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Article

Thinking International Waters as Integrated Ecosystems: A Study of the La Plata River Basin

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Abstract: International basins are divided into sub-basins that are managed at the national and local levels, within the territory of each country, before reaching the level of international concern. The management of international basins could be developed using an integrated water management, based on multi-level governance model in which many actors are involved, from local to international scale. However, in the La Plata River Basin this model is not working, even with international agreements such as the La Plata Basin Treaty, which was signed in 1969. The understanding of political interests behind the law helps to explain its inefficiency. Therefore, considering the lack of a systemic view in an international watershed, it could be possible to have accumulating effects caused by the transformations of watercourses in the sub-basins. Then, the 2014 water crisis in the State of São Paulo, Brazil, is an example of the possible consequences arising from the lack of an integrated water management in the La Plata River Basin. Finally, this article demonstrates that the only way to have water resources utilization efficiency in an international basin is considering it as an integrated ecosystem, in order that any local problem may affect the whole basin.

Keywords: Integrated water management; international water law; political interests on water; water resources utilization efficiency; La Plata River Basin

1. Introduction

Water is an essential natural resource not only for human survival, but also for economic investment, growth and progress at any scale (local to global), and for any sector of the economy (industry, agriculture or energy). Nevertheless, water resources and its distribution around the earth are not equitable, primarily because of physical or political geography. Political boundaries do not often coincide with water basin boundaries, causing political tension or even conflicts over access and use of this precious resource.

The greater importance that has been attached to international water law since the last century cannot be denied. Frequently, shared water resources are the driving force developing new models of international water management and catalyzing cooperation among those countries which share transboundary waters. Simply stated, water basins have become a focal point for debates impacting many sectors of the economy. However, countries have yet to reach consensus as to how to use shared water as a means to catalyze cooperation and avoid conflict.

International law is built and strengthened through international relations that consider the political interests of many actors and stakeholders involved in this building process. In other words, it is not international law *per se* that determines the outcome of international relations, but rather the good will and political will of the actors involved. The willingness to be a good listener and accept cooperation as a fundamental mechanism in fostering understanding is the way in which conflict is avoided. Political risks and opportunities, such as economic costs and benefits, often times underlie rational choices in reaching consensus in complex decision-making processes.

The main problem addressed in this work, using the La Plata River Basin (Figure 1) as a case study, is the impact of national decisions on a larger system of a shared international water basin, with possible transboundary impacts and conflicts among nations. In spite of the concept of national sovereignty, it is important to consider the many actors involved, from local to international scale, and the wide range of interests regarding the eventual management model applied in any international water basin. Depending on the convergence or divergence of interest and priorities among involved parties, it may be possible (or not) to reach multi-level governance agreements in water basin management decisions.



Figure 1. La Plata Basin. This figure shows all the La Plata Basin’s territory and its main rivers.

2. Identifying Basins at Risk

An ambitious and potentially far-reaching research project entitled ‘Basins at Risk’ (BAR), coordinated by Professor Aaron T. Wolf at the Oregon State University, aims to identify all international river basins in the world, documenting historical facts and current status during the most recent fifty years and through analysis establish variables in order to identify those with a higher potential for engendering greater political stress and potential for cooperation in the future.

Analyzing some 1.831 cases in many international basins on all continents in the period between 1948 and 1999, Wolf et. al. [1] created the BAR scale, which varies from the highest conflict degree (-7) to the highest cooperation degree (+7), totalizing fifteen degrees (Table 1).

Table 1. Basins at Risk (BAR) Scale. This table defines all the degrees of conflict and cooperation established by the BAR Scale.

Degrees		Definitions
Conflict	-7	Formal war
	-6	Extensive military acts
	-5	Small-scale military acts
	-4	Political/Military hostile acts
	-3	Diplomatic/Economic hostile acts
	-2	Strong/Official verbal hostility

	-1	Mild/unofficial verbal hostility
	0	Neutral, non-significant acts
Cooperation	+1	Mild Verbal support
	+2	Official verbal support
	+3	Cultural, Scientific Agreement/Support
	+4	Non-military, Economic, Technological, Industrial Agreement
	+5	Military, Economic strategic support
	+6	International water treaty
	+7	Unification into one nation

Some conclusions from this research [1] are important in understanding the focus of this paper: the La Plata Basin. First, the main problems related to water are quantity and infrastructure; some 64 percent of cases analyzed related to these two problems. Moreover, while cooperation is related to a diversity of issues, 82% of conflicts are related to those two issues.

In order to reach more detailed results about conflicts and cooperation related to transboundary waters, Wolf *et. al.* [1] focused their analysis on two distinct features. First, they took the water basin as the unit to observe variables related to water itself, such as: supply, demand, droughts and changes in the physical system. Second, they observed the capacity of a nation to absorb the physical aspects of stress, either within a nation, between a pair of nations or among all the nations of the water basin. According to these scholars, this framework is broader than a country’s economic strength, although this attribute plays a major role.

Therefore, the scholars formulated the main work’s hypothesis, establishing the relations between the changes that occurred in a basin and the institutional capacity of absorb them: “The likelihood and intensity of a dispute rise as the rate of change within a basin exceeds the institutional capacity to absorb that change” [1, p. 43]. Then, once the institutional capacity mitigates or even alleviates the conflict, the likelihood of their occurrences is associated to the rapid changes that occur within the basin, either institutional or physical [1].

Two main indicators related to these changes, one social and the other physical are respectively: the internationalization of the basin, and the building of big dams and rivers’ diverting without cooperation among riparian countries. The internationalization occurs when a basin that was managed by single jurisdiction suffers a rupture, being shared by more than one state [1].

The research team also found that when projects involved dams or river diversions, it is also necessary to consider the installed institutional capacity of the countries in the basin, in order to be able to rank the likelihood of conflict or cooperation. Therefore, the presence of treaties, regimes and international organizations supporting the basin’s joint management, good relations among countries within the basin, and the level of technological capacity can all help mitigate conflicts that could likely occur without these indicators [1].

Using the rapid change indicators (internationalization of basins and great projects, such as dams and diverting) researchers identified basins with potential risk of conflict in the ten years following the research. The La Plata Basin was among those due to the great projects.

As it will be demonstrated in this paper, the inefficiency of the La Plata Basin Treaty [2], signed in 1969 by all riparian countries, and the lack of institutionalization inhibit real cooperation in the Basin. Furthermore, the data presented will indicate possible ways to reach a cooperative state and thus prevent conflict. Further, the 2014 water crisis in the State of São Paulo, Brazil, which is within the La Plata Basin’s territory, exacerbates the absolute need to overcome barriers in the pursuit of better management.

However, it will also be demonstrated how we need to be careful when working with institutionalism and international law as the basis to reach international cooperation, as the politics underlying such agreements can make them inefficient.

3. Evolution and Limits of the International Water Law

By the classic theory, established in the Congress of Vienna (1815), rivers are classified as contiguous or successive [3]. The former serve as boundaries between two or more states and the latter are those that cross the boundary between two or more states without serving as limit between them. However, it is possible that a river flows down a state's territory, establishes the boundary between one state and another, and after flows through the other state's territory. In this case, the river would be both contiguous and successive.

The thesis on international drainage basins emerged in 1966, in the Meeting of the International Law Association (ILA), and together with many other principles is jointly known as The Helsinki Rules on the Uses of the Waters of International Rivers [4]. They are related to the uses of international water courses.

According to that document, "an international drainage basin is a geographical area extending over two or more States determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus" [4].

It does not refer to international rivers, but rather international basins. This concept has great importance for international water law particularly in terms of the hydrological cycle. The fundamental importance that can be drawn from this concept is the extension of the multiple sovereignty regimes applied to rivers. According to the new concept, rivers that flow exclusively inside one state's territory but within an international basin shall be considered as international rivers as well.

The United Nations International Law Commission rejected the expression *international drainage basin* and worked during twenty-one years elaborating the Law of the Non-Navigational Uses of International Watercourses, which was submitted to the General Assembly in 1994 and approved in 1997 by 103 countries as a Convention [5].

It is important to emphasize that the 1997 Convention on the Law of the Non-Navigational Uses of International Watercourses [6] adopted in its article 2 the following definitions:

- (a) 'Watercourse' means a system of surface waters and groundwater constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus;
- (b) 'International watercourse' means a watercourse, parts of which are situated in different States;
- (c) 'Watercourse State' means a State Party to the present Convention in whose territory part of an international watercourse is situated or a Party that is a regional economic integration organization, in the territory of one or more of whose Member States part of an international watercourse is situated.

The definitions above note the difference between the UN Convention and the Helsinki Rules, in that the latter considers the hydrological cycle in addition to the water system constituted by a physical relationship. In other words, according to Machado [7: p. 248], "the Convention did not include the concept of watershed as the system chosen for the international watercourses management, [but] the option for the notion of unitary whole gives rise an adequate management if there is good faith and cooperation by the riparian states sharing an international basin".

The main point of this concept of a unitary whole is the real change in understanding that an international river is not only a boundary or transboundary, according to the Brazilian's Ministry of Foreign Affairs. In other words, for example, adopting the concept of the 1997 Convention, the Tietê River, in the State of São Paulo (Brazil), is an international river, once it is within a water system given that the Plate Estuary is a common terminus for all countries of the basin.

It should also be emphasized that once norms are based on international regimes created in a regional sphere, the pressure increases on those states that have invested the least in water management yet. On the other hand, the countries that have already developed national norms have an advantage in both understanding and integrating existing laws into a new international legal context.

In the Brazilian case, for example, Conca [8] noted that Law nº 9.433/97 was greatly influenced by the UN's twenty-year debate for the elaboration of the Convention on the Law of the Non-Navigational Uses of International Watercourses (1997), and specifically with the adoption of some international principles applied in the national territory.

4. The Inefficiency of the La Plata Basin Treaty

Paraguay was the only country of the La Plata Basin that signed the 1997 UN Convention, although it did not ratify it. However, a joint reading of the 1997 UN Convention and the La Plata Basin Treaty [2] – which also established an Intergovernmental Committee among the five nations within this basin – can be based on the main principles of international water law established by the Convention. Therefore, although these principles are presented in the Treaty, and although the Intergovernmental Coordination Committee met annually for many years, it is necessary to understand the underlying reasons for its near-total ineffectiveness. A hermeneutic analysis of the political interests in the context of the time when it was signed clarifies its main faults.

According to the principle of equitable and reasonable utilization, found in the article 5(1), of the Convention on the Law of the Non-navigational Uses of International Watercourses [4]:

Watercourse States shall in their respective territories utilize an international watercourse in an equitable and reasonable manner. In particular, an international watercourse shall be used and developed by watercourse States with a view to attaining optimal and sustainable utilization thereof and benefits there from, taking into account the interests of the watercourse States concerned, consistent with adequate protection of the watercourse.

Interestingly, when talking about the interests of co-riparian states, one must not only consider the formal interests written in an international law, but also understand that political interests of signatory countries be taken into account [9].

Believing that an international law is sufficient to bar the Brazilian claims of carrying forward the Itaipú Dam project, Argentina did not realize that the real political interest of the Brazilian government was to conduct a bilateral negotiation with Paraguay outside of the context of the La Plata Basin Treaty, undermining the goals of the government of Argentina – the Corpus Dam project.

Although it seemed legally clear, in the article 1 of the Treaty, in which Brazil had adhered to the principle of equitable and reasonable utilization, its claims were not clear from a political point of view.

Article 1. The Contracting Parties agree to join forces with the object of promoting the harmonious development and physical integration of the River Plate Basin and its areas of direct and considerable influence.

Single Paragraph. The States will promote, within the Basin, the identification of areas of common interest and the realization of studies, programs and works, as well as the formulation of operative understandings or legal instruments which they deem necessary and that trend:

(...)

b) to the reasonable utilization of water, specially by the regularization of the watercourses and their multiple and equitable utilization;

(...)

h) to the promotion of others projects of common interests and especially of those related to the inventory, evaluation and exploitation of the natural resources in the area.

Machado [5, p. 89] argues that the “equitable utilization is based on the balance of interests among riparian states and it is an objective principle based on the harmonization of interests among the states”. Although I disagree with the level of legal objectivity applied in this case, it is necessary to understand that, in the case of the La Plata Basin Treaty, Argentina had cleared its interest of building the Corpus Dam. This objective supports the fact that a harmonization of interests would not exclude the Brazilian interest of building Itaipú Dam.

According to Machado [5, p. 89]

The finding that a utilization is equitable and reasonable does not emerge automatically. It has not been possible to find a formula to solve all discordance situations, or even disputes, on the use of international waters. The requisites of equitability and reasonability were adequately created, and without them it would be excluded a foundation to build an adequate or acceptable situation for all parts.

The principle of equitable and reasonable participation of the States is established by the UN Convention on the Law of the Non-navigational Uses of International Watercourses [6], in its article 5(2), such as:

Watercourse States shall participate in the use, development and protection of an international watercourse in an equitable and reasonable manner. Such participation includes both the right to utilize the watercourse and the duty to cooperate in the protection and development thereof, as provided in the present Convention.

Taking the expression *equitable participation*, it is difficult to understand that it is simply related to the division of the water among the riparian states from a quantitative perspective. According to Machado [7, p. 115], “the own notion of equity implies a response to a specific situation and not the application of an immutable rule, [so that] the notion of partition may suppose a grant of advantage to a state and the refuse of advantage to another”.

In the case of Brazil and Argentina, by signing the La Plata Basin Treaty, it was clear that while they were both interested in power generation, the construction of the Itaipú Dam would cause technical obstacles to the Argentinean project (Corpus Dam).

This principle of equitable and reasonable participation of the states leads us to the principle of sovereignty, which was already in the Declaration signed in the 1972 Conference on the human environment [10], as it follows below:

Principle 21. States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

According to Machado [7], a principle that is related to the principle of equitable and reasonable participation is that of shared natural resources. If a water basin is a system of integrated watercourses, interconnected with land and air, it follows that any activity in any part of the water basin can have consequences in the basin as a whole. It means that any project in a national territory within the water basin shall be jointly discussed by all riparian states. Moreover, it shall be considered that a river of an international water basin is an international river even if it is completely in a national territory, so that any alteration in its waters will have consequences in a wider system (international basin).

In this case, reaffirming what has already been argued concerning the equitable use of water, the La Plata Basin Treaty [2] makes clear, in its article 5, the necessity of an equitable participation of the states in accordance with the concept of shared natural resources.

Article 5. The collective action between the Contracting Parties shall be developed without prejudice to projects and enterprises that they decide to implement in their respective territories, respecting international law and according to good practice between neighboring and friendly countries.

However, once Brazil and Paraguay negotiated without involving Argentina, and considering the impact that any forthcoming decisions would have to the Corpus Dam project, they demonstrated their disregard to the underlying principles of the Treaty. According to Stephen McCaffrey [11, p. 108], “the freshwater international law establishes a legal prejudice to a state deprived of its equitable part in a watercourse or when an excessive part is given to another state”.

Therefore, it can be argued that this Treaty was always going to be an ineffective mechanism for engendering collaboration in the management of the La Plata Basin. Moreover, once Argentina accepted the reality of Itaipú in 1979, in reality they endorsed a rupture with the principle of equitable and reasonable utilization, which was in the article 1 of the La Plata Basin Treaty, which had been signed ten years before.

Regarding the principle of optimal and sustainable utilization, the article 5 of the 1997 UN Convention [6] establishes that “an international watercourse shall be used and developed by watercourse States with a view to attaining optimal and sustainable utilization thereof and benefits therefrom”. From the 1980s, according to the Brundtland Report [12] – which is accepted as the framework of the 1992 Declaration on Environment and Development [13] –, any investment can be analyzed based on environmental protection.

According to Soares [14, p. 348]:

The international economic relations, such as they were worked traditionally, passed to be analysed, from the cited Declaration, in the context of protection to the right to development, which recognizes the real inequality among states and, based on this fact, tries to give an equitable dimension to the international economic relations.

Complementing Soares’s argument, Machado [7, p. 122) argues that “economic growth involves the development of agriculture, industry and urbanization, and at the same time shows the problem of water consumption (quantitative aspects) and the possible damages to its quality (polluted effluent discharges) – according to Jacques Sironneau”.

The quotation above leads to the conclusion that sustainable development demands integrated water resources management (IWRM), which is a concept formulated by the Global Water Partnership as “a process which promotes the coordinated development and management of water, land and related resources in order to maximize the resultants economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” [15, p. 125].

According to Mitchell [16], integrated water resources management (IWRM) may be contemplated in at least three ways. First, it may imply the systematic consideration of many dimensions of water: surface and underground, quantity and quality. Second, it can imply that, while water is a system, it is also a component that interacts with other systems, such as land and environment as a whole. And third, the integrated water management shall take into account the interrelationships between water and socio-economic development, according to the Brundtland Report.

Taking the introduction of the La Plata Basin Treaty, we find that one of the reasons that motivated the states to sign it was the fact that they were “convinced that the joint action will enable the harmonious and balanced development as well as the optimal use of the great resources of the region, and will ensure its preservation for future generations by the rational use thereof” [2].

Thus, although the La Plata Basin Treaty was signed before the United Nations Conference on the Human Environment (1972), it is possible to find the underlying concepts of sustainable development in its text.

One of the basic problems for the ineffectiveness of the Treaty, specifically in terms of sustainability, is the fact that there was never an analysis of the potential for acceptance of integrated management in the La Plata Basin, particularly in a political context.

The 1997 UN Convention [6] establishes, in its article 8(2), that the riparian states “may consider the establishment of joint mechanisms or commissions, as deemed necessary by them” in order to cooperate, such as it was done with the La Plata Basin Treaty by the creation of the Intergovernmental Co-ordination Committee. However, some authors contest the legitimacy of integrated management in an international water basin without the implementation of a supranational independent authority with commensurate enforcement powers.

Regarding the principle of general obligation to cooperate, and according to the introduction of the La Plata Basin Treaty [2], the states were:

Convinced of the necessity of joining efforts for the proper achievement of the basic purposes indicated in the Joint Declaration of Buenos Aires, in February 27th, 1967, and in the Act of Santa Cruz de la Sierra, in May 20th, 1968, and animated by a firm spirit of cooperation and solidarity.

Thus, once again the La Plata Basin Treaty [2] has included a principle related to the international water law, which was also presented in the article 8(1) of the 1997 UN Convention [6]: “Watercourse States shall cooperate on the basis of sovereign equality, territorial integrity, mutual benefit and good faith in order to attain optimal utilization and adequate protection of an international watercourse”.

However, following an in-depth analysis of the concept of cooperation, it is clear that it was not put in practice by the countries in the La Plata Basin, especially by Brazil and Paraguay, in the case of Itaipú. According to Machado [7, p. 155], “in the international cooperation, no country will work alone, and the results thereof will be shared. Efforts are integrated in order that the benefits are shared”.

Furthermore, based on the 1974 Charter of Economic Rights and Responsibilities of States [17] – Resolution 3.281 of XXIX United Nations General Assembly –, Machado [7, p. 162] argues that “the principle of mutual benefit aims to make international cooperation in the use and management of international rivers as something planned and implemented so that the benefits are equitable and thus be reciprocal”.

The La Plata Basin Treaty [2] opened a chance for wider cooperation for any project within the basin, since, in theory, it was formulated to serve the interests of all riparian countries. However, the first breach of this principle was the decision taken by Brazil and Paraguay to hold bilateral discussions on the construction of a major infrastructure investment without Argentina, which had a similar interest in building a dam on the Paraná River.

Therefore, Brazil was only interested in demonstrating to Argentina its ‘willingness’ to cooperate through the creation of an international regime. Indeed, it did not want to put in practice the cooperation with all riparian countries. It is fair to state that Argentina believed in the effectiveness of the Treaty and all of its principles as signed, but Brazil utilized the same principles to carry forward the negotiations with Paraguay without the Argentinean involvement.

5. Possible Effects in the La Plata Basin without an Integrated Water Management

According to the conceptual base for the international watercourses management, established by 1997 UN Convention [6], it is necessary to think on the water basin from a systemic view, as Rebouças [18, p. 65] emphasizes below:

The integrated water management in a systemic view means to improve the understanding that the rivers management is different from the water basin management as a basic unity of planning. In this case, it is necessary to consider, besides the *blue water flow*, the use conditions of the binomial soil-water or the water that infiltrates and favours the development of the

water basin's biomass, *green water flow*, the groundwater, or *grey water flow*, and non-conventional water resources for recycling and reuse.

Taking the concept of international rivers as "a system of surface waters and groundwater, parts of which are situated in different states" [6], we can understand, following Conca's thoughts, that the transformations made in a watercourse within a water basin – such as dams, diversions, and drainage infrastructure – cause systemic and accumulating effects which can cross the national boundary.

Conca [8] emphasizes three specific effects from these transformations: the first is the human intervention in the global hydrological cycle in a large scale; the second is the impact on the freshwater biodiversity; the third is the impact on the floodplains and wetlands that surround, incorporate, and interact with freshwater riverine ecosystems.

Furthermore, "modifications of rivers have had a huge impact on human settlements and global land-use patterns" [8, p. 88]. This reality can be perceived in the dispute for water in the Brazilian water basins. For example, in the Committee of Paranaíba River Basin, tensions between the industrial and agricultural sectors, as well as with the environmentalist non-governmental organizations, are due to the water dams and their effects. Dams can be built for different purposes – such as river flow control, power generation, irrigation and human supply – causing conflict of interests among many people.

Coming back to the Brazilian section of the La Plata Basin, some data from the National Water Agency is preoccupying as it portends to think beyond national boundaries. According to a study published by this Brazilian institution [19, p. 144]:

The year-base balance 2010 differs from the previous one, specifically in the Paranaíba River Basin, within the Paraná Water Region. It is partially due to the incorporation of more detailed information about consumer demands and water availability, coming from the researches made for the elaboration of the Water Resources Plan for the Paranaíba River Basin, in 2013. This incorporation contributed for the growing percentage of the rivers in 'very critical', 'critical' and 'worrying' situations, from 21,9% to 36,3%, in the Paraná Water Region, because the plan detected a great expansion of the irrigated agriculture in the region.

It is important to note that the Cantareira Water System – which diverts water from the Piracicaba River Basin (where the city of Campinas is localized) to the city of São Paulo, which is in the High Tietê River Basin – was one of main sites where the 2014 water crisis happened, and it is within the La Plata Basin's territory (Figure 2). Therefore, this crisis was not only affecting the water supply in the Campinas and São Paulo Metropolitan Regions, but also affecting navigation on the Tietê-Paraná Hydro-way because of the lack of a minimum water flow in the Tietê River.

However, although this water crisis have not affected Paraguay and Argentina yet, it is possible to conceive of a scenario in which a worst crisis may occur because what was happening in the State of São Paulo, in 2014, is already being foreseen by experts to be replicated in the Paranaíba and Grand Rivers, which are the natural origins of the Paraná River (Figure 1). However, this scenario could be considered as an avoidable fact if the integrated management based on multi-level governance was put in practice.



Figure 2. State of São Paulo, Brazil. This figure shows the localization of the State of São Paulo in Brazilian territory. It also shows the Tietê and Piracicaba Rivers (which are within the La Plata Basin), and the cities of Campinas and São Paulo – which are linked by the Cantareira Water System, where the 2014 water crisis was more critical.

6. Grounds for Integrated Water Resources Management (IWRM) in an International River Basin

Although we can observe limits in the efficiency of international water law – even considering the evolution in understanding and applying commonly accepted principles in the context of international water management –, according to Conca [8, p. 95], it is important to emphasize “that building a global rivers regime is not a top-down process of negotiating a global framework to be applied to individual rivers but a bottom-up process of norm diffusion and normative convergence over time across separate regimes at the basin level”.

Therefore, the 1997 UN Convention did not emerge from a single debate among Heads of Government, or by their representatives, but from a long and arduous process among all actors and stakeholders participant to small international basins management, more specifically in Europe. Water governance is not the result of international law but rather the inverse – international law, particularly as its application evolves overtime, is the result of water governance which occurs among many actors within an international basin. These actors take their experiences to the debate in the international institutions that subsequently create the norms that can, through a process of negotiation, be adopted by all those riparian countries.

According to Conca [8, p. 94]:

Seen through the lens of interstate regimes, one might interpret the seeming absence of water wars, the proliferation of basin accords, and the UN framework convention as grounds for cautious optimism about international river governance. Governments long ago learned to cooperate on questions of river navigation. More recently, some have learned how to cooperate to allocate shared water supplies. Perhaps they are slowly learning to cooperate on issues of water quality, pollution control, ecosystem protection, and watershed management as well.

Through this vision of building international water law, it is possible to think that simply because the 1997 UN Convention has not been ratified by all countries in the La Plata Basin, this fact may not be an obstacle for developing common accords among these countries. The solution for the

water management in the La Plata Basin could be thought from the regional context, including the reinterpretation of existing treaties, such as the La Plata Basin Treaty.

Therefore, even though riparian countries may not be adhering to the norms of an international law, even those established by the United Nations, it may be possible to make great progress towards regional integrated water management based on priority political and economic factors, determined to be so by local or regional stakeholders. These factors can generate regional multi-level governance that leads to a new international regime more adequate to the countries' interests and circumstances.

Nevertheless, when an analysis about the possibility of cooperation on international waters is undertaken, it is important to think about the political and economic risks and opportunities before creating institutions [20].

According to Brown et. al. [20, p. 15] national risk is defined as "the perception that an act of cooperation will expose the country to harm, will jeopardize something of value to the country, or will threaten the political future of individual policymakers". Moreover, many times the perception of resulting national and regional political gains still overcomes residual risks. In other words, with enough political opportunities, some countries wish to cooperate despite the potential costs or risks [20].

Another important point to be considered when we adopt the principle of the multiple uses of water is the diversity of interests regarding to the water dispute within the same international basin. According to Brown et. al. [20], countries are not single actors, and many other interested parts may be involved, in order that it is important to recognize in the studies on international water that the dynamics inside each country may influence the possibility of cooperation.

Therefore, when countries work jointly on issues related to integrated water management, the concepts of social risks and opportunities, as well as those of economic costs and benefits, must be viewed from a broad perspective taking into account all interests and all users as well the impacts on relations with neighbouring or riparian countries as part of the decision model.

Hence, an integrated and/or an institutionalized water management plan will not have efficiency by the simple signature of international treaties and agreements without considering all those actors involved and interested in this water use.

Thinking about a water basin that is being shared by many levels of government, and by many non-governmental sectors in each level, it is important to consider that one same actor can have different interests, not only in one specific local but in the basin as a whole. So, activities developed by an actor could be causing negative impacts in other sites within the basin where the same actor's own interests are localized. As an example, we could think on a municipal government that plans to build a dam for the city's water supply and it could threaten the hydropower capacity or efficiency in another dam downstream, which serves to provide power for that same city.

According to Tundisi [21, p. 157]:

The different human activities have economic impact on surface water and groundwater. An economic analysis of the water multiple use (surface water, groundwater, lakes, dams, reservoirs and other water systems) shall evaluate the many activities and the costs of pollution and degradation as well, once the multiple uses are linked to the surface water and groundwater degradation. Irreversible damages cause irreversible economic losses as well. The recuperation efforts shall consider the economic factors that include the socio-economic infrastructure, the costs of treatment and recuperation, and the aggregate value. All these factors consist of water of excellent quality that provides multiple activities. It should also be considered that the state's economic vision differs from the local communities' one regarding to the water resources and their uses.

For example, in a country like Brazil, in which the States have a tremendous amount of autonomy as a Federal Republic, local interests, such as the water supply in the city of São Paulo, and its Metropolitan Region, may conflict with national interests such as water use for hydropower, irrigation and transport. However, if the São Paulo Metropolitan Region's interests are prioritized, without thinking on the risks that it could cause for the international hydro-way project (national interest), it is possible to impact opportunities with other countries in the La Plata Basin and yet one potentially benefiting all of Brazil. That is, there would be a local vision of risk that in isolation restricts the federal government's ability to undertake an international project benefiting both countries. Even before the 2014 water crisis in the State of São Paulo has reached the Paraguay-Paraná International Hydro-way, it was already possible to verify its consequences in the Tietê-Paraná National Hydro-way, within the State of São Paulo (Figures 1 and 2).

It is also important to consider that not only the interests linked to water resources be considered in a debate focusing on international water management. After all, countries sharing a water basin may have other interests in their relationships, and a lack of cooperation for an integrated water management endeavor could cause risks to development plans. This is frequently the case when regional (and cross-border) infrastructure projects are contemplated.

Furthermore, any shock in diplomatic relations between two or more countries could, at minimum, impact other negotiations, or pose a threat to international security, putting the international water basin in higher degrees of conflict in the BAR Scale (Table 1). Taking the 2014 water crisis in the State of São Paulo, Brazil, we can verify that, if the extremely low flow in the Tietê River was already a worrying case for the Paraná River, another possible water crisis in the region between the Paranaíba and Grande Rivers, which form the headwaters of the Paraná River (Figure 1), would have worst consequences. Therefore, it is possible to imagine that political stress among Brazilian states will become an international stress, because of the lack of water in downstream countries (Argentina, Paraguay and Uruguay), although the latter issue may be reduced because of the Paraguay River (Figure 1).

7. Conclusions

Finally, talking about international water management, it is necessary to consider the fact that, in each national territory, an international water basin is fragmented in many sub-basins and their management may be done differently, by national law and with the participation of many other sub-national actors, whether from the public or private sectors.

Therefore, undertaking an analysis of the La Plata Basin, we can perceive some systemic effects which have occurred, such as the Cantareira Water System case, leading to some international tensions that can occur due to future problems in other sites within the Basin and beyond national boundaries. It encourages us to think on an integrated water management, based on multi-level governance, as a preventive solution.

However, thinking about the participation of all sub-national actors from the countries that share the La Plata Basin, it is necessary to be aware that there are many interests, sometimes in conflict with the objectives of states and municipal governments. As this paper documents in the Brazilian case, the dispute among federal states in the water crisis can have its impact on national interests – that of keeping stable relationships with the neighbouring countries in order to guarantee a regional integration process.

In other words, without the systemic view of an international water basin, we can have a perspective of local water crisis that pressures the federal government to abandon or alter regional cooperation objectives. These types of decisions may threaten other opportunities such as the one presented by the Paraguay-Paraná Hydro-way.

However, as demonstrated with the interpretation of the La Plata River Basin Treaty, it is important to emphasize that institutionalism and international law shall be taken carefully when we work towards the idea of cooperation in an international basin, because, at times, the politics underlying the treaty's text or institutional policies can make them inefficient and creating an opening for conflict.

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