





# CONTENTS

Foreword .....	2
ORASECOM publishes its “State of the Orange-Senqu River System” Report .....	2
Two major programmes draw to a close .....	3
The GIZ (BMZ/UKAID/AusAID) programme .....	3
The EU support programme .....	5
A Private-Public Partnership tackles Water Conservation and Demand Management ..	5
ORASECOM develops a project to deliver an Orange-Senqu <i>River Learning Box</i> .....	6
Towards Transboundary EA Guidelines for the Orange-Senqu Basin .....	6
Training Courses and Workshops .....	7
Training on Aquatic Ecosystem Health Monitoring .....	7
The Urban Pollution Workshop and Mohale Dam .....	8
The ORASECOM Secretariat takes delivery of a three dimensional map of the basin .....	8



## Foreword



Six months ago I suggested 'ORASECOM – KeNako, it is time!!!'. These last six months have certainly proven this. We have again made enormous progress since our last Newsletter, and now more than ever we are ready to start the formulation of our Basin Wide Plan.

During this last six months two of our ICP Programmes have wound up their activities. Phase 2 of the GIZ (BMZ/UKAID/AusAID) has left us with a basin wide model which will form the basis for analysing scenarios for the Basin Wide Plan, we now have environmental flows and states for key points in the River System, and the climate change work has provided us with possible climate change scenarios for the future.

The EU support programme has left us with options for the development, implementation and monitoring of the Basin Wide Plan, and has proposed the institutional arrangements to support this. This programme has also outlined Transboundary Water Quality and Aquatic Ecosystem Health monitoring programmes.

We have made progress towards establishing a Water Information System which will act as a portal for data and information on the basin. We have seen how the transboundary water quality monitoring programme can focus attention on potential urban pollution problems. The information collected in our Joint Basin Survey, which piloted the Aquatic Ecosystem Health monitoring programme, has been written up in a "State of the Orange-Senqu River System" booklet.

We have acted on the Honourable Minister's request to investigate the modalities of transboundary Environmental Impact Assessments, and have distilled clear recommendations for stakeholder participation structures for Council to consider. Work on the Orange-Senqu - *River Learning Box* is due to start soon.

We are getting more and more ready to take this common understanding of the basin forward into the next key phase of our development as a River Basin Organisation. Work on this has already started with the formulation of a proposal for a further phase of GIZ(BMZ/UKAID/AusAID) support, and with the initial work on the Strategic Action Plan and the National Action Plans.

I am increasingly looking forward to the challenges of the next few years, and I know that many others in ORASECOM, and our international cooperating partners share this enthusiasm.

**Lenka Thamae**

**Executive Secretary: Orange-Senqu River Commission**

## ORASECOM publishes its "State of the Orange-Senqu River System" Report

In the last Newsletter we described ORASECOM's first Joint Basin Survey (JBS-1). Water and sediment samples from over 60 sites, scattered across the whole basin, were analysed for water chemistry, metal pollution, and persistent organic pollutants.

Fish and bird eggs were analysed to determine if certain substances were bio-accumulating. Some 45 sites were assessed for Aquatic Ecosystem Health. The results of this survey are now available, and have been published in a series of detailed scientific reports, as well as a 'coffee-table' booklet for wider public consumption. These are available from the Secretariat.

*While certain river reaches show significant environmental degradation and pollution impacts, for the most part the River System is in a moderately modified state with some, but not significant, loss of species and habitat.*

While some of the sites sampled showed significant pollution problems and environmental degradation, for the most part the Orange-Senqu River System is in a 'moderately modified' state, and aquatic ecosystems seem to have retained most of their functions and species. However, some of the sites near the large urban and industrialised centres show a 'largely modified' state with significant loss of ecosystem functions and



species. Nevertheless, none of the sites sampled are in a pristine state, and the entire River System shows some human impacts.

Both total salt and nutrient concentrations increase significantly in the middle reaches of the Vaal River due to the intensive use of this part of the River System. The dominance of sulphate salts in this stretch of river is a good indicator of pollution from mining. However management of the salt concentrations in this part of the system has prevented long term increases in salinity. Nutrient concentrations, and particularly phosphates, have nevertheless shown a steady increase in concentrations since the mid-1990's. This is indicative of increasing nutrient loads from Waste Water Treatment Works.



Further downstream in the Vaal River large scale irrigation schemes increase the salinity of the river, with elevated concentrations of sodium and chloride salts. This is particularly a problem in the lower Riet River as a result of the Orange-Riet Irrigation Scheme. Both the Riet and Vaal Rivers are largely operated as closed systems, and salts tend to accumulate in the lower reaches of these systems.

Water quality along most of the length of the Orange-Senqu River System does not seem to be significantly degraded through pollution. Localised impacts have been noted along the Caledon/Mohokare River shared between Lesotho and South Africa due to industrial and urban pollution from Maseru. The Orange River maintains its natural chemical composition ('fingerprint') for most of its length. However, increases in salt concentrations and the increasing dominance of Sodium and Chloride salts downstream of Upington are indicative of a growing impact from the intensive irrigation along the lower reaches of the river.



Both organic pollutants and metals concentrations are only found in low concentrations throughout the basin, with the exception of a few 'hot spots'. However, there is some evidence that both metals and dioxin concentrations are higher near the urban centres. The spikes in the concentrations of organic pollutants at some points in the system may be related to localised sources. There is some evidence that some organic pollutants are accumulating in bird eggs and fish tissue.

## Two major programmes draw to a close

Two of our International Cooperating Partner programmes have drawn to a close over this last six months leaving a sound basis for our on-going work.

### Phase II of the GIZ(BMZ/UKAID/AusAID) programme

The GIZ(BMZ/UKAID/AusAID) phase 2 support aimed at enlarging and improving the existing models for the Orange-Senqu Basin, to incorporate all of the essential components in all four Basin States. A key objective of this process was to develop models that were accepted by each of the Contracting Parties, and which could serve as a basis for developing the Basin Wide Plan. The models developed in this process can now be used to explore a range of scenarios for meeting the water needs of the Parties, without compromising basin wide water security. These models will enable ORASECOM to propose infrastructure and operational options to address the growing water needs of the region in a manner which is aligned with the principles of the Revised SADC Protocol on Shared Watercourses.



Overall the project comprised six "work packages"; all of which provided some basis for the development of the Basin Wide Plan. This included work packages central to the further development of the basin water availability models, including the updating and expansion of the Water Resources Yield Model to cover the whole basin,



and enhancing the model output through a more complete hydrology. Other work packages provided better and more complete water quality information, determined possible climate change impacts and adaptation options, as well as the determination of environmental flow requirements at key points. Scenarios for improved water demand management in the key irrigation sector were also investigated.

This work has generated a number of important theme-specific reports and other outputs under each of the work packages. In addition a short Overall Project Executive Summary, which provides an overview of activities, outputs and both theme-specific and general conclusions and recommendations has been produced. Most of the outputs are accessible through the project website. Those which were just too big to place on the site have been supplied to the Secretariat and Contracting Parties on computers and portable hard drives. The contents of the project website will be migrated over to main ORASECOM website in the very near future.

The key conclusions and recommendations from the study are;

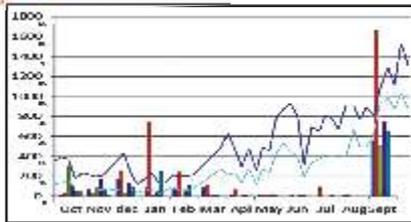
- **Improved knowledge of the resource base.** A main input for the yield and planning models is hydrological data. Long historic records are important in establishing reliable estimates of yields and reliable real-time data are required for operational planning. **A major drive at improving the quality of data from key river gauging stations and efforts to improve the rain gauge network is required;**
- **Improved Water Resource Modelling and increased Basin-wide Transparency.** Efforts have been made to expand and enhance the existing water resources models and to capacitate decision-makers and experts in all basin states. **Continuous upgrading of the models as well as regular capacity building should be an essential part of the on-going work;**
- **Reduced water demand.** Overall water demand should be reduced, or at least growth rates must be kept to very low levels.
  - The irrigation sector has to be made more efficient. Priorities **include accelerating the creation of water user associations** and empowering them. **Measurement and billing volumetrically is essential** for other water demand management measures to follow.
  - Water demand management in the urban environment already receives attention but more is required. **Leakage management and other water demand management initiatives should be vigorously pursued;**
- **Environmental Flows**
  - Now that environmental flow requirements for different ecological states have been established, there is a need for the basin states to agree on what ecological **states should be maintained in the future** and the **means to monitor this.**
  - **An extensive and joint monitoring system should then be implemented.** It is strongly recommended that an Ecological Water Resources Monitoring (EWRM) programme is initiated as soon as possible. The **monitoring of essential Goods and Services** should be included as part of the EWRM;
- **Climate Change.** There is a need to prepare for the impacts of climate change and also to continually improve estimates of the anticipated climate change :
  - **The 'downscaled' climate change model should be fine-tuned** for the region and incorporation of further technical improvements such as improved convection scheme.
  - The improved downscaled model could be used **to focus on particular areas** by doing high resolution runs. The source areas such as the Lesotho Highlands would be obvious targets.
  - Improved accuracy of Global Climate Change downscaling relies on large and good quality climate observation datasets. **There is a need to improve the meteorological network especially in the source areas.**
  - **Design of a flexible adaptation strategy** for the different parts and livelihoods around the basin;
- **Water Quality.** There is a need to concretize the joint basin-wide initiative of water quality monitoring at critical points and to make this part of the overall resource modelling process throughout the basin. Phase 3 of GIZ (BMZ/UKAID/USAID) support should **see implementation of the water quality monitoring programme.** During this process capacity-building should continue.

## The EU's African Transboundary River Basin Support Programme: Case of the Orange-Senqu in Botswana, Lesotho, Namibia and South Africa

The EU support has provided a different, but still critical support role for ORASECOM. Rather than focus on the delivery of technical tools and a common understanding of basin characteristics, the EU programme has focussed on working with us to better understand our mandate and how we can best support the Parties with technical advice. The key contributions from this programme have been the establishment of the ORASECOM Communications Strategy, and the production of a wide range of awareness and promotional items over the 3 ½ years of the project - including the initiation of these Newsletters.



The EU programme has also gone a long way towards helping ORASECOM understand its legal mandate, and the core components of international water law. Other key contributions have been the Delphi process which helped us understand the way the Basin Wide Planning process could unfold by aligning and coordinating existing national and bilateral planning processes - ultimately leading to the reasonable and equitable use of all the waters of the Orange-Senqu System. This work also helped us understand the institutional requirements for ORASECOM's evolving role in the basin, as well as the way in which we can start engaging stakeholders. The key recommendations emerging from these processes will now be discussed in Council.



However, the EU project also made its contribution to the more technical aspects of the work of the Commission. The programme's contributions to Water Resources Quality Monitoring have included the development and testing of an Aquatic Ecosystem Health monitoring programme, and the development of a Transboundary Water Quality Monitoring programme - which has already proven its worth in the Urban Pollution Study. The EU support programme has therefore made a significant contribution to understanding ORASECOM's core business, as well as undertaking technical studies that equip the Commission for this future role.

## A Private-Public Partnership tackles Water Conservation and Demand Management in the urban setting

ORASECOM, together with our partners in GIZ and Sasol, have been instrumental in driving the development of a public-private partnership to reduce water demands and address leakages in a Municipal setting, specifically the Emfuleni Local Municipality on the Vaal River. A project to reduce water consumption has been initiated which will include; retrofitting of household and public fixtures, training of local technicians on installation of water conservation/demand management facilities, awareness and training for schools and communities, as well as the establishment of water-wise gardens.

It is hoped that this range of methods will realise water savings of up to 15%.

GIZ, through their Private-Public Partnership and the SADC Transboundary Waters Programmes, and Sasol have each committed ZAR 5 million to the project. ORASECOM and SADC will be documenting lessons learnt, as well as the technical approach adopted with a view to replicating of the model in other Municipalities in the Orange-Senqu Basin and also the wider SADC region. This project will be formally launched on 8th September 2011 in Midrand, South Africa.



## ORASECOM initiates work on the Orange-Senqu: River Learning Box



The project formulation team at Mokolodi, and WESSA in Howick.

ORASECOM has been working with the Mokolodi Environmental Centre in Botswana; the National Curriculum Development Centre (NCDC) in Lesotho; the Desert Research Foundation-Namibia (DRFN) in Namibia; and the Wildlife and Environment Society of South Africa (WESSA) in South Africa to develop a *River Learning Box* project proposal. This work has been backed by technical and financial support from GIZ(BMZ/UKAID/AusAID) and UNDP-GEF Supported Project.

Good habits formed at youth  
make all the difference.  
- Aristotle

*The River Learning Box* was first mooted by the ORASECOM Roadmap Towards Stakeholder Participation in 2007. However, the idea really took root after a visit to the International Commission for the Protection of the Danube River Basin (ICPDR) in 2008. The ICPDR had already developed and distributed a Danube Box with great success. The idea, emerging from that visit, was to develop an adapted version of the Danube Box for the Orange-Senqu River Basin. Importantly, the Orange-Senqu *River Learning Box* will now benefit from this North-South Cooperation in the form of a twinning arrangement between two river basin organisations.

Work on the Orange-Senqu *River Learning Box* began in earnest in 2010, and since then a number of workshops have been held to refine a detailed project proposal. The final proposal prepared in July 2011 outlines a project to provide educational resource materials for 10-12 year old school children. These children will, through this project, learn to understand and promote sustainable water resources development and management in the Basin. These learning objectives will be achieved through the *River Learning Box*, as well as associated capacity building processes to support teachers to plan and implement lessons and activities for this age group.

The goal of the River Learning Box project is to ensure basin-wide outreach, wide-spread information dissemination and support active learning processes in formats that are easily accessible to 10-12 year old school children. The material will become a living resource, and teachers will be encouraged to progressively add more recent materials to ensure that the River Learning Box remains relevant and up-to-date. The long-term changes expected to come about as a result of this project are:

The goal of the River Learning Box project is to ensure basin-wide outreach, wide-spread information dissemination and support active learning processes in formats that are easily accessible to 10-12 year old school children. The material will become a living resource, and teachers will be encouraged to progressively add more recent materials to ensure that the River Learning Box remains relevant and up-to-date. The long-term changes expected to come about as a result of this project are:

The goal of the River Learning Box project is to ensure basin-wide outreach, wide-spread information dissemination and support active learning processes in formats that are easily accessible to 10-12 year old school children. The material will become a living resource, and teachers will be encouraged to progressively add more recent materials to ensure that the River Learning Box remains relevant and up-to-date. The long-term changes expected to come about as a result of this project are:

- Increased awareness among teachers, and school children about sustainable and trans-boundary water resources development and management;
- Improved appreciation, use and management of water resources among the youth;
- Young people engaging in action learning for a living river.

### Towards Transboundary Environmental Assessment Guidelines for the Orange-Senqu River Basin

Environmental Impact Assessments (EIAs) are normally required by most countries' legislation prior to initiating any larger scale project, and are a standard requirement for grants or loans from most development agencies and multilateral development banks. However, there are particular challenges for EIAs with transboundary impacts, as the possible transboundary impacts of any proposed developments also need to be considered.

Globally the most significant instruments with regard to transboundary impact assessments are the "1991 Convention on Environmental Impact Assessment in a Transboundary Context" (the so-called Espoo Convention) and the "2003 Protocol on Strategic Environmental Assessment" to this Convention (the so-called Kiev Protocol), which establish a regime for EIAs in a transboundary context and for assessing any cumulative impacts that may result, respectively. While open to non-European signatories, the Espoo Convention is primarily used by European states. Similar frameworks have not yet emerged in other regions, including the Southern African Development Community (SADC).

All four of the Contracting Parties to ORASECOM have nevertheless developed national environmental legislation that recognises the need for EIAs. Likewise, the raft of legislation recognises the need for assessing any potential transboundary and / or cumulative impacts of developments. However, the procedures for assessing these potential impacts and more specifically the cross border consultation with stakeholders require further elaboration. As a result, on the occasion of the World Water Day in March 2011, the Honourable Ministers responsible for water in the Parties recognised the need for developing such procedures and instructed the Commission to develop Transboundary EIA procedures. The UNDP-GEF supported Project has committed to facilitating this process, through the development of Transboundary Environmental Assessment Guidelines.

The purpose of these Guidelines is to:

- Highlight the issues of concern in the Orange-Senqu Basin, especially how transboundary impacts on the river and associated habitats could impact on future livelihood and development options;
- Provide guidance on how transboundary impacts should be assessed, using Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) tools;
- Advise on how best to develop or strengthen the legal and administrative instruments, in the context of notification under the ORASECOM Agreement.

The Guidelines are primarily intended for people who have to make decisions on environmental issues through the impact assessment process; namely: national, provincial/state and local authorities who comment on impact assessment reports and who make decisions about the environment and development.

An *ad-hoc* Working Group has been established to ensure input to drafting the Guidelines from all the parties. This Working Group met for the first time on 16 August 2011, and discussed the annotated outline of the Guidelines. Further consultations in all the Member States have been planned. A well advanced draft will be tabled at the Council meeting of October 2011.

## Training Courses and workshops

***ORASECOM has continued to build the skills of staff in the Member States through training programmes and workshops. These not only provide the opportunity to share ideas and experiences, but also to gain from the depth of experience we have in four Contracting Parties.***



Trainers and trainees along the banks of the Vaal River

### Training on Aquatic Ecosystem Health Monitoring

ORASECOM has developed an Aquatic Ecosystem Health Monitoring programme, which includes biannual assessments of aquatic ecosystem health at 45 sites using the South African Scoring System (SASS5) or the Namibia Scoring System (NASS2). This regular monitoring would be supplemented by a more comprehensive monitoring of a range of bio-monitoring protocols every 5 years.

However, as there were very few specialists to undertake this kind of monitoring, the EU project support also included a training course in monitoring Aquatic Ecosystem Health. Recognising that the full accreditation in the SASS5 protocol required people with several years of experience, we decided to rather train a larger group of people in the miniSASS methodology. This is a simplified methodology that would initially provide a useful indication of the overall health of the river system, but would allow trainees to gain experience in the techniques and hence providing a platform for later accreditation. Trainees were also provided with all the sampling equipment, so that they were completely capacitated to start regular miniSASS sampling throughout the basin.

A group of 12 trainees from all 4 ORASECOM Member States therefore gathered at Parys along the Vaal River for a 4 day course on aquatic ecosystem health monitoring. While the course material covered all aspects of monitoring the ecosystem health of rivers, backed up by practical experience in the field, it focussed on building the trainee's competency in the miniSASS methodology. The expert trainers provided a post-course evaluation - indicating that all the trainees were capable of providing reliable miniSASS results.

## The Urban Pollution Workshop at Mohale Dam

**Urban pollution remains one of the biggest threats to aquatic ecosystems, human health and the costs of treating water to potable standards. However, the geographical extent of this problem is largely unknown. This was the subject of a short assignment undertaken by the EU support team.**

The EU programme supported a scoping study on the extent of the urban pollution problem in the Orange-Senqu Basin. This study identified the main urban pollution "hot spots" within the river basin through population density data, estimates of the volumes of urban effluents, as well as water quality data.

The study included an assessment of the legislation in each of the ORASECOM Member States, and efforts being made by the Parties to tackle the problem. However, given the complex nature of urban pollution, the project team held a workshop at Mohale Dam in Lesotho. The aims of this workshop were to:

- Present the preliminary results of the study to specialists from each Member State.
- Ensure the country specific facts and assessments were correct.
- Gather more information from the participants where necessary.
- To discuss key aspects of the urban pollution problem, and to share ideas and best practices.



Urban pollution specialists meet at Mohale Dam in Lesotho

This assignment has shown that while localised urban pollution can occur in any of the cities and towns scattered across the basin; the most significant regional problems occur in the Gauteng area of South Africa, and along the middle Vaal River. There is evidence that this problem is worsening. Other regional water quality problems from urban centres seem to occur along the Riet / Modder Rivers downstream of Bloemfontein, and along the Caledon/Mohokare River downstream of Maseru. The latter area is the only clearly transboundary urban pollution study. However, Lesotho has taken steps to address the problem through the establishment of a joint committee between all the role players. Additional management options may emerge from the Basin Wide Plan.

## The ORASECOM Secretariat takes delivery of a three dimensional map of the basin.

**It has been remarked before that; those involved in ORASECOM from each of the Contracting Parties often did not know the whole basin.**

One of the more unique characteristics of the Orange-Senqu basin is its diversity. The basin ranges from the mountainous and wetter Lesotho, to the deserts of the lower Orange River - from the densely populated, urbanised and industrialised Gauteng region with its intensive mining to the very sparsely populated Botswana and Namibian portions of the basin. The basin has 11 distinct ecological regions -each characterised by a unique natural vegetation, geology, and climate.



However, understanding this diversity is important to develop an appreciation of the challenges ORASECOM will face in developing a Basin Wide Plan. The basin tour, conducted at the start of the GIZ(BMZ/UKAID/AusAID) Phase 2 support, and the Joint Basin Survey went some way towards addressing this. However, it has hitherto been difficult to visualise the basin as a whole. The EU programme therefore supported the development of a large scale 3 dimensional geographical model of the whole basin.

This model based on NASA images taken in February 2009 shows the main topographic features of the basin, but also the land cover types. The detail of the map, and the image overlay provides a wealth of information on the key features of the basin, showing the main irrigation areas, mountains, valleys, degraded areas, vegetation types, and deserts. The Secretariat took delivery of this map in August 2011.

This 3D map will form a useful backdrop to discussions on the basin, and will allow visitors to the Secretariat to get a quick overview of the basin. Newcomers to ORASECOM, who may start working with the organisation, can use this map to rapidly gain an appreciation of the extent of the basin and its key features.



[www.orasecom.org](http://www.orasecom.org)