

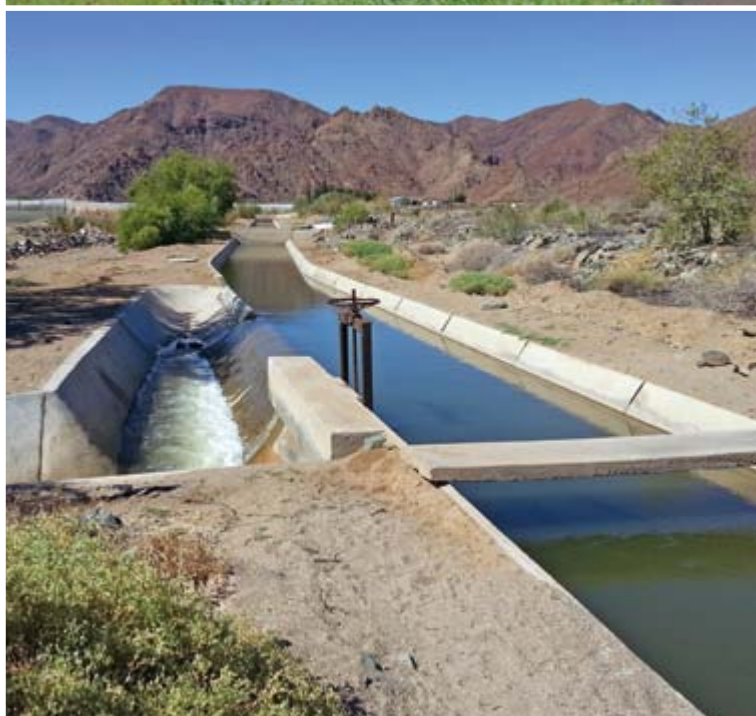


ORASECOM

THE ORANGE-SENQU RIVER COMMISSION

NEWSLETTER

No. 5, May 2014





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Cover photographs, clockwise from top left: Visiting Lesotho's highland sponges on the Khubelu Sponges Project, © KSP; rehabilitating degraded dunes in south-eastern Botswana, © UNOPS/Abigail Engleton; sampling fish for determining environmental flows in the Fish River, © Andrew Deacon; supply canal, Noordoeuer–Vioolsdrift Irrigation Scheme, © Francois du Plessis, MBB

This page, top to bottom: The Senqu River near Mount Moorosi, Lesotho, © UNOPS/Zachel Koorzen; flood irrigation of maize field, © Hermie Sutherland; aerial view of the lower Orange River, © UNOPS/Christoph Mor

Opposite, top to bottom: Orange River mouth, © Spaggs Spaggiari; V-notch for measuring off-take, Noordoeuer–Vioolsdrift demonstration project, © UNOPS/Christoph Mor; diverse vegetation in the Lesotho Highlands, © Teboho Maliehe

Back cover: Water storage tank in south-eastern Botswana, © UNOPS/Zachel Koorzen

FOREWORD

The past few years have been a productive and exciting time for ORASECOM. We have proactively and tangibly advanced towards an improved and integrated approach for the management of the Orange–Senqu River basin. This has been enabled by the generous and much-appreciated support of our international cooperating partners (ICPs). With their support, we have defined a vision and identified strategic objectives for ORASECOM; identified priority transboundary environmental problems and how to address them through the Transboundary Diagnostic Analysis (TDA) and Strategic Action Programme (SAP) process; and are well on our way in drafting a comprehensive Integrated Water Resources Management (IWRM) Plan for the basin. Through collaboration and conscious effort to dovetail the SAP and IWRM Plan processes – our two main projects – the SAP is now recognised by ORASECOM and its partners as the environmental component of the IWRM plan.

We have also had some extremely encouraging results demonstrating practical solutions with our basin communities to address some of our most pressing problems. Interventions to address land degradation in rural Lesotho and south-eastern Botswana have shown that it is possible to rehabilitate the land and thereby improve local livelihoods and safeguard our water resources. Other efforts have demonstrated methods that improve water efficiency in our biggest water-user sector, irrigation. These demonstration projects provide a strong foundation for future participatory efforts planned with local-level stakeholders in the implementation of our SAP and IWRM Plan.

Research and field investigations over the past few years have helped us better understand various aspects of our basin – especially concerning environmental flows required to improve ecosystem integrity of the lower basin, and pollutants in our basin-wide surface water resources. To enable the Commission, its member states, partners and stakeholders to manage, access and share such information and data, a cutting-edge water information system (WIS) has been developed with support from GEF – a milestone.

Another noteworthy development is the recommendations guiding transboundary environmental assessments, which we hope will soon be adopted by our basin states and piloted during the implementation of the various developments planned for the basin. We will keep you posted on this and other ORASECOM activities through future issues of the newsletter and our website, www.orasecom.org.

Have a great read! ■

Lenka Thamae
EXECUTIVE SECRETARY
ORASECOM



BASIN-WIDE INTEGRATED WATER RESOURCES MANAGEMENT PLAN

Steve Crerar, Consultant Team Leader & water resources management expert

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© Derek Weston

Participants at a recent Regional Working Group workshop

Following the preparatory two phases of the GIZ-supported *Orange-Senqu Integrated Water Resources Management (IWRM) Plan*, Phase 3 aims to establish the IWRM Plan. The plan will provide a framework for management, development and conservation of water resources in the Orange-Senqu River basin, serving to advise parties on optimising overall water resources utilisation.

Amongst others, the IWRM Plan will:

- set out the short- and long-term actions to achieve the strategic objectives of ORASECOM
- signify the transition of ORASECOM from reactive to pro-active mode as envisaged in the ORASECOM Agreement
- be comprehensive and inclusive
- identify activities to be implemented collectively as well as separately by all the Parties, with ORASECOM activities developed at a higher level of detail
- provide a framework to enable the

basin to realise economic and social benefits through better water resources management in the future

- strive to link the water sector with national economic growth and poverty alleviation strategies, using it as a means to achieve economic and social development.

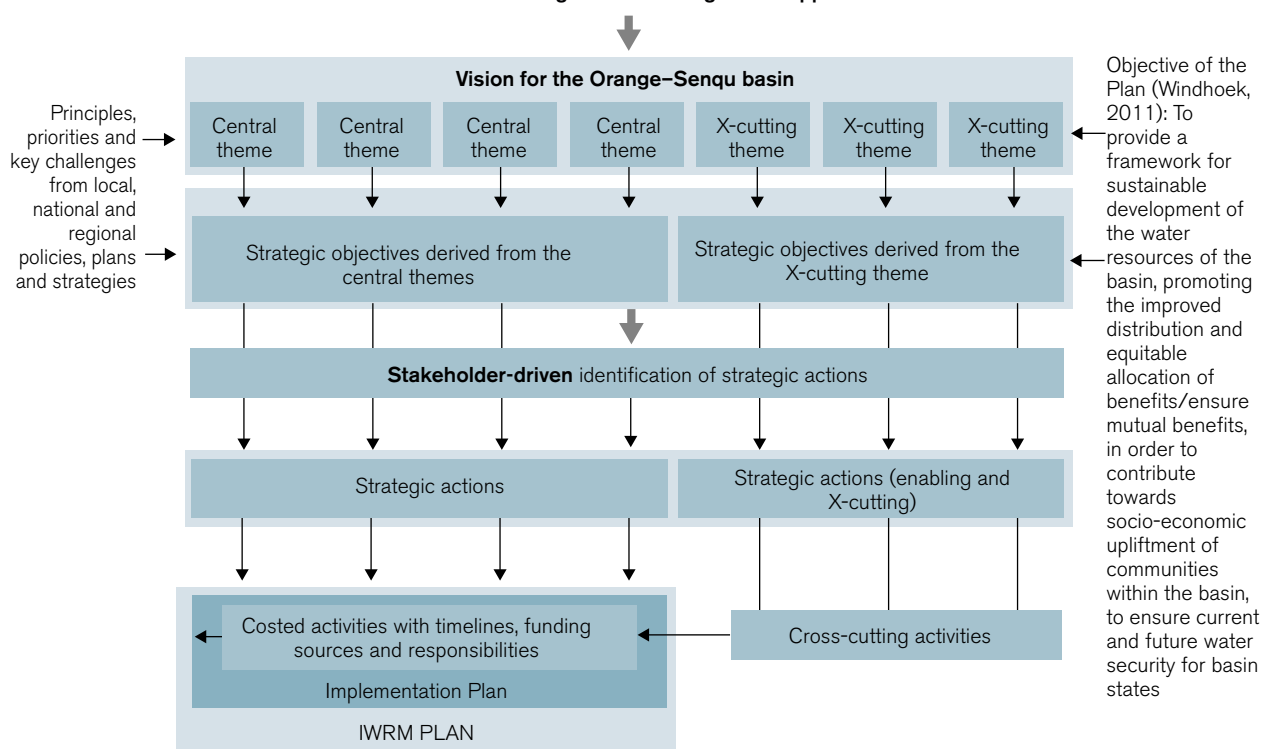
In October 2013, regional stakeholders agreed on a vision and strategic objectives of the Orange-Senqu basin (see flow chart). Since then, work has progressed on identifying the strategic actions that will form the plan.

More recently, possible water resources development and management scenarios are being investigated to allow their results to be compared with stakeholder-developed evaluation criteria. The first draft of the IWRM Plan was discussed and further developed at a regional workshop in mid-May 2014. ■

Situational analysis based on previous work

(IWRM phase 1 and 2, TDA, EU and FGEF support)

Water resources management challenges and opportunities





Photos © Cryton Zazu

‘LEARNING BY DOING’: THE CASE OF BOKSPIT DEMONSTRATION PROJECT

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The *Bokspit Integrated Water Resources Management (IWRM) Demonstration Project* in Botswana is one of the two SADC projects being implemented in the Orange–Senqu River basin. This project draws on the lessons learnt from similar projects implemented within the river basin, such as the community-based rangeland management project in south-eastern Botswana done through the UNDP–GEF Strategic Action Programme.

One of the key objectives of the SADC IWRM community projects is the need to ensure meaningful participation of all stakeholders in the management planning of local water resources. Active participation by local people allows for ‘learning by doing’, which enhances their capacity to manage their water resources.

In the *Bokspit IWRM Demonstration Project*, such active and meaningful participation was a major factor in the planning stage. It involved all key stakeholders in the community ranging from government officers, school teachers, women and children, to traditional leaders.

The community planning process in Bokspit lasted three days and involved the use of participatory methodologies such as focus group discussions, debates and mapping. The community had an opportunity to map and audit their own water resources, identify problem areas and propose possible interventions. This process enabled them to gain deeper insights and knowledge into how to better manage their local water resources. The planning processes in Bokspit therefore illustrated the case for ‘learning by doing’ as an effective approach to incorporating multi-sectoral participation in IWRM at local level. ■



Top: Youth leading the mapping processes

Bottom: Tapping the knowledge of the elderly on the locations of local water resources



© KSP

Range ecology demonstration
for KSP stakeholders by
range management expert

KHUBELU SPONGES PROJECT, LESOTHO

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The *Protection of the Orange–Senqu Water Sources Project* (2013–2015) supports ORASECOM in the implementation of a pilot intervention for the protection of the Orange–Senqu sources, contributing to the SADC Regional Strategic Action Plan on Integrated Water Resources Development and Management. The project is financed through the *Transboundary Water Management in SADC Programme*.

The implementation process of the Khubelu Sponges Project (KSP) emulates the *National Wetlands Conservation Strategy 2013/14–2017/18*, developed under the *Wetlands Restoration and Conservation Project* (WRCP) of Lesotho. The KSP aims to achieve the goal of the strategy, of protecting and sustaining wetlands in a healthy status through applying appropriate land management and water conservation principles and techniques, while optimizing their wise utilization for socio-economic benefits for Basotho, through piloting a holistic approach to protect and conserve the sponges in the Khubelu catchment.

The objectives of holistic management include introducing rotational grazing, systematic herding and capacity-building strategies for local farmers and their herders.

Conventional grazing patterns in the Lesotho Highlands allow stock to graze palatable grasses in an uncontrolled way, leading to loss of soil nutrition and the inability of nutritious grasses to re-establish themselves. Holistic management, however, requires stock to be grazed in herds that are moved in patterns through a series of 'paddocks', pre-determined by a grazing regime agreed on through participatory planning with relevant farmers' groups.

The project aims to address challenges associated with range management and wetland rehabilitation identified in the feasibility study. At this half-way stage of implementation, participatory re-planning activities are presently taking into consideration time and remaining budget for the most effective way forward. ■

ORANGE-SENQU STRATEGIC ACTION PROGRAMME

This four-year ORASECOM project, funded by the Global Environment Fund (GEF) through the United Nations Development Programme (UNDP) and executed by the United Nations Office for Project Services, has assisted the basin states to identify principal threats to the water resources of the Orange–Senqu and to develop a sustainable programme of reforms, actions and investments to address these. The objective of implementing such initiatives contributes towards ORASECOM's programmes and the long-term goal of sustainable development of the Orange–Senqu River basin.

The project adopted a *transboundary diagnostic analysis* (TDA) and *Strategic Action Programme* (SAP) process to meet its objective, while concurrently

implementing a number of sub-projects and activities to help strengthen ORASECOM, fill knowledge gaps, and raise awareness and encourage participation of the public.

Through its activities, the project has supported ORASECOM in four main areas:

- strengthening institutional capacity
- developing a comprehensive description of the basin and analysis of transboundary problems, and filling knowledge gaps through research
- piloting techniques and methodologies to address priority transboundary problems for potential wider application
- raising awareness and encouraging participation of different audiences through a variety of means.

The key strategic outputs of the project are national action plans for each of the

basin states and a basin-wide *Strategic Action Programme for the Orange–Senqu River Basin* (SAP) towards the improved and sustainable management of the basin's resources.

These have been developed through an integrated and participatory approach and are based on findings of the technical and research aspects of the project. Currently in the final months of the project, ORASECOM now seeks ministerial endorsement from its member states – Botswana, Lesotho, Namibia and South Africa – for the formal adoption and implementation of the SAP.

Information on various components of the project are summarised in this newsletter; for more information on the project and its activities, visit wis.orasecom.org. ■

The Transboundary Diagnostic Analysis

The *Orange–Senqu River Basin Transboundary Diagnostic Analysis* (TDA) is based on preliminary findings and recommendations of scientific studies (the preliminary TDA) adopted by ORASECOM in 2008. This latest publication provides a revised scientific and technical basis for making decisions on how to tackle transboundary issues in the basin. It is aimed at governments, industry, academia, civil society and environmental groups in the four basin states.

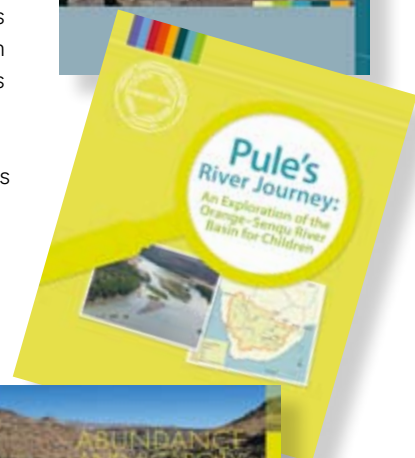
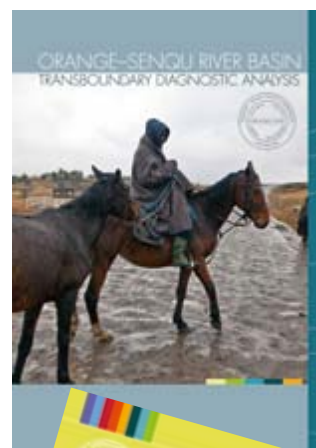
The first step in compiling the TDA was to agree on the transboundary problems and prioritise them. Stakeholder consultations conducted during the preliminary TDA identified major issues of concern in the basin. These included increasing water demands, changes in flow, declining water quality, and land degradation, including the spread of alien invasive species. Loss of biodiversity and the impacts of climate change were considered cross-cutting issues. The preliminary TDA was produced through gathering and interpreting information on environmental impacts and the socio-economic consequences of each problem, and developing preliminary causal chain analyses (CCAs).

Since the production of the preliminary TDA:

- knowledge gaps were filled and pilot projects initiated to address issues following recommendations of the preliminary TDA
- CCAs were reworked with stakeholders in the light of new information, which also identified points of intervention
- a comprehensive description of the basin and analysis of the transboundary issues were compiled
- drafts of the final document were made widely available for review and comment.

The document provides the basis for strategic planning to address problems identified at both national and basin-wide levels. Resulting planning documents – the *Strategic Action Programme for the Orange–Senqu River Basin* and four national action plans – outline appropriate and agreed management responses to address the problems identified in the TDA.

The main messages in the TDA have been distilled into two less-technical publications aimed to reach a wider audience, *Abundance and Scarcity: The story of water in the Orange–Senqu River Basin*, and *Pule's River Journey: An Exploration of the Orange–Senqu River Basin for Children*. A number of posters are also in production. All these publications are available from wis.orasecom.org. ■



Plans to address priority transboundary problems

Developed through a stakeholder participation process, the *Strategic Action Programme for the Orange–Senqu River Basin* (SAP) for the joint management of the basin's natural resources and the four countries' related Action Plans are the key strategic outputs resulting from the findings of the *Orange–Senqu River Basin Transboundary Diagnostic Analysis* (TDA). ORASECOM now seeks ministerial endorsement from the member states – Botswana, Lesotho, Namibia and South Africa – for the formal adoption and implementation of the SAP.

The SAP is designed for joint implementation by the Orange–Senqu basin states and has an overarching objective defined as: 'Orange–Senqu basin states collectively reduce water pollution, control catchment degradation and mitigate the effects of environmental degradation.'

Demand for water is predicted to increase with economic growth and development. In essence, the central aim of the SAP is to ensure that the basin's environmental functions and services are maintained at levels that are adequate to sustain livelihoods and economic development in the light of predicted future population increase, economic growth, rising living standards and the possible effects of climate change.

In the context of the Orange–Senqu River basin, the SAP is closely linked to the basin-wide Orange–Senqu Integrated Water Resources Management (IWRM) plan, as are the Action Plans. All of these planning documents are developed for a ten-year horizon with targets set for that period.

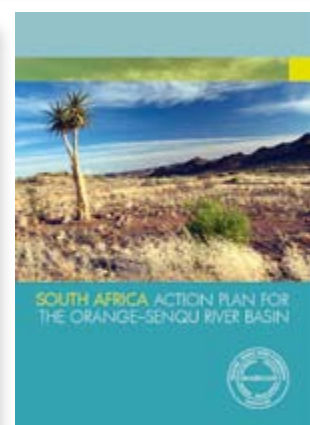
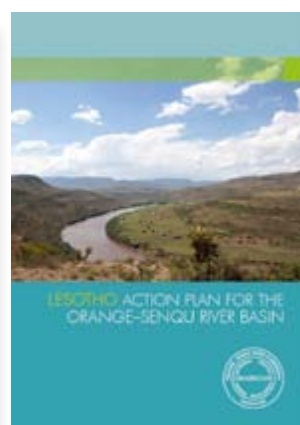
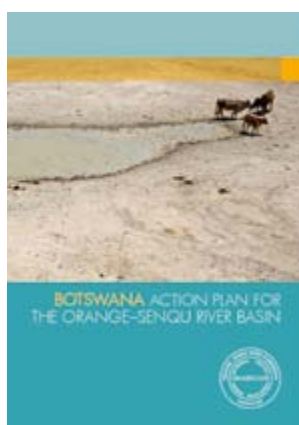
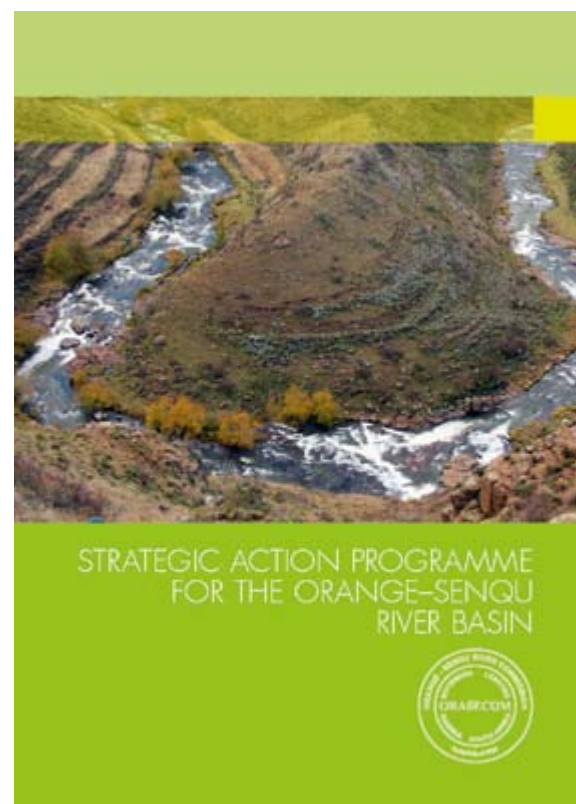
The SAP conceptualises basin-wide projects in five areas to address priority transboundary problems:

1. ORASECOM information and knowledge management
2. groundwater management and use
3. basin-wide environmental flows regime
4. Orange–Senqu River mouth management
5. control of alien invasive species.

Likewise, the four Action Plans elaborate project concepts that support these areas to address transboundary problems at a national level.

Funding will be sought for each project, either individually or for a combination of projects. Potential funding sources are expected to be primarily national governments, international cooperating partners and, to some degree, the private sector.

It is envisaged that the Action Plans and SAP will be available for download at wis.orasecom.org by the third quarter of 2014. ■



RESEARCH PROJECTS

Efforts have been made to fill knowledge gaps identified in the preliminary transboundary diagnostic analysis (TDA). The research projects, with short descriptions below, are summarised in this newsletter and further information can be found on <http://undp.orasecom.org/>.

- The levels of POPs, PAHs and heavy metals in sediments, fish and the eggs

of water birds were surveyed throughout the basin, providing a first approximation for many of these chemicals and health risk assessment.

- The hydrology of the basin has been further analysed and recommendations were made for improved understanding of the basin's water balance.
- Through cooperation with the Benguela Current Commission and their UNDP–

GEF-supported Strategic Action Programme, impacts of the Orange–Senqu River system on the marine and coastal environment were assessed.

- Determination of the environmental flow requirements of the Fish and lower Orange rivers and estuary was carried out to provide guidance to the basin states on strategies regarding the release of water from dams. ■

Determining levels of POPs and heavy metals in our water resources

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Very little was known about the distribution and levels of persistent organic pollutants (POPs) and metals in the Orange–Senqu River system before this investigation was launched in 2010. A survey was undertaken to assess levels of these and polycyclic aromatic hydrocarbons (PAHs) in water bodies under the umbrella of ORASECOM's 2010 Joint Basin Survey. The survey focused on river and wetland sediments, fish tissue

and bird eggs, as pollutants are known to accumulate in these. Water quality experts from North-West University sampled sediments at 61 sites, 33 of which were in the Vaal sub-basin, and fish tissue and bird eggs at five sites.

This reconnaissance survey determined the extent of the problem across the basin rather than the sources of pollutants. It has helped identify areas of concern and issues requiring further investigation. A report on the study can be downloaded at wis.orasecom.org. A second, follow-up study focusing mostly on perfluorinated compounds in Lesotho and the Vaal sub-basin, is being carried out by the School of Environmental Sciences and Development, North-West University. ■



A member of the team working on the ORASECOM survey of persistent organic pollutants and heavy metals collects fish in Parys on the Vaal River.

© UNOPS/Christoph Mor



© Council for Scientific and Industrial Research, South Africa

After exceptional rains in 1988, the Orange River flooded through the sand barrier at the mouth, muddying the ocean.

Determining **environmental flow requirements** of the Fish and lower Orange–Senqu rivers and estuary

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This project addressed the environmental flow requirements of the ephemeral, but nevertheless important Fish River, and the Orange–Senqu River from its confluence with the Fish River downstream, with special attention to the estuary.

The need to establish the flow requirements of this section of the river became increasingly urgent because two large dams, the Vioolsdrift on the lower Orange and the Neckartal on the Fish are at an advanced state of planning. These lower areas of the basin are ecologically important and sensitive.

The water resources of the Orange–Senqu and its tributaries are vital for supporting the ecological balance of the area and the livelihoods of people there. High demands are estimated to have reduced the amount of water reaching the mouth to approximately 40% of the average annual natural flow.

The establishment of integrated basin-wide environmental releases is central to mitigating the effects of reduced water resources and changes in flow patterns. This work will contribute towards the determination and implementation of synchronised catchment releases proposed in the *Strategic Action Programme for the Orange–Senqu River Basin* to ensure appropriately timed flows that sustain the aquatic ecosystems and the services they provide, while meeting the demands of the population.

More information on this project can be found at the study website (<http://wis.orasecom.org/environmental-flow-requirements-of-the-fish-river-and-the-orange-senqu-river-mouth/>) established for this initiative. ■



The lower Orange River

© Daniel Malzbender



© UNOPS/Zachel Koorzen

Dune stabilisation demonstration; brush packing with *Rhigozum trichotomum* branches on the windward flanks of a dune in Khawa, Botswana

DEMONSTRATION PROJECTS

Three projects were developed within the framework of the UNDP–GEF-funded *Orange–Senqu Strategic Action Programme* to test and demonstrate new techniques and methodologies to help address priority transboundary problems. Set locally, they are expected to provide best practices, lessons and potential solutions to problems at a basin-wide scale. They include:

- rangeland management in south-eastern Botswana
- rangeland rehabilitation in Lesotho
- water demand management and conservation in irrigation along the lower Orange.

The projects are summarised in this newsletter and further information is available in a number of publications and technical reports, as well as on wis.orasecom.org. ■



© Francois du Plessis



© Teboho Maliehe

Top: The use of soil moisture sensors for scheduling irrigation was tested in the Noordoewer–Violsdrift irrigation demonstration project. The application of such 'smart irrigation' methods should be increasingly adopted throughout the basin in an attempt to make irrigation more efficient.

Bottom: Stone walls were constructed to slow down water flow and prevent erosion in the rangeland rehabilitation project in Lesotho



© UNOPS/Zachel Koorzen

Communities rehabilitate rangelands in Mount Moorosi, Lesotho

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Communities in four villages located on the slopes and in the valleys of the Senqu River in the Mount Moorosi area, Quthing District, participated in the rangeland rehabilitation demonstration project. The objectives of the project were to investigate methods of protecting rangelands from overgrazing, leading to improved animal health and local livelihoods. This was achieved by activities in two main areas, namely the rehabilitation of rangelands and generating alternative income sources.

Primary activities to rehabilitate rangelands included:

- construction of physical barriers on steep slopes to slow down the flow of surface water, trap sediment and promote infiltration of water
- physical removal of invasive shrubs
- sowing grass seeds on cleared areas and bare ground to help re-establish grass cover
- excluding livestock from rangelands to allow the grasslands to recover and regenerate.

These activities were carried out while concurrently instituting improved farming practices and generating alternative income sources by introducing 'keyhole' kitchen gardening techniques and Koekoek chickens, bred for southern African conditions, and improved Merino sheep and Angora goats breeding stock.

Participants were enthusiastic about the project and felt they had benefited greatly, but also identified major challenges and lessons learnt, and how these could be addressed when



© Sharon Montgomery

up-scaling initiatives to catchment level. A booklet describing the project and capturing these points is currently in production and will be made available on the web.

This demonstration project has opened doors for networking and amalgamating with similar projects being conducted in Lesotho, and has provided an opportunity for involvement in other integrated water resources management initiatives as well as national and basin-wide action plans. ■

Community-based rangeland management in south-eastern Botswana

Abigail Engleton
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This demonstration project of the *Orange–Senqu Strategic Action Programme* was started in 2011 at the request of the Government of Botswana and worked with the communities of two villages, Khawa and Zutshwa, in the arid south-eastern Kalahari Desert. The project addresses rangeland management through a number of cross-sectoral activities and initiatives. These have focused on sand dune stabilisation and tree planting, rotational grazing, rangeland monitoring, rainwater harvesting and human–wildlife conflict, and on the introduction of alternative income-generating opportunities.

In Khawa, a 46,000-litre underground ferro-cement rainwater-harvesting tank was constructed and used to irrigate a community vegetable garden, also established with support from the project. In addition, Karakul sheep farming has been introduced to the area by bringing in experts from Namibia.

Improving water management in the irrigation sector in Namibia and South Africa

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In addition to being the largest user of water in the basin, the irrigation sector is often accused of being the biggest waster of water. This perception is a result of the use of old technology, both in conveying and distributing water, and inefficient water-management practices.

Working with the farmers in Noordoewer and Vioolsdrift, and the Joint Irrigation Authority (JIA) responsible for their shared irrigation scheme in this part of the lower Orange River (see jia.orasecom.org), this UNDP–GEF-supported demonstration project tested a number of different management approaches and technologies to assist in developing a water management plan.

The objective of the demonstration project is to contribute towards better managed irrigation demand in the basin, more economical use of water and improved pollution control in the irrigation sector.



© UNOPS/Christoph Mor

Cisterns constructed in the seasonal pans at Zutshwa help to prolong the availability of this water source.

The rangelands around Zutshwa are still in fairly good condition. The community, who are not traditionally pastoral, have become livestock farmers in the past decade. Poor groundwater quality in the area dictates lower grazing impacts. Activities have concentrated more on the need to upgrade tourism facilities to re-establish salt mining as alternative income-generation initiatives.

By creating alternative livelihood options, pressure is taken off the area's fragile environment. Initiatives in Khawa, especially, have provided a model for the district, and expansion of the project to other villages is being investigated. ■



© Francois du Plessis

Installing a V-notch system in the canal so that off-take can be measured. During the project, many different measurement devices were installed throughout the irrigation scheme.

Activities during the project have included installation of equipment allowing improved irrigation scheduling, and training sessions and study tours with farmers to irrigation schemes in other parts of the basin, to encourage water demand management and water conservation practices. A water management plan is currently being drafted for this relatively small irrigation scheme, which will be updated by the farmers and JIA on an annual basis.

Having identified best management practices already used in the sector, the project was able to underline four major water management issues that should be addressed to achieve the long-term management goals of this irrigation scheme.

The best practices and water management plan adopted in this demonstration project are likely to serve as a valuable guideline for other small schemes in the basin. ■

Influence of the Orange–Senqu River on marine and coastal environments

The Orange–Senqu River drains into the Atlantic Ocean at the border between South Africa and Namibia, where it forms a large estuary of global significance that is recognised as a Ramsar site. This forms a natural linkage between the two commissions responsible for promoting the sustainable management of these two important ecosystems: the Orange–Senqu River Commission (ORASECOM) and the Benguela Current Commission (BCC).

A common understanding of how these freshwater and marine ecosystems interact and influence each other is essential for the respective and joint management of the river basin, marine ecosystem and estuary. Cooperation between two UNDP–GEF projects on environmental concerns – the *Orange–Senqu Strategic Action Programme* supporting ORASECOM and the *Benguela Current Large Marine Ecosystem Strategic Action Programme Implementation Project* supporting BCC – enabled these interactions to be explored by a multi-disciplinary team of specialists.

Of particular interest are the interaction of the estuary with the coastal zone and larger marine ecosystem, and the impact of the altered state of the Orange–Senqu River and its catchment with respect to flow, sediment transport, nutrient loads and other water quality issues. A workshop established the need for developing an overarching rehabilitation and management plan for the estuary in consultation with the key government and private sector stakeholders in Namibia and South Africa to ensure maximum synergy between any management interventions that are introduced.

This initiative helped to establish working relations and cooperation at three levels, paving the way for future joint action:

- between two international commissions on data and information sharing
- between two UNDP–GEF projects addressing transboundary environmental concerns
- between the two estuarine states of Namibia and South Africa in the development of coordinated management plans for the Ramsar site.

The findings of the study are published in a booklet and a more detailed scoping report useful for managers (see wis.orasecom.org). ■



The Orange River in flood spews a plume of sediment-laden freshwater into the Atlantic Ocean.

NASA image created by Jesse Allan, Earth Observatory, using data obtained courtesy of the University of Maryland's Global Land Cover Facility

ORASECOM's Water Information System

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The ORASECOM Water Information System (WIS) is a comprehensive information system on the Orange–Senqu River basin.

The WIS is a wiki-based interface to basin-wide data sets, documents and maps. The WIS wikis describe links to content and sources of the information elements that mostly originate from ORASECOM and other donor-funded projects. The information on the WIS is also searchable. Registered users can contribute towards the WIS with water environment-related data. The WIS includes information related to Basin State data custodians with data and information holdings relevant to ORASECOM's functions.

Developed and established by the UNDP–GEF-supported Orange–Senqu Strategic Action Programme, maintenance and updating of the WIS is now supported by GIZ through their programme for the development of the Orange–Senqu Integrated Water Resources Management (IWRM) Plan. ■

**Access ORASECOM's
Water Information
System at
wis.orasecom.org**

wis ORANGE-SENQU WATER INFORMATION SYSTEM

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Irrigation Water Demand Management (IWRM)
Objectives The overall objective of the work package was to obtain an overall understanding of how better management practices could reduce...
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Environmental Flow Requirements for the Orange-Senqu basin (EFM)
Objectives The main objective for this Work Package is to assess Environmental Flow Requirements (EFRs) at selected key areas of...
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Objectives The overall objective of this work package was to carry out a detailed assessment of the occurrence, extent and possible...
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Preparation and development of integrated water resources quality management plan (IWRM-QMP)
Objectives The central objective of this work package was to provide the tools, methods and training for the implementation of...
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Orange-Senqu Water Information System (WIS)
The Orange-Senqu WIS supports data and information sharing between the ORASECOM riparian States. The WIS provides searchable:

- documents, data, media and software produced by ORASECOM, developed through direct or donor funding, in support of the Integrated Water Resources Management and information sharing goals of the organisation
- water resource related data collection and sharing initiatives of riparian States, and contact information of key organisations in the riparian States with water resource management related information.

All data and documents are searchable. Some important data, documents and data sources are highlighted in the following categories for easy browsing:

Biotic and Ecosystems	Geology and Soils
Climate	Economy and Society
Geology and Soils	Groundwater Resources
Infrastructure	Integrated W.R.M.
Landcover and Use	Other
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Water use	

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