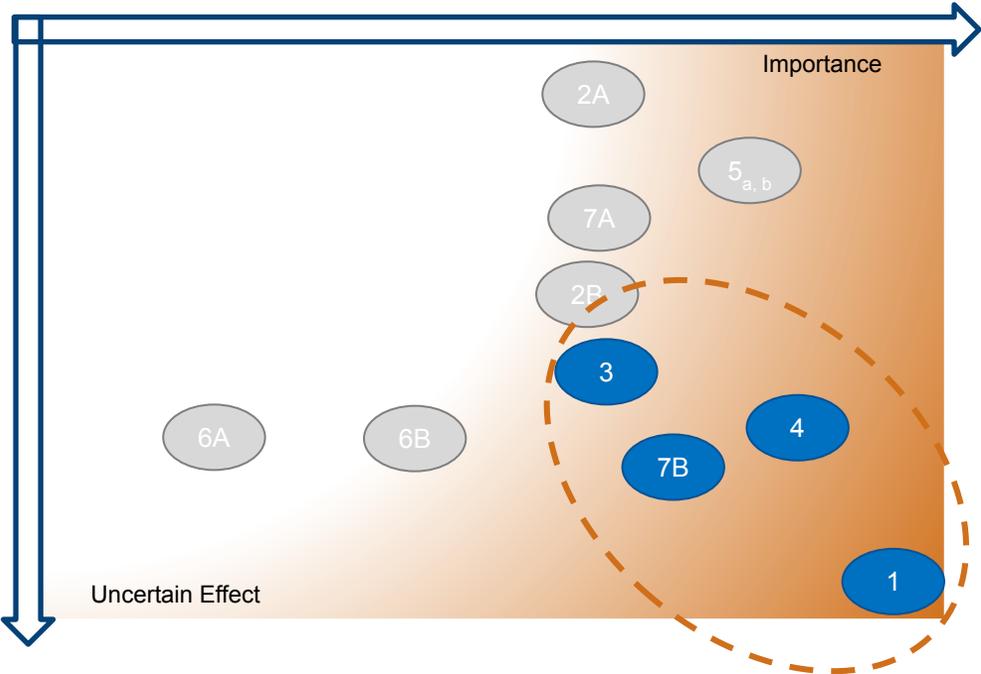
Development of
Planning Scenarios

Challenges and
Solutions



- Scenario Planning Method (for strategic thinking)
- Participatory workshop with representatives of various entities
- Capture participants' vision of the future

Description of Selected Future Scenarios



- 1) Climate factors
- 4) Political interference to technical considerations
- 7b) Alteration of water consumption caused by exogenous conditions
- 3) Changes in land use

Scenario name/type	Conditions
Pessimistic	<ul style="list-style-type: none"> • Weather conditions of medium adversity with reduced precipitation • Highest water consumption per capita • High rate of urban sprawl
Optimistic	<ul style="list-style-type: none"> • High adversity climatic conditions with reduced precipitation • Lower water consumption per capita • Low rate of urban sprawl
Apocalyptic	<ul style="list-style-type: none"> • Extreme reduction of precipitation in the dry months • Consumption per capita remains • Moderate change of urban sprawl in rural areas

List of Mitigation Measures Identified in the Workshop

- Supply Increase
- Demand management
- Infrastructure

Structural

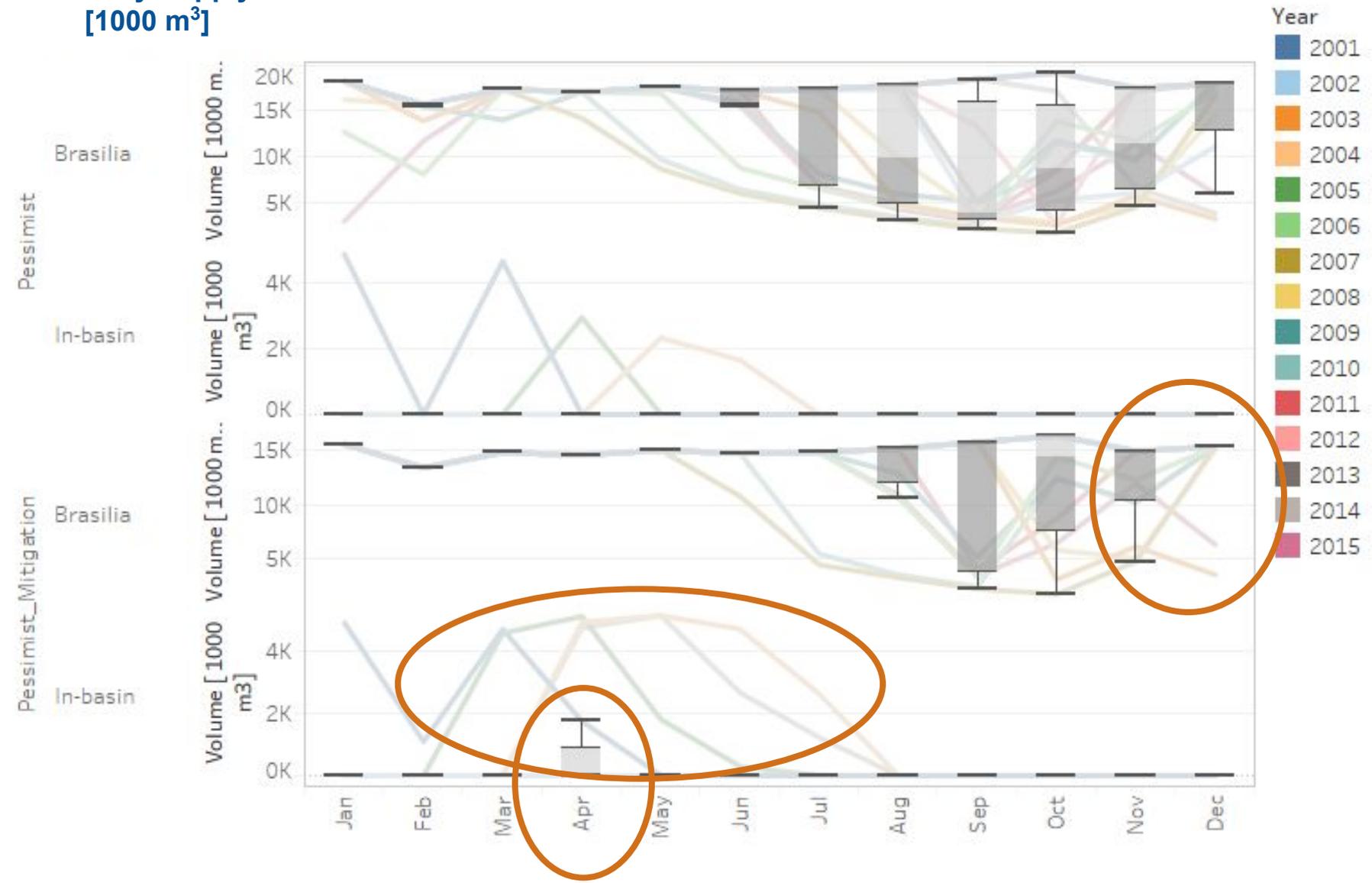
- Obstacles of other basins
- Integration of supply systems
- Infrastructure for water reuse
- Renovation of irrigation systems and drinking water distribution systems
- Reduction of losses in the distribution system
- Implementation of gray and green infrastructure to improve aquifer recharge.
- Increase monitoring of water use, flows, and water quality to create a 'water culture'
- Adapt treatment plants to treat deterioration of water quality
- Expansion of sanitation services in urban areas
- Expansion and improvement of sanitation services in rural areas

Non-Structural

- Increase in the urban water rate for water and sanitation services.
 - Decrease in the cost of water and sanitation services
 - Inspection
 - Permit reforms (change in amount granted)
 - Water use awareness
 - Restriction of new users
 - Implementation of basin management plans
 - Intensification of negotiated water distribution processes in times of crisis
 - Rationing in all sectors
 - Increase irrigation efficiency through irrigation management
 - Improve the availability and communication of information of the integrated water resources management plan (SIRH-DF)
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Example of the Results with Mitigation Measures for the Pessimistic Scenario

Monthly Supply
[1000 m³]



It shows the sensitivity of the demand reduction/supply increase for these conditions

Planning Process



Development of solutions and plans

Conclusions – Future Scenarios and Mitigation Measures

- **The most significant vulnerability to water supply was found in scenarios with greater associated climate change and specifically with reductions in precipitation.**
 - Scenarios with this exogenous factor "locked" the system, showing significant water stress, water scarcity, and no excess water for storage or downstream supply. For example, **reductions in the availability of water in the system could represent around 10% to 70% per year.**
- **Simulated, positive, incremental economic benefits for those scenarios occur where there was higher domestic water use.**
- **An improvement in the efficiency** of urban distribution systems and **the incorporation of diversions** were simulated to illustrate the potential benefits of adopting some of the identified mitigation measures.
 - General improvement in water supply for the different scenarios, particularly under a future extended dry season scenario with an increase of approximately 20% in water supply.
 - Simulated water storage levels were higher with the mitigation measures, allowing for a more consistent supply for Brasilia and other demands downstream of the basin.

Thanks!