AFRICAN RIVER BASINS

How the Senegal River sets an example of transboundary basin water management

When countries share river basins, conflicting needs of upstream and downstream nations can easily lead to discord, with international ramifications. It's a common concern, with so many borders that have been drawn across rivers. This is not the case in the Senegal River Basin, where member countries have been lauded for their transboundary water management. Petro Kotzé reports.

All photographs by Petro Kotzé

The Republic of Senegal, located in West Africa, shares the Senegal River Basin with Mali, Mauritania, Senegal and Guinea. The countries are collaborating over the water resources that they share, for the benefit of their people.

Africa has more share of its area (62%) within transboundary basins than any other continent. A total of 68 transboundary basins, out of 310 worldwide, are in Africa. South Africa is no stranger to the implications of these statistics. The country shares six international watercourse systems with neighbours. The four most important basins are the Limpopo, Incomati, Maputo and Orange, which are shared with Botswana, Lesotho, Mozambique, Namibia, Swaziland and Zimbabwe.

The Orange-Senqu River Basin is a case in point of the disputes that can develop between adjacent states. South Africa's largest river, the Orange originates in the Lesotho Highlands. From here the river stretches for 2 300 km to the Atlantic Ocean along a basin that includes Lesotho, South Africa, Namibia and southwestern Botswana. The last 600 km form an ambiguous border with Namibia that has led to tussles with South Africa over what constitutes 'fair' water allocation. The situation could likely escalate as pressure on water availability in the region increase on the back of worsening climate variability and escalating development demands.

Elsewhere on the continent, an exemplary example of transboundary basin management has developed in the Senegal River Basin, which is shared by Mali, Mauritania, Senegal and Guinea.

Together with the Niger River, Lake Chad, the Volta River and the Gambia River Basin, it's one of West Africa's largest transboundary basins and is managed by the Senegal River Development Organization (the OMVS, according to the French acronym for ***Organisation pour la Mise en Valeur du fleuve Sénégal***).

Established in 1972, the OMVS has been widely lauded for its achievements. Fifty years since their establishment, in March, they were awarded the Hassan II Grand Prize for Water at the World Water Forum in the Senegalese capital Dakar. They were distinguished for achieving water and food security in the basin, and for actions towards peace, prosperity, and territorial development of its member countries. They were also nominated for the 2022 Nobel Peace prize as a facilitator of peace, stability, and development in the region.

Though each river basin has unique characteristics that call for tailor-made management approaches, the OMVS and its management of the Senegal River Basin is a valuable example of an innovative approach to how this can be done successfully.

The Senegal River Basin

The Senegal River originates in the high plateaus of the Fouta Djallon massif in Guinea, from where it transverses 1 800 km across Mali and Mauritania to empty into the Atlantic Ocean at Saint Louis in Senegal. The river is divided into an upper basin, valley, and delta. Though each has distinct environmental conditions, the majority of the basin has a sub-Saharan desert climate and is marked by long droughts. Annual rainfall varies greatly between seasons and years and decreases from about 2 000 mm per year in the upper basin to around 500 mm in the delta. Rain generally falls from June to September, followed by a cold and dry season from October to February, and a hot and dry season from March to June.

The ebb and flow of the river traditionally gave shape to the lives that depend on it. The Senegal is a key resource for livelihoods in all countries that it flows through, and the bulk of the ethnically diverse population lives close to its banks. Traditionally, they have engaged in a mix of farming, fishing, and herding activities, with rainfed agriculture practiced in the uplands and recessional floodplain farming in the lowlands. However, these activities were slave to fickle extremes. Depending on the size and duration of floods, arable land could vary between 15 000 and 150 000 hectares.

Serious floods in 1890, 1906 and 1950 were devastating, but intermittent droughts were equally crippling, especially the series of droughts experienced in the Sahel region from West Africa to Ethiopia from the late sixties to the eighties. The resulting famine killed an estimated 100 000 people, and 750 000 were left dependent on food aid. At the peak of the drought, the Senegal River almost dried up, driving a large exodus of people from the rural areas to over-burdened cities, and highlighting the vulnerability of the region's food-producing system to climate variability.

In response, the countries of the Senegal River Basin came together to collaborate on solutions. Instead of conflict over water resources, the catalyst for the birth of the OMVS was a need to join forces for the good of the basin's people.

An innovative river basin organisation backed by international law

The OMVS aims to develop food security; reduce economic vulnerability to external factors such as climate changes;

The Diama Dam has been key to unlocking the economic growth of the region as envisioned by the OMVS.

Life along the Senegal River develops with the ebb and flow of the river. Along with rising sea levels, the water levels of the river are some of the threats faced by Saint Louis, once an important economic centre in French West Africa.

Fishing has always been one of the staples for the people of the Senegal River.

The OMVS ensures equity in access to the river's water resources among riparian countries.

accelerate the economic development of member states; preserve ecosystem balance in the sub-region and basin; and, secure and improve revenue. It was established by Mali, Mauritania, and Senegal, and joined by Guinea in 2006.

The organisation created several shared physical and institutional infrastructures, supported by what has been described as 'farsighted legislation' for the time. For one, the watershed of the Senegal River has been declared common and indivisible property of all the member states. This guarantees free navigability of the river and ensures equity in access to the river's water resources among riparian countries. This convention also implies that any intervention that could significantly affect the hydrological regime or condition of the river must be approved by all member states. The infrastructure on the river, such as reservoirs, has also been declared the common property of all member states.

In 2002, a groundbreaking Water Charter was adopted. Likely a first of its kind in Africa, it is a commitment to a shared vision for sustainable development of the river basin. It embodies all key emerging principles on equity, integrated water resources management (IWRM), and the need to protect the environment.

Broad political issues are dealt with by the highest management body, the Conference of Heads of State and Government. A Council of Ministers exercises oversight roles and is made up of one minister from each member state. A High Commissariat implements its decisions. Then, a Permanent Commission for Water acts as an advisory body. The commission consists of senior experts of member states. This is seen as part of the OMVS's unique management approaches.

Furthermore, there are established structures at national and local levels. For example, in each country, a National Coordination Committee is made up of representatives of ministries involved in or affected by water management in the basin, as well as civil society organisations.

Sharing costs and benefits

Another facet that sets the OMVS apart from other river basin organisations, is the notion of joint financing that it adheres to. This approach follows the principles of solidarity and equity to share the benefits of the basin.

It is based on a method called 'adjusted separable cost remaining benefit'. Benefits are analysed in the three categories of irrigation, energy production, and navigation, and divided among the basin countries along fixed quotas. In other words, benefits are at stake, instead of physical water allocation. An example of how this plays out is demonstrated by the funding for the Manantali Dam.

Dams have been key to the strategy for economic growth followed by the OMVS. The first to be built was the Diama Dam and embankment in 1986 a few kilometres inland from where the river empties into the Atlantic. Before the dam blocked saltwater from entering the delta, it used to seep upstream up to 200 kilometres. The reservoir stores at least 250 million cubic metres, and supplies water to the various towns and cities, including the provision of 60% of Dakar's needs as well as the domestic and pastoral needs of rural populations. It also supports expanding irrigated agriculture and several protected wetlands.

Manantali was built in 1988 on a tributary of the Senegal River in western Mali and has been generating hydropower since 2002. The two dams cost a total of about 1 billion US dollars, most of which was obtained through a loan from the World Bank at a low interest rate of about 2%. The debt was to be shared among Mali, Mauritania, and Senegal, the three member states of the OMVS at the time, on the pro rata of the benefits that would accrue to each of them. This amounted the 35.30% for Mali, 22.60% for Mauritania and 42.10% for Senegal.


IBRAHIMA DIEYE

Development of the Senegal River Basin has allowed for an increased area of irrigated rice production.

More reservoirs and hydropower projects have since been constructed or are in the pipeline.

The OMVS can rely on various options to mobilise funding. These include contributions from member states, loans obtained by member states and made available to the OMVS, grants from donors, and loans obtained by the OMVS with or without guarantees from member states. Bulk water and electricity tariffs go towards the operation and maintenance of shared infrastructure but activities and administration are also funded by annual contributions from member states.

A changed basin

Today, the Senegal River Basin is a different world, shaped by the OMVS-driven development that started in the seventies. Dams have provided a year-round supply of irrigation water, preventing people from migrating to urban areas.

Salt intrusion has also been halted. The Manantali Dam has become a significant fisheries resource, while releases from Diama are maintaining critical wetlands.

These benefits have not come without costs, and the river has undergone major ecological changes. The volume and duration of annual floods have decreased substantially, leading to the areas suitable for flood-recession cropping shrinking substantially. The river is now also prone to serious invasions by ***Typha australis***, among other aquatic plants that thrive in stable freshwater bodies. Waterborne diseases that proliferated now have to be carefully managed.

In future, it seems that climate variability in the region will intensify, testing the capacity of the OMVS to continue to achieve the goals it set out for itself even further. Yet, history has shown that through collaboration, they have established an unusually sturdy foundation to build on going forward.

Petro Kotzé participated in a study tour to the Senegal River Basin, with support from the OMVS, as part of the Blue Peace Central Asia project, this March.

Sources:

- Assessing the impacts of climate change on water resources of a West African transboundary river basin and its environmental consequences (Senegal River Basin) by Cheikh Bécaye Gaye, Moctar Diaw and Raymond Malou, published in Sciences in Cold and Arid Regions, 2013
- Africa environment outlook. Past, present and future perspectives. United Nations Environmental Programme (2002)
- SHARE Toolkit: Case Studies Integrated management of the Senegal River by Madiodio Niasse, published by the IUCN Water Programme
- World Bank. 2021. "World Bank Engagement in Transboundary Waters in West Africa: Retrospective and Lessons Learned." World Bank, Washington, DC