

THE CHALLENGES OF WATER RESOURCES MANAGEMENT AND GOVERNANCE IN BRAZIL: AN PERSPECTIVE FROM THE ELECTRIC SECTOR

Fabrizio Lóes, Instituto Acende Brasil,
fabrizio.loes@acendebrasil.com.br
Patricia Guardabassi, Instituto Acende Brasil,
patricia@acendebrasil.com.br
Richard Hochstetler, Instituto Acende Brasil,
richard@acendebrasil.com.br

Overview

Brazil holds a favorable position compared to other countries, concentrating approximately 12% of the world's surface freshwater availability. Despite the ample water reserves each region of the country faces distinct challenges regarding water resources management. A significant portion of the reserves is situated in hydrographic basins with low population density and lower energy generation potential, especially in the Amazon River basin, whilst the Southeast region comprises 44% of the Brazilian population, large industrial area and its power generation potential has already been vastly exploited.

Recent episodes of acute water scarcity in the country, spotlighted issues regarding water resources management and governance. The absence of an integrating authority responsible for the coordinating of the decision-making process by the multiple governmental authorities in a timely manner is identified as one of the main problems in the water resources sector. The problem is particularly acute when conflicts emerge between users or governmental authorities. The problem is exacerbated by the static licensing system that does not consider the variation in natural hydro inflows.

The governance of water resources is paramount for Brazil's electricity power supply, given the predominance of hydrogeneration in the country. Although hydrogeneration does not consume, the hydroelectric operation alters the natural water flows in rivers. Thus, hydroelectric operation impacts and is impacted by hydro restrictions imposed to meet other hydro resource uses.

When analyzing the profile of major water consumers in Brazil, irrigation emerges as the activity with the highest consumption patterns, accounting for approximately 70%, and when combined with the amount allocated for animal supply and industrial use, it reaches approximately 90% of water consumptive use in Brazil. Non-consumptive uses involve activities where nearly all the water withdraw returns to the supply source, potentially causing temporal alterations in availability, such as hydropower generation from HPPs, navigation, and tourism.

The legal framework for water resources in Brazil was established with the enactment of the National Water Resources Policy and the creation of the Water Resources Management System (SINGREH) – Law No. 9,433/1997. One of the pillars of the law is the characterization of water as a public good, with priority given to human and animal consumption during scarcity. The Brazilian water resources management, strongly inspired by the French legislation, is based on the tripod of decentralization, integration, and participation, aiming at balancing the interests of various users and different water resources utilization.

Methods

Seeking a realistic diagnosis and tangible solutions for improving water resources management, a series of interviews were conducted with experts from various sectors related to water resources governance and management. Professionals from specialized consultancies, academia, electric power generation companies, water and energy regulatory agencies, water and sanitation companies, and other governmental institutions were selected.

The one-hour interviews were divided into two stages. The first part consisted of five unstructured questions, referred to as "top of mind," aimed at capturing the top concerns and perspectives from the professionals of various fields on broad questions regarding the governance, regulation and the risk of over-exploitation (Tragedy of the Commons) of the country's water resources. These questions allowed interviewees more freedom to construct their reasoning.

The second part of the interviews comprised fifteen prompted questions, where interviewees were instructed to indicate their level of agreement or disagreement with statements by assigning scores ranging from one to five on the following topics:

- diagnosis of the source of the main water resource problems, such as the legal framework and its implementation and enforcement;
- individual assessment of each of the entities responsible for water resources governance and management;

- issues related to governance problems, such as the adequacy of the licensing system, the performance of the National Water Agency (ANA), and the possibility of creating an institution to act as a central integrating authority responsible for expediting decision-making processes; and
- opinions regarding specific hydro conflicts that have occurred in Brazil in the last few years, such as the imposition of minimum reservoir levels by state governments (i.e., the case of Furnas and Mascarenhas de Moraes reservoirs, instituted by the Legislative Assembly of Minas Gerais in 2020).

The combination of qualitative and quantitative interview techniques enables flexible interactions between interviewees and interviewers, while still ensuring coverage of key issues. This approach enables the development of concepts, ideas, and understandings based on patterns found in responses and observations, while also providing quantitative data that allows systemization of responses from various stakeholders from different areas of expertise and of water usage.

Results

The results obtained provided us with a systemic view of water resources governance, enabling the identification of convergent and divergent points among the involved agents, both in broader and more specific issues.

Many of the interviewees praised the content of Law No. 9,433 but emphasized its inadequacy to the Brazilian reality, highlighting that its implementation has not been satisfactory, particularly with regard to enforcement.

One of the major issues mentioned was the lack of coordination among the various authorities responsible for water licensing and management, yet when questioned about the establishment of a new institution responsible for coordinating the entire decision-making process of all agencies involved, responses were divergent.

The absence of a water market in Brazil was also identified as one of the problems that hinders the efficient water resource usage. Markets would provide pricing signals that would serve as an important tool for facilitating the efficient allocation of water resources, based on supply and demand.

Several interviewees stressed that, compared to the electricity sector, the water resources sector does not use quantitative tools enough. The responsible regulatory agency often do not have the human and financial resources to apply highly technical analysis and there are discrepancies in the data used by different responsible stakeholders. Measurement is still in its infancy stage, often resulting in discrepancies between state and federal level data on water availability and usage.

The legal framework, established through the National Water Resources Policy and the Water Resources Management System (SINGREH), lays down important principles such as water as a public good and prioritization of human and animal consumption during scarcity. Nevertheless, the implementation of these policies has faced criticism, highlighting issues such as inadequate coordination among responsible authorities and the absence of a water market, which could facilitate more efficient resources allocation.

Conclusions

In conclusion, this study sheds light on the complex landscape of water resources governance in Brazil, particularly focusing on the flexibility of Brazilian Hydroelectric Power Plants (HPPs) and the broader challenges within the sector.

The signaling of the economic costs and benefits of water restrictions and their possible solutions is essential for the operational and management efficiency of water resources and the electricity sector. The entities responsible for sector operations must communicate and work together to eliminate and address restrictions in the least costly and most efficient manner possible. Some restrictions may be resolved straightforwardly, but the existing institutional gap creates a scenario where this does not constitute responsibility for any individual or entity.

The study's methodology provided a comprehensive understanding of water governance dynamics, identifying both areas of convergence and divergence among stakeholders. However, notable gaps remain, including the lack of economic signaling for water restrictions and challenges in data measurement and coordination. Addressing these gaps requires collaborative efforts among sector stakeholders to ensure effective decision-making and resources management.

To move forward, policymakers and stakeholders must prioritize initiatives aimed at enhancing institutional capacity to address the complex challenges of an effective water resources management.