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THE SECTORIZATION IN THE WATER RESOURCES MANAGEMENT AS A STRUCTURAL HURDLE FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT

The administrative sectorization for the management of Brazilian hydric resources presents itself as an obstacle to sustainable development, as it potentiates the occurrence of conflicts of interest for the multiple uses of water and perpetuates the exposure of the resource to vulnerability scenarios. Given the intensification of water crisis cases, conflicts in this sphere have become increasingly recurrent, so that integration among the actors and sectors that depend on water availability to carry out their activities is necessary. In this context, the objective of this research paper is to demonstrate that insufficient integration between sectors in water management does not contribute to sustainable development. Based on the hypothesis that the national management of Brazilian water resources is insufficiently integrated, this paper investigates to what extent the political-administrative sectorization of water resource management in Brazil represents an obstacle to the implementation and achievement of the objectives established by the National Water Resources Policy. Based on the hypothetical-deductive method, supported by the sample analysis of national water and by normative, doctrinal and jurisprudential review, the research argues that the sectorization of water management constitutes a structural obstacle to sustainable development. Overcoming this obstacle

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requires the observance of the Integration Principle, whose application becomes relevant in the water field from the ecosystemic perception of the interconnections between the sectors, actors, and natural resources that are part of this process.

Keywords: national water resources management; sectorization; sustainable development; water conflicts.

A SETORIZAÇÃO NA GESTÃO DOS RECURSOS HÍDRICOS COMO UM ÓBICE ESTRUTURAL AO DESENVOLVIMENTO SUSTENTÁVEL

RESUMO

A Setorização administrativa para a gestão dos recursos hídricos brasileiros apresenta-se como um óbice ao desenvolvimento sustentável, na medida em que potencializa a ocorrência de conflitos de interesses pelos usos múltiplos da água e em que perpetua a exposição do recurso aos cenários de vulnerabilidade. Diante da intensificação dos casos de crise hídrica, os conflitos nessa esfera se tornaram cada vez mais recorrentes, de modo que se faz necessária a integração entre os atores e setores que dependem de disponibilidade hídrica para realizarem suas atividades. Nesse contexto, o objetivo deste artigo é demonstrar que a insuficiência de integração entre os setores na gestão da água não contribui para o desenvolvimento sustentável. A partir da hipótese de que a gestão nacional dos recursos hídricos brasileiros é insuficientemente integrada, investiga-se em que medida a Setorização político-administrativa da gestão dos recursos hídricos no Brasil representa um óbice à implementação e alcance de objetivos elencados pela Política Nacional de Recursos Hídricos. Com base no método hipotético-dedutivo, apoiado pela análise amostral dos conflitos hídricos nacionais e pela revisão normativa, doutrinária e jurisprudencial, a pesquisa argumenta que a Setorização da gestão hídrica se constitui como um óbice estrutural ao desenvolvimento sustentável. A superação desse óbice requer a observância do Princípio da Integração, cuja aplicação se torna relevante no campo hídrico a partir da percepção ecossistêmica das interconexões entre os setores, atores e recursos naturais integrantes desse processo.

Palavras-chave: *conflitos hídricos; desenvolvimento sustentável; gestão nacional dos recursos hídricos; setorização.*

INTRODUCTION

The sectorization of national water management enhances the emergence of water conflict and the exposure of water resources to vulnerability situations, as it contradicts the multisectoral nature of water resources and the natural configuration of the hydrographic basin as a management unit. This element is an obstacle to sustainable development, which has environmental integration as one of its normative foundations (DUPUY; VIÑUALES, 2015; LAFFERTY, 2012)[3].

This research proposes that the lack of integration in resource management can present structural obstacles to sustainability, highlighting the necessity to adopt integrated strategies for the management of river basins. Based on this hypothesis, based on examples of water conflicts, we aim to demonstrate that insufficient integration in Brazilian water management[4] is a structural obstacle to sustainable development. We argue that Sectorization contributes to perpetuating situations of water vulnerability and to the establishment of water conflicts due to opposed interests in the multiple uses of this resource.

Regarding the legal aspects of water regulation, the normative basis of sustainability is provided for by Law no. 9433/97, in its Arts. 2nd and 3rd, which outline the objectives and guidelines of the National Water Resources Policy (NWRP). The provisions prescribe, respectively, general guidelines for the implementation of the NWRP, the integration of water resources management with environmental management, and that the National Policy must aim at the rational and integrated use of water resources to promote sustainable development. The norm thus provides the general objective of action given that the resource use permeates several sectors. These sectors are in a relationship of mutual impact, as well as between them and the environment.

These normative provisions are directly related to guaranteeing the

3 In its classic concept in international law, integration is seen as a principle that prescribes the idea that economic, environmental, and social planning must be integrated into public decision-making (VIÑUALES *et al*., 2015; SANDS, 1995; MEDINA; TARLOCK, 2010; ASHFORD; HALL, 2011).

4 The emphasis of this assessment will be on federal actors and surface water, excluding groundwater, with states, municipalities and civil society being considered incidentally. This focus is due to the fact that, according to art. 21, XII, b, and XIX, and art. 22, IV, of the CFRB, it is incumbent upon the Federal Executive Branch to institute the national water resources management system and define criteria for the granting of rights for its use, to explore the energy potential of water courses, as well as to legislate privately on water and energy. In addition, art. 20, III combined with art. 26, I, of the Magna Carta allows us to state that the vast majority of bodies of water are assets belonging to the Union.

multiple uses of water, which is a foundation and principle of the National Water Resources Policy. NWRP devices that address multiple uses of water aim to guarantee equal access to water among users due to the availability of the resource for various uses. The guarantee of the multiple uses of water is the responsibility of the Public Administration, through the management, regulation, and inspection of the resource. These actions are performed by institutional bodies such as the National Water Agency (ANA), responsible for defining and overseeing the reservoir operation conditions for public and private agents[5].

Therefore, integration is close to the objectives, guidelines, and competencies established by the NWRP. In general, the Integration Principle proposes an integrated approach of all environmental effects in the elaboration and execution of public policies related to a sector or single administrative structure, and of environmental objectives in the development and execution in an intersectoral way, thus presenting effects in the definition of policies and implementation of measures in both economic and social sectors. Thus, the principle requires the integration of environmental aspects in the objectives of sectoral policies and the integration between different levels of government and stakeholders.

The establishment of management measures and the articulation between the public actors involved in this process concerning the implementation of policies, guidelines, and regulations in the same territory of a hydrographic basin should present integration. Therefore, this article aims to investigate the extent to which the political-administrative sectorization of water resources management in Brazil constitutes an obstacle to the implementation and achievement of objectives listed by the National Water Resources Policy, which aims to ensure sustainable development in water management. This investigation allows us to verify the legal and environmental effectiveness of the NWRP to achieve three of its main objectives: the availability of water for future generations, the rational and integrated use of the resource, and the prevention of critical hydrological events resulting from the inappropriate use of the resource[6].

Since it is an asset available in the environment, but with potential for scarcity and, considering the value and economic benefit arising from the use of the resource, water management fits into a logic of Regulatory Law, complementary to the determinations of Environmental Law. The

5 NWRP – Art. 1, IV and Art. 13, sole paragraph, of Law 9,433/1997 and Art. 4, XII of Law 9,984/2000.
6 PNRH – Art. 2, I, II and III of Law 9.433/1997.

regulation establishes that the performance of the Public Administration must be based on the constant reconfiguration of the rules of conduct and administrative acts so that the performance parameters can guarantee fundamental rights (ARANHA, 2015).

Given these determinations and the consequences resulting from the use of water, the characterization of the regulatory logic is involved in the management of water resources. This management takes place through control and monitoring instruments, economic management instruments, and pricing. They are applied by operational entities that can systematically rationalize the use of the resource by different recipients to avoid harmful interferences in water management (PINHEIRO, 2014), which ultimately lead to situations of conflict and scarcity.

For this reason, the Administrative Procedure Theory of regulation presents a significant contribution to this analysis. This theoretical framework is justified by the evidence that there are flaws and obstacles in the regulation of water resources. The theory is the basis for investigating the effectiveness of the instruments used for the allocation of water resources and administrative organization, considering the public interest embodied in the guarantee of water security, essential to the development of a healthy quality of life (SOUZA; GHILARDI, 2017). Thus, the study of water resources management requires the use of a regulatory approach based on Administrative Procedural Theory (CROLEY, 1998, 2000, 2008), as it considers the need for flexible regulatory rules in the administrative procedure, due to the resource scarcity and the public interest embodied in the performance of the competent entities for its management and inspection.

To carry out this investigation, in the present study we examine the occurrence of water conflicts in Brazil since these cases can be related to the administrative management structure, that implies in legal, political, or organizational issues. The analysis of conflicts is relevant because these cases show how management is conducted, and how flaws in its execution can be identified. Thus, we can evidence the creative function of the legal structure for the regulation of activities involving water resources by delimiting the mechanisms capable of resolving divergent dualisms (AMORIM; RIBEIRO; BRAGA, 2016). The investigative direction of this study allows us to identify how to increase the environmental protection of water resources, to guarantee their multiple uses based on the rationalization that integration can bring to water management. To achieve this purpose, the study is supported by a qualitative approach of an explanatory

character, based on the analysis of exemplary cases of water conflicts that address energy and food production issues. These cases allow us to identify the causes and relationships that characterize the main obstacles in the performance of the actors aiming at sustainable development. We use the hypothetical-deductive method together with a bibliographic, normative, and jurisprudential review.

The central hypothesis of this research is that the prevalence of sectoral logic, as opposed to the integrated logic in the application of legal instruments for water management, poses a major structural and normative obstacle to a systemic approach in the application of norms and in the performance of sectors, which is called the water sectorization. To analyze this problem, at first, we address the need to balance the administrative specialization that leads to Sectorization, typical of the national regulatory model, given the need for integration that the water management demands. Next, we analyze potential conflicts of interest due to the multiple uses of the resource in its shared, yet sectorized management, highlighting the main aspects of environmental protection in this scenario. Based on these considerations, we draw attention to the necessary perception of the intersectoral relations of water as a means of mitigating environmental impacts and conflicts of interest in water resources.

1 THE SECTORIZATION IN THE REGULATORY ORGANIZATION AS AN ENVIRONMENTAL OBSTACLE TO THE NATIONAL WATER MANAGEMENT

Water sectorization is based on insufficient integration between the water, irrigation, energy, and environmental sectors. When considering that the performance of these sectors is related to water availability, it is clear that all these sectors carry out their activities to guarantee the multiple uses of water. For this reason, insufficient integration between sectors can lead to conflicts of water interest since the use of resources by one sector impacts the activities of others and all depend on water availability for their activities.

The national policy provides for the integrated use of water resources (art. 2, II) and the integration of water resource management with environmental management and with estuarine systems and coastal zones (art. 3, III and VI), incumbent upon the National Executive Branch promote such integration (art. 29, IV). SINGREH aims to coordinate integrated water

management (art. 32, I), with the National Water Agency being one of the main actors for the implementation of policy instruments (art. 33, I-A).

Even though the implementation and improvement of water management instruments have presented organizational and institutional advances[7], the gaps for integrated management, given the shared responsibilities, are still widespread in the national context (THEODORO; NASCIMENTO; HELLER, 2016). In an attempt to achieve greater water integration, the National Water Resources Policy provides for decentralized, participatory, and integrated management of the resource. The law attributed to the public authority the competence to regulate the provisions of the Basin Committees elaborated in the Hydrographic Basin Plan, since its stipulations lack binding force, where there is a determination of the competence of the public entities for the inspection of the stipulated measures, according to the NWRP (arts. 29, II and 30, I).

Specialization is a postulate that reflects the organization of Public Administration and implies gains in administrative efficiency (JUSTEN FILHO, 2016). However, when considering the need for integration for the management of national water resources, it is necessary to verify to what extent the administrative guidance should be guided by the search for administrative efficiency, through specialization, or by the preventive management of the environmental resource, guided by integration. The balance between the autonomy provided by specialization and the ecosystemic approach provided by integration is an important step towards the realization of sustainable development, given the need for integration to reach the latter.

The regulatory organizational model gained strength in the first term of former President Fernando Henrique Cardoso, proposing a new structuring of the Public Administration, with a decentralized bias, supported by regulatory agencies (KLERING; PORSSE; GUADAGNIN, 2010). Public Administration, direct and indirect, is guided by explicit principles in art. 37 of the 1988 Federal Republican Constitution, which are pre-normative canons that guide the conduct of the State in administrative activities (CARVALHO FILHO, 2010).

However, the constitutional mandate for the performance of Public Administration does not end in the form of explicit principles. The exegesis

7 The advances are observed mainly in the last 20 years with the edition of the NWRP in 1997, which implemented a democratic and participative management, addressing the common character of water, as opposed to the previous regime. In addition, with technological advances and the creation of ANA, it became possible to better assess hydrological conditions and water allocation more efficiently, prioritizing public interest in water management.

of the administration principles demonstrates the operational aspect of other more sectoral postulates, such as the principle of specialty, derived from the principles of legality and the unavailability of the public interest, which guide administrative decentralization.

Specialization is a typical regulatory measure, in which the sectoral organization allows greater independence from the Executive, Legislative, and Judiciary Powers, as well as from the regulated industry and consumers. Sectorization can be understood as fundamental for the impartiality and technique required by the bodies, which are fundamental elements for the efficiency of the regulation (MONTINI, 2016). Specialization in administration promotes the functional decentralization of entities in the provision of public services through the purposes and functions defined in its creation law, to show that the availability of the public interest does not depend on a strict analysis of the entity's convenience.

Concerning water resources, we also observe the decentralization promoted by specialization. This field presents blocks of mastery of specialties such as issues related to energy, security, agriculture, and livestock, as well as the supply and provision of water, around a common object, namely water. This is what occurs in the organization of national energy agencies and water, for example.

It should be noted that the legal protection of an ecologically balanced environment involves not just one sector, but all sectors that have an impact on natural resources. A concept that resembles this reality of interdependence and provides a procedural character for integration is the ecosystemic approach (PLATJOUW, 2016). However, the standardization of its protection at the national level is still sectorized.

As for the normative determination for Public Administration activities, there is still a predominance of sectoral logic: the rules and administrative structure applied to water resources are different from those applied to energy, which is different from those applied to agriculture. And it would be no different, since Public Administration in Brazil is based on the Principle of Specialization as an assumption of legal effectiveness in the management of public affairs, under the argument that management is better when specialized. If, on the one hand, it is a legitimate way of seeking to improve public administration, on the other, this results in sectoral management that may eventually be insufficient if what is managed demands a multisectoral approach.

The general regime of water resources in Brazil, governed by the

National Water Resources Policy, is characterized by a decision-making process of shared responsibilities according to a decentralized and participatory institutional model. As an example of this decision-making model, the issuance of grants of rights and inspection of the use of water resources is an exclusive manifestation of the State's regulatory power. Hydrographic Basin Committees and agencies are responsible for defining the Hydrographic Basin Plans, the approval of values for charging for the use of water resources, financing tools for the plans, and support the management system (COSTA, 2004).

The sectoral prevalence of the law reflects the difficulty of a systemic approach to the rules: each sector has its rules. They are their own sectors, with their entities, principles, rules, and priorities, although the priorities of one generate undesirable consequences in the other.

As an example, it is worth considering the case of the crisis in the Cantareira de São Paulo Reserve in 2015, which severely affected the water distribution services provided by the Basic Sanitation Company of the State of São Paulo (SABESP).

After a year of problems related to water, the water crisis was recognized in 2015, through the Ordinance of the Superintendent of the Water and Power Department (DAEE)-2617.

Accordingly, constructing legal strategies was presented as a matter of order, of managing a public good, and also of distributive justice of the burden to be borne in times of crisis. However, SABESP, through contracts, presented a different treatment to consumers and the industry. Specifically, consumers of water for residential use were paying more for the supply of water than industrial consumers, who signed a firm demand contract that defines a set of exclusives and differentiated prices for the customer, provided that this is for commercial purposes (FERRAÇO; MORAES, 2018b).

There is an injustice in terms of environmental equity (BEDER, 2000) in SABESP's actions about its different contracts aimed at different types of consumers because environmental equity can be related to the adoption of measures to guarantee sustainability. These mechanisms are, as a rule, market mechanisms, due to the scarcity levels of a natural resource. However, these measures can reinforce or even create inequalities between the final beneficiaries of the resources.

In this sense, environmental equity reinforces the idea that such policies should be applied in an impartial, balanced, and equitable way to

guarantee access and the possibility of using the resource. In the case of SABESP, there is water rationing for some and maintenance of consumption levels for others. Likewise, those who use water for human supply and self-consumption were paying more than those who use water for commercial purposes.

Water management found a foundation in economic approaches to resource assessment and use. Pricing started to be used as an important tool to equate the scarcity of the resource with economic value, aiming at the rational use by the final recipients. Markets have been considered the most efficient way to allocate scarce resources, although a full assessment of the impacts and interconnections in such transactions on natural resources is not possible. Through this logic, natural water resources have come to be considered as externalities of the economic system, with the need to commercialize them with an appropriate economic value and be able to determine and control their use.

However, these administrative policies play uncertain roles in the practical results of physical water allocation, leading to Pareto's inefficiency due to market failure caused by asymmetric information (ZHOU, 2018). In agriculture, for instance, the price of water for irrigation could guide farmers to adopt irrigation technologies with high efficiency or promote a more productive cultivation pattern. However, the low cost for this sector implies the intensive use of water, precisely because of the inexpressive value of the resource in comparison with the scale of production.

However, it is worth noting that water is a natural resource that guides the activity of several sectors of Public Administration. In Brazil, the water sector can be identified as something beyond its own sector, being, at the same time, part of the sectors of environment, agriculture, energy, health, infrastructure, and climate change, for example. Water management has a diverse range of interests, encompassing public and private actors with varied interests, as well as structural fragmentation scenarios. This is a favorable scenario for the overlapping of interests, interference, and conflicts, as we will discuss below.

The complexity involved in water management and the implementation of sustainable practices for this resource is influenced by administrative policy. Likewise, the administrative policy can be influenced by unplanned and uncertain environmental aspects as a consequence of the effects of climate change. In this sense, it is important to understand the real need to promote management measures applied to water resources that

aim at the transition from isolated sectoral practices to a new cycle that involves the articulation of the actors, even if it is still in a sectoral organization, to implement integrated practices.

In this sense, even if the administrative organization of any government is organized separately according to the sectors, the connection between these sectors in the performance of activities related to natural resources cannot be denied. We draw attention to the fact that, regardless of whether the administrative organization is sectorized, water resources are not available in isolation. This resource can be addressed by the ecosystemic approach so that the intersectoral uses will have repercussions among themselves.

Both integration and specialization are not ends in themselves. Both constitute postulates that guide actions and aim at a balance within their proposals, whether to achieve greater efficiency, procedural simplification, and less bureaucracy, or to determine the necessary interconnection of environmental, social, and economic components in planning and political actions, the articulation between the actors with the objective of environmental preservation.

Sustainability does not relate separately to environmental policies, but rather to all policies, thus extending horizontally in the weighting of assets and interests of the other sectors that are equally important for the State's tutelage and intervention (CANOTILHO; MOREIRA, 2014). Given the environmental concerns regarding climatic uncertainties, as well as the risk of the probable influence of the climate in political relations, thinking about strategies for solving sustainability in structured sectors becomes a preventive management measure.

2 SECTORIZATION AS AN ORIGINATING CONFLICT ELEMENT BEFORE THE MULTIPLE INTERSECTORAL USES OF WATER

The sectorization of national water management leads to management failures, which can be observed by the emergence of conflicts of interest due to the multiple uses of the resource. The insufficient integration between the sectors involved in activities dependent on water availability in the same basin sometimes implies conflicts of interest for the allocation of water that best meets interests in isolation. This overlaps the existing uses in the basin. In addition, it is necessary to consider priority uses by law.

The sectorial and specialized administrative organization, typical of the vertical regulatory model (MONTINI, 2016), leads the sectorization of water resources towards a management logic that presents disparity with the natural environment since the latter is highly integrated. In this context, the implementation of an ecosystemic approach remains hampered by inconsistencies in the sectorized governance structures, since the implementation of this approach remains at the discretion of the decision-maker, sometimes the judicialization of issues to arbitrate interests that share common factors (PLATJOUW, 2016).

The administrative actors responsible for the management of water resources and the regulation of activities related to it are organized in a specialized way and present themselves in levels and sectors[8]. Based on the principle of specialty, the Administration can act in a particular way, managing problems and presenting solutions according to a specific segment.

The principle of specialty, which establishes the idea of decentralization and specialization in sectors in administration, derives from other principles of Public Administration, which are those of legality, efficiency, purpose, and unavailability of the public interest. The creation of entities and forms of organizations to perform the attributions that are within their competence are established by law, in the name of the Principle of Legality. The organization for carrying out administrative competencies in a specialized way is supported by the unavailability of the public interest, since this format allows for more efficient management of the public good, due to the logic of speed and independence.

Although the uses and ends of the sectors that perform activities related to water are inseparable, the regulation and inspection of the Public Administration lead to segmented management based on the uses, since the organization of the Brazilian interventionist structure is presented in a sectorized manner. Given the lack of regulation in the food sector, which includes the irrigation sector, we can identify the study of the Sectorization of water resources management in the main public entities that operate in the segments related to water management: ANA, ANEEL, and IBAMA.

Although it does not present specific rules for regulation from a sector delimited by a regulatory agent, the irrigation sector has a strong influence on water uses, given the intensive production aimed at grains, vegetables,

8 The conjuncture of sectorized administrative organization is due to the strong influence of the United States public administration reforms and to the pretension of the Weberian bureaucratic model. These elements led the process of rationalization of the Brazilian public apparatus to an organization based on the Taylorist and Fayolian molds, in the name of greater administrative efficiency (COSTA, 2014; SECCHI, 2009).

and animals. This sector is related to the Ministry of Agriculture, Livestock and Food Supply (MAPA), linked to the Brazilian Agricultural Research Corporation (EMBRAPA). The Brazilian Electricity Regulatory Agency (ANEEL), a federal agency linked to the Ministry of Mines and Energy (MME), promotes activities related to the Grants for electric energy projects and services, while to the National Water Agency (ANA), which is part of the Ministry of the Environment (MMA), is responsible for water regulation, to ensure the multiple uses of the resource.

Besides these three sectors, it is worth mentioning the environmental agency, the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA). It is directly related to the supervision of potentially impacting activities, responsible for granting the concession for water use (BRASIL, 2011b).

The origin of the specialization and sectorization of administrative activity of regulatory agencies can be identified from their creation laws. These laws show the occurrence of Sectorization, as the objectives and competencies of the entities come to fruition, according to the public interest chosen and confirmed in the form of the law, without considering the impacts and relationships that they play in relation to each other.

Law no. 9,427/1996, which institutes the National Electric Energy Agency (ANEEL), is an example of this specialization (BRASIL, 1996). The sole paragraph of art. 2 of the law, which determined the promotion and articulation of ANEEL with the States and the Federal District, for the energy use of watercourses and compatibility with the National Water Resources Policy, was revoked by Law no. 10,848, of March 15, 2004, which provides for the sale of electric energy. In addition, the law does not rule on the management of water resources at security levels, only mentioning the articulation of the agency with other bodies responsible for the management of water resources when its use may imply a reduction in the firm power of hydraulic potentials[9].

Thus, it is possible to note that the law confers autonomy, even within hierarchical administrative frameworks, and delimits, in a binding way, the purposes of the autarchic entity in the performance of its functions. We can also verify that a specialized approach is an element that runs through the

9 Art. 31. The technical and patrimonial collection, obligations, rights and revenues of the National Department of Water and Electricity - DNAEE will be transferred to ANEEL. […] § 3 The bodies responsible for the management of water resources and ANEEL must articulate for the granting of water use concession in hydrographic basins that may result in a reduction in the firm power of hydraulic potentials, especially those that are in operation, that have already started to be built or that will still start to be built, but already granted.

entire organizational theory of public administration and thus, also determines the legal structure of natural resource management. When focused on natural resources such as water, this measure can be harmful, while sectoral legal effectiveness is insufficient to meet a management objective that requires a systemic and integrated approach.

By the constitutional provision, the activities of the actors mentioned above are based on the principle of legality. It is worth mentioning that, according to the respective creation laws[10], each agency and body has attributions and operating guidelines in specific areas, being able to do little or nothing, beyond these attributions, under penalty of violating the Principle of Legality.

ANA's main task is to guarantee the multiple uses of water. This planning takes place within a perspective applied to the hydrological character of the resource, which is not linked to the environmental component, and ANA does not even have the technical apparatus for environmental assessment, since its area of expertise is hydrology. ANEEL's activities are focused on electric energy projects and services (BRASIL, 2019), which, although exploring the water potential for energy production, are also not linked to the environmental component, but rather to the potential for energy use. We emphasize that both the ANA creation law and the ANEEL creation law do not even mention the environment as a concern for the performance of their activities or sustainability as an objective or guideline for action.

However, the interconnection for the activities performed between these sectors is notorious. For the hydroelectric use to take place, taking into account the use of water for energy gain, the articulation between the water agency and the energy agency is required. The connection point between the two is materialized in the Water Availability Reserve Declaration (WARD) which is issued by ANA at the request of ANEEL[11], which is subsequently converted into a Water Use Right Grant[12] for the installation of hydroelectric power plants (HPP). Given the environmental impact caused by the construction of HPP, Resolution No. 237 of 1997 from CONAMA

10 Law no. 9,427/1996 and Law no. 9,984/2000.

11 Resolution no. 131, of March 11, 2003. Provides for procedures related to the issuance of a declaration of water availability reserve and the granting of the right to use water resources, for the use of hydraulic power potential greater than 1 MW in a body of water under the control of the Union and other measures (BRASIL, 2003).

12 rt. 4 The following are subject to the Grant: IV - the use of water for the purpose of harnessing hydroelectric potential; and Resolutions no. 16/2001 and 37/2004, of the NWRP, which establishes guidelines for the Granting of water resources for the implantation of dams in bodies of water.

determines the obligation to carry out environmental licensing studies so that the environmental agency acts to protect the energy use of water resources from an environmental perspective (BRASIL, 1997b).

Alongside this perception, some measures were incorporated to act preventively in the use of water. Following Resolution No. 65, of September 7, 2006, of the National Water Resources Council, articulation measures were established between the environmental entity and those in the water sector, establishing the need to verify the socioenvironmental viability for issuing the Grant. In the same direction, Resolution no. 129, of June 29, 2011, established general guidelines for the definition of the minimum remaining flows, which is important to ensure the use of water in periods of drought. This resolution makes an important contribution to environmental protection since in the licensing process the determination of the minimum flow volume must consider the value established by the environmental agency[13].

Therefore, the Grant is one of the possible instruments for the articulation of water issues with environmental issues, while it allows assessing both hydrological and environmental feasibility in granting the right to use water. However, specifically in the case of hydroelectric power plant installations, environmental licensing has been presented as an obstacle to the exploitation of the power generation capacity. The main problems are related to the pre-license phase, especially long-term issues, uncertainties regarding the state and federal competencies of environmental agencies, and the delay in issuing terms of reference for environmental impact studies (BANCO MUNDIAL, 2008; CNI, 2015).

Within this context of intersectoral attributions, the conversion of the Water Availability Reserve Declaration into Granting of the right of use has been one of the main causes of water conflicts. The analysis of this element reaffirms the Sectorization of the administrative regulatory structure, in particular, given the lack of compliance with the NWRP stipulations regarding the management instruments implemented by it or the disregard of environmental criteria.

Therefore, we can conclude, within the logic of administrative

13 Art. 3 In order to establish the minimum remaining flow in a control section, the following will be considered: I - the reference flow; II - the grant criteria formally established; III - the specific demands and characteristics of the uses and interferences in the upstream and downstream water resources; IV - the management criteria adopted in the hydrographic basins of the water bodies of interest; V - the priorities and guidelines established in the water resources plans; VI - the framing of water bodies; VII - the water allocation terms; and VIII - the criterion established by the competent environment agency, in the licensing process (BRASIL, 2011b).

organization, that the shared but sectorized management of natural resources, although intending to a democratic opening in the management of the resource, presents challenges motivated by the interests and priorities of each actor involved in the water governance scenario. Water problems that involve issues related to the hydroelectric sector and agriculture, for example, still lack proposals for equitable and efficient management. Not without reason, the opposition of interests for the multiple uses of water and the absence of integrated planning between sectors and levels can be pointed out as the main reasons for some conflicts for the management of the resource in hydrographic basins.

An important place of analysis, recognized as a source of great biodiversity and with excellent hydroelectric use, is the Amazon region. This region covers the Amazon Basin and the Tocantins Araguaia Basin, which together have 53% of Brazil's hydroelectric potential (BRASIL, 2008), but also have areas for environmental preservation and traditional communities settled around the basins.

In total, ten lawsuits filed by the Federal Public Prosecution Office (MPF) are pending before the Federal Regional Court of the 1st Region for ANA to be prohibited from issuing the Water Availability Reserve Declaration. These actions cover any projects that are under licensing in the Negro, Solimões, Tapajós, Teles Pires, Madeira, Ji-Paraná, Oiapoque, Jari, Araguaia, Tocantins and Trombetas basins. Among these, it is worth mentioning the case of the São Luiz do Tapajós Hydroelectric Plant, since it is the sub-basin with the greatest hydroelectric potential according to the 2030 National Energy Plan (BRASIL, 2007b).

The Public Civil Action[14] in the Tapajós Case aims to prevent ANA from issuing a Declaration of Water Availability Reserve in the environmental licensing processes of projects in the Tapajós/Teles Pires River Basin. The MPF supports ANA's omission in the absence of the creation of the Hydrographic Basin Committee, necessary to approve its respective Water Resources Plan. This fact was also pointed out in Resolution no. 128 of the National Water Resources Council, when stating that "the Hydrographic Basin Committee has not yet been established in any of the tributaries of the area on the right bank of the Amazon River" (BRASIL, 2011a). The issuance of the Grant, without the respective Committee and Basin Plan, prevents the participation of users and settled communities,

14 Public Civil Action n. 0018966-22.2014.4.01.3600, 8th CIVIL COURT CUIABÁ - 1st REGION FRC - hydrographic basin of the Tapajós/Teles Pires River.

which can lead to problems in the multiple uses of water, as well as conflicts in situations of scarcity, due to the absence of priorities of use that should be established by the plan, as well as in violation of the principles of popular participation and the decentralization of water resources management prescribed by the NWRP.

When analyzing the matter of law raised above, we can note, in the case of the Tapajós/Teles Pires River, the lack of dialogue in the management of the environmental resource given the sectorization of ANA, ANEEL, and IBAMA. This is because the issuance of the WARD aims to guarantee the existence of the amount of water necessary for the viability of the HPP, being issued after the process of environmental licensing.

To understand the moment when the Tapajós Case conflict takes place, we highlight what are the stages for the approval of a hydroelectric project. At first, there are attributions related to the energy sector, in which the Estimation of Hydroelectric Potential is carried out, succeeded by the elaboration of the Hydrographic Basin Inventory with Integrated Environmental Assessment - IEA and Strategic Environmental Assessment - SEA of the region in which the resource will be explored, considering the water availability and geographic aspects of the region. The third step is the Feasibility Assessment for the Hydroelectric Project, and then the Environmental Impact Study (EIA-RIMA) must be carried out, which will result in the granting of a Preliminary License by the environmental agency. The preliminary license demonstrates the socio-environmental feasibility of the project and, in addition to this information, the water sector issues the Water Availability Reserve Declaration for the hydroelectric plant. After these phases, the energy sector carries out the Bidding for the project and the Basic Project. Afterward, the Installation License, the Executive Project, and the Operation License are also required.

In the case of the Tapajós River, insufficient integration occurs between the environmental and water sectors when ANA checked the Water Availability Reserve Declaration at the São Luiz do Tapajós Hydroelectric Plant[15] since IBAMA did not grant the Preliminary License for the project.

In the present case, inconsistencies were identified in the environmental licensing carried out by Eletrobrás, which made it impossible to analyze the socio-environmental feasibility of the project.

Among several observations made by IBAMA on the licensing

15 Water Availability Reserve Declaration (WARD) of the São Luiz do Tapajós Hydroelectric Plant issued by the National Water Agency through Resolution No. 1,308, of November 30, 2015.

process[16], it is worth noting, for example, the disregard of the participation of users and riverside communities, silting of tributary rivers, water drainage, the vulnerability of the water table, the presence of mercury in the river water, the impact on regional flora and fauna, in addition to the deforestation eventually carried out by workers or due to the population increase in the region.

Given these notes provided by the agency, Eletrobrás had the opportunity to complement the flaws in the Environmental Impact Study so that it was possible to analyze the feasibility of the project. However, the company exceeded the deadline set by Resolution no. 237 of Conama, being filed on August 4, 2016.

In the case of Tapajós, we can see an obstacle to the use of energy, due to the disregard of the environmental aspect by the water and energy sectors. The insufficient integration between the water and environmental sector in an energy issue, in this case, is reflected in the disregard of the preliminary license for the issuance of WARD by ANA. The performance of this act by the water regulatory agency, even though flaws that made the analysis of socioenvironmental impacts in the licensing procedure by IBAMA impossible, point out a serious absence of interlocution between sectors, contrary to the national water resources management guideline, as prescribed by the NWRP.

Based on these reasons, IBAMA's Environmental Licensing board manifested itself in the order that led to the filing of the environmental licensing of the São Luiz do Tapajós Hydroelectric Plant. In the document, IBAMA highlighted the need for prior articulation of the governance spheres of the Union, states, and municipalities to face regional problems to prevent deficient public policies from interfering in the analysis of environmental licensing.

Another important case demonstrates insufficient integration between the water, irrigation, and energy sectors. The conflict involves the use of water in the hydrographic basin of the São Marcos River[17], which covers

16 In March 2015, IBAMA submitted an official letter (no. 02001.002132 / 2015-86), as seen in Brazil (2016a).

17 After the Paranaíba River crosses the state border between Goiás and Minas Gerais, it receives the São Marcos River, one of the main tributaries of the right bank. São Marcos is one of the four federal rivers in the hydrographic basin of the Paranaíba River, being formed from the Samambaia stream, which rises at an altitude of about 1,000 m, in the territory of the Federal District. From its source, until the encounter with the Paranaíba River, it travels a distance of about 480 km. São Marcos is a river in the domain of the Union. The hydrographic basin is located in the Central region of Brazil, between the parallel 16° and 18° of south latitude, and the meridians 47º and 48º of West longitude, covering, in addition to part of the Federal District, the lands of the States of Goiás and Minas Gerais, with an area of 11,950 km^2 (COBRAPE, 2011).

the jurisdiction of management bodies in several Brazilian states, with the participation of the Union in its management, as well as of different Basin Committees.

The case is marked by the opposition of interests between the irrigators of the states of Minas Gerais and Goiás settled in the basin, which represent the self-regulated food sector, in the face of the Batalha Hydroelectric Power Plant, whose Concession for use belongs to Furnas, which represents the electricity sector. As it is a conflict that deals with the criteria for granting a concession for the use of water from a federal river, there is the participation of the water sector itself, since ANA is responsible for granting this authorization.

Given this complex configuration and the diversity of interests, the case allows the analysis of sectorization caused by the insufficient integration o between the sectors involved in the dispute for the use of water. The characterization of the conflict due to water use in the São Marcos River basin unfolds, therefore, on two main fronts of interest: the production capacity for the food sector, corresponding to agricultural and agricultural activity, and the energy potential of the region, for example, through Batalha HPP (BRASIL, 2013).

On the one hand, there is interest in hydroelectric power generation, materialized by the construction of the Batalha HPP on the São Marcos River, with a minimum settled capacity of 52.5 MW with the right to use the water granted to Furnas Centrais Elétricas through ANA Resolution no. 489 of 2008. Equipped with a regulating reservoir, its effect of accumulating water for hydroelectric generation spreads to a cascade of hydroelectric plants downstream of its axis, increasing the physical guarantee of energy by 25.7 MWHmed, according to information from the Energy Research Company (BRAZIL, 2011c).

On the other hand, farmers who use irrigation, that are already settled and intend to settle, expect to expand the irrigated areas without a global occupation project duly approved or registered with the management bodies. The region is considered unique for the production of seeds, grains, and vegetables of high added value, thanks to the exceptional characteristics of climate, terrain, and soils. It is worth mentioning the fact that the river is one of the main sources of water for the municipalities of Cristalina - GO, Paracatu - MG, and Unaí - MG with high levels of agricultural production, with emphasis on Cristalina, which has the largest agricultural GDP in Brazil, with the third-largest national production (IBGE, 2016).

The state public agencies of Goiás and Minas Gerais do not present plans regarding agricultural activity so that irrigation networks become a private initiative of farmers. This factor exacerbates the existing tensions between Furnas, holder of the Grant for the Batalha HPP, and the farmers. As it is an activity of private initiative, farmers settled around the reservoir are hardly compelled to observe compliance with requirements set out in the environmental license for exploitation of the resource (BRASIL, 2013).

Thus, the disorderly and unruly occupation of agriculture, especially irrigated agriculture, contrasts with the history of planning and hegemony acquired by the electricity sector, which, since the mid-1960s, has been studying the basin to explore its hydroelectric potential. The basin, however, encompasses territories in the states of Goiás and Minas Gerais and the Federal District, and the management of one State is not necessarily integrated with the management of the other and neither with that of the Federal District. The respective priorities of the states may not coincide, as occurred with the preference for irrigation at the expense of energy and supply, with the consequent repercussion of this choice in the course of the river, interfering in the management of water resources as a whole.

In this context of the opposition of interests, the Water Resources Plans did not present criteria to define the priorities for use and Grant, except those defined by law. In addition, the conflict is accentuated as the generation of electric energy is a priority for the Union, while irrigation for agriculture is elected as a priority for the states of Goiás and Minas Gerais (OECD, 2015).

Given the conflict, ANA issued Resolution no. 562/2010 that established the Regulatory Framework for Water Use in the São Marcos hydrographic basin. The resolution sought to reconcile uses by guaranteeing water availability for the Batalha HPP and providing an irrigated area of 33,500 hectares for the state of Goiás and 30,000 hectares for Minas Gerais. However, in the municipality of Cristalina-GO alone there were already 32,122 hectares of central pivot irrigation facilities, with a projected annual growth of the irrigated area of 4.28% per year (IRRIGO, 2017). In establishing the regulatory framework for the São Marcos River, the Batalha hydroelectric grant was revised to allow an increase in the amount of water allocated for agricultural use upstream of the HPP, which caused a 5% reduction in the expected energy production (OECD, 2015).

The disparity between the regulation proposal carried out by ANA demonstrates the total lack of connection between the water sector with the

food and energy sectors. The articulation between these sectors in planning for efficient management for the São Marcos Case would, for example, allow innocuous measures, such as the resolution edited by ANA, not to be issued as a conflict resolution mechanism.

It is worth mentioning the fact that the absence of inspection and control measures under the food sector is a factor that contributes to this type of conflict. The uncoordinated and irregular growth of users of central pivots for irrigation in the São Marcos River makes it difficult to design the best arrangement for the allocation of water, considering the multiple uses for which it is intended, the social and economic needs, and the balance between national and subnational interests (OECD, 2015).

3 INTEGRATION BETWEEN SECTORS AS A MEANS OF MITIGATING ENVIRONMENTAL IMPACTS AND CONFLICTS OF INTEREST UNDER WATER RESOURCES

The Public Administration is organized in a specialized way, thus giving administrative autonomy to the decision-making of its actors. However, the lack of integration to deal with systemically connected issues, such as water management, leads to poor management of resources and enhances the occurrence of conflicts. Therefore, the implementation of an ecosystemic approach among autonomous actors is desirable from an environmental point of view, as it promotes the application of the Integration Principle.

The specialized administrative organization has not been sufficient to prevent conflicts from occurring due to the multiple uses of water, as well as to ensure environmental consideration in resource management. For this reason, the interconnections between sectors cannot be ignored in the formulation of policies aimed at water management, as well as in the execution of management measures by interested actors, bearing in mind the possibility of avoiding environmental losses and the occurrence of conflicts of interest.

The implementation of isolated sectoral policies does not present itself adequately for water management, given the multidimensionality of sustainability, as well as the interdependence of activities developed in the water, food, and energy sectors (FERRAÇO; MORAES, 2018b). The lack of intersectoral articulation reflects the non-compliance with legal provisions, thus reflecting on the lack of legal effectiveness, since

the disconnection between environmentally impacting activities implies the absence of environmental protection proposed by the Principle of Environmental Integration, expressed as an objective and guideline in the NWRP.

Thus, a possible measure for the promotion of sustainable development objectives that relate to water management is the observance of the Principle of Integration, embodied in the perception of the interconnections between the sectors and natural resources under which they operate. The promotion of an integrated analysis perspective is a paradigm that is more adequate to the guidelines and objectives of the NWRP, as it is opposed to Sectorization, and capable of breaking the existing cause and effect cycle from a sectoral perspective, harmonizing the autonomy promoted by the Specialization Principle with the Integration Principle, which is a normative basis for achieving sustainable development. This capacity is justified by the opportunity to analyze the management of water resources based on its complexity and systematicity, which is manifested, for example, in the consideration of different interests, actors, sectors, administrative levels, regulatory structures, and national and international policy goals that focus on resource management.

The difficulty of each sector in implementing its own objectives is compounded by the lack of connection between sectors that in practice are interconnected: the choice for the energy use of water affects the choice of water use by the irrigation sector, that affects human water consumption, for example. This scenario is aggravated by the vulnerability brought about by climate change, whose dimensions are difficult to establish, and which cannot be ignored (FERRAÇO; MORAES, 2018b).

However, we cannot overlooked that the autonomy, specialization, and distribution of specific competencies for each sector contribute to administrative efficiency in the decision-making process. This configuration allows decisions to be made independently, without external influences, in the name of the autonomy that each actor has in carrying out their duties. Thus, complex issues involving its own sector can be decided more quickly and efficiently, since they are inserted in the scenario of expertise of the sector.

Nevertheless, the autonomy and independence of the entities can constitute a limit to integration, while sectors and actors are free to defend their interests. Administrative autonomy grants powers to the entity to manage its own businesses, under any aspect, according to the institutional

rules and principles of its existence and of that administration. Thus, it is not necessary to implement an ecosystemic perspective that contemplates the integration between the sectors involved in water management, except if this is the purpose for which an administrative entity was created.

Although administrative autonomy promotes a scenario of specialty, the perception that water management must operate by a systemic logic is convenient, while it seeks to connect different concepts and effects between social systems, the latter being perceived as their own regimes, with their own principles, rules, and objectives (LUHMANN, 1998). Since it aims to connect causes and effects, it is also the consolidation of a consequentialist foundation (LIMA, 2012), as the management sectors focused on water, energy, and food are connected, where there are consequences between the activities carried out in one sector in the other.

It is worth noting that the end of the Sectorization of the administrative organization, by itself, does not solve the issue of the integration of water resources. Water management presents extremely complex problems (RITTEL; WEBBER, 1973), which, in a large country like Brazil, reach proportions that are unable to be concentrated in just one entity in the same sector (BISWAS, 2001). Thus, decentralization, operated by the delegation of competencies, as well as the possibility for the execution of activities within the scope of the ANA, allows the management of the resource from the local level closest to the hydrographic basin, that is, the basin Committee. This measure allows those directly affected by the availability of the resource to manifest to assert their interests, in theory, in an equitable way to the decision-makers.

Likewise, specialization enables better technical appropriation of problems related to an area of activity. This form of organization favors the efficiency of the Public Administration's performance, as it allows for faster decision-making. One caveat, however, is that administrative efficiency cannot serve as an excuse for the insufficient integration that the segmented organization presents in the face of the management of the water resource. This environmental asset impacts the activities of all sectors involved and, therefore, demand integration in its management.

This allows us to highlight the dual function of the Integration Principle applied to water resources. The first function concerns environmental integration itself, as policies ensure a balance between the social and economic dimensions with environmental protection. The second function, which arises from the application of the former, concerns institutional

integration in the execution of water policies developed in Brazil, which focuses both on the sectors responsible for carrying out activities related to water resources, as for the federative entities and other actors that share their management.

The obstacle to sustainable development in Brazilian water management lies, precisely, in the insufficient integration between the water, food, energy, and environmental sectors, called Water Sector. To avoid and minimize the occurrence of conflicts and environmental risks, such as those exemplified in the cases of this article, water management must be developed in an integrated context between sectors, so that the articulation between these presents gains in terms of effectiveness in water management, as well as for the protection of the environmental resource. Therefore, an important aspect, if not the main requirement for achieving sustainable development in the management of water resources, is the integration in the execution of intersectoral activities related to the multiple uses of water.

CONCLUSION

The multisectoriality of the water sector provides the central and strategic role of water resources for sustainable development, while the limited integration in the management of this resource is a structural obstacle to sustainability. Promoting a positive sustainability obligation requires integration. In turn, it requires that the social, environmental, and economic dimensions, as well as the articulation between the actors and sectors involved in the shared management of water resources, are also taken into account.

The consideration of integration in water management is related to one of the main fundamentals of the NWRP, the multiple uses of water. This foundation reflects the legislator's perception of the multisectoral use of the resource, which presents itself as an impact relationship between the sectors and between them and the environment. This systemic relationship of multiple uses and their impacts underscores the need to comply with the Integration Principle from an ecosystemic approach, capable of considering the sustainable use of the resource, without hindering its exploitation.

However, the situation of crisis and water scarcity, accentuated by climate change, highlights the insufficient integration in water management, causing the loss of the NWRP's environmental efficiency to achieve the objectives that aim at the sustainability of water management. In this

scenario, conflicts of interest occur, which, in general, are due to the use of water for the legal priority of human supply in relation to its use for the electric and agricultural sectors, which use the resource intensively in Brazil.

National water conflicts confirm the hypothesis supported by this study that the administrative configuration for the management of the resource, according to the federal levels and regulated sectors, does not sufficiently promote the objective and guideline of action for integration aiming at sustainable development, as prescribed the NWRP. This context of low integration characterizes Sectorization, a structural obstacle to sustainability that can be verified according to the organization of individual sectors, but which perform their activities under a common resource. Through this logic, each sector has a specific normative set that guides the performance of its activities in an autonomous way and independent of the others, even though its performance is presented in a causal relationship, impacting the other sectors.

The Sectorization in water management demonstrates that each sector has its own rules and is limited to its competencies and attributions, establishing priorities from an individualized view, although the priorities of one sector cause impacts on the others. When considering that the performance of these sectors is related to water availability, we can notice that these activities are carried out in a way connected to the multiple uses of water. Thus, insufficient integration can lead to conflicts of interest, since the use of resources by one sector impacts the activities of others and all depend on water availability for the regular exercise of their activities.

It should be noted that Sectorization is a form of administrative organization that gives greater autonomy and speed in the performance of each entity. However, in the scope of water resources, this structural organization leads to insufficient integration for water management, since it disenfranchises the connections of typical connections from an ecosystemic perspective, among those hydro-dependent sectors for carrying out their activities.

Although the sectors are organized individually and independently, their activities are carried out based on water availability, which is why the regular performance of activities depends on ensuring the multiple uses of water. For this reason, the option for a configuration that does not promote integration between sectors can lead to conflicts of water interest, since these uses are impactful and depend on water availability.

In Brazil, Sectorization is observed, precisely, in the insufficient integration between the water sector, irrigation, energy, and with the environmental agencies. Therefore, water management must be guided by an integrated context between sectors, so that the articulation between them presents gains in administrative efficiency in the management of the resource, as well as for the protection of the environmental resource. This measure has the potential to avoid or minimize the occurrence of conflicts and environmental risks, since it values an ecosystemic management perspective, taking into consideration the sectors involved and their relationship with the environment in which they operate.

The insufficiency of intersectoral articulation reflects the non-compliance with the legal provisions for integration proposed by the NWRP, bearing in mind integration as a precondition for achieving the availability of water for future generations, the rational and integrated use of the resource, and the prevention of critical hydrological events resulting from inappropriate use. Thus, we conclude that the lack of integration leads to a lack of environmental legal efficacy to achieve the objectives of Law No. 9,433/1997 (BRASIL, 1997a) since the failure to consider the connection between environmentally impacting activities implies the absence of environmental protection proposed by the Principle of Environmental Integration, a normative assumption to guarantee sustainability in water management.

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