RIVER BASIN MANAGEMENT PLANS AND THEIR CHALLENGES: THE CASE OF THE ALTO-TIETÊ RIVER BASIN — STATE OF SÃO PAULO, BRAZIL[1]

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Introduction

The National Policy for Water Resources (Federal Law 9433 dated January 8th, 1997) has brought to Brazil a new legal and institutional order for water, its uses and management, the fundamentals of common goods and their economic value, the guarantee of multiple use of water resources, the river basin as a territorial unit of planning and resources management, as well as decentralization and social participation in the water management process.

In this context, the role to be played by the River Basin Management Plans (RBMPs) becomes relevant and the RBMPs, important planning instruments. By means of pacts and solutions negotiated among several actors, the RBMPs should contemplate both short- and long-term necessities, incorporating environmental and socioeconomic issues in the definition of sustainable guidelines for the use of water resources in the ambit of a river basin. Therefore, the methodology of RBMP elaboration must assume an integrating character, aiming to make explicit the axis of integration of environmental, social, economic and institutional factors (MILARÉ, 2014).

According to Zuffo and Zuffo (2016), an integrative approach in the process of RBMPs elaboration should: (I) facilitate the approval of RBMPs by River Basin Com-

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mittees (RBCs); (II) implement the RBMP as a guiding instrument for the actions taken in the basin and as the basis for the RBC budgeting, and (III) gather the society around the negotiations and pacts, forcing the constituted (federal, state, municipal) powers and even the private initiative to invest only in the actions prioritized in the RBMP.

It is important to highlight that, despite the adoption of an integrative approach should facilitate the incorporation of environmental, social and economic aspects in the RBMP elaboration, it does not ensure the gathering of the society around the negotiations and pacts, which is essentially a political process. According to Agra Filho and Ramos (2015), the effective incorporation of the sustainability perspective in RBMPs is influenced by the governance-inducing conditions that are available for their implementation. In this sense, one must consider the politicians' and stakeholders' degree of awareness and commitment regarding the benefits of the integration, as well the necessity of adjustments in the institutional organizations (which are traditionally fragmented) and of dialogue among conservative sectors that compose such organizations (CAMPOS; FRACALANZA, 2010).

Thus, if on one hand, considerable progress has been observed in water management since the promulgation of Law 9433/1997, which instituted a sophisticated system of water resources management in Brazil (SINGREH) based on innovative principles, such as public participation and decentralized decision taking, on the other hand, the concretization of an efficient governance system, able to harmonize conflicting interests in adequate institutional environment, has run into a series of difficulties and refusals (BRAGA *et al*., 2009), so that the effective Integrated Water Resources Management is still a challenge to Brazilians (VEIGA; MAGRINI, 2013).

Water Resources Plans as inducers of the Integrated Water Resources Management

Integration, decentralization and participation in the management of resources are the permanent fundamentals of the National Policy for Water Resources and the tripod that supports the Integrated Water Resources Management in Brazil (BORBA *et al*., 2007), a process that should consider the multiple uses of water and their conflicts and complementarities, integrating economic, social and environmental objectives in planning and management of river basins. However, to elaborate a RBMP taking into account all the technical and political aspects mentioned above is a great challenge, which assumes the use of mechanisms for negotiation, identification of common objectives, political support and articulation among the actors involved in the matter (ANA, 2013).

Thus, despite the strategic importance attributed to RBMPs as inducers of the Integrated Water Resources Management in the country (LANNA; PEREIRA; HUBERT, 2002; ANA, 2013), technical and political obstacles have hindered the definition of alternatives for development capable of integrating the demands, the objectives and the values of the variety of actors involved in the decision-making process in the context of RBCs, limiting the implementation and adoption of these plans by several users (CAMPOS; SOUSA, 2003).

In this sense, this study presents a set of methodological requirements to be used as assessment criteria of the approaches employed in the elaboration of RBMPs. By means of the application of such requirements to the Alto-Tietê River Basin Management Plan – State of São Paulo, 2010-2015 horizon, we analyze the potential and extensiveness of such plan as an instrument for integrated planning and management of water resources.

General aspects of the Alto-Tietê River Basin

Since the end of the 1990's, the Alto-Tietê Basin Committee, by means of its subcommittees (Cotia–Guarapiranga; Billings–Tamanduateí; Pinheiros–Pirapora; Tietê–Cabeceiras, and Juquerí–Cantareira), has sought to increase public participation as a means to support decision making, when it comes to conflicts that involve water resources (ALVIM; RONCA, 2007). In this context, the Alto-Tietê Basin Plan (PAT 2010-2015), elaborated by the São Paulo University Foundation (*Fundação Universidade de São Paulo* – FUSP), is of strategic relevance, given the broad area of influence of its guidelines, which stretches out beyond the Alto-Tietê River Basin physical boundaries, encompassing an expressive population contingent and the largest pole for employment and income in Brazil: the São Paulo Metropolitan Region (RMSP).

Another aspect that adds importance to PAT 2010-2015 is the large amount of works for the use of the existing water resources in the Alto-Tietê basin region and for the supply of water to other basins. Among many others, the main transfers, or transpositions, are: (1) water from the Cantareira System – water from the Piracicaba river basin; (2) the water course reversal of the Tietê and the Pinheiros rivers to the Billings Dam; and (3) the diversion of water from the Upper Tietê river and some of its affluents to the RMSP central region (FUSP, 2009a).

Moreover, because of the increasing risk of water scarcity in RMSP, as studies show the incapacity of the water-producing systems to supply the present and the projected demand, especially concerning public water supply, PAT 2010-2015 must deal with challenges of large magnitude, indicating the necessity of improving the water security, in particular in face of unfavorable climatic conditions (BICUDO et al., 2015).

Methodology

Based on a literature survey, a set of ten methodological requirements was defined and checked in the assessing of the River Basin Management Plan (RBMP) elaboration process. When defining such requirements, it was intended to contemplate essential themes to the quality and good performance of the RBMP (i) the (vertical) articulation between the RBMP and the national and state water resources plans; (ii) the (horizontal) articulation between the RBMP and other sectorial strategies; (iii) the integration of water resources planning and regional and municipal strategies of territorial ordering and environmental sanitation, and (iv) water security planning and management.

It is admitted that the approach employed in the RBMP conception can be assessed according to the degree of compliance with the requirements presented in Chart 1.

Chart 1. Methodological requirements for the elaboration of River Basin Management Plans

Theme	Requirements	Authors
Vertical articulation	**1. To identify the main conflicts among the users** of the water resources in the ambit of the river basin, searching, whenever possible, to solve them by means of the integrating approaches – *principle of locality.* **2. To collect data and information at an adequate level of pertinence and detail**, making the preparation of a focused plan possible – *principle of equilibrium*. **3. To define planning guidelines compatible with the guidelines of the national and state water resources plans** – *principle of subsidiarity.*	Lanna; Pereira; Hubert (2002) Braga *et al.* (2009) Veiga and Magrini (2013) ANA (2013a)
Horizontal articulation	**4. To mobilize in advance the main political actors and user sectors,** including the public power and the civil society, organized or not, making possible the establishment of legitimate criteria for the use of available resources – *principles of decentralization and participation.* **5. To define compatibilization and articulation guidelines with other policies, plans and sectorial programs,** directly or indirectly related to water resources management in the basin (energy, agriculture, environment, among others).	Lanna; Pereira; Hubert (2002) Barth (1999) Saito (2001) Braga and Lotufo (2008) Pereira (2003) ANA (2013a)
Integration of water resources planning and regional and municipal strategies of territorial ordering and environmental sanitation	**6. To integrate scenarios and indicators of other regional and municipal strategies of territorial ordering and environmental sanitation** (Master Plans, Sanitation Plans, Residue Management Plans, among others). **7. To guide by means of its guidelines the elaboration of other plans, programs and projects** in the river basin, promoting the articulation between the regional and municipal spheres.	Muñoz (2000) Granzieira (2001) Setti *et al.* (2001) Tucci (2006) Empinotti (2010) ANA (2013a)
Water security planning and management	**8. To act transparently by means of broad-spectrum communication and dissemination strategies –** ensuring to the public in general the free access to the complete and updated information**.** **9. To act both in the supply and demand management –** encouraging the rational use of the water in industry, agriculture and public supply; the technologies of water conservation and reuse, as well as the spring protection projects. **10. To define emergency measures and actions to cope with extreme hydrological events –** contingency plan with equitable measures that can reach all users equitably.	Jacobi (2006) Jacobi; Cibim; Leão (2015) Bicudo *et al.* (2015)

Source: Elaborated by the authors

Thus, after the analysis of the *PAT Executive Summary* (FUSP, 2009a) and the *PAT Final Report* (FUSP, 2009 b, c, d), the proposed requirements were applied and the approach used in the elaboration of PAT (2010-2015) was assessed.

The compliance of the requirements was assessed according to the scale presented in Table 1. To the global assessment of the PAT, the scoring presented in Table 2 was used. By the end of the process, it was possible to identify the main fragilities and challenges to be overcome in the next reviews of the PAT, having in mind the encouragement of an effective integrated water resources management.

Table 1. Assessment scale according to levels of compliance with the requirements

Description	Assessment	Score
Requirement totally met	HIGH	10
Requirement partially met	MEDIUM	5
Requirement not met	LOW	0

Source: Elaborated by the authors

Table 2. Scoring for the assessment of the themes

Theme	**Number of requirements**	**Maximum score**
Vertical articulation	3	30
Horizontal articulation	2	20
Regional/municipal integration	2	20
Water security	3	30
Global assessment	10	100
Performance in the theme (D)	D=(∑ score for the requirements) / (theme maximum score)	
Result	If D ≤ 0.5 = Unsatisfactory If 1 ≥ D > 0.5 = Satisfactory	

Source: Elaborated by the authors

Results and Discussion

According to the methodology presented here, a set of 10 requirements was defined and presented in Chart 1. These requirements should be complied during the elaboration of the River Basin Management Plans (RBMPs), having in mind the strategic importance of these planning instruments in encouraging an effective integrated water resources management in Brazil.

In this context, it is understood that the vertical articulation among the different water resources planning and management scopes (national, state and the river basin) assumes the compatibilization of the demands identified in the river basins and sub-basins, as the national and state water resources plans are elaborated. Thus, these plans should

deal with the coordination of the guidelines and integration of the demands identified in the River Basin Management Plans (RBMPs).

On the other hand, issues of local interest, whose consequences and developments do not exceed the limits of a river basin or sub-basin, must be solved in the area of expertise of the respective river basin committees. Therefore, RBMPs should be prepared considering the equilibrium among the geographic ambit, the river basin, and the interests of the involved municipalities, the state and the civil society actors. Thus, even if planning is a gradual and decentralized process, a compromise exists with the compliance of the negotiated dispositions and guidelines – *principle of subsidiarity.*

Regarding horizontal articulation and considering that the water resources management must always provide the multiple use of water, as stated in the fundamentals of the National Policy for Water Resources (Lei nº 9.433/1997), it is understood that in the very initial stages of the RBMP elaboration, the mobilization of varied water users, of the public power (municipal, state/district and federal), of the water and environmental organizations, as well as of the civil society, is necessary, once the involvement of these actors is related to the wider or narrower range of the guidelines defined in RBMP. Besides, the coordinated effort among the varied user sectors makes the water resources system more efficient and of a more rational use, at the same time as it encourages a better quality of the water and of the environment.

The integration of water resources planning and regional and municipal strategies of territorial ordering and environmental sanitation is advocated by several actors, because many of the problems related to the qualitative and quantitative water resources management result from the incompatibility between water availability in the river basin and the demands identified in the intended regional and municipal strategies. Under this perspective, the River Basin Management Plans (RBMPs) must contemplate guidelines that can aid urban expansion and soil use and occupation, in the sense of the preservation of the water resources, when it comes to quality and quantity.

The option for water security requirements is justified because

> [...] the evidence of an on-going climatic change is very strong, highlighted by the analysis of historical series of climatic and hydrological data and projections of climatic models, with consequences in water preservation and in the entire planning of water resources management (BICUDO et al., 2014, p. 13).

According to Jacobi; Cibim; Leão (2015), in the specific case of RMSP, the lack of a water security strategic planning is evidenced when one notes that water scarcity, intensely discussed from 2013 to 2014, has been announced far back in 1970. Besides, the lack of information that contributes to the commitment of every water user, including the civil society, is an aggravating factor in situations of water scarcity.

Therefore, beyond the analysis of historical series and climatic and hydrologic data, other factors, such as investments in demand management (rational use, reuse and reduction of water losses) and the responsibilities of the institutions regarding planning,

transparency and information about water resources management, must be considered when dealing with issues associated with water security.

The Alto-Tietê River Basin Management Plan – PAT (2010-2015)

The aim of the final PAT (2010-2015) report was to establish a set of actions that would allow facing the problems identified in previous studies of the Upper Tietê river basin, mainly the previous version – PAT (2005-2010), approved in January 2004 (FUSP, 2009b). Therefore, corroborating the finding of its previous version, PAT (2010-2015) identifies six water stress factors in the Upper Tietê basin: (i) water scarcity (consumption exceeding production); (ii) committal of the surficial springs because of the disordered urban occupation; (iii) the disorganized exploitation and the menace to underground springs; (iv) committal of the quality of the surficial water; (v) the menace of the solid waste (situation of the municipalities regarding treatment and final disposal of domestic waste), and (vi) the soil impermeabilization and the improper occupation of the floodplains.

Therefore, the PAT (2010-2015) Action Plan contemplated two major components: the first, named Water Resources Management, aimed to aggregate actions whose objectives were the promotion of the Institutional Development (DI) and Planning and Management (PG); the second, named Services and Works, tried to aggregate the interventions relative to Water Resources and Sanitation (RH), Environmental Protection and Conservation (CA), besides actions and projects concerning the Compensation to Municipalities in Areas of Spring Protection (CM). Thus, 46 actions relative to Water Resources Management were defined, being 15 institutional and 31 related to planning and management. Out of 15 Services and Works, seven dealt with Water Resources and Sanitation, four with Environmental Protection and Conservation, and four with the Compensation to the Municipalities.

The PAT (2010-2015) Plan of Investments considered three scenarios for the application of the resources: baseline scenario, recommended scenario and desirable scenario. All first-priority actions were considered in the baseline scenario, whereas the recommended scenario included first- and second-priority actions, and the desirable scenario contemplated all (first, second and third priority) actions. According to the PAT (2010-2015) Executive Summary, the main criterion that guided the construction of scenarios was to prioritize the actions that would permit the formation of a basis for the decision-making process, the cost of these actions not influencing its selection (FUSP, 2009a).

Based on the documental analysis, it was possible to assess the PAT (2010-2015) performance regarding the compliance with the methodological requirements proposed here. A synthesis of this assessment is presented in Chart 2. The results obtained here highlighted the satisfactory PAT (2010-2015) performance regarding the themes *Vertical articulation* and *Integration of the water resources planning to the regional and municipal strategies*; in contrast, some inconsistencies related to the approach of the themes *Horizontal articulation* and *Water security* were identified.

As a whole, PAT (2010-2015) presents an adequate level of details, discussing the available information in a clear way, constituting a focused and objective plan. Besides,

it is committed to the compliance of the dispositions and guidelines negotiated in the State Plan for Water Resources, as well as in the National Policy for Water Resources.

However, PAT (2010-2015) is limited in guidelines to overcome the conflicts originated among the varied water user sectors, only emphasizing the possibilities related to the urban planning and sanitation sectors. Such aspects contributed to its unsatisfactory performance in the theme *Horizontal articulation* and, conversely, for its satisfactory performance in the theme *Integration of the water resources planning to the regional and municipal strategies*, with good performance in all assessed requirements.

Although PAT (2010-2015) did not perform satisfactorily in the theme *Horizontal articulation*, it is important to stress that the approach to the theme is not easy, being one of the factors that limit the quality and implementation of several sector strategies, including those for water resources. Rather, it is a challenge common to several economic and planning sectors, which originates in the inseparable relationship between planning and governmental processes.

The need to deal with the decision-making complexities in operating territories of several economic sectors and social actors, with active but not necessarily convergent interests, demands the use of mechanisms that promote the coordination of objectives and sector actions, so as to overcome the fragmentation in the range of the public policies, which can or cannot be facilitated by the existing planning instruments (BÜHRS, 1991; BÜHRS; BARTLETT, 1993; MINNERY, 1988; MOLNAR; ROGERS, 1982).

Besides, one cannot ignore either the difficulty that the people responsible for the RBMP elaboration have to incorporate decisions of political and institutional order, of the precarity of the legal mechanisms to guarantee the compliance with guidelines and recommendations predicted in these plans (LANNA; PEREIRA; HUBERT, 2000; BARTH, 1999; SAITO, 2001; BRAGA; LOTUFO, 2008; CAMPOS; FRACALANZA, 2010; PEREIRA, 2003; ANA, 2013a).

Thus, despite the horizontal articulation is necessary and even predicted by PNRH, Agra Filho and Ramos (2015) highlight that the Brazilian water resources system is lacking of means and legal and institutional procedures that promote the strengthening of institutional relationships and decision instances. Moreover, the possibilities of public participation (public power, users and communities) in the process of RBMP elaboration are limited to queries and discussions promoted in the River Basin Committees (RBCs), with minor participation of some sectors in their composition, and devoid of institutional resources that can influence the final definitions.

Campos and Fracalanza (2010) stress that, despite the Brazilian and the São Paulo State systems for water resources make the inclusion of several social actors in the management process possible, public participation may not be effective, both as a function of the themes discussed in the committees and councils and recurrence of situations in which there is prioritization of issues and uses related to the economic sectors of greater political and economic influence, such as the hydroelectric, irrigation and industrial sectors.

In face of these considerations, if on one hand the low PAT (2010-2015) performance in requirement 5 – *To define compatibilization and articulation guidelines com other policies, plans and sectorial programs* – can, in part, be justified by the existing institutional

barriers and policies, on the other hand, the low performance in requirement 4 – *To mobilize in advance the main political actors and user sectors* – highlights the lack of proactivity to overcome the difficulties inherent to the process of RBMP elaboration.

To admit that the participation and representativeness of RBCs are enough to deal with the complexity of water resources planning is a decision that compromises not only the effectiveness of the plan *per se*, but also water security planning and management that, among others aspects, assumes the transparent operation by means of wide-range strategies of communication and dissemination (JACOBI; CIBIM; LEÃO, 2015).

However, it is not in the ambit of the RBCs that the conditions are more favorable to integrated management, being the decentralization of the decisions the driving element for such integration. As mentioned by several actors (MACHADO; MIRANDA; PINHEIRO, 2002; BARRAQUÉ, 1995; CARVALHO; MAGRINI, 2006; GUIMARÃES; MAGRINI 2007), RBCs are the deliberation instances that deserve attention, once that, contrarily to the National System for Water Resources Management (SNGRH) entities, their limits do not correspond to the traditional administration divisions (VEIGA; MAGRINI, 2013).

Chart 2. PAT (2010-2015) performance regarding the compliance with the proposed requirements

Themes of analysis	Requirements	Assessment scale			Comments
		HIGH	MEDIUM	LOW	
Vertical articulation	1. To identify the main conflicts among the users of the water resources in the ambit of the river basin, searching, whenever possible, to solve them by means of the integrating guidelines – *principle of locality*.	It identifies the main conflicts among the users; it defines and prioritizes specific guidelines to solve them.	It identifies the main conflicts among the users; it defines but does not prioritize specific guidelines to solve them.	It identifies the main conflicts among the users, without defining or prioritizing specific guidelines to solve them.	It identifies the main conflicts among the users and proposes guidelines for each conflict. However, the action plan does not prioritize all the identified guidelines, only fostering those related to sanitation and territorial ordering. Guideline PG-14, for example, which deals with joint action plans aiming the multiple uses in the basin, was not considered a priority.
	2. To collect data and information at an adequate level of pertinence and detail, making the preparation of a focused plan possible – *principle of equilibrium*.	Adequate scope with enough information to identify the main conflicts, possible causes and solutions, in proper scales (of diagnosis and prognosis) to the RBMP regional approach.	Adequate scope with enough information to identify the main conflicts, possible causes and solutions, but in inadequate scales (of diagnosis and prognosis) to the RBMP regional approach.	Generalization of the scope, weighing irrelevant information to the identification of the main conflicts, possible causes and solutions, in inadequate scales (of diagnosis and prognosis).	It presents data and relevant information to decision making within what the plan is intended: to establish priorities for the application of resources arising from charging, with emphasis on non-structuring, institutional and legal measures (planning and management). Besides, it brings relevant information to the following decision-making levels.
	3. To define planning guidelines compatible with the guidelines of the national and state water resources plans – *principle of subsidiarity*.	Within the guidelines of the national and state plans, it identifies those bound to act at the basin level or conflicting with the demands identified for the river basin, informing, when they exist, the adjustments carried out to attain compatibility.	Within the guidelines of the national and state plans, it does not identify those bound to act at the basin level or conflicting with the demands identified for the river basin, informing, when they exist, the adjustments carried out to attain compatibility.	Within the guidelines of the national and state plans, it neither identifies those bound to act at the basin level nor those conflicting with the demands identified for the river basin.	It weighs the issues predicted in the national and state plans bound to act at the river basin level, defining guidelines compatible with such plans, recommending the division of activities necessary to water resources management in the Upper Tietê basin among these planning instruments.

Horizontal articulation	4. To mobilize in advance the main political actors and user sectors, including the public power and the civil society, organized or not, making possible the establishment of legitimate criteria for the use of available resources – *principles of decentralization and participation*.	It defines some kind of public participation (query, technical meetings, workshops or other means of communication) for each stage of the RBMP elaboration, besides discussions promoted within the committees, making possible the active involvement in the decisions concerning the alternatives to solve the identified conflicts.	It defines some kind of public participation (query, technical meetings, workshops or other means of communication) in the decisions concerning the alternatives to solve the identified conflicts, besides discussions promoted within the committees.	Public participation restricted to discussions within the committees, with public queries programmed at the end of the RBMP elaboration.	Despite the elaboration of the plan took place within RBC and the five subcommittees, with following discussions among actors and consultants on the diagnose results and the main lines of action, strategies to get the public involved were not observed, because the representativeness of these collegiate bodies was considered enough.
	5. To define compatibilization and articulation guidelines with other policies, plans and sectorial programs, directly or indirectly related to water resources management in the basin (energy, agriculture, environment, among others).	It carries out a compatibility study and identifies guidelines for compatibilization and articulation with all policies, plans and sectorial programs directly and indirectly related to RBMP.	It carries out a compatibility study with all policies, plans and sectorial programs directly or indirectly related to RBMP; however, guidelines that promote articulation with all the sectors are not identified.	It does not carry out a compatibility study with policies, plans and sectorial programs directly or indirectly related to RBMP.	Compatibilization guidelines involving the Macrodrainage Master Plan, the Macrometropolis Plan and the Municipal Rainwater Handling and Sanitation Plans were defined; however, compatibility studies and/or compatibilization guidelines with other policies and sectorial programs, such as agriculture, energy and transport, were not identified.
Integration with regional and municipal planning	6. To integrate scenarios and indicators of other regional and municipal strategies of territorial ordering and environmental sanitation (Master Plans, Sanitation Plans, Residue Management Plans, among others).	It identifies and integrates (via procedures identifiable in the RBMP contents) scenarios and indicators of regional and municipal strategies of ordering and environmental sanitation.	It identifies, but does not integrate (via procedures identifiable in the RBMP contents) scenarios and indicators of regional and municipal strategies of ordering and environmental sanitation.	It neither identifies nor integrates via procedures identifiable in the RBMP contents) scenarios and indicators of regional and municipal strategies of ordering and environmental sanitation.	From the diagnosis stage, it integrates and discusses other regional and municipal strategies, such as: the RMSP Map of Soil Use and Occupation (EMPLASA, 2002); Water Master Plan 2025 (HIDROCONSULT – ENCIBRA Consortium); the São Paulo City Master Plan, as well as resolutions of the Secretariat for the Environment and the Secretariat for Energy and Sanitation of the State of São Paulo
	7. To guide by means of its guidelines the elaboration of other plans, programs and projects in the river basin, promoting the articulation between the regional and municipal spheres.	It defines specific guidelines directed to decision making in municipal strategies directly related to the quality and quantity of water resources in the basin, identifying support instruments and/or monitoring indicators.	It defines specific guidelines directed to decision making in municipal strategies directly related to the quality and quantity of water resources in the basin, without identifying support instruments and/or monitoring indicators.	It neither defines specific guidelines directed to decision making in municipal strategies directly related to the quality and quantity of water resources in the basin, nor identifies support instruments and/or monitoring indicators.	It defines guidelines that direct and support varied regional and municipal strategies, such as: Municipal Master Plans; Municipal Plans for Rainwater Handling; the Basin Macrodrainage Plan, and the Municipal Sanitation (water, sewage, drainage and solid waste) Plans.

Water security	8. To act transparently by means of broad-spectrum communication and dissemination strategies – ensuring to the public in general the free access to the complete and updated information.	It defines and prioritizes guidelines for communication and dissemination of information on the plan, critical events (draught, floods and water quality) and hydrologic data, informing the public on the partial results of all RBMP elaboration stages.	It defines but does not prioritize guidelines for communication and dissemination of information on the plan, critical events (draught, floods and water quality) and hydrologic data, informing the public on the partial results of all RBMP elaboration stages.	It defines but does not prioritize guidelines for communication and dissemination of information on the plan, critical events (draught, floods and water quality) and hydrologic data; besides, it does not inform the public on the partial results of all RBMP elaboration stages.	It defines guidelines for communication and dissemination of information on the plan, critical events (draught, floods and water quality) and hydrologic data; however, it does not prioritize such guidelines in its action plan, considering them as second or third priority. Besides, during the initial stages of the Plan preparation, strategies to communicate and disseminate the partial results to the public were not observed.
	9. To act both in the supply and demand management – encouraging the rational use of the water in industry, agriculture and public supply; the technologies of water conservation and reuse, as well as the spring protection projects.	It defines and prioritizes equitable actions for the supply and demand management, balancing measures of rational use of water and technological development (conservation and reuse) in the main user sectors, and measures of recovery and protection of springs.	It defines and prioritizes actions for the supply and demand management, predominating actions directed to the supply management or disequilibrium among the measures of rational use of water and technological development (conservation and reuse) in the main user sectors, with measures of recovery and protection of springs.	It defines and prioritizes actions for the supply and demand management, predominating actions directed to the supply management and disequilibrium among the measures of rational use of water and technological development (conservation and reuse) in the main user sectors, and measures of recovery and protection of springs.	It defines and prioritizes guidelines for the water supply and demand management in a balanced way, emphasizing guidelines for the rational use and reuse of water.
	10. To define emergency measures and actions to cope with extreme hydrological events – contingency plan with equitable measures that can reach all users equitably.	It defines and prioritizes emergency measures and actions to face the extreme hydrologic events with equitable measures for the main users of the basin.	It defines and prioritizes emergency measures and actions to face the extreme hydrologic events, without an equitable distribution of the measures for the main users of the basin.	It defines but does not prioritize emergency measures and actions to face the extreme hydrologic events, even in face of an equitable distribution of the measures for the main users of the basin.	It defines guidelines for emergency action: a contingency plan to reduce scarcity risks and a joint management plan for water demand, aiming its multiple uses. However, these guidelines do not contemplate all users or are not prioritized in its action plan, being considered as third priority.

Source: Elaborated by the authors
Note: Highlighted cells identify the performance of PAT (2010-2015) regarding the compliance of the proposed requirements.

Therefore, even if the objective of the decentralized management is greater legitimacy in decision making at the river basin level, taking into account the rights of individuals or groups, organized or not, another challenge is the overcome the political interference from specific sectors and actors. All the difficulties must be observed (access to information, transfer to participate in the activities, address of technical issues, among others) that limit the participation of the civil society (CAMPOS; FRACALANZA, 2010; PEREIRA, 2003).

In this context, it is worth stressing out the strategic role to be played by transparency and access to information regarding water resources management, which emerge as instruments for the assessment of the effectiveness and legitimacy of the planning and governance practices, in which the public participation is a key factor (JACOBI; CIBIM; LEÃO, 2015). Thus, when influencing the mobilization of several actors, transparency constitutes an important part of water security planning and management. However, water resources planning:

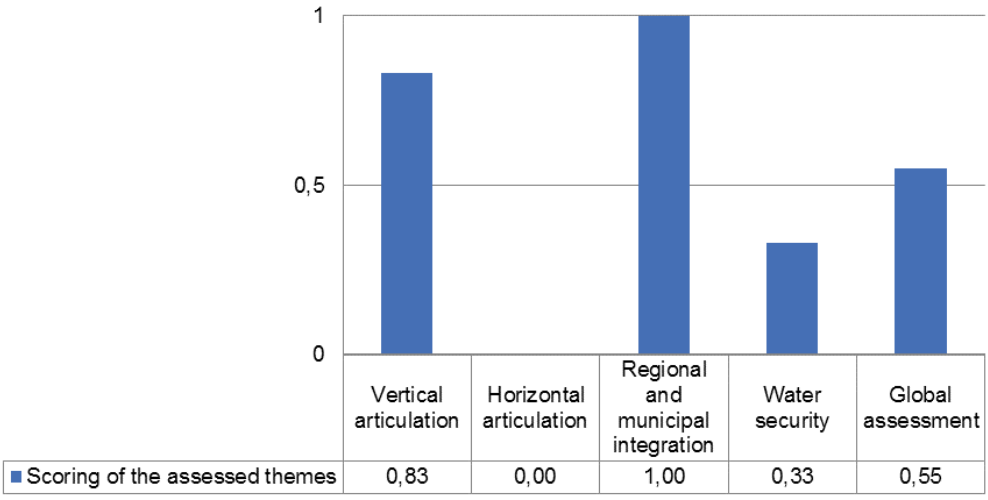
> [...] is a political decision process that depends on precise information, transparency, ethics, temperance, acceptance of different viewpoints and will to negotiate and search for joint solutions that are acceptable for the whole society and mainly for the parties involved (OLIVEIRA, 2006, p. 284).

When it comes to PAT (2010-2015), the low performance in requirement 8 – *To act transparently by means of broad-spectrum communication and dissemination strategies* – is justified by the non-prioritization of the guidelines regarding social communication in its action plan, and also by the lack of mobilization strategies to involve the public in the initial stages of the plan elaboration, as attested in the analysis of requirement 4 – *To mobilize in advance the main political actors and user sectors*.

Considering water security as a whole, another aspect that contributed to the PAT (2010-2015) unsatisfactory performance was the limited character of the proposed Contingency Plan (PG-13), which emphasizes the role of the water supply dealers in the management of the demands, but does not discuss the other users' responsibilities in situations of water scarcity. Besides, the joint management plans predicted in the PG-14 guideline were not prioritized in the PAT (2010-2015) action plan, being considered of third priority.

However, the high PAT (2010-2015) performance in requirement 9 – *To act both in the supply and demand management*, is explained by the fact that a guideline is proposed to encourage studies for the Implantation of Systems to Induce the Reduction of Losses and Consumption, Rational Use and Use of Water (PG-12), and prioritize it in its action plan. Figure 1 presents the PAT (2010-2015) global assessment according to the score obtained in the analyzed themes. It is observed that despite the satisfactory global assessment, the plan presents some important gaps in the approach of horizontal articulation and water security.

Figure 1. PAT (2010-2015) global assessment



	Vertical articulation	Horizontal articulation	Regional and municipal integration	Water security	Global assessment
Scoring of the assessed themes	0,83	0,00	1,00	0,33	0,55

Source: Elaborated by the authors

Conclusions

Among the factors that contribute to the unsatisfactory scope of the River Basin Plans (RBMPs) elaborated in Brazil, the following are highlighted: (i) the precarious articulation of these plans with the national and state water resources plans, as well as with other sector strategies; (ii) the institutional difficulties for the integration of water resources planning with regional and municipal territorial planning, and (iii) the insufficient approach of issues related to water security.

Therefore, in order to guarantee the RBMP role as instrument that can induce the integrated (participative and shared) water resources management, it is suggested that the set of methodological requirements proposed here be met, thus encouraging the equity of forces between the technical-scientific knowledge and the community wishes, as well as the integration of other sectorial public policies in decision making in the ambit of the River Basin Committees (RBCs).

The application of the proposed requirements to PAT (2010-2015) pointed to the difficulty faced by the water resources managers to overcome the bureaucratic logic of formulation and control, which sees planning as a process of making plans, delegating responsibilities and determining budgets in a sectorized way. Given the strategic and transversal character of water resources planning, it was expected that a process of political construction shared among the varied actors and user sectors should be prioritized in the construction of PAT (2010-2015).

Based on the requirements proposed here, an essentially technical-scientific approach in the elaboration process and in treating issues related to water security is observed in PAT (2010-2015). This approach is at odds with the several actors' orientations who discuss the water scarcity in the Upper Tietê Basin.

Thus, considering that the sustainable use of water resources depends on interdisciplinary actions and cultural changes that assume mobilization and involvement of the public in decision making, it is understood that, despite the satisfactory global assessment, PAT (2010-2015) presents important challenges for the next reviews, such as: (i) the use of planning strategies that promote the participation and involvement of the society from the initial stages of the plan elaboration, so as to complement the discussions in the ambit of the basin committee, making a greater social engagement and control possible, and (ii) the guiding of efforts to overcome the technicist approach – which does not recognize the planning limitations as a tool capable of predicting and controlling the future – in the prioritization of the measures predicted in its action plan.

In this sense, it is necessary that the water resources managers recognize that the lack of articulation among the varied institutions involved in the planning of the sectorial public policies and the low capacity to organize and mobilize the civil society in the ambit of the RBCs are factors that limit the range and implementation of the measures and actions predicted in the RBMPs.

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Original Article

RIVER BASIN MANAGEMENT PLANS AND THEIR CHALLENGES: THE CASE OF THE ALTO-TIETÊ RIVER BASIN — STATE OF SÃO PAULO, BRAZIL

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RIVER BASIN MANAGEMENT PLANS AND THEIR CHALLENGES: THE CASE OF THE ALTO-TIETÊ RIVER BASIN – STATE OF SÃO PAULO, BRAZIL

***Abstract*:** The article proposes a set of requirements to be used in assessing the potential of the River Basin Management Plans as instruments: (i) of (vertical) articulation between river basin planning and national and state planning of water resources; (ii) of articulation (horizontal) between water resources planning and other sectorial planning; (iii) of integration between water resources planning and regional and municipal strategies for land use planning and environmental sanitation; (iv) of water safety. These requirements were applied to the Alto-Tietê River Basin Management Plan, which demonstrated low potential for horizontal articulation and water safety planning. To overcome these limitations, it is suggested, in the next plan revisions, the use of planning tools that promote the involvement of society in a complementary way to the discussions in the river basin committee, fostering shared decision-making between the different actors and user sectors.

***Keywords*:** river basin management plans; integrated water resources management; public participation; user sectors.

PLANOS DE BACIA E SEUS DESAFIOS: O CASO DA BACIA HIDROGRÁFICA DO ALTO-TIETÊ – SP

***Resumo*:** O artigo propõe um conjunto de requisitos a ser utilizado na avaliação do potencial dos Planos de Bacia Hidrográfica como instrumentos de: (i) articulação (vertical) entre o planejamento da bacia hidrográfica e os planejamentos nacional e estadual dos recursos hídricos; (ii) de articulação (horizontal) entre planejamento dos recursos hídricos e outros

planejamentos setoriais; (iii) de integração entre o planejamento dos recursos hídricos e as estratégias regionais e municipais de ordenamento territorial e saneamento ambiental e; (iv) de segurança hídrica. Tais requisitos foram aplicados ao Plano da Bacia Hidrográfica do Alto Tietê, que mostrou baixo potencial de articulação horizontal e de planejamento da segurança hídrica. Visando à superação de tais limitações, sugere-se que nas próximas revisões do Plano sejam utilizadas ferramentas de planejamento que promovam o envolvimento da sociedade, de forma complementar às discussões no âmbito do comitê de bacia, fomentando a decisão compartilhada entre os diversos atores e setores usuários.

***Palavras-chave*:** planos de bacia hidrográfica; gestão integrada dos recursos hídricos; participação pública; setores usuários.

PLANOS DE ORDENACIÓN Y MANEJO DE CUENCAS: EL CASO DE LA CUENCA DEL ALTO-TIETÊ – SP

Resumen: El artículo propone un conjunto de requisitos a ser utilizado en la evaluación de los Planes de Ordenación y Manejo de Cuencas Hidrográficas (POMCA) como instrumentos de: (i) articulación (vertical) entre la planificación de cuencas hidrográficas y la planificación nacional y estatal de los recursos hídricos; (ii) de articulación (horizontal) entre la planificación de los recursos hídricos y otra planificación sectorial; (iii) de integración entre la planificación de los recursos hídricos y las estrategias regionales y municipales para la ordenación del territorio y el saneamiento ambiental y; (iv) de seguridad del agua. Tales requisitos fueron aplicados al POMCA del Alto-Tietê, que demostró bajo potencial para la articulación horizontal y la planificación de la seguridad del agua. Se sugiere que en las próximas revisiones del POMCA, se promuevan la participación pública de manera complementaria a las discusiones dentro del comité de cuenca, fomentando la decisión compartida entre los sectores de usuarios.

***Palabras clave*:** planes de ordenación y manejo de cuencas hidrográficas; gestión integrada de recursos hídricos; participación pública; sectores usuarios.