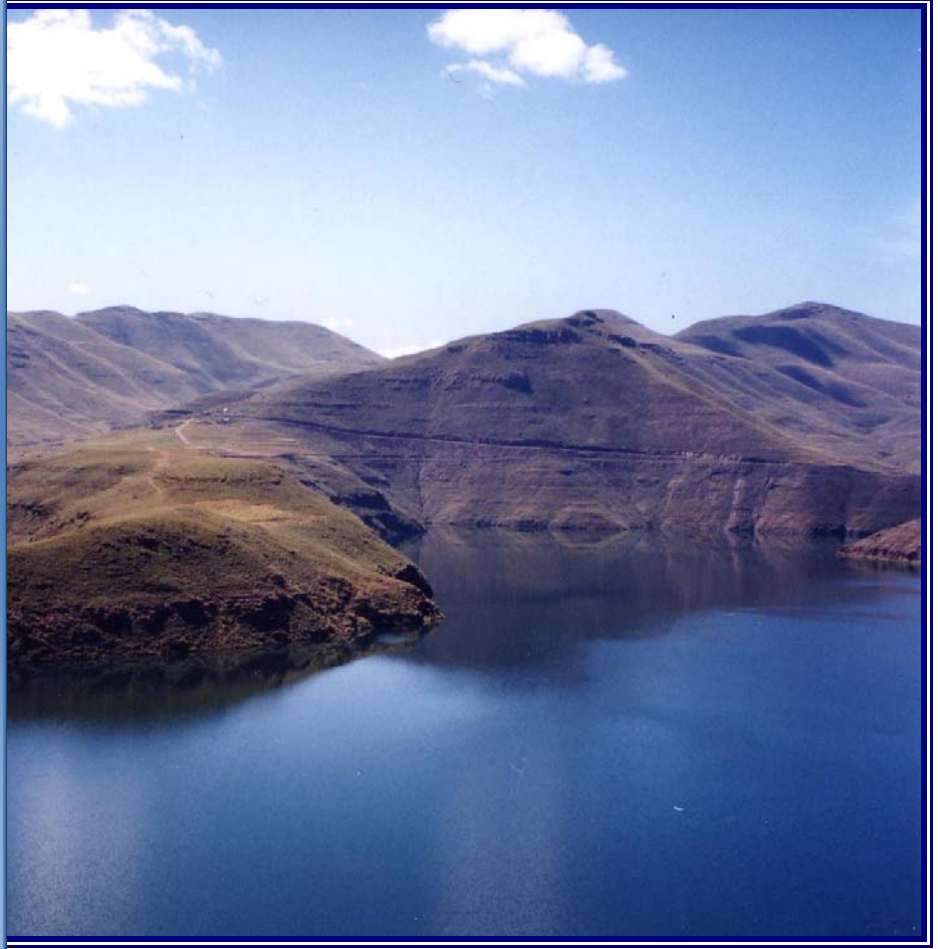


# SUMMARY REPORT

THE APPLICABILITY OF TOOLS AND APPROACHES TO THE PILOT  
STUDY OF THE ORANGE-SENQU RIVER BASIN

Inga Jacobs





**SUMMARY REPORT**  
**THE APPLICABILITY OF TOOLS AND APPROACHES TO THE PILOT STUDY OF**  
**THE ORANGE-SENQU RIVER BASIN**

**Report prepared for**

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## Purpose of Pilot Study

The purpose of the Pilot Study is to provide a real-life case example of how the tools and approaches adopted in this project can be used in one of the river basin organisations (RBOs) in SADC with the intended outcome of assisting RBOs to empower themselves in order to deliver on their mandates. The Orange-Senqu River and the Orange-Senqu River Commission (ORASECOM) has been selected as the case study area for the Pilot Study. ORASECOM is an international organisation with an international and legal personality (Tompkins, 2007). As such it provides a solid institutional framework through which to conduct research and is indeed considered to be a model for RBOs and institutional development within the region.

ORASECOM is however not without challenges. While it acts as a forum for discussion and the dissemination of knowledge and ideas regarding the basin, and is empowered to advise the riparian governments of South Africa, Lesotho, Botswana and Namibia on technical issues relating to the Orange-Senqu Basin it also faces challenges such as water scarcity, which will be compounded by climate change; defining equitable allocation and benefit sharing with limited available water resource and basin-wide data; sustainable knowledge transfer and challenges of building adaptive and flexible institutional capacity, as well as organisational challenges regarding the construction of a shared vision and the role/efficacy of its mandate. The broader goal of this project is to address some of these aforementioned challenges by commenting on the degree to which several tools and approaches developed in this project can be applied to this basin. These tools include the TWO Analysis – through the identification of regional benefits; developing an appropriate Business Model for ORASECOM – taking into consideration the consequences of complexity etc; and by incorporating culturally embedded approaches to emphasise the importance of culture and value systems in shaping river basin management.

## Brief Description of Pilot Study

The purpose of the Pilot Study is to provide a real-life case example of how the tools and approaches adopted in this project can be used in one of the river basin organisations (RBOs) in the SADC with the intended outcome of assisting RBOs to empower themselves in order to deliver on their mandates. The Orange-Senqu River basin and its respective multilateral RBO, the Orange-Senqu River Commission (ORASECOM) has been selected as the case study area for the Pilot Study. ORASECOM is an international organisation with an international and legal personality (Tompkins, 2007). As such it provides a solid institutional framework through which to conduct research and is indeed considered to be a model for RBOs and institutional development within the region.

ORASECOM is however not without challenges. While it acts as a forum for discussion and the dissemination of knowledge and ideas regarding the basin, and is empowered to advise the riparian governments of South Africa, Lesotho, Botswana and Namibia on technical issues relating to the Orange-Senqu Basin it also faces challenges such as water scarcity, which will be compounded by climate change; defining equitable allocation and benefit sharing with limited available water resource and basin-wide data; effectively involving stakeholders at the basin level e.g. given asymmetry of stakeholder groups in basin states; determining long term ecological allocation; clearly defining roles and relationships with bilateral institutions; ensuring consistency in delegations and moving forward as a unit through the use of sustainable knowledge transfer and capacity building; as well as organisational challenges regarding the construction of a shared vision and the role and efficacy of its mandate. As such, the broader goal of this project is to address some of these aforementioned challenges by commenting on the degree to which several tools and approaches developed in this project can be applied to the Pilot Study. These tools include the TWO Analysis – through the identification of regional benefits; developing an appropriate Business Model for ORASECOM and its subsequent business process and development of the mandate, and by incorporating culturally embedded approaches to emphasise the importance of culture and value systems in shaping river basin management.

## Objectives

- To demonstrate the potential benefits of adopting selected tools/approaches to strengthen RBOs in SADC
- To act as an analytical test for further research on the implementation of these tools in other RBOs in southern Africa.

## Justification for using the Orange-Senqu River Commission as a Pilot Study

The Orange-Senqu River has arguably the most comprehensive history of successful water regime creation in the entire Southern African Development Community (SADC) region due to a high dependence on the resource-base for long-term economic growth by virtually all riparian states and progressive institutional development. ORASECOM is one of two multilateral commissions in SADC with a fully functional Secretariat. It is also the most established at an operational level. As such, it offers an institutional infrastructure that is multi-tiered i.e. Secretariat, Commission, and several task teams (legal, financial, technical, communication, groundwater). The multi-tiered nature of ORASECOM therefore makes for easier implementation of the Transboundary Waters Opportunity (TWO) Analysis and allows for greater inclusivity in terms of the process by which to identify benefits. While this study

was unable to conduct a full-scale participatory implementation process of the three selected tools and approaches due to time constraints as a result of EU, French GEF and other ORASECOM projects drawing to a close and requiring significant inputs and participation from the ORASECOM institutional structure, this study uses available information of past and present projects to “populate” tools, followed by selective engagement with ORASECOM staff and technical task team members to solicit specific inputs.

The ORASECOM Agreement was signed in 2000 and was the first attempt to bring all Orange-Senqu riparian states together in a multilateral forum. Its **mandate is to serve as a technical advisor to the Parties on matters relating to the development, utilisation and conservation of water resources in the river system** (Kistin and Ashton, 2008) and can, in this capacity, **execute the necessary feasibility studies to support decision-making**.

It is therefore responsible for the dissemination of information and encourages communication on basin issues between the member states by hosting an annual meeting of all state representatives. The ORASECOM Agreement also stipulates that states utilise the resource within their respective states equitably and reasonably (in accordance with the 1995 SADC Water Protocol and the 2000 Revised Water Protocol). ORASECOM furthermore acts within the role of funding coordinator for basin specific and joint basin projects. It does not, however, have any direct links (through formal mechanisms), or any formal oversight or coordinating powers with respect to the pre-existing bilateral commissions (Lesotho Highlands Water Commission between South Africa and Lesotho, or the Permanent Water Commission between South Africa and Namibia). The bilateral institutions are required to inform ORASECOM of any issues pertaining to the basin, changes to agreements or impacts on the waters of the basin (Tompkins, 2007). These institutional dynamics are imperative to note when developing an appropriate business model for ORASECOM in terms of complexity. As noted by Granit and Lofgren (2009), complexity is defined as the number of countries, management and development issues, the in-country organisational capacity, in-country institutional organisation and cooperative financing capacity.

## An Overview of the Orange-Senqu River Basin

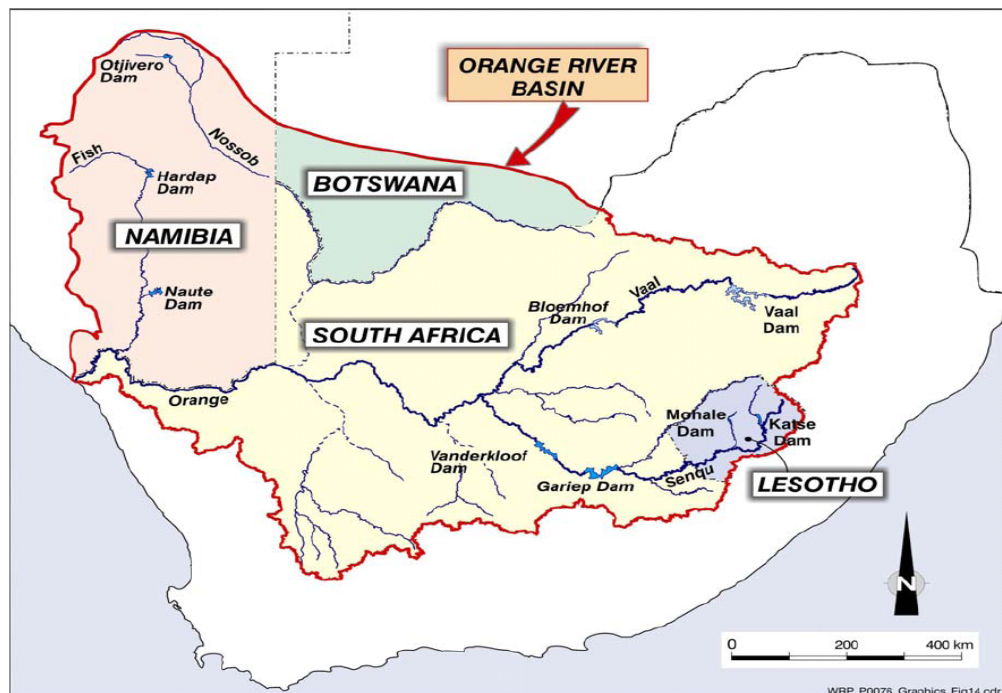
The Orange-Senqu River traverses the borders of Lesotho, South Africa, Botswana and Namibia. It originates in the Lesotho Highlands and flows westward for roughly 2300 km (Heyns, 2003), to its mouth in the Atlantic Ocean, where it forms the contiguous border between South Africa and Namibia (See Map 1). The basin spans a wide range of ecological zones with the mountainous area of the Lesotho Highlands, through the savannah grasslands and rugged hills of South Africa’s central plateau to the desert conditions in the

western part of the basin falling in Namibia (Bohensky, Reyers, van Jaarsveld and Fabricius, 2004). As such, rainfall also varies, from high rainfall in the eastern parts of the basin (over 2000 mm per annum) to Namibia's hyper-arid area where rainfall is less than 50 mm per annum (See Tables 1 and 3). Moreover, much of the basin experiences some degree of water stress, with the average water availability per capita in the basin just barely exceeding 1,000 cubic metres. This places the Orange-Senqu River basin on the border between what scholars refer to as chronic scarcity (500 – 1000m<sup>3</sup>/yr) and water stressed (1000 – 1700 m<sup>3</sup>/yr) (Bohensky *et al.*, 2004; Falkenmark and Widstrand, 1992).

**Table 1: Physical Characteristics of the Orange-Senqu River Basin (Earle, Malzbender, Turton and Manzungu, 2005; Mare, 2007)**

Orange-Senqu River Basin – Major features	
<b>Total Basin Area</b>	896.368 km <sup>2</sup>
<b>Area Rainfall (mm/y)</b>	Average: 330; range > 2000 to < 50
<b>Estimated Natural runoff</b>	11, 300 km <sup>3</sup>
<b>Water Demand</b>	Irrigation – 54%, environmental demands – 10%, urban and industrial use – 2%, evaporation and run-off to the ocean through the mouth and canals – 34% (Supplied from Gariep and Vanderkloof) (DWAf, 2008)
<b>Population</b>	19 million (year 2002)
<b>Water Availability</b>	<1000 m <sup>3</sup> per capita

**Figure 1: The Orange-Senqu River Basin (Tompkins, 2007)**



The contributions of the riparian states to the basin in terms of mean annual run-off (MAR), as well as the area of the basin falling within each state vary considerably (as shown in Table 2). Lesotho's contribution to the Orange-Senqu is significant, providing the basin with 41% of its water, from a mere 5% of total basin area. Moreover, the entire population (100%) of Lesotho is resident in the basin (See Map 1 and Table 3), which intricately links its national interests to the Orange-Senqu River Basin. Lesotho is highly dependent on royalties from South Africa for inter-basin water transfer for economic development, and together with garments, the export of water forms the majority of its export revenue.

South Africa has the largest area of the basin within its territory, contributes the most water in terms of MAR and is also the largest user, accounting for roughly 82% of annual total use (Earle, et al., 2005). Botswana is an interesting case for while it contributes no streamflow and uses none of the surface water in the basin, it is included as a riparian due to the ephemeral Nossob and Molopo Rivers (which is suspected to have contributed to surface run-off contributions historically but is now blocked by the Kalahari Desert dunes downstream of its confluence with the Nossob River (Heyns, 2003: 19) and therefore does not reach the Orange-Senqu), both of which form the border with South Africa, although neither have made a measurable contribution to the Orange-Senqu in living memory. However, it is suspected that Botswana contributes groundwater from the Molopo River and its dependency is related to groundwater aquifers.

**Table 2: Contributions to the Orange-Senqu River Basin by Country (Kranz, Interwies, Vorwerk and von Raggamby, 2005b)**

Item	Lesotho	South Africa	Botswana	Namibia
Basin Area (%)	5%	60%	12%	25%
MAR (%)	41%	55%	0%	4%

**Table 3: Riparian State Socio-Economic Statistics (CIA World Fact Book, 2009)**

Item	Lesotho	South Africa	Botswana	Namibia
Co-ordinates	29 30 S, 28 30 E	29 00 S, 24 00 E	22 00 S, 24 00 E	22 00 S, 17 00 E
Population <sup>1</sup>	2,130,819 (July 2009 est)	49,052,489 (July 2009 est)	1,990,876 (July 2009 est)	2,108,665 (July 2009 est)
Population Growth rate	0.116% (2009 est.)	0.281% (2009 est.)	1.937% (2009 est.)	0.95% (2009 est.)
% Pop res. in basin	100%	29.8%	2.8%	8.9%
Total Area	30, 355km <sup>2</sup>	1, 219, 912 km <sup>2</sup>	600, 370 km <sup>2</sup>	825, 418 km <sup>2</sup>

<sup>1</sup> The CIA World Factbook take into account the effects of excess mortality due to AIDS; this can result in lower life expectancy, higher infant mortality, higher death rates, lower population growth rates, and changes in the distribution of population by age and sex than would otherwise be expected.

<b>Climate</b>	Temperate; cool to cold, dry winters; hot, wet summers	Mostly semiarid; subtropical along East Coast	Semiarid; warm winters and hot summers	Desert; hot, dry; rainfall sparse and erratic
<b>Terrain</b>	Mostly highland with plateaus, hills, and mountains	Vast interior plateau rimmed by rugged hills and narrow coastal plain	Predominantly flat to gently rolling tableland; Kalahari Desert in southwest	Mostly high plateau. Namib Desert along coast, Kalahari Desert in east
<b>GDP (Purchasing Power Parity)</b>	\$3.293 billion (2008 est.)	\$491 billion (2008 est.)	\$27.06 billion (2008 est.)	\$13.25 billion (2008 est.)
<b>GDP Real Growth Rate</b>	6.8% (2008 est.)	3.1% (2008 est.)	2.9% (2008 est.)	2.9% (2008 est.)
<b>GDP per capita (PPP)</b>	\$1,500 (2008 est.)	\$10,100 (2008 est.)	\$13,900 (2008 est.)	\$6,300 (2008 est.)
<b>Government type</b>	Parliamentary constitutional monarchy	Republic – constitutional democracy	Parliamentary Republic	Republic
<b>HDI Rank in 2006<sup>2</sup></b>	155 (Low)	125 (Medium)	126 (Medium)	129 (Medium)

Economic indicators show that while South Africa has by far the highest total GDP, Botswana has the highest GDP per capita out of all four countries (See Table 3). Interestingly, while Lesotho has the lowest GDP, it has the highest GDP growth rate out of all four riparian states, due in large part to royalties paid by South Africa for inter-basin water transfer, the expanding apparel-assembly sector and remittances from miners employed in South Africa and customs duties from the Southern Africa Customs Union for the majority of government revenue<sup>3</sup> (CIA World Factbook, 2008).

Namibia is the most arid country and also the most downstream. This makes it particularly vulnerable to upstream developments, even though a relatively small proportion of its population (8.9%) live in the basin's territory. In the southern parts of Namibia, the greatest development potential lies in irrigation, which subsequently creates the highest demand for water (Kranz, Interwies and Vidaurre, 2005).

However, since Namibia is downstream, it relies on South Africa (which is the most dominant in terms of resident population, basin area coverage, economic power and current water use patterns in order to sustain its larger population, key mining, industrial and agricultural activities) for future water storage developments, such as a new water reservoir on the Lower Orange to increase its assurance of supply (Kranz *et al.*, 2005: 3). Future water demands are also expected on the Lesotho side where rapid urban and industrial development in the increasingly urbanising lowlands of Lesotho is expected to contribute to marginal increases in demand (Kistin and Ashton, 2008; Government of Lesotho, 2004). To summarise, increasing population growth, urbanisation, industrialisation as well as the non-maintenance of supply infrastructure such as dams and pipelines (Jacobs and Turton, 2008) combined with the anticipated effects of climate change on river flows

<sup>2</sup>Human Development Index as included in the United Nations Development Program's Human Development Statistical Update released on December 18, 2008, compiled on the basis of data from 2006. It covers 177 U.N. member countries out of 192 countries.

<sup>3</sup> Although, the government has recently strengthened its tax system to reduce dependency on customs duties.

are some of the geophysical and socio-economic factors placing further constraints on this already completely utilised river facing “closure.” Institutional capacity in the form of river basin commissions and regional water structures, or whether it is defined as a legal framework in the form of formal treaties and protocols, or technical cooperation in the form of informal working groups and technical task teams or generally warm relations, is therefore prioritised in order to absorb these “shocks” (Turton, 2003; 2008; Wolf, 2005: 13). Negotiations over the waters of the Orange-Senqu River basin have been ongoing between various combinations of the riparian states since the 1980s, which has resulted in a wide range of bilateral and multilateral inter-state/government-led commissions and agreements, to project-based organisations and treaties, to technical committees. In addition to this, an international policy and legislative framework exists which guides policy formulation at the basin and national levels.

### **Tools/Approaches and their Applicability to the Pilot Study**

- TWO Analysis - preliminary matrix level TWO Analysis data with a selected group of stakeholders
- The Business Model as an operational tool and the business process
- Mandates
- Embedding implementation of tools within a Culturally Embedded Approach

### **The Transboundary Waters Opportunity (TWO) Analysis**

The TWO Analysis outlines an approach by which transboundary water stakeholders can collaborate on the equitable and sustainable use of their jointly held freshwater resources. It sets out a methodology for optimising benefits for development and economic growth and clarifies tradeoffs in developing transboundary water resources.

The basic framework for the original TWO Analysis is the development of a matrix with four key factors of development opportunities and two main categories of water sources. The four broad development opportunities highlighted in the TWO Analysis include hydropower and power trading, primary water use in agriculture, urban growth and industry, and environmental and ecosystem services. Water sources include the development of potential “new water” from such sources as desalination or waste water reuse, as well as more efficient use of existing water sources.

When conducting the analysis it is important to consider context-specific categories and factors for each basin. These are determined by the specific political, economic and basin-related parameters such as opportunities for inter-basin transfers, regional cooperation, and desalination. These should be added to the matrix as the analysis develops. The development opportunities that can be explored through the TWO are found in the different potential combinations of water sources and water uses.

The 2Tool (Claassen, 2009) was therefore developed to build on the TWO approach by providing stakeholders an opportunity to explore development options in a non-threatening environment through the use of scenarios with the help of computer based software. In this regard, economic, societal and political layers are then added to the matrix and the analyses of the effects of these layers provide a form of “rating” of the different development options and their feasibility. An advantage of the TWO Analysis is that it can incorporate different kinds of data and answers that are not technically verifiable. The societal layer in particular can also include stakeholders’ perception of the different development options, which can help in determining which options might be more likely of succeeding if implemented in terms of community buy-in.

### **Method used in the Orange-Senqu River Pilot Study**

In the Orange-Senqu River Pilot Study, the TWO Analysis was conducted through a participatory process where workshop participants were divided into pairs to discuss development opportunities in the Orange-Senqu River basin. Each pair was tasked to list five sources of water (where can water come from?) and ten uses of water (how can it be utilised?). These lists were gathered and grouped into several primary categories on two wall maps.

Following the completion of this identification exercise, the project team collated this information and fed it into the 2Tool (Claassen, 2009) software. The 2Tool (Claassen, 2009) generated three types of questionnaires:

1. Questionnaire relating to the biophysical environment and the identification of economic development opportunities/preferences
2. Questionnaire relating to the political environment and the identification of suitable political opportunities/preferences
3. Questionnaire relating to society and the identification of development preferences based on an individual’s beliefs, culture, professional knowledge base etc.

Each pair of participants was given one questionnaire to complete. A scale was provided for participants to provide a “value” for each of their answers. Additionally, they were asked to write a short motivation for the answer, for example: “Too expensive”, “Good for export”, “Regional benefit”, “Will depend on commodity prices”, etc.

**Table 4: Scale used in the 2Tool (Claassen, 2009)**

Value	Description
100	Huge benefit
75	Extensive Benefit
50	Clear Benefit
25	Little Benefit
0	No net Benefit
-25	Slight Negative Impact
-50	Clear Negative Impact
-75	Extensive Negative Impact
-100	Huge Negative Impact

## The Applicability of the TWO Analysis and the 2Tool to the Orange-Senqu River Basin

Following the multi-stakeholder workshop, several key points were highlighted:

- Structured tools to explore benefit options before moving into pre-investment studies, such as the TWO Analysis, is one way of engaging stakeholders and prioritising investment options. This helps to strengthen investment planning processes in shared water resources management and infrastructure by providing a method for assessing optimal investments in support of benefit sharing discourse. Moreover, this approach highlights the variety of economic, political and societal development options that can be employed, and the development preferences of different stakeholders in this regard.
- The 2Tool allows for engagement of multiple voices through its participatory and inclusive approach. This facilitates trust-building and buy-in of development preferences at all levels of scale.

- The TWO Analysis framework methodology can be of utility in a range of circumstances and for a wide variety of parties, as follows:
  1. The TWO Analysis demonstrates possible ways through which countries can cooperate on transboundary river basins, in exploring development opportunities determined to be Positive Sum Outcomes by providing deep insights into the preferred strategic stance of the riparians within a transboundary basin. It can be used in formal negotiations and in training situations.
  2. The TWO Analysis can act as a 'compass' identifying the need for subsequent detailed investigations by riparian countries falling into two broad tracks:
    - a) Political negotiations to be undertaken by the countries concerned;
    - b) Cooperative strategic pre-investment analyses to analyse development options and tradeoffs
  3. The TWO Analysis can act as a scenario tool to illustrate longer term changes and future options.
  4. The TWO Analysis should identify opportunities for public and private financiers to support initiatives taken by riparian countries since it provides a blueprint for preferred and/or optimal development options in transboundary basins, and this can assist measurably in focusing international aid and finance and chronologically ranking these development options. This should lead to feasibility studies, investment and transaction advice to support real development that could be either transboundary or intra-state, depending on the circumstance involved. Where such programmes are specifically focused upon the alleviation of poverty and hunger, the TWO Analysis provides preferred routes for both improving the intra-sectoral use of fresh waters (usually in the agricultural sector, in developing nations), and the inter-sectoral reallocation of flows.
  5. At the managerial level, the TWO Analysis can provide a framework for the preferred sectoral allocation of fresh waters, and the change in such allocation over time. This is extremely valuable in determining major infrastructural requirements (e.g. basin storage requirements, hydropower, desalination, wastewater treatment and re-use, inter-basin transfers).

The primary strength of the TWO Analysis therefore lies in its inclusive characteristics. Inclusive processes encourage people to engage on a platform that is non-threatening. Participants who were initially apprehensive about the process expressed their interest, curiosity and enthusiasm for the process.

While there are limitations to the tool, the process encourages interaction between various stakeholders in a non-threatening manner where individuals could be freed from the responsibility of representing a particular interest group. As such, they could be free to 'play

development games' and in so doing, discuss and identify options that they may never have otherwise considered.

The TWO Analysis defined development preferences for various groups and individuals and this is important information when choosing development options for implementation as it projects the degree of buy-in/ownership that can be attained.

It is important to note that the particular approaches to running the TWO Analysis may require specific expertise in communication, facilitation, public participation and mediation.

### **The Applicability of Business Models to ORASECOM**

Another process highlighted in this project to strengthen RBO organisational structure is the development of a business model. Business models are defined as frameworks for creating economic, social, and environmental value in a shared watercourse context. The business models are based on an analysis of functions an RBO could have to reach its stated objectives effectively, moving from simple to more complex situations.

RBOs can be more effective if they carefully analyse their business objectives and establish a business model that serve them the best. The business model should be designed so that it fulfils the agreed institutional mandate. A careful analysis of business functions to achieve the mandate will create opportunities to save costs and increase efficiency. A challenge for RBOs and the member states they are serving is to design a business model that does not create expectations amongst stakeholders that it will deliver more than what it is intended to do. To ensure this, it is important that the business model is designed with adequate stakeholder input so that clients (governments) are aware of what they can expect and what not.

The analytical model for design of appropriate business models is based on an analysis of the complexity of the river basin and what the desired operational functions should be. Complexity in terms of a shared watercourse is defined as the number of countries, management and development issues, the in-country organisational capacity, in-country institutional organisation and cooperative financing capacity.

Two clusters of functions can be identified, management and development, and under those several operational functions (Granit and Lofgren, 2009). The number and type of functions a RBO is tasked to perform determine the complexity of the business model. The model chosen should depend on what is collectively agreed to be carried out by the institution. There is no model that is better than others. However, from a function, cost and

business management perspective simplicity is advocated in the shared water course context.

**Table 5: Comprehensive list of operational functions to be considered to include when selecting an appropriate business model for a RBO depending on its stated mandate (Granit and Lofgren, 2009)**

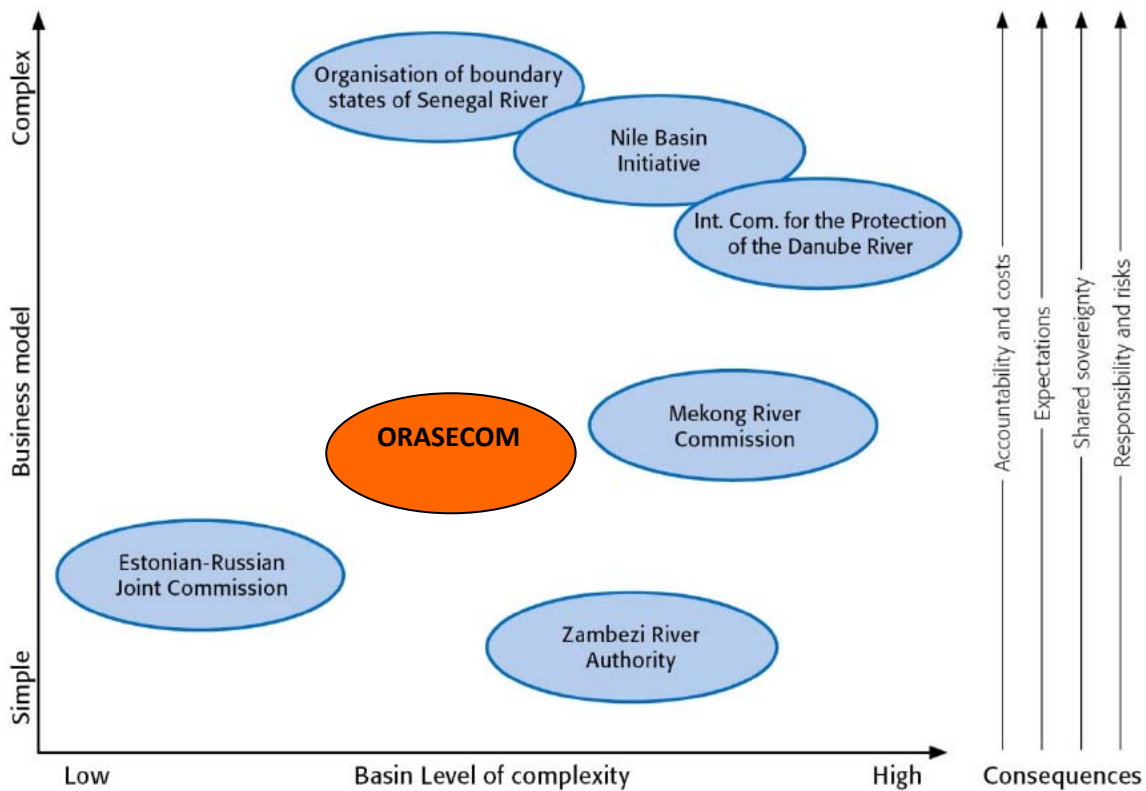
<b>Management function</b>
1. Corporate management
2. Financial management - cost recovery
3. Monitoring and modelling (water and natural resources data and socioeconomic and legal developments)
4. Pollution control/monitoring
5. Information and communication
6. Stakeholder engagement
7. Conflict resolution
8. Visioning and trust building
<b>Development Function</b>
9. Strategic basin planning (input to regional planning)
10. Policy and strategy development (economic, social and environmental issues)
11. Water allocation (to sectors and/or users)
12. Pre investment work at multi-country level
13. Support to in-country development planning

Business models usually evolve over time and sometimes without an overall analysis of the mandate of the institution. In a multi-country perspective the external environment changes rapidly together with the internal environment as the RBO is maturing. This is also the case for ORASECOM. In their paper on business models, Granit and Lofgren (2009) outline a structured approach to review the objectives of a RBO and to explore and design the most appropriate business model to deliver on agreed objectives. As ORASECOM mainly has an advisory function, providing the platform for coordination and consultation in the basin, the business model and the functions should be chosen to fit this purpose and should therefore not include all management and development functions listed in Table 5.

In this regard, the context of the business model for ORASECOM needs to be closely defined, prior to determining the business process. The complexity of the basin should therefore not only be defined as the number of countries, management and development issues, the in-country organisational capacity, in-country institutional organisation and cooperative financing capacity, but should also include the degree to which the socio-cultural, political, biophysical and economic contexts can help define what roles and responsibilities are suitable for the RBO to undertake. In the Orange-Senqu River basin, for example, a review of the political and institutional context reveals that the existence of pre-existing bilateral institutions in the basin, discourages (but does not prohibit) ORASECOM

from taking on infrastructural responsibilities, and encourages its coordinative role as the umbrella RBO in the basin. Moreover, business models need to be flexible enough to adapt to changing needs, demands and capabilities both within the organisations and in impacted communities.

**Figure 2: Diagramme of selected Shared Watercourse Institutions showing basin complexity and the complexity of associated consequences for each business model chosen (Adopted from Granit and Lofgren, 2009)**



Watercourse states have several business models to choose from and the placement of ORASECOM in Figure 2 is but an example of where ORASECOM can be placed in terms of basin complexity and the type of business model it could develop. The model ORASECOM chooses will ultimately depend on what the organisation (through the riparian states it serves) collectively agrees to carry out.

Moreover, in terms of ORASECOM’s advisory mandate, the business model chosen does not necessarily need to be complex to be functional and effective. The size of the ORASECOM organisational structure, which is comparatively small, suits its strategic character and advisory mandate. The business model chosen should therefore reflect this institutional simplicity combined with the Orange-Senqu’s biophysical complexity, but may change depending on the level of functions chosen at later stages.

## ORASECOM'S Advisory Mandate

Regarding the way in which ORASECOM's advisory role is implemented, it may benefit from compartmentalising this advisory role. By clearly defining how this mandate will be implemented into projects and strategies, this will facilitate the incremental development of ORASECOM's business model.

Areas of advice include:

- determination of yield;
- equitable and reasonable utilisation of water resources;
- investigations and studies on development of the river system;
- stakeholder participation, harmonisation of policies and impact of water resources development on social, cultural, economic and natural environment;
- standardised form of collection, processing and dissemination of data and information;
- prevention of pollution and control of aquatic weeds;
- contingency plans for responding to emergencies resulting from natural causes such as droughts, floods and industrial accidents;
- exchange of information and consultations on possible effects of planned measures;
- measures with a view to arriving at settlement of dispute between two or more of the Parties;
- any other matters as may be determined by the Parties.

The various advisory roles that ORASECOM can play can therefore be sub-divided into a list of operational functions that operationalises each advisory role.

## Applicability of Business Processes to ORASECOM

Claassen (2009) documents the business process in the report entitled, *Business Process for Shared Watercourse Institutions in SADC*. The generic business process is an iterative cycle that starts with a vision, which is supported by a strategy. The strategy is pursued through an operational plan, which directs decisions and actions. The efficacy of these actions in relation to the vision and strategy is then assessed through a monitoring and review

process. Within the business process there could be a multitude of operational tools to help run the business.

At the CSIR-hosted two-day workshop at which the tools and approaches for this project were reviewed, participants were divided into four breakaway groups to discuss the applicability of the tools and approaches to a given context, or to elaborate on the applicability of a particular tool/approach. Feedback from the group discussing the business process and its applicability to RBOs in southern Africa revealed the critical nature of a shared vision. The complexity of the business process was noted, e.g. an individual representing a State in an RBO, trying to reflect business needs, community views. The paucity of national (consensual) strategies in African countries was also noted, thus creating difficulties for individuals to represent their national positions. Similarly, ORASECOM and its accompanying business processes, needs to develop and evolve at a pace that the organisation is comfortable with (as opposed to externally induced and driven). Any forced adjustments and changes to operational functions could have negative repercussions for growth and development.

### **Culturally Embedded approaches and its applicability to ORASECOM**

The significance of the Culturally Embedded Approach is extensively documented in *A Culturally Embedded Approach for River Basin Organisations in SADC -A Guideline-* (Nortje et al, 2009). This approach enhances our understanding of the context within which an RBO operates. A holistic and integrated understanding of the biophysical, political, economic as well as socio-cultural context enables RBOs to design its roles and responsibilities in a context-specific manner, conduct culturally sanctioned projects that have credibility and legitimacy by local and external stakeholders. Through the use of the 2Tool and the TWO Analysis, RBOs such as ORASECOM are able to identify development preferences for various groups and individuals. This is important information when choosing development options and conducting pre-feasibility studies as it reflects the degree to which community buy-in and ownership at the local level can be attained from different cultural groups and local residents. A Culturally Embedded Approach also necessitates that culturally embedded and context specific approaches are integrated into all RBO operations (i.e. its mandate, business model, business processes, and operational tools). This is a form of internal cultural diversity mainstreaming and is a critical component to strengthening RBO processes and going beyond the mere rhetoric of public participation and stakeholder involvement because it shows that local cultures and values are being taken seriously at the institutional level (Nortje et al, 2009).

## Conclusion

This report attempted to provide short commentaries on the applicability of tools and approaches developed in this project to the Orange-Senqu River basin. It is important to note that these tools and approaches were not implemented or tested in this specific basin but rather the theoretical framework applied for usefulness.

It can be concluded that structured tools (such as the TWO Analysis, Business Models etc) are needed that can assist with effective cooperation, but there is also a need for approaches (such as the Culturally Embedded Approach, and Business Process) that advocate for transformational change as incremental steps towards optimisation of water use is not sufficient to meet the current challenges of global climate change and rapid urban growth.

The TWO Analysis is one way of engaging stakeholders and prioritising investment options, which helps to strengthen investment planning processes in shared water resources management and infrastructure by providing a method for assessing optimal investments in support of benefit sharing discourse. Moreover, this approach highlights the variety of economic, political and societal development options that can be employed, and the development preferences of different stakeholders in this regard.

Additionally, the incorporation of a business approach to transboundary river basin management will help to strengthen and empower RBOs to more effectively carry out their mandates by facilitating the operationalisation of functions. This then helps RBOs to choose appropriate organisational structures (in terms of size and complexity) that best suits the functions they have articulated based on their mandates.

Finally, the Culturally Embedded Approach created in this project emphasises the benefits of considering cultural issues in river basin management. Longstanding cultural belief systems regarding water and the way it is used may offer useful suggestions as to how transboundary river basin management can and should be conducted.

## Bibliography

Bohensky, E., B. Reyers, A.S. van Jaarsveld and C. Fabricius eds. 2004. Ecosystem services in the Gariep Basin. Stellenbosch: SUNPRESS.

Claassen, M., 2009. Business Process for Shared Watercourse Institutions in SADC. Contract report to GTZ. Project 05.2005.6-001.00

- DWAF. 2008. "Water Requirements in the Orange River Basin." In Orange River Project, ed. Orange River Project. Pretoria: Department of Water Affairs and Forestry.
- Earle, A., D. Malzbender, A. Turton and E. Manzungu. 2005. "A Preliminary Basin Profile of the Orange-Senqu River." In Integrated Water Resources Management in Shared River Basin in the SADC Region. Pretoria: AWIRU, University of Pretoria.
- Falkenmark, M. and C. Widstrand. 1992. "Population and Water Resources: A Delicate Balance." In Population Bulletin: Population Reference Bureau.
- Heath, R. and C. Brown. 2007. "Environmental Considerations Pertaining to the Orange River." In Orange River Integrated Water Resources Management Plan. Pretoria: WRP Consulting Engineers.
- Heyns, P. 2003. "Water Resources Management in Southern Africa." In International Waters in Southern Africa, ed. M. Nakayama. Tokyo: United Nations University Press.
- Jacobs, I. and A. Turton. 2009. "Chapter 17: South Africa." In Making the Most of the Water You Have: The Soft Path Approach to Water Management, eds. O. Brandes, D. Brooks and S. Gurman. London: Earthscan.
- Kistin, E. and P. Ashton. 2008. "Adapting to Change in Transboundary Rivers: An Analysis of Treaty Flexibility on the Orange-Senqu River Basin." International Journal of Water Resources Development 24(3):15.
- Kranz, N., E. Interwies and R. Vidaurre. 2005. "Transboundary Regimes in the Orange-Senqu Basin." In New Approaches to Adaptive Water Management under Uncertainty. Berlin: NeWater.
- Lesotho, Government of. 2004. "The Lowlands Water Supply Scheme." Maseru: Government of Lesotho.
- Granit, J. and Löfgren, R. 2009. A Framework for Exploring Business Models for Shared Watercourse Institutions. Contract report to GTZ. Project 05.2005.6-001.00
- Mare, H.G. 2007. "Summary of Water Requirements from the Orange River." In Orange River Integrated Water Resources Management Plan. Pretoria: WRP Consulting Engineers.
- Nortje, K. Jacobs, I. and Nienaber, S. 2009. A Culturally Embedded Approach for River Basin Organisations in SADC - A Guideline. Contract report to GTZ. Project 05.2005.6-001.00
- Tompkins, R. 2007. "Institutional Structures in the four Orange Basin States." In Orange River Integrated Water Resources Management Plan. Pretoria: WRP Consulting Engineers.
- Turton, A. 2003. "The political aspects of institutional developments in the water sector: South Africa and its international river basins." Pretoria: University of Pretoria.
- Turton, A. 2008. "The Southern African Hydropolitical Complex." In Management of Transboundary Rivers and Lakes, eds. O. Varis, C. Tortajada and A.J. Biswas. Berlin: Springer-Verlag.
- Wolf, A. 2005. "Hydropolitical Vulnerability and Resilience: Series Introduction." In Hydropolitical Vulnerability and Resilience along International Waters: Africa. Nairobi: United Nations Environment Programme.