BULK WATER PRICING IN BRAZIL: ADVANCEMENTS, RESISTANCE, CONTROVERSIES AND AMBIGUITIES

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1 INTRODUCTION

The implementation of bulk water pricing in Brazil is especially complex, due to the peculiar legal status of water resources, which are defined as a publicly owned good, whose ownership resides partly with the Federation and partly with the states. This implies the existence of separate Federal and state water pricing systems. Existing water laws call for the adoption of water pricing as a management tool but differ in their emphasis on charges as a way to encourage efficient water use by signaling its economic value, or as a revenue-raising instrument. As is typical of Brazil's water management reforms, the dynamics of charges' conception and implementation vary greatly across states and basins. Still, almost everywhere a gap exists between the political will demonstrated by the promulgation of water laws and the resolve needed to implement charges.

This paper discusses the dynamics of two pioneering experiences –one involving state and one Federal waters– in the context of the overhaul of Brazil's water management practices. Its main goal is to identify the facilitating conditions for the introduction of charges, as well as the sources of resistance and persisting ambiguities. The main focus is on a basin that contains both Federal and state waters, i.e. a 'national' basin. This note discusses the identification of the users who will pay; the arrangements for revenue collection and allocation; and which level of fiscal solidarity should exist across and within river basins. The paper concludes that, while progress in the implementation of charges appears small compared with the considerable advancements in other components of the new management framework, for the regions where charges were introduced, their adoption represents a giant step towards effective water resources management.

2 BRAZIL'S WATER MANAGEMENT SYSTEM: PECULIARITIES AFFECTING BULK WATER CHARGES

The structure of Brazil's new water resources management system and the ongoing reform process were strongly influenced by the constitutional norms mandating the legal separation of state and federal waters, and granting states ownership over what were previously defined as municipal, private and common water resources.[3] State waters are all resources located entirely within the territory of a single state and are the sole jurisdiction of state authorities. Federal ownership is limited to surface waters flowing or spreading across or along state boundaries, or into foreign countries, whose management requires the participation of all riparian states and of

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[3] 1988 Federal Constitution, art. 20 and 26. Previous norms from the 1934, 1937, 1946 and 1967 Federal Constitutions, as well as the Water Code 1934.

the Federal government.[4] The distinction between Federal and state waters prompted the creation of institutional frameworks for their management at both levels of government.

The 1988 Constitution called for a new approach to water management.[5] While a number of states rapidly undertook reforms, the process at the federal level was much slower and the federal Congress promulgated the National Water Law (9.433/97) only 10 years later. This Law, however, confirmed that Brazilian water management had entered a new era, embracing the concepts of integrated, participatory and decentralized management as the basis of the new system. The National Law defines the objectives of the National Water Resources Policy as follows: (i) reliability of current and future water availability, at the desired level of water quality;[6] (ii) rational and integrated water use for sustainable development; and (iii) prevention of critical hydrologic events descending from the inadequate use of natural resources. The key principles of the Policy that should be followed to meet these objectives are: *an integrated approach based on water's economic value*, *decentralization* and *participation*.

> The coexistence of a set of similar but distinct management systems in different implementation stages is one of the challenges facing Brazil's water management. Among its consequences are difficulties to manage basins that contain both Federal and state waters (or 'national' basins), where river basin plans and systems may have difficulties coexisting with developments along state-controlled tributaries. Differences between state and federal systems are greater in states that approved their regulations before the promulgation of Law 9.433/97. Some states attributed more power to state-level than to river basin institutions, the extreme case being Paraíba, where no river basin organizations were foreseen. Another difference regards river basin agencies, as some state laws (including Ceará's) do not include them. This is relevant because agencies were expected to control collected revenues from water charges. For water charges, the existence of separate Federal and state systems is particularly problematic for national basins.
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> A development that may help resolve this situation was the promulgation of Law 9.984/00 creating the National Water Agency (ANA – *Agência Nacional das Águas*), a Federal autarky whose primary responsibilities include: (i) supervising and regulating the implementation of the National Policy and its instruments; (ii) issuing permits for federal waters and monitoring their use; (iii) supporting the creation of river basin committees; and (iv) collecting Federal water charges and redistributing these funds to the basins of origin. Since its creation, advancements have taken place in pricing regulation the Federal level and implementation in national basins. This Law also defined the specific set of charges to be levied on power sector users. Article 28 determines that 0.75% of the financial compensation concessionaires have to pay states for the areas flooded by hydroelectric reservoirs –paid since Dec. 1989– is to be paid to ANA as the bulk water use charge.

[4] Note that groundwater resources are currently considered state-owned. The problem of aquifer shared by more than one state (or even internationally) has only recently entered the debate concerning water resources management.

[5] See Formiga-Johnsson and Scatasta (2001); Porto, (1998); and Azevedo and Simpson, (1995).

[6] CONAMA Resolution no.20/86: water bodies have to be assigned to water classes according to prevalent use. For each class, the resolution lists accepted pollutant concentrations, turbidity, pH and other characteristics.

3 PIONEERING EXPERIENCES WITH WATER CHARGES: THE IMPORTANCE OF BEING SIMPLE

Among the management instruments foreseen by water laws, bulk water charges are the ones that Brazil's technical and scientific community has been studying the most since the early 1990's.[7] Still, more doubts than certainties still surround their application, regarding their nature, the methodology for their computation, which users should pay, and where charges should be applied. Public debates regarding water pricing have thus been very polarized since the promulgation of the National Law. São Paulo is a good example of the gap between the political will demonstrated by the promulgation of water laws and the resolve needed to implement charges. While it was the first state to approve a water law in Brazil, more than a decade later, despite great progress elsewhere, a draft law on charges is still awaiting approval.

Inspired by São Paulo's early pioneering efforts, Ceará introduced an innovative water management framework and succeeded where its mentor failed. Ceará was the second Brazilian state to adopt a water law (Law 11.996/92) and the only to implement charges on state waters. Its water management reforms were part of a broader reform concerning the state's public administration structure. Among other conditions, this enabled Ceará to move rapidly and to accomplish more in terms of actual implementation of the new system. Central in the development of Ceará's management system was the creation, in 1993, of the state Company for Water Resources Management (COGERH), which was initially established to exert management, monitoring and enforcement functions. The fact that only one of its rivers is federal may give the impression that the Federal-*vs*.-state-water issues discussed above may be less relevant in Ceará. This, however, is a misconception, as DNOCS – a federal agency in charge of drought prevention policies and programs – always controlled the state's key reservoirs (*açudes*[8]), thanks to the constitutional norm (art. 26) that grants federal control over waters collected in federal structures, even when these are built on state rivers. As a consequence, COGERH was unable to assert itself as the state's primary management institution until 1994, when DNOCS delegated to it the management of its vast network of hydraulic infrastructures.

As of 1996, Ceará had managed to implement a system of state bulk water charges, which are currently levied on domestic, industrial and irrigation water uses in some of its eleven river basins. One reason for this achievement was the use of simplified practices, often chosen for the sake of pragmatism.[9] In particular, one can highlight four simplifications relative to proposals that are being discussed elsewhere, including the Paraíba do Sul river basin. First of all, charges were introduced gradually, starting from municipal and industrial water users and only later expanding to irrigators. In addition, and most importantly, the system does not distinguish between water use categories and charges are applied only to quantitative use, and specifically only to water that is actually consumed, based on measurements,[10] thus de-coupling charges from permits. The third peculiarity of Ceará's bulk water charges is that COGERH negotiates them directly with municipal and industrial users, while only irrigation charges are defined by river basin committees. This has produced sizeable differences in their values.[11] Finally, the collection and allocation of charges is centralized in the hands of COGERH. Ceará depends on large public hydraulic infrastructure to face recurrent droughts, and collected revenues are

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[7] See for instance de Mendes Thame, ed. (2000)., CORHI/SP, (1997), CNEC/FIPE, (1996), Garrido, (2000), Terra Barth, (2000). Seroa da Motta, (1997), Lanna and Pereira, (1996).

[8] The word *açude* indicates all man-made storage structures aimed at preventing or reducing the impact of droughts.

[9] PROAGUA-PARAIBA DO SUL, (2001).

[10] What facilitates this in Ceará is that most users are served by public water supply infrastructures.

[11] Charges for 100 m^3 varied from R$ 4 for irrigators in the Acarape do Meio valley, to R$ 670 for industrial users. (Data from COGERH's website : www.cogerh.com.br – May 2003)

generally applied to cover their operation and maintenance costs as well as COGERH's management costs. The system is working smoothly and with minimal objections on the part of water users. Collected revenues increased rapidly, from less than R$ 0.3 million in 1996, to R$ 10.7 million in 2002, to an expected R$ 13 million in 2003.

Recently, interesting attempts have been made to strengthen water charges' role as economic incentives. This has so far been achieved by carefully combining them with other instruments. In August 2001, ANA and the state of Ceará reached an agreement for the implementation of a Plan for the Rational Use of Irrigation Water (*Plano de Uso Racional da Água de Irrigação*). The Plan combines charges and subsidies as incentives to stimulate (i) changes in irrigation techniques in favor of water-saving technologies, and especially (ii) voluntary reductions of irrigated areas under low-value crops – particularly rice – in favor of higher value crops. The Plan is directly linked with the negotiated allocation carried out by local commissions, thus strengthening their role. The monetary incentives are accompanied by improvements in monitoring the use of both surface and groundwater, as well as a capacity-building program for irrigators. The first basins to implement this program were the Jaguaribe and Banabuiú river basin, the first of which alone accounts for over 60% of Ceará's waters.

In other states, water pricing is at most in embryonic states, pending further Federal regulations. In general, the design and implementation of charges has not yet been addressed in an open and systematic way involving users and organized civil society. An exception is represented by Paraná state, where charges were subject to the most heated debate in the process leading to the approval of the state water law in 1999. The reactions of agricultural users prevented the approval of the draft law, which had to be resubmitted and was approved only with explicit, permanent exemptions for the sector.

4 THE PARAÍBA DO SUL RIVER BASIN: CHARGES IN A NATIONAL RIVER BASIN CONTEXT

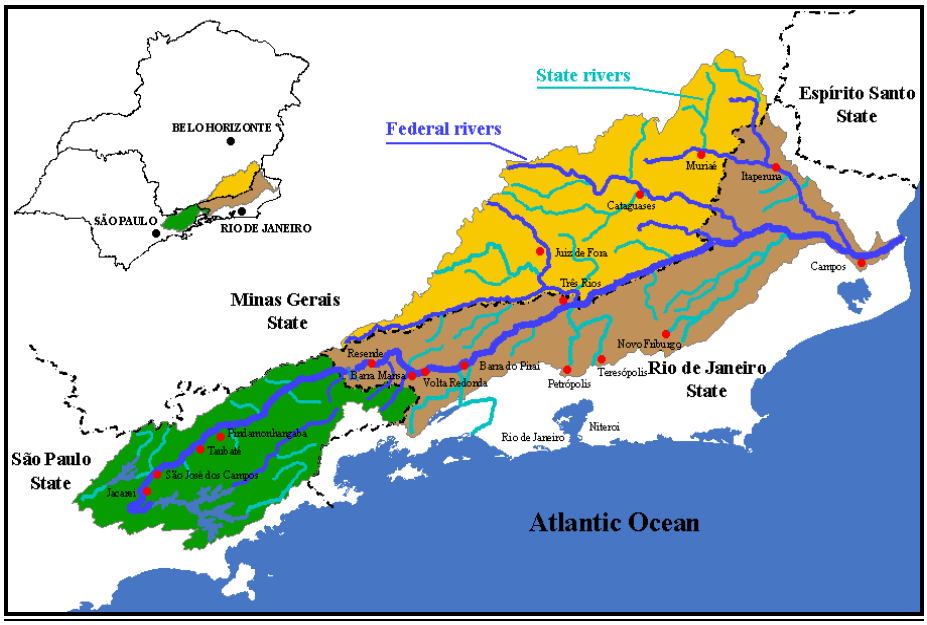
The Paraíba do Sul river basin is the priority basin for the implementation of the National Management System in national basins. It has a drainage area of about 57,000 km^2 in the states of São Paulo, Rio de Janeiro and Minas Gerais, connecting the metropolitan areas of São Paulo and Rio de Janeiro, and accounting for about 10% of the country's GDP. Almost 14 million people depend on its water, of which only 5.6 million live within the basin, while over 8 million are served by an inter-basin transfer serving hydropower generation and water supply for the metropolitan region of Rio de Janeiro. Over the last 40 years, the basin has experienced intense urbanization and demographic growth. In the 1990's population grew by 17%, due primarily to urban population, which accounts for almost 90% of the total.[12]

The main water-related concern in the basin is declining water quality, due primarily to limited treatment of municipal and industrial wastewater. One million cubic meters of raw domestic sewage, as well as about 7 tons of industrial effluents, sometimes highly toxic, are returned daily to its waters. In addition, while no reliable data exists, it is known that agricultural practices in the region have given little consideration to land degradation or the impacts of excessive agrochemical use. Some regions of the basin are also subject to flooding, and some major urban areas are periodically attained. Finally, despite relatively high water availability, quantity-related tensions are mounting in some regions. In addition, protracted low-flow episodes are not unheard of. In 2001, for instance, the basin –along with the rest of the country– experienced one of the worst droughts on record. The main source of management complexities in the Paraíba do Sul river basin is the coexistence of state and Federal waters (Figure 4.1). This

[12] IBGE (*Istituto Brasileiro de Geografia e Estatística*). *Censo 1991*, and *2000*.

feature federal calls for the identification of innovative practices for the Federal and state systems to interact in a way that makes management work. This dialogue across institutional frameworks is however complicated by their different principles, technical aspects, and degree of implementation.

Figure 4.1: Paraíba do Sul river basin: State and federal waters



Source: LabHid. - COPPE/UFRJ

After over sixty years of attempts and intermittent successes, actual progress in the creation of a new management system in the Paraíba do Sul has taken place over the last decade, particularly after the institution of CEIVAP, the river basin committee. Its main functions are the coordination of interventions and policies and the management of Federal waters, delegated by the Union. Its composition is a testament to the efforts to decentralize management and increase the role of new stakeholder groups. A privileged role is accorded to users and organized civil society, which control 40% and 25% of the 60 seats. Federal, state and municipal governments share the remaining 35%. The creation of ANA also played a key role in the recent progress in implementing new management instruments in the basin, particularly for bulk water pricing.

Bulk water charges in the Paraíba do Sul river basin are a pioneering experience in the national scenario, applying for the first time to Federal waters and enabling the effective launch of a full-fledged management system in a national river basin. The debate and negotiation launched in February 2001 by a joint proposal by ANA and CEIVAP concluded in November 2002 with the approval by the National Water Resources Council (CNRH) of a final set of norms affecting all users. Collection started in January 2003. Current charges have a transitory nature. This is due (i) to the ongoing revisions the initial formula, and (ii) to the absence of Federal-level regulations for bulk water charges at the time of CNRH approval. The methodology and criteria were approved for three years from their effective implementation.

Given the pioneering nature of the system, the main guiding principle in defining the transitory methodology was its conceptual and operational simplicity. The adopted formula is easy to understand and based on easy to measure parameters, to maximize computational ease. While the goal was to enable the rapid implementation of charges, the proposals also aimed at meeting the main objectives associated with water pricing. First, it aimed from its inception to signal to users the importance of rational water use and the nature of bulk water as an economic good. All uses as defined by the National Law –withdrawal, consumption and effluent dilution– are included in the formula, so that rationality is promoted in both quantitative and qualitative use.

Second, it aimed to obtain financial resources to support structural and non-structural interventions for the recuperation of the basin, promoting a minimum level of financial self-sufficiency for water management in the basin. Finally, the formula tried to maximize acceptability by defining mechanisms to minimize the risk of economic impacts on different use categories. A question that needs to be addressed is how well these objectives can be achieved by a single formula, and what trade-offs exist between them.

Charges for bulk water use in the basin were approved in two subsequent stages. The first round of debates and decision-making (March-Dec 2001, from the presentation of the initial proposal to its approval by CEIVAP) introduced charges for major industrial and municipal users, ratified by CNRH in March 2002. In Feb-Oct 2002, the debate extended to all other users, and led to the CNRH Resolution ratifying CEIVAP's complementary regulation on these matters.[13] The debate produced substantial changes in the initial proposals, affecting not only the formula and its application, but other components of the management system as well, such as the basin agency, water use permits and the basin water resources plan. The debate regarding these associated issues gave rise to parallel negotiations in 2002, now in their final stages.

Negotiations built consensus around the universal nature of charges from their inception, at least for users of Federal waters. All users would be charged, including industry, municipal water supply and sanitation operators, agricultural users, aquaculture, small hydropower plants (PCHs – with an energy output of up to 30 MWh) exempt from the parallel financial compensation mechanisms of the power sector, and mining activities of a minimum 'industrial level' scale. The only exemptions contemplated by the system affect what the National Law defines as 'insignificant uses' (Table 4.3). Due to their complexity, the definition and implementation of charges for inter-basin transfers from the Paraíba do Sul to the Guandu river and for sand extraction from riverbeds was deferred by one year.

The formula (Table 4.1) for the computation of charges adopted by CEIVAP is applied to all users, except hydropower users –including PCHs– which are subject to a distinct methodology (Table 4.2) defined by the power sector. The main formula comprises three components corresponding to the three types of bulk water use defined by the National Law:

- withdrawal (volume abstracted from a water body);
- consumption (abstracted flow that does not return to waters in the basin); and
- effluent release (volume of wastewater released to waters in the basin, with or without previous treatment to reduce pollutants). In the initial phase of implementation of charged, only one pollutant (BOD) was considered.

Each use is expressed in measured or estimated flows (m^3/s). For each flow abstracted, consumed or released, a corresponding charge is defined starting from a unit price (PPU – Preço Público Unitário) modified by use-specific coefficients.

[13] In both cases the negotiation process was directed by CEIVAP and ANA, with the permanent support of the Hydrology Laboratory of COPPE/UFRJ, which developed all technical material and proposals subject to negotiations. Debate forums ranged from seminars and technical events to plenary sessions of the basin committee, with numerous reunions of its technical working groups and the active involvement of all stakeholders, particularly private user groups.

Table 4.1: ANA-CEIVAP formula for bulk water use charges (except PCHs)

$$C = Q_{cap} \times K_0 \times PPU + [Q_{cap} \times K_1] \times PPU + [Q_{cap} \times (1 - K_1)] \times [(1 - K_2 K_3) \times PPU]$$

Withdrawal | Consumption | Effluent Dilution (BOD)

Where:

Q_{cap} = Abstracted flow (m^3/s). Data provided by user.

K_0 = Withdrawal unit price multiplier. Defined by CEIVAP.

K_1 = Consumption coefficient by activity. Provided by user.

K_2 = Treated share (%) of effluent volume (industrial and municipal effluent treatment coverage). Provided by user.

K_3 = BOD reduction effectiveness of effluent treatment process. Provided by user.

PPU = Public unit price ($R\$/m^3$). Defined by CEIVAP.

The main advantage of the formula resides in its simplicity. The formula clearly states that all water uses –withdrawal, consumption and effluent dilution– are subject to charges. This resolves the debate concerning whether paying for withdrawal and consumption constitutes double-counting. This is not the case, as these uses impose different impacts on other users.[14] Simplicity also has some drawbacks. For instance, it ignores other pollutants that play a more relevant role than BOD in the basin. Also, the dilution coefficient ($1-K_2K_3$) does not distinguish users by the relative pollution-intensity of their processes. In this sense, it should be seen as a reward for those who invested in BOD emission reduction, rather than as a way to reflect users' impact on water quality.

Charges for hydropower users, including PCHs, are defined as a share of revenues from power output, using the formula for financial compensation paid by hydropower producers since 1989. CEIVAP set **P** to 0.75%. This is added –except for PCHs– to the financial compensation charged by ANA and mandated by the National Law as payment for water use by the power sector.

Table 4.2: Formula for hydropower producers

Charges = GH x TAR x P, where:

GH = total monthly energy output, in MWh, informed by the generator

TAR = Reference Tariff in R$/MWh, defined by the National Electric Power Agency in Resolution n.º 66/2001, or any of its successive updated versions,

P = percentage defined by CEIVAP as charge on the value of generated energy

Table 4.3 summarizes the criteria for the application of the formula in Table 4.1 (CEIVAP Deliberation nº 08/2001 and 15/2002; CNRH Resolutions nº 19/2002 and 27/2002), showing how the parameters defined by the river basin committee vary across sectors.

[14] See Lyra et al., (2001) for a description of water use permits and their impacts. Scatasta (2003) focuses on their economic implications, based on an optimization model of the Paraíba do Sul river basin that elicits water charges as shadow prices associated with optimal permit allocations under different institutional and economic scenarios.

Table 4.3: Criteria for the application of water charges approved by CEIVAP and CNRH

User Group	Methodology	Criteria	Insignificant Uses
Municipal water supply and sanitation	ANA-CEIVAP Formula	PPU = R$ 0.02 per m^3 K_0 = 0.4	Withdrawals that do not exceed 1.0 liter per second and their corresponding effluents
Industrial	ANA-CEIVAP Formula	R$ 0.02 per m^3 K_0 = 0.4	Withdrawals that do not exceed 1.0 liter per second and their corresponding effluents
Agricultural irrigation and livestock use)	ANA-CEIVAP Formula	PPU = R$ 0.0005 per m^3 K_0 = 0.4 BOD emissions = zero, except for confined swine-feeding operations *Charges may not exceed 0.5% of production costs*	Withdrawals that do not exceed 1.0 liter per second and their corresponding effluents
Aquaculture	ANA-CEIVAP Formula	PPU = R$ 0.0004 per m^3 K_0 = 0.4 Consumption factor and BOD emission set to zero *Charges may not exceed 0.5% of production costs*	Withdrawals that do not exceed 1.0 liter per second and their corresponding effluents
Mining activities on industrial scale	ANA-CEIVAP Formula	As for industrial users: PPU = R$ 0.02 per m^3 K_0 = 0.4	Withdrawals that do not exceed 1.0 liter per second and their corresponding effluents
PCHs exempt from power sector financial compensation	Formula applied to hydropower producers subject to national charges since 2000	**W**ater charges are equal to a percentage P = 0.75% of the value of energy output	PCHs with installed capacity that does not exceed 1.0 MW
Inter-basin transfers	*Charges will be implemented within one year from the implementation of the initial water pricing system, based on criteria to be negotiated and approved by ANA, Rio de Janeiro State Government, CEIVAP and the Guandu River Basin Committee*		
Sand extraction and other mining	*A specific methodology will be defined and applied within one year from the implementation of the initial water pricing system*		

Source: PGRH, (2002).

These differences were the result of the negotiation process and reflect users' perceptions of fairness, as well as their capacity to organize and represent their views in the political process that defined the formula. Pure economic efficiency was a secondary objective and was therefore left on the side to ensure that the charges system be implemented. The system's ongoing and future modifications should be based on a better understanding of the value of water for different users and in different parts of the basin, so as to ensure a closer link between the charges and the scarcity value of the resource. The importance of easy applicability and political acceptability, however, was such that the initial sacrifice of economic efficiency appears to be justified given the potential for a stalling or breakdown of the process if charges incorporating full scarcity values had been proposed, especially since the data sets and analytical tools needed for their computation are still under construction for the basin. Charges thus act primarily as a revenue-generation tools, as reflected by the direct link between expected revenues and investment needs as discussed below. One aspect of the approved formula, however, appears problematic. The definition of multipliers could have been used to establish a single public price per unit of water (PPU in R$/m^3) to be negotiated along with multipliers. Thus, the "weight" given to the impacts of different use categories would have been a negotiated decision, while the unit price could have been used to reflect other considerations, including region-specific scarcity values, in successive refinements of the formula. The differentiation of PPU across user groups, and its use to address perceived fairness issues, however, prevents this, and makes its interpretation murkier, while muddling the affordability issue as well, given that this is also addressed by sector-specific discounts.

> Finally, one should note that, contrary to Ceará's case, volumetric charges do not apply to actual uses, but rather to the size of water use permits users must obtain in the context of the parallel permit system. The link between charges and permits was partly conceived as a way to induce permit requests to reflect actual needs. However, as charges levels are low (Table 4.3) and negotiated for political acceptability, their capacity to signal economic values is limited. This, coupled with limited permit reallocation opportunities, reduces the capacity of the system to achieve an economic efficient water use in a systemic sense, i.e. an inter-sectoral and inter-regional allocation driven by the opportunity cost of water resources.

Collected revenues are to be applied to finance investments defined in the basin-level water resources plan. The recently approved river basin water resources plan[15] is based on a series of studies on water resources availability, quality and use; expected economic, demographic and land use developments; current and expected water balances, including quality considerations. It includes the definition of specific objectives in terms of rationalization of water use –including the definition of restricted use areas– and reliability of water availability and quality, the identification of programs and projects to meet these objectives, and the definition of rules and criteria for bulk water pricing. The plan details a R$ 44 million investment plan, 30% of which are for non-structural institutional interventions, with the rest divided among a set of priority municipal wastewater treatment and sediment control projects in various municipalities.[16]

While numerous decision-making organisms operate in the basin, including three sub-basin committees and numerous user consortia, the negotiating process built consensus around a basin-wide financial solidarity to tackle its environmental recuperation. Local and regional interests may be considered for the disbursement of collected revenues, but this will have to be negotiated within CEIVAP and in the context of overall basin planning. While this may appear

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[15]The plan and its synthesis were elaborated by the Hydrology and Environmental Studies Laboratory, COPPE/UFRJ, and are respectively contained in reports available at www.hidro.ufrj.br

[16]Priority projects were chosen in 2000 using a participatory approach based on a previous screening by the elected members of CEIVAP's technical working groups that used multi-criteria analysis. A number of wastewater treatment projects are already under way. The set of non-structural interventions was recently revised.

as a natural feature of river basin management, it actually constituted a major step towards the consolidation of the regional identity of the Paraíba do Sul river basin.[17] Its size and complexity could have easily resulted in a more pulverized control over financial resources, as appeared likely early in the negotiation process.

Revenues from water charges should ideally become the main source of financing for the interventions foreseen by the plan. Based on information on users registered during the 2001-02 use regularization campaign, which translated historical uses into legal water use permits in the basin, ANA elaborated partial estimates of collected revenues from Federal water charges in the Paraíba do Sul river basin for 2003. Potential revenue estimates from industrial users reached R$ 4.3 million, while those from domestic water supply and sanitation exceeded R$ 6 million.[18] While these are gross values to which discounts were not applied and are still subject to further verification, the basin appears to have a much higher financial capacity than was expected in the initial phases of the debate leading to the introduction of charges.[19] The approval of charges on state waters will increase the basin's capacity to reach financial self-sufficiency. Rio de Janeiro just approved charges for state waters in the basin, to be levied starting January 2004. While ANA's partial estimates fall short of needs, the fact of linking the discussion about charges and their use to the negotiations regarding the plan's design had a profound impact on the way the system is conceived and on its implementation. While it emphasizes the revenue-raising aspect of charges, possibly to the detriment of their design for economic efficiency, this link increases their acceptability, reduces the risk of their highjacking by institutions at levels other than the river basin (Federal, state, sub-basin, etc.), and defines a minimum set of financial resources for the realization of the plan, emphasizing the need to follow a path towards basins' financial self-sufficiency. What remains to be defined are the financial terms under which funds will be allocated, as this may affect the discipline with which they are used.

5 CONCLUSIONS

This paper discussed the dynamics of a few pioneering experiences with water charges in the context of the overhaul of Brazil's water management practices. Its main goal was to identify the driving forces, persisting ambiguities and contentious issues regarding the introduction of charges, with a special emphasis on national river basins. The implementation of bulk water pricing in Brazil is especially complex, due to the peculiar legal status of water resources, which are defined as a publicly owned good, whose ownership resides partly with the Federation and partly with the states. This implies the existence of separate Federal and state water pricing systems. As is typical of Brazil's water management reforms, the dynamics of charges' conception and implementation vary greatly across states and basins. Still, almost everywhere a gap exists between the political will demonstrated by the promulgation of water laws and the resolve needed to implement charges.

The paper shows that, while progress in the implementation of charges may appear small, for the regions where charges have advanced, their adoption represents a giant step when compared with the management practices in place elsewhere in the country. In particular, they are likely to play a major role in strengthening the position of river basin institutions by granting them control over financial resources that can be invested to support river basin water resources plans. The level of decentralization of negotiations and decision-making will have to be decided on a basin by basin level, depending on the specific problems to be resolved and therefore on the greater or lesser need for integration in the definition of management and investment

[17]See PPG, (2000a) and (2000b). All documents produced by PPG, *Projeto Preparatório para o Gerenciamento dos Recursos Hídricos do Paraíba do Sul*, are accessible at www.hidro.ufrj.br

[18]Data from ANA's seminar on "Cobrança na Bacia do Rio Paraíba do Sul" presented by Francisco L. Viana and Pedro C. Pocciotti at the meeting of CEIVAP's technical working group in February 2003.

[19]PQA, (1999). All documents produced by PQA are accessible at http://www.hidro.ufrj.br

interventions. In the Paraíba do Sul river basin, the proliferation of local level committees seems to respond to a real need, since the river basin dimension still has an "abstract" nature for many local stakeholders. However, the creation of another layer of basin entities took place quickly in the context of a complex, pioneering experience. The desire to control the collection and allocation of charges generated some centrifugal tendencies, questioning the river basin as the planning and management unit. These tendencies appear to have subsided, however, with the direct link of collected revenues with a basin-level investment plan that was discussed at all regional level but maintains an integrated perspective of the priority interventions for the recuperation of the basin's water quality. In this sense, the simplified nature of the initial formula, and the greater weight given to the revenue-raising nature of charges may have played an important role. The resurgence of centrifugal tendencies, however, is always a possibility and should be carefully monitored, particularly with respect to the incipient state water charges systems.

> One tension that has yet to subside, however, regards fiscal solidarity *across* basins. At the federal level, ANA officials have repeatedly and publicly stated that all revenues collected on federal water will return to the basin of origin – apart from ANA's 7.5% share. In informal discussion, however, some defend the idea that federal charges collected in the relatively rich basins in the Southeast –which received considerable federal support, and will be the first recipients under ANA's basin recuperation programs– should later contribute to developing management systems in poorer areas of the country. This is a is strongly disputed by many users, states and local interest representatives in river basin and sub-basin committees, and has the potential to break the consensus that it took so long to build.

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