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Governance and Water Security: Analysis of The Profile of Representatives of River Basin Organizations in Brazil

Fernanda Matos, Ivan Beck Ckagnazaroff, Norma Angelica Hernandez-Bernal and Alexandre de Pádua Carrieri

Fernanda Matos, University of Minas Gerais.
e-mail: fcmatosbh@gmail.com
Norma Angelica Hernámdez-Bernal, University of Minas Gerais.
e-mail: h2o.norma@gmail.com
Ivan Beck Ckagnazaroff, University of Minas Gerais.
e-mail: ivanbeck00@gmail.com
Alexandre de Pádua Carrieri, University of Minas Gerais.
e-mail: alexandre@face.ufmg.br

Abstract

This paper aims to contribute to the studies about governance by presenting the profile of the representatives of state river basin committees in Brazil and to provide information that may highlight important aspects of their inclusive capacity, based on the premise that good governance is key to achieving water security. It starts from the perspective that it is possible to analyze basin organizations as governance arrangements made up of different actors that have attributions to mediate, articulate, approve and follow the actions for the management of the water resources of their jurisdiction. These initiatives are characterized by management proposals that are imbued with aspects of decentralization, participation and integration. They imply a relationship between the state (at its different levels) and society (or with entrepreneurs, communities, NGOs) in the management of river basins. The governance arrangements for basin management aim, among other aspects, to guarantee access to water and establish standards for the protection of the quality of territorial waters, seeking water security. Between November/2017 and July/2018, a broad survey was carried out with the representatives of committees in order to identify who are the actors who participate in the processes of formulation and deliberation of water resources management policies, and how the representatives perceive their involvement in the decision-making process. The analysis was carried out based on a sample of 30%, out of a total of 11,197 representatives, between representatives and deputies, who are part of 205 of the 210 state river basin committees in Brazil.

Keywords

Basin Committees, governance, management of water resources, Brazil

01

Basin Committees; Governance; Management of Water Resources; Brazil

The importance of water for maintaining life, protecting human health, and improving quality of life is indisputable and widely recognized. It is noted that the first international discussions that calls attention to the modernization of water resources management occurred at the United Nations Water Conference held in 1977. Among other decisions, its Action Plan recognized the water as a right declaring that "all peoples, whatever their stage of development and social and economic conditions, have the right to have access to drinking water in quantities and of a quality equal to their basic needs."

Water is used for consumption, cultivation and production of food and energy, transportation, as a political and cultural symbol (religious and cultural values), as well as being a place and source of entertainment (recreation and tourism), among others applications. For these benefits to be achieved, various natures are necessary, mainly because the water resources do not always obey the limits of the man-made political structures.

"Water security is the result of good water governance, allowing better access to water, sanitation and preservation of water resources."

The changes that have occurred in the last century, such as population increase, growing and disorganized urbanization, deforestation, food production and industrial activities, among others, have led to a greater demand for the multiple uses of water, which generate competition and conflicts for this limited natural resource. The availability of water resources—in terms of sufficient quantity and quality—has become an object of concern for society as a whole, especially since Rio 1992. When considering these changes and increasing water demand, there may be situations of tension between social, political and economic agents, often expressed through land use and occupation, increasing the need to seek cooperative ways of resolving the use of resources and drawing attention to water security.

In this sense, water security is the result of good water governance, which may allow better access to water, sanitation and preservation of the quantity conditions and the quality of water resources. In general, the objectives are to reduce absolute poverty, develop the health of the population and preserve natural resources. However, it is necessary to adopt policies and strategies that help improve manage and use water resources through the participation and interrelations between different actors and sectors that use water resources, including the environment itself.

It should be stressed that the participation of all actors involved—from all sectors of society—is an important element that can promote equity in water management. Another point to be considered is that transparency and institutional development are elementary to enable and facilitate participation that can lead to effective governance and better possibilities for action against climate variability and all associated impacts.

According to Greya and Sadoff (2007), water security is determined by numerous physical factors, including the absolute amount of water available, its annual variability and spatial distribution. The socioeconomic factors emphasize the structure of the economy and the behavior of its actors, which reflect cultural legacies and political choices determined by different historical, social, and political conditions. These factors, along with climate change, influence the institutions and organizations of management and governance in addition to the type and scale of infrastructure needed to achieve water security.

Climate change is the physical element that can impact the availability of water in the semiarid regions of the world, including South America, which can lead to frequent and prolonged periods of droughts and lack of water within the next 50 to 100 years (Bates *et al.*, 2008). The variability and decrease of precipitation in arid and semiarid areas of Argentina, Chile and Brazil will be extreme. In Bolivia, Colombia, Ecuador and Peru, the reduction of glaciers will generate smaller volumes of water to satisfy the most basic needs of the population.

Thus, problems of governance and management of water resources may result in strong impasses related to the availability of water, food, and possible social and political conflicts arising from this situation. For this reason, it is important to look at the water security problem through the perspective of governance. That is to look at the urgency of the theme of water and everything related to it: Food, energy, right to water, gender and social participation. This perspective is in line with what is advocated by the United Nations 2030 Agenda and the Sustainable Development Goals (SDGs), especially with regard to water resources (Goal 6), which aims to ensure universal and equitable access to safe drinking water and safe for all.

Thinking about the concept of water security in terms of governance can be a tool for establishing policies and assisting decision-making on issues related to the private/public and individual/collective use of water. For Kooiman (2003), governance is the structure that arises in a sociopolitical system as the joint result of the interaction efforts of all the actors involved, which conforms the rules of the game in a specific system. As an example, it is possible to mention the basin committees and management councils of water resources. Therefore, governance occurs when actors can perform and try to use these rules in accordance with the interests and goals of the groups they represent

in these arrangements. Therefore, Integrated Water Resources Management should consider water security as a multidimensional element to be considered as a reference in decision making and as a guide in the elaboration of public management and governance policies, but should be based on technical and scientific knowledge.

Integrated water resources management is associated with the concept of "participatory management", that is, a management model that provides for the participation of representatives of various segments of society in the decision making. This management model can be aligned with goals 6.5 and 6.b of the Sustainable Development Goals. In Brazil, the current regulations require that the Water Basin Committees be composed of representatives of the executive branch, water users and civil society of the geographical area covered by the Committee for the management of water resources in its region of operation, in order to support and strengthen the participation of local communities, to improve water management. Thus, the Committees are collegiate bodies with normative, consultative and deliberative attributions; being the main forum for knowledge, problem-solving, planning and decision-making on the multiple uses of water resources within the river basin within its jurisdiction.

As noted by Chhotray and Stoker (2009, p. 191), concerns posed by environmental changes have led to a serious consideration of how the environment should be governed.
The environment encompasses issues that are simultaneously local and global in character, and its governance continues to pose both theoretical and practical challenges in a variety of disciplines.

Governance can be understood as the way in which individuals and institutions, public and private, manage their common problems, among which it is possible to cite access to water. It is a continuous process through which it is possible to accommodate conflicting or different interests that must be adjusted in cooperation actions (Our Global Community, 1996, Chhotray and Stoker, 2009).

For Hollanda (2009 p. 16), the adoption of governance proposes methodologies for strengthening communities in order to qualify them for participation in local decision-making processes with the purpose of better influencing the construction of more environmentally sustainable processes, evaluating and proposing solutions to the problems of basins. In this sense, water governance emerges as an opportunity to build new models, or models of institutional articulation, for the management of the territory that the basin covers in front of the priorities that are presented related to water, such as the recovery of rivers and aquifers and their protection, food and water security, sanitation services to the entire population, reduction of risk conditions in drought or flood events, and assurance of water supply in countless and increasingly large urban areas. In summary, to achieve water security, cooperation and joint work of the different water users are necessary, within a context of management and public policies that protect the environment and ecosystems in the face of changes in the concentration of urban centers (migration), the climatic and economic changes with the purpose of having and maintaining the natural basis for the sustenance and development of the population.

In "The Future of Democracy", Norberto Bobbio (1986) warned that a democratic process is characterized by a set of rules that establish who is authorized to make collective decisions and with what procedures. The author also points out that even group decisions are made by individuals (the group as such does not decide). Thus, the diversity of actors in the process of formulating public policies—with different capacities, with different interests and incentives, and interacting in several arenas—requires the understanding of the following questions: Who are the actors involved in the water policy-making processes at the river basin level? Who are the social subjects that participate in the processes of formulation and deliberation of water resources management policies? What are the characteristics of the participants (training and professional area)? With these questions, it is discussed who are the social subjects that act in these spheres, presenting the profile of the participants.

"Governance can be understood as the way in which individuals and institutions, public and private, manage their common problems."

From this characterization, one can analyze and discuss if the basin organisms are able to include subjects that are traditionally underinserted in spaces of decision. In the first questions proposed in the survey sent to the representatives of basin committees, it was sought to identify who are the social subjects that act in these spaces, presenting the profile of the participants.

The objectives established for this research were to understand who the social subjects are, the practices and interconnection of the organizations responsible for the management of water resources in the exercise of their normative and deliberative function in the scope of the hydrographic basins, and the profiles of the representatives of the River Basin Committees. The full functioning of the committees and the active exercise of representatives of the different segments should contribute to ensuring sustainable access to quality water in an adequate quantity for maintaining livelihoods, human well-being, and socio-economic development. In other words, promoting water security should be the main focus of those who manage water resources.

02

Water Basin Committees in Brazil

Brazil has about 12% of the world's fresh water. However, this availability varies considerably, both geographically and seasonally, with several records of supply problems at various uses. One of the major challenges of water resources management in the country, as Cardoso (2008) points out, is related to the expansion of water supply in regions with low availability of river basins and need to improve quality through the reduction of domestic and industrial pollution. It should also be noted that the lack of water and sewage services threatens the quality of life of the people, the environment and water. In addition to these challenges, another complicating factor for the management of water resource is climate change, as pointed out earlier.

According to ANA (2017), droughts and floods represent about 84% of the natural disasters that occurred in Brazil from 1991 to 2012. During that period, almost 39,000 natural disasters affected about 127 million people. A total of 47.5% (2,641) of the Brazilian municipalities decreed Emergency Situation or State of Public Calamity due to floods at least once from 2003 to 2016. About 55% (1,435) of these municipalities are in the South and Southeast regions. As for drought, about 50% (2,783) of the Brazilian municipalities decreed emergency or calamity situation in the same period.

The basin committees are state organizations, within which state river basins are created by means of Decree of the state governor. The decision to create a basin committee is a political act and the creation of these collegiate bodies is closely related to the state of water policy in the national and state spheres.

As established by the National Water Resources Policy, the main competencies of the Water Basin Committees within their area of action are highlighted as follows:

i) Promote the debate on issues related to water resources and articulate the actions of the intervening entities;
ii) arbitrate, in the first administrative instance, conflicts related to water resources;
iii) approve the basin water resources plan;
iv) monitor the implementation of the basin's water resources plan and suggest measures to meet its goals;
v) propose to the national council and to the state councils of water resources the accumulations, derivations, abstractions, and launches of little expression for the purpose of exemption from the granting rights of water resources use according to their domains;
vi) establish the mechanisms for charging for the use of water resources and suggest the amounts to be charged;
ix) establish criteria and promote the sharing of the work costs of multiple, common or collective interest.

Observing the responsibilities of the Basin Committees as potential spaces for innovation in the management of water resources, it is noticed that the main attributions are related to the planning, articulation and the management of conflicts due to the lack or excess of water. Thus, the approval of the river basin water resources plan is carried out by the Committee, defining rules for the use of water as concession priorities, reservoir operating conditions, guidelines and criteria for charging for water use, among others. In this sense, it is imperative that the management of water resources consider the risks associated with climate change more frequently. However, it is observed, low effectiveness in the implementation of the actions proposed in these plans, as well as committees that have not yet approved their plans. In some river basins, even after the charge for water use has been approved, few interventions are effectively implemented, among those planned. In addition, there is very

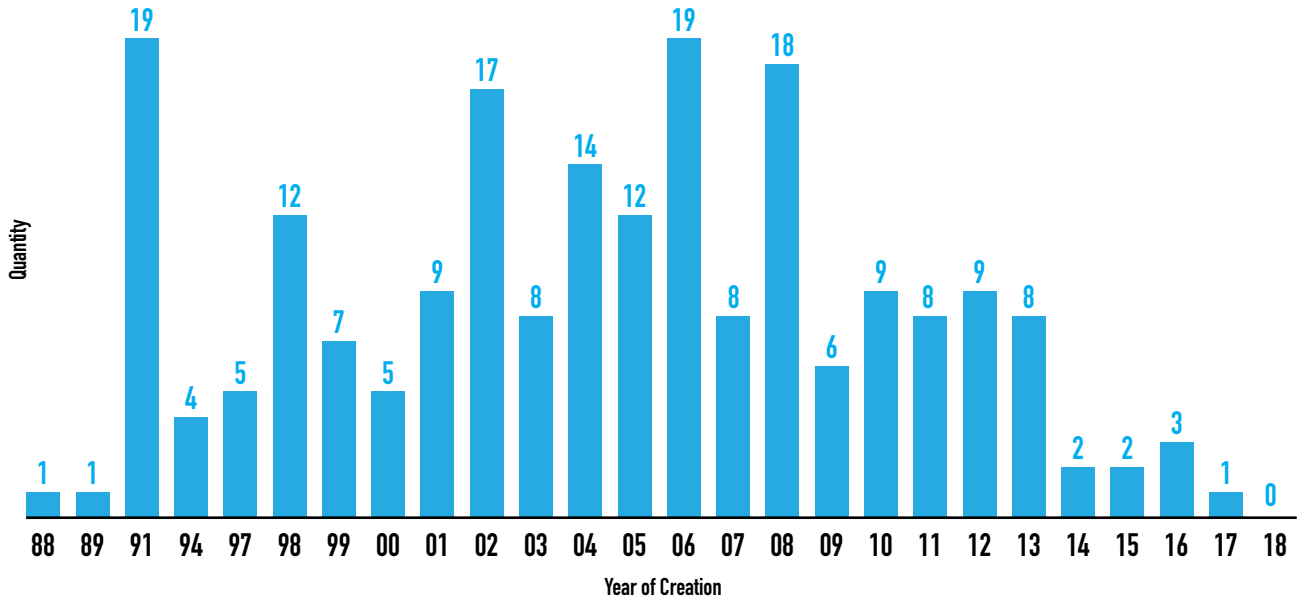

Figure 10-1 *Creation of basin committees in the country (Source Prepared by the authors)*

low alignment of the basin plans in the programming and budget of the state water resources management bodies, as observed by the OECD (2015).

The Committees are composed of representatives and deputies and their joint structure is constituted by the state public authority of where the territories are located, even partially, in their respective areas of activity. The municipal public government, the water users of its area of action and the representatives of civil entities of water resources with proven performance in the basin are part of this Committee. In the Hydrographic Basin Committees whose territories cover indigenous lands, representatives of the National Indian Foundation (FUNAI) should be included as part of the representation of the Union, in addition to the indigenous communities that are residents or have interests in the basin.

The proportion of these representatives was defined by the National Council of Water Resources, through Resolution No. 5 of April 10th, 2000 (modified by Resolution No. 18 of December 20th, 2001 and Resolution No. 24 of May 24th, 2002) that established the guidelines for the formation and functioning of the Water Basin Committees. It also established that in the rivers at the national territory, the number of representatives of civil entities should be proportional to the population residing in the territory of each State and the Federal District by at least 20%. Furthermore, the number of representatives of the users should be 40% of the total votes, and the votes of the representative of the executive branches of the Union, the States, the Federal District and the Municipalities, should obbey the 40% limit (CNRH, 2000).

The electoral process of these members, according to the National Water Agency (2011b), should be conducted in such a way as to guarantee the participation of all players in the basin. The members of the collegiate are chosen among their peers, considering the various sectors of water users, civil society organizations or public authorities.

From 2010 to 2017, 50 new basin committees were installed and others are still being implemented and installed. According to research conducted in Brazil, there are eight Interstate Basin Committees and 210 State Committees. In addition to these, other committees have been created, but have not yet been implemented, as well as other river basins that do not yet have plans for committees. It can be observed that the National Policy of Water Resources advanced more in the Southeast and South regions of the country, where all the committees were constituted and have more resources to contribute to the installation of the committees and the

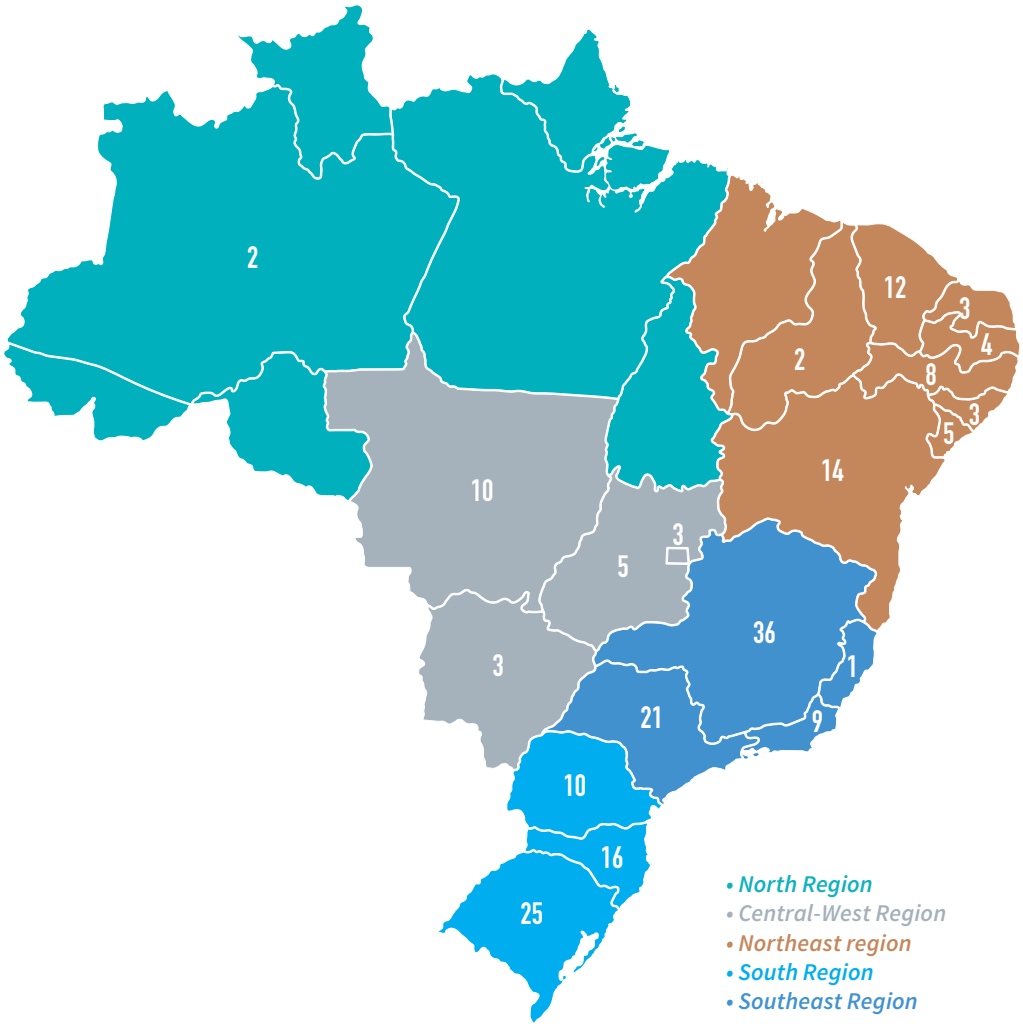

Figure 10-2 *Distribution of State Committees by state*

"In Brazil, the main atributions of the Basin Committes are related to planning, articulation and management of conflicts."

development of their actions. However, the same is not observed in the Northeast region (semiarid with most of its intermittent rivers), and mainly in the North with large basins. Figure 10-1 organizes information on the implementation of state committees between 1988 and 2017.

There are seven in the North region: Two in the state of Amazonas (founded in 2009 and 2016, but the latter is inactive) and five in the State of Tocantins (founded between 2011 and 2014).

The Central-West Region has 21 Watershed Committees: 10 in the State of Mato Grosso, five in Goiás (founded in 1997, 2003 and 2011), three in the Federal District (founded in 2005 and 2010), and three in the State of Mato Grosso do Sul (instituted in 2005, 2010 and 2016).

The Northeast region has 48 committees of which two are in Piauí (founded in 2009 and 2014). The State of Ceará has 12 committees (the oldest constituted in 1997, two in 1999, seven in 2002 and 2006, and two in 2013), Rio Grande do Norte has three (created in 2004 and 2010) and Paraíba has three (constituted in 2006). The State of Pernambuco has seven basin committees (seven founded between 2001 and 2007, 2012 and 2015), Alagoas has five (constituted between 2003 and 2006), and Sergipe has three (created in 2002, 2005, and 2007). Moreover, the State of Bahia has 14 basin committees (six were created in 2006, four were created in 2008, three in 2013 and another in 2014).

The South region has 51 Committees, of which 10 are in Paraná (the oldest one has a 2002 creation date), 17 committees are in the State of Santa Catarina (the oldest one, basin committee of Rio Cubatão do Sul, was created in 1993), and 25 committees are in Rio Grande do Sul (nine of these were created between 1998 and 2000, the oldest of which was created in 1994, but the Rio Tramandaí committee is inactive).

The Southeast region includes the majority of the committees created. Out of a total of 80, nine are in the State of Rio de Janeiro (eight of them created between 2002 and 2008, and 2011) and 14 committees in Espírito Santo (the oldest two being created in 2001, eight in 2003 and 2007, 2010, and the most recent in 2015). There are 21 basin committees in the State of São Paulo (13 of which were established on 12/30/1991, the last one being created in 2001). Furthermore, in a total of 36 committees, the State of Minas Gerais has the largest number of committees in the country (the oldest was constituted in 1997, seven more were constituted in the subsequent year, one in 1999—Rio Paraopeba committee, and the three most recent were created on 11/20/2008).

03
Materials and methods

The epistemological stance adopted for the development of the project is interpretative in nature. In the first phase of the research, it was sought to quantify River Basin Committees in all States of the Country and the Federal District in addition to the number of members in each organism.
At the collection of these data, the representatives of the State Hydrographic Basin Committees were contacted and sent the questionnaires. The structured research questionnaire (guided by the study questions) was composed of a set of questions with preset answers and the possibility of comments by the respondent, as well as some open questions. This data collection was performed entirely by electronic means.
After the collection, the data was tabulated with the aid of statistical software. In order to analyze the responses received, duplicate and incongruent ones were excluded.
This resulted in a sample of 30% of the seats, including holders and substitutes, in 205 Watershed Committees. Watershed Committees from the states of Amazonas (2) and Piauí (2) were not considered, because they did not obtain the minimum percentages for the study. A Watershed Committees of the State of Rio Grande do Sul, is deactivated due to lack of resources. Data collection was performed between November 2017 and July 2018. In the process of analyzing the open questions, we use the Content Analysis method from the data.

Basin Committees Place	**Number** (Water Basin Committees)	**Members** (representatives and deputies)
Alagoas	5	138
Bahia	14	769
Ceará	12	1263
Distrito Federal	3	120
Espírito Santo	14	405
Goiás	5	290
Maranhão	2	200
Mato Grosso	10	286
Mato Grosso do Sul	3	214
Minas Gerais	36	2120
Paraíba	3	242
Paraná	10	718
Pernambuco	7	245
Rio de Janeiro	9	612
Rio Grande do Norte	3	136
Rio Grande do Sul	24	1072
Santa Catarina	16	677
São Paulo	21	1694
Sergipe	3	140
Tocantins	5	216
	205	**11153**

Table 10-1 List of Water Basin Committees considered in the survey (Source Research Data)

04
Data Analysis

The water sector has intrinsic characteristics that make it highly sensitive and dependent on a multilevel governance system. Water is connected transversally to multiple sectors, places, people and also to different geographic and temporal scales. In most cases, hydrographic boundaries and administrative perimeters do not coincide.

The composition of a basin committee should reflect the multiple interests with respect to basin waters. It is hoped that this plurality of composition is reflected in the diversity of perspectives represented in the discussions and decision-making of the committees. In general, there are three interests expressed in the basins: From the direct users of water resources (whether or not subject to the granting of right of use), of the public branches constituted (municipalities, states, and Union) in the implementation of the different public policies, and civil organizations in the defense of collective interests and with the view of diffuse interests. It should be noted that participation within these arrangements is voluntary and may be a central indicator in the difficulties of establishing more demanding accountability mechanisms. Another point is that the occurence of meetings, in most committees, is every two months and extraordinary meetings may be called. There are those who hold monthly and quarterly meetings. The frequency of the meetings is defined by the plenary of the committees and is part of the internal bylaws. It has not yet been possible to identify a correlation of possible factors for the frequency of encounters.

This paper provides information that can point to important aspects of the inclusive capacity of the researched representatives, presenting as a premise that good governance is fundamental to achieve water security, considering that a democratic participation is necessary in the choice of what measures can be adopted to mitigate the impact of climate change and combat impacts and water preservation.

The committees are composed of a limited number of representatives, as defined in their bylaws approved by the committee plenary, which is the highest decision-making body. The plenary is composed of all the representatives and presided over by one of them. Its operation is based on open and public meetings.

In general terms, it can be said that the definition of the characteristics that qualify the representative as the most adequate to defend the interests of a certain segment is carried out among its peers in sectoral assemblies, convened by publishing a notice of the committees to choose the representatives. These representatives are generally accredited by an internal electoral commission and, after completing the stage of presentation of the supporting documents established by the committee, they are able to participate in the process of choosing the committee members.

Of the respondents to the research questionnaire, 74% are titular representatives and the remaining 26% are deputies. With regard to the representation sector, 22% of respondents belong to the segment of water users, 21% to the municipal public government, 34% to civil society, 20% to the state public government, and 2% to the federal public government. In the case of civil society and water users, this representation is related to constituted entities and there is no space for individual participation.

It should be noted that the term civil society shelter a very different set of organizations, entities, and interest groups: NGOs, philanthropic entities, trade unions, and business organizations, among others. In addition, water users, groups, public and private entities, and collectivities in their own name or in the name of third parties use water resources or even capture water, discharge effluents, or perform uses that are not for consumption directly on bodies (river or watercourse, reservoir, dam, well, spring, etc.).

Thus, in what constitutes representation, an entity represents a set of its peers and an individual is appointed representative of that entity in the committee. In other words, an agent is empowered to make decisions on behalf of an organization and a segment of representation in presenting the perspectives and anxieties of a group that are thinking about the collective interest that is the rational use of water resources. The author Norberto Bobbio (1986) reminds us that the fundamental rule of democracy is the rule of the majority, that is to say that the rule on the basis of which collective decisions are considered, and thus binding for the whole group, are the decisions approved by the majority of those who are responsible for making the decision.

4.1. Socioeconomic Profile

From the research carried out, when the profile of the representatives according to gender is observed, we initially noticed that the Water Basin Committees in Brazil have a predominantly male composition. That is, the percentage of men (69%) more than doubles that of women (31%).
Thus, the data indicates that there is no parity between men and women in these spheres. Gender roles not only determine how men and women are affected by the way water resources are developed and managed. Another point, the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, recognized women as one of the nine major groups in society whose participation in decision-making is essential to achieving sustainable development, and reaffirmed in SDG 5, which is about achieving gender equality, including at the political decisions (5.5).

Figure 10-3 below shows how the representatives are

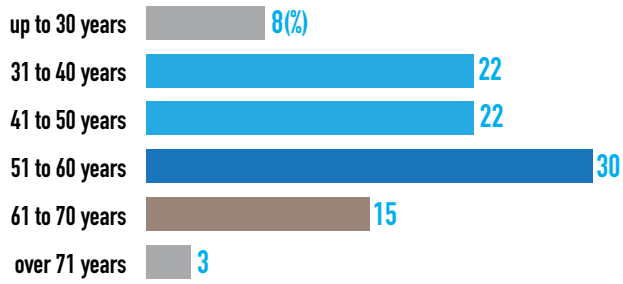

Figure 10-3 *Distribution of representatives by age (Source Research Data)*

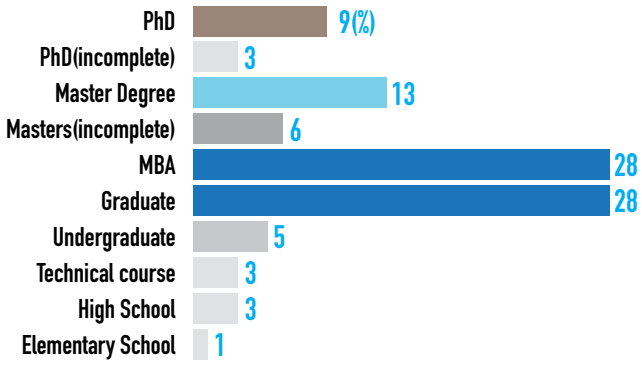

Figure 10-4 *Representatives' education (Source Research Data)*

distributed in the basin committees in Brazil, according to age groups. The data allows us to point out that the distribution of the actors in the committees concentrates the largest proportions in the representatives between the ages of 51 and 60, which are about 30%.

However, considering that slightly less than half, or 47% of the representatives, are more than 51 years old, there is a reflection on the importance of investing in the formation of representatives in order to give continuity to the renewal process of representation and social participation of water management, because it will be necessary to train them for this process.

Considering that the elected member must be prepared to defend the interests of the segment he represents, we also question the representatives about the level of education, training area, and the experience in other collegial organisms in the area of water resources, as in other areas.

When analyzing the level of education of the respondents who work in these spaces, as shown in Figure 10-4 it is noteworthy that 28% of the members of the Committees have completed a higher degree, which is a proportion that is similar to the representatives who also have some MBA/Specialization training. The data also shows that in terms of schooling, the extremes are situated at the fundamental level in which the number of representatives with this full degree reaches 1% while it is 9% of representatives at the doctoral level.

We can see that the education of the representatives of the Committees is diversely distributed and in an unbalanced way between the different levels of education. However, interesting data have to do with the fact that 87.8% of the representatives who answered the question concluded a course of higher education, and almost 60% also entered postgraduate courses.

In addition, basin committees are spaces in which the concentration of respondents predominates in certain training areas, as can be seen in Figure 10-5, especially Engineering courses (38.9%) that are more than double (Public Administration and Business, Accounting and Tourism Architecture, Urbanism and Design, Communication and Information, Law, Economics, Urban and Regional Planning, Demography, Social Work) with 19% of the indications. In the sequence, the Agricultural Sciences (Food Sciences, Agricultural Sciences, Veterinary, Zootechnics) with 16.9% were indicated, the Biological Sciences with 13.3%, and the other areas received less than 8% of respondents' indications.

The existence the rivers favored urban and agricultural development, but this growth causes the "death" of several of them, transforming them into a means of sewage disposal. Urban rivers suffer from pollution, silting, smelling (Pampulha Lagoon in Belo Horizonte, for example), diversion of their courses, destruction of riparian forests, change of color, inability to use their resources (the Tietê River in São Paulo and the Iguaçu River in the South region). Evidence of the urgent need to implement the sustainable development agenda (6.3), which concerns improving water quality and reducing pollution. Thus, it possible to say that the planning and management of water resources bring with it the complex relationship of intersectoral, interdisciplinary and transdisciplinary nature.

Sommerman (2005, p. 7) explains the etymology of complexus, "what is woven together", citing Morin (2001: 33), and explains that this concept "articulates polarities and contradictory, competing, and antagonistic elements of 'fabric'" and adds asking what is the breadth of this articulation? These remarks reinforce the complexity underlying the field of water resources management, considering the influence of technical, political, economic and cultural factors, as well as the involvement of different spheres of government, as well as other actors grouped in the water and civil society.

Transdisciplinarity, according to Bignardi (2011, p. 22) is:

… the contemporary scientific attitude that, recognizing the complexity of phenomena as well as the multidimensionality of

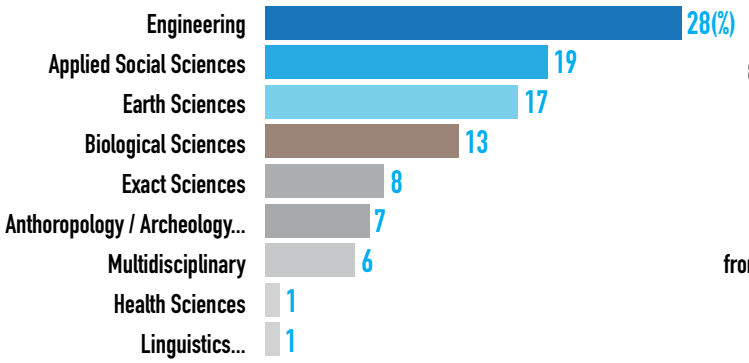

Figure 10-5 Distribution of representatives by area of training (in%) (Source Research Data)

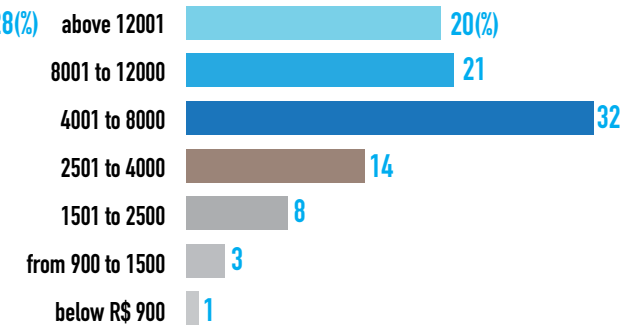

Figure 10-6 Average family income (Brazilian Reals) of the representatives (in%)(Source Research Data)

reality, are willing to seek sustainable solutions in the subtler (informational) strata of reality which makes it possible to find situations of genuine collective consensus, through inclusion and respect for diversifying the use of disciplinary knowledge in a synergistic and transformative way.

Sehume (2013, p. 4) explains that this approach "emphasizes the interconnectivity of the branches of knowledge, aiming at improving the human condition." Water is a resource that man can not do without, it is a vital and irreplaceable good. We can also say that the management's view on the water theme, which departs from the definition of this as well as fundamental right and essential to the maintenance of life. The transdiciplinarity approach, according to the author, "encourages the synthesis of knowledge experiences involving actors in academia, government, industry, civil society," which is advocated in water resource management and water governance studies. In other words, the need for greater involvement in the model of articulation of the different sectors of society.

In this sense, we can consider collective decision-making requires a strong type of interdiciplinarity as pointed out by Sommerman (2005, p. 5) that will occur when the predominant one is not the transfer of methods, but of concepts, and when each not only seek to "instruct others but also receive instruction" and "instead of a series of juxtaposed monologues", as in the case of multidisciplinary interdisciplinarity, there is "a true dialogue". The author explains that the term "strong" is related to the "emphasis given to the subject and intersubjective exchanges" and does not even indicate value aspects. For Sommerman this requires "favoring intersubjective exchanges" of the different social subjects which, in this study, is related to the representatives of the river basin committees, "where each one recognizes in himself and in others not only the theoretical knowledge, but the practical knowledge and existential knowledge."

Given the scenario of the representativeness and level of education of the actors involved in these instances and considering that the representations in the committees should reflect the multiple interests in their jurisdiction, we can ask if high qualification of a great part of the representatives with respect to the formation, especially engineering would not be reducing the perspective of interests and demands of groups and social sectors whose voices do not reach expression and recognition in the common spaces of political representation, thus generating socially and environmentally unjust. In other words, for whatever reason, governance arrangements would be leaving out groups with a capacity to influence the policies adopted in them and representing other languages, knowledges, and formations, which are representative in the basin, such as fishermen, the quilombolas, indigenous communities, and other sectors.

Regarding the distribution of resources, the results of the study show that in family income the majority of the members—about 33%—earn R$ 4,001 to R$ 8,000. It is also possible to observe that 73.6% earn over R$ 4,001. In this group, 20% have income above R$ 12,000, as shown below in Figure 10-6.

Of the representatives with the highest incomes, (41% of them earn more than R$ 8,001 a month), it was observed that only 9.8% are women. In a comparative analysis, it is noticed that not only are women still a minority in the basin organisms, but belong to the groups with the lowest family incomes. This seems to reflect the challenge for the country as a whole on gender equality in relation to women receiving the same salary as men. On the other hand, this fact may be positive, because women belonging to the groups with lower family incomes may be representing another voice and language on the committee which could otherwise be neglected.

The results indicate a profile with income above the national average when compared to the value of the minimum wage established (R$ 954) or with the national nominal per capita monthly household income of R$ 2,112 (IBGE, 2018), thus indicating the groups that control the decisions about water management. These data corroborate with the notes of Santos Junior *et al.* (2004) on which the profile of the

representatives constitute a kind of elite of reference, or of a civic community (p.37) bearing an associative culture, characterized by a superior socioeconomic profile and by a greater degree of information and technical and political training when compared to the average of the population in general. When data are separated by the representation sector, it is observed that the representatives of the Federal Public Sector segment are concentrated in the two highest income categories (above R$ 8,001).

It is observed that of the 26% of the representatives who are included in the category of those who have family income up to R$ 4,000—a total of 5%—come from the municipal public government and 6% come from civil society.

Joint, participatory and deliberative management within the basin committees should seek to improve the sustainability of supply, demand and the collective security of the population in relation to the availability of water resources, that is, restrictions on consumption can affect water security. So, we can question: does this really happen if we consider income and the major social-economic group?

On the one hand, considering that the participatory experience of both the individual representatives and the civil organizations represented in the Basin Committees represents an important differential in ensuring the potential of the governance arrangements referring to the decision-making process of the public water policies, the results of the research showed a weak insertion of the representatives of the basin committees in other collegiate bodies related to the management of water resources. When questioning whether representatives of the basin committees also participate in other collegial bodies related to water resources management, 25% of the respondents said they participate and 75% said that they only participate in the Basin Committee.

These data show that 25% of the respondents, besides participating in Basin Committees, also participate in the National Water Resources Council (2%), State Water Resources Council (9.5%), National Forum of Basin Committees (6%), and State Forum of Basin Committees (1.5%), in addition to other instances of discussion (1%). Although participation in other forums related to water management issues is still low, this can be a good thing because, by participating in other collegial bodies that also discuss water resources, representatives of basin committees can increase integration and articulation to exchange experiences and learning with other spheres of participation.

On the other hand, given that the political dynamics that characterize the establishment of governance arrangements play an important role in the action of representatives in the decision-making of water policies, the research data shows that in addition to participating in the basin committee 39% of the representatives indicated that they also participate or are members of other collegiate bodies, such as education and health councils.

In particular, the other collegiate mentioned were: Municipal Council of Environment, Municipal Council of Urban Development / Urban Policies, Municipal Council for Economic Development, Environment Committee of the City Council, Climate Change Forum, Council on Environmental Protection Area, Basic Sanitation Council, Development Council of the Metropolitan Region, Municipal Council of Culture, Community Public Security Council, National Council for the

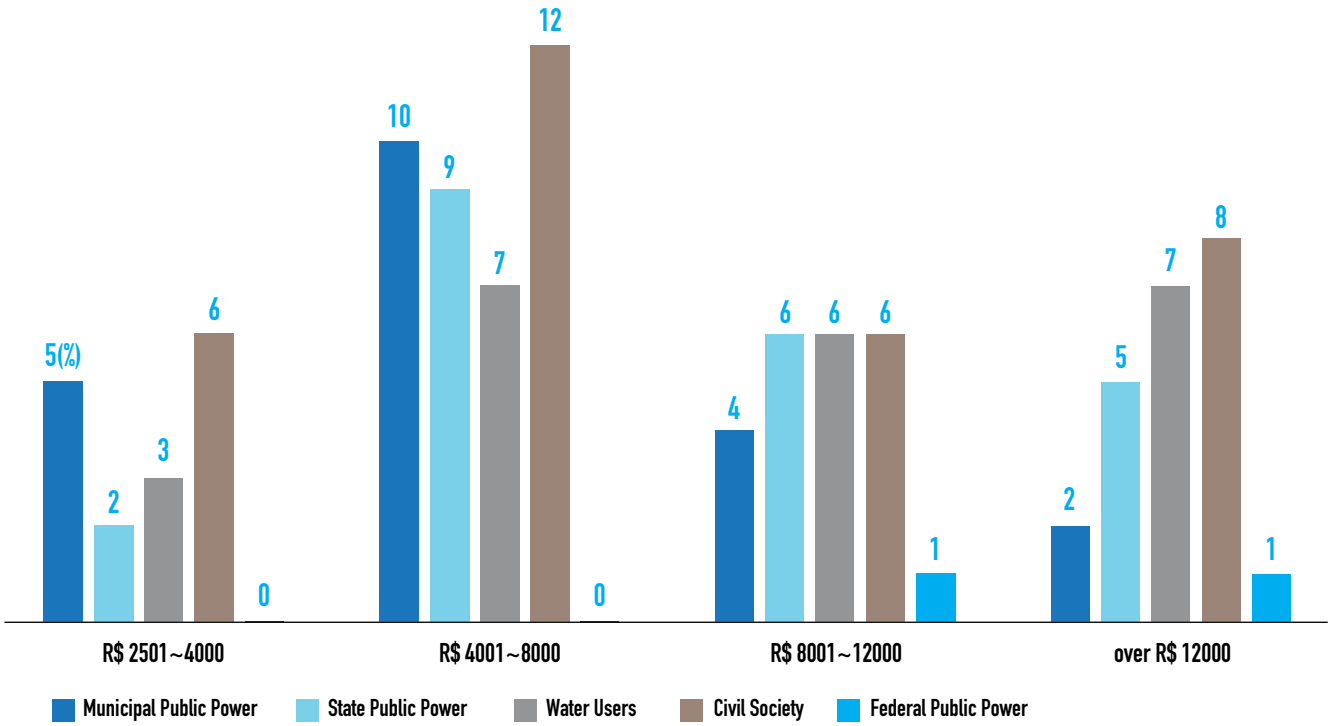

Figure 10-7 Monthly family income by representation sector (in%) (Source Research Data)

Environment, and Council of the Federation of Industry and Agriculture. The participation of the representatives in basin committees in other collegiate bodies can be something positive since it can help in the articulation and integration of water resources in other public policies.

The representatives were also asked about the time of participation and representation in basin committees and it was observed that 15% participated for less than one year in the composition of the committee, 49% from 1 to 5 years, 18% from 6 to 10 years, 10% from 10 to 15 years, 5% from 16 to 20 years, and 3% have been participating for more than 20 years. When the data is separeted by the representation sector, the representatives of the segment of the Federal and Municipal Public Authorities are the ones with the highest percentage of representatives with the shortest participation time (28% and 27%, respectively). At the other extreme, those who participate for more than 11 years have the highest percentages of water users (21%) and State Public Authorities (20%).

We sought to identify, among the respondents, representatives who also serve on the Board of the Committee (20%) and those who are members of a Technical Chamber (31%). The technical chambers have the attribution to subsidize the decision making of the committee, as it seeks to develop and deepen the necessary thematic discussions before being submitted to the plenary. The Chambers shall preferably consist of the members, representatives or deputies of the committee, or may be composed of representatives formally appointed by those members. In general, the composition should seek to reflect the proportionality between the segments represented. In these discussion forums, it is common for technical experts to be invited to collaborate with the discussions and to enrich the analyses carried out.

The various forms of participation are important for building a democratic society. Some forms of participation are only consultative, while basin committees differ from other forms of participation foreseen in other public policies since they have as legal attribution to deliberate on water management doing this in a shared way with representatives of civil society and users as well as public government.

4.2. Decision-making Process in Water Basin Committees

According to legislation, water basin committees should define the rules to be followed in relation to water use. Furthemore, the composition of the committees should reflect, as already mentioned, the multiple interests with respect to waters of the basin. Thus, in the exercise of their functions, the representatives reflect the interests of the organization they represent and the segment in which they are a part. In this sense, the indicated representative is subject to what Bobbio calls a bound mandate. However, there is always the danger that self-representation is an elected representative among his peers who will defend self or private interests and not share the issues discussed with the group. In this way, this member would not be adequately representing the interests for which he was elected.

Considering these notes, the committee members were asked how often, in the exercise of their mandate as a

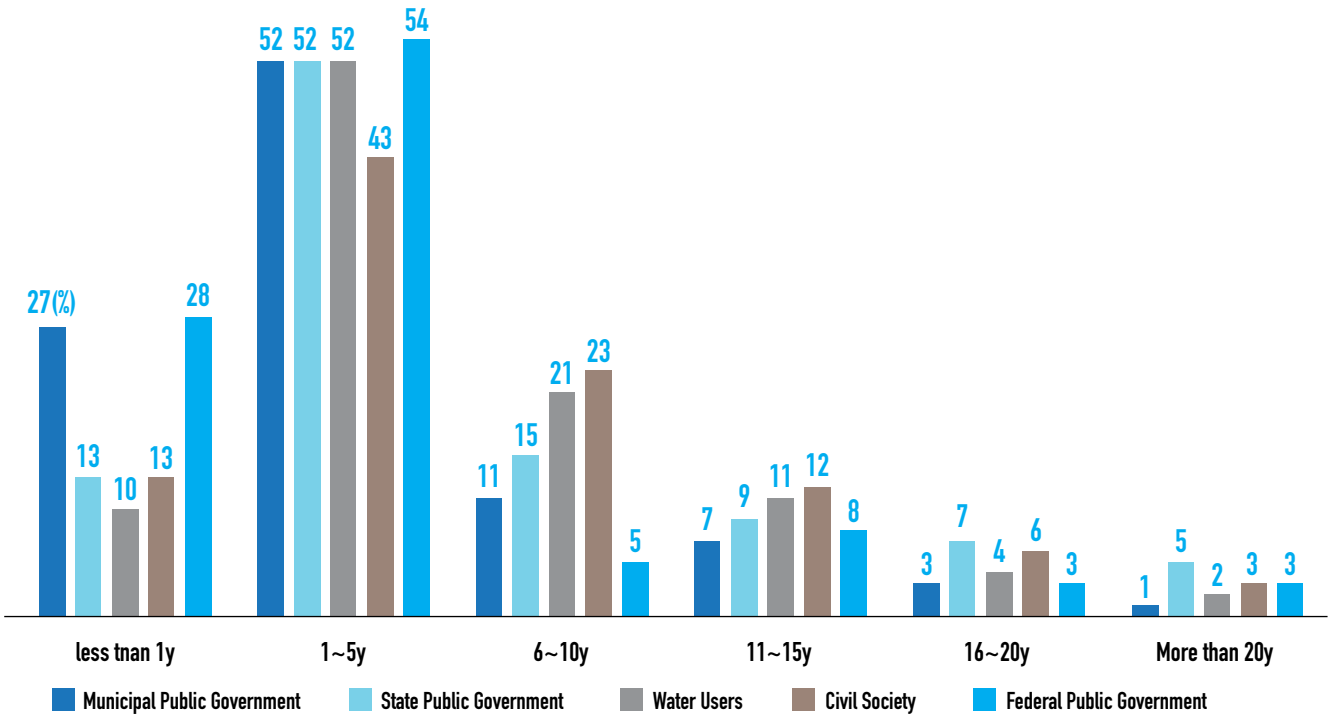

Figure 10-8 Time of representation in basin committees by segment (Source Research Data)

representative, they maintain contact with their support base/organization which they represent. After analyzing the data, it is noticed that 66% of the representatives maintain contact frequently or always, 28% make contact sometimes or rarely, and 6% of respondents do not have a support base. The fact that 28% of the representatives do not make regular contact with the organizations they represent is a cause for concern, and even greater, considering that the representation in the committees is by segment, that about 6% report that they do not have a support base.

Based on the data, 34% may have no significant participation in decision making, or defend individual interests, and if they are actors with political power and influence they can impose their own interests.

In a formalist view of representation, the representative must be made accountable. So, in the sequence, we ask how often they consulted their base to build and/or strengthen articulations with their segment representation, account for the performance, report on discussions and deliberations, and define or sustain a position in committee meetings. As can be seen in Figure 10-9, only about 50% (average) of the representatives have more frequent contact with their support base, in essence, the organization they represent in the Committee.

These results show not only the frequency of contact but also the main reasons for contact. However, it is observed that the representatives do not do it regularly; in this sense, it is important to discuss how this should be done by communication. The National Water Agency, in Brazil, recommends that procedures be established to ensure that these representatives perform their representation functions well. It is also necessary to define how this representative should inform and consult the represented base and thus have the exercise of his mandate legitimized to each debate and decision to be made within the basin committee (ANA, 2011).

The terms of representation, once it is clear who (person) represents what (organization), brings along the question: "How does is this representation?" Since they are called to represent the specific interests of a segment, it usually belongs to the same professional category as those represented.

Another issue in terms of the relationship between representatives and represented organization was the most used forms of contact to make contact with the organization that represents the basin committee. In this question, the respondents could indicate more than one option, which were face-to-face meetings (21.9%), personal conversations (20.1%), e-mail and mailing list (19.6%), SMS or WhatsApp messages (19.8%), telephone calls (13.6%), Facebook, Twitter and other social networks (3.9%), institutional site / Intranet (3.7%), letter (3.2%) and others (0.5%).

It was also asked about the perception on the performance of the other representatives of the segment with the following

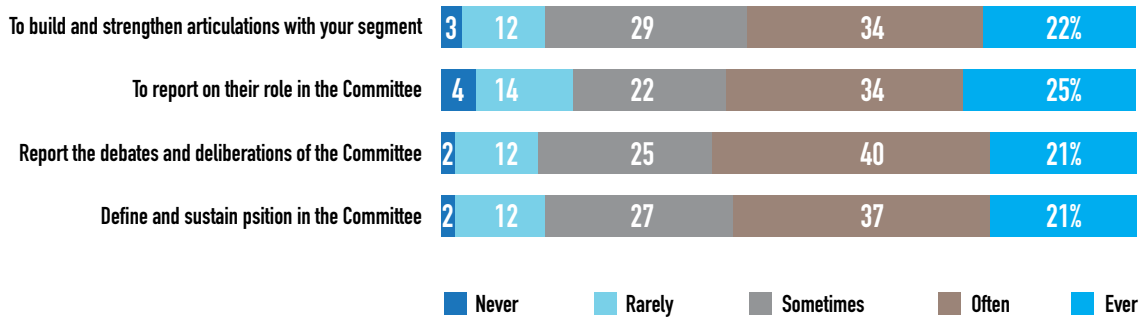

Figure 10-9 *Consultation with support (organization representing) (Source Research Data)*

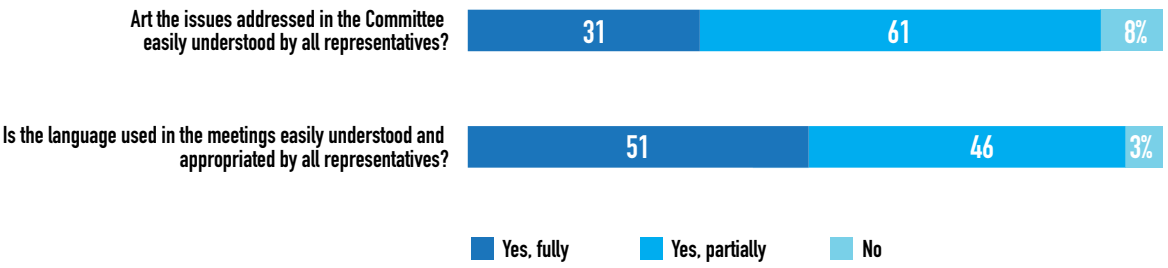

Figure 10-10 *Perception about the communication and understanding of the representatives(Source Research Data)*

question: “For you, how often does the performance of the representatives correspond to the interests of the respective segments?” For 14% of the respondents, the performance of the representatives always corresponds to the interests of the respective representation segment. For 50% of the respondents, this often corresponds to the interests of the segment. The other percentages were 28% with sometimes, 7% with rarely and 1% with never, corresponding to the interests of the representation segment. As can be observed in the data in the perception of the representatives, the performance of the other members does not always correspond to the interests of the respective segments.

Considering that the committee’s decision-making process must follow a broad process of articulation and negotiation, and should be based on technical studies to support political decisions, the representatives were questioned on their perception whether the matters dealt with in the Committee are easily understood by all representatives and if language used in meetings is easily understood and appropriated by all representatives.

“Perception of representatives seems to have an important weight on qualifying and interpreting other members interests.”

Considering that most of the participants have a high level of education, the result is worrisome, even more if we consider the need to expand the social base in the management of water resources. In the perception of the representatives, they partially understand the subjects (61%) and also partially understand the language used (46%), which seems to demonstrate the need to rethink the presentation of the themes in the meetings of the members. All attributions of the committee presuppose wide discussion and agreement between the parties involved. Based on these data, we can say that if most do not end up with what they are, they also do not have effective decision-making power. However, the discussions can not be an end in itself, and the committee only makes sense when it manages to fully exercise its legal attributions.

We also ask the representatives how many hours on average per month they dedicate themselves to the activities related to the Basin Committee. The results show that nearly half of the representatives (47%) spend less than five hours per month on activities related to basin committees. Following that, 30% of the representatives indicated that they dedicate from six to ten hours a month, 8% devote between 11 and 15 hours, 6% from 16 to 20 hours, and 9% dedicate more than 21 hours per month to committee activities. This data, in isolation, does not seem to be significant, but when it is observed along with the information about the understanding of the subjects approached in the committee’s scope, one can suggest that more hours of dedication could broaden the understanding of the representatives on the themes recurrent to the be representative.

With regard to the issues addressed, some of the respondents indicated the need for greater understanding of water legislation; technical capacity for conducting the discussions, and also on the responsibilities of a basin committee (i.e. the role of the collegiate body and the manner in which it, as a representative, falls within this area) as functions or the depth of the topics are being discussed. According to respondents, the renewal of the member organizations, especially of the representatives, is seen as a problem since the new participants “arrive without any instruction and sometimes the issues that have already been overcome are taken over”, and there is “high turnover of members mainly in the municipal public sector, when the representative begins to familiarize with affairs, changes management and most of the time representatives of technical and plenary chamber.” There was also a lack of commitment regarding attendance at meetings; the prior reading of the topics to be debated; as one representative reports, “there is insufficient reading of the materials available, causing dispersion and lack of control”.

The respondents also highlighted there was “lack of an effective agenda”, as well as previously unsettled discussions and issues pertaining to the committee. Regarding the participation of the municipal public power, there are reports of “low presence” in the meetings; high turnover; and the indication of non-decision-making representatives.
With regard to the state public government, the complaints are of the pressure of the approval of guidelines, mainly of topics of interest; the “representatives of the public government often act defending the slowness of the process, implying that public power is against the charge for the use of water.” “Large users influence public administrations in the sense that charging [for water use] does not happen”, “pro-government representatives defend the interests of the current administration.”

Other points, the positioning of representatives, mainly of water users is often strictly tied to the specific interest of the organization representing or by personal interests, “disregarding the collective interest”, was also reported the lack of transparency and information mainly data relative “to the actual situation of both the conditions of quality and quantity of water, their uses and consequences; as well as on management tools”, and on “environmental licensing processes”. According to one representative, “the committee is an arena of political dispute, sometimes leaving the other uninformed is a strategy adopted by representatives little fond of democratic debate!”. River basin committees are state institutions with clear legal attributions. With its strengthening, it strengthens the implementation of the National Water Resources Policy as a whole, legitimizing the regulatory action by the water resources management bodies.

05
Final Considerations

The importance of thinking about water basin organizations from the point of view of governance lies in the fact that the collective decision process is the structuring basis of the proposal of this type of organization, something that characterizes and differentiates it from others. And in a scenario where water security is threatened, planning and adopting prevention, adaptation and mitigation measures to this new climate reality is a collective action problem that raises institutional responses from states, markets and communities. This Dilemma, strongly related to SDG 6, which aims to ensure the availability and sustainable management of water and sanitation for all, aims, among other goals, to strengthen the participation of local communities in improving water and sanitation management.

The adaptation to water-related changes should be an integral part of water resources plans and vice versa, meaning that no climate change adaptation plan should be developed without explicit consideration of water issues, especially in a scenario on which the global challenges related to water are increasing. Studies indicate that 16 out of the 17 warmest years recorded around the world have occurred since the beginning of this century. Global data show that 2017 was the warmest year ever recorded, surpassing 2016, which by itself surpassed 2015, and so on.
Climate change, one of the greatest challenges of our era, is accelerating catastrophic water-related events at a pace never seen before. In this scenario, droughts and floods are spreading devastation. While population growth, economic development, and changes in consumption patterns, among other factors, demand for water, food and energy increases, rivers dry up and many of them pour into the sea in an intermittent way, if they are able to reach the ocean. Global demand for water has grown and will continue to increase significantly over the next two decades. In this worrying panorama, it is necessary to discuss what the role of water should be in our future. The discussion about how we understand, value and manage water to contribute to policy decisions about our water resources should be encouraged. This challenge involves the consolidation of three fundamental components of a democratic process: participation, citizenship and politicies that are deeply intertwined. The full exercise of citizenship presupposes political participation in decision-making. Politics should be integrated in the sense of dialogue, exchange of opinions and respect for the contradictory against the background of the search for the common good.

The right to access drinking water is essential for a decent human life and is recognized as universal and vital for the realization of human rights. And for management of this finite resource, cooperation and participation are key elements, and that brings us back to the concept of Governance.
The term can be understood as the way on which individuals and organizations, public and private, manage their common problems, like access to water. It is a continuous process through which it is possible to accommodate conflicting or different interests that must be adjusted in cooperation actions. Thus, governance can contribute to developing, implementing, and enforcing sustainable solutions for water allocation and provision problems. This may include notions of demand response and anticipation, based on consensus, to mitigate the effects of extreme events. Water is the link that connects all aspects of human development. Water security is therefore vital to all social and economic sectors, as well as the basis of the natural resources on which the world depends.

> *"The importance of governance within water basin organizations is because the collective decision process is the structuring basis of this type of organization."*

To contribute to the dicussion, this study presents the profile of the member representatives and providing information that may point out important aspects of the inclusive capacity of the researched representatives with the premise that good governance is key to achieving water security.

For a comprehensive view on adaptation to climate change related to water and water security, water management plans need to consider the needs of all sectors that use water. This means to promote dialogue through their differences in order to arrive at a better understanding of a given problem and its solution. However, this set of agents from the different sectors should seek to bring together the antagonisms of interests over water since the use of water resources must be sustainable in order to ensure conditions not only for the present generations, but also for the future.

However, with the development of the research, it has been observed that in many river basins of the country (state and federal) the committees have not yet been implemented. Moreover, even in the case of active committees, there are still limitations related to integration, communication and return to society; adequate investment of resources; and the implementation of management tools (such as basin management plans), scarce financial resources where there is still no charge for water use.

The data presented allow to outline the profile of the representatives of state river basin committees in Brazil. Most of the representatives are male, middle and upper classes, have high education and are over 41 years old. It is hoped that these governance arrangements should be able to include all individuals in deliberative and decision-making processes regardless of the positions of power they occupy in social relations. This shows the need for a more balanced participation of women and young people in the basin

committees and consequently in the management of water resources.

When it comes to the participatory profile, it is noted that although the majority of representatives are members between 1 and 5 years of basin organizations (49%), but a percentage has experience in other deliberative processes as members of other national, state, and municipal collegiate bodies (on average 32%); thus, indicating some experience in this type of activity.

The formation of the representative, as a member of a collegial arrangement, and establishment in the field are significantly related to the trajectory that accompanies, either as a researcher or professional in the area (and even before). The representative's insertion in the field is to deliberate as a member of the committee. The trajectory is influenced by processes of socialization and identification, in which the agent continually builds up as a member, changing over time. In his interaction with others (in the organization in which he works and represents, and also with other members of the collegiate body in which he is a part) in his identification process or not with these others, the representative becomes constituted.

This process of formation, according to Bourdieu (1989), is also influenced by the interests and the taking of political positions in the space of deliberation. Individuals, therefore, assume specific positions that are determined by the action of certain capitals. In this respect, it should be noted that he does not act naively since the representative is a political being. Thus, assuming a position within a field also implies assuming a political position. For Bourdieu, all social fields are immersed in fields of power. Thus, individuals are builders of social reality with the purpose of imposing their vision, but always guided by points of view, interests, and references determined by the position they occupy in the same world that they intend to transform or conserve.

However, collaboration among members of the basin committees in Brazil presents serious challenges. As it has been put, the interests of a particular group (36%), or even individuals (34%), can intervene in decision-making. The misinformation or lack of knowledge (59%) of several aspects of legislation related to water management, on the part of some representatives is also a weak point in the process of exchanging ideas and a fair balance in the participation of members in the Basin Committees, modifying the reference frameworks for water resources and these are affected by different factors—climate change, financing and infrastructure, sanitation, irrigation, quality, quantity, etc.—for each committee, according to their location and geographic conditions, and hindering the capacity for governance, which can only benefit certain group interests.

Based on the analyzes, the need is perceived by the management bodies to create conditions that foster the population's interest in the management of the country's water resources, awareness of the problems of water use and its strong relationship with water and food security, the possible solutions or different scenarios in the future and, in this way, give popular support to the performance of the basin committees.

This proposal should focus on the young population through education and participation in schools and communities, farming groups and fishing, as well as the industry that has manufacturing processes where water intervenes.
In addition, special emphasis should be placed on promoting the participation of women, with the dissemination of messages highlighting the importance of the role of women in the management of resources, specifically water at the household level.

There should be a government effort to invest in education and empowerment of the population at different levels and sectors to gain a comprehensive understanding of the management not only of water but of natural resources and environmental services. However, it is not only a question of knowledge, but of empowering all individuals to use such knowledge and to take part in the processes of consultation or participation in management.

Transdisciplinarity in water issues can facilitate the approach from different perspectives allowing a situation of benefit for all the groups and actors involved, creating new ways of approaching problems and generating good practices, both participation and decision making, creating an environment fair and equitable governance that will facilitate the measures to be taken to achieve water security at the local, regional and federal level.

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