

**ACHIEVEMENTS
OF THE
ORANGE-SENQU RIVER COMMISSION
IN
INTEGRATED TRANSBOUNDARY
WATER RESOURCE MANAGEMENT**

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by

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Keywords

Integrated water resources management, international and regional water institutions, Orange River basin, river basin organization,

1. INTRODUCTION

The Governments of all the member States of the Southern African Development Community (SADC) have a major responsibility to ensure that the natural resources of each country are utilised optimally. This must be done on a sustainable basis in order to achieve and maintain the long-term objectives of regional, economic integration as advocated in the SADC Treaty.

The scarcity of water is considered to be one of the most significant limiting natural resources in Southern Africa when it comes to social, economic, industrial and agricultural development. This situation calls for innovative water resource management to realise maximum long-term benefits for the people in the SADC Region in general and the Orange-Senqu Basin in particular, especially when the arid nature of the environment in the western portions of the basin is taken into account.

It is therefore of strategic importance for all four Orange-Senqu Basin States, Botswana, Lesotho, Namibia and South Africa, to gain maximum benefit from water resources of the river. Each State must have access to a mutually agreed, reasonable and equitable share in the available water. In view of this, the four Governments have resolved to co-operate constructively and created the Orange Senqu River Commission (ORASECOM). The Commission has the responsibility to take the necessary measures to ensure that the potential of the resource of the Orange-Senqu Basin is investigated. At the same time, human and institutional capacity must be built to facilitate integrated and effective water resource management that will enable each country to sustain its development needs to meet its future commitments with confidence.

This paper therefore briefly refers to the achievements of the Orange-Senqu River Commission over the last three years since its inception in 2000 and specifically concentrates on recent issues related to the management of the water resources of the internationally shared Orange-Senqu River.

2. THE ORANGE-SENQU RIVER BASIN

2.1 Basin Characteristics

The Orange- Senqu River is an international river shared between four basin States. The basin covers an area of about one million square kilometres and is definitely the most developed shared river system in Southern Africa. The main tributaries of the Orange are the Senqu in Lesotho, the Vaal in South Africa and the Fish in Namibia. The mean annual precipitation varies between 2 000 mm (millimetres) in the Lesotho Highlands and less than 50 mm at the Atlantic Ocean in the west. The average precipitation over the catchment is 400 mm/a and is arid in terms of world standards. The corresponding mean annual

evaporation varies between 1 200 mm in Lesotho and 3 500 mm near the coast. Although the Orange is viewed as a perennial river, the runoff is seasonal in nature and extremely variable from one year to the next. The main reasons for this are that the runoff is generated by spatially unevenly distributed and unreliable summer rainfall over Southern Africa and specifically so in the western reaches of the Orange catchment. The virgin mean runoff at the mouth of the river is 11 000 million cubic metres per annum (Mm^3/a), but can vary between 40 000 Mm^3/a and nearly zero. A portion of the territories of two of the driest countries in the SADC (Botswana and Namibia) lies in the basin. The contribution of each basin State to the runoff in the Orange is reflected in **TABLE 1**.

TABLE 1: CONTRIBUTION TO RUNOFF IN THE ORANGE RIVER

COUNTRY	AREA OF THE BASIN		MEAN ANNUAL RUNOFF	
	(km^2)	(%)	(Mm^3/a)	(%)
Botswana	120 000	12	0	0
Lesotho	30 000	5	4 700	41
Namibia	250 000	25	500	4
South Africa	600 000	60	6 300	55
TOTAL	1 000 000		11 500	

In **TABLE 1** it can be seen that Lesotho covers only 5 % of the catchment, but contributes 40 % of the runoff. Botswana makes no visible contribution to the surface runoff and Namibia only contributes 5 % to the runoff due to the arid climate in those two countries. This aridity in the western parts of the basin is also the reason why Namibia and South Africa are so dependent on the regulated runoff in the lower reaches of the Orange River.

Due to the seasonal nature of the runoff and periodic droughts, it is necessary to construct large dams to impound the runoff, whenever it is available, in order to store it for later use or release downstream during the dry season. More than thirty dams with a capacity of more than 12 Mm^3 each have been constructed in the Orange River and most of them are in South Africa. The largest is the Gariep Dam in South Africa. Lesotho has two major dams, namely Katse (the highest in Africa) and Mohale. These dams in Lesotho are part of the Phase 1A and Phase 1B development of the Lesotho Highlands Water Project. Namibia has five dams in the Orange River Basin, but they cannot be used to release water into the Orange River due to the ephemeral nature of the tributaries. Refer to **TABLE 2** for more information.

TABLE 2: MAJOR DAM DEVELOPMENTS ON THE ORANGE

COUNTRY	NUMBER OF DAMS (CAPACITY >12 Mm^3)	LARGEST DAM	CAPACITY (Mm^3)
Botswana	0	-	-
Lesotho	2	Katse	1 900
Namibia	5	Hardap	300
South Africa	24	Gariep	5 500

2.2 Water Availability and Use

It has been estimated that of the 11,5 km³ (Note: One cubic kilometre is one thousand million cubic metres) of water available per annum in the Orange, about 8,5 km³ can be utilized through infrastructure development. The balance of 3 km³ is lost due to river losses and evaporation from the dams. Of the remaining 8,5 km³, South Africa is using about 5,4 km³ while Namibia and Lesotho use about 0,13 km³. This means that there are about 2,0 km³ that can still be developed for future use by any one of the basin States. Refer to **TABLE 3**.

TABLE 3: PRESENT DEMANDS ON THE ORANGE

ITEM	QUANTITY OF WATER (Mm ³ /a)
Mean Annual Runoff Minus System Losses	11 500 - 3 000
Resource Potential	8 500
Minus Present Utilization	- 6 500
Botswana	0
Lesotho	20
Namibia	110
South Africa	5 370
Environment	<u>1 000</u>
Total	6 500
Remaining Potential	2 000

3. NATIONAL, REGIONAL AND INTERNATIONAL INSTRUMENTS OF WATER LAW

3.1 The SADC Treaty

The Lusaka Declaration, adopted by the Heads of State of the participating countries in Southern Africa in Lusaka, Zambia on 1 April 1980, gave rise to the establishment of the Southern African Development Conference (SADCC). The members States of the SADCC committed themselves to pursue policies aimed at economic liberation and the integrated development of the economies of the Region. (Water is of course a major resource to achieve these objectives.) Further institutional developments took place and today the Southern African Development Community (SADC), established by Treaty on the 17 August 1992 in Windhoek, Namibia, is a regional grouping of fourteen sovereign member States. Botswana, Lesotho, and Namibia, were among the ten founder member States. South Africa joined the SADC on 29 August 1994 through accession to the Treaty.

The goal of SADC is "the attainment of an integrated regional economy on the basis of balance, equity and mutual benefit of all States." Within this goal, the key objectives are identified as poverty alleviation, food security and industrial development.

Article 22(1) of the Treaty provides that member States should conclude a series of protocols with clearly stipulated objectives and scope, as well as institutional mechanisms to address the specific issues that support cooperation and integration.

3.2 The Revised SADC Protocol on Shared Watercourses

The SADC Protocol on Shared Watercourse Systems (The Protocol) was developed over a long period of discussions between SADC member States since 1991. The Protocol was adopted by the Heads of State on 28 August 1995 in Johannesburg, South Africa and became an instrument of international water law for the SADC in September 1998 after it had been ratified in terms of the provisions of the SADC Treaty. However, the Protocol was subsequently revised to bring it more in line with the Convention on the Non-navigational Uses of International Watercourses adopted by the United Nations General Assembly in 1997. The Revised Protocol on Shared Watercourses was signed by the Heads of State of the SADC member States on 7 August 2000 in Windhoek, Namibia, and entered into force on 22 September 2003. The overall objective of the Revised Protocol is to foster closer cooperation for judicious, sustainable and coordinated management, protection and utilization of shared watercourses and to advance the SADC agenda of regional integration and poverty alleviation.

3.3 The UN Convention on the Non-navigational Uses of International Watercourses

All four Orange Senqu River basin States voted in the General Assembly for the United Nations Convention on the Non-navigational Uses of International Watercourses and the ratification process is at various stages within the basin States. (Namibia and South Africa ratified the Convention.)

3.4 Bilateral and Multilateral Institutional Arrangements

In 1987 Lesotho and South Africa created a Permanent Joint Technical Commission to guide the development of the Lesotho Highland Water Project (LHWP) in the upper reaches of the Orange River Basin. Two authorities were created to facilitate development activities in Lesotho and South Africa. These were the Lesotho Highlands Development Authority and the Trans Caledon Tunnel Authority. In 1999, when the LHWP was already in an advanced stage of completion, the Lesotho Highlands Water Commission was established between Lesotho and South Africa.

In September 1992 a Permanent Water Commission (PWC) was established between South Africa and Namibia to advise the Governments on matters pertaining to the development of the Lower Orange River where it forms the border between South Africa and Namibia. The PWC actually replaced a Joint Technical Committee (JTC) that was established in 1987 and functioned in the transitional period before Namibia became independent in 1990.

Namibia also entered into an agreement with South Africa in 1992 on the establishment of a Joint Irrigation Authority for the Noordoewer (in Namibia) and Vioolsdrift (in South Africa) irrigation scheme that is located on both sides of the border along the Lower Orange River.

Both of the above-mentioned bilateral Commissions did, however, not conform to the concept that the management of internationally shared rivers should be done on a multi-lateral, basin wide scale by all basin States. However, they served a useful purpose in the absence of other arrangements and still contribute to do so after the ORASECOM was established.

In November 1995 South Africa hosted a conference of SADC Ministers responsible for water resources management. The theme related to the future vision for water resources management in Southern Africa. Part of the vision to facilitate future activities in joint cooperation on dealing with infrastructure development and the management of water issues on the internationally shared rivers in the SADC Region, led to the identification of a need to establish of a Water Sector in the SADC. The proposal to create the Water Sector was individually supported by all the Orange-Senqu River basin States and today there is a dedicated Water Division at the SADC Headquarters in Gaborone, Botswana.

All the above-mentioned positive developments in water sector issues prompted the Orange-Senqu Basin States to meet to discuss the possibility to create a multilateral Basin Commission. A long process of discussions and negotiations followed, mostly influenced by the evolving political transformation in South Africa since 1994 and the progressive developments in the water sector in Southern Africa. On 3 November 2000 the Orange-Senqu River Commission was eventually established between Botswana, Lesotho, Namibia and South Africa.

3.5 The Responsibilities of the Orange-Senqu River Commission (ORASECOM)

In the Agreement that established the ORASECOM, the Commission is regarded as an international organisation with international and national legal personality. The Commission is empowered to serve as the technical advisor of the Parties on matters relating to the development, utilization and conservation of the water resources of the Orange River Watercourse System. The Commission shall also perform such other functions pertaining to the development and utilization of the water resources as the Parties may agree to assign to the Commission.

The Parties to the ORASECOM view the Commission as an important forum to discuss water matters of mutual interest at a technical level. The Commission may also execute the necessary feasibility studies to enable the Commission to recommend the most feasible technical solutions, based on the hard facts. The Commission has a duty to advise the respective Governments accordingly about the perceived best technical solution and to what extent the Commission is in agreement about the way forward. If there is no agreement about a proposed project, or if there would be a conflict of national interests, then the matter would revert back to the political level for further negotiations or final approval as the case may be. In this way the proposed technical solution will be based on the facts and not on any prior political perception or influence. Any subsequent decision can then clearly be seen as the best solution in terms of technical viability while accommodating national interests in a balanced way through acceptable compromise.

The allocation of water from the Orange to the Parties is also subject to negotiations between the riparian States according to the rules of mutually accepted instruments of international water law. The Commission is therefore in a position to stimulate and coordinate development on the Orange by advising the Parties about the availability of water, the results of feasibility studies and the most viable options for infrastructure development.

4 DEVELOPMENT CONSIDERATIONS

4.1 Background

The development of national and shared water resources can never be without strategic considerations. Any State has the responsibility to provide security of access to water sources. The basis for the allocation of water for certain uses has three major components. One is the allocation of water as a social good for domestic use and food production. Second is the allocation of water as an economic good for industry, mining, manufacturing, irrigated agriculture, hydropower generation and recreation. Last, but not least, is the reservation of water for the environment. There is considerable potential for conflict among these consumer groups and it does not matter whether it is at local, national or international level. These issues must be resolved to the satisfaction of all parties concerned, but must also maximise the benefits for all in the best, joint interest.

The establishment of the Orange Senqu River Commission and the anticipated future successful functioning of the Commission should therefore be examined in the context of the interests that each Party may have in the Orange.

4.2 The Interests of Botswana

Although there is a limited contribution to the surface runoff in the Orange from Botswana territory, Botswana was included as Party to the Commission because Botswana is a strategically important and economically significant SADC State in the Orange Basin.

Botswana is faced with extremely arid conditions in the southern parts of its territory because it forms part of the Kalahari Desert. Access to water is critical and the only surface water resources of significance are the Nossob River coming from Namibia and the Molopo River originating in Botswana and South Africa. Both of these rivers are ephemeral and although the floods in the upper reaches drain southwards towards the Orange, the rivers are endoreic downstream of their confluence and dissipate in the desert before reaching the Orange River. The proposed joint study by the ORASECOM on the Molopo-Nossob River System in the Orange River Basin, will determine the potential of this river system and enhance joint cooperation between Botswana, Namibia and South Africa. At the same time Lesotho will be able to share in the exchange of information and the building of capacity as far as resource potential investigations are concerned.

Botswana is contemplating to draw water from the Zambezi in the distant future to augment the existing North-South Carrier supplying the capital city, Gaborone. The city is located in the Limpopo Basin and can already receive water from the Molatedi Dam in the Limpopo Basin in South Africa. However, when a future link to the Zambezi is built through Botswana, there may be merit in increasing the capacity of such a water carrier from the Zambezi to transfer water to the highly industrialised Highveld of South Africa as well. Both Botswana and Namibia are riparian States of the Zambezi and the future transfer of water from the Zambezi to South Africa may require the blessing of Namibia and Botswana who both have interests on the Orange and Botswana on the Limpopo.

Botswana would therefore remain an important role player as far as the future augmentation of the water resources in Southern Africa from the Okavango River to the central parts of Namibia, or from the Zambezi River to Botswana itself or to South Africa is concerned. The importance of good neighbourliness between Botswana, Namibia and South Africa is clear.

Furthermore, it is technically possible to transfer water from the Lesotho Highlands to Gaborone instead of augmenting the North South Carrier from the Zambezi. In order to optimise these alternative solutions to meet future water demands, it will require joint planning on a regional scale between the Orange River Basin States, the Limpopo Basin States and the Zambezi River Basin States in particular.

The importance of the Orange-Senqu River Commission and the participation of Botswana as a "limited water contributing" basin State in the Commission should therefore not be underestimated as far as hydrological considerations with regard to regional and local water security in Botswana, Namibia and South Africa is concerned.

4.3 The Interests of Lesotho

Due to its topography, the Kingdom of Lesotho is in a position to dispose of its surplus water in a more beneficial way than to just allow it to flow downstream across its border into South Africa. The LHWP is a good example to show how Lesotho and South Africa are sharing in the benefits of using Orange River. The water is supplied under gravity from Lesotho into the Vaal Dam near Johannesburg. Lesotho receives royalties for the water conveyed to South

Africa while South Africa is saving the costs of pumping the water from the Orange after it flowed across the border from Lesotho into South Africa.

Lesotho is interested in utilising the financial benefits of the LHWP to supply more water and electricity to its people and to raise the standard of living for all by improving infrastructure, education, health, housing and the creation of jobs, but to name a few.

The Capital City of Lesotho, Maseru, is also in need of additional water supplies and the development of the proposed Metolong Dam in Lesotho will make an important contribution to reach this objective.

4.4 The Interests of Namibia

Namibia is heavily dependent on the availability of water along the lower Orange River. The possibilities for socio-economic development in the arid southern parts of the country are limited to extensive small stock farming, mining, irrigation and tourism. The water requirements for domestic use, a number of diamond mines, two zinc mines and the future development of the proposed Kudu gasfield power station at Oranjemund will require an assured source of water.

The main potential for development lies in irrigation and this will most probably create the highest demand for water. There is about 2 200 ha under irrigation along the Orange in Namibia and the present irrigation water demand is about 35 Mm³/a in comparison to the less than 10 for all the other uses mentioned above. One of the most significant and exciting developments along the lower Orange River in recent years is the production of export table grapes for the European and American market. About 1 000 ha have been developed at Aussenkehr and 50 Mm³/a have been allocated to new developers. The success of the industry has been firmly established and will provide seasonal job opportunities for as many as 10 000 people. It is clear that the future development of the labour intensive export grape industry is economically viable, but is heavily dependent on the availability of water.

The Namibian Government made an assessment of the reasonably expected development possibilities in Namibia along the lower Orange River and it is estimated that the long-term water requirements will be in the order of 200 Mm³/a. However, there is no dam on the Orange River along the common border between South Africa and Namibia, running from 20° longitude to the Atlantic Ocean. Namibia is therefore at present dependent on South Africa for river regulation and the release of water from the South African dams until such time as a storage dam has been built to provide for the Namibian needs in particular. This dam should preferably be located on the common border section of the river and the achievement of this objective will only be possible through joint cooperation between Namibia and South Africa.

Currently Namibia has a bilateral accord with South Africa to receive 50 Mm³/annum from the South African regulation dams on the Orange River. This accord was subsequently renegotiated to obtain access to an additional 60 Mm³/a until the end of the year 2007, by which time South Africa would need the water for itself. Both Namibia and South Africa have at least time until 2007 to find other alternatives to meet the needs of Namibia.

Namibia is therefore extremely concerned about its lack of access to a major dam that can store the seasonal runoff in the Orange River to meet the estimated future Namibian water demand. South Africa is also interested to improve the efficiency and management of the existing river regulating infrastructure on the Orange. The advantage of a re-regulating or storage dam on the Lower Orange is that it will facilitate the overall management of the water resources in the Orange River. It is also envisaged that the environmental integrity of the Lower Orange could be improved, especially the estuary that has been designated as a RAMSAR site by both South Africa and Namibia.

In view of these issues, the bilateral Permanent Water Commission commenced in October 2001 with a study into measures to improve the management of the Lower Orange River and to provide for future development along the border between South Africa and Namibia. This will include the possible development of a re-regulating or storage dam on the Orange River. The exact site of the dam will be determined during this study and a more detailed feasibility study will then follow.

4.5 The Interests of South Africa

The industrial heartland of South Africa straddles the watershed between four internationally shared river systems, namely the Limpopo, the Incomati, the Maputo and the Orange. It is therefore in the interest of South Africa to utilise these resources to support its economic development and a number of water transfer schemes have been developed to meet the water demand. Some of these projects have an influence on the availability of water on the Lower Orange River. See **TABLE 4**.

TABLE 4: WATER TRANSFER SCHEMES AFFECTING THE ORANGE

INTERNATIONAL SOURCE BASIN	NATIONAL SOURCE BASIN	INTERNATIONAL RECIPIENT BASIN	NATIONAL RECIPIENT BASIN	TRANSFER CAPACITY Mm ³ /a	
				IN	OUT
Maputo		Orange		81	
Orange			Buffels		10
Orange	-	Limpopo			765
Orange			Fish		643
	Tugela	Orange		680	
TOTAL				761	1 418

From the above it can be seen that about 1 400 Mm³/a can be exported and 760 Mm³/a imported into the Orange River Basin when it is required to do so.

Apart from the domestic, mining and industrial water requirements in the Vaal Catchment, an area of about 800 000 ha is at present under irrigation in South Africa. The South African interests in the Lower Orange are basically similar to the Namibian interests as stated in the paragraph 4.4, namely water for socio-economic development, domestic use, stock farming, mining, irrigation and tourism.

Most of the water demand on the Lower Orange is generated by irrigation, but water is used for domestic purposes at towns near the river and pumped to the towns of Pofadder, Aggeneis and Springbok, much further south of the river. Water is also supplied to a major rural water supply project in the Kalahari to the north of the river, as well as various mining developments within reasonable reach of the river.

An encouraging aspect of the new South African National Water Act (Act 36 of 1998) are the provisions made in Article 2. According to Article 2(i) South Africa will take into account its "international obligations" as far as the use, development, conservation, management and control of the water resources of international watercourses are concerned. The same applies to the protection and maintenance of water quality as reflected in Article 27 (j) of the said Act. The new water legislation is a clear demonstration that South Africa is committed to

its international obligations with regards to the access to water by downstream riparians. This is further strengthened by the proposed optimisation of water use from the Orange in South Africa. The inefficient use of water for irrigation, in comparison to industrial or other use, will be addressed and the provision of water for socio-economic, rural community development is also receiving attention and water for the irrigation of 4 000 ha has been earmarked for that.

According to estimates by South Africa, it will need further augmentation of its water resources by 2020, but the source of the water and the quantity that would be imported to or exported from the Orange River Basin has not yet been finalized. One possibility, after all the internal water sources such as the Tugela or the remaining Phases of the LHWP have been developed optimally, would be to utilize surplus water from the Zambezi River. In this regard Namibia and Botswana are Zambezi Basin States that might be able to support South Africa.

South Africa is anxious to improve the management of the water resources of the Orange. This can be achieved by the construction of a re-regulating or storage dam and is at present under investigation by the PWC as stated in paragraph 4.4 above. The activities of the PWC are reported at ORASECOM meetings to keep the other basin States informed about the work that is being done.

4.6 Joint Activities

All Parties in the Commission wish to share information on the river flow, droughts, floods, irrigation development, water use and infrastructure operations. Pollution must be prevented, water quality maintained and the ecological integrity of the watercourse secured. In this way it would be possible to ensure that the resources of the Orange-Senqu River is utilized optimally for the benefit of all Parties.

After its inception, the Commission managed to obtain financial support from several cooperating partners, including the German Government through the GTZ and the French Government through the FGEF, as well as the European Union. A number of joint projects are presently receiving attention. The support from the German Government includes the preparation of an integrated water resources management plan, a study to determine the need for a secretariat for the Commission and a number of capacity building activities for the Commission and other stakeholders in the basin. The French Government will assist with the feasibility study for sustainable water resource development on the Molopo-Nossob River System, other technical projects of transfrontier interest (groundwater in the Molopo "sponges" in Lesotho etc) and a project for the promotion of water conservation and environmental strategies.

The Commission provided the EU with a portfolio of projects relating to the harmonization of the legislation in the different countries, the study of transboundary aquifers, water demand management, a basin information system, capacity building and stakeholder participation.

It is clear that matters of joint interest must be pursued through a multilateral Commission and that is why it was so important to establish Orange River Basin Commission to take cognisance of all existing and anticipated developments in the whole Orange River Basin. It was also wise to retain the existing bilateral Commission arrangements on the Lower Orange and the Lesotho Highlands to ensure that all bilateral and multilateral interests will receive attention at the most appropriate level.

In this process there is ample scope to develop understanding and build trust between the Parties in order to achieve constructive cooperation. The study, planning and development of infrastructure projects for water supply, hydropower or irrigation will be done together and will not only be related to the Orange-Senqu Basin, but also at a more regional level because the Parties to the ORASECOM Agreement have interests in adjoining internationally shared river basins.

5 CONCLUSION

From the above it is clear that the four States in the Orange-Senqu River basin have taken all reasonable measures to strengthen their means to improve the integrated transboundary management of the water resources in the basin. This resolve culminated in the establishment of the ORASECOM and the Commission already embarked upon several studies to provide more information for constructive and realistic joint planning.

All Parties wish to create an enabling environment for entrepreneurship, private sector involvement and socio-economic development by determining the potential of the water resources of the river in order to facilitate further investments in agriculture, mining, industry tourism. The management of floods and droughts, as well as measures to improve the environmental integrity of the watercourse systems in the basin are other major priorities.

The present arrangements for joint management is already bearing fruit for all Parties concerned by reducing the potential for conflict, increasing cooperation and drawing the attention of several donors and other cooperating partners who are getting involved in supporting the activities of the ORASECOM.

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