INBO
International Network of Basin Organizations

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Session 4 Report

Climate change adaptation at basin level: controlling floods and droughts

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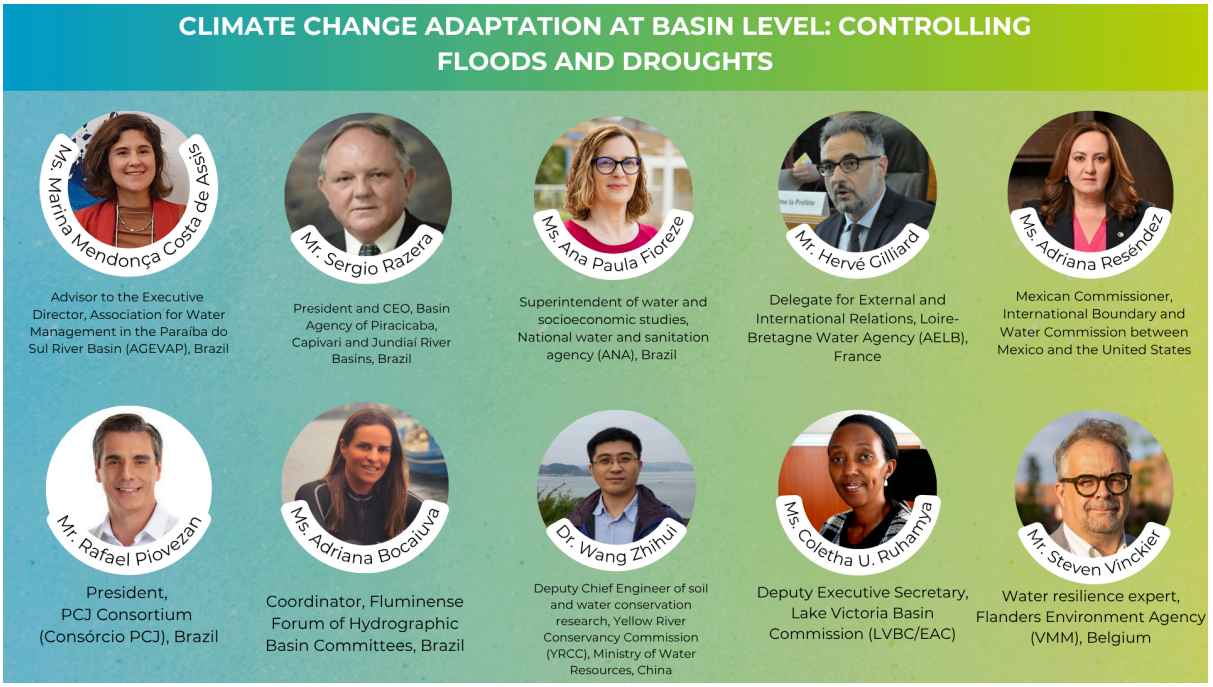
Thematic Context

Climate change manifests primarily through water, intensifying the hydro-climatic extremes of floods and droughts. These events are two sides of the same coin, often occurring in rapid succession within a basin, and pose a fundamental threat to water security. The challenge is to move from reactive crisis response to proactive, integrated risk management. Traditional, hard infrastructure alone can be inadequate or even result in maladaptation. Solutions require a paradigm shift towards a more holistic approach that respects the natural functioning of the river basin. Basin management planning is the cornerstone of this adaptation. It allows for the development of long-term strategies that combine "grey" and "green" infrastructure in cascades in the whole river basin from ridge to reefs, land-use planning (e.g., giving "room for the river"), demand management, and robust forecasting and early warning systems. The plan must facilitate the difficult trade-offs and synergies between water users, ensuring that measures for flood control (e.g., upstream water retention) also contribute to drought mitigation by enhancing groundwater recharge, thereby building systemic resilience.

Speakers



Session Report

Issues:

The impacts of climate change are already visible, as shown by rising temperatures and the increased frequency of extreme weather events, such as droughts and floods. Overall, current monitoring results indicate significant changes in the hydrological cycle, making droughts and floods more frequent and intense, which exposes many regions to the risk of "water scarcity." These impacts affect various sectors, such as water supply, agriculture, hydropower generation, urbanization, and economic development, thereby contributing to increased poverty and vulnerability among communities, which also increases socio-economic inequalities.

The challenges identified by the various stakeholders are numerous and often interrelated, and the shift from a crisis response to an integrated risk management faces significant obstacles:

- A trend toward increasing water demand precisely in the most vulnerable areas, at same time as a decrease in water availability, particularly in regions that currently rely solely on rainfall and may need irrigation systems in the future.
- Traditional urbanization models rely on concrete construction and reduced soil permeability, which exacerbates flooding by preventing water infiltration. It is therefore necessary to develop blue and green infrastructures to create cities that are more resilient to climate impacts.
- Complex governance: Effective adaptation requires community involvement and cross-sectoral coordination at all administrative levels, from local municipalities to cross-border commissions. However, it appears that certain themes are traditionally addressed separately, such as water supply security, water quality, flood risk management plans, drought contingency plans, agriculture, nature restoration, and land management.
- Scientific and technical information must be communicated in a clear and accessible manner so that policymakers can translate it into concrete actions. Furthermore, this information must be made publicly available so that the public understands the risks and participates in finding solutions.
- Current investments are insufficient given the needs for climate change adaptation and continue to be primarily directed toward post-disaster reconstruction rather than prevention and nature-based solutions, despite the latter being more cost-effective.

Solutions Implemented:

- Strengthen hydrological monitoring and data collection and analysis to deepen the understanding of future water resource availability. This

hydrological monitoring can be combined with the use of mathematical models to support water resource planning and management.

- Invest in the establishment of droughts and floods early warning systems, thereby enabling faster responses and better preparedness of communities in the face of extreme events.
- Invest in technical training and knowledge management by organizing training sessions, engaging experts, developing data-sharing platforms, and encouraging regional networks for the exchange of experiences. These initiatives help strengthen cooperation among countries and improve integrated water resources management (IWRM) in the face of climate change-induced challenges.
- Create a catalog of adaptation measures, compiling experiences already implemented in various contexts, their results, and the lessons learned. The goal is to provide decision-makers with a practical tool enabling them to identify solutions tailored to the problems encountered in their territories, taking into account current and future climate risks.
- Develop nature-based solutions, green infrastructure in urban and rural areas, measures aimed at conserving water, the development of water reuse projects, the evaluation of water storage alternatives, the restoration of wetlands, reforestation, watershed management, and the strengthening of natural buffer zones…
- Implement the concept of “sponge landscapes,” an approach aimed at increasing the landscape’s natural capacity to retain, store, and release water. Rather than a standalone measure, this is a multifunctional strategy that integrates actions designed to simultaneously reduce flooding and droughts, improve water quality, preserve biodiversity, ensure food production, and regulate environmental temperature.
- Assess management plans and public policies to determine whether they adequately integrate issues related to water, climate, and the interaction between the two, and to evaluate the degree of preparedness of various sectors for more challenging future climate scenarios. The results of the studies presented showed that many water-consuming sectors do not yet sufficiently take water resources into account in their planning processes, while the water management sector must also deepen dialogue and coordination with other public policies. Strengthening this cross-sectoral integration is considered a fundamental step toward increasing resilience to climate change.
- Prioritize “low-regret” and immediate measures: Given that financial resources are limited and the climate future is uncertain, decision-makers should invest in flexible, robust, and “low-regret” adaptation strategies that help avoid maladaptation. France’s collective goal of reducing total water withdrawals across all sectors by 10% by 2030 was cited as an example.

- Take social vulnerability into account when setting public policy priorities, emphasizing the need to direct actions and investments toward these areas in order to reduce inequalities and prevent the most vulnerable groups from being disproportionately impacted by climate change.
- Promote community-level adaptation projects by supporting local initiatives that promote climate-resilient agriculture, diversification of subsistence means, rainwater harvesting, simplified solar-powered irrigation systems, and the restoration of degraded ecosystems. This adaptation also involves developing climate change adaptation plans that define visions and actions for the short, medium, and long-term, enabling the rapid implementation of priority actions at the local level.

Conclusion:

Four principles emerge for strengthening water resilience and mitigating the negative impacts associated with the intensification of climate change:

1. Promote cross-sectoral action involving agriculture, land-use planning, the environment, and finance.
2. Replace isolated projects with a coordinated transformation at the basin level, notably by facilitating access to financing.
3. Adopt a continuous learning approach, recognizing that adaptation to climate change requires experimentation, monitoring, and continuous improvement of the solutions implemented.
4. Apply the precautionary principle, according to which basin planning and risk management must consider the most critical and pessimistic climate scenarios when determining water allocations and developing public policies.

Credits: INBO and Fabiano Veneza/SEAS