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# Joint infrastructure and the sharing of benefits in the Senegal and Niger watersheds

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## ABSTRACT

Riparian states of the Senegal and Niger watersheds have developed specific techniques for the management of water infrastructure. A common feature in both watersheds is the sharing of benefits from water facilities. Niger River basin states are still at the beginning of a shared vision process for jointly managed infrastructure and equitable benefit sharing, while Senegal River basin states have led the way in innovative forms of shared ownership and governance. Environmental protection and public participation are increasingly included in the development of joint infrastructure, but more could be done to strengthen these aspects of river governance.

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## Introduction

The Niger and Senegal Rivers are the first- and second-most important watercourses in West Africa. Spanning over 4200 kilometres, the Niger River is the third-longest river in Africa, after the Nile and the Congo. The Niger River basin overlies the territories of Benin, Burkina Faso, Cameroon, Chad, Côte d'Ivoire, Guinea, Mali, Niger and Nigeria – nine states in total. More than 100 million people live in the basin area. All nine of the river's riparian countries have been included in its legal framework since development of the river began in 1963 (Salman, 2007). The Senegal River is over 1800 kilometres long and covers a drainage area of 300,000 square kilometres. Its basin is a fifth of the size of the Niger River basin, stretching over the territories of four states: Guinea-Conakry (or Guinea), Mali, Mauritania and Senegal.

The riparian states of the Senegal River signed various international agreements to establish transboundary cooperation in the basin in the period following their independence in the 1960s.<sup>1</sup> In 1963, all four countries signed the Convention Relating to the Development of the Senegal River, establishing an inter-state committee for development of the Senegal River basin. In 1968, the four heads of state decided to replace this inter-state committee with the Organization of Riparian States of the Senegal River (OERS).<sup>2</sup> The operation of this new organization was stymied by ideological divergences between Guinea and Senegal. In 1972, the OERS was replaced by the Senegal River Development Organization (OMVS).<sup>3</sup> The OMVS did not include Guinea as a member until Guinea finally acceded to the OMVS in 2006.

The General Act of the Berlin Conference on West Africa of 1885 opened the Niger River (along with the Congo River) for navigation to all basin states under the respective control of France, the United Kingdom and Germany. In contrast to the Senegal River watershed, where riparian states share a cultural and linguistic heritage, wide differences in culture, language and administration exist today in the Niger River basin. Notwithstanding these differences, the Niger basin states adopted several international treaties shortly after their independence from European colonial powers. The first such treaty was the 1963 Act Regarding Navigation and Economic Co-operation between the States of the Niger Basin, in which riparian states undertook to establish an intergovernmental organization “entrusted with the task of encouraging, promoting and co-ordinating the studies and programmes concerning the exploitation of the resources of the Niger River basin” (Article 5). Such an organization came into being a year later through the adoption of the Agreement Concerning the Niger River Commission and the Navigation and Transport on the River Niger. In 1980, the riparian states of the Niger River concluded the Convention Creating the Niger Basin Authority (NBA). As a result of this convention, the NBA replaced the Niger River Commission in 1980. The NBA’s initial remit included the development of water resources in areas such as energy, fisheries and industry. The NBA’s role in ensuring coherent development of national water resource policies, protection of the environment, fulfilment of the rights of local populations and reinvigoration of cooperation on basin-related issues has been further strengthened through agreement on the Niger Basin Water Charter, signed in 2008.

A specialized regime for the conception, construction and operation of river infrastructure thus exists for both the Senegal and Niger Rivers, in the form of the OMVS and NBA, respectively. Infrastructure on either international watercourse may serve multiple purposes, including producing hydroelectric energy, storing water for irrigation, supplying drinking water to riparian populations, facilitating navigation and preventing flooding. The two basins have chosen different methods to manage water infrastructure. On the Senegal River, OMVS members have developed jointly managed facilities such as the Diama and Manantali Dams. Dam projects also exist on the Niger River, but they are largely national infrastructure projects. After describing the main elements of the legal regimes that govern facilities on the two rivers, this article will compare the relationship between river management models and the distribution of benefits in each context. It will then examine the mechanisms adopted to ensure environmental protection and public participation, both of which are integral to the implementation of integrated water resources management.

## **The legal and institutional framework governing joint watercourse infrastructure**

The management of the Senegal and Niger Rivers is based on the formalization of riparian state relations through legal instruments and institutions. Since the beginning of the 2000s, the Senegal and Niger basin states have pursued an approach based on a ‘shared vision’. This approach draws on numerous principles of integrated water resources management, notably a commitment to public participation in decision making to allow basin issues to be considered contextually as part of the broader

development goals of all the riparian states (GWP & INBO 2009; Mbengue, 2014; Sangbana, 2016). In the Senegal River watershed, cooperation is driven by a desire to balance careful stewardship and efficient use of transboundary water resources (Godana, 1985). To achieve these goals, riparian states regard themselves as part of a community of interests and rights around shared resources and therefore embrace a communal, integrated approach to managing them.

In both the Niger and Senegal River watersheds, jointly managed facilities and sharing of benefits are means to put this community of interests into concrete practice. The seeds of this community of interest were planted in the early 1970s. The initial traces of a specialized regime for hydraulic facilities on the Senegal River can be discerned in Article 3 of the Agreement on the Establishment of an Inter-state Committee for Development of the Senegal River Basin. Although this agreement was adopted in 1964, it was not until 1972 that the Senegal River's riparian states adopted the two cardinal instruments of the river's governance regime: the Convention Concerning the Creation of the Senegal River Development Organization and the Convention Concerning the Status of the Senegal River. In the Senegal River context, not only did the normative and institutional framework which emerged over time make the Senegal watershed a forerunner in international water governance, but the heft and substance of its governance regime also made it a pacesetter (Boisson de Chazournes, 2013).

A noteworthy feature of the governance regime of the Senegal River is its provisions for the creation of the status of 'common works'. The management of common works became the subject of two international conventions, the Convention Concerning the Legal Status of Common Works of 1978 (hereinafter Common Works Convention) and the Convention Regarding Financing Arrangements for Common Works of 1982. Under the auspices of these instruments, the OMVS members put in place a unique system of interstate agencies for the management and operation of two dams on the Senegal River: the Manantali and Diama Dams. The 1978 and 1982 conventions were supplemented by two additional agreements in 1997. The 1997 agreements established separate, autonomous agencies responsible for the management and operation of these two facilities: the Convention Creating the Diama Management and Operation Agency (hereinafter SOGED Convention) and the Convention Creating the Manantali Energy Management Agency (hereinafter SOGEM Convention).

In contrast, in the Niger River basin, there is no international instrument specifically dedicated to shared infrastructure. Provisions in existing instruments provide signs of a regime still under construction. For example, the 1964 Agreement Concerning the Niger River Commission and the Navigation and Transport on the River Niger enjoined the Niger River Commission to "collect, evaluate and disseminate basic data on the whole of the basin, to examine the projects prepared by the riparian states, and to recommend to the Governments of the riparian states plans for common studies and works for the judicious utilization and development of the resources of the basin" (Article 2(c)). The Niger River's governance regime has been strongly shaped by the shared vision process initiated in 2002 (Sangbana, 2011). The shared vision laid out the strategic framework for the sustainable development of the Niger Basin. This regime comprises both "common works" and "works of common interest" which will permit benefit sharing among the Niger basin states.

Among the most important results of the shared vision process are the Niger Basin Water Charter and the Sustainable Development Action Plan (SDAP) and its associated investment programme (2008–2017). These instruments set out a general approach to basin development, an approach negotiated and accepted not only by all member states but also by other actors who are users of basin resources. The aim of these instruments is to develop the potential of the basin as a whole and generate the greatest possible advantages for the Niger's riparian states and the populations that depend on its resources.

## **Infrastructure in the Senegal and Niger basins: collective governance in practice**

### ***The Senegal basin***

The Senegal River basin is the site of a number of common works which have been the object of cooperative management by the OMVS. These projects bear witness to the efficacy of collective river governance. The OMVS developed the Diama and Manantali Dams, as well as the port facilities between Saint-Louis and Kayes. Infrastructure projects began in the 1970s in the hopes of overcoming annual irregularities in river levels, reducing flooding, and addressing the significant rainfall deficit.

The Diama Dam is located near the delta of the Senegal River, between Senegal and Mauritania. This project was designed for flood control, irrigation and drinking water provision and to prevent the intrusion of saltwater into the lower valley. The Diama Dam permits the irrigation of 120,000 hectares and satisfies the water needs of several urban and rural populations. This dam is the main source for water withdrawals in Senegal and Mauritania, not only for farming (in particular cereals and traditional crops) but also to supply water to many urban and rural centres (OMVS SOGED, 2006).

Alongside the Diama Dam project, the OMVS also developed the Manantali Dam project. This included construction of a dam on the Bafing River (a tributary of the Senegal River in Mali) and the construction of 1300 km of transmission lines to Bamako, Mali. The Manantali Dam irrigates an area of over 3750 km<sup>2</sup> and allows navigation between the cities of Saint-Louis and Kayes. In addition to its irrigation and navigation functions, the Manantali Dam provides about 800 million kilowatt hours per year to the cities of Bamako, Dakar and Nouakchott. The Manantali power station went unfinished until 2002. The delay in construction was largely attributable to the border conflict between Mauritania and Senegal in 1989. The killing of Senegalese farmers by Mauritians triggered a conflict that cost the lives of hundreds of people. The two states engaged in occasional armed skirmishes and nearly entered full-scale armed conflict.

Senegal, Mauritania and Mali draw major benefits from the Diama and Manantali Dams. Beyond the Diama and Manantali Dams, common infrastructure on the Senegal River includes the sea ports at Saint-Louis and Kayes in Senegal. Since its founding in 2011, the Agency for the Management and Exploitation of Navigation on the Senegal River (SOGENAV) has sought to improve navigation between the fluvial ports in

Senegal and Mauritania. Its tasks include the management and administration of activities related to navigation and transportation on the river.

As none of the riparian states was able to finance these projects on its own, the creation of the OMVS provided a means of mobilizing financial assistance from the international donor community. Twelve donors contributed to a loan totalling USD 620 million (Yu, 2011). The three states negotiated a cost-sharing schedule based on projected benefits and tailored to their differing needs. This *clé de répartition* was adopted by the Council of Ministers of the OMVS in 1985 (Hensengerth, Dombrowsky, & Scheumann, 2012). The cost schedule should be considered a success to the extent that the countries agreed on not only how to share expected benefits from cooperation, but also how to allocate costs in accordance with expected benefits.

### ***The legal regime governing the Diama and Manantali Dams***

The joint ownership of the dams through the OMVS makes the Senegal River a unique case of substantive transboundary cooperation on the management of water infrastructure. The Diama and Manantali Dams on the Senegal River are governed and managed according to rules laid out in the Common Works Convention and the Convention Regarding Financing Arrangements for Common Works.

According to the Common Works Convention, a facility is common works whenever it is the object of a legal instrument declaring it to be “common and indivisible property” of the member states. The term “legal instrument” comprises any “convention or resolution adopted by a deliberative body of the OMVS” (Articles 1 and 2). Thus, whether a facility constitutes a common work cannot be deduced from anything about the facility itself; it does not depend, for example, on the facility’s territorial location. The convention does set out a non-exhaustive list of works designated as common: the Manantali Dam, the Diama Dam, the Saint-Louis sea-river port, the Kayes river port, and any ancillary facilities or annexes to these works (Article 3).

The Common Works Convention stipulates that any infrastructure designated as common becomes and remains during its lifetime the common and indivisible property of the OMVS member states (Articles 2 and 3). Where a common project is constructed (or partially constructed) on the territory of one state, that state must not create any obstacle for other states with a co-ownership interest to exercise their use, enjoyment and administration rights (Article 6). Furthermore, common works are exempt from requisition, confiscation, expropriation or any other form of seizure or forced takeover by the legislative, executive or judicial powers in any of the co-owner states (Article 5). On the financial level, OMVS member states act as co-guarantors for the repayment of any loans extended to the organization for the construction or operation of jointly managed facilities (Mbengue, 2004). Each co-guarantor state is obligated to contribute to the organization’s financial resources. In particular, each member must take all appropriate measures to contribute the necessary funds to the organization, within the appropriate period, to prevent a default with creditors. A state breaching this obligation will bear the entirety of financial charges arising from the delay, including expenses related to any work and engineering contracts on joint facilities. Another aspect of the financial component is the capacity of the members of the organization to borrow individually or jointly for the construction or operation of common works.

Member states pay back the loans to the organization, which controls and manages joint infrastructure on behalf of the OMVS's member states (Convention Regarding Financing Arrangements for Common Works, 1982).

The operation and maintenance of common works may be delegated to autonomous agencies overseen by the OMVS (Article 15). The establishment of these agencies demonstrates the uniqueness of the system created by the Common Works Convention. These agencies are constituted as public, inter-state bodies and tasked with the sharing of economic benefits among OMVS members.

The jointly managed facilities in the Senegal basin could serve as a model of cooperation for other international watercourses in Africa. A tripartite project modelled on the Senegal River example could have been beneficial for the Grand Ethiopian Renaissance Dam project. The concerns of Egypt, Sudan and Ethiopia could have been addressed through joint ownership, management and funding of the project. Although Ethiopia proposed a joint ownership regime, Egypt and Sudan rejected this option (Salman, 2016).

### ***The Niger basin***

The development of the Niger River provides a further illustration of the benefits of multi-state collective cooperation and management of river basins. Crossing some of the least developed African countries and four landlocked countries (Burkina Faso, Chad, Mali and Niger), the Niger River offers significant development opportunities for watercourse states. Some of these opportunities are directly linked to the river, like production of energy, irrigation and food production, whereas others are 'beyond the river', like the promotion of economic integration and the fight against poverty (Andersen, Golitzen, Ousmane, Jarosewich-Holder, & Olivry, 2005).

The most significant outputs from the shared vision process led by the NBA are the SDAP and the Niger Basin Water Charter. The NBA spearheaded a strategic framework for the sustainable development of the Niger River basin: that is the SDAP. One of the pillars of the SDAP concerns the development of socio-economic infrastructure (Niger Basin Authority (NBA), 2007).<sup>4</sup> In this regard, the NBA has three priorities before 2025: (1) infrastructure of common interest and/or with transboundary benefits; (2) infrastructure favouring local socio-economic development; and (3) infrastructure ensuring access to basic services. The considerations at play in choosing these priority areas were: (1) maintaining sufficient flow rates during low-water periods; (2) minimizing the impact on wetland zones, particularly the Inland Delta; (3) developing agriculture via irrigation; and (4) generating hydroelectric power. On the basis of these criteria, the parties adopted a development plan for the 2025 horizon that included both the rehabilitation of existing dams (the Kainji and Jebba in Nigeria and the Lagdo in Cameroon) and the development of three new installations (Fomi, Taoussa and Kandadji) (Brachet & Dessouassi, 2008). This particular development plan was considered not only most beneficial for the basin as a whole but also best for the Inland Delta, aggregate electric production and respect for minimum flow rates (Niger Basin Authority (NBA), 2007).

In contrast to the collective water facilities on the Senegal River jointly managed by OMVS member states, the planned infrastructure in the Niger basin is for the most part



national works. The Niger Basin Water Charter includes two types of joint infrastructure: common works and works of common interest. Common works, which are to be found on the Niger River, are “a facility which the member states of the NBA have decided through a legal act to make their common and indivisible property” (Article 1.21). Works of common interest are “a facility being of interest to two or more member states of the NBA, for which they have mutually agreed on coordinated management” (Article 1.22). The designation of infrastructure as either common works or works of common interest is dependent on the adoption of legislation by the parties. Only common works carry with them the idea of indivisible, communal property of all the member states. Works of common interest are restricted to a limited number of NBA member states.

The SDAP includes proposals for 26 new dam projects on the Niger River. Several of these projects warrant special attention for their transboundary impacts, like the proposed Fomi Dam in Guinea, the Taoussa Dam in Mali and the Kandjadji Dam in Niger. Funding for these three dams has primarily been provided by the World Bank and the African Development Bank.

The Fomi Dam project is a crucial test of the implementation of the SDAP, due to its potential for both transboundary benefits and potential harms to nearby communities. This multipurpose dam, located in Guinea, would allow Mali to double the area of the arable land and regulate river flow for downstream countries (NEPAD 2014). As conceived in 2015, the Fomi Dam would provide 6.1 billion cubic metres of water storage in Guinea, generate 90 MW of renewable energy and maintain dry-season environmental flows. The Fomi Dam could contribute to food security, production of electricity, and water storage during dry seasons. The implementation of this project is supposed to include a decision-making process involving potentially affected communities. The project seems likely to displace many people in Guinea and could have negative environmental impacts in the inner Niger Delta in Mali, an area that is a source of livelihood for around one million people (World Bank, 2014). Because of these risks posed by the construction of the dam, an environmental and social impact assessment and a mitigation action plan are necessary to advance the project.

This dam is a joint project between Guinea (upstream) and Mali (downstream). Guinea and Mali would have to mitigate the impacts, including on livelihoods, the resettlement of communities in Guinea and the environmental and social impacts in the Niger Inner Delta in Mali (World Bank, 2015). The two states established an Inter-Ministerial Committee in 2014 to oversee the joint implementation of the project, with the NBA serving as an observer.

The SDAP also includes a component focusing on facilities that are in urgent need of rehabilitation, including the Kainji and Jebba Dams in Nigeria and the Lagdo in Cameroon. There is also mention of the finalization of studies on planned facilities in the basin (i.e. the Taoussa, Kandadji and Fomi Dams) to ensure that they comply with environmental and social norms and thus facilitate consensus among financial partners on their development.

As yet, the Niger basin lacks any infrastructure designated as common works in the sense envisioned by the Niger Basin Water Charter. This suggests that Niger River basin states are reluctant to participate in full-blooded joint cooperation regarding river infrastructure. Instead, the Fomi, Taoussa and Kandadji Dams will be works of



common interest (Brachet & Dessouassi, 2008). Given that the plan that included these three national dams of common interest was preferred over alternatives in economic, social and environmental dimensions, it seems that the configuration of the basin – in which nine states share more or less direct access to the river’s principal course – may never make the establishment of common works a meaningful possibility. The idea that sub-basin commissions are necessary for the success of the NBA’s mandate – an idea that finds expression in the Niger Basin Water Charter – weighs heavily in favour of a sub-regional approach to basin management (Article 1.4).

## **The sharing of benefits in the Senegal and Niger basins**

The distinctions between the governance systems for the Senegal and Niger Rivers continue in the area of benefit sharing. The principle of benefit sharing consists in ensuring that the direct benefits of an installation are distributed in such a way as to balance the share of investments contributed by each state (Brachet & Dessouassi, 2008). Equitable division varies depending on whether the installation in question is designated as common works or works of common interest. With regard to common works, the fundamental principle associated with the status of common and indivisible property entails each state’s individual right to an indivisible share, and a collective right to the use, enjoyment and administration of the shared facility. Each state is furthermore required to guarantee the enjoyment of these rights by all the others. The sharing of benefits and costs is dealt with differently in the Senegal and Niger basins depending on whether an installation is designated as common work or work of common interest. As further elaborated below, the distinctions between these legal categories come to the fore at a temporal level, as questions arise about how new users should bear the costs already incurred to build and maintain jointly managed installations.

### ***The Senegal basin***

The division of benefits is organized on an equitable basis in the Senegal River basin, under the auspices of the OMVS. In the OMVS, the division of benefits is tightly linked to the status of common works, designated as indivisible property of OMVS members. The operative principle is set out in the Common Works Convention. Article 12.1 states that “investment costs and operational fees are to be allocated between the co-owner states on the basis of the benefits that each co-owner state will have from the operation of common works”. Each co-owner, moreover, guarantees repayment of the loans extended to the OMVS by the international donor community for the construction of the relevant infrastructure.

The central importance of sharing benefits, costs and fees can be illustrated by the ongoing issues raised by Guinea’s late accession to the Senegal River Water Charter. Guinea, a riparian state of the Senegal River, acceded to the charter in 2006. According to the accession treaty, Guinea also became a party to the Common Works Convention. In the accession treaty, however, no mention is made of the Convention Regarding Financing Arrangements for Common Works nor of the 1997 instruments concerning the management and operation of the Diama and Manantali Dams. As a result, the

Conference of Heads of State and Heads of Government is charged with ruling on Guinea's future share of costs, benefits and expenses (Guinea Accession Treaty, Article 6). Further, the conditions of construction and operation for future common works are to be decided on a case-by-case basis with respect to Guinea (Article 5). Doubt surrounds the degree to which Guinea may benefit from common works constructed prior to its accession to the treaty. The four riparian states are currently negotiating a schedule of costs and benefits that includes Guinea. The inclusion of Guinea in the OMVS requires a revision of the 1985 schedule key.

The principle of shared management of common works finds further institutional expression in the creation of public, inter-state organizations to operate and manage these works, as in the case of SOGED and SOGEM and their responsibilities regarding the Diama and Manantali Dams on the Senegal River. The differences between the agencies provide an informative case study about the practical implementation of benefit sharing. SOGED draws its financing primarily from its exclusive right to sell water of the Senegal River to all users other than those related to the production of electricity (SOGED Convention, Articles 12 and 13). OMVS member states, in turn, must ensure that their own users pay for water provided by SOGED (Article 13). The OMVS maintains an oversight role to ensure that SOGED is fully paid. For SOGEM, in contrast, the principal source of revenue is its exclusive right to produce, transmit and sell the electricity generated by the jointly owned facility. SOGEM determines electricity prices in agreement with the Council of Ministers. SOGEM is responsible for managing these resources and for ensuring the provision of services through the Manantali facilities. SOGEM can also lease all or part of these installations or transfer operation of them to a third party in return for a fee (SOGEM Convention, Article 12.1). As in the case of the Diama Dam, the OMVS must assure itself that the national electricity agencies pay the full cost for energy provided through SOGEM. The most salient difference between the SOGED and the SOGEM lies in the specific range of activities of the two agencies. The two institutions are complementary in supplying water and energy to the population of the Senegal watershed. Benefit distribution is ensured through the sale of water and energy to local users.

### ***The Niger basin***

The idea of shared benefits also informs the Niger River basin regime. In Senegal, the principle of shared benefits takes shape around the pursuit of an equitable division that aligns investment costs and direct benefits drawn from particular installations. The principle of shared benefits manifests quite differently when it comes to works of common interest, as aptly illustrated by the management of the Niger River basin. In this case, the division of benefits is restricted to a subset of the member states. This status is to be attributed only to infrastructure shared among a collection of states smaller than the entire membership of the NBA.

However, a closer examination of the practical implementation of the benefit-sharing regime indicates a different outcome, one that distributes benefits more widely to all of the Niger basin's nine riparian states. The computation of earnings for all member states takes into account the economic returns not just from a single facility but from the "entire collection of works of common interest" as foreseen in the chosen basin

development scenario, which includes the Fomi, Taoussa and Kandadji Dam projects. The construction of these three projects will make it possible to satisfy the minimum flow objectives for the Niger as a whole and upstream hydro-agricultural needs (Niger Basin Authority (NBA), 2007). It was only by comparing the potential benefits of each dam and their combined contribution to the basin as a whole that the experts concluded that the construction of these three dams would be the most beneficial for the social and economic development of basin's states.

In the case of the Niger basin, benefit sharing among the nine states consists in part in ensuring that the direct benefits generated by projects are distributed in such a way as to strike a balance between the share of benefits received and the share of investments made by each state. The NBA is the body overseeing the implementation of the three projects, and its aim is to generate as many benefits as possible for all member states. In the next years, the NBA could play a role in the adoption of an instrument to share costs and benefits between all or a subset of the riparian states.

### **The inclusion of environmental and local community considerations in benefit sharing**

There have been efforts in both the Niger and Senegal River contexts to ensure environmental protection, distribution of benefits to local populations, and local participation in decision making.

Dams can contribute significantly and positively to human development. However, they can also have negative impacts on the environment and the living conditions of local populations, or even necessitate forced resettlement. Negatively impacted populations too rarely see a net benefit from the resulting economic and social development. Instead, the main recipients of a dam's benefits often live in cities and urban areas far away from the dam site. Proactive measures are needed to include local populations in benefit-sharing mechanisms and to distribute the economic advantages of dam projects to the local communities. In this sense, benefit sharing comprises not only inter-state relations but also interaction between states and local populations. This latter aspect of benefit sharing can strengthen public participation in the decision-making process for the construction of dams in the two basins.

Civil society must be a part of the decision process in relation to the construction of dams on both the Senegal and the Niger rivers. This inclusion is reflected in the institutionalization of public participation via the creation of consultation fora, such as the local coordination committees in the context of the OMVS and national user organizations in the context of the NBA (Dessouassi, 2015; Sangbana, 2015).

For a long time, neither the protection of the environment nor public participation played much of a role in either the Senegal or the Niger basin's legal regime. Water management projects were considered solely from the perspective of the development needs of individual states (Sangbana, 2015). In response to the negative impacts these projects had on the environment and on local populations, the members of the OMVS and of the NBA were led to include these aspects more directly in their governance instruments (Boinet, 2013; Ndiaye, 2003).

The 2002 Senegal River Water Charter dedicated a chapter to the environment and another to institutions charged with management of water and the environment, as well

as making reference to the polluter-pays principle (Article 18), the principle of prevention (Article 16), and the determination of shared objectives regarding water quality (Article 16). Similar intentions were affirmed in the Niger Basin Water Charter, which includes principles of international environmental law ranging from the precautionary principle (Article 6) and the prevention principle (Article 7) to the polluter-pays principle (Article 8).

Both the Senegal and Niger basin projects attempted to distribute the projects' benefits to local populations. Following the construction of infrastructure for the exploitation of the Senegal River (Diama and Manantali Dams), the OMVS invested in socio-economic development and environmental protection of the Senegal River basin. In addition to these macroeconomic programs, OMVS promoted actions to improve the standard of living, incomes and productivity of local people. Thus, the people already benefit from the potential for water supply and energy generated by the dams. With regard to the Niger River, the shared vision framework emphasizes solidarity and community of interest among states sharing this river basin. Member states recognize that each one of them must enjoy a reasonable and equitable share of water resources in order to contribute to the reduction of poverty, to food security and to the protection of the environment (Principle 3 of the Declaration of Paris).

Institutional cooperation mechanisms like the OMVS (in Senegal) and the NBA (in Niger) provide a framework for coordination among riparian states. This not only reduces the numerous risks raised by dam construction but also facilitates a redistribution of benefits among all the states sharing an international watercourse. Furthermore, these mechanisms promote a distribution of 'immaterial' benefits related to the rights of local populations potentially affected by dam construction (Geneva Water Hub/Platform for International Water Law 2015). As examples, consider the OMVS's investment in environmental protection measures following the construction of the Manantali and Diama Dams, and the NBA's efforts to improve standards of living through the construction of hydroelectric projects such as the Kandadji Dam in Niger (Skinner, Niasse, & Haas, 2009).

With regard to environmental monitoring, members of the Senegal River system have committed themselves to "monitor all activity that could noticeably affect the characteristics of the river regime, the health of the waters, the biological characteristics of its flora and fauna, its bodies of water or its environment in general" (Senegal River Water Charter, Article 16.2). As for the Niger River, the objective of the Niger Basin Water Charter is to promote "a sustainable, equitable and coordinated utilisation of water resources in the Niger river watershed" (Article 2.1). Furthermore, the state parties must "manage the Niger Basin's water resources so as to maintain the quantity and quality of these resources at the highest possible level" (Article 10).

Since the beginning of the investment programmes, the states along the Senegal River have paid attention to the environmental impacts of dam construction. A case in point is the Programme for the Mitigation and Monitoring of Environmental Impacts (PASIE) related to the construction and operation of the Manantali Dam. PASIE was developed in light of the domestic legislation of the OMVS member states and the standards of the World Bank, the African Development Bank and other donors (Uhlir, 2000). The objective was to set out norms to prevent negative impacts on the environment from the Manantali Dam. In the Niger basin, the World Bank is playing a central

role in bringing the planned projects into compliance with international social and environmental standards. The bank requires studies of environmental impacts, technical feasibility and resettlement planning. Through the 2002 adoption of the Senegal River Water Charter, the parties redoubled their commitments to sustainable development and public participation. The charter put in place mechanisms to ensure improved monitoring of the aquatic ecosystems on the one hand and, on the other, to bring together a diversity of relevant actors – local populations, policy makers and technical experts – in river management (Article 13). Despite the nature of the Senegal River regime as a pioneer of joint management, much more could be done to ensure environmental protection and promote public participation (Sangbana, 2015; Vick, 2006).

These environmental obligations are accompanied at the institutional level by the establishment, at the OMVS in 2000 and the NBA in 2006, of environmental observatories, whose objective in each context is to monitor environmental developments in the watershed. The observatories provide state parties the information necessary to measure the environmental impacts of dams and other hydraulic infrastructure and to undertake actions to attenuate negative environmental effects. In the case of the Senegal River, the observatory publishes an annual report for policy makers on the state of the environment. The Niger-based observatory ensures the distribution of hydrologic, meteorological, demographic, social and environmental information. Its principal aim is to improve coordination at the basin level through the systematic production of forms of environmental information useful in the facilitation of regional cooperation. The Niger Basin Water Charter aims at facilitating the inclusion of environmental considerations and local community concerns in the sharing of benefits. To this end, each of the nine riparian states has a National Focal Point charged with ensuring the coordination of NBA activities at the state level and with engaging local civil society actors (Niger Basin Water Charter, Article 2). The parties have put in place national user organizations aimed at facilitating effective involvement by non-state actors in the shared vision process. The nine national user organizations and the Regional User Organization facilitate relations among users and other stakeholders in environmental protection and the development of the Niger basin (Dessouassi, 2015).

## **Conclusion: the broader impact of joint management of watersheds**

The formalization of riparian state relations through legal instruments and institutions is the principal mechanism for the management of the Senegal and Niger Rivers. Riparian states of the Senegal and Niger watersheds have developed innovative techniques for the management of their collective water infrastructure. Both the Senegal and Niger watersheds are managed according to the principle of benefit sharing, but this is realized in different ways in the two river basins. In the Senegal River basin, infrastructure is often co-owned and co-managed as ‘common works’, whereas in the Niger River basin, infrastructure tends to be national works or ‘works of common interest’. Although Niger River basin states appear reluctant to participate in full-blooded joint cooperation regarding river infrastructure, the governance regimes nevertheless display some common attributes. The sharing of benefits and costs depends on whether an installation is designated as common

work or work of common interest, a distinction that comes to the fore most visibly with regard to the rights and responsibilities of treaty parties who acceded after infrastructure projects were developed. In both the Niger and Senegal River basin joint management schemes, attention has been paid to environmental impacts and the importance of public participation. However, much more could be done on these important aspects of shared governance of water infrastructure.

West Africa is a vulnerable region. The dams planned for the Senegal and Niger Rivers could either trigger tensions in West Africa or be instruments of peace and stability between riparian countries. Since 2006, Mali has been under the threat of simmering armed conflict in its northern region. In Nigeria, Boko Haram is responsible for several attacks against the population. The conflict in Libya is also a threat to West African countries, especially those in the Sahel region. As a forum of dialogue between countries, mechanisms of transboundary watercourses such as the OMVS and NBA may contribute to the promotion of peace and stability in the region. Benefit sharing laws and institutions strengthen inter-state cooperation and promote the inclusion of local populations in the benefits of socio-economic development. These mechanisms are not only indispensable in the planning and implementation of dams but may also undergird regional conflict prevention.

## Notes

1. Details of all statutory references are listed in the Appendix.
2. Organisation des états riverains du bassin du fleuve Sénégal (OERS).
3. Organisation pour la mise en valeur du fleuve Sénégal (OMVS).
4. The other two aspects are (1) protection of resources and ecosystems, and (2) capacity building of actors and involvement of those actors in integrated water resources management.

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