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Water resources as a common good in Brazil: Legal reform between theory and practice

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Abstract. Water resources management in Brazil has been based upon its legal characteristic of a common good. After the 1988 Federal Constitution established that the environment is a common good, a legal reform took place in order to better adjust the Brazilian environmental policy to this new regime. The first attempt of doing so was the 1997 Water Resources Policy Act that had its basis in the water's economic value, and the polluter and user pays principles. This paper aims to show the legal status of water resources management in Brazil, focusing on the economic instruments, such as the water charges, as well as the political structure created to guarantee an envisaged quality of these resources. Taking as a case study the Paraíba do Sul river basin, located in the Southeast region, the paper presents some trends and constraints experimented by the first River Basin Committee that implement the legal provisions on water charges in Brazil.

1. INTRODUCTION

Due to the risk of over-exploiting natural resources, or damaging them by pollutant activities, environmental law are used across the world as a tool to manage common property resources like water. Economics has contributed to solve some environmental problems by introducing instruments like taxation over the use of some of these goods. However, the amount of tax still in all cases represents a thorny issue. Another important point concerns how to address the issue of existing private property rights of environmental resources. The quality of water is getting worse, compromising the availability of water for various usages in the future. In an effort to change this scenario, Brazil is moving in a new direction in relation to the domain of water bodies, following the Federal Constitution that was adopted in 1988. It stipulates that all water bodies are public, including riparian areas located within 15 meters of rivers.

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The Brazilian approach to water resources management is based upon the French model. This model was developed for a specific cultural and political system, and is based on the assumption that the whole infrastructure in the river basin is covered by legislation. The French model was adopted without many changes, and it represented a dramatic departure from the previous approach. Because of this it was implemented in a slow and adaptive manner in order to be successful. Because of this a number of problems and conflicts have occurred.

This paper analyzes water resources management in Brazil, focusing mainly on legal and economic instruments. A case study of the river basin Paraíba do Sul, located in the southeast of Brazil and comprising three States (São Paulo, Rio de Janeiro and Minas Gerais), is presented in order to evaluate the implementation of the water management regime according to the 1988 Constitution. This river basin represents innumerable environmental and management problems, including: discharge of water pollutants such as domestic sewage, industrial organic and non-organic effluents, inadequate solid waste disposal, illegal deforestation that causes erosion processes and consequently the silt up of rivers, illegal mining activities, the use of pesticides without control, unplanned land occupation, and predatory fishing.

This is the first Brazilian river basin where charging of fees for use of water is used. As a consequence, many problems (including lack of guarantees that the financial resources will return to the river basin, and conflicts of legislation between federal, state and municipal levels) result, and these are presented and analyzed. Another aspect that is covered is how the river basin committee will address the important role of stakeholder participation in decision-making, and how this is a good example of applied conflict resolution as well as management of environmental resources. Finally, suggestions are presented towards improving the water resources policy in Brazil.

2. BACKGROUND

This Section presents the economical and legal instruments used in order to promote sustainable use of water resources. A brief comment on the French model for water resources management will be also given due to the fact it inspired the Brazilian model.

User charges as an instrument to control over-exploitation of natural resources

Law is used to restrict over-exploitation of natural resources throughout the world. However, the instruments of command and control (legal coercion) have not managed to reduce the human negative impacts on nature. For this reason economics began being used in conjunction with law in order to promote economic incentives, or to create a situation where it would be more economically beneficial to prevent pollution than to pollute (Plater 1992). Economics also takes into consideration aggregate social welfare in order to calculate the cost of a polluting activity to a society as a whole, showing the cost-benefit of a certain activity to the environment.

In order to promote the link between environmental law and economics, the externalized costs must be identified and included into legal accounting, as well as internalized within the market and the decision making process (Griffin 1979). User charge is an instrument to internalize externalities that would otherwise not be taken into account before its application.[2/]

User charges have been used as an instrument to reduce pollution and the over-exploitation of natural resources. In Brazil this charge was implemented recently for water resources, as will be discussed in Section 3. User charges are distinct from taxation, because they are not used to finance a service, but are instead used to finance measures to conserve and restore the quality of water bodies.

Property rights

Brazilian Law originated from the Roman law where property was attributed to the *gens* (municipality). Each individual could own only a small piece of land (half a hectare) that could not be sold, because only moveable goods could be alienated. This type of property right disappeared when the familiar property right took its place – a kind of collective property. As times passed by, the collective property rights got weaker, and in their place individual property rights arose.

[2/] As stated at the Rio Declaration on Environment and Development, in its principle 16: "National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment."

Later on, thinkers like Locke, Hobbes, Rousseau and Montesquieu argued the importance of individual rights like liberty, equality, and the right to private property.

It is interesting to note that the French Declaration of the Rights of Man and the Citizen, from 26 August 1789, in article 17 states that property is a sacred and inviolable right, and the only reason that justifies the interference in this right is the public interest (Hobsbawm 1996). However, any interference must be indemnified. The 1804 Code of Napoleon, for instance, shows how strong the will was to protect the private property at the time. Of its 2,287 articles, more than 800 are related to private property.

The Brazilian Civil Code was written in 1916 under the influence of the 1789 Declaration of the Rights of Man and the Citizen and the 1804 Code of Napoleon (Fed. Govt. of Brazil 1916). The private and the public laws in Brazil always diverged in the sense that under the administrative law the absolute characteristic of the property right based upon the Declaration of the Rights of Man and the Citizen – where its limitation relied only on the other individual rights – was questioned.

In the Federal Constitution of 1988 property were given two functions: an individual and a social function. Both were based on the principles of a person's dignity and the social solidarity. In all previous Brazilian Constitutions – from 1824 to 1988 – property was seen as an individual right influenced by the Declaration on Human Rights and Citizen from 1789.

The new Civil Code of 2002 adopted the concept of social, economical and environmental function of the property, following the 1988 Constitutional provisions (Fed. Govt. of Brazil 1988, 2002). The Federal Constitution of 1988 was built upon the ideas of Léon Duguit (Duguit 1945).[3/] He does not understand property as a subjective right, but as the owner's duty to keep its social function, as in the following: "The law of property should be understood only as the power of individuals who are in a specific economic position to fulfill the obligation of the social purpose required of their social status" (Duguit 2003: 47).[4/] If property does not keep its social function, the Public Power has legitimacy to intervene, assuring that a proper purpose will be given to this

[3/] See especially p. 179.
[4/] Translation by the authors.

property. Duguit argued that the ultimate aim of law is to follow its social mission and that the owner must behave like a public functionary when managing his goods.

The social function does not mean that the property no longer exists; it does and the right of indemnification for eventual limits imposed on property is foreseen in the Brazilian Constitution. If one can no longer make use of the property in the same way that it was allowed under the previous legislation, this limit imposed by the new legislation must be indemnified in order to protect the so-called acquired right. However, there are no acquired rights against the Constitution, so if a citizen's right is modified by the Constitution there will not be any right of indemnification. Under Brazilian legislation there is no acquired right to pollute as well.

Another aspect of the Constitution that must be taken into consideration is that property rights are also connected with the legal protection of the environment, because the right to have a clean and healthy environment belongs to all of society, and cannot be suppressed by one particular interest.[5/] The Federal Constitution assures the right of property. However, this right is at the same level of hierarchy as the right of having a healthy environment. The protection of the environment is an intrinsic limitation of property rights.

Even before the promulgation of the Federal Constitution of 1988, the 1965 Forest Code foresaw some limitations to property rights in order to protect the environment, including creating the so-called permanent preserved areas (Fed. Govt. of Brazil 1965). In such areas – including hilltops and the peripheries of water bodies – vegetation cannot be removed even if these areas are privately owned. The objective of preserving the vegetation in such areas is to prevent erosion and sedimentation of water bodies. It is interesting to note that that several court decisions state that if the Pubic Power needs to expropriate private property, permanently preserved areas inside such private property will not be indemnified by their market value, because they cannot be used economically.

Not only the specific environmental laws impose the respect for social and environmental functions of property. The new Civil Code from 2002 establishes that the

[5/] According to the Federal Constitution the environment is considered to be a good of common use of society.

property right must be in accordance with its economical and social aims in order to preserve the environment (Fed. Govt. of Brazil 2002).

Environmental goods, like water resources, are classified as goods of diffuse interest or common goods, since it is trans-individual and indivisible. This means that the environment, including water resources, cannot be appropriated by the private or the public sectors.

Models for water resources management

The Brazilian water resources policy was directly influenced by the French model on water resources. In this section a brief analysis of the French model will be made in order to give a better understanding of Brazilian water resources management to be presented below (see Section 3).

Although both systems are very similar, there is a significant difference between them. In France, water was never considered a common use good like in Brazil. In this sense, Michel Prieur critiques the French system, stating that water should have been considered a collective heritage by French legislation in order for it to be better protected (Prieur 1996). On the other hand, the Brazilian system presents many disadvantages that France does not have regarding overlapping and conflicting authorities.

The French model

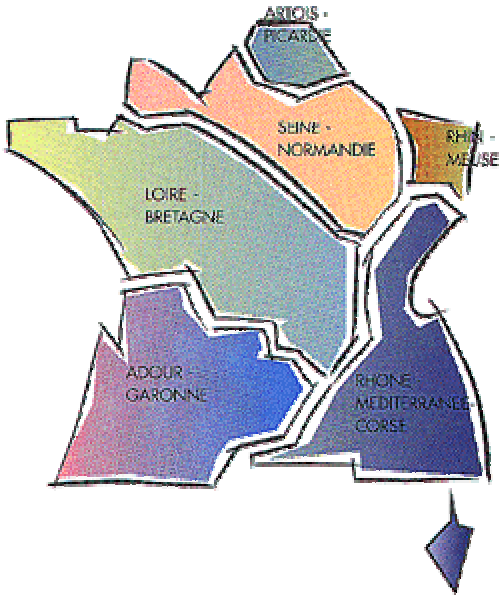
The first French act related to this theme was the law no. 64-1245 (Govt. of France 1964). It established the regime and distribution of water and water pollution control in France. The main principles set down in this law were the following:

(i) Unity of the catchment area (from upstream to downstream),
(ii) Solidarity among water users, and
(iii) Polluter pays principle.

Through this Act, France was divided in 6 large hydrographic areas (see Figure 1). In each one of these areas the following structure was created: a river basin committee (comprised of all stakeholders), and a water agency responsible for providing assis-

tance in carrying out the studies, research work and structures of joint interest to the catchment areas and in covering their operating expenses.[6/]

Figure 1: Map of the hydrographic areas in France [7/]



Some of the provisions established by the previous legislation on water resources were updated in the French Water Act - Law No. 92-3 (Govt. of France 1992). This new act mainly had its basis in the following principles:

(i) An integrated approach, based on ecosystem's physical, chemical and biological elements, surface and underground water, as well as water quantity and quality,

(ii) The drainage area as the spatial administrative location,

(iii) Decentralized management and local decision-making,

(iv) Consultation and participation of many stakeholders,

(v) Polluter pays and user pays principles,

(vi) Integration between the water policy and the land use policy, and

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6 The water agencies in France are public: "In each catchment area, or group thereof, a catchment financial Agency is formed as a public administrative establishment having legal status and financial independence, entrusted with facilitating the various measures of joint interest to the catchment area or group thereof" (Govt. of France 1964: article 14). Translation by the authors. The water agencies are: Agence de l'Eau Adour-Garonne, Agence de l'Eau Artois-Picardie, Agence de l'Eau Loire-Bretagne, Agence de l'Eau Rhin-Meuse, Agence de l'Eau Rhône-Méditerranée-Corse, and Agence de l'Eau Seine-Normandie.

7/ Loire-Bretagne Water Agency (2002).

(vii) An integrated risk prevention policy.

This law established that "… the Master Water Development and Management Plan(s) shall set forth, for each basin or basin group, the basic guidelines for the balanced management of water resources …" (Govt. of France 1992: Article 3).

The charge for water resources use is called "redevance", and is the responsibility of the Water Agencies that are directly linked to the Environment Ministry (Machado 2002).

The Brazilian model

- Legal aspects of water resources in Brazil

The Water Code (Fed. Govt. of Brazil 1934) classified water into three groups: public water for common use, common water and private water. The domain of water bodies was divided between the Federal Government, the States, the Municipalities and private owners.

After the promulgation of the Federal Constitution of 1988 that expressed the idea that the healthy environment is a common good and that everyone have rights to it because it is essential to the quality of life, it was accepted that water, as an element of the environment, was also a common good (Freitas 2000).

The Federal Constitution also modified the Water Code in a sense that there cannot exist any particular owner of water resources. Even if a stream crosses private land, it does not belong to the owner of the land. The Constitution also states that there are only State and Federal water bodies. Under this new regime there cannot be Municipal water bodies anymore, and all water resource subsequently became public. Rivers that run within the borders of a State are administered by that State. Rivers that run through more than one State are administered by the Federal Government. As a common use good, water cannot be appropriated by the Federal Government or by the States. These federated entities have the domain, but they are not the owners of water resources. They are supposed to manage this natural resource in order to protect it from pollution and sedimentation, and aim to restore or to maintain the same quality of this good. As the manager, the Federal Government or the State Government can authorize the use of water resources by giving a permit to its use.

- The National Water Resources Policy

After almost nine years of studies and discussions the National Water Resources Act was promulgated (Fed. Govt. of Brazil 1997). It defines the objectives, principles, and instruments of the National Water Resources Policy and Management System. The principles of this Policy and System are as follows:

(i) Water is a public good,
(ii) Water is a finite resource that has economic value,
(iii) The use of water required to meet people's basic needs shall have priority, specially in critical periods,
(iv) Water management shall comprise and induce multiple uses,
(v) The river basin is the appropriate unit for water management, and
(vi) Water management shall be decentralized, with the participation of government, stakeholders and society.

These principles constitute the basis for planning that must integrate the quality standards with the quantity of water.

The instruments of the National Water Resources Policy are the following:

(i) The Water Resources Plans,
(ii) The classification of water bodies according to their preponderant uses,
(iii) Permit for the use of water resources,
(iv) The charge for the use of water resources,
(v) Compensation to municipalities, and
(vi) The Water Resources Information System.

The Water Resources Plans are master plans that undertake to provide the basis for, as well as orient the implementation of the National Water Resources Policy and water resources management. They are long-term plans, and shall contain at least the following:

(i) Diagnoses of the current status of water resources;
(ii) An analysis of alternatives for population growth, for the evolution of production activities, and for changes in land-use patterns;
(iii) A statement of the future supply of and demand for water resources in terms of both quantity and quality, and an identification of potential areas of conflict;

(iv) Targets for rationalizing the use, increasing the volume, and improving the quality of the water available;

(v) Measures to be taken, programs to be developed, and projects to be implemented for attaining the targets envisaged;

(vi) Priorities for the award of water-use rights;

(vii) Guidelines and criteria for water-use charges; and

(viii) Proposals for the creation of areas subject to restrictions on water use, with a view to protecting water resources Water Resources Plans shall be developed for each river basin, for each State, and for the country as a whole.

The objectives of the establishment of permits for water use are to ensure the quantitative and qualitative control of water use and to promote effective rights of access to water. The right to the following water uses are subject to Government permit:

(i) Diversion or impoundment of water from a water body for final consumption, including public water supply or uses in a production process;

(ii) Extraction of water from subterranean aquifers for final consumption or for use in a production process;

(iii) Discharge of treated or untreated sewage and other liquid or gaseous waste into a water body with a view to diluting, transporting, or disposing of it;

(iv) Utilization of hydroelectric potential; and

(v) Other uses that affect the flow, quantity, or quality of water existing in a water body.

In some cases these permits are not required, like when water resources are used by small groups of people in rural areas, or when diversions, catchments, or discharges are considered insignificant.

All permits shall be subject to the priorities for land use established in the Water Resources Plans, and shall respect the class to which the water body has been assigned,[8/] and, when applicable, the maintenance of conditions suitable for transport via aqueducts. It is important to notice that this permit in no way implies partial alienation of the water itself, which is inalienable; it merely awards the right to use it.

[8/] The classification of water bodies is imposed by legislation, and consists of defining the characteristics (i.e., BOD, pH, fluctuating substances, oil, etc) of each class in order to establish a quality goal for each water body to achieve.

That is why the Water Resources Plans are so important and must be elaborated before the start of charging.

Charges for the use of water are intended to recognize that water is an economic good, providing the user with a sense of its real value; to encourage the rationalization of water use; and to raise funds for financing programs and interventions established by the Water Resources Plans. In setting the charges for the use of water resources, the following elements, among others, should be taken into account:

(i) In diversions, catchments, and extractions of water, the volume removed and the variation in its flow, and

(ii) In the discharge of effluents and other liquid or gaseous waste, the volume discharged, the variation in its flow, and the physical-chemical and biological characteristics and toxicity of the effluent.

Regarding the allocation of funds collected from charges for the use of water, priority shall be given to the river basin in which they were generated, and they shall be applied in order to finance studies, programs, and projects under the Water Resources Plans, as well as defraying implementation costs and administrative overhead for agencies and entities of the National Water Resources Management System.

The Water Resources Information System is a system for the collection, processing, storage, and retrieval of information on water resources and the factors involved in their management. That is, it has a function similar to a clearinghouse mechanism. In order to work properly, the operation of such a system shall be governed by the principles of decentralization, standardized coordination, and information for the whole society.

The National Resources Management System includes the National Water Resources Council, the National Water Agency, State Water Resources Councils, River Basin Committees and theirs respective Agencies that are the executive offices of these Committees. The River Basin Committees are responsible for:

(i) An entire river basin,

(ii) The river sub-basin of any tributary to the principal watercourse of the basin, or any tributary of that tributary, or

(iii) A group of contiguous river basins or sub-basins.

The River Basin Committees are composed of representatives of:

(i) The Federal Government,

(ii) The States or the Federal District in which they are located, even if only partially, in their respective areas of action,

(iii) The Municipalities in which they are located, entirely or in part, in their areas of action,

(iv) The water users in their areas of action, and

(v) Civil water resources organizations that have demonstrated record of action in the basin.

River Basin Committees are, furthermore, supposed to have the following responsibilities:

(i) To promote the discussion of issues relating to water resources, and to co-ordinate the work of the entities involved,

(ii) To arbitrate, as the first administrative recourse, conflicts relating to water resources,

(iii) To approve the Water Resources Plan for the river basin,

(iv) To monitor the execution of the Water Resources Plan for the river basin and suggest the measures required for its goals to be met,

(v) To propose to the State and National Councils on Water Resources which impoundments, diversions, catchments, and discharges are of minor importance for purposes of exemption from the necessity of obtaining an award of water-use rights, depending on the dominium of the water,

(vi) To establish mechanisms for the receipt of fees for the use of water resources and suggest the fees to be charged, and

(vii) To establish criteria for and promote the apportionment of the cost of multiple-use projects of common or collective interest.

Decisions made by River Basin Committees may be appealed to the State or National Councils on Water Resources, depending on their respective sphere of competence.

The Water Agencies serve as the executive secretariats of the River Basin Committees and they shall have the same area of action as one or more River Basin Committees.

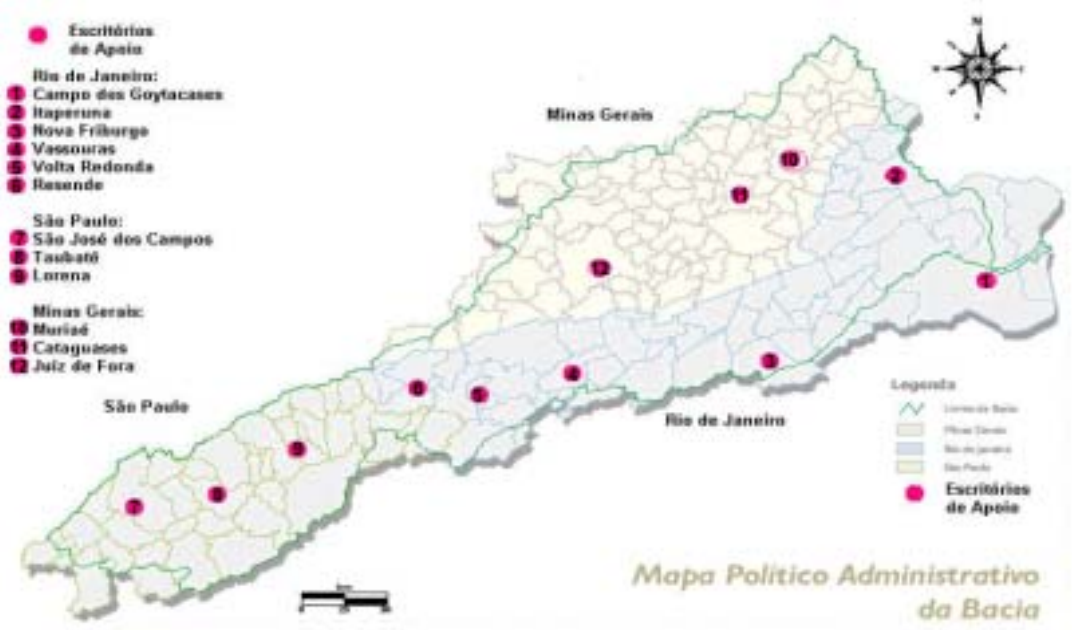
3. CASE STUDY

To focus more specifically on the situation with water resources management in Brazil, the Paraíba do Sul river basin is the southeast of Brazil will be presented in some detail.

Location

Paraíba do Sul river basin is located in the southeast of Brazil, comprising the States of São Paulo, Rio de Janeiro and Minas Gerais. There are 180 municipalities within the limits of this river basin, which 88 are from Minas Gerais, 53 from Rio de Janeiro and 39 from São Paulo. This is about 0,7% of Brazil's total area. Paraíba do Sul River has 1,150 km of extension, running from São Paulo to the Atlantic Ocean in Rio de Janeiro. The drainage area is about 55.500 km^2.[9/]

Figure 2: Map of the Paraíba do Sul river basin [10/]



[9/] See Figure 2.
[10/] Source: GESTIN (2004).

Approximately 5 million people live in this area. It is important to note that the southeast is the most developed region in Brazil. Unfortunately, the concept of sustainable development has not been applied, resulting in innumerable environmental problems to this river basin, including erosion due to deforestation with resulting silting of rivers, discharge of water pollutants such as domestic sewage (1 billion liters per day), industrial organic and non-organic effluents (including toxic substances and heavy metals), inadequate solid waste disposal, illegal mining activities, the use of pesticides without control, unplanned land occupation, and predatory fishing.

Notwithstanding the fact that the Paraíba do Sul River is highly polluted, it provides treated domestic water to approximately 13 million people.

The Paraíba do Sul River Basin Committee - CEIVAP

These negative trends were perceived already in the late 1970s, when CEEIVAP was created to study the Paraíba do Sul river basin in order to promote the future recovery and management of the area.[11/]

After many years of studies,[12/] a reformulated committee abbreviated CEIVAP[13/] was established in 1996[14/]. This new phase of CEIVAP focused also on management and integrative actions for the river basin instead of focusing only on assessments. CEIVAP was composed of representatives from the Federal and States Governments.

In 1997, under the new regime established by the National Water Resources Policy Act (Fed. Govt. of Brazil 1997), CEIVAP had to change its composition to include also civil society and scientific institutions.

Preparation of the Water Resources Plan for the Paraíba do Sul river basin began in 1999. As already mentioned, the Water Resources Plan is the basis for determining the water charge. After the approval of the Plan by CEIVAP in November 2002, the charge for water use could be implemented in the Federal rivers of Paraíba do Sul river basin. The charge for water use in Federal rivers was actually initiated in March 2003.

[11/] CEEIVAP is an abbreviation of "Comitê Executivo de Estudos Integrados da Bacia Hidrográfica do Rio Paraíba do Sul".

[12/] From 1992 to 1999 a program of cooperation between France and Brazil promoted studies related to water quality and industrial activities in the Paraíba do Sul river basin.

[13/] CEIVAP is an abbreviation of "Comitê para a Integração da Bacia Hidrográfica do Rio Paraíba do Sul".

[14/] This was one year before the promulgation of the National Water Resources Policy Act.

Due to the federated division and independency of powers the charge could not be implemented in the State rivers that are part of this river basin. It was necessary that the three States (São Paulo, Rio de Janeiro and Minas Gerais) established their own regulation (while respecting the general rules given by CEIVAP) in order to charge for the water use regarding the rivers under their domain. This situation creates a delay in all activities towards implementation of the Water Resources Plan.

It is important to understand that CEIVAP cannot itself charge for the use of water. The Committee is able to stipulate rules for charging. The National Water Resources Policy Act determined that the charging must be done by the Water Resources Agencies, which still have not been created. The National Water Agency (ANA) was created in 2000, not for the purpose of charging, but as a regulatory agency. However, since CEIVAP did not have its own agency, ANA started to charge the water users of Paraíba do Sul river basin. Out of this a complex problem appeared: all taxes, charges, and incomes in Brazil go to one single account, and because of this there is no guarantee that financial resources can be returned to its source. As a result water users lose their belief with the system, as they never know whether what is paid in will return to recover activities at the watershed.

CEIVAP's composition and mission

CEIVAP has 60 members, 3 from the Federal level and 19 from each member State: São Paulo, Rio de Janeiro and Minas Gerais. CEIVAP´s composition is a good example of the successful participation of stakeholders in the co-management of a specific region, implementing decentralized governance. Forty percent of the 60 members are water users, including water supply and sanitation companies, the industrial sector, hydroelectric plants, and parts of the sectors of agriculture, fisheries and tourism. Thirty five percent are from the Government, including the Federal, States and Municipalities levels. Twenty five percent are from civil society, such as Non-Governmental Organizations, and area elected through a forum.

CEIVAP's responsibilities are: (1) to classify the rivers that constitute the watershed according to the quality of water that they are supposed to have, (2) propose guidelines for impoundments permits, (3) approve the Water Resources Plan, (4)

supervise its implementation, (5) create the Water Agency, and (6) implement the charge for the use of water.

CEIVAP is a deliberative committee. The subjects of the regulations created by the committee are previously well assessed by its three technical bodies, namely institutional, planning and investment, and environmental education.

The Watershed Agency

As mentioned above, since 1999, many studies have addressed the legal nature of the watershed agencies. The National Water Resources Act did not define the legal nature of the agencies that are the executive branch of the committees. This became a thorny issue for the committees because without the agency they could not sign contracts, agreements, receive financial resources, pay for services, and so on. The reason for this is because under Brazilian legislation river basin committees are not judicial persons.

Once CEIVAP was operating, innumerable activities could not be done due to the absence of the agency. As a result, the Committee started already in 1999 to study how to address this problem. ANA did not solve the problem regarding the absence of the watershed agency in Paraíba do Sul river basin, because even though it began charging in 2002, the return of financial resources to this river basin was not guaranteed. Legislation states that these resources must *preferable* return to the watershed where the charges were made. However, this is not imperative.

The water charge

The methodology used for charging the use of water resources in Paraíba do Sul river basin (for users such as industries, urban water supply, sanitation, agriculture, and so on) takes into account water impounding, consumption and effluent dilution.

The equation for calculating the price to be paid is:[15/]

[15/] Q_{cap} = volume of water's impoundment (m^3/s); K_0 = 0,4; K_1 = consumption coefficient. It is the relation between the volume consumed and the volume impounded; K_2 = percentage of the volume of treated effluents among the volume of total effluents discharged; K_3 = efficiency level of Biological Oxygen Demand (BOD) reduction at the treatment plant; and PPU = public price used for the impoundment, consumption and BOD discharge.

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

The 1st parcel corresponds to the charge for the volume water's impoundment. The 2nd parcel is the charge for consumption (impoundment volume that does not return to the water body). The 3rd parcel calculates the price of effluents discharge. The only effluent that has being charged in this river basin so far is Biological Oxygen Demand (BOD).

The PPU varies depending on the activity it is related to. For public water supply, sanitation and industrial activities it costs R$ 0,02 per m^3. For irrigation and agriculture it costs R$ 0,0005 per m^3. For aquaculture it costs R$ 0,0004 per m^3. For mining activities it costs R$ 0,02 per m^3. [16/]

The equation for charging the water use of small hydroelectric companies is:[17/]

(3.2) $$Charge = GH \times TAR \times P$$

Until June 2004 the total value received by ANA was about R$7.500.000,00.

The participation of stakeholders in approving these equations (Equations 3.1 and 3.2) is a key issue in the charging process. The involvement of all sectors guarantees, to a certain extent, that the payment will be done, because it generates not only an obligation, but also a commitment between those involved. The belief that the financial resources will be applied to programmes that aim to improve the environmental conditions at the watershed, is considered valuable for strengthening this commitment. This contributes, moreover, to enhancing environmental awareness throughout the society.

4. DISCUSSION

In this section, the current problems faced by CEIVAP will be presented. The importance of the specific issues discussed below lie in the fact that they are representative of the problems faced by the whole water resources system in Brazil.

[16/] R$ 0,02 is approximately US$ 0,006. R$ 0,0004 is approximately US$ 0,00013. R$ 0,0005 is approximately US$ 0,00016.

[17/] GH = monthly power generated; TAR = value of the tax defined by the Electric Power National Agency; and P = percentage defined by CEIVAP, which is 0,75% over the generated power.

A legal conflict

The first legal conflict on this matter is the one related to the water domain. As already seen, Brazilian water bodies are under the Federal or States' domain. However, this division may create conflicts in managing watersheds. This is so because a watershed may contain Federal and State rivers, like in Paraíba do Sul river basin. The conflicts regarding this situation begin when charging for water use is ready to be done. ANA is charging the water use only on Federal rivers. The water use on State rivers cannot be charged by ANA, which is a Federal Agency. Due to this Constitutional provision on the water domain, the charge on State Rivers must be done by each State that compose the river basin. It may be a problem if the State does not follow the guidelines given by the committee. Imagine that in a specific watershed, the mathematical formula used to charge federal rivers differs from the one used by the States. Industries, for instance, would prefer to build their plants where it would cost less in terms of charges. It would create am unacceptable situation. While this constitutional provision is not changed, we can only count on the Government's awareness in order to avoid a conflict like this.

The National Water Resources Policy Act gap

The big gap in the National Water Resources Policy Act was the lack of provisions on the legal nature of the Watershed Agencies. As already demonstrated, CEIVAP spent many years studying the possible alternatives in order to constitute its Agency. After all these years of assessments, they came to the conclusion that the agency should be a "social organization".[18/] After some discussion, it was agreed that a Presidential Decree would be necessary to create the Agency as a Social Organization by the end of 2003. This did not happen. Instead, in February 2004, another legal instrument, Provisory Measure No. 165 (Fed. Govt. of Brazil 2004a), created a new legal entity with the name of Delegating Entity. This entity is not the Agency itself, but it may be considered as one

[18/] Social Organizations were created by Federal Law No. 9637/98 (Govt. of Brazil 1998). These "social organizations" are NGOs that can apply to the Public Sector in order to receive the qualification of Social Organizations. Following recognition as a Social Organization, they will be able to sign co-management contracts with the Government, reinforcing the idea of decentralization. Studies made in order to chose the best form of watershed agency for CEIVAP, showed that a Social Organization composed of the same members of CEIVAP would enable these stakeholders to become more involved in the decision-making processes related to planning issues in the watershed.

by ANA.[19/] This new legal provision solved one problem, however, it led to another one, namely: CEIVAP has an executive office that depends on the financial resources obtained by the water use charge received by ANA. This office would function until the date that this new Delegating Entity signs a contract with ANA in order to receive the office's attributions, among all the other foreseen by the National Water Resources Policy Act. It is expected that this contract will be signed by September 2004. However, as it happened, ANA decided to not sign this agreement with CEIVAP's executive office. The result is that if was not possible for the office to continue until September 2004, and CEIVAP's executive office closed 30 June 2004.

Lack of other pollutants parameters

The water use charge in the river basin under analysis only takes into account the Biochemical Oxygen Demand (BOD) introduced into a water body. This is definitely not enough to prevent the discharge of other pollutants, such as heavy metals, persistent organic pollutants, and chemical pollutants. Studies on preparing a formula that takes into consideration these other elements will possibly only begin in a couple of years. If not so much time had been used on assessments concerning the legal nature of the watershed agency; the formula for charging other kind of pollutants would likely be available sooner.

Lack of watershed and coastal management integration

The lack of integration between the watershed plans and the coastal management is not only present in the Paraíba do Sul river basin. It is common in Brazil to have disarticulated actions regarding areas that should be planned in an integrative and coordinated way.

In this particular case, once again, much time and money were spent on legal assessments, and the integrated management was left behind.[20/]

[19/] Provisory Measure 165 was subsequently transformed into law (Fed. Govt. of Brazil 2004b).

[20/] One good example of such integration that could be used in order to provide some ideas for a pilot project in Brazil is the Italian Adricosm project (Adriatic sea integrated coastal areas and river basin management system pilot project) (Adricosm 2002)

5. CONCLUSIONS

The Brazilian legislation has strengthened the idea that a healthy environment is a right that belongs to all, and it follows that property rights cannot be put at risk. Water is considered a common use good in the Federal Constitution. As a result of this constitutional provision water resources cannot be appropriated by anyone, since the whole society has the right to a clean and safe environment. Due to this, both the private and public sectors have to take measures in order to protect the water bodies that cross their lands.

The Brazilian model for water resources management from 1997 was influenced by French legislation from 1964 and 1992, which attributed economic value to water and had its basis in the user / polluter pays principles. These models – that combine economical and legal instruments – have become an effective way of reaching the sustainable use of natural resources.

The Brazilian Water Resources Policy appears to be more complex than the French one. The problems created by using an imported model, without taking the necessary measures regarding the legal provisions on the water bodies' domain, is one example of how this complexity has come about.

Some other problems caused by gaps in the legislation have been the object of many studies. Some of these legislation lacunae – like the lack of provisions regarding the Watershed Agency's legal nature – have been solved by the recent Delegating Entities Act. However, there are other gaps not related to legislation, but related to management and planning that still must be solved, like the lack of an integrated river basin and coastal area management. It is understandable that the protection of the oceans is not on the list of watershed committees' priorities. However, it is not acceptable that such an issue is not among the topics addressed by the watershed plan, taking into consideration the fact that River Paraíba do Sul runs to the Atlantic Ocean and that Campos dos Goytacases (the outfall municipality)[21/] is part of this river basin.

Water resources management in Brazil is very recent, and has a long way forward in order to be accomplished. As in every evolving process, many lessons have been

[21/] See Figure 2.

learned in the course of these seven years of management. The legislation has been a good tool specially in considering water resources as a common good and by creating means to their protection. However, it is important to look ahead at other great experiences happening around the world regarding natural resources management, in order to enhance our experience as well as to correct our mistakes.

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