



## UNDP Project Document

Governments of Botswana, Lesotho, Namibia and South Africa

United Nations Development Programme

United Nations Office for Project Services

### **Development and adoption of a Strategic Action Programme for balancing water uses and sustainable natural resource management in the Orange-Senqu River trans-boundary basin (PIMS: 3243)**

The Project will assist the Orange-Senqu riparian states to 1) identify the principal threats and root causes of the trans-boundary water resources of the Orange-Senqu River Transboundary Basin and 2) develop and implement a sustainable programme of policy, legal and institutional reforms and investments to address these threats. Competing water uses in the context of dwindling and uncertain future supplies is seen as the critical issue in the basin and will be a principal focus of project attention from the very outset. The Project will create synergies with and build upon a range of initiatives being undertaken by the countries themselves and those of bi-lateral and multi-lateral donors that have given priority to the Basin.

The long-term development/environmental goal of the project is the sustainable development of the Orange-Senqu River Basin enhanced through ecosystem-based, Integrated Water Resource Management approaches. The project objective is to improve the management of the Orange-Senqu River Transboundary Basin through the implementation of a sustainable programme of policy, legal and institutional reforms and investment options using the Trans-boundary Diagnostic Analysis (TDA) and Strategic Action Programme (SAP) process. In order to achieve this objective, the project will strengthen the capacity of ORASECOM, update the TDA, formulate a SAP and associated National Action Programmes (NAPs) as part of a wider regional IWRM plan, undertake a range of public involvement and awareness activities focusing on trans-boundary activities, and undertake demonstration projects that implement key aspects of the SAP.

The project will support the institutional strengthening of ORASECOM through development of an informational management system, establishment of a wider Orange–Senqu Water Resources and Environmental Programme (OSWREP), developing guidelines for water allocation, climate change scenarios to be applied in water resource planning, and transboundary EIA. During the development of the preliminary TDA, five priority transboundary problems were identified as affecting the Orange Senqu River Basin: 1) Stress on surface and groundwater resources, 2) Altered water flow regime, 3) Deteriorating water quality (surface and groundwater), 4) Land degradation and 5) Alien invasives. This project in finalising the TDA will undertake a number of gap filling activities related to these transboundary issues including: a review of the impacts of artisanal mining on the middle and lower Orange; an assessment of Persistent Organic Pollutants levels in the Orange Senqu basin; and a detailed yield assessment and demand forecast for the Orange Senqu basin for the next 25 years based on an agreed methodology. Climate change and biodiversity are identified as cross-cutting concerns and these issues will be highlighted and integrated throughout the project. The final TDA will serve as the scientific basis for development of an agreed programme of interventions for the introduction of eco-system based approaches throughout the basin under the framework of the SAP, itself a critical component of a wider IWRM being developed by ORASECOM. The SAP will incorporate a basin vision, water resource quality objectives, targets and interventions in the short and medium term to meet targets.

In parallel to SAP development, the project will implement three pilot projects which are developed based on three of the five priorities identified during the preliminary TDA development, namely, the setting of ecological flows; water demand and quality management in the irrigation sector; and land/range management. These pilots will demonstrate new techniques and methodologies in those critical SAP areas of concern:

This project has been designed in close collaboration with the Orange Senqu River Commission (ORASECOM) and will form a part of the Orange Senqu Water Resource Environmental Programme. It has been developed in coordination with the other major ORASECOM donors, inter alia French GEF, BMZ/GtZ, European Union and InWEnt, to ensure maximum synergy and minimum overlap between supporting projects.

## Table of Contents

<u>Section</u>	<u>Page</u>
Acronyms	4
Map of the Basin	7
<b>SECTION I : Elaboration of the Narrative</b>	<b>8</b>
<b>PART I: Situation Analysis</b>	<b>8</b>
<b>Project Context</b>	<b>8</b>
<i>Physical Context</i>	8
<i>Environmental Context</i>	9
<i>Socio-economic Context</i>	11
<i>Legal, Institutional, and Policy Context</i>	14
<b>Threats, underlying and root causes analysis</b>	<b>17</b>
<b>Stakeholders Analysis Summary</b>	<b>28</b>
<b>Baseline Analysis</b>	<b>29</b>
<b>PART II: Strategy</b>	<b>33</b>
<i>Project Rationale and Policy Conformity</i>	35
<i>Project Goal, Outcomes and Outputs/activities</i>	36
<i>Project Indicator</i>	47
<i>Risks and Assumptions</i>	48
<i>Expected global, national and local benefits</i>	49
<i>Country Ownership: Country Eligibility and Country Drivenness</i>	51
<i>Sustainability</i>	52
<i>Replicability and innovation</i>	53
<b>PART III: Management Arrangements</b>	<b>55</b>
<b>PART IV: Monitoring and Evaluation Plan and Budget</b>	<b>57</b>
<b>PART V: Legal Context</b>	<b>66</b>
<b>SECTION II: STRATEGIC RESULTS FRAMEWORK AND     GEF INCREMENT</b>	<b>68</b>
<b>PART I: Incremental Cost Analysis and list of affiliated projects</b>	<b>67</b>
<b>PART II: Strategic Results Framework</b>	<b>89</b>
<b>SECTION III: Total Budget and Work Plan</b>	<b>103</b>
<b>SECTION IV: ADDITIONAL INFORMATION</b>	
<b>PART I: Other agreements</b>	<b>108</b>
<b>PART II: Organogram of Project</b>	<b>109</b>
<b>PART III : Terms of Reference of key personnel</b>	<b>110</b>

<b>PART IV: Institutional arrangements for the Orange-Senqu Water Resource and Environmental Programme (approved by ORASECOM April 2007)</b>	115
<b>PART V: Draft Demonstration Project documents</b>	124
<b>PART VI: Orange-Senqu Water Resource and Environment Programme integrated workplan</b>	170
<b>ANNEXES:</b>	
<b>ANNEX 1: Stakeholder Involvement Plan</b>	171
<b>ANNEX 2: Stakeholder Analysis</b>	180
<b>ANNEX 3: Basin wide preliminary TDA</b>	272
<b>ANNEX 4: Causal Chain Analyses</b>	273
<b>ANNEX 5: EPAC Meeting Minutes</b>	278
<b>SIGNATURE PAGE</b>	288

## Acronyms and Abbreviations

ARB- Botswana	Agricultural Resources Board
APR	Annual Project Report
AWP	Annual Work Plan
BCLME	Benguela Current Large Marine Ecosystem Programme
BMZ	German Ministry for Economic Cooperation and Development
BWP	Botswana Pula
BWSF	Basin Wide Stakeholder Forum
CBO	Community Based Organisation
CCA	Causal Chain Analysis
CEPF	Critical Ecosystem Partnership Fund
CI	Conservation International
CLMC	Community Land Management Committee
CMA	Catchment Management Authority
CMS	Catchment Management Strategy
CO	Country Office
cumec	Cubic metre
DCPF-Botswana	Department of Crop Production and Forestry
DDC-Botswana	District Development Committee
DDP- Botswana	District Development Plan
DEAT-SA	Department of Environmental Affairs and Tourism
DWA- Botswana	Department of Water Affairs
DWAF-SA	Department of Water Affairs and Forestry
EF	Environmental Flow
EFR	Ecological Flow Requirements
EIA	Environmental Impact Assessment
ELF	Environmental Low Flows
ELMS	Environment and Land Management Sector
ESI	Environmental Status Indicators
ESIA	Environmental and Social Impact Assessment
EWT	Endangered Wildlife Trust
FGEF	French GEF ( <i>Fonds Français pour l'Environnement Mondial</i> )
FSP	Full Size Project
GA	Grazing Association
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEF-4	Global Environment Facility (Phase 4)
GHG	Green House Gases
GIS	Geographic Information System
GoB	Government of Botswana
GtZ	Deutsche Gesellschaft für Technische Zusammenarbeit
IAs	Implementing Agencies
IFAD	International Fund for Agricultural Development
InWent	Internationale Weiterbildung und Entwicklung gGmbH

IPCC	Intergovernmental Panel on Climate Change
IR	Inception Report
IW	International Waters
IWRM	Integrated Water Resource Management
JICA	Japan International Cooperation Agency
JPTC	Joint Permanent Technical Committee
JPWC	Joint Permanent Water Commission
LHWC	Lesotho Highlands Water Commission
LHWP	Lesotho Highlands Water Project
LME	Large Marine Ecosystem
LORMS	Lower Orange River Management Study
M&E	Monitoring and Evaluation
MAWF- Namibia	Ministry of Agriculture, Water and Forestry
MDG	Millennium Development Goal
MET-Namibia	Ministry of Environment and Tourism
MEWT-Botswana	Ministry of Environment, Wildlife and Tourism
MLRR-Namibia	Ministry of Lands, Rehabilitation and Resettlement
MMEWR	Ministry of Minerals, Energy and Water Resources
MoA- Botswana	Ministry of Agriculture
MOU	Memorandum of Understanding
NACOMA	Namib Coast Biodiversity Conservation and Management Project
NAPs	National Action Plan
NCSA- Botswana	National Conservation Strategy (Coordinating) Agency
NEMA-SA	National Environmental Management Act
NFP	National Focal Point
NGO	Non Governmental Organization
NPC	National Planning Commission
NWRMR	Namibian Water Resources Management Review
NWSP	National Wetland Strategy and Policy
OPEC	Organisation of Petroleum Exporting Countries
ORASECOM	Orange-Senqu River Basin Commission
OSRB	Orange-Senqu River Basin
OSWREP	Orange-Senqu Water Resources and Environment Programme
PC	Project Coordinator
PCU	Project Coordination Unit
PDF B	Project Development Facility Block B
PIR	Project Implementation Review
PIU	Project Implementation Unit (for demonstration projects)
POPs	Persistent Organic Pollutants
PSC	Project Steering Committee
PWV	Pretoria-Witwatersrand-Vereniging Area
RC	Regional Coordinator
RCU	Regional Coordination Unit
REEP	Regional Environmental Educators Programme
RMA	Rangeland Management Areas
RMU	Regional Management Unit

RSA	Republic of South Africa
RWP	Regional Water Policy
RWQO	Receiving Water Quality Objective
RWS	Regional Water Strategy
SADC	Southern African Development Community
SAP	GEF Strategic Action Programme
SH	Stakeholder
SHAF	Stakeholder Advisor Forum
SHF	National Stakeholder Forum
SO	Scientific Officer
SRF	Strategic Results Framework
SRI	Stress Reduction Indicators
TDA	GEF Trans-boundary Diagnostic Analysis
TPR	Tripartite Review
TTR	Terminal Tripartite Review
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNOPS	United Nations Office of Programme Services
WB	World Bank
WMA	Water Management Area
WRQOs	Water Resource Quality Objectives
WSSD	World Summit on Sustainable Development
WUA	Water User Association

MAP of the ORANGE-SENQU RIVER BASIN



## **SECTION I: Elaboration of the Narrative**

### **PART I: SITUATION ANALYSIS**

#### **Project Context**

1. The overall goal of the Project is to improve the management of the Orange-Senqu River Basin's trans-boundary water resources through ecosystem based Integrated Water Resource Management (IWRM) approaches that remediate threats and root causes. An IWRM approach considers the inter-relationships between natural resource systems, biophysical processes and socio-economic systems and objectives. IWRM seeks to integrate this approach into the management of the overall water resource, taking into account factors outside of the water sector, such as agriculture and energy and such issues as land degradation and climate change. This expanded approach makes possible a transition to adaptive management strategies for water resources.
2. The principal anthropogenic threats to the integrity of the basin identified in the preliminary Trans-boundary Diagnostic Analysis (TDA) include:
  - Stress on surface and groundwater resources
  - Altered water flow regime
  - Deteriorating water quality (surface and groundwater)
  - Land degradation
  - Alien invasives
3. Climate change is viewed as a cross-cutting issue and is expected to lead to greater environmental variability in future (e.g. dislocations in spatial and temporal rainfall patterns). Biodiversity is also viewed as a cross-cutting issue by the region in the context of this project. Though climate change and biodiversity are not independent priority trans-boundary concerns, these issues will be highlighted and integrated throughout the project into all aspects of these priority issues since any shifts in these aspects could result in critical impacts on the ecology of the Orange-Senqu River Basin.

#### *Physical Context:*

4. The Orange River, (called the Senqu River in Lesotho), originates in the Lesotho Highlands some 3,300 m above sea level where the average annual precipitation can exceed 1,800 mm, with a corresponding average annual potential evaporation of 1,100 mm. The river stretches



2,300 km from the source to its mouth at Alexander Bay/Oranjemund on the South Africa/Namibia border, where the average annual precipitation drops to below 50 mm, while the average annual potential evaporation rises to over 3,000 mm. The Orange-Senqu River basin is the largest river basin in southern Africa south of the Zambezi, with a total catchment area in the order of one million km<sup>2</sup>, of which almost 60% is within the Republic of South Africa with the remainder in Lesotho, Botswana and Namibia. The effective catchment area is difficult to determine since it includes many pan areas and also several large ephemeral tributaries, such as the Molopo and Nossob in Botswana and Namibia which rarely contribute to flows in the main river channel. The average river flow that would occur if the river were free flowing is less than half of its natural, historic runoff. The river has been significantly and heavily developed with the result that the current average annual runoff reaching the river mouth at Alexander Bay is significantly diminished.

5. There are several storage dams on the downstream portion of the Orange – Senqu River that effectively control the flow of water. These structures have modified the flow regime of the river and have exacerbated the periodicity of discharge to the Atlantic Ocean at Oranjemund (Namibia).
6. The banks of the middle and lower Orange-Senqu River are heavily developed in many areas, with irrigation being the principal use, compounded by increasing demands from industry, energy, mining and municipal demands. The principal tributary of the Orange-Senqu River is the Vaal and its associated basin, which is not only the largest and most important tributary, but ‘fuels’ South Africa’s industrial heartland in the greater Pretoria-Witwatersrand-Vereniging (PWV) region<sup>1</sup>. Approximately fifty percent of South Africa’s GDP is generated in this area, and more than 80% of South Africa’s electricity requirements due to the presence of extensive, shallow coalfields in the Upper Vaal catchment. This constitutes approximately 50% of all the electricity generated in Africa. Cooling water for the numerous thermal power stations is supplied from the Vaal River and its tributaries and from transfers into the basin. Water is also supplied from the Vaal catchment to some of the largest gold and platinum mines in the world, as well as to production activities in some of the World’s largest coal reserves.
7. Many of the river systems in the southern African subregion are subject to periodic impoundment by sandbars at their mouths, which reflect the significant natural climatic variability of the region. It is this characteristic of the Orange-Senqu River system that differentiates it from other basins elsewhere in the world (such as the Mekong and la Plata River basins in Asia and South America, respectively) within which GEF IW project are operating and is potentially an ideal test-bed adaptation management techniques for climate change.

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<sup>1</sup> The industrial heartland of South Africa is commonly known as the PWV region. This region includes the towns named in the title, as well as Midrand, the East Rand, West Rand, Johannesburg, Sasolburg and Vanderbijlpark.

*Environmental Context:*

8. The highlands of Lesotho support Alpine vegetation that consists of climax heather communities composed mainly of low woody species interspersed with alpine grasses at the highest altitudes. Grassland habitat dominates the remaining high-lying areas while at lower altitude, mixed sour grassveld occurs westwards to False Upper Karoo. A series of karoid vegetation types characterize the middle and lower Orange River catchment, including the Fish River tributary in Namibia, ending ultimately in the Succulent Karoo from the Richtersveld to the coast. The Nossob / Molopo catchment in Namibia and Botswana drains mainly the Southern Kalahari.
9. The ecological condition of the Orange River continues to be significantly negatively impacted by human activities. The main hydrological changes are:
  - A decline in the mean annual runoff of the river. The past 20 years has seen less than half the annual runoff recorded before 1960
  - A marked decrease in summer flows (November to March)
  - A dramatic reduction in seasonal differentiation
  - A marked decrease in magnitude of inter-annual floods
  - A virtual elimination of early summer flows (spring freshets)
  - A marked decrease in variability
  - An increase in winter flows (mainly July and August) and a lack of very low flow periods.
10. The riparian and in-stream vegetation is negatively impacted and continues to deteriorate in the following ways:
  - Clearing for small scale alluvial mining
  - Wood fuel collecting for cooking and building material
  - Agriculture on river banks
  - Colonisation by alien species
11. The situation regarding the aquatic invertebrates in the middle and lower Orange River also reflects a degraded system, with further deterioration predicted.
  - There is an overwhelming and persistent abundance of filter-feeders, in particular the pest proportion numbers of the blackfly *Simulium chutteri*. The outbreaks of blackfly are attributed to stable flow conditions, particularly high winter flow, deterioration in water quality and encroachment of in-stream vegetation;
  - Winter releases from Vanderkloof dam were shown to have detrimental impacts on aquatic invertebrates up to 600 km downstream – a significant increase in abundance of blackfly, almost complete disappearance of a previously abundant midge and a significant drop in the abundance of a predaceous caddisfly;
  - A number of aquatic invertebrates have declined and possibly disappeared from the Orange River system, including mayflies, snails, a large elmid beetle (the only known specialised wood borer along the Orange River), and a leech species which was known

to be parasitic on hippopotami, the latter becoming extinct in the Orange River in the 1930s. By contrast, an invasive snail *Physa acuta* has spread dramatically.

12. The status of the fish communities in the middle and lower Orange River is considered to be largely modified and on a negative trajectory. The main reasons for this are the deviation from the natural flow and deterioration in water quality. The poor ecological status and negative trends of the Orange River are as a result of both the changed hydrology and out-of-river activities.
13. The Orange River mouth carries the status of Ramsar wetland site as a result of its high number of rare or endangered species, particularly relating to waterfowl, and its uniqueness as ecosystem within the bioregion. Through changes in the flow of the river, and particularly the impacts of mining, it is considered to be in a highly degraded state. Recent initiatives by the Northern Cape Department of Conservation, Environment and Land in cooperation with the Namibian Ministry of Environment and Tourism have started to rehabilitate the wetland and provide it with statutory protection. While changes in flow regimes over time have contributed to degradation of the site, there are several other contributing factors such as diamond mining activities and the physical presence of sewage treatment works and golf courses located in the floodplain of the mouth. The level of degradation has proceeded to such a state that the Ramsar Convention Secretariat has placed the site on the Montreux Record. The additional perturbations caused by potential climate change will further stress this already overwrought environment at the mouth.
14. Research has shown that large parts of southern Africa experience amongst the most variable rainfalls and streamflows worldwide. Not surprisingly, the Inter-governmental Panel on Climate Change (IPCC) has identified this region as one of the most vulnerable to anticipated climate change. These two factors, together with the juxtaposed mix of developed and underdeveloped sectors within the region, present major challenges to water resources and disaster managers alike.
15. A consequence of the accumulating GHGs is a projected increase in global temperature, estimated to be about 2.0 - 3.5° C by the time the CO<sub>2</sub> level reaches double its pre-industrial level. Higher temperatures will lead to changes in precipitation and atmospheric circulation, which are currently hard to predict with acceptable accuracy.
16. The anticipated increase in temperature that will (or has already begun to) accompany global warming will have profound effects on evaporation rates. This in turn will affect atmospheric water storage, and hence, magnitudes, frequencies and intensities of rainfall events, as well as seasonal and geographical distributions of rainfall and its inter-annual variability. All of these impacts will influence the magnitude and variability of streamflow in river basins. In addition, temperature directly affects a wide range of processes and activities such as human comfort and demand for heating and cooling, crop and livestock responses, ecological responses, and incidences of pests and disease.

## Socio-economic Context

17. The total population of the River Basin is estimated at approximately 19 million. The array of cultural, social and economic characteristics in the Orange-Senqu Basin is remarkably diverse. The development within the basin ranges from indigenous traditional lifestyles similar to those hundreds of years ago to exceptionally modern development based in resource extraction and meeting globally driven market demands. Diverse human immigration and emigration and settlement patterns in the basin have left a significant footprint on the basin ecology which grows wider as further economic development scenarios emerge.
18. Agriculture employs more than 25% of the basin's population, many of whom reside in rural areas, while a good portion of the remainder is employed in the industrial sector. This rural-urban dichotomy is a prominent feature in the divergent livelihoods of the inhabitants of the basin as well as their use of ecosystem services. Table 1.1 below outlines the wide variation in economic conditions in the basin countries.

Table I.I.1 Economic Indicators

	Botswana	Lesotho	Namibia	South Africa
GDP/Capita adjusted for PPP*	\$10,900	\$2,600	\$7,600	\$13,300
Percent GDP by sector				
Agriculture	2.4	16.1	11.8	2.6
Industry, includes mining	46.9	43	30.2	30.3
Services	50.7	40.9	58.1	67.1
Percent employment by sector, gender				
Agriculture	26 m/19f	86**	33m/29f	13m/7f
Industry, including mining	29/13	14	17/7	33/14
Services	43/58		49/63	54/79
Unemployment rate	23.8	45	33.8	25.5

\* PPP – purchasing power parity

\*\* employment figures for Lesotho from CIA World Fact Book, others from World Bank Labor Report 2007

19. Social development indicators for the Basin countries shown in Table 1.2 demonstrate that there is a significant basin-wide discrepancy in human development trends. These trends as they relate to trans-boundary water management issues are more fully expanded upon in the TDA.

Table I.I. 2 Social Development Indicators\*

	Botswana	Lesotho	Namibia	South Africa
Total Population	1,815,508	2,123,262	2,055,080	43,997,828
UN Human Development Index/ Rank of 1-177	0.57/131	0.494/149	0.626/125	0.653/121
Infant Mortality Rate/1,000	116	82	63	67

	<b>Botswana</b>	<b>Lesotho</b>	<b>Namibia</b>	<b>South Africa</b>
live births				
Life Expectancy	34.9	35.2	47.2	47
HIV/AIDS Infection Rate (%)	24.1	23.2	19.6	18.8
Population below poverty line (Population living below USD1 a day) (%)	23.5	36.4	34.9	10.7
Population Undernourished (%)	30	12	23	3
Gender-related Development Index	0.55	0.486	0.622	0.646
GINI Index	63	63.2	74.3	57.8
Population with access to improved water (%)	95	79	87	88
Population with access to sanitation facilities (%)	42	37	25	65

*\*UNDP Human Development Report (2006)*

20. The UN Human Development Index demonstrates that the Orange-Senqu River Basin states are in the lower quartile on the world country ranking, with Lesotho ranked as a Least Developed Country, and both Namibia and Botswana very close to this category. Indicators especially pertinent to environmental conditions, water resource use and availability for human health, demonstrate that conditions are widely varied and in dire need of improvement throughout the basin. The infant mortality, low life expectancy and HIV/AIDS infection rates, are extremely troubling, especially combined with percentage of the population below the poverty line and undernourished. The gender-related Development Index places the Basin countries in the middle range of countries on the world ranking. The GINI Index – measuring equity of income distribution – shows a significant skewing, with a large portion of total income going to a wealthy minority of citizens. With regards to percent of populations with access to improved water, the initial numbers look quite good. However perhaps more telling is the relatively low percentage of population with access to sanitation facilities and failing facilities, resulting in the contamination of water courses and groundwater, which in turn results in greater direct contact and exposure to microbiological pathogens and diseases.
21. The indicators listed in Tables I.I.1 and I.I.2 paint a partial picture of the challenges facing the Basin states. Poverty levels, income discrepancies, public health considerations including HIV/AIDS, lack of sanitation, and urbanisation, create significant challenges to the Basin governments who are also having to adapt to climate change and increasing demands for equitable distribution of resources, whilst striving to reach the MDGs.
22. While this project alone will not assist the governments to meet their Millennium Development Goals independently, it will assist the countries to optimize equitable and coordinated water use to improve living conditions throughout the basin. The first and

foremost of the MDGs is ensuring environmental sustainability (MDG 7), and specifically improving sustainable access to safe drinking water, and integrate the principles of sustainable development into country water management policies and programmes to include reversing of environmental loss. By providing populations access to cleaner water, infant mortality is expected to be reduced. Through demonstrating improved irrigation technologies, and improved rangeland management it is hoped that there will be a reduction in those who are suffering from hunger (MDG 1) as access to local food sources are improved.

*Legal, Institutional and Policy Context:*

23. At the regional level, all Orange-Senqu River riparian states – Botswana, Lesotho, Namibia and South Africa – are Member States of the Southern African Development Community (SADC). The SADC Protocol on Shared Watercourses (hereafter the SADC Protocol) is the regional framework agreement dealing with the management of shared watercourses in SADC. The SADC Protocol received the required number of ratifications and entered into force on 22 September 2003 (Barroso, 2007) for all countries that ratified it, which include all Orange-Senqu River riparian states. The SADC Protocol is drafted largely in line with the provisions of the 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses (hereafter the UN Convention). Of the Orange-Senqu River riparian states, to date only Namibia and South Africa have ratified the UN Convention.
24. Of relevance for the GEF project is the adoption of the internationally-accepted “ecosystems approach” to environmental protection of shared watercourses in the SADC Protocol. The SADC Protocol also contains the generic rules for the management of shared rivers within the SADC region, but does not contain basin-specific rules. The SADC Protocol establishes an institutional framework at the regional level for the implementation of the instrument.
25. Within the Orange-Senqu River Basin, an Agreement was concluded in 2000 between the Governments of the Republic of Botswana, the Kingdom of Lesotho, the Republic of Namibia and the Republic of South Africa on the establishment of the Orange-Senqu River Commission (hereafter ORASECOM Agreement). It is the first basin-wide agreement on the Orange-Senqu River involving all four basin states.
26. The objectives of the ORASECOM Council are to “serve as technical advisor to the Parties on matters relating to the development, utilization and conservation of the water resources in the River System” and to “perform such other functions pertaining to the development and utilization of water resources as the Parties may agree to assign to the Commission” (Article 4 of the ORASECOM Agreement). Article 5 of the ORASECOM Agreement singles out a number of areas where the Commission is requested to take the required measures necessary for advising the parties. These issues are the long-term yield determination, equitable and reasonable utilization, studies with regard to the development of the resources, stakeholder involvement, data collection and sharing,

pollution prevention, measures for emergency situations, information exchange and consultation between parties and measures for the prevention and settlement of potential disputes as well as any other matters determined by the parties (i.e. the four riparian states). SADC institutions are not mandated with the implementation and enforcement of basin-wide agreements. Where basin-wide agreements have been concluded they have been done by Shared Watercourse Institutions such as ORASECOM and/or bilateral institutions as well as the domestic institutions in the countries that are party to the basin specific agreements. Bilateral agreements take precedence over basin wide agreements, which create challenges when these do not coincide and the relationships between the agreements have to be assessed on a case by case basis. Article 1 (3) of the ORASECOM Agreement stipulates that the rights and obligations of the parties from other agreements in force prior to the date of entry into force of the ORASECOM Agreement, remain unaffected. The rights and obligations provided for in the applicable bilateral agreements (see below) therefore remain unaffected.

27. Bilateral agreements relating to the Orange-Senqu River have also been concluded between riparian states over time. Two treaties between Botswana and South Africa deal with border delineation and the establishment of a Joint Permanent Commission for Cooperation (on several matters, including water) respectively. The most important bilateral agreements specifically dealing with cooperation on the development and use of the water resources of the Orange-Senqu River are:

- Treaty on the Lesotho Highlands Water Project Between the Government of the Republic of South Africa and the Government of the Kingdom of Lesotho (1986) with Protocols I-VI (concluded between 1988 and 1999) supported by the Lesotho Highlands Water Commission (LHWC) between Lesotho and South Africa;
- Cooperation Agreement between the Government of the Republic of South Africa and the Transitional Government of National Unity of South-West Africa/ Namibia Concerning the Management, Development and Use of the Water of the Orange River (1987);
- Agreement on the Vioolsdrift and Noordoewer Joint Irrigation Scheme Between the Government of the Republic of Namibia and The Government of the Republic of South Africa (1992);
- Agreement between the Government of the Republic of South Africa and the Government of the Republic of Namibia on the Establishment of a Permanent Water Commission (1992);

28. The legal framework for trans-boundary water resources management set by the SADC Protocol, the ORASECOM Agreement and the bilateral agreements is complemented by the domestic laws of the member states. Essentially, the effective implementation of international agreements depends on the interaction between international and national laws, as enforcement on the national level has to make use of the instruments of national laws.

29. Currently, the main Act governing water resources management in Botswana is the Water Act 34 of 1968. Yet, the 1968 Act is outdated and Botswana currently is in the process of

reforming its water law. A new draft Botswana Water Bill (2005) has been prepared and is currently being prepared for parliamentary proceedings (Mathangwane, 2007). The draft bill contains provisions on water resources management as well as pollution control. In recognizing IWRM principles it creates a new institutional set-up for water management in the country, including the involvement of stakeholders. It also includes reference to Botswana's rights and obligations resulting from international agreements related to water.

30. Water resource management in Lesotho is governed by the Water Resources Act 1978, which defines water users and contains some provision on permit administration and pollution control. This act does not recognize international obligations and does not provide the Lesotho Authorities with adequate means in domestic law to comply with international obligations. Lesotho has embarked on a process to reform its water resource legislation and the new Water Resources Management Bill 2007 is currently going through a public consultation process. The Bill recognizes Lesotho's international obligations related to water. It also establishes a comprehensive water resource management framework, including water use entitlements with administration of water licenses, pollution prevention and control, and the establishment of a new institutional framework for water management, including establishment of Catchment Management Agencies. Also, the Bill makes provisions for protection of wetlands and natural springs. To date, the legislation has not been gazetted and is yet to come into force.
31. The relevant water resources management legislation in Namibia is currently largely confined in the Water Act No 54 of 1956. Although it is still in force, the Act is outdated and does not take modern water law principles into account. Namibia has, however, promulgated a new Water Resources Management Act 24 of 2004. The new Act has not yet commenced, but this is expected for December 2007 (Amakali, 2007). Once commenced the new Act will replace the 1956 Water Act. The new Act subscribes to the principle of IWRM and establishes a new institutional framework for water management in the country. Importantly it places strong emphasis on the involvement of stakeholders in water resources management and makes specific reference to meeting Namibia's international obligations, thus providing Namibian authorities with the domestic legal means to comply with international agreements related to water resources.
32. South Africa has replaced the old Water Act 54 of 1956 with the National Water Act No. 36 of 1998. The Act, in combination with the National Water Resources Strategy, establishes a detailed framework for water resources management and the protection of water resources in the country. Based on the principles of IWRM, the Act stipulates the gradual devolution of water resources management responsibilities to Catchment Management Agencies (CMAs) and Water User Associations (WUAs). Five CMAs are to be established in the South African part of the Orange-Senqu River basin. Section 2 (i) of the National Water Act expressly recognizes the need to meet international obligations relating to shared water resources as a purpose of the Act. This provides South African water resources management authorities with the means to enforce international obligations domestically and comply with obligations resulting from international



agreements. The Act furthermore contains specific provisions empowering the Minister to establish bodies to implement international agreements.

33. In addition to the above-mentioned water specific international agreements, the Orange-Senqu River riparian states are Party to a number of other relevant international (environmental) agreements, such as:
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention);
  - Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);
  - Convention on Biological Diversity;
  - UN Framework Convention on Climate Change and Kyoto Protocol;
  - United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa;
  - Stockholm Convention on Persistent Organic Pollutants.
34. A full list of references for the above sections is given in the preliminary Transboundary Diagnostic Analysis – see Part IX of this document.

### **Threats, underlying and root cause analysis**

35. The threats and their root causes were identified during the development of the TDA. These are summarized below, under the sub-heading for each of the major trans-boundary issues: stress on surface and groundwater resources and altered flow regime, deteriorating water quality, land degradation and alien invasives. The details of each issue and its impacts are provided in the TDA, but a summary of each issue is provided below. The Causal Chain Analysis (CCA) may be found in Annex 4 of this Prodoc.

<b><u>Stress on surface and ground waters and altered flow regimes</u></b>
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36. The highlands of Lesotho provide the only exception where the climate is temperate and annual rainfall exceeds evaporation in the Orange-Senqu basin. Elsewhere annual evaporative losses far exceed annual rainfall and to such a degree in the Lower Orange that the climate is classified as arid to hyper-arid. Certain areas of the Basin are already densely populated, economic development is significant, and socio-economic expectations are high. This causes an inevitable high degree of competition for the finite water resources that are available. The skewed distribution of rainfall, the geographical concentration of demand in the upper half of the system, the significant agricultural demands in the drier parts of the catchment and the provision of the storage and transmission infrastructure to meet these, is the essence and driving force of the ensuing trans-boundary issues.

37. Starting with the construction of Vaal Dam in the 1930's and accelerating with of the 'Orange River Development Project' in the early 1960's, huge investments were made in water resources infrastructure to meet demand in an industrialized South Africa. As a consequence the Orange – Senqu basin and the external river basins which are integrated with the Orange Basin feature one of the most complex bulk water storage and transfer systems anywhere in the world. Its major elements are summarised below:
- The Lesotho Highlands Water Project (LHWP) has a combined storage capacity in the Katse and Mohale dams of 2376 Mm<sup>3</sup>. The present rate of transfer, from Phase I of the project, is of the order of 780 Mm<sup>3</sup>/a, or just over 7% of the overall Basin's natural annual runoff of 1300 Mm<sup>3</sup>.
  - The Vaal and Bloemhof dams with a combined storage of 3 843 Mm<sup>3</sup>/a.
  - Transfers into the eastern sub system of the Vaal from the Inkomati, Usuthu and Thukela river basins of 853 Mm<sup>3</sup>/a.
  - Transfer from the Upper Vaal to the Upper Olifants.
  - The Gariep and Vanderkloof Dams situated on the mainstream of the Orange River in South Africa, upstream of the Vaal confluence, with a combined storage of 8500 Mm<sup>3</sup>.
  - The Orange – Fish tunnel which transfers out an average of 575 Mm<sup>3</sup>/a to the Eastern Cape and Port Elizabeth for irrigation and urban use.
  - The largest single water transfer into the system from the Thukela drainage basin of 790 Mm<sup>3</sup>/a.
  - Transfers of potable water out of the Basin through water supply to northern Johannesburg, Tshwane and Rustenburg.
38. For Namibia the Orange River is a key resource for the southern region of the country, where the commercial agriculture and mining activities depend on the river as a reliable resource. In Botswana the basin is very flat has not contributed water to the mainstream in recent history. Nor is the Orange a very practicable resource for the southwest Botswana. The existing demands generally are too far distant from the river, however, some irrigation development is proposed. In the case of Lesotho the national water demands are relatively small and the downstream impacts of abstractions would therefore be quite minor and not present a significant downstream conflict risk. However, the development of the Lesotho Highlands Water Project (LHWP) in Lesotho, transferring water to the Vaal System, does have a significant impact on the river in Lesotho and South Africa.
39. The groundwater resources of the Orange-Senqu River basin, play an important role in supplementing severely stressed surface water resources in certain parts of the catchment. Groundwater is principally used locally for potable water for small towns and villages, particularly in remote areas, for livestock and in some cases mining enterprises. Limited information is available on the inter-connectivity between ground and surface waters and there are no examples of conjunctive use in the basin. It is evident that further or better use could be made of the groundwater resources but how much that resource is worth is unclear. However, groundwater quality is a pressing issue and existing resources are

increasingly under threat from diffuse pollution sources. Aquifer protection policies are urgently required.

40. DWAF has assessed the current firm yield of the Integrated Vaal River System, including transfers from Lesotho at 2920 Mm<sup>3</sup>/a, with 98% assurance and the historic yield of the remainder of the system as 2220 Mm<sup>3</sup>/a.

41. The current and estimated future water requirements of the whole Orange-Senqu River Basin up to 2025 are shown in Table I.I.3. It should be noted that the current study of the Vaal River system (PWC 2005) will have produced revised demands for that system.

Table I.I.3: Summary of Water Demands on the Orange-Senqu River System

Category	Expected water demand (Mm <sup>3</sup> /a)					
	RSA					
	2002	2005	2010	2015	2020	2025
Irrigation						
Vaal	796	796	796	796	796	796
Upper & Middle Orange	1 371	1 381.2	1 398.1	1 415	1 415	1 415
Eastern Cape	607	617.5	634.4	651	651	651
Diffuse Irrigation	397	397	397	397	397	397
Lower Orange	62	82	102	122	122	122
Subtotal Irrigation	3 233	3 273	3 328	3 381	3 381	3 381
Urban, Industrial & Mining						
Vaal6	1 840	1 968	2 039	2 088	2 163	2 270
Upper & Middle Orange	101	110	122	134	143	153
Eastern Cape	19	20	20	20	20	41
Lower Orange	15	17	23	24	22	23
Subtotal Urban, Industrial, Mining	1 975	2 115	2 204	2 266	2 348	2 487
TOTAL- South Africa	5 208	5 389	5 531	5 647	5 729	5 868
		<b>NAMIBIA</b>				
Irrigation- Lower Orange	41	60	103	150	197	227
Urban	9	16	31	47	47	48
Total – Namibia	50	76	134	197	244	274
		<b>Lesotho</b>				
Irrigation		9	9	9	9	9
Urban		11	12	14	15	17
Total – Lesotho		20	21	23	24	26

TOTAL (RSA, Namibia & Lesotho)		5 485	5 687	5 867	5 997	6 168
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\* No figures were made available for the catchment within Botswana

42. The increased demand in Lesotho of 1.5% per annum is due to limited increase in domestic water use and some agricultural development in the Lower Senqu. In South Africa, a slow growth in demand from the urban and industrial sectors of less than 1% per annum is predicted.
43. There is significant potential for increased water use for commercial irrigation, particularly in the Lower Orange area, where the climate is suitable to grow high value crops using efficient drip or sub surface irrigation systems. In Namibia, the majority of the present and future demands are for irrigation, with some increase in demands by mining. A total possible irrigation development for Namibia of 15,115 ha is projected for 2025, with an annual growth in water requirement of 11%. There is also a proposal for irrigation in Botswana with a water requirement of 100 Mm<sup>3</sup>/a, which is not shown in Table I.I.3.
44. Results from the DWAF Water Resources Planning Model (PWC 2005) excluding any potential impact from climate change and maintaining existing ecological flow requirements predict a supply deficit developing from 2006 onwards. In practice it will not be possible to provide any significant increase in the system yield until 2015 at the earliest by which time a significant deficit will have arisen without taking account of any increase in the recognised ecological flow requirements of the estuary. The proposed management and development actions to address the temporary shortfall are discussed in subsequent sections.
45. The inevitable conclusion is that the present levels of water use and the intentions to expand it even further are not sustainable. The key issue to be addressed is the management of demand, which while being attended to a degree in the urban / industrial sector, it is in the agricultural sector that action needs to be taken most urgently since it is here that more than 50% of the total demand lies.
46. The natural flow of the Orange River at its mouth is estimated to be 11,300 Mm<sup>3</sup>/a and has been reduced by half by the major water resource development taking place in the basin since the 1930's, to the extent that now it is only in March that the former mean annual discharge of 380 cumecs is commonly exceeded. In most other months the flows are a fraction of the pre-development figures.
47. The changes to the hydrological regime of the Lower Orange-Senqu particularly below Vanderkloof dam have, as a consequence of upstream development, been dramatic. Flood events have reduced considerably, while the usual month of peak discharge has been set back from February to March. This radical modification of the regime means in effect that the former natural dynamic equilibrium of the biophysical environment in the Lower Orange River has all but been destroyed, resulting in a much degraded fluvial, ecological and environmental situation, particularly at the mouth.

48. Current ecological flows, established in the early 1990s, although honoured, do not provide the protection required in the Lower Orange and a re-evaluation of these flows, and thereby a re-evaluation of the water resources of the Lower Orange system, is now required. Furthermore, a new methodology for establishing ecological flows throughout the river basin, in the main river channel and the seasonal rivers, is now required based on best international practice.
49. Excess water use and the lack of effective demand management particularly in the agricultural sector emerge very strongly as the major immediate and root causes of the degraded hydrological regime. In addition, reservoir operation procedures, particularly of Gariiep and Vanderkloof, do not currently provide meaningful environmental releases and operation policies are not consistent with the spirit of integrated water resources management. More water needs to be found for transboundary flow provision and for environmental water needs of the Lower Orange River.
50. The causal chain analysis (CCA) illustrated in Annex 4 verified that over-allocation of available water resources is the immediate cause of stress on surface and groundwater resources and alteration of hydrological flows. Socio-economic, legal, and political root causes underlie the immediate causes. For the mining/industrial sectors there is a lack of harmonization in policy and legislation at the national and basin wide levels, a lack of international agreements, and uneven economic growth featuring development at all costs. For urban and household uses the changes in national political priorities and targets combined with shifts in population density and growth, including urban migration, and fragmentation of management at the municipal, provincial, national, and basin wide levels, has lead to increased demand on water resources. In the agricultural sector root causes include lack of coordinated basin wide policy and targets, and a lack of harmonized regulations and policing at the municipal and provincial wide levels. Throughout the basin there is a lack of holistic planning and management pertaining to efficient water use, which is compounded by a lack of coordination of related research.

Deteriorating water quality

51. The surface water in the Orange-Senqu Basin has deteriorated significantly over the last 30 years due to the development of irrigation agriculture, mining, industry, urbanisation and growth in human population. The problem has been further exacerbated by the increase in water consumption, which has reduced the ability of river systems to assimilate pollutants through dilution. The key water quality issues of which some are of transboundary nature are: eutrophication, microbiological organisms and pathogens, salinity, and possibly heavy metals, persistent organic pollutants, radio-nuclides and to a lesser extent, temperature changes.
52. Eutrophication, i.e. nitrogen and phosphate enrichment of surface waters emanates from a combination of point and non-point sources. Point sources of high concentrations of

nitrogen and phosphate include: overflow from waste water treatment works, animal feedlots and industrial effluents which are discharged directly to the river.

53. Salinity is a major cause for concern in the Orange-Senqu Basin. The issue is particularly serious in the Vaal catchment, due to the extent of urbanisation, industry, mining and irrigation agriculture in the Upper, Middle and Lower Vaal sub-catchments.
54. Salt inputs to river systems derive from: industrial discharges directly to river, runoff from urban areas and industrial sites, power station blow-down water and cooling water, mine water decant from closed mines, discharge of underground mine water to surface, and return flows from irrigated lands. The situation in the Lower Vaal is so bad that under normal and low flow conditions, no water is released from Douglas Weir (just upstream of the Vaal-Orange confluence) to prevent pollution of the low salinity Orange River.
55. Elevated concentrations of heavy metals, especially copper, lead, zinc, nickel, cadmium, chromium, iron, manganese, arsenic, selenium and mercury may be found in surface and underground water from mine water discharge and seepage from mining wastes, industrial effluent discharged directly into rivers, seepage and runoff from landfills, urban storm water runoff and in return flows from lands treated with pesticides. The Water Management Areas (WMAs) which are most affected are the Upper and Middle Vaal, including many of the main tributaries, and the Lower Orange.
56. The temperature within a water column is one of the factors which dictate the nature and functioning of the ecosystem within a given river reach. This is because less oxygen can dissolve in warm water than in cold and rates of chemical reactions, including photosynthesis and respiration increase in warmer water. The impact of altered temperature regimes resulting from unseasonable low or high flow conditions within the Orange-Senqu catchment has not been well studied and therefore the scale and significance of the impact is not known.
57. While groundwater pollution is a problem throughout South Africa in urban, industrialised and mining areas, the only trans-boundary aquifer in the Orange-Senqu basin that may be affected is the Molopo aquifer, which straddles the Botswana-South African border. There are naturally high levels of nitrate in this aquifer but there are few significant sources of pollution.
58. The other major immediate causes of water quality deterioration from the urban and house hold sector include discharges of wastewater from inadequate municipal wastewater treatment works, run-off from urban areas including solid waste disposal along river banks. From the mining and industrial sectors there is untreated or inadequately treated wastewater from industry and mining, land contamination from spills and hazardous waste, and discharge of waste-water from mining operations and acid mine drainage. The primary causes from the agricultural sector are diffuse pollution from agricultural enterprises (incorrect application of pesticides and fertilizers), intensive

farming, sedimentation from poor pasture management, and salinity from poor irrigation practices.

59. The problems identified above result from a number of underlying causes in each sector. These underlying causes are: inadequate and failing waste water treatment facilities, lack of incentives for improvements and lack of understanding and attention to the impacts of deteriorating water quality. The socio-economic, legal and political root causes of deteriorating water quality are: a lack of dedication of resources and a low level of capacity to sufficiently address these challenges through enforcement of regulations. This is exacerbated by inadequate administrative systems to manage and evaluate diffuse sources of pollution from agriculture, growing demands for products combined with a lack of regulation of informal agriculture.

#### Land Degradation

60. Land degradation in the Orange-Senqu Basin is due to activities primarily within three major sectors. These are mining, commercial agriculture and rural activities including pastoral and small scale agriculture. Large-scale coal and gold mines generate vast quantities of overburden, waste rock, process tailings, liquid effluents and other associated wastes. The disposal of these wastes over large tracts of land, together with the actual surface disturbance of opencast and underground mines, are the causes of severe land degradation in certain parts of the catchment. Within the agricultural sector the immediate causes are cultivation practices along river banks and on floodplains as well as in wetlands, which often do not have adequate legal protection to prevent conversion to agriculture. The loss of riparian vegetation and large-scale land conversion to agriculture has both contributed significantly to land degradation in the catchment.
61. Landscape degradation from the rural sector is caused by extensive overgrazing by subsistence stock farming in particular. Grazing on steep slopes, especially in Lesotho and on marginal grasslands in the drier parts of the catchment causes large-scale erosion. Remedying unsustainable grazing practices is a crucial step in improving conditions. All the countries of the Orange-Senqu River Basin consider rangeland degradation to be a significant threat to sustainable land management and biodiversity conservation. Traditionally, livelihoods have been based on the use of natural resources through livestock husbandry and cultivation of land. Land management practices evolved to adapt to the physical conditions of the southern African climate and historically, resource use is considered to have been largely sustainable. Today, in the Orange-Senqu Basin people on communal lands still largely lead subsistence lifestyles, due to the absence of employment and other significant monetary income. As a result livestock are a major investment, and animal husbandry serves as an economic driver for subsistence level populations. The impacts of this on the landscapes in terms of degradation due to over grazing are significant.

62. Landscape degradation manifests itself in two contradictory forms: loss of vegetation cover on the one hand and bush encroachment on the other. In the south of Namibia, Lesotho and parts of South Africa, the former is by far the dominant expression of degradation, while in Botswana (and possibly the adjacent areas of South Africa) bush encroachment is listed as a significant challenge. Loss of vegetation cover is perhaps the most obvious indicator of landscape degradation, ranging from the loss of grass species diversity and perennial grasses, a loss of grass vigour to a loss of ground cover and land productivity, increasing vulnerability to drought and facilitating encroachment of undesirable plants and soil erosion. There are generally two interrelated causes for loss of vegetation cover: overstocking - which describes the situation where more animals are kept on a certain piece of land than there is fodder available to feed them; and overgrazing – which is caused when animals are concentrated in one specific area for too long, resulting in over use of the vegetation with inadequate recovery time. Open access to land and unsuitable distribution of water and boreholes is one major factor for the latter.
63. Two important biomes, the grasslands and succulent karoo, are noted for their high floristic richness and endemism. The grasslands biome is further noted for its hydrological service provisioning capacity, straddling important catchment areas in the headwaters of the Orange River. Land degradation in these areas is a threat to biodiversity and undermines hydrological service functions. With the exception of the montane grasslands these biomes are all considered deserts or semi deserts with unpredictable rainfall patterns. The succulent and Nama karoo biomes are highly vulnerable to desertification and are expected to suffer from increased rainfall variability and changes expected as a result of climate change. The succulent karoo, which lies within a winter rainfall area, currently has more predictable rainfall than the other areas.
64. With regard to dryland habitats, development of the river has at least indirectly affected the surrounding lands through what might be called a “knock-on” effect of irrigation schemes, which have led to the loss or degradation of large tracts of indigenous veld. There have also been losses in biodiversity of riparian vegetation along the Orange-Senqu River. Such losses appear to be mainly secondary consequences of current river regulation schemes, which led to land clearing for cultivation and set the stage for the introduction of invasive alien species.
65. The underlying causes of land degradation for the mining sector are inadequate law enforcement as a result of limited institutional capacity, as well as poor rehabilitation, which together have resulted in large areas of partially or completely un-rehabilitated land. The proliferation of small-scale mining and unregulated river bank mining has added to the problem. Within the formal agricultural sector: the underlying causes stem from agriculture development on marginal land; poor land planning; inadequate monitoring and regulation of the sector; and limited financial and human resources to regulate the industry adequately. From the rural agricultural sector, the underlying causes are inadequate rangeland planning systems; inadequate knowledge of good farming practices; increased numbers of domestic livestock due to market demands; and, poor



land planning due to inadequate coordinated management through conservation and livelihood development agencies.

66. The socio-economic, legal and political root causes of land degradation have several shared issues across the sectors, including a lack of knowledge, planning, and regulation. Poor regulation of the mining sector is a major root cause since it is a profit driven, exploitative short-term industry. Clear economic incentives are needed to ensure effective rehabilitation of mining sites. The socio-economic, legal and political root causes in the agricultural sectors include a high demand for products, including those for export, and political prioritization. Within the rural pastoral sector the main socio-economic root causes are poverty, increased human pressures often from migration, combined with the land tenure system and skewed land ownership, and an overall lack of integrated management. While these causes are largely localized there are significant trans-boundary implications which make addressing these causes a priority.

Alien Invasives
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67. ORASECOM and stakeholders, in determining the priority trans-boundary issues during the TDA training and development exercises, decided that loss and degradation of biodiversity was a cross-cutting issue, however they recognised that invasive species was a critical problem and classified it as priority problem for the Orange-Senqu Basin.
68. Alien species are generally pioneers by nature. Disturbances in natural systems (aquatic and terrestrial) and degradation of land often make colonization of new areas by alien invasive species possible. Increases in alien species were found to have an impact in the trans-boundary problems of: land degradation, deteriorating water quality, changed hydrological regime and decreased availability of water. In each of the above mentioned cases, an ecological system is affected, causing disruptions to the habitat balance. Such disruptions cause ideal environmental conditions for fast growing and reproducing alien species to establish, leading to a vicious circle of degradation. The cause of the problem arises from three main sectors: agriculture, tourism and urban / household development. Introductions of ornamental and productive species are often deliberate, but their invasive ability was not predicted. Introductions can also be accidental, as with plant material carried in feeds, or attached to animal parts for dispersal. Floods are often responsible for the spread of alien species beyond areas of initial distribution.
69. Alien invasive species within the Orange – Senqu River Basin can be broadly grouped in two categories, namely aquatic and riparian invasive species.
70. The aquatic plant species *Eichhornia crassipes* (Water hyacinth) has heavily invaded sections of the Vaal River. It has spread from the upper-middle parts to near the confluence with the Orange-Senqu River in recent years. Apart from the large water use of the plant, its ability to cover the surface of the river in dense stands makes it a physical

impediment, blocking abstraction channels and irrigation equipment. Chemical and biological control measures have proven successful in eradicating the plant. *Azolla filiculoides* (Water fern) has invaded sections of the upper Orange River and its tributaries. Impacts of invasion by the plant are similar to that of *E. crassipes*.

71. The introduction of two trout species (*Salmo trutta* and *Oncorhynchus mykiss*) to the upper reaches of the Orange-Senqu River catchment in South Africa and Lesotho has impacted on populations of indigenous minnow species in these areas. The value of these species for sport angling, and their impact on indigenous fish species are a highly debated topic among local ichthyologists. Exotic trout have been found in small populations in the Gariiep and Vanderkloof dams.
72. Monitoring and research programmes have confirmed that riparian areas of all southern African rivers have been invaded by alien plant species. The severity of invasions is correlated to average annual rainfall, with rivers in the drier western portions of the subcontinent being less impacted than the eastern rivers. Tributaries of the Orange such as the Vaal and the Senqu Rivers have their origins in the wetter parts of the country and are thus more heavily infested with alien species.
73. In the upper catchments, where rainfall is typically above 600mm per annum, the woody plant species *Acacia dealbata*, *Acacia mearnsii*, *Populus* sp. *Melia azederach* and *Jacaranda mimosifolia* are invasive in riparian areas. As the rivers enter more arid areas in the central and western areas of South Africa, and southern Namibia, the invasion of mostly *Prosopis glandulosa* is encountered. The *Prosopis* invasions are mostly found on flat alluvial floodplains, which are often disturbed by flooding and erosion. *Prosopis* has been identified by the South African National Botanical Institute (SANBI) as the seventh most invasive species in South Africa. Throughout the course of the rivers, common reed (*Phragmites australis*) is found on the edge of the river channels, or in shallow sections of the channels. The species, although not alien, has proliferated with increased river regulation which has reduced the frequency of flood events in the system.
74. The main underlying causes of increased invasions of alien species in the tourism sector are where alien species have an amenity value (e.g. trout) and there is a demand for services and products exacerbated by competition within the sector. The underlying causes in the agricultural sector are demand for products from invasive species; lack of understanding of ecosystems combined with incorrect agricultural practices and changed land use. Within the rural household sector the underlying causes are pressure on available natural resources, resulting in changed water flows, creating ecological conditions suitable for the spread of alien species, as well as eutrophication and disturbances in ecosystem balance, thus creating disturbed systems ideal for invasion by alien species. Another underlying cause in rural areas is intentional and accidental veldt fires, causing disturbances in natural systems. In urban areas, many garden species have been introduced from overseas e.g. jacaranda and syringa trees, which have spread into natural systems along the urban edge.

75. The root causes across the sectors are a lack of knowledge, inadequate planning, and ineffective monitoring and enforcement of regulations. There is also a lack of harmonized legislation within the basin, and a lack of resources for eradication of alien invasives, the spread of which is exacerbated by climate change conditions.

Underlying Causes
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76. The above threats have been evaluated and the following underlying causes have been identified at the basin wide level:
77. The accelerating use of the waters of the Orange-Senqu River Basin is rapidly outstripping the basin's institutional ability to adapt. While there are several Commissions that currently have responsibility for management of the system, and the principal Commission, ORASECOM, is an entity with international legal status, there is limited capacity to jointly identify and advise the riparian countries with many anticipatory actions that will be necessary for the countries to adopt.
78. Increasing, though uneven, economic growth rates within the basin and the region have driven increased consumption and demands on limited water resources, as industrial, energy and extractive industries vie for resources with agriculture, tourism, and environmental sectors.
79. Population growth in the basin and region, including large influxes of immigrants and rapid urbanization has impacted water use trends and demands for increased dedication of revenues to infrastructure and social development needs.
80. Previously insufficient attention had been given to the wide array of stakeholder views, knowledge and concerns about trends in water management throughout the basin.
81. Cooperative endeavours have heretofore focused on the water sector specifically, rather than the production sectors that use water; an integrated cross-sectoral focus will be needed to balance water demand and supplies, and address land degradation and other key threats.
82. There is a need to share information both within and between countries and sectors regarding water use trends, environmental demands, and development strategies.
83. There is a need for joint harmonized planning for environment linked with water departments and ORASECOM through inter-sectoral planning.
84. At the National level, underlying causes are identified as:

- The domestic push for economic development and provision of social services at the national level in some cases obscures basin-wide water resource availability.
- Agencies responsible for water management have many of the legal tools with which to address issues confronting the Basin, but lack the capacity to use them effectively.
- Cooperation and the sharing of information between and among Departments/Ministries is not targeted to the needs of the wider basin, which cut across Departmental/Ministerial lines of responsibility.
- Environmental legislation is often new and difficult to implement effectively.
- Harmonization of approaches and expectations at national and basin-wide levels are needed to enable effective management of the shared basin.
- Countries need to improve measurement of demand and exert greater control of water abstractions in order to better evaluate the water balance of surface and ground waters.
- While some countries have given consideration to revamping water pricing strategies, initiating water trading through use of normal market forces, having users of water bear responsibility for water losses, and water conservation strategies (reducing water demand), there is still much work needing to be done at national levels in these areas.
- All the challenges outlined above require financial capabilities, access to capital and government commitment to be addressed effectively.

### **Stakeholder Analysis Summary**

85. During the PDF-B Phase a stakeholder analysis was undertaken to identify direct and indirect, and impacted and impacting stakeholder groups, to gauge the stakeholder group perceptions pertaining to the issues within the TDA and to illuminate areas of potential tensions between stakeholder groups. The full Stakeholder Involvement Strategy and Stakeholder Analysis is given in Section IV. Based on both qualitative and quantitative stakeholder analyses, stakeholder involvement activities have been developed to address the specific concerns identified by stakeholders and directly pertaining to the priority trans-boundary problems.

86. Involvement of a wide array of stakeholders is a critical element of this project. There are multiple venues to feature stakeholder involvement and public participation in the project, including intersectoral committees, activities emphasizing direct stakeholder involvement in water management strategies, a basin-wide stakeholder forum, and national stakeholder forums, and a wide spectrum public awareness building effort conducted through a social marketing campaign. The details of these efforts are elucidated in Section IV, with the following groups (inter alia) included:

- Inter-sectoral Committees involving government departments or ministries of: Water, Conservation/Environment, Fisheries, Industry, Energy, Mining, Finance, Foreign Affairs, Agriculture, Social Welfare/Public Health, Labour, as well as

elected politicians, local government and water management parastatal organizations.

- Stakeholder Activities, as shown in Table I.I.4 below:

**Table I.I.4: Involvement of stakeholder groups**

Stakeholders	Direct stakeholder activities	Basin-wide and national stakeholder forums	Social marketing campaigns
Government officials	✓	✓	
Water management officials	✓	✓	
Power utilities	✓	✓	
Tourism/recreation sector	✓	✓	✓
Mining sector	✓	✓	
Industrial sector	✓	✓	
Construction industry		✓	
Agro-industrial sector	✓	✓	✓
Local government officials	✓	✓	✓
Waste management officials		✓	
NGOs	✓	✓	✓
CBOs/village development committees	✓	✓	✓
Education sector	✓	✓	✓
Student and youth groups	✓	✓	✓
Irrigation farmers	✓	✓	✓
Stock farmers		✓	
Factory farmers (chickens, piggeries etc)		✓	
Dryland croppers		✓	
Health care providers	✓	✓	✓
Riverine community members	✓	✓	✓
Traditional healers	✓		
Scientists	✓	✓	✓
Conservation officials	✓	✓	✓
Press/media		✓	✓
Development finance institutions (DFIs)			✓
Bilateral development organizations			✓

*Baseline Analysis*

87. As noted above, water demand in all the Orange-Senqu River Basin states is forecast to rise and it is unclear how those demands are to be met. The second stage of the Lesotho Highlands Water Project is currently being evaluated but this on its own will not satisfy the demand in the basin and a new impoundment in the Lower Orange is being considered, the feasibility of which will depend upon the environmental flow requirements. In order for either of these to be effective without significantly altering the

conditions of the river system, the basic tenets of Integrated Water Resource Management (IWRM) must be applied.

88. The concept of Integrated Water Resource Management (IWRM) is well known throughout the basin and it is enshrined in the National Water Resource Strategy of South Africa, in the Water Resource Management Act in Namibia, and in the draft Water Bills in Botswana and Lesotho. IWRM is a systematic process for the sustainable development, allocation and monitoring of water resource use in the context of social, economic and environmental objectives. It is a cross-sectoral policy approach, designed to replace the traditional, fragmented sectoral approach to water resources and management that has led to poor services and unsustainable resource use. IWRM is based on the understanding that water resources are an integral component of the ecosystem, a natural resource, and a social and economic good. Traditionally within the water sector, resource management has been undertaken independently of social and economic objectives and has focused on the interaction between land and water use at the basin level. The increased complexity of the IWRM inter-sectoral approach brings with it many challenges, not least the differing planning units and plans in which the different sectors operate.
89. For example in South Africa, in order to achieve an inter-sectoral approach, water resource management responsibilities are to be devolved from central government to the catchment level. The National Water Resource Strategy has identified 19 Water Management Areas (WMA), 5 of which are in the Orange-Senqu River Basin. In each WMA there will be a Catchment Management Agency (CMA) responsible for certain water resource functions and for the development a Catchment Management Strategy (CMS) for the protection, use, development, conservation, management and control of water resources within its WMA. The way in which the resources are protected, used, developed, conserved, managed and controlled needs to form an integral part of other planning initiatives at provincial, district and local authority level.
90. IWRM plans are also under development in other parts of basin, in particular in Botswana where the plan is soon to be supported by GEF through an International Waters (IW) Medium Size Project, and in Namibia which has secured financial support from the African Development Bank to develop its national IWRM Plan. In addition, Lesotho is in the process of modifying its water management legislation to incorporate principles of IWRM. It is important that these initiatives and those on-going in South Africa are closely tied under an agreed set of policies in order to avoid unconstrained water resource consumption whilst still recognizing the need to apply the concept of IWRM. Under the present agreement, ORASECOM is an advisory body to the Governments with no basin management or regulatory functions. There are also bi-lateral water resource agreements which set a status quo against which the ORASECOM agreement is measured. A permanent secretariat to ORASECOM was established in 2007 and a executive secretary appointed. The effectiveness of ORASECOM is currently limited by the amount of time that technical task team members, drawn from the respective countries' water departments/ ministries can dedicate to ORASECOM issues. In 2003, with the assistance of BMZ/GTZ, ORASECOM commissioned an IWRM Plan to be prepared for the whole

of the Orange-Senqu Basin. The first phase is now complete and a large amount of data, information and knowledge has been collated in a series of thematic reports, many of which have been used to prepare the preliminary TDA. The second phase which is currently in preparation will implement priority interventions identified and further prepare for the development of the IWRM plan. There is no overall vision statement for IWRM in the Orange-Senqu Basin as yet, nor have water resource objectives been set, targets agreed or final interventions identified. The establishment of a basin-wide agreed vision will enable the countries to more effectively implement their national level IWRM strategies.

91. As part of the push toward coordinated IWRM strategies the countries of the basin need to be very conscious of the need to focus on the management of water quality as well as quantity as part of their water resource planning. Water availability is only as good as the quality of that water. It is recognized in the basin that too often there has been a failure to integrate the issues of quantity and quality – both with regard to surface water and groundwater. The need to manage water quality and quantity together is a central tenet in the concept of Integrated Water Resource Management. This is especially pernicious with non-point source pollution. The consequences of irrigation with larger quantities of water results in the leaching of fertilisers, and more importantly the leaching of salts from deeper soil horizons, which can render both the lands themselves and the receiving rivers unsuitable for use. Diffuse agricultural ‘effluent’ may be less visible than direct discharges of sewage or industrial effluent, but are no less pernicious. Diffuse pollution sources are also a problem particularly for groundwater resources. Aquifer protection policies need to be developed and implemented throughout the basin as part of the efforts to apply IWRM principles in the basin. The integrated management of surface and groundwaters within the basin is being pursued by a specifically task force (the Transboundary Aquifer Initiative) within ORASECOM and this project endeavour to support the group’s activities.
92. There is a need to ensure that direct discharges to rivers are licensed and managed properly on the basis of assimilative capacities of those rivers, and on Receiving Water Quality Objectives (RWQOs). Where these limits are exceeded, often through the cumulative impact of diffuse discharges, water becomes unavailable to some, or even all, users downstream. Licensing and permitting procedures should be harmonized and Receiving Water Quality Objectives or a set of discharge standards should be agreed by all basin states. Even once licensing/permitting procedures and water quality standards (for end-of-pipe discharges and receiving waters) are in place; this does not guarantee good water quality management. Without the essential policing and monitoring, compliance is impossible to ensure. In the remoter parts of the Orange-Senqu River Basin and within certain sectors, for example artisanal mining, compliance is a real problem which will require concerted efforts to overcome.
93. The linkage between water resource management and land use, in particular range management, is not clearly articulated in any of the basin countries. A lack of capacity and information prevents local communities from making informed management decisions. They lack information on the important parameters like rangeland condition,

carrying capacity and livestock condition which would allow the resource users to identify problem areas and make appropriate mitigation decisions. Conservation of biodiversity and preservation of the hydrology pathways, particularly in the riparian areas should be key objectives in any rangeland management plan. These can be realized through basin wide implementation of IWRM and associated activities.

94. The national level IWRM efforts are to be commended where appropriate, and this project seeks to build coordination mechanisms between the countries to ensure that there are collaborative efforts in managing water resources in line with basin-wide priorities. Without this level of collaboration, national level policies will be sub-optimal, as shared resources require shared management.



## **PART II: Project Strategy**

95. The overall goal of the Project is to improve the management of the Orange-Senqu River Trans-boundary Basin through implementation of a sustainable programme of policy, legal and institutional reforms and investment options using the TDA/SAP process. The project will apply Integrated Water Resource Management (IWRM) approaches which consider the interrelationships between natural resource systems, biophysical processes and socio-economic systems. IWRM will take into account factors outside the water sector such as agriculture and energy and such issues as land degradation and climate change in a cross-sectoral approach. This expanded approach makes possible a transition to adaptive management strategies for water resources.
96. The project will play a catalytic role in developing and implementing, through the TDA and SAP process, a sustainable programme of policy, legal and institutional reforms and investments to address them. The Project will create synergies with and build upon a range of initiatives being undertaken by the countries themselves and those of bi-lateral and multi-lateral development partners that have given priority to the Basin. Competing water uses in the context of dwindling and uncertain future supplies is seen as the critical issue in the basin and will be a principal focus of project attention from the outset.
97. The Project will strengthen basin-wide institutions, particularly ORASECOM, to ensure the long term management sustainability; identify the underlying and root causes of the priority trans-boundary problems/issues and building on the existing preliminary TDA identify potential interventions to address them; develop an agreed basin-wide Strategic Action Programme (SAP) based upon short, medium, and long term management objectives and strategies; through pilot projects, build capacity for adaptive management and implement measures to sustain and enhance overall environmental health of the Orange-Senqu river basin; and support ORASECOM to implement a comprehensive stakeholder involvement programme based on its Stakeholder Roadmap. The Project will create synergies with and build upon a range of initiatives being undertaken in the Basin by the four countries and those of donor agencies. In particular, the project shall coordinate with the existing BMZ/GtZ, EU, InWent and FGEF projects in the implementation of the Orange-Senqu River Basin Programme (see below) and ORASECOM's Road-map towards Stakeholder Participation.
98. During the PDF-B stage the countries have:
- Undertaken a qualitative and quantitative stakeholder analysis to determine stakeholder perceptions and ranking of the priority trans-boundary issues (Annex 2).
  - Prepared a draft public involvement and communication strategy building upon the ORASECOM Road-map towards Stakeholder Participation (Annex 1).
  - Confirmed the trans-boundary priority issues and undertaken causal chain analyses to identify immediate, underlying and root causes (Annex 4).
  - Developed a preliminary trans-boundary diagnostic analysis (to be further refined during the project implementation), incorporating thematic basin studies on water quantity and quality, climate change and the studies undertaken by BMZ/GTZ as

a first step to the development of an Integrated Water Resource Management Plan for the Orange-Senqu River Basin.

- Agreed the institutional arrangement for an Orange-Senqu River Basin umbrella programme under which the GEF project and other international donor projects, and eventually the SAP, are to be implemented. (Section IV, Part IV).
- Agreed on a draft basin vision and water resource quality objectives, corresponding to the priority trans-boundary issues, as the framework for the Strategic Action Programme to be later developed.
- Agreed the scope, activities, outputs and outcomes of three demonstration projects addressing environmental low flows, water conservation in the irrigation sector and range land management.
- Prepared a Full Sized project document for submission to GEF through UNDP.

99. The proposed GEF project on the Orange-Senqu River Basin will build upon these achievements and those by other organizations and together with the countries and other partners will undertake the following activities:

- Strengthen the Orange-Senqu River Commission and its Secretariat through creation of an Information Management System; establishment of technical working groups; establishment of water resource allocation criteria; and capacity building;
- Review and update the Trans-boundary Diagnostic Analysis (TDA), filling critical data gaps through targeted assessments in collaboration with EU, FGEF and BMZ/GtZ, identifying potential short, medium and long-term interventions to address trans-boundary issues and conducting pre-feasibility studies on key interventions;
- Development of a Strategic Action Programme (SAP) and National Action Plans (NAPs) as part of a wider IWRM plan for the Orange-Senqu River Basin to be implemented by ORASECOM under the Orange-Senqu River Basin Programme; including the development of a detailed Monitoring and Evaluation framework for SAP implementation and support of implementing institutions at the national level;
- In line with the ORASECOM Road-map towards Stakeholder Participation, implement a range of stakeholder involvement activities to encourage stakeholder participation and involvement in basin management and increase awareness in the critical issue of water conservation in the basin;
- Implementation of three demonstration projects to show the potential for strengthening integrated water resource management at the national, sub-basin and basin wide scale and fill critical data gaps.

## *Project Rationale and Policy Conformity*

### GEF Alternative Scenario

100. Strengthening of ORASECOM will provide a stronger forum for the countries to discuss difficult issues such as water allocation and water quality objectives at a multi-lateral level. A strong ORASECOM will also help coordinate the various national and basin-wide strategies to ensure that the principles of IWRM are applied basin-wide and not distorted at the sub-basin level. The environment is a primary stakeholder. In order to apply the IWRM principles effectively, ORASECOM should be able to strike a balance between the needs of the environment and national economic and social development objectives.
101. The GEF project will support the countries to approach water resource management issues in an interdisciplinary, multi sectoral manner focusing on harmonized basin wide priorities through the development of the SAP as part of a ORASECOM's IWRM plan. Ultimately, the harmonization of policies and approaches, demonstration of cost effective alternatives, and setting of basin-wide empirical baselines will empower the counties in the basin to most effectively adapt future growth trends towards realistic sustainable development scenarios and protection of the riverine environment.
102. The GEF project will support the countries to strengthen and find common ecosystem based approaches and IWRM policies, objectives and targets to which they can commit over the next 20-25 years through the SAP. Some tools to be developed with the assistance of the GEF project may include, for example:
  - Agreed methodology for determination of environmental flow requirements;
  - Develop transboundary EA procedures and policies
  - Common policy on aquifer protection;
  - A shared water quantity and quality monitoring system and information management system.
103. An umbrella Orange-Senqu Water Resources and Environment Programme (OSWREP) has been developed in a form of Gantt Chart and as a living document during the PDF phase and serves as the key donor coordination tool for ORASECOM. This document will keep encourage and coordinate support from the international donor community during the implementation phase of the Full sized project and help avoiding duplication and maximize synergies and complementarities.
104. The GEF project, amongst other public involvement activities promoted by the countries and other partners, will raise the awareness of the general public to the need to conserve water in all sectors, in collaboration with in particular the EU initiative. Through support of the basin forums the GEF project will provide multi-stakeholder access to the decision making process.

Fit with Focal Area strategy:

105. The project is consistent with the 1<sup>st</sup> Strategic Objective of the IW Focal Area: to foster international, multi-state cooperation on priority trans-boundary water concerns through more comprehensive, ecosystem-based approaches to management. It furthermore fits with the 3<sup>rd</sup> Strategic Programme in GEF-4: Balancing overuse and conflicting uses of water resources in trans-boundary surface and groundwater basins. The project aims to assist countries to balance competing water uses between production sectors in the highly water stressed river basin under climate change uncertainties, while ensuring water security to support the people's livelihoods and ecological flows to sustain riparian ecosystems. Following integrated basin river management (IRBM) principles, the project will in particular demonstrate the application of integrated land and water resource management practices in the upper catchment of the basin, as well as promote the harmonization of policies and activities necessary to effectively address trans-boundary water concerns in the basin.

*Project Goal, Outcomes and Outputs/activities*

106. The goal of the GEF involvement will be to address trans-boundary water resource management issues, including transboundary aquifers, as identified through the TDA process and articulated in the Strategic Action Programme (SAP) and the accompanying National Action Plans (NAPs). GEF funding will be drawn upon for finalization of the comprehensive TDA and SAP, and the implementation of selected interventions identified in the SAP as basin-wide priorities.

107. The outcomes for this project are based on basin-wide initiatives that will enable the countries to reach the objective through improved basin-wide conditions. These five outcomes are:

- 1 Capacity of ORASECOM strengthened to coordinate initiatives, national institutions and current and future support from development partners in a harmonised manner to effectively promote the implementation of IWRM principles. ORASECOM's coordination capacity will be further strengthened through the establishment of the Orange-Senqu Water Resources and Environment Programme;
- 2 Trans-boundary issues analyzed through additional studies, underlying and root causes and targeted interventions identified in a comprehensive TDA;
- 3 Agreement on and commitment to policy, legal and institutional reforms and capital investments to address priority trans-boundary issues and implementation of IWRM approaches through endorsement of SAP and NAPs. This will include sustainable financial arrangements agreed for SAP implementation;
- 4 Stakeholder involvement in project activities assured and public awareness of trans-boundary issues raised;
- 5 Ecosystem-based IWRM approaches encouraged and strengthened through the successful implementation of the Demonstration Projects.

108. At its Council meeting in April 2007 in Windhoek, ORASECOM agreed on the establishment of an Orange-Senqu Water Resource and Environment Programme (OSWREP) to bring the various ORASECOM supporting projects under one umbrella and provide a platform for the development and implementation of the SAP (to be re-titled to better reflect its final content). The approved institutional arrangement document (see Section IV, Part IV) shows how the programme will be governed and how the various international funded projects are to contribute.
109. Currently, there are several development partner driven projects in the basin which are assisting ORASECOM and SADC in their efforts to implement IWRM in the Orange-Senqu River Basin. To date, these partners, including BMZ/GtZ, the French GEF, EU, InWent and the UNDP/GEF, have worked well together albeit in a loose collaboration. A more structured approach has now been adopted by ORASECOM with the formation of the Orange-Senqu Water Resource and Environmental Programme and integrated workplan. Partner coordination meetings are now being held frequently under the chairmanship of ORASECOM and partners are being encouraged to coordinate implementation of their projects under the OSWREP workplan in order to avoid overlap and ensure complementarities.
110. The intended catalytic role of the GEF project and co-financing objectives are to be stressed in the context of the coordination among the countries and development partners to achieve the sustainable development objectives outlined in this document. The following five technical project activity components (plus a project management component) were identified during the project preparatory phase as the most effective intervention areas to realize these sustainable development objectives, global environmental benefits and address transboundary concerns in the basin. The project activities have been designed to most effectively meet the project goals and objectives. The design however is not so rigid as to limit the project's ability to play the catalytic role during the implementation of the project in coordination with activities of other partners, nor does it presume that implementation be solely carried out by GEF funding. Maximum implementation flexibility will be exercised at all times.

### **Component 1: Institutional Strengthening of ORASECOM**

111. In order for ORASECOM to function optimally, there is a need to strengthen the institutional capacity of the organization and enable it to reach the objective of serving effectively as a coordinating agent for trans-boundary water management in the Orange-Senqu River Basin. The project will work closely with BMZ/GtZ, EU and SADC in contributing to the support and strengthening of ORASECOM.

#### **Activities:**

- 1.1. GIS-based Information Management System created
- 1.2. Technical Working Groups established
- 1.3. Transboundary EIA guidelines and procedures prepared

#### 1.4. Capacity of water resource practitioners strengthened

112. The supportive measures to be taken for strengthening ORASECOM must have clearly defined objectives and concrete results. The activities outlined above will build capacity within ORASECOM and create mechanisms that will perpetuate the positive steps taken thus far by the Commission.
113. There is a clear need to develop a common information system and thereby understanding of the water related problems and issues of the Orange-Senqu Basin. Equal access to data and information is essential if the countries are to be able to enter into basin-wide agreements on a range of key trans-boundary issues. The design of the information system will need to take account of the management decisions it will be required to support, the current and future form and type of data to be made available to ORASECOM (with the need for a data sharing protocol), quality control/assurance procedures and security access procedures. A web-based, GIS information system and a website will enable the information to be shared efficiently by projects, governments, NGOs, the media, and other interested stakeholders in and outside the basin. The creation of online databases will enable a knowledge based community to emerge, building on the collective expertise in the basin. Additionally, it will be critical in the development of outreach mechanisms for stakeholders without access to internet media, including posters, radio and television information in conjunction with other activities for stakeholder participation (see Component 4). The project will contribute to the development of the information system and the ORASECOM website in close coordination with the EU and BMZ/GtZ projects. A project website will also be established in line with IW:LEARN guidance and standards and linked to the ORASECOM website, once the latter becomes operational.
114. In order to strengthen the technical working of the OSWREP and ORASECOM, the project will establish a set of technical working groups to review key aspects of trans-boundary water issues, such as water resource yields, demand forecasting and management, pollution control, etc. in consultation with the ORASECOM and in close coordination with the EU and BMZ/GtZ projects. Experts from the basin states will be selected to serve on these groups which will meet regularly to review the work done by ORASECOM and the international projects and provide guidance to the Orange-Senqu Water Resource and Environment Programme Strategy Committee.
115. ORASECOM will also be assisted in the development of guidelines and procedures for trans-boundary Strategic Environmental Impact Assessment. Experts will be appointed to develop draft procedures specific to OSRB in compliance with international best practice and to present them to ORASECOM for consideration and negotiation and eventual agreement.
116. In addition to the efforts listed above, in conjunction with ORASECOM, French GEF, BMZ/GtZ, EU, and InWent, the GEF project will undertake capacity building efforts for water resource practitioners. The project will with the aid of a Needs Assessment and Capacity Building programme to be developed by FGEF, identify

specific basin wide capacity gaps, review options for improving capacity, initiate a recruitment programme for junior water management officials and implement training as appropriate. This has been identified as critical area for capacity building in the short and medium term by all the countries.

**117. Deliverables:**

- Functional GIS based information system and web page;
- Technical working groups established and functioning to support the implementation of OSWREP;
- Trans-boundary Strategic EIA guidelines and procedures prepared; and
- Capacity improved based on the Needs Assessment and Capacity Building Programme developed by F-GEF.

**Component 2: Completion of Transboundary Diagnostic Analysis**

118. Within the PDF-B phase of the project, a preliminary TDA was conducted to identify and assess the status of the priority trans-boundary issues. The preliminary TDA identified information gaps to be addressed in order to better understand and improve our knowledge of the trans-boundary issues. The information gaps presented in the ORASECOM integrated work plan (Section IV, Part VI) and will be addressed by the four major projects. Once these gaps have been addressed as part of the Full Size Project the TDA will be revised and updated and include a listing of potential interventions for inclusion in the SAP.

**Activities:**

- 2.1. Information gaps filled for the TDA
- 2.2. TDA revised and updated
- 2.3. Revised TDA widely disseminated

119. The following critical information gaps were identified in the TDA to be addressed in the Full Sized Project:

- A review of the impacts of artisanal mining on the middle and lower Orange, requiring a desk study plus field visits to validate findings and perhaps limited contaminant monitoring of sites.
- An assessment of Persistent Organic Pollutants levels in the OSRB. This will be in the form of a series of monitoring surveys, probably in the sediment phase, to give a snap-shot of current levels throughout the basin. This study will not provide an estimate of contaminant input or fluxes through the system.

- A detailed yield assessment and demand forecasts for the OSRB for the next 25 years based on an agreed methodology including water allocation criteria and climate change scenarios (see Component 1). This work will be done in close collaboration with the BMZ/GtZ project.

120. Other critical gaps will be filled by studies supported by Phase II of the BMZ/GtZ IWRM project and EU project. Once these studies are complete the TDA will be revised and updated, including a thorough revision of the Causal Chain Analyses, development of causal loop diagrams, indicating the positive and negative feed-back and identifying the gate-keepers in the decision process, and identification of a range of short, medium and long term interventions for inclusion in the Strategic Action Program. Priority short-medium term interventions will be subject to pre-feasibility desk studies. The final TDA will be presented to ORASECOM and once approved will be disseminated widely to stakeholders, civil society, governments, other basin wide and regional projects, and the International Waters community.

121. **Deliverables:**

- Gap-filling studies on artisanal mining, POPs and water resource yields and demand forecasts based on agreed climate change scenarios;
- Revised/updated CCA and causal loop diagrams;
- Listing of potential SAP interventions;
- Pre-feasibility studies for key interventions; and
- Final TDA

**Component 3: Preparation of the Strategic Action Programme and National Action Plans**

122. The project will provide support to ORASECOM in the development of a Strategic Action Programme and supporting National Action Plans that will enable the basin to harmonize their IWRM policies and actions. The culmination of these efforts will be a donors' conference to mobilize financial commitments to implement the SAP. The development of a basin wide plan for the Orange-Senqu basin is a key element in the Terms of Reference of BMZ/GtZ and UNDP-GEF, although the emphasis and development processes of each is slightly different. Guided by ORASECOM, the GEF project will work with the other two donors to ensure that there is a single and not multiple development plans. It was agreed during the consultation in May 2008 that the SAP will be a component of a wider IWRM plan to be developed by ORASECOM and supported by BMZ/GTZ Phase III project.

**Activities:**

- 3.1. Institutions established to support the national process for the NAP development
- 3.2. SAP and NAPs formulated and endorsed
- 3.3. Donor conference held to mobilize resources for IWRM Implementation



123. The Strategic Action Programme is at the heart of this project and will assist the countries to harmonize their national IWRM policies and strategies in the Orange–Senqu River Basin, and incorporate the ecosystem based approach in any regional IWRM plan. The SAP will be under-pinned by National Ecosystem Based and IWRM Action Plans (NAPs), which will take into account both national and basin wide priorities. The SAP and the NAPs will be developed in parallel to ensure consistency and correlation and will be an iterative process beginning with the development of a preliminary SAP.
124. The project will assist the countries to formulate and obtain endorsement of the Strategic Action Programme (SAP) and National Action Plans (NAPs). A basin wide working group for SAP formulation and national groups for NAP development will be formed. The preliminary SAP will incorporate the Basin Vision and Water Resource Quality Objectives (WRQOs) developed in the PDF-B stage and for each WRQO a set of targets for the short, medium and long-terms. A listing of policy, legal, institutional, and investment interventions to meet those targets will be drawn from the work done under the TDA. It should be noted that the SAP may include interventions which are not GEF applicable and alternative funding sources will need to be sought. The preliminary SAP will be reviewed at basin-wide meeting which will include the participation of the Basin Wide Stakeholder Forum (BWSF – see Section 4.1). On the basis on the preliminary SAP, draft NAPs will be developed and will be appraised through national workshops to verify the feasibility of the proposed targets and interventions in each state and determine the financial implications. The NAPs will be reviewed by the National Stakeholder Forums to obtain additional inputs from throughout the basin of those who will be impacted and whose support will be critical. Through an iterative process the project will amend the SAP in line with findings of the NAPs, while the countries finalise and endorse the NAPs through national planning procedures including establishing financing arrangements. An important element of SAP development will be the creation a Monitoring and Evaluation framework based on GEF International Waters indicators (process, stress reduction and environmental and socio-economic status) and the new GEF-4 IW Results Tracker. Using this framework the implementation of the SAP will be monitored by ORASECOM on an annual basis. Once the SAP and NAPs are completed and agreed, the project will, with the support of ORASECOM, seek to obtain endorsement of the SAP at the highest government level in each basin country.
125. Once the SAP is endorsed the project will assist ORASECOM to organize a donor conference aimed at mobilizing commitments for SAP and NAP implementation. A range of international and bi-lateral donors will be invited to consider support for specific aspects or interventions within the SAP, some of which will have been subject to pre-feasibility studies. The project will assist ORASECOM in establishing commitments through appropriate memoranda and/or agreements, at national or basin wide level as appropriate.
126. The SAP and NAPs will correspond to the priorities identified by the basin countries for the basin and will incorporate social and economic development objectives as well as environment protection targets and measures. The SAP will form a component of a

basin-wide IWRM plan being developed by ORASECOM and drawing together the outputs from all the donor projects. It is expected that the preliminary basin-wide IWRM Plan will be available by the time for the donor conference. Implementation of developmental targeted activities may not be eligible for the GEF funding, but the project will assist the countries to secure support from other development partners, such as IFIs and bilateral donors. Priorities included in the SAP and NAPs are determined by the countries and not by the GEF funding scope.

**127. Deliverables:**

- Endorsed SAP and NAPs;
- Operational GEF M&E framework for SAP implementation; and
- Financial support leverage for SAP and NAP implementation

**Component 4: Basin wide stakeholder involvement activities**

128. The project will aim to involve stakeholders and the public in all stages of project development and implementation through active participation, targeted stakeholder education, and sectoral and long term public awareness raising of the importance of environmental and water conservation measures. These activities link with the objectives of the ORASECOM Roadmap toward Stakeholder Participation, specifically the four key focus areas outlined in the Roadmap: 1) enhanced communication and information, 2) institution creation and development, 3) capacity building, and 4) creation of institutional interfaces. In addition this project will support enhancement and promotion of stakeholder interaction encouraging them to progressively play an enhanced role in the management of the basin, at the same time as educating them in the economic benefits of improved resource stewardship. During coordination meetings, it has been agreed that all projects will work together closely and collaboratively to ensure their contributions are compatible and demonstrate synergy.

**Activities:**

- 4.1. Basin Wide Stakeholder Forum and National Stakeholder Forum established
- 4.2. Water conservation awareness raised
- 4.3. Education & Social marketing campaign materials produced

129. The active inclusion of stakeholders in project activities at all levels will be critical to the successful implementation of the project. This has been highlighted in the ORASECOM Roadmap toward Stakeholder Participation and it is intended that at every juncture possible this project will coordinate stakeholder inclusion according to the Roadmap guidelines. At the highest level the Basin Wide Stakeholder Forum (BWSF) will be supported and will provide stakeholder oversight into project activities. The membership of the BWSF will be determined in accordance with the ORASECOM Roadmap. Stakeholders from a wide array of groups with diverse interests and concerns

will be elected by the National Stakeholder Forums to serve on the BWSF. They may include representatives from river community stakeholders, NGOs, industries and private sectors, agriculture, energy, conservationists, the media, public health care providers, educators, and others. The members will receive training on the GEF TDA/SAP approach and IWRM and be asked to review the TDA, and have input to the formulation of the Basin Vision. The BWSF will also come together to review and provide input into project activities at critical junctures throughout the project.

130. In addition to the BSWF, two or more example national forums will be identified, established and supported in sub-basins, elected in part through holding open meetings in the sub-basin to identify the stakeholders' views and perceptions. The aim is to garner community support and to include local, economically-oriented stakeholders in demonstration project activities including training. Key members of the National Stakeholder Forums will be involved in demonstration projects and will also serve on the BWSF as illustrated above. In all cases the local stakeholders will help to develop community level strategies to apply lessons/technology from the demonstration projects (see Component 5).
131. In order to raise awareness among stakeholders about the challenges of water conservation and introduce cost effective strategies to preserve water resources, a basin wide campaign will be conducted. This will target the general public, the tourism and recreation industry, light industry, agriculture and mining sectors and will feature the introduction of measures to reduce water use, improve water efficiency and lower costs incurred due to unnecessary water loss. Training on water conservation will be conducted in golf resorts, factories and mining sites with workers and other stakeholders, including regulators, administrators and owners and communities. The project will also assist the stakeholders to develop water conservation measures for communities in both rural and urban areas. Results monitoring will be emphasized. It will be crucial to monitor and evaluate effectiveness of conservation activities, and the results will be publicized as part of a social marketing campaign.
132. The public outreach campaign will also include the publication of a high quality photographic project profiling of the Orange-Senqu linked to the production of a coffee table book which will focus on the river basin and its water resources being at the heart of Southern Africa's modern development and the stakeholder activities to protect the river system.
133. The project will also build long term capacity and increase stakeholder awareness of water issues through development of ecosystem educational curriculum outreach for specific stakeholder groups in conjunction with SADC REEP (Regional Environmental Educators Programme). This will include the development of language appropriate primary and secondary education curricula for schools throughout the basin with all materials in self contained activity kits to emphasize low cost, hands on activities to study water quality, ecology, flow rates, seasonal variation, and climate change adaptation. Additionally the project will develop "river culture centres" guides for schools and communities to teach about traditional uses of the river through oral history projects.

With REEP, the project will review and develop a university level curriculum course on hydro-ecology based on the Orange River to emphasize the inter-sectoral importance of river health and explore the feasibility of small matched grant scholarships for students specializing in water issues.

134. In coordination with National Stakeholder Forums and the BWSF, the NGOs and other role-players will develop a social marketing campaign for water conservation (Activity 4.3 listed above) to emphasize awareness raising and empowering behaviour. The social marketing campaign will be informed by the approaches developed through GEF best practices on Communication Strategies employed successfully in other river basins and trans-boundary water systems throughout the world, and will emphasize increasing awareness, small but meaningful changes in behaviours and local ownership of solutions. ORASECOM will be asked to establish a date for an official Orange-Senqu River Awareness Day which will be celebrated throughout the basin.

135. **Deliverables:**

- BWSF and National Stakeholder Forum reports and recommendations;
- Environmental education curriculum materials;
- Coffee-table book about socio-economic history and biodiversity of the Orange-Senqu River basin produced; and
- Awareness raising and social marketing campaign for water conservation.

**Component 5: Demonstration projects on Environmental flows, Water conservation and improved water management targeting irrigation sector, community led range land management**

136. In order to catalyze activities for the SAP, the project will implement three demonstration projects to demonstrate and improve IWRM in the basin. These projects are designed to be replicable throughout the basin and beyond and are accompanied by a strong results dissemination programme. These projects were selected and developed by the countries during the TDA development and correspond to priority activities identified by ORASECOM. The pilots are summarized below and the full draft project documents are given in Section IV, Part V.

**Activities:**

- 5.1. Mechanisms established to assure preservation of environmental flows for the surface and subsurface flows of the Lower Orange.
- 5.2. Water use efficiency improved at the transboundary pilot sites and best practices in irrigation water usage developed
- 5.3. Soil erosion reduced at the pilot site and self-governance lessons and best practices for improved land/range management established

137. **Environmental Flow:** Two sites will be selected, one on the Lower Orange and one on a seasonal tributary, to test methodologies for setting Ecological Low Flows (ELF) in

the Orange-Senqu River Basin, setting the bounds for water resource development. The project design will be finalized in the first three months in an inception report, which will include a review of state-of-the-art methodologies for setting ELF and an appropriate methodology for testing and selection of the pilot sites, based on an agreed set of criteria. The study will undertake a baseline data collection programme; assess the flow and non-flow/ anthropogenic related impacts on the river and estuary and the likely outcome of their possible amelioration; and, design a long-term monitoring programme to assess the efficacy of any environmental flow and/or other management interventions (i.e. non-flow/anthropogenic related) that have been implemented. The demonstration project will establish two stakeholder advisory forums which will hold regular meetings. A socio-economic study of the impact of flow scenarios will be conducted and the results incorporated into the design and implementation of the long-term monitoring programme. Similar studies will be undertaken by the BMZ/GtZ at other key sites in the basin identified by ORASECOM in phase II of their support project.

138. **Water Conservation in Irrigation Sector:** High levels of water use and poor water quality management by the agricultural sector is a key trans-boundary issue which will be targeted in the second demonstration project. A minimum of two trans-boundary irrigation sites will be chosen to demonstrate improved water conservation and water quality control management. The project design will be finalized in the first three months in an inception report which will include a review of basin-wide and international best practice. The trans-boundary project sites will be selected based on replicability and the willingness of irrigation farmers to participate and apply best practice as well as serving as control groups. For each site a stakeholder advisory forum and water-user association, if not already formed, will be created to support the project and play an active role in project implementation and monitoring. The project will assess existing practices at selected sites, including monitoring of drainage waters, to serve as a baseline. The project will develop a plan of improved management measures to be introduced (metering, conservation tariffs, scheduling), designed, constructed and monitored. The project will conduct training with nearby communities' agricultural departments, agro-industry and irrigation farmers and farm workers and others. The BMZ/GtZ project will undertake demand assessment and demand management studies in other water use sectors.
139. **Community-led Rangeland Management:** Land degradation due to human activity is a critical trans-boundary issue in the Orange-Senqu River Basin. Demonstration projects focusing on improved land/range management will be implemented in Botswana and Lesotho rangelands to provide models to be replicated throughout the basin. The project design will be finalized in the first three months in an inception report which will include a review of best practice in range management regionally and nationally. The project will identify and assess current baseline land conditions at each site and practices pertaining to livestock husbandry, farming, forestry, mining, etc. Concurrently a socio-economic evaluation will be conducted at the sites to determine relevant trends and future impacts. The project will feature the formation of community land management committees with stakeholder advisory forums to guide and direct the demonstration projects. Within the project locally agreed management plans will be developed and implemented.

140. All three pilot projects will be subject to regular monitoring and in the last quarter of project implementation a series of workshops to disseminate the findings from all three demonstration projects will be held at the basin-wide level. Intermediate and final findings from the pilot will be fed into the TDA/SAP process.

141. **Deliverables:**

- Agreed methodology for setting Ecological Flows in the Orange-Senqu river basin at selected points of the basin;
- Demonstration of water conservation and water quality management best practices in the irrigation sector;
- Demonstration of best practices in land/range management and development of basin wide guidelines; and
- Lessons learned (Experience Notes) extracted from the above and disseminated widely

**Component 6: Project Management**

142. A project management structure will be established in order to facilitate optimal project coordination and serve as the inter-linking mechanism for project components. The activities include:

**Activities:**

- 6.1 Establish a basin wide Project Coordination Unit (PCU);
- 6.2 Attendance and Support of the Programme Coordination Group;
- 6.3 Inception and Steering Committee meetings (Programme Strategy Meeting).

143. The implementation of this component is designed to minimize efforts devoted to unwarranted project oversight, while facilitating optimal project outcomes (please refer to the Organogram in Section IV, Part II of this document.) and will build upon the foundations established during the PDF-B stage. Initially the project Steering Committee will comprise the ORASECOM Commissioners who will act as National Focal Points, representatives from UNDP and UNOPS, as the GEF implementing and executing agencies, and a stakeholder representative. Once established the ORASECOM Water Resource and Environmental Programme Strategy Committee will act as the Project Steering Committee.

144. A small basin wide Project Coordination Unit (PCU) will be established in Pretoria, South Africa within the offices of ORASECOM Secretariat for the four year duration of the project. Administration support staff, including office manager, secretary and accountant will be sourced locally. The PCU will be provided with the basic equipment necessary for the functioning of the project, including computers, copy machines and other materials as needed and appropriate.

145. To ensure good coordination of donor-supported projects under the wider programme at the operation level a Programme Coordination Group will be formed made up of project managers and chaired by the ORASECOM Executive Secretary. The Programme Coordination Group will meet quarterly.
146. Within the first three months the Project Coordinator will prepare an inception report giving details of the full implementation of the project in consultation with the Programme Coordination Group and will organize an inception meeting involving the Programme Strategy Committee members.

**Deliverables:**

- Project Coordination Unit established;
- Programme Coordination Group established; and
- Inception and Quarterly Progress reports.

*Project Indicators*

147. An agreement on trans-boundary priority concerns, impacts and causes embodied in an endorsed TDA will signify strong technical collaboration and understanding between the basin countries.
148. The development of the SAP, and NAPs and their adoption will represent a firm united commitment by the basin states to take the governance reforms and commit the investment necessary address the priority trans-boundary concerns.
149. The SAP and NAPs formulation and implementation will be substantially strengthened by the functioning of inter-ministry/inter-departmental committees. These committees are essential for the successful introduction of the IWRM approach as the forum at which the differing sectoral objectives and targets can be balanced and reconciled.
150. The success of the project will be dependent on the level of involvement of multiple stakeholder groups impacting and impacted by trans-boundary problems and the proposed solutions. Indications will include multi-stakeholder involvement in goal oriented activities and inputs into decision making as recorded in the reports of the TDA/SAP development process.
151. Strengthening of the ORASECOM agreement and the enhanced functioning of the secretariat will indicate the long term sustainable commitment of the countries to multi-lateral management of the basin and wider commitment to international environmental and water resource protection agreements.
152. The commitments from the governments, the basin wide bodies, and international donors to support at the donor conference will serve as a critical process indicator of the successful implementation of the SAP.

153. The key project indicators focus on preparation of the TDA and development of the SAP and NAPs are largely focused on the processes, although there are some environmental and socio-economic status indicators (ESIs) and stress reduction indicators (SRIs) related to the demonstration projects (see full project and pilot project logframes). In the irrigation pilot project the reduced volume of water consumed and levels of agro-chemicals in the drainage waters are obvious SRIs linked to investments in metering and improved distribution systems.

### *Risks and Assumptions*

#### *Risks*

154. *Acceptance of TDA findings by the participating Governments* – Key findings of the TDA may not be accepted by all governments for various reasons including wider development targets and objectives – Low Risk.
155. *Inabilities to bring NAPs in line with SAP* – The project risks unequal development of the SAP if not all countries are able to align their National Action Plans with the SAP. This will be dependent on the level of development of national IRWM plans of which the NAPs for the Orange River will be nested. Thus the NAPs maybe over or under ambitious and may not meet the minimum standards agreed upon with in the SAP development. This risk should be managed through multiple iterations of the NAP/SAP development in order to harmonize these strategies and national multi-sectoral commitments. - Low Risk.
156. *Strong and high-level government commitment is not sustained* – High level political commitment to basin wide cooperation in water resource management is growing, as observed in the agreement to establish the ORASECOM and other bilateral agreements. The high economic importance of the basin’s water resources and the vulnerability of those resources to environmental degradation are well understood, and provide the impetus for further cooperation. – Low Risk.
157. *Shift in economic conditions in the basin* – An unexpected shift in economic conditions could result in realignment of government budgets and national commitments reducing the overall ability to support the project activities. Should this occur the project has a strong degree of flexibility to adjust the project prioritization giving it the ability to buffer any potential disruptions, if temporary and reversible. - Medium risk.
158. *Procedures to operationalize/implement the political commitment to basin-wide cooperation on the ground are still in their infancy* - Despite the political commitment, many decisions to be made by the diverse stakeholders will not present clear “win-win” solutions. As such, it will be particularly important to create strong decision support frameworks and procedural mechanisms to ensure meaningful stakeholder involvement – Medium Risk.



159. *Parallel commitment on the part of Governments and potential donors to ensure financial sustainability beyond the life of the Project* - Strong coordination with governments and other donors who are already involved in, or interested in, the sustainable management of the Orange-Senqu River basin will need to be assured. The creation of ORASECOM's umbrella Water Resource and Environment Programme will provide a strong framework for donor and country collaboration. – Moderate Risk.
160. *Currently planned interventions will not bring effective results due to adverse effects of climate change* – As part of the SAP and NAP development the project will assist the riparian states to develop adaptation strategies and decision frameworks to address shifts in resource availability caused by climate change impacts – Low Risk.

#### *Assumptions*

161. Concurrently to the risks listed above there are assumed conditions that are requisite for success of the projects. Awareness of these assumptions and their potential to destabilize the process if not met is critical to effective project management.
162. *Full support of governments and sectors* – It is assumed that the approval by the governments of the project indicates full support of all executing ministries and sectors. Formation of inter-ministry and inter-departmental committees is essential in ensuring full government support throughout the TDA/SAP process and applying the IWRM approach. This assumption should be reviewed regularly throughout the project life on a country by country basis.
163. *Acceptance of and reliance on scientific method to define problems in the basin* – There is an assumed acceptance that scientific methods will be employed to explore the trans-boundary problems. The high level of technical capacity throughout the basin supports this assumption.

#### *Expected global, national and local benefits*

164. *Global Benefits* – The global benefits of this project extend to the preservation of the unique ecosystems, increasing socio-economic stability through environmental cooperation in an ecologically sensitive area, and testing activities that can be replicated elsewhere for integrated trans-boundary water resource management. The challenge in this project is developing harmonized policies among nations who are at varying stages of development, with multiple stakeholders and wide ranging priorities pertaining to water use. This situation can be found throughout the world in shared water basins and presents international, basin-wide and local decision makers with a unique set of options ranging between meeting the most immediate and dire needs, to considering long term sustainable actions that do not lead to a marked negative shift in water resources

throughout the full region. By trialling a number of innovative strategies, as well as employing proven coordination mechanisms this project takes an array of options into account and will devise a set of realistic activities and objectives that will create long terms benefits and address the conditions which may be exacerbated by a further decline in water quantity and quality. The lessons learned from this can be translated to many shared water systems globally and it is expected that refinement of strategies will enable this and other projects to develop more fully in the future. The Orange-Senqu River Basin for example complements the current GEF IW portfolio by adding experience of management in arid and semi-arid regions to those gained in the humid tropics and mid-continental basins in Asia and Latin America. The proposed project also complements the GEF IW Benguela Current Large Marine Ecosystem project that has contributed to the sound management of shared marine resources at the mouth of the Orange-Senqu River system. These benefits are more fully developed within the Incremental Cost Analysis in Section IV, Part I.

165. *Regional Benefits* – The Orange-Senqu River basin is possibly the central water resource feature within this portion of southern Africa. Although less well known than the other major river systems on the African continent – such as the Zambezi, Congo, Volta and Nile –the Orange-Senqu is possibly one of the most significant in terms of its economic importance to the continent. It supports not only a significant proportion of the industrial outputs of southern Africa, but also fuels a large part of the agricultural enterprises that feed this region. As early as the 1950s, perturbations of the riverine system were being recorded as a consequence of the development activities associated with the industrialisation of southern Africa. By the 1970s, the condition of the Basin’s waters had deteriorated to the point where remedial actions were being contemplated, and technologies developed to address the concerns over eutrophication and salinisation that were all too evident in this system. Initially, these focused on technological approaches pioneered by the South African Council for Scientific and Industrial Research (CSIR), and supported by applied research at the region’s universities and institutions for higher learning. The net result has been a leadership position within southern hemisphere water resources management centred in South Africa. In recent years, however, this position has been eroded as water resources studies have declined in number to the point where, during the first decade of the new millennium, it has been reported that there are no institutions of higher learning offering studies in water resource engineering and sciences. Consequently, the types of initiatives proposed herein can have a significant ‘knock-on’ effect by creating an opportunity for southern Africa to once again establish a leading role in practical water resources management. In addition, there is the real possibility that this opportunity can be realised at the regional level, through complementary programmes of education, research, and policy development being coordinated and encouraged by entities such as ORASECOM.
166. *National Benefits* – The project will strengthen IWRM strategies in the countries and assist each of the basin states in realizing increased coordination, policy, planning and regulatory harmonization. Through harmonized development strategies, the countries will benefit from equitable sharing and co-management of water resources and underpinning sustainable, social and economic development objectives at the national

level. The project through the SAP and NAPs will provide a platform for increased regulatory investment in the basin and thereby conserve and improve the aquatic environment.

167. *Local Benefits* – The local communities within the river basin are aware of challenges of water management, but often lack the skills or means to empower them to improve their own conditions. By collaborating with the project the local stakeholders will gain a sense of control over their circumstances, increase their ability to address them and learn from other stakeholders in neighbouring countries. The project, through the public involvement component and pilot projects, will provide communities and stakeholders with examples of low cost activities that can be undertaken to improve conditions pertaining to water resource management. Both the national and local benefits are delineated in the Incremental Cost Analysis in Section IV, Part I under the “domestic benefits” column.

*Country Ownership: Country Eligibility and Country Drivenness*

168. The countries singly and jointly are strongly committed to a basin wide approach to addressing threats to the shared water resources of the basin. Each of the countries has in place, is developing, and continues to improve upon domestic legislation that provides a framework for basin-wide cooperation in the arena of Integrated Water Resource Management. This is given further substance in bilateral and basin-wide agreements between the riparian countries. In addition, the countries have formed basin-wide institutions that provide a basis for management cooperation.
169. The participating countries are members of the SADC and the SADC Environment and Land Management Sector Coordinating Committee Unit (ELMS), and are Parties to the SADC Protocol on Shared Watercourses.
170. Each of the participating countries is an active and committed member of the Orange-Senqu River Basin Commission (ORASECOM) – see *Institutional, sectoral and policy context* outlined in Section I. The countries are also members of other bi-lateral management bodies including the Joint Permanent Technical Committee involving South Africa and Botswana (JPTC), the Lesotho Highlands Water Commission (South Africa and Lesotho -LHWC), the Permanent Water Commission involving Namibia and South Africa, and the Joint Permanent Water Commission established by Botswana and Namibia (JPWC).
171. The participating countries are supportive of the Southern Africa Vision for Water, Life & the Environment in the 21st Century (Vision). The Vision states, *inter alia*, that there are:
- An increasing demand on water resources;

- An increasing strain on both water resources and the infrastructure necessary to sustain an urban environment;
- Increasing poverty;
- Widespread food insecurity;
- Inadequate coverage of water and sanitation services;
- Disease and premature death from water related illness;
- A need for integrated water resources management (IWRM);
- Poor waste management and lack of accountability;
- Low levels of energy supply;
- Degraded watersheds; and
- Constraints within water management institutions

172. Management of the trans-boundary water resources of the Orange–Senqu River Basin will be a complex undertaking, requiring attention to a host of interrelated issues: water supply and quality, water demand from different sectors, potential conflict between and among users at a national level, water allocation decisions, pollution control, environmental protection, climate change, land degradation and invasive alien species. As demand for water resources in the basin countries is in excess of the reliable yield of the basin<sup>2</sup>, it is in the countries’ best interests to continue and to build upon their commitment to cooperative approaches to the management of Basin resources. The countries have signalled their intention to work together in, *inter alia*, the following areas: developing joint adaptive management strategies codified in basin-wide action plans; ensuring policy concordance to promote water conservation and maximize currently available supplies of surface and groundwater fresh water flows; strengthening institutional capacity for cooperative water resource management; developing a basin-wide information system to establish a common understanding of management issues; operationalizing specific, prioritized technical projects and studies to expand know-how; and developing a multi-sector stakeholder participation framework. These activities will be assessed, described and captured in the TDA/SAP process.

173. The national institutional support mechanisms are in varying stages of development but all show promising trends towards increasing dedication to trans-boundary water management and national level IWRM. These national institutions in support of the project are outlined above in the *Institutional, Sectoral and Policy Context* outlined in Section I, Part I.

### *Sustainability*

174. The long-term sustainability of the results of this Project rests on the assumption that there is strong and high-level government commitment to the outcomes of this project

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<sup>2</sup> The recent Lower Orange River Management Study (LORMS) has estimated that surface water supplies of the Orange –Senqu River Basin system may only be capable of meeting requirements for present and future predictable uses until sometime between 2010 and 2015.

and financially sustaining them beyond the life of the Project. The Member States of the ORASECOM have demonstrated their immediate political commitment with the establishment of a permanent ORASECOM Secretariat in South Africa, appointment of a full-time executive secretary, and financial contribution to the ORASECOM from each state. The Governments are well aware that in the near future forecast water demand will exceed reliable yield and that a full-range of measures will have to be jointly identified and undertaken to address this reality. The joint development of a TDA and SAP are important steps in this overall process.

*Replicability and innovation*

175. The overall objectives of this Project have high potential for international replicability and a replication plan will be developed during the full size project. Specifically, the project emphasis on cross-sectoral and basin-wide driven planning and actions, the incorporation of an IWRM approach, will be a most instructive experience for semi-arid river basins globally in which significant economic development and growth is being experience. Further, the strong focus on public involvement in all project activities can also serve as a model exercise.
176. The largest riparian in the Basin, South Africa, has an innovative water policy and accompanying legislation (National Water Policy and National Water Act), which provides amongst other things for the establishment of Catchment Management Agencies (CMA). In creation of the CMAs South Africa is applying the principle of subsidiarity, devolving responsibilities for integrated water resource management so that decisions are taken as close as possible to and with the involvement of the end user. Provision is made for the establishment of water user associations, co-operative associations of water users who wish to collaborate on water management. The project will assist in connecting the CMAs and water user associations with ORASECOM, and thus connect national and trans-boundary IWRM strategies and programmes. A second point of innovation will be the establishment of ecological flow requirements for the river basin not only in the main river but also seasonal tributaries. The project will contribute to the understanding of ecological needs of the Orange River which can be applied to other river systems throughout southern Africa. The project will link closely with the GEF Benguela Current Large Marine Ecosystem project to determine the impacts of reduced and altered flows at the mouth on the coastal zone and fisheries of southern Namibia. A third innovative aspect concerns the focus on adaptation to climate change in water resource management on the Orange – Senqu, a topic which has not yet been fully addressed.
177. As noted above, the conduct of this project in a major global semi-arid climatic area extends the GEF best practices experience into a climatic zone that has been underrepresented in the GEF IW portfolio in the southern hemisphere. While portions of the la Plata River basin, for example, include arid or semi-arid areas, the majority of the basin grades from a mountain environment (the Andes) to the savannahs of South America (the Chaco) which differs significantly from the southern African Karoo. The

Orange-Senqu River Basin project will form a useful complement to the la Plata River basin project in that portions of both basins are highly urbanised and industrialised, both rivers are highly regulated, and both basins include a variety of trans-boundary relationships — meaning that there is not only an upstream-downstream relationship (such as that between Lesotho and South Africa) but also a shared boundary relationship (such as that between Namibia and South Africa). It has been suggested that there should be an information exchange meeting between the two project teams once the Orange-Senqu River Basin project has reached an advanced state of completion to elucidate additional lessons learned beyond those that can be gleaned from the project individually. The GEF International Waters Conferences (IWC) could provide a suitable venue for the conduct of such south-to-south dialogue and the project will actively participate in these using project financial resources to support participation of both project staff and key government counterparts to each IWC.

178. The implementation of the three demonstration projects is a key feature of this project, and clearly contributes to the potential for replication of beneficial practices and techniques. The project explicitly provides for mechanisms to disseminate the results at the national, regional and international levels and through websites, scientific publications, and other media will facilitate replication of the techniques and approaches in other trans-boundary basins. The use of the GEF IW:LEARN network, IW Experience Notes, and IW:LEARN website/data base will underpin the implementation of this project.

### **PART III: Management Arrangements**

179. The project will be administered from a small Project Coordination Unit (PCU), located in Pretoria, South Africa within the offices of ORASECOM Secretariat. The PCU will comprise an internationally recruited Project Coordinator (PC) with a background in IWRM, a basin-wide recruited Scientific Officer who will act as deputy PC and a part-time Public Involvement Coordinator to oversee public involvement activities of this project. The number of support staff will be limited in order to keep administration costs to a minimum. Where possible, administrative support will be cost shared with the host organization and/or other initiatives that are also located within the same premises. Whenever possible project work will be bundled into medium and large sized contracts to be tendered internationally; the exception being the development of the SAP and the regional coordination capacity development activities, which remains under the management of the PCU. The PCU will be supported by experts/consultants based in the region. Only when expertise regionally available is deemed insufficient, services of international consultants will be procured.
180. The project will be guided by a Steering Committee comprising representatives, National Focal Points, of the participating states drawn from ORASECOM, the GEF implementing and executing agencies, and key stakeholders. The Steering Committee will review and approve all technical documents, review budgets and financial reports and provide general implementation guidance to the PCU. It will meet at least once a year and all its decisions will be made on the basis of consensus. The Steering Committee will be responsible for providing strategic guidance to the project, as well as oversight of all activities and outcomes.
181. The National Focal Point (NFP) will be either the ORASECOM Commissioner or a nominated representative. The NFP will be responsible for facilitating all necessary permissions to enable the project to function effectively and efficiently in each country. The NFP will also ensure that there is good coordination between the project and relevant government bodies, institutions and projects (government and donor funded) in the country. Under the leadership of the NFP, the countries will be encouraged, if it does not already exist, to form an Inter-Ministry/ Department Committee to ensure inter-sectoral coordination in the formulation of the SAP and NAPs.
182. The ORASECOM Programme Coordination Group has been established, comprising the major programme projects (EU, FGEF, BMZ/GtZ, and UNDP-GEF) and chaired by the executive secretary of ORASECOM. The group meets quarterly and will report to the Programme Strategy Committee biannually. The Programme Strategy Committee of the ORASECOM Orange-Senqu River Basin Water Resource and Environmental umbrella programme will act as the project Steering Committee. The institutional arrangement document for the proposed programme is contained in Part IV of this document.
183. A Basin Wide Stakeholder Forum (see Component 4) comprising a wide range of stakeholders will be established to provide early input to the TDA and SAP and other key documents. The establishment and functioning of the BWSF will meet at key

milestones during the TDA/SAP process, and will provide critical guidance to the project development from the unique vantage point of stakeholders.

184. The success of the project implementation is dependent upon strong project guidance from the Programme Strategy Committee and high quality technical inputs from the PCU. The more collaborative the relationship between the PCU and the Programme Strategy Committee - in particular ORASECOM - the more positive will be the project outcomes. The onus for ensuring a good working relationship lies with the PCU and ORASECOM Secretariat who will act as the secretariat to the Programme Strategy Committee and ensure good communications among donors. BMZ/GtZ and EU projects will also provide technical assistance to the ORASECOM and its Executive Secretary in its efforts to fulfill its coordination and secretariat functions to support the implementation of the Programme Framework.
185. The UNDP through its South Africa-based Regional Coordination Unit (RCU) and South Africa country office (lead Country Office) will have full responsibility for implementation oversight of the project in accordance with the articles of this project document and delivery of the project outcomes as specified. The RCU in coordination with UNDP country office will have responsibility for monitoring and evaluating the project in accordance with the PART IV of the document. Progress will be reported by UNDP to the Strategy Committee and will be responsible for ensuring decisions made by the Committee are executed in full.
186. The United Nations Office for Project Services (UNOPS) through its International Waters Unit based in Copenhagen, Denmark, will be the Executing Agency for the project. It will be responsible for delivery of project terms of reference on budget and to programme in accordance with this document. All international contracts both for procurement and consultancy will be issued by UNOPS and local contracts will be issued either directly by UNOPS or through the UNDP country offices on behalf of UNOPS on cost recovery basis for the execution support. The staff of the PCU will be under contract to UNOPS and will report to the UNOPS portfolio manager. The Executing Agency will report quarterly to the Implementing Agency in addition to provide the UNDP-GEF task manager with regular progress updates.
187. The project will be audited in accordance with UNDP Financial Regulations and Rules and Audit policies.
188. The three demonstration projects will be either tendered internationally or executed by a nominated lead organisation/project partner under contract or through an Inter-Agency Agreement. Each demonstration project will be managed by its own Project Implementation Unit, which will report to the PCU.
189. In order to accord proper acknowledgement to GEF for providing funding, a GEF logo should appear on all relevant GEF project publications, including among others, project hardware and vehicles purchased with GEF funds. Any citation on publications regarding projects funded by GEF should also accord proper acknowledgment to GEF.



The UNDP logo should be more prominent – and separated from the GEF logo if possible, as UN visibility is important for security purposes.

#### **PART IV: Monitoring and Evaluation Plan and Budget**

190. Project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures and will be undertaken by the project team and the lead UNDP Country Office with support from UNDP/GEF. The Strategic Result Framework in Section II, Part 2 provides *performance* and *impact* indicators for project implementation along with their corresponding *means of verification*. These will form the basis on which the project's Monitoring and Evaluation system will be built.
191. The following sections outline the principle components of the Monitoring and Evaluation Plan and indicative cost estimates related to M&E activities. The project's Monitoring and Evaluation Plan will be presented and finalized in the Project Inception Report following a collective fine-tuning of indicators, means of verification, and the full definition of project staff M&E responsibilities.

#### **MONITORING AND REPORTING**

##### **Project Inception Phase**

192. A Project Inception Workshop will be conducted at the end of the Inception Phase with the full project team, relevant government counterparts, a wide range of stakeholders, co-financing partners, the lead UNDP Country Office and representation from the UNDP-GEF Regional Coordination Unit (RCU), as well as UNDP-GEF (HQs) as appropriate.
193. A fundamental objective of the Inception Phase will be to assist the project team to understand and take ownership of the project's goals and objectives, as well as finalize preparation of the project's first annual work plan on the basis of the project's Strategic Results Framework. This will include reviewing the SRF (outcomes, targets, means of verification, assumptions/risks), imparting additional detail as needed, and on the basis of this exercise finalize the Annual Work Plan (AWP) with precise and measurable performance indicators, and in a manner consistent with the expected outcomes for the project.
194. The purpose and objective of the Inception Workshop will be to: (i) introduce project staff with the UNDP-GEF *expanded team* which will support the project during its implementation, namely the Country Offices (CO) and responsible Regional Coordinating Unit staff; (ii) detail the roles, support services and complementary responsibilities of UNDP-CO and RCU staff vis à vis the project team; (iii) provide a detailed overview of UNDP-GEF reporting and monitoring and evaluation (M&E)

requirements, with particular emphasis on the annual Project Implementation Reviews (APR/PIRs), IW Results Template, and related documentation, Tripartite Review Meetings, as well as mid-term and final evaluations. Equally, the inception workshop will provide an opportunity to inform the project team on UNDP project related budgetary planning, budget reviews, and mandatory budget re-phasing.

195. The inception workshop will also provide an opportunity for all parties to understand their roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff and decision-making structures will be discussed again, as needed, in order to clarify for all each party's responsibilities during the project's implementation phase.

### **Monitoring responsibilities and events**

196. A detailed schedule of project review meetings will be developed by the project management, in consultation with project implementation partners and stakeholder representatives and incorporated in the Project Inception Report. Such a schedule will include: (i) tentative time frames for Tripartite Reviews, Steering Committee Meetings, (or relevant advisory and/or coordination mechanisms) and (ii) project related Monitoring and Evaluation activities.
197. *Day to day monitoring of implementation progress* will be the responsibility of the Project Coordinator based on the project's Annual Work Plan and its indicators. The Project Team will inform the RCU and lead UNDP Country Office of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely and remedial fashion.
198. The Project Coordinator and Scientific Officer will fine-tune the progress and performance/impact indicators of the project in consultation with the full project team at the Inception Workshop with support from the lead UNDP Country Office and the UNDP-GEF Regional Coordination Unit. Specific targets for the first year implementation progress indicators together with their means of verification will be finalized at this Workshop. These will be used to assess whether implementation is proceeding at the intended pace and in the right direction and will form part of the Annual Work Plan. The local implementing partners will also take part in the Inception Workshop in which a common vision of overall project goals will be established. Targets and indicators for subsequent years would be defined annually as part of the internal evaluation and planning processes undertaken by the project team.
199. Measurement of impact indicators related to global benefits will occur according to the schedules defined in the Inception Workshop and tentatively outlined in the indicative Impact Measurement Template at the end of this section (Table 1-5). The measurement of these will be undertaken through subcontracts or retainers with relevant institutions or through specific studies that are to form part of the project's activities or periodic water quality sampling for example.

200. *Periodic monitoring of implementation progress* will be undertaken by UNDP through quarterly meetings with the PCU, or more frequently as deemed necessary. This will allow parties to take stock and to troubleshoot any problems pertaining to the project in a timely fashion to ensure smooth implementation of project activities.
201. UNDP-GEF RCU, as appropriate, will conduct yearly visits to projects that have field sites, or more often, based on an agreed upon schedule to be detailed in the project's Inception Report / Annual Work Plan to assess first hand project progress. Any other members of the Steering Committee can also accompany the inspections, as decided by the PSC. A Field Visit Report will be prepared by RCU and circulated no less than one month after the visit to the project team, all PSC members, and UNDP-GEF.
202. *Annual Monitoring* will occur through the ***Tripartite Review (TPR)***. This is the highest policy-level meeting of the parties directly involved in the implementation of a project. The project will be subject to Tripartite Review (TPR) at least once every year. The first such meeting will be held within the first twelve months of the start of full implementation. The PCU will prepare an Annual Project Report/Project Implementation Review (APR/PIR)<sup>3</sup> and IW Results Template and submit it to the lead CO and the UNDP-GEF RCU at least two weeks prior to the TPR for review and comments.
203. The APR/PIR will be used as one of the basic documents for discussions in the TPR meeting. The PCU will present the APR/PIR to the TPR, highlighting policy issues and recommendations for the decision of the TPR participants. The PCU also informs the participants of any agreement reached by stakeholders during the APR/PIR preparation on how to resolve operational issues. Separate reviews of each project component may also be conducted if necessary.

#### **Terminal Tripartite Review (TTR)**

204. The terminal tripartite review is held in the last month of project operations. The PCU is responsible for preparing the Terminal Report and submitting it to UNDP-CO and Regional Coordinating Unit. It shall be prepared in draft at least two months in advance of the TTR in order to allow review, and will serve as the basis for discussions in the TTR. The terminal tripartite review considers the implementation of the project as a whole, paying particular attention to whether the project has achieved its stated objectives and contributed to the broader environmental objective. It decides whether any actions are still necessary, particularly in relation to sustainability of project results, and acts as a vehicle through which lessons learnt can be captured to feed into other projects under implementation or formulation.

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<sup>3</sup> For a UNDP/GEF project, a template for Annual Project Report (APR), an annual monitoring document required by UNDP, and that of Project Implementation Review (PIR), an annual monitoring document required by GEF, have been merged to simplify the annual review exercise. Therefore, APR and PIR are one and the same document and there will be only one annual monitoring process for all UNDP/GEF projects.

## **Project Monitoring Reporting**

205. The Project Coordinator in conjunction with the UNDP-GEF extended team will be responsible for the preparation and submission of the following reports that form part of the monitoring process. Items (a) through (f) are mandatory and strictly related to monitoring, while (g) through (h) have a broader function and the frequency and nature is project specific to be defined throughout implementation.

### **(a) Inception Report (IR)**

206. A Project Inception Report will be prepared immediately following the Inception Workshop. It will include a detailed First Year/ Annual Work Plan divided in quarterly time-frames detailing the activities and progress indicators that will guide implementation during the first year of the project. This Work Plan would include the dates of specific field visits, support missions from the PCU or consultants, as well as time-frames for meetings of the project's decision making structures. The Report will also include the detailed project budget for the first full year of implementation, prepared on the basis of the Annual Work Plan, and including any monitoring and evaluation requirements to effectively measure project performance during the targeted 12 month time-frame.

207. The IR will include a more detailed narrative on the institutional roles, responsibilities, coordinating actions and feedback mechanisms of project related partners. In addition, a section will be included on progress to date on project establishment and start-up activities and an update of any changed external conditions that may effect project implementation.

208. When finalized the report will be circulated to project counterparts who will be given a period of one calendar month in which to respond with comments or queries. Prior to this circulation of the IR, the lead UNDP Country Office and UNDP-GEF's Regional Coordinating Unit will review the document.

### **(b) Annual Project Report (APR)<sup>4</sup>**

209. The APR is a UNDP requirement and part of the lead UNDP Country Office's central oversight, monitoring and project management function. It is a self -assessment report by project management to the CO and provides input to the country office reporting process and the ROAR, as well as forming a key input to the Tripartite Project Review. An APR will be prepared on an annual basis prior to the Tripartite Project Review, to reflect progress achieved in meeting the project's Annual Work Plan and assess performance of the project in contributing to intended outcomes through outputs and partnership work.

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<sup>4</sup> As stated earlier, APR format and process are merged into the PIR format and process for UNDP/GEF projects to simplify the annual monitoring procedures.

210. The format of the APR is flexible but should include the following:
- An analysis of project performance over the reporting period, including outputs produced and, where possible, information on the status of the outcome;
  - The constraints experienced in the progress towards results and the reasons for these;
  - The three (at most) major constraints to achieving the desired results
  - Expenditure reports;
  - Lessons learned;
  - Clear recommendations for future orientation in addressing key problems in lack of progress.

### **(c) Project Implementation Review (PIR)**

211. The PIR is an annual monitoring process mandated by the GEF. It has become an essential management and monitoring tool for project managers and offers the main vehicle for extracting lessons from ongoing projects. Once the project has been under implementation for a year, a Project Implementation Report must be completed by the CO together with the project. The PIR can be prepared any time during the year (July-June) and ideally prior to the TPR. The PIR should then be discussed in the TPR so that the result would be a PIR that has been agreed upon by the project, the executing agency, lead CO and the concerned Regional Coordinator.

212. The individual PIRs are collected, reviewed and analysed by the RCs prior to sending them to the focal area clusters at the UNDP/GEF headquarters. The focal area clusters supported by the UNDP/GEF M&E Unit analyse the PIRs by focal area, theme and region for common issues/results and lessons.

213. The focal area PIRs are then discussed in the GEF Interagency Focal Area Task Forces in or around November each year and consolidated reports by focal area are collated by the GEF Independent M&E Units based on the Task Force findings.

### **(d) Quarterly Progress Reports**

214. Short reports outlining main updates in project progress will be provided quarterly to the lead UNDP Country Office and the UNDP-GEF RCU by the project team.

### **(e) Periodic Thematic Reports**

215. As and when called for by UNDP, UNDP-GEF or the Implementing Partner, the project team will prepare Specific Thematic Reports, focusing on specific issues or areas of activity. The request for a Thematic Report will be provided to the project team in written form by UNDP and will clearly state the issue or activities that need to be reported on. These reports can be used as a form of lessons learnt exercise, specific oversight in key areas, or as troubleshooting exercises to evaluate and overcome obstacles and difficulties encountered. UNDP is requested to minimize its requests for

Thematic Reports, and when such are necessary will allow reasonable timeframes for their preparation by the project team.

#### **(f) Project Terminal Report**

216. During the last three months of the project the project team will prepare the Project Terminal Report. This comprehensive report will summarize all activities, achievements and outputs of the Project, lessons learnt, objectives met, or not achieved, structures and systems implemented, etc. and will be the definitive statement of the Project's activities during its lifetime. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the Project's activities.

#### **(g) Technical Reports**

217. Technical Reports are detailed documents covering specific areas of analysis or scientific specializations within the overall project. As part of the Inception Report, the project team will prepare a draft Reports List, detailing the technical reports that are expected to be prepared on key areas of activity during the course of the Project, and tentative due dates. Where necessary this Reports List will be revised and updated, and included in subsequent APRs. Technical Reports may also be prepared by external consultants and should be comprehensive, specialized analyses of clearly defined areas of research within the framework of the project and its sites. These technical reports will represent, as appropriate, the project's substantive contribution to specific areas, and will be used in efforts to disseminate relevant information and best practices at local, national and international levels.

#### **(h) Project Publications**

218. Project Publications will form a key method of crystallizing and disseminating the results and achievements of the Project. These publications may be scientific or informational texts on the activities and achievements of the Project, in the form of journal articles, multimedia publications, etc. These publications can be based on Technical Reports, depending upon the relevance, scientific worth, etc. of these Reports, or may be summaries or compilations of a series of Technical Reports and other research. The project team will determine if any of the Technical Reports merit formal publication, and will also (in consultation with UNDP, the government and other relevant stakeholder groups) plan and produce these Publications in a consistent and recognizable format. Project resources will need to be defined and allocated for these activities as appropriate and in a manner commensurate with the project's budget.

#### **INDEPENDENT EVALUATION**

219. The project will be subjected to at least two independent external evaluations as follows:

## Mid-Term Evaluation

220. An independent Mid-Term Evaluation will be undertaken at the end of the second year of implementation. The Mid-Term Evaluation will determine progress being made towards the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term Evaluation will be prepared by the lead UNDP Country Office based on guidance from the Regional Coordinating Unit and UNDP-GEF. An associated output of the MTE will be an IW Experience Note following the TOR developed under the IW:LEARN Programme and disseminated through the IW:LEARN website.

## Final Evaluation

221. An independent Final Evaluation will take place three months prior to the terminal tripartite review meeting, and will focus on the same issues as the mid-term evaluation. The final evaluation will also look at the impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. The Final Evaluation should also provide recommendations for follow-up activities. The Terms of Reference for this evaluation will be prepared by the lead UNDP CO based on guidance from the Regional Coordination Unit and UNDP-GEF. An associated output of the FE will be an IW Experience Note following the TOR developed under the IW:LEARN Programme and disseminated through the IW:LEARN website.

**TABLE I.IV.1 INDICATIVE MONITORING AND EVALUATION WORK PLAN AND CORRESPONDING BUDGET**

Type of M&E activity	Responsible Parties	Budget US\$ <i>Excluding project team Staff time</i>	Time frame
Inception Workshop	Project Coordinator UNDP CO UNDP GEF		Within first two months of project start up
Inception Report	Project Team UNDP CO	None	Immediately following IW
Measurement of Means of Verification for Project Purpose Indicators	PC will oversee the hiring of consultants or institutions to undertake specific studies , and delegate responsibilities to relevant team members	To be finalized in Inception Phase and Workshop. Indicative cost \$2000	Start, mid and end of project
Measurement of Means of Verification for Project Progress and	Oversight by Project GEF Scientific Officer and Project Coordinator	To be determined as part of the Annual Work Plan's preparation.	Annually prior to APR/PIR and to the definition of annual

Performance (measured on an annual basis)	Measurements by regional field officers and local IAs	Indicative cost \$2000	work plans
APR and PIR	Project Team UNDP-CO UNDP-GEF	None	Annually
TPR and TPR report	Government Counterparts UNDP CO Project team UNDP-GEF Regional Coordinating Unit	None	Every year, upon receipt of APR
Steering Committee Meetings	Project Coordinator UNDP CO	None	Following Project IW and subsequently at least once a year
Periodic status reports	Project team	5,000	To be determined by Project team and UNDP CO
Technical reports	Project team Hired consultants as needed	15,000	To be determined by Project Team and UNDP-CO
Mid-term External Evaluation	Project team UNDP- CO UNDP-GEF Regional Coordinating Unit External Consultants (i.e. evaluation team)	20,000	At the mid-point of project implementation.
Final External Evaluation	Project team, UNDP-CO UNDP-GEF Regional Coordinating Unit External Consultants (i.e. evaluation team)	30,000	At the end of project implementation
Terminal Report	Project team UNDP-CO External Consultant	None	At least one month before the end of the project
Lessons learned	Project team UNDP-GEF Regional Coordinating Unit (suggested formats for documenting best practices, etc)	15,000 (average 3,000 per year)	Yearly
Audit	UNDP-CO Project team	4,000 (average \$1000 per year)	Yearly
Visits to field sites (UNDP staff travel costs to be charged to IA fees)	UNDP Country Office UNDP-GEF Regional Coordinating Unit (as appropriate) Government representatives	15,000 (average one visit per year)	Yearly
<b>TOTAL INDICATIVE COST</b> <i>Excluding project team staff time and UNDP staff and travel expenses</i>		US\$ 250,000	



**Table I.IV.2: Indicative Impact Measurement Template**

<b>Key Impact Indicator</b>	<b>Target (Year 4)</b>	<b>Means of Verification</b>	<b>Sampling frequency</b>	<b>Location</b>
Strengthen ORASECOM	Improved stakeholder involvement and enhanced capacity with the secretariat	Signed agreement, fully staffed secretariat, ORWREP operational		
Sustainable water resource use based on IWRM principles	Water resource allocation between the four basin countries agreed based on reliable yields and taking into account climate change.	Agreed CC scenarios Demand Management policies and campaigns introduced ELF methodology agreed and applied		
Improved water quality in OSRB	Water quality objectives established throughout the basin and a water quality monitoring programme agreed	Basin monitoring programme agreed. Investment in pollution control		
Reduction in area of riparian lands degraded	Land management and water resource policy linked and integrated river basin planning approach adopted.	Management best practice agreed.		

222. The above indicators relate to the measurement of global benefits achieved by the project rather than project implementation progress. They will need to be fine tuned and detailed in the Inception Workshop and as part of the TDA.

#### **LEARNING AND KNOWLEDGE SHARING**

223. Results from the project will be disseminated within and beyond the project intervention zone through a number of existing information sharing networks and forums. In addition:

- The project will participate, as relevant and appropriate, in UNDP/GEF sponsored networks, organized for Senior Personnel working on projects that share common characteristics. UNDP/GEF shall establish a number of networks, such as Integrated Ecosystem Management, eco-tourism, co-management, etc, that will largely function on the basis of an electronic platform.
  - The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned.
224. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Identifying and analyzing lessons learned is an on-going process, and the need to communicate such lessons as one of the project's central contributions is a requirement to be delivered not less frequently than once every 12 months. UNDP/GEF shall provide a format and assist the project team in categorizing, documenting and reporting on lessons learned. To this end a percentage of project resources will need to be allocated for these activities.
225. The project will actively participate in and contribute to the learning and knowledge sharing activities among the GEF IW projects globally through means established by the IW:LEARN project. The project will allocate at least 1% of its budget to mainstream IW:LEARN activities during its implementation including, but not limited to: preparation of two or more IW 'Experience Notes', participation (project coordinator, 2 or more government representatives) in biennial GEF IW Conferences, participation in relevant IW:LEARN regional and/or thematic learning activities, and development of a project website in line with IW:LEARN guidance and standards.

#### **PART V: Legal Context**

226. This Project Document shall be the instrument referred to as such in Article I of the Standard Basic Assistance Agreement between the Governments of Botswana, Lesotho, Namibia and South Africa and the United Nations Development Programme, signed by the parties on 14 May 1975, 31 December 1974, 22 March, 1990 and 3 October 1994 respectively. The host country implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government co-operating agency described in that Agreement.
227. The UNDP Principal Project Representative is authorized to effect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by the UNDP-GEF Unit and is assured that the other signatories to the Project Document have no objection to the proposed changes:
- a) Revision of, or addition to, any of the annexes to the Project Document;

- b) Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation;
- c) Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility; and
- d) Inclusion of additional annexes and attachments only as set out here in this Project Document

## SECTION II: STRATEGIC RESULTS FRAMEWORK AND GEF INCREMENT

### PART I: Incremental Cost Analysis

#### A. PROJECT BACKGROUND

##### Objective development

228. The Project will address the principal threats and root causes of the trans-boundary water resources of the OSRB and develop and implement, through the TDA and SAP process, a sustainable programme of policy, legal and institutional reforms and investments to address these threats. The Project will create synergies with and build upon a range of initiatives being undertaken by the countries themselves and those of bi-lateral and multi-lateral donors that have given priority to the Basin. Competing water uses in the context of dwindling and uncertain future supplies is seen as the critical issue in the basin and will be a principal focus of project attention from the very outset of project related activities.

Broad Development Objectives:

229. The long-term development/environmental goal of the project is: Sustainable development of the Orange-Senqu River Basin enhanced through ecosystem-based Integrated Water Resource Management approaches. The Project Objective is: To improve the management of the Orange-Senqu River Trans-boundary Basin through the implementation of a sustainable programme of policy, legal and institutional reforms and investment options using the TDA/SAP process.

230. In order to achieve this objective, the project will strengthen the capacity of ORASECOM, undertake a range of public involve and awareness activities focusing on trans-boundary activities, update the Trans-boundary Diagnostic Analysis (TDA), formulate a Strategic Action Programme (SAP) and associated National Action Programmes (NAPs) and undertake demonstration projects that implement key aspects of the SAP.

#### B. Incremental cost assessment

*Baseline/ Business as Usual*

231. Within the Orange-Senqu River Basin, the countries of Botswana, Lesotho, Namibia, and South Africa, have sought to address water resource management issues at the national level but it has been increasingly clear that coordinated action at the basin level is required. There are bilateral efforts to improve management but until relatively recently there had been limited basin wide coordination of policies. The Orange-Senqu

River Commission (ORASECOM) was established in 2000 and now has a nascent secretariat.

232. ORASECOM has been successful in attracting external funding to implement activities in the basin, including BMZ/GTZ, French GEF, EU, UNDP/GEF and InWent; however, the level of coordination among the projects funded by different donors was not optimal. Some tools that may assist effective coordination, such as a coordination framework or a commonly shared direction (e.g. the basin-wide Vision) were missing. All external support are essentially intended to support ORASECOM to develop a basin-wide management framework based on IWRM principles, which presents both opportunities and risks: *opportunities* for realizing larger impacts in the basin, through a good coordination, than what an individual project could achieve and *risks* for duplication resulting from the lack of coordination.
233. During the preparatory phase, the significant efforts have been spent towards consultation with the other donors to assess the baseline and supporting ORASECOM to set up better coordination framework. UNDP-GEF project, during its preparatory phase, held a number of coordination meetings with ORASECOM and all other partners supporting ORASECOM. It has worked closely and will remain coordinating its activities with other initiatives under the guidance and leadership of ORASECOM to ensure minimal overlap and maximum synergy. French GEF (the Fonds Française pour Environment Mondiale) project has been addressing some specific environmental and technical issues selected from “30 priority actions” developed by ORASECOM, including the management of the highland sponges (wetlands) in the Lesotho Highlands. One of the three proposed demonstration projects, rangeland management in the upper basin, will be built upon/learning from the results yielded by the FGEF’s highland sponge management project. BMZ/GTZ supports ORASECOM through its SADC Transboundary Water Management Program and initiated the process of an IWRM plan development. BMZ/GTZ team undertook a series of thematic studies in its first phase of the development of the IWRM plan<sup>5</sup>. Findings from many of those studies were used in the preliminary TDA development. It will in the second phase focus on specific technical issues which will feed into the updated TDA. The BMZ/GTZ project has been demonstrating its emphasis and strengths in technical (in particular, modelling and engineering) aspects of the IWRM and will continue to maintain those strengths in its second phase, while increasing its focus on the socio-economic aspects of the IWRM as well. Funding from the European Union has being secured and the implementation started in 2008 with its major objective to strengthen ORASECOM as a regional advisory body to achieve the sustainable management of the Orange-Senque transboundary basin.
234. The basin states would still have relatively large amount of external funding to implement activities even without UNDP/GEF support; however, the UNDP/GEF support to ORASECOM will ensure that the opportunities for realizing larger impacts in the basin through a good coordination will be realized and risks for duplication resulting

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<sup>5</sup> BMZ/GTZ adapted the four phased approach to the development of the IWRM plan for the Orange-Senque River basin.

from the lack of coordination will be better managed, through applying the TDA/SAP processes which will assist ORASECOM to systematically address the holistic, inter-sectoral dimensions of the IWRM plan.

235. The four Basin states will address the priority trans-boundary problems - biodiversity and alien invasives; pollution/water quality; water quantity/altered river flow; and land degradation - through a range of national and international projects described below.

*Biodiversity and alien invasive species*

236. The current situation in the OSRB pertaining to decline in biodiversity and increase in alien invasive species is currently being addressed at the national level with only South Africa and Namibia implementing bilateral trans-boundary activities. While the PIF and PDF-B Concept Paper did not identify loss of biodiversity in itself as a priority trans-boundary issue, alien invasive species was identified as a significant trans-boundary problem.

237. South Africa is most aggressively addressing this issue through a wide variety of national level projects and whilst some projects are still pending funding, US \$2.1 million is already dedicated to biodiversity protection. Rehabilitation of the wetlands in various areas of the basin, implemented through the RSA DWAF Working for Wetlands project is ongoing with a total budget of US \$ 2 million for 2007-2008. The project provides unemployed and low income workers with skills to improve wetlands in a sustainable manner, serving as a possible model for other trans-boundary projects in the region. The Department of Environmental Affairs and Tourism in the Northern Cape are initiating the “Lower Orange River Conservation Development Plan” between 2008 – 2009 for US\$ 0.07 million. There is a need for Namibian input into this project, which will enable the countries to address the degraded status of the Lower Orange, particularly the Ramsar site at the mouth of the river. If realized, this project will signify initial steps in trans-boundary management. GEF is contributing US\$ 0.03 M to the development of the “Systematic Conservation Plan for the Richtersveld District” in 2007. The DWAF- RSA and MAWF – Namibia are undertaking an Ecological Needs Assessment for the Orange River mouth, with RSA contributing US\$ 0.7 M, and Namibia contributing US\$ 0.2 M, which will provide rudimentary baseline data complementing the proposed demonstration project on Ecological Flows. This study will be supplemented by work by MAWF-Namibia which is investing US\$ 0.03 M in the years 2008-2012 for a wetland inventory for the Ramsar site at the Orange River Mouth, The RSA National Research Foundation is implementing a project on mining rehabilitation practices to sustain ecosystem services, through the University of Stellenbosch, at mine sites in the basin between 2006-2009, with an estimated value of US\$ 0.03 M which will focus on alluvial deposits, and provide case studies for the stakeholder involvement training materials. The Peace Parks Foundation is investing US\$ 0.09 M in 2006-2007 to implement a trans-boundary Joint Tourism Plan for the Richtersveld Ai-Ais Transfrontier Park, between Namibia and South Africa which will increase institutional collaboration, and ecosystem preservation, setting the stage for additional phases of the project. Lesotho’s Millennium Challenge Cooperation is

investing US \$5 M in the years 2008-2013 in a project on Rehabilitation and Restoration of Highlands Wetlands focusing on managing highland wetlands to conserve river flows. It is also aimed at developing and implementing wetland catchment Management Plans and supporting livelihoods of communities near the wetlands. The total baseline estimate for this trans-boundary issue is **US\$ 8.15 million**.

*Pollution/water quality*

238. Although water quality is identified as a priority trans-boundary issue it has not received a significant amount of attention at either the national or trans-boundary level to date.
239. In 2008 the DWAF- RSA plan to invest US\$ 0.6 M on an Integrated Water Quality Management Plan for the Vaal River. In Botswana, the Department of Local Government, Finance and Technical Services in the Ministry of Local Government is investing US\$ 27 M between 2006/07 in Rural Water Supply and Sanitation programmes – infrastructural development which will reduce pollution loadings on the surface and groundwater. There is also an ongoing Groundwater Quality Monitoring programme in the Molopo River Basin between the governments of South Africa and Botswana, however, information about the financing of this project is not currently available. Total baseline estimate is **US \$ 27.6 million**.

*Water quantity/altered river flow*

240. The OSRB is one of the most altered river systems in the world, with significant transfers of water to and from other basins and extensive impoundments to guarantee water supply throughout the basin. The efforts required to maintain this complex system are made primarily by DWAF-RSA and national level investments are aimed largely as maintaining the current position and developing where possible new resources in conjunction with neighbouring countries.
241. DWAF- RSA will be investing US\$ 1 M on a Vaal Reconciliation Strategy which will address priority water management issues in the Vaal sub basin and identify future water demands. DWAF are also developing reconciliation strategies for small water users in the Vaal / Orange basin at a cost of US\$0.8 M, establishing the level of use of water from the smaller tributaries in the system. Real Time Modelling of the Orange-Vaal river systems is an on-going project with a value of US\$ 0.3 M, funded from the main departmental budget. Longer term larger investment projects on the Vaal include infrastructure augmentation in the Eastern Vaal River (pipeline systems etc.) valued at US\$ 340 M over 5 or more years. The DWAF-RSA Resource Efficiency Directorate is implementing a US\$ 1.4 M project over the next 4 years to determine the comprehensive reserve determination (yield) of all surface and groundwater resources of the Orange River Basin. Between South Africa and Lesotho, the DWAF-RSA is investing US\$ 4 M, and the Lesotho Government is investing US\$ 4 M in the Lesotho Highlands Phase II Feasibility Study to be completed by March 2008. Together DWAF-RSA and MAWF-Namibia have invested US\$ 1.2 M (2006-2008) in the Lower Orange Management Study (LORMS) pre-feasibility study which is a comprehensive review of

the water resources of the Lower Orange. The DWAF-RSA and MAWF-Namibia are also scheduled to invest US\$ 1.7 M and US\$ 1.2 M, respectively, in 2008 on a Feasibility Study and EIA for the construction of a dam on the Lower Orange River. MAWF-Namibia plans to spend US\$ 2 M in 2007-2008 on a demonstration project on the efficient use of irrigation water at two sites at the Orange River. MAWF-Namibia, with the African Development Bank, the OPEC Fund, and the Arabic Bank for Development will be implementing US\$ 16 M and US\$ 36 M (loan) for development of a 1000 ha irrigation project at Tantjeskop (mainly grapes and dates). The Government of Botswana is investing US\$ 6 M between 2008-2010 for the Rolong Dolomite Project: Identifying Groundwater Resources in the Molopo River Basin, which will provide valuable baseline information. The studies listed above will provide baseline data for use in improving the TDA and in setting targets for the SAP. The major infrastructure investments indicate the importance of water resource management at the country level. The total baseline estimate for this is **US \$ 421.13 million.**

### *Land degradation*

242. The issue of land degradation and desertification has obvious trans-boundary impacts, though currently it is being managed in the basin as a national or bilateral issue and with poor linkages to water resource management.
243. In 2005 the governments of Lesotho and South Africa began implementation of a five year Integrated Catchment Management project intended to benefit local communities by promoting sustainable resource use within the Lesotho Highlands Water Project area at the cost of US\$ 2.7 M. In Lesotho, the International Fund for Agricultural Development (IFAD) is implementing a US \$1.6 M between 2005-2011 on Sustainable Agricultural and Natural Resources Management Project (SANREMP) featuring: natural resource management; rangeland rehabilitation; land degradation monitoring study; and community based soil and water conservation projects. In Botswana, the MEWT/MoA within the Government of Botswana have initiated a national US\$ 4.5 M Land Resource Management Project to be implemented between 2007 and 2009. The Botswana Energy Affairs Department is implementing a US\$ 24 M (JICA & GEF) project on renewable energy and power development which will include the revision of Botswana's energy master plan, management of forestry resources, and an inventory of forestry resources between 2007 – 2009. These projects will feed data to the revised UNDP/GEF project. The total baseline estimate for this is **US \$ 37.28 million.**

**Table II.I.1 Summary of Baseline Investment**

<b>Issue</b>	<b>Detail</b>	<b>Cost US\$</b>
1	Biodiversity and alien invasive species	8,150,000
2	Pollution/water quality	27,000,000
3	Water quantity/altered river flow	421,130,000
4	Land degradation	37,280,000
<b>Total</b>	<b>Total Baseline Expenditures (4 years)</b>	<b>493,560,000</b>



## Global Environmental Objective / Global Environmental Benefits

244. The Orange-Senqu River basin is of critical importance for economic development and human wellbeing within this central portion of southern Africa and possibly one of the most significant in terms of its economic importance to the continent. With the South African industrial conurbations of the PWV area located in the Vaal catchment, the Orange-Senqu River system supports not only a significant proportion of the industrial outputs of southern Africa, but also provides water for many agricultural enterprises. As early as the 1950s, perturbations of the riverine system were being recorded as a consequence of the development activities associated with the industrialisation of southern Africa. The Orange River Basin is now seriously threatened at many levels and the capacity to address these levels has been eroded at national and regional level in the wake of tremendous social and political changes in southern Africa.
245. The global objective is to halt and reverse the decline of the Orange-Senqu River Basin environment and through association with the Benguela Current Large Marine Ecosystem<sup>6</sup>. This objective will be achieved through the improved cooperation between basin states, strengthened legislation, policy and regulation and application of the IWRM approach. It is hoped that the project will be a model for southern Africa and the methods (Ecological flows) and techniques developed will be replicated throughout the region. The protection of the Lower Orange River and its estuary and Ramsar site is of particular importance and will be the focus of one of the demonstration projects (see Part V, Section IV).
246. The Orange-Senqu River discharges into the Atlantic Ocean, where it forms an estuary of global significance (a Ramsar site); hence there is a natural linkage between the Orange-Senqu project and the Benguela Current LME. The project will provide an opportunity to improve GEF's knowledge of the challenges of the combined management (from the scientific and institutional perspectives) of a trans-boundary river and LME management; the model to be drawn upon is the Danube and the Black Sea Partnership. The project will consult closely with the newly established Benguela Current Commission and the new GEF BCLME SAP implementation project which will commence at approximately the same time as this project. Of particular interest will be the topic of climate change and the impact of the variable river flows on the coastal zone and the Benguela Current LME as a whole. With successful coordination, the two IW projects will be able to demonstrate how actions/decisions of non-coastal countries (e.g. Botswana and Lesotho), which may impact the LME management, can be guided/advised through a joint management and coordination of the transboundary river basin management structure.

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<sup>6</sup> The Orange-Senqu River discharges into the southern Atlantic Ocean at Oranjemund/Alexander Bay. One of the threats identified in the BCLME project was the pollution load from the river and its effects on the marine ecosystem of the BCLME.

## **Alternative/ Incremental Reasoning and GEFs' Role**

247. The proposed GEF Alternative is targeted at removing identified constraints and barriers to the trans-boundary IWRM of the Orange-Senqu River Basin, including discrete capacity-building activities, demonstration projects in three critical aspects of the ecosystem approach: productive, conservation and adaptive management, as well as cross-sectoral engagement. The transition towards the trans-boundary based IWRM of the Orange-Senqu will depend on the development of a clear, balanced development vision for the catchment, a convergence of policy tools including long-term, joint programmes and actions, a strengthening of technical and decision making capacities at all levels of governance, and a robust monitoring and evaluation programme. Six outcomes have been mutually identified, to be supported through a mix of GEF financing and co-financing including reoriented baseline.

### **Outcome 1: ORASECOM institutionally strengthened**

248. A stronger, institutionally set ORASECOM with enhanced capacities to oversee and coordinate activities throughout the basin will encourage national and basin wide commitments to adopt an IWRM strategy and honor the role of ecosystem functions within the basin. This outcome will address prioritized concerns of the countries including the lack of a trans-boundary information management system and web-site; a strengthened ORASECOM agreement; lack of established, focused technical working groups on key topics - such as resource yields, environmental flows, demand forecasting and management, pollution control (permitting and licensing); lack of established criteria for water resource allocation; the need for agreed guidelines and procedures for trans-boundary ESIA; and critical need for capacity building for water resource practitioners. Under the alternative GEF resources and co-financing will be used to significantly enhance the concrete institutional capacities of ORASECOM, enabling them to address and oversee the priority trans-boundary issues. **(US\$ 0.75M GEF, US\$ 3.64M, Co-financing).**

249. During its preparatory phase, UNDP/GEF project supported the ORASECOM in developing the integrated workplan that include major activities supported by multiple donors and indicated their timeline for implementation. The integrated workplan strengthened the ORASECOM Secretariat's donor coordination capacity. It has, for example, revealed some areas for potential duplication and guided projects to modify and/or revise their project activities during their inception or preparatory phase (including UNDP/GEF project). The integrated workplan will be periodically reviewed by ORASECOM and updated by its Secretariat.

### **Outcome 2: Transboundary Diagnostic Analysis Completed**

250. The second outcome is an objective, scientific and technical fully completed Trans-boundary Diagnostic Analysis (TDA) defining the trans-boundary problems affecting

the environmental goods and services from an ecosystems perspective. Within the PDF-B phase of the project, an initial TDA was conducted to identify and assess the status of the major trans-boundary issues and identify key information gaps which need to be filled, including: the impacts of artisanal mining on the middle and lower Orange; an assessment of Persistent Organic Pollutants levels in the basin; an assessment of groundwater, particularly transboundary, and surface water resource yields based on an agreed methodology, including supply assurance levels and climate change scenarios; and detailed demand forecasts for the OSRB for the next 25 years based on an agreed methodology including water allocation criteria and climate change scenarios. Under the alternative, GEF resources and co-financing will be used to fill these significant gaps, and as part of the Full Size Project, the TDA will be revised and updated, to include a listing of potential interventions for inclusion in the SAP. (US\$ 0.7M GEF, US\$ 11.88M Co-Finance).

**Outcome 3: The SAP and associated NAPS are formulated and adopted at ministerial level**

251. Nationally endorsed SAP and NAPs with accompanying sustainable financing plans will pave the way towards incremental improvement in the Orange-Senqu River Basin, based on a solid foundation of basin wide commitment and consensus. National, regional and global co-benefits will be generated through basin-wide agreement on improved legal and policy frameworks; targeted capacity building and increased environmental protection. The SAP and NAPs will also include the creation or strengthening of existing institutional mechanisms for the basin wide coordination of IWRM implemented activities. (US\$ 0.6M GEF, US\$4.25M Co-finance).

**Outcome 4: Stakeholders actively involved in project activities and public awareness increased**

252. Inclusion of stakeholders in trans-boundary water governance and active participation in project activities is a key component to meet the ORASECOM stakeholder involvement objectives. The lack of stakeholder inclusion in IWRM leads to failure to address the multiple and competing uses of basin wide water resources, leading to incomplete project implementation, inability to effectively address the needs of multiple users, and increases tensions between those who have significant influence, and those who perceived themselves to be under duress because of current distribution patterns. The GEF resources will enable the project to incorporate multi-stakeholder demands, concerns and expectations through education, awareness building, targeted trainings, civil society involvement, and social marketing campaigns, and help demonstrate incentives to all stakeholder groups to shift their water use behaviours in favour of more sustainable practices. (US\$ 0.9M GEF, US\$ 4.67M Co-finance).

### **Outcome 5: Demonstration projects successfully implemented**

253. Three priority demonstration projects were jointly identified by participating countries to advance SAP implementation and to set the basis for its long-term sustainability. The demonstration projects are fully incremental, will leverage significant co-financing and will contribute to the adoption of IWRM in the Orange-Senqu River Basin by assisting the countries coordinate water conservation, range land preservation and Ecological flow monitoring activities. The demonstration strategies will generate practical experiences to address a complex baseline of overlapping policies and competencies for protected area conservation, social and economic development, and threats to terrestrial biodiversity. The harmonized development of the three demonstrations will contribute to defining a stronger baseline, and help enable the development of validated integrated approaches that will facilitate upscaling and replication to other States and at a national level. Successful implementation of the demonstrations will also provide concrete steps forward towards achieving the ecosystem goals to be established in the SAP. (US \$2.75M GEF, US\$4.6M Co-finance).

### **Outcome 6: Effective project coordination**

254. The GEF alternative proposes improved basin wide mechanisms to meet and address the coordination needs and gaps that currently inhibit the carrying out of basin-wide interventions for IWRM. By the end of the project, it is expected that an appropriate long-term basin wide coordination mechanism will be defined by all countries. This will include joint definition of a long-term basin wide coordination mechanism building upon existing multilateral initiatives and the establishment of a Regional Project Coordination Unit (PCU). Incremental support will help promote the transfer of institutional arrangements from the support of GEF and other donors to ownership by the basin. GEF funding will also identify and apply best practices for public awareness and involvement in order to mobilize basin wide political and stakeholder commitments to the broader development goals of the BCLME (US\$0.6M GEF, US\$3.03M Co-finance).

### **Systems Boundary**

255. Incremental costs have been assessed temporally, over the planned four-year implementation of GEF-supported activities, and geographically, Orange-Senqu River Basin as well as the target sites of the demonstration projects. In this particular project all countries are eligible for GEF financing. The analysis also covers the suite of thematic issues identified in the TDA process, some building on past and present bilateral efforts.

## Summary of Costs

256. The baseline, comprising activities that would be pursued irrespective of project investment, has been estimated at US\$ 493,560,000. Incremental Costs amount to US\$ 33,590,000 of which the GEF would fund US\$ 6,300,000. The total Alternative is US\$527,150,000. The GEF contribution amounts to 18.8% of the cost of the total Incremental Cost and 1.2% of the cost of the Alternative. The GEF will provide funding for activities that generate clear global benefits, and could not be justified solely on domestic benefits.

- FGEF has committed a budget of Euro 1,500,000 (US\$2.1M) with a corresponding contribution in cash or in kind from ORASECOM totalling Euro 421,500 (US\$0.59M) over a period of three years which commenced in June 2006. The budget is broken down as follows:

**Table II.I.2 Additional funding sources (FGEF)**

Item	FGEF	ORASECOM	TOTAL
<b>Structures</b>			
1. Council meetings	-	67 500	67 500
2. PSC/Coordination meetings	39 000	144 000	183 000
3. Expert Groups	67 000	192 000	259 000
4. Project Implement Unit	439 000	18000	457 000
<b>Actions</b>			
5. Priority Programme	900 000	-	900 000
6. Supervision	55 000	-	55 000
7. Other Actions ( see below)			
<b>Overall Total</b>	<b>1,500 000</b>	<b>421 500</b>	<b>1,921 500</b>

257. Other Funding including BZM//GTZ and EU.

- BMZ/GTZ funded IWRMP Study Phase 1 started in 2004 and is just about to be completed at a cost of US\$ 0.56M (approximately Euro 100 000 disbursement per annum). A second phase worth US\$3.864M is scheduled to commence in 2008;
- InWent are committed to funding of US\$0.28M over the next four years to support implementation of the ORASECOM Roadmap for Stakeholder Participation in parallel with GEF;
- EU funding to the tune of Euro 2,500,000 has recently been secured through the signing of a Financing Agreement between EU and SADC with ORASECOM as the implementing agency;

- ORASECOM member states are pledged to make annual contributions amounting to US\$0.2M/yr towards the running of a Permanent Secretariat, or US\$0.8M over the life of the project.
- Conservational International have pledged \$4,200,000 of co-funding in support of the methodological and policy related project outcomes

**Table II.I.3 Incremental Costs**

<b>Outcome</b>	<b>Baseline</b>	<b>GEF</b>	<b>Co-Funding</b>	<b>Increment</b>	<b>Alternative</b>
1. ORASECOM institutionally strengthened	0	750,000	3,640,000	4,390,000	4,390,000
2. TDA gaps filled	24,950,000	700,000	11,871,500	12,571,500	37,521,500
3. The SAP and associated NAPS are formulated and adopted at ministerial level	391,375,000	600,000	4,250,000	4,850,000	396,225,000
4. Stakeholders actively involved	8,505,000	900,000	4,670,000	5,570,000	14,075,000
5. Demonstration projects successfully implemented	68,730,000	2,750,000	4,604,000	7,354,000	76,084,000
6. Effective project coordination	0	600,000	3,030,000	3,630,000	3,630,000
<b>Total</b>	<b>493,560,000</b>	<b>6,300,000</b>	<b>32,065,500</b>	<b>38,365,500</b>	<b>531,925,500</b>

#### II.1.4 Incremental Cost Matrix

Component	Baseline	Increment	Alternative
<p><b>Overall Objective:</b>  <b>The overall objective of the Project is to address the principal threats and root causes thereof to the trans-boundary water resources of the OSRB and to develop and implement, through the TDA and SAP process, a sustainable programme of policy, legal and institutional reforms and investments to address these threats.</b></p>	<p><b>\$ 493,560,000</b></p>	<p><b>GEF: \$ 6,300,000</b>  <b>ORASECOM and</b>  <b>Countries: \$16,621,500</b>  <b>(excl. project prep)</b>  <b>FGEF/BMZ/GtZ/EU/In</b>  <b>Went/CI: 13,540,000</b></p> <p><b>Total: \$ 38,365,500</b></p>	<p><b>Total</b>  <b>Alternative:</b>  <b>\$531,925,500</b></p>
<p><b>Explanatory note:</b>  A financial baseline for the project has been set at \$ 493,560,000, over 4 years, established using a ‘business as usual’ scenario where, despite existing bi-national agreements on issues such as some site specific monitoring, the shared resources of the OSRB are unsustainably exploited. In the absence of the GEF intervention, fragmented management approaches not consistent with ecosystem-based IWRM will continue. Currently there are no agreed basin wide programmes for managing the OSRB resources and although the institutional frameworks are in place.</p> <p>The proposed GEF alternative is required in order to remove identified constraints and barriers to the use of the ecosystem-based IWRM approach in the management of the OSRB. The transition towards the ecosystem-based IWRM will depend on a greater convergence of policy tools including long-term joint programmes and actions, a clearer distribution of competencies at all levels of governance, and a robust monitoring and evaluation programme.</p> <p>Within this integrated approach, the project will address specific IW GEF priorities, in particular <i>Balancing overuse and conflicting uses of water resources in trans-boundary surface and groundwater basins</i>. The project through the SAP development process will have to address the multiple stakeholders’ competing demands and government commitments to access to water for all, and economic development. The project will also develop mechanisms and undertake reforms for maintaining water resources to within safe ecological limits, and encourage the sustainable use of all exploited water resources in the OSRB.</p> <p>The alternative scenario includes financing from GEF, French GEF, BMZ/GtZ, InWent, Conservational International and the European Union a total of US\$15,444,000</p>			

Component	Baseline	Increment	Alternative
<b>Outcome 1: ORASECOM institutionally strengthened</b>	<b>\$0</b>	<b>GEF: \$750,000 ORASECOM and countries: \$1,500,000 BMZ/GTZ/EU/Conservational International: \$2,140,000  Total: \$4,390,000</b>	<b>Total Alternative: \$4,390,000</b>
<p><b>Explanatory note:</b> The financial baseline by definition for institutionally strengthening ORASECOM is zero.</p> <p>Under the alternative, GEF resources and co-financing will be used to assist in development of capacity of ORASECOM. In addition to agreed financial contribution of \$200K per annum (\$800K over project life) it is estimated that the countries will contribute an additional \$700K in attending ORASECOM and project meetings and coordinating the new ORASECOM Water Resource and Environmental Programme.</p> <p>The BMZ/GTZ through support of SADC are committed to assist ORASECOM in the establishment of a strong secretariat and improve water resource planning capacity in all the basin countries. A proportion of the US\$4.5M EU funding will also be used to support ORASECOM. Details of actual activities are not yet available and therefore the combined funding has been estimated at US\$1,600,000.</p>			
<b>Outcome 2: Trans-boundary issues analyzed with gaps filled through additional studies</b>	<b>\$ 24,950,000</b>	<b>GEF: \$ 700,000 ORASECOM and countries: \$5,900,000 FGEF/BMZ/GtZ/EU/CI : US\$ 5,971.5  Total: \$ 12,571,500</b>	<b>Total Alternative: \$ 37,521,500</b>
<p><b>Explanatory note:</b> A financial baseline for this Outcome has been set at \$ 24,950,000 over 4 years, comprising of unilateral projects carried out on a wide-ranging number of issues including demand studies, biodiversity assessments, yield assessments, feasibility testing, identification of ground water resources, etc. The results of many of these studies will feed into the TDA over the life of the project.</p> <p>Under the alternative, GEF resources and co-financing will be used to finalize the development of the TDA through a capacity needs and information gap</p>			



Component	Baseline	Increment	Alternative
<p>assessment of the priority issues, revised Causal Chain Analyses and Causal Loop Diagrams, and identification and pre-feasibility studies of key SAP interventions. There are a number of trans-boundary/bilateral studies being undertaken by the basin countries including LORMS, Lesotho Highlands Phase II feasibility study and orange River estuary studies. The value of this work has been conservatively estimated to be valued at US\$5,900,000.</p> <p>The FGEF project will undertake various studies identified under the ORASECOM workplan, including the development of a management plan for the Lesotho Highland sponges and an assessment of groundwater resources in the Molopo basin. All the FGEF activities, although not yet fully defined, will feed into the TDA. It is understood that part of the EU funding will also be used for specific technical studies as will some of the BMZ/GtZ, but full ToR are not yet available. It is estimated that the co-financing of this activity from the bi-lateral and multi-lateral donors will be US\$ (FGEF US\$ 1,600,000).</p> <p>In addition inputs into the TDA are anticipated from the WB-GEF project Groundwater and Drought Management in Southern Africa, executed by SADC – including development of a regional GW vulnerability map; regional awareness campaign; and a knowledge management system for groundwater drought management – and the UNEP –GEF SLM project which includes a study of the Molopo-Nossob aquifer.</p>			
<p><b>Outcome 3: Country agreement on and commitment to basin wide and national policy, legal and institutional reforms to address the agreed priority trans-boundary issues within the SAP and associated NAPS</b></p>	<p><b>\$391,375,000</b></p>	<p><b>GEF: \$600,000</b>  <b>ORASECOM:</b>  <b>1,580,000</b>  <b>FGEF/BMZ/GtZ/EU/CI</b>  <b>: 2,670,000</b>    <b>Total: \$ 4,850,000</b></p>	<p><b>Total Alternative:</b>  <b>\$ 396,225,000</b></p>
<p><b>Explanatory note:</b>  The financial baseline for the development of the SAP has been set at \$ 370,190,000, over 4 years. A significant portion on this money will be spent on large infrastructure projects that will improve water distribution and efficiency in the basin. There are also improvements planned for the already sophisticated control systems in place for the Vaal and Middle Orange-Senqu, including real-time modeling. Some of these improvements have trans-boundary implications and an estimate of the value of these incremental investments has had to be made. A conservative estimate of US\$2,580,000 has been put on the country co-financing for this component.</p> <p>Alternative is estimated at US\$375,040,000, with co-financing of US\$4,850,000: Countries US\$2,850,000 and BMZ/GtZ/EU US\$1,670,000. In addition to the trans-boundary investments above the countries will incur costs attending and hosting the SAP meetings, development of their own national action plans, which are expected to go beyond the initial formulation, and establishment and operation of the interministry/interdepartmental committees. In Botswana UNDP-GEF is assisting the government in preparing a national IWRM plan which will guide the OSRB NAP for that country.</p>			

Component	Baseline	Increment	Alternative
<p>The support from the donors for SAP development will come from BMZ/GtZ and principally the EU. Although the support is known to be considerable it is not clear how the funds are to be spent, possibly in the early implementation of priority SAP interventions drawn from the ORASECOM Action Plan. Total estimated donor co-financing is US\$1,670,000</p>			
<p><b>Outcome 4: Stakeholders actively involved in project and engaged in addressing the trans-boundary issues, with increased public awareness</b></p>	<p><b>\$ 8,505,000</b></p>	<p><b>GEF: \$900,000 ORASECOM and countries: \$1,370,000 FGEF/InWent/EU/CI: \$3,300,000  Total: \$5,570,000</b></p>	<p><b>Total Alternative: \$ 14,075,000</b></p>
<p><b>Explanatory note:</b> The financial baseline for Outcome 4 has been set at \$8,505,000 over 4 years. Currently there are several national and bilateral level efforts which are aimed at inclusion of stakeholders in national water management projects. These efforts focus on sustainable development of sensitive wetlands and rehabilitation of susceptible areas. These efforts do not incorporate a wide array of stakeholders with significantly diverse water uses in such a way that they are actively contributing to basin wide water management, though they do focus on alternative income sources for those in river communities.</p> <p>Under the alternative, it is estimated from the full list of water management projects US\$3,370,000 is being spent by ORASECOM and the countries on the implementation of public involvement activities across all trans-boundary projects, including components of ORASECOM's Roadmap for Stakeholder involvement. Further support for the Roadmap has been pledged by FGEF, InWent and the EU with an estimated value of US\$1,300,000</p>			
<p><b>Outcome 5: IWRM ecosystem-based management approaches encouraged and strengthened through the successful implementation of the Demonstration Projects</b></p>	<p><b>\$ 68,780,000</b></p>	<p><b>GEF: \$ 2,750,000 ORASECOM and countries: \$2,700,000 FGEF/BMZ//GtZ/EU/CI: \$1,904,000  Total: \$ 7,354,000</b></p>	<p><b>Total Alternative: \$ 76,134,000</b></p>
<p><b>Explanatory note:</b> The financial baseline for Outcome 5 has been set at \$ 68,780,000, over 4 years, and has been established using a 'business as usual' scenario. Currently, there are numerous national efforts investigating in particular land degradation and irrigation, including large feasibility studies. These studies and investments will form a</p>			

Component	Baseline	Increment	Alternative
<p>nucleus of the NAPs and will have considerable influence over the shape and form of the SAP.</p> <p>Under the alternative, the parallel studies on the environmental flows and Ramsar site under LORMS and the irrigation demand management studies are estimated to have a value of US\$2,700,000. There is no donor co-funding for these activities since they were specific activities selected in consultation with ORASECOM from the ORASECOM workplan in order to avoid overlap.</p> <p>It is estimated that support for this component from the FGEF, EU and BMZ/GTZ projects will be US\$ 1,904,000</p>			
<p><b>Outcome 6: Effective project coordination</b></p>	<p><b>\$ 0</b></p>	<p><b>GEF: \$ 600,000</b>  <b>ORASECOM and</b>  <b>countries:</b>  <b>\$ 700,000</b>  <b>FGEF/BMZ/GtZ,EU,CI</b>  <b>:</b>  <b>\$ 2,330,000</b>  <b>Total: \$ 3,630,000</b></p>	<p><b>Total</b>  <b>Alternative:</b>  <b>\$ 3,630,000</b></p>
<p><b>Explanatory Note:</b></p> <p>The financial baseline for component 1 is by definition zero. It is estimated that the countries will in providing accommodation for the PCU and the demonstration project PIUs contribute US\$45,000 over the four year period. In addition, it is estimated that the other three main component programme projects will undertake coordination activities with a value of US\$150,000 over four years</p>			

**Current and Future Activities**

**Table II.I.5 South Africa**

<b><u>Project Title and Description</u></b>	<b><u>Funding Institutions</u></b>	<b><u>Funding committed</u></b>	<b><u>Duration</u></b>	<b><u>Contact</u></b>
Integrated Water Quality management Plan for the Vaal River.	DWAF- RSA	US\$ 0.6 M	To March 2008	P. Pyke Department of Water Affairs and Forestry
Integrated Water Quality management Plan for the Orange River.	DWAF-RSA	US\$ 0.6 M	Uncertain	P. Pyke Department of Water Affairs and Forestry
Vaal Reconciliation Strategy	DWAF-RSA	US\$ 1.3 M	To March 2008	B. Weston Department of Water Affairs and Forestry
Orange River Comprehensive Reserve Study (Comprehensive reserve determination for all surface and groundwater resources of the Orange River Basin	DWAF-RSA (Resource Efficiency Directorate)	US\$ 1.4 M	Next 4 years (no timelines available)	P. Pyke Department of Water Affairs and Forestry
Reconciliation strategies for small water users in the Vaal / Orange basin (To establish the use of water from the smaller tributaries in the system, excluding the major dams and rivers for which this is known)	DWAF-RSA	US\$ 0.3 M	To March 2008	S. Rademeyer Department of Water Affairs and Forestry
Rehabilitation of Wetlands in various areas of the Basin	RSA Working for Wetlands (RSA – Govt)	Total expenditure within the basin for 2007 – 2008 – US\$ 2 M, of which US\$ 0.2 M is being spent on the OR mouth	2007-2008	J. Dini Working for Wetlands, Department of Water Affairs and Forestry
Infrastructure augmentation in the Eastern Vaal River (Piping systems etc.)	DWAF-RSA	US\$ 342 M	Long term (5 yrs +)	P. Pyke
Determining the effects and impacts of water releases from dams in the Orange Vaal systems	Concept development phase	Concept development phase	Concept development phase	Concept development phase

<b>Project Title and Description</b>	<b>Funding Institutions</b>	<b>Funding committed</b>	<b>Duration</b>	<b>Contact</b>
Various projects relating to the conservation of Largemouth and Smallmouth Yellowfish in the Orange / Vaal - co-ordinated by the Yellowfish Conservation Group	Concept documents developed	None as yet, + - US\$ 0.6 M required	5 years	P. de Villiers
Proclamation of the Orange River Mouth as a provincial protected area (Northern Cape, South Africa)	Northern Cape Department of Environment, Conservation and Tourism	Part of operational budget	2007-2009	D. Badenhorst
Lower Orange River Conservation Development Plan	Department of Tourism Environment and Conservation (RSA)	US \$ 70 K (Need for Namibia to be included in the project)	2008-2009	P. Theron
Systematic Conservation Plan for the Richtersveld District	GEF	US\$ 35 K	2007	P. Desmet

**Table II.I.6 South Africa and Lesotho Related Activities**

<b>Project Title and Description</b>	<b>Funding Institutions</b>	<b>Funding committed</b>	<b>Duration</b>	<b>Contact</b>
Integrated Catchment Management. To benefit local communities by sustainability of resource use within the Lesotho Highlands Water Project	Lesotho and RSA Govt.	US\$ 2.7 M (Combined, mostly RSA)	2005-2010	Chief Executive, LHDA
Lesotho Highlands Phase II Feasibility Study	DWAF-RSA Lesotho Govt.	US\$ 4 M US\$ 4 M	To be completed by march 2008	P. Pyke Department of Water Affairs and Forestry
Cash contribution to ORASECOM	DWAF-RSA	US\$ 0.5 M	2008-2012	C.L. van den Berg Department of Water Affairs and Forestry
Staff cost and travel cost to ORASECOM	DWAF-RSA	US\$ 0.5 M	2008-2012	C.L. van den Berg Department of Water Affairs and Forestry

**Table II.17 South Africa and Namibia Related Activities**

<b>Project Title and Description</b>	<b>Funding Institutions</b>	<b>Funding committed</b>	<b>Duration</b>	<b>Contact</b>
LORMS pre feasibility study (managing the Lower Orange River for benefit to Namibia and South Africa as well as the Environment)	DWAF-RSA MAWF-Namibia	US\$ 0.6 M RSA US\$ 0.6 M Namibia	2006-2008	P. Pyke, G. Van Langenhoven Department of Water Affairs and Forestry, and Ministry of Agriculture, Water and Forestry
The construction of gauging weirs at two sites in the Lower Orange river (one at Sendelingsdrift, and the other at the eastern border point between RSA and Namibia)	DWAF-RSA MAWF- Namibia	US\$ 1.7 M (not yet committed)(RSA) US\$ 1.3 M (not yet committed)(Nam)	2007-2012	L. Snyders Department of Water Affairs and Forestry G. van Langenhoven Ministry of Agriculture, Water and Forestry
Feasibility Study and EIA for the construction of a dam on the Lower Orange River	DWAF-RSA MAWF- Namibia	US\$ 1.7 M US\$ 1.2 M	2008	M. Amakali Ministry of Agriculture, Water and Forestry
Ecological Needs Assessment for the Orange River mouth	DWAF-RSA MAWF- Namibia	US\$ 0.7 M US\$ 0.2 M	No detail available	M. Amakali Ministry of Agriculture, Water and Forestry
Richtersveld Ai Ais Programme to combat alien vegetation along the Orange River	Not yet secured	-	No detail available	SPAN Namibia
Joint Tourism Plan for the Richtersveld Ai-Ais Transfrontier Park	Peace Parks Foundation	US\$ 35-40 K A further 14K is needed for completion	2006-2007	P. van der Walt
Joint Management Plan for the Richtersveld Ai-Ais Transfontier Park	Peace Parks Foundation	US\$ 35- 40 K	2006-2007	P. Theron
Refurbishment of Vioolsdrift / Noordoewer Joint Irrigation Scheme	DWAF-RSA	US\$ 0.9 M	2007-2008	L. Snyders Department of Water Affairs and Forestry

**Table II.18 Namibia Related Activities**

<b>Project Title and Description</b>	<b>Funding Institutions</b>	<b>Funding committed</b>	<b>Duration</b>	<b>Contact</b>
Pilot study on the efficient use of irrigation methods on two sites at the Orange River (As adapted from the Logframe/SRF developed at Gobabeb)	MAWF-Namibia	US\$ 2 M (initial estimates)	2007-2008	M. Amakali Ministry of Agriculture, Water and Forestry

<b>Project Title and Description</b>	<b>Funding Institutions</b>	<b>Funding committed</b>	<b>Duration</b>	<b>Contact</b>
Ephemeral River Basin project for the Fish River (Improving resource management in the basin)(part of the SADC-ERB project	Govt. of Norway	US\$ 1.4 M for the full ERB project in Botswana and Namibia	2005-2009	C. Roberts / M. Seely Desert Research Foundation
Stampriet Kalahari/Karoo Artesian Basin Transboundary Aquifer Study	MAWF – Namibia		In preparation	Greg Christelis, Deputy Director Geohydrology, MoAWF

**Table II.I.9 Botswana Related Activities**

<b>Project Title and Description</b>	<b>Funding Institutions</b>	<b>Funding committed</b>	<b>Duration</b>	<b>Contact</b>
The Western Kgalagadi Conservation Corridor project	CI and the French FFEM (Fonds Francaise pour Environnement Mondiale	US\$ 4.2 M	2007-2010	Hisso Sebina Project manager
Land Resource Management	MEWT/MoA Gov't of Botswana	US\$ 4.5 M	2007 - 2009	S. Monna/ G.Woto Ministry of Environment Water and Tourism
Rolong Dolomite Project: Identifying Groundwater Resources in the Molopo River Basin	Govt of Botswana	US\$ 6 M	2008-2010	N. Mangisi Ministry of Environment Water and Tourism
Water Conservation	MMEWR	US\$ 0.5 M	2006/07	O. Katai Ministry of Minerals Energy and Water Resources

**Table II.I.10 Lesotho Related Activities**

<b>Project title and description</b>	<b>Funding Institutions</b>	<b>Funding Committed</b>	<b>Duration</b>	<b>Contact person</b>
Rehabilitation and Restoration of highlands Wetlands. Managing highland wetlands to conserve river flows. It is also aimed at developing and implementing wetland catchment Management Plans and supporting livelihoods of communities near the wetlands.	Millennium Challenge Cooperation	US \$5 M	2008-2013	Director- Department of Water Email: director@dwa.gov.ls

Sustainable Agricultural and Natural Resources Management Project (SANREMP) 1. Natural resource Management-Rangeland rehabilitation 2. Land degradation and monitoring study 3. Soil and water conservation thru community driven projects	International Fund for Agricultural Development (IFAD)	US \$1.6 M	2005-2011	M. Pomela, Ministry of Agriculture
Capacity building and knowledge Management for sustainable land management in Lesotho. Enhanced awareness, understanding and analysis of sustainable land management best practices at resource users	Government of Lesotho (Ministry of Forestry and Land Reclamation) and BMZ/GTZ	US \$4.48 M	Unconfirmed	Principal Secretary, Ministry of Forestry and Land Reclamation

**Table III.11 ORASECOM Projects**

<b><u>Project Title and Description</u></b>	<b><u>Funding Institutions</u></b>	<b><u>Funding committed</u></b>	<b><u>Duration</u></b>	<b><u>Contact</u></b>
African transboundary river support programme: Case of the Basin of Orange-Senqu River	EU	2.5 M Euro	2008-2013	Head of the delegation for the European Commission - Botswana
Orasecom support, priority programme within the Basin	French GEF	1.4 M Euro	2006-2009	Orasecom secretariat
IWRMP studies, Establishment of Orasecom secretariat	BMZ/GTZ	1 M Euro	2004-	Orasecom secretariat



## PART II: Strategic Results Framework

Project Strategy	Indicator	Base Line	Target <i>Unless otherwise stated these are targets for Project completion</i>	Means of Verification	Assumption
<p><b>Goal:</b> The overall goal of the Project is to contribute to improved management of the Orange Senqu River Basin's trans-boundary water resources through Integrated Water Resource Management (IWRM) approaches that remediate threats and root causes.</p>					
<p><b>Purpose (Objective):</b> To contribute to improved management of the Orange-Senqu River Transboundary Basin through the implementation of a sustainable programme of policy, legal and institutional reforms and investment options, using the TDA/SAP process.</p>	<p>1. A fully operational ORASECOM. Demonstrable contribution to the capacity strengthening of ORASECOM to coordinate initiatives, institutions and international cooperating partners (ICPs) in a harmonized manner. Promotion of IWRM principles in the basin</p>	<p>ORASECOM has established the secretariat and a full time executive secretary has been appointed. ORASECOM and the TTT met regularly to discuss basin issues and donor coordination meetings are now held every four months led by ORASECOM and BMZ/GtZ. An Orange – Senqu Water Resource and Environmental Programme has been established and a draft workplan prepared in conjunction with the donors. There is currently no information management system to enable ORASECOM to share available data and information and water allocation</p>	<p>ORASECOM sufficiently strengthened to coordinate initiatives, with national institutions and international cooperating partners (ICPs) to effectively promote the implementation of IWRM principles in the basin.</p>	<ul style="list-style-type: none"> <li>• A programme framework and workplan that will guide the harmonization and coordination of all the ongoing and forthcoming initiatives funded by the ICPs and the implementation of the SAP.</li> <li>• Technical working groups established</li> <li>• Information management System developed and operational</li> <li>• Rules and procedures for EA in a transboundary context agreed.</li> </ul>	<ul style="list-style-type: none"> <li>• All four countries are equally engaged in the operation of ORASECOM</li> <li>• Millennium Sustainable Development Targets can be met while still developing water resources in the basin in a sustainable manner.</li> </ul>
	<p>2. Priority transboundary issues are analyzed through additional studies, immediate and root causes of priority transboundary issues identified.</p>	<p>The preliminary TDA , conducted during the preparatory stage, is based on desk studies produced by the GEF team and by BMZ/GtZ, as the first phase of the four-phased IWRM initiative supported by BMZ/GtZ. This work has identified a number of knowledge gaps to be filled some of which will</p>	<p>A comprehensive TDA to enable ORASECOM and its parties to target investments at root and underlying causes and to form a solid scientific base for the SAP (IWRM plan).</p>	<ul style="list-style-type: none"> <li>• Gap filling assessments on PoPs, artisanal mining and climate change</li> <li>• Updated and revised TDA endorsed by the countries.</li> <li>• TDA disseminated widely</li> </ul>	<ul style="list-style-type: none"> <li>• Willingness of countries and stakeholders to accept objective findings of the TDA</li> </ul>

Project Strategy	Indicator	Base Line	Target <i>Unless otherwise stated these are targets for Project completion</i>	Means of Verification	Assumption
		be addressed by GEF in the full size project, including POPs contamination, artisanal mining and climate change impacts.			
	3. ORASECOM agrees vision, WR objectives and targets for the OS basin forming the basis of the SAP which is endorsed by all Parties. NAPs developed congruently in the basin states as the implementation mechanisms for the SAP	The three initiatives, EU, BMZ/GtZ French GEF are committed to work together under the ORASECOM's leadership to develop the SAP as a component of a regional IWRM plan thereby ensuring the maximization of synergies, taking each other's comparative advantages into consideration, and to avoid duplication of efforts. The current ORASECOM Action plan is not sufficiently detailed and is not politically binding.	A fully endorsed SAP which will address the priority transboundary issues in the basin and bring about IWRM involving the all major sectors in water resource planning at a basin wide level.	<ul style="list-style-type: none"> <li>• SAP endorsed and signed by countries</li> <li>• Consistent NAPs agreed and signed</li> <li>• Financial commitments from governments and donor organizations to support SAP and NAP implementation</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriateness of recommendations based on TDA</li> </ul>
	4. Stakeholder involvement in project activities ensured; Public awareness raised on transboundary issues in the basin	ORASECOM has developed and endorsed the Roadmap for stakeholder participation communication but funding for realization of its objectives outlined is not yet available.	Activities supported by GEF towards the stakeholder involvement support an Action Plan to implement the Roadmap together with InWEnt and later will contribute to its implementation to increase the awareness and involvement of stakeholders in the IWRM across the basin	<ul style="list-style-type: none"> <li>• Stakeholder forums established and meeting regularly</li> <li>• Public awareness raising activities implemented</li> <li>• Social marketing campaign and activities targeting specific stakeholder groups implemented</li> </ul>	<ul style="list-style-type: none"> <li>• Stakeholder available and willing to participate and effectiveness of awareness raising campaigns</li> </ul>
	5. Ecosystem-based IWRM approaches encouraged and strengthened through the successful	The ORASECOM TTT members identified and with the GEF team identified and developed three pilot projects which	Effective strategies for setting ecological flows, efficient irrigation water management; and community based governance to address land degradation and its linkage to WR	<ul style="list-style-type: none"> <li>• Reports from demonstration projects</li> <li>• Lesson learned</li> <li>• Results</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration projects successful and replicable</li> </ul>

Project Strategy	Indicator	Base Line	Target <i>Unless otherwise stated these are targets for Project completion</i>	Means of Verification	Assumption
	implementation of the demonstration projects.	addressed critical IWRM issues: ecological flows, in particular in the lower Orange; water conservation and water quality management in the irrigation sector and land/range management in at the community level in key catchment locations, for example the Lesotho Highlands.	management.	replicated in other parts of the basin and in the wider region	
<b>OUTCOME 1: Institutional strengthening of ORASECOM</b>	1.1. GIS-based Information Management System functional and active	There is a current lack of a mechanism for sharing information within the basin, and across sectors and also analysing data in an integrated manner. While there is high level capacity in some areas, there is also a lack of a database that is accessible to all users including multiple government departments, academic and scientific communities, farmers, conservationists, NGOs, and others. There are a number of initiatives under proposal which need to be coordinated	Information Management System Created with Functional GIS Based Web page utilized by a wide range of stakeholders from throughout the basin and internationally.	<ul style="list-style-type: none"> <li>• IMS design and QA/QS procedures agreed.</li> <li>• Management arrangements put in place</li> <li>• Meta-database prepared</li> <li>• Common database agreed</li> <li>• Submission of data base on agreed procedures</li> <li>Web-site operational and number of website hits recorded</li> </ul>	<ul style="list-style-type: none"> <li>• Management arrangements agreed and financially supported</li> <li>• Countries provide data and information freely.</li> <li>• Information exchanges bi directional</li> </ul>
	1.2. Technical Working Groups established	There is a ORASECOM Technical Task Team which meets regularly to discuss component projects and the implementation of the Action Plan, However, membership and time available is limited. Key aspects of IWRM require	Technical working groups created functioning and meeting regularly to address key aspects of the ecosystem based approach and IWRM implementation in the Orange-Senqu river basin.	<ul style="list-style-type: none"> <li>• Technical group reports.</li> <li>• Written guidance from the TWG to component projects regarding implementation</li> <li>• Reports to Steering Committee meeting</li> </ul>	<ul style="list-style-type: none"> <li>• Ability to recruit suitable members from each country</li> </ul>

Project Strategy	Indicator	Base Line	Target <i>Unless otherwise stated these are targets for Project completion</i>	Means of Verification	Assumption
		further attention and continuing dialogue			
	1.3. Water resource allocation criteria established and agreed practitioners strengthened	Although a number of studies have been undertaken there are no national or basin-wide decision framework agreed and established. In the irrigation sector water is commonly used for cultivated of feed-stock rather than high value crops. Subsidies and allocations to the agricultural sector are common without good economic reasoning. This is recognized as an important issue to be addressed. The 'value' of water retained in the lower Orange and its importance in preserving environment as eco-tourism attraction has not been evaluated.	Decision framework created for determining water resource allocation base on economic evaluation criteria and for it to be applied at the basin-wide and national levels.	<ul style="list-style-type: none"> <li>• Technical report on water use priority based on economic evaluations</li> <li>• Criteria agreed for evaluating water abstraction and allocation</li> <li>• Decision frameworks agreed nationally and base-wide</li> </ul>	<ul style="list-style-type: none"> <li>• Allocation criteria realistic and acceptable to ORASECOM and impacted stakeholders</li> </ul>
	1.4. Transboundary EA guidelines and procedures prepared and agreed	To date there are no EA guidelines in a transboundary context operational in the Orange-Senqu river basin. Although there are numerous water resource projects on-going, such as Lesotho Highlands phase II, full disclosure regarding the environmental implications is not always available to the basin countries, or they are not available in a coherent	Trans-boundary EIA guidelines and procedures to be agreed by the ORASECOM members including a listing of type and size of project applicable.	<ul style="list-style-type: none"> <li>• Guidance document approved by ORASECOM</li> <li>• Rules and procedures document from transboundary EA prepared and agreed</li> <li>• Reference to transboundary EA guidelines, rules and procedures in national EIA guidelines</li> <li>• Trans-boundary EAs posted on</li> </ul>	<ul style="list-style-type: none"> <li>• Willingness of government to agree to basin-wide trans-boundary EA guidelines and rules and procedures</li> </ul>

Project Strategy	Indicator	Base Line	Target <i>Unless otherwise stated these are targets for Project completion</i>	Means of Verification	Assumption
		form. There is no agreement on the type and size of project which should be subject to that considers transboundary impacts on water resource uses		ORASECOM web-site.	
	1.5. The knowledge of water resource practitioners in IWRM improved at all levels. Evidence of transfer of knowledge between countries and between senior and junior staff.	The capacity for water resource management is expected to decline in the near future with the retirement of many senior managers and engineers. Without additional capacity building efforts, it is anticipated there will be a significant knowledge gap will open up in all basin countries. All major donors have allocated funds for training but it is not yet clear what is required in each country and basin-wide. A needs assessment should be urgently undertaken to determine the scope and scale of the problem as it relates to the water resource planning.	Clear strategies for maintaining and strengthening water resource knowledge in government agencies in the short to medium terms. Improved capacity of existing water resource practitioners in all basin countries in Integrated Water Resource Management and increased recruitment of new young engineers/planners.	<ul style="list-style-type: none"> <li>Needs assessment undertaken</li> <li>ORASECOM and country capacity development strategies and training programmes developed</li> <li>Number of water resource practitioners trained</li> <li>Feed-back results from training</li> </ul>	<ul style="list-style-type: none"> <li>Assumes that suitable junior engineers / planners exist and the rewards are sufficient to attract them.</li> <li>Assumes that there exist capacity in the Ministries to mentor the junior engineers/planners</li> </ul>
<b>Outcome 2: Completion of Transboundary Diagnostic Analysis</b>	2.1. Detailed analyses of transboundary issues as they relate to IWRM elaborated	There is good agreement on the priority transboundary issues relating to water resource management in the river basin but there remain a number of information gaps to be filled before a complete picture can be formed. A detailed gap analysis has been	<p>Assessment on artisanal mining impacts in the lower Orange and mitigation measures outlined</p> <p>POPs levels screened in the Orange-Senqu basin and measures to be taken to lower levels determined and mitigation measures outlined</p> <p>Climate change scenarios based medium and long term forecasts agreed and the</p>	<ul style="list-style-type: none"> <li>Assessment report of the impact of artisanal mining in the lower and middle Orange,, including proposals for control and mitigation.</li> <li>Maps of POPs distribution prepared and</li> </ul>	<ul style="list-style-type: none"> <li>Results from the gap filling activities being undertaken by other parties will be made available with the first three years on project</li> </ul>

Project Strategy	Indicator	Base Line	Target <i>Unless otherwise stated these are targets for Project completion</i>	Means of Verification	Assumption
		undertaken by OORASECOM and GEF the results of which are summarized in the OSWREP workplan. The donor component projects will address these knowledge gaps, with GEF investigating POPs contamination, impact of artisanal mining and impact of climate change on water resource management..	impact on water resource yields and demands assessed with outline adaptive management strategies proposed	sources identified. <ul style="list-style-type: none"> <li>• Climate change scenarios agreed and yield and demand forecast figures revised</li> <li>• TWG Reports (See 1.2)</li> </ul>	
	2.2. Agreement on needed interventions at sub-regional and regional levels to address underlying and root causes for the priority transboundary issues	The preliminary TDA undertaken during the preparatory stage did not identify the longer term interventions to be incorporated into the SAP or undertake pre-feasibility studies into priority interventions. The additional work required will involve a revised CCA and preparation of Causal Loop diagrams. This work will be a precursor to SAP and NAP development.	An understanding and agreement of the priority transboundary problems of the Orange-Senqu and identification of the necessary short, medium and long term interventions to address them	<ul style="list-style-type: none"> <li>• Revised TDA document containing the results from gap filling studies and revised Causal Chain Analyses</li> <li>• List of potential interventions in the short, medium and long term to address each of the transboundary issues</li> <li>• Pre-feasibility studies of priority interventions</li> </ul>	<ul style="list-style-type: none"> <li>• Regional agreement on the findings of the TDA and listings of priority interventions</li> </ul>
	2.3. Revised TDA finalized and widely disseminated	As evidenced in the SHA, there is currently low awareness among stakeholders regarding the priority transboundary issues in the basin and how the issues inter-relate.	Updated TDA approved and disseminated widely to stakeholders, civil society, governments, other basin wide projects, and the International Waters community for use in decision making, programming and long term development	<ul style="list-style-type: none"> <li>• TDA finalized and endorsed by ORASECOM</li> <li>• TDA in easy access format prepared and disseminated</li> <li>• Newspaper articles and TV</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>

Project Strategy	Indicator	Base Line	Target <i>Unless otherwise stated these are targets for Project completion</i>	Means of Verification	Assumption
				programmes featuring the OS TDA findings	
<b>Outcome 3: Preparation of the Strategic Action Programme and National Action Plans</b>	3.1. Institutions established to support the national process for the NAP development	Comprehensive water legislation is either in place or is in advanced development in all basin countries; however, the necessary institutional framework is in some of the basin countries not fully developed. Assistance is required in Namibia, Botswana and Lesotho to strengthen existing institutions and in some circumstances establish new structures to develop and operationalise NAPs based on IWRM principles. In particular, the development of mechanisms for cross-sectoral consultation and decision making.	To establish in the basin countries institutional frameworks and procedures capable of developing and implementing NAPs based on IWRM principles.	<ul style="list-style-type: none"> <li>Country needs assessment for NAP implementation in each country</li> <li>Establishment of inter-sectoral committees and meeting reports</li> <li>Establishment of NAP formulation team</li> </ul>	<ul style="list-style-type: none"> <li>Long-term political and financial commitment to SAP implementation</li> <li>Countries are able to endorse SAP through national planning process</li> <li>NAPs and SAP reflect IWRM principles</li> <li>ORASECOM has the capacity and financing to monitor GEF M&amp;E framework</li> </ul>
	3.2. SAP and NAPs formulated and endorsed	The ORASECOM Action Plan of thirty activities was developed with the donor community four years ago and needs to be revised. The Action Plan does not include a vision for the river basin or clear targets under the component objectives. As a first step the Action Plan has been operationalised under the OSWREP and the major donors have committed to a major part of its implementation.	A SAP and underpinning NAPs that will provide a road-map for water resource development in the Orange-Senqu river basin based on IWRM principles. An overarching water resource develop vision with component WR objectives, targets and short, medium and long term interventions and a M&E framework	<ul style="list-style-type: none"> <li>SAP endorsed by the national governments</li> <li>Final NAPs approved by appropriate national planning authorities</li> <li>GEF M&amp;E Framework included in the final SAP</li> </ul>	

Project Strategy	Indicator	Base Line	Target <i>Unless otherwise stated these are targets for Project completion</i>	Means of Verification	Assumption
		Work on revising the Action Plan has been started by BMZ/GtZ and the first phase of the ICZM plan is now complete. In the			
	3.3. Donor conference held to mobilize resources for SAP implementation	There are currently three projects assisting ORASECOM with development of the OSWREP workplan and substantial coordination efforts have been undertaken to ensure the minimum of duplication of effort and maximum synergy. These efforts will continue throughout the project and more donors will be asked to support the OSWREP, including the major IFIs.	Based on SAP and NAP endorsements a donors' meeting will serve as the basis to mobilize commitments to SAP implementation and assist countries to form	<ul style="list-style-type: none"> <li>• Donor conference minutes, project monitoring reports and files</li> <li>• Memoranda or agreements, project monitoring reports and files</li> </ul>	<ul style="list-style-type: none"> <li>• Continued donor and national commitment to implementing ORASECOM activities.</li> </ul>
<b>Outcome 4: Basin wide stakeholder involvement activities</b>	4.1 Contributing to the establishment of Basin Wide Stakeholder Forum (BWSF) and National Stakeholder Forums	There are currently limited facilities at the basin wide level for consultation and involvement of stakeholders. ORASECOM have in partnership with InWent developed a strategy (the Roadmap) for stakeholder involvement in the decision making in the Orange-Senqu basin. This strategy includes the establishment of a Basin Wide Stakeholder forum and national stakeholders forums. At present there is no immediate funding for implementation In SA as	BWSF established and functioning in line with ORASECOM Roadmap and with stakeholder input into the decision process. River basin councils functioning in one or more trans-boundary sub-basins including an ephemeral river basin as models for stakeholder involvement at the sub-regional level.	<ul style="list-style-type: none"> <li>• Basin –wide and national stakeholder forum roster</li> <li>• Basin wide and national council meeting minutes</li> <li>• Community support indicated and training materials</li> </ul>	<ul style="list-style-type: none"> <li>• Diversity of BWSF to reflect broad array of stakeholders within the basin</li> <li>• River basin councils are representative of stakeholders in the basin</li> </ul>



Project Strategy	Indicator	Base Line	Target <i>Unless otherwise stated these are targets for Project completion</i>	Means of Verification	Assumption
		<p>part of the national water strategy Catchment Management Areas are to be established but implementation is slow. In Namibia with the assistance of Norway a river basin council has been establish on the River Fish. There are no councils on any transboundary rivers or ephemeral rivers.</p>			
	4.2. Awareness on water conservation raised	<p>The current level of awareness of water conservation is stakeholder group specific and sectorally focused. Stakeholders are eager for more information about conservation measures across the basin. There are national water conservation campaigns in most countries but it is unclear what impact these are having on water consumption. Domestic consumption levels are high in comparison to European levels and are predicted to rise. However, this represents only a small proportion of demand with large demand in the irrigation and industry, particularly mining, sectors. The impact of climate change on demand is not yet been assessed although work</p>	<p>All stakeholders have increased awareness of water conservation measures and the political commitment to address overuse and inefficient use of water in the basin.</p>	<ul style="list-style-type: none"> <li>• Basin-wide campaign strategy to engage stakeholders in all sectors</li> <li>• Press releases, TV slots, posters, advertisement campaigns evident at national and regional levels.</li> <li>• Monitoring and evaluation of stakeholders perceptions at beginning, middle and end of the campaign</li> <li>• Records of public meetings</li> </ul>	<ul style="list-style-type: none"> <li>• Support and political commitment from the basin government for the aims and objectives of the campaign</li> </ul>

Project Strategy	Indicator	Base Line	Target <i>Unless otherwise stated these are targets for Project completion</i>	Means of Verification	Assumption
	4.3 Education & Social marketing campaign materials produced on the river environment and ecology	<p>has been done to assess impacts on resource yields.</p> <p>There is limited amount of educational material available to local communities on the importance of the ecology of the river system, and low level of understanding among many stakeholders about the measures needed to improve conditions across the basin.</p>	To increase awareness and understanding of the vital importance of the river environment and its ecology on the livelihoods and lives of all stakeholders through an educational campaign targeting younger generation at all levels of society. Emphasis to be placed on climate change and its implications.	<ul style="list-style-type: none"> <li>• Campaign strategy and linkages with educational institutions and NGO throughout the basin</li> <li>• Primary and secondary education curriculum materials produced for schools throughout the basin.</li> <li>• “river ecology centres” established and guided tours for schools developed.</li> <li>• scholarships for students specializing in water issues in subsequent phases of the project</li> <li>• Development of high quality basin profile.</li> <li>• Documentary film on Orange River for local, basin wide and international broadcast.</li> <li>• Number of newspaper/radio/TV articles about the Orange.</li> <li>• Interest of local</li> </ul>	

Project Strategy	Indicator	Base Line	Target <i>Unless otherwise stated these are targets for Project completion</i>	Means of Verification	Assumption
				MPs and majors	
<b>Outcome 5: Demonstration Projects on Ecological Flows, Irrigation Sector Reforms and Community led range land management</b>	5.1. Limits agreed basin wide to assure preservation of ecological flows for the surface and subsurface flows of the Lower Orange.	Although the current ecological flow limits set in the 1990s on the Orange river are respected, they do not to be appear adequate and the Orange mouth and associated RAMSAR site are seriously degraded. Changes in the hydrological regime timing as well as volume impact the river and riparian environments. The setting of ecological flows and classification of the river are sensitive since it has a direct bearing on the water resources available upstream. The LORMS study investigated raising the classification of and protection to the Lower Orange and found it would have an immediate impact on the water supply balance creating a supply deficit. There are no procedures for establishing ecological flows in the seasonal rivers. The countries by agreeing a basin-wide methodology and criteria for ecological flows are helping to define the long-term vision for the basin	Agreement on the methodology and criteria for setting ecological flows throughout the basin, including seasonal rivers and establishing bounds for water resource availability. Setting of new ecological flow to provide additional protection to the Orange mouth and its associated RAMSAR site.	<ul style="list-style-type: none"> <li>• Project Plan and inception report</li> <li>• Criteria and site selection report</li> <li>• Baseline assessment of the Lower Orange and a site on a seasonal river</li> <li>• Socioeconomic evaluation of the impact of low ecological flows</li> <li>• Community committee meeting minutes</li> <li>• Long monitoring plans</li> <li>• Evaluation and lessons learned report</li> <li>• Basin wide agreement on setting of ecological flows</li> </ul>	<ul style="list-style-type: none"> <li>• The lessons learnt on the Lower Orange can be applied to a seasonal river</li> <li>• The ecological value of the river is recognized when establishing levels of protection</li> </ul>
	5.2. Water use efficiency improved at	In the Orange Senqu basin	Demonstrate how water can be conserved and productivity increased at	<ul style="list-style-type: none"> <li>• Project Plan and inception report</li> </ul>	<ul style="list-style-type: none"> <li>• The farmers are willing to invest in improved infrastructure and adopt new practices as part of the pilot project.</li> </ul>

Project Strategy	Indicator	Base Line	Target <i>Unless otherwise stated these are targets for Project completion</i>	Means of Verification	Assumption
	the transboundary pilot sites and best practices in irrigation water usage developed	irrigation water is one of the biggest demands and one which is predicted to grow at the greatest rate in the medium term with new developments planned in Botswana and Namibia. It is also recognized as the sector where most water savings could be made with the improvements in infrastructure, metering, scheduling and tariffs. It has been calculated in South Africa that approximately 50 million cubic metres of water could be saved per year. The value of water is not appreciated in the sector and low value feed crops are being irrigated instead of high value export crops such as grapes. It is unclear what levels of contamination of the drainage water are from most irrigation sites and what impact they have on the immediate and wider environment.	two transboundary irrigation sites, through metering, scheduling, tariff structures and crop enhancement, and to demonstrate best water quality management practice. Using the lessons learnt develop a replicability strategy for the basin.	<ul style="list-style-type: none"> <li>• Criteria and site selection report</li> <li>• Water management improvement recommendations and action plan</li> <li>• Water quality assessment reports and recommendations for improved management.</li> <li>• Infrastructure investment</li> <li>• Training materials</li> <li>• Monitoring and evaluation reports</li> </ul>	<ul style="list-style-type: none"> <li>• There is sufficient time to implement and monitor the impact of the management changes</li> </ul>
	5.3. Soil erosion reduced at the pilot site and self-governance lessons and best practices for improved land/range management established	Within the basin there are currently encapsulated efforts focusing on reducing soil erosion and improved rangeland management but these do not use a common property community based management practice.	The formation of community based governance structures to improve land/range management with clear linkages to water resource management which can be used as models for replication in the OS basin and further afield.	<ul style="list-style-type: none"> <li>• Project Plan and inception report</li> <li>• Criteria and site selection report</li> <li>• Review of land degradation in the Orange-Senqu basin</li> <li>• Review of best</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration of strong linkages between land/range management and WR management at pilot sites.</li> </ul>

Project Strategy	Indicator	Base Line	Target <i>Unless otherwise stated these are targets for Project completion</i>	Means of Verification	Assumption
				practice and linkage with water resource management issues. <ul style="list-style-type: none"> <li>• Formation of community land/range management committees</li> <li>• Development and implementation of land/range management plans</li> <li>• Monitoring reports</li> </ul>	
<b>Outcome 6:</b> Effective project coordination	6.1 Establish a basin wide Project Coordination Unit	N/A	A fully operational and equipped PCU established to coordinate with the offices of ORASECOM and the other donors within three months of project commencement.	<ul style="list-style-type: none"> <li>• Local administration staff appointed</li> <li>• Filing and accounting systems set up and bank account opened.</li> <li>• Web-site updated regularly</li> <li>• Number of web-sites hits</li> </ul>	<ul style="list-style-type: none"> <li>• Efficiency of start-up of project</li> <li>• The programme (i.e. the SC and PCU) must effectively communicate the issues and the suggested remedies to the national sectors and be responsive to national real and perceived needs.</li> </ul>

<b>Project Strategy</b>	<b>Indicator</b>	<b>Base Line</b>	<b>Target</b> <i>Unless otherwise stated these are targets for Project completion</i>	<b>Means of Verification</b>	<b>Assumption</b>
	6.2 Attend and support Programme Coordination Group meetings	The establishment of the OS Water Resource and Environment Programme has provided a focus for coordination of the donor activities. A detailed workplan is currently being developed and gaps in funding at the national and basin level identified.	Group of bilateral and multi-lateral donors supporting implementation of the SAP and IWRM plan	<ul style="list-style-type: none"> <li>• PCG meeting minutes</li> <li>• Support of SAP components by PCG members</li> </ul>	
	6.3 Inception and Steering Committee meetings	N/A	Involvement of the participating countries in the management and technical direction of the project meetings regularly	<ul style="list-style-type: none"> <li>• Steering Committee reports</li> <li>• UNDP Progress reports measured against inception report</li> </ul>	

## SECTION III : Total Budget and Workplan

### Orange-Senqu River Basin Total Budget and Work Plan

<b>Award ID:</b>	00056936
<b>Award Title:</b>	PIMS 3243 FSP IW: ORASCOM: Orange-Senqu - Strategic Action Programme
<b>Business Unit:</b>	ZAF10
<b>Project Title:</b>	Development and adoption of a Strategic Action Programme for balancing water uses and sustainable natural resource management in the Orange Senqu River transboundary basin (PIMS 3243)
<b>Project ID:</b>	00070094
<b>Implementing Partner (Executing Agency)</b>	UNOPS

GEF Outcome/Atlas Activity	Responsible Party/Implementing Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)	See Budget Note:
<b>OUTCOME 1: Institutional Strengthening of ORASECOM</b>	UNOPS	62000	GEF	71200	International Consultants	100,000	80,000	70,000	20,000	270,000	1
				71300	Local Consultants	100,000	100,000	60,000	60,000	320,000	2
				72200	Equipment	50,000	50,000			100,000	3
				71600	Travel	20,000	20,000	10,000	10,000	60,000	4
					<b>Total Outcome 1</b>	<b>270,000</b>	<b>250,000</b>	<b>140,000</b>	<b>90,000</b>	<b>750,000</b>	
<b>OUTCOME 2: Completion of Transboundary Diagnostic Analysis</b>	UNOPS	62000	GEF	71200	International Consultants	110,000	100,000	10,000		220,000	5
				71300	Local Consultants	90,000	100,000			190,000	6
				72100	Contractual services – company		150,000	40,000		190,000	7
				74500	Miscellaneous			30,000		30,000	8
				71600	Travel	35,000	35,000			70,000	9
					<b>Total Outcome 2</b>	<b>235,000</b>	<b>385,000</b>	<b>80,000</b>	<b>0</b>	<b>700,000</b>	
<b>OUTCOME 3: Preparation of Strategic Action Programme and National Action Plans</b>	UNOPS	62000	GEF	71200	International Consultants		80,000	60,000		140,000	10
				71300	Local Consultants		150,000	150,000		300,000	11
				74500	Miscellaneous				30,000	30,000	12
				71600	Travel		60,000	50,000	20,000	130,000	13
					<b>Total Outcome 3</b>	<b>0</b>	<b>290,000</b>	<b>260,000</b>	<b>50,000</b>	<b>600,000</b>	

<b>OUTCOME 4: Basin Wide stakeholder Involvement Activities</b>	<b>UNOPS</b>	<b>62000</b>	<b>GEF</b>	71200	International Consultants	40,000	60,000	40,000	40,000	180,000	14
				71300	Local Consultants	100,000	100,000	70,000	60,000	330,000	15
				74500	Miscellaneous	40,000	50,000	60,000	60,000	210,000	16
				71600	Travel	30,000	50,000	50,000	50,000	180,000	17
					<b>Total Outcome 4</b>	<b>210,000</b>	<b>260,000</b>	<b>220,000</b>	<b>210,000</b>	<b>900,000</b>	
<b>OUTCOME 5: Demonstration Projects on Ecological Flows, Irrigation sector reforms and community led range land management</b>	<b>UNOPS</b>	<b>62000</b>	<b>GEF</b>	71200	International Consultants	70,000	70,000	70,000	70,000	280,000	18
				72100	Contractual services – companies	730,000	920,000	430,000	240,000	2320000	19
				74500	Miscellaneous		10,000	10,000	30,000	50,000	20
				71600	Travel	20,000	20,000	10,000	50,000	100,000	21
					<b>Total Outcome 5</b>	<b>820,000</b>	<b>1,020,000</b>	<b>520,000</b>	<b>390,000</b>	<b>2,750,000</b>	
<b>PROJECT MANAGEMENT</b>	<b>UNOPS</b>	<b>62000</b>	<b>GEF</b>	71200	International Consultants	45,000	45,000	45,000	30,000	165,000	22
				71300	Local Consultants	50,000	50,000	50,000	50,000	200,000	23
				71600	Travel	20,000	20,000	15,000	15,000	70,000	24
				72200	Equipment	45,000	0	0	0	45,000	25
				72500	Office Supplies	10,000	10,000	10,000	10,000	40,000	26
				74500	Miscellaneous expenses	20,000	20,000	20,000	20,000	80,000	27
					<b>Total Management</b>	<b>190,000</b>	<b>145,000</b>	<b>140,000</b>	<b>125,000</b>	<b>600,000</b>	
<b>PROJECT TOTAL</b>						<b>1,725,000</b>	<b>2,350,000</b>	<b>1,360,000</b>	<b>865,000</b>	<b>6,300,000</b>	

**Budget notes:**

1. 90 staff-weeks of international consultants (including 10% of PC and 30% of Scientific Officer) to work on Activities 1.1 Creation of Information Management System (IMS), 1.3 Development of EA guidelines and procedures; 1.4 Capacity of water resource practitioners strengthened
2. Includes:
  - a. 110 staff- weeks of local consultants to assist with development of IMS software and collation and processing of data including assembling of metadatabase
  - b. 100 staff- week of a pool of national experts serving as members of the four Technical Working Groups to meet twice yearly
3. Computer server to host IMS and web-site and GIS printer. .Statistical and GIS software
4. Includes:
  - a. Travel cost associated with two technical meetings associated with development of IMS
  - b. Travel costs for Technical working group meetings
5. 73 staff-weeks of international consultants (including 10% % of PC and 20% of Scientific Officer) to work on Activities 2.1 Gap Analysis( Gap assessment, ,review of artisanal mining, PoPs assessment ,climate change scenarios ) and 2.2 TDA Revision and update (CCA, identification of intervention). TDA/SAP expert to be engaged to facilitate process.



6. *127 staff-weeks of a pool national consultants working on the TDA Technical Task Group, CCA and Causal loop diagrams, interventions and prefeasibility studies. National consultants will also have input into artisanal mining, PoPs and climate change scenarios and demand forecasting in preparing national reports*
7. *Contract for PoPs sampling and analysis (100 sediment samples) and preparation of transboundary EA rules and procedures*
8. *Printing and production costs of final TDA*
9. *Includes:*
  - a. *Travel costs for three technical gap filling meetings*
  - b. *Travel costs for three TDA meetings (CCA and CLDs, interventions and review of pre-feasibility studies and TDA finalization)*
10. *47 staff-weeks of international consultants (including 20% of PC) to support Activities 3.1 Establishment of institutional structures and 3.2 Development of SAP and NAPs. TDA/SAP expert to facilitate the TDA/SAP process including vision and WRECO formulation, target setting and drafting of final document.*
11. *210 staff-weeks of national consultants to formulate the NAPs and the SAP and attend key SAP meetings*
12. *Costs of SAP production and distribution.*
13. *Includes:*
  - a. *Travel costs for two NAP meetings in each country*
  - b. *Travel costs for four SAP meetings (Vision and WRQOs, Preliminary SAP and integration of NAPs, draft SAP and M&E framework and final SAP)*
14. *60 staff-weeks of international consultants including 100% of part-time public participation expert. International consultant to be hired to assist with establishment of BWSF and the national river basin councils*
15. *200 staff-weeks of a pool of national consultants to work on Activities 4.1 Establishment of BWSF and national river basin councils (70 weeks), 4.2 Water Conservation Campaign (80 weeks), Educational and social marketing Campaign (50 weeks) and involvement of IWLEARN (\$20,000).*
16. *Costs of promotional materials for Activities 4.1 – 4.3*
17. *Including:*
  - a. *Travel costs for six BWSF meetings*
  - b. *Travel costs for eight national river basin meetings*
  - c. *Travel costs for launch meetings for the water conservation campaign and public marketing campaign*
18. *93 staff-weeks of international consultants including 25% of PC and 50% of Scientific Officer*
19. *International contracts:*
  - a. *Ecological Flows study (\$970,000) with the following outputs: site selection; comprehensive baseline information at pilot sites; review of ecological flow determination methodologies and agreement on methodology for Orange-senqu; establishment of stakeholder groups; socio-economic study of the impact of low flow scenarios; design and implementation of long-term monitoring programme ;and final report*
  - b. *Water Conservation in the irrigation sector( \$800,000)with the following outputs: Site selection; review of existing irrigation practices and infrastructure ; assessment of drainage water quality; establishment of stakeholder group; strategy for improved water conservation and drainage water quality and implementation; and final report*
  - c. *Land Management (\$550,000) with the following outputs: review of land/range management best practice; site selection; baseline assessment of pilot sites including socio-economic assessment; establishment of stakeholder groups; design and implementation of community based action plans; and final report*
20. *Cost of promotional materials for dissemination of pilot project results*
21. *Includes:*
  - a. *Travel costs for pilot project inception meetings (3)*
  - b. *Travel costs for stakeholder meetings (10)*
  - c. *Travel costs for final dissemination meetings (3)*
22. *55 staff-weeks of international consultant (35% of PC)*
23. *310 staff-weeks of national consultant including office manager and administrative assistant*
24. *PMU staff travel on project management and programme coordination related business including attendance at IW conferences in 2009 and 2011*
25. *Hardware and software equipment for PCU and office furniture*
26. *Office supplies*
27. *Includes telecommunications and internet connection.*

Quarterly work plan	Orange-Senqu River Basin															
	Full Sized Project Timeline															
	Q1 Yr 1	Q2	Q3	Q4	Q1 Yr 2	Q2	Q3	Q4	Q1 Yr 3	Q2	Q3	Q4	Q1 Yr 4	Q2	Q3	Q4
<b>Activity</b>																
<b>Component 1 – ORASECOM Institutional Strengthening</b>																
1.1 Creation of Information Management System and web-site																
1.2 Establishment of technical working groups																
1.3 Development of Trans-boundary ESIA guidelines and procedures																
1.4 Capacity of water resource practitioners strengthened																
<b>Component 2 – Completion of Transboundary Diagnostic Analysis</b>																
2.1 TDA Gap Filling																
Gap analysis																
Review impact of artisanal mining on the middle and lower Orange River																
Assessment of PoPs levels in OSRB																
Water demand forecasting in the OSRB in the medium to long term taking into account climate change																
Review of existing water resource yields (GW and SW) taking into account climate change																
2.2 TDA Revision and update																
Detailed Causal Chain Analysis and Causal Loop Diagrams																
Identification of short, medium and long term interventions																
Pre-feasibility studies of priority interventions																
3.TDA revised and disseminated																
<b>Component 3 – Preparation of the Strategic Action Programme and National Action Plans</b>																
3.1 Establish and strengthen support institutions for NAP development																
Establish inter-sectoral committees																
Review national planning procedures																
Establish NAP formulation team																
3.2 Development of SAP and NAPs																
Vision and EcoQOs confirmed																
Draft SAP developed including targets and interventions																
Draft NAPs developed																
Revision of SAP in line with NAPs																
Finalise and endorse NAPs																
Develop M&E framework for SAP implementation																
Finalise and endorse SAP																
Disseminate results																*
3.3 Donors Conference																
Organise donors meeting to mobilize funding for SAP implementation																
Formalise SAP and NAP agreement through appropriate memoranda, agreements at national and basin wide levels																

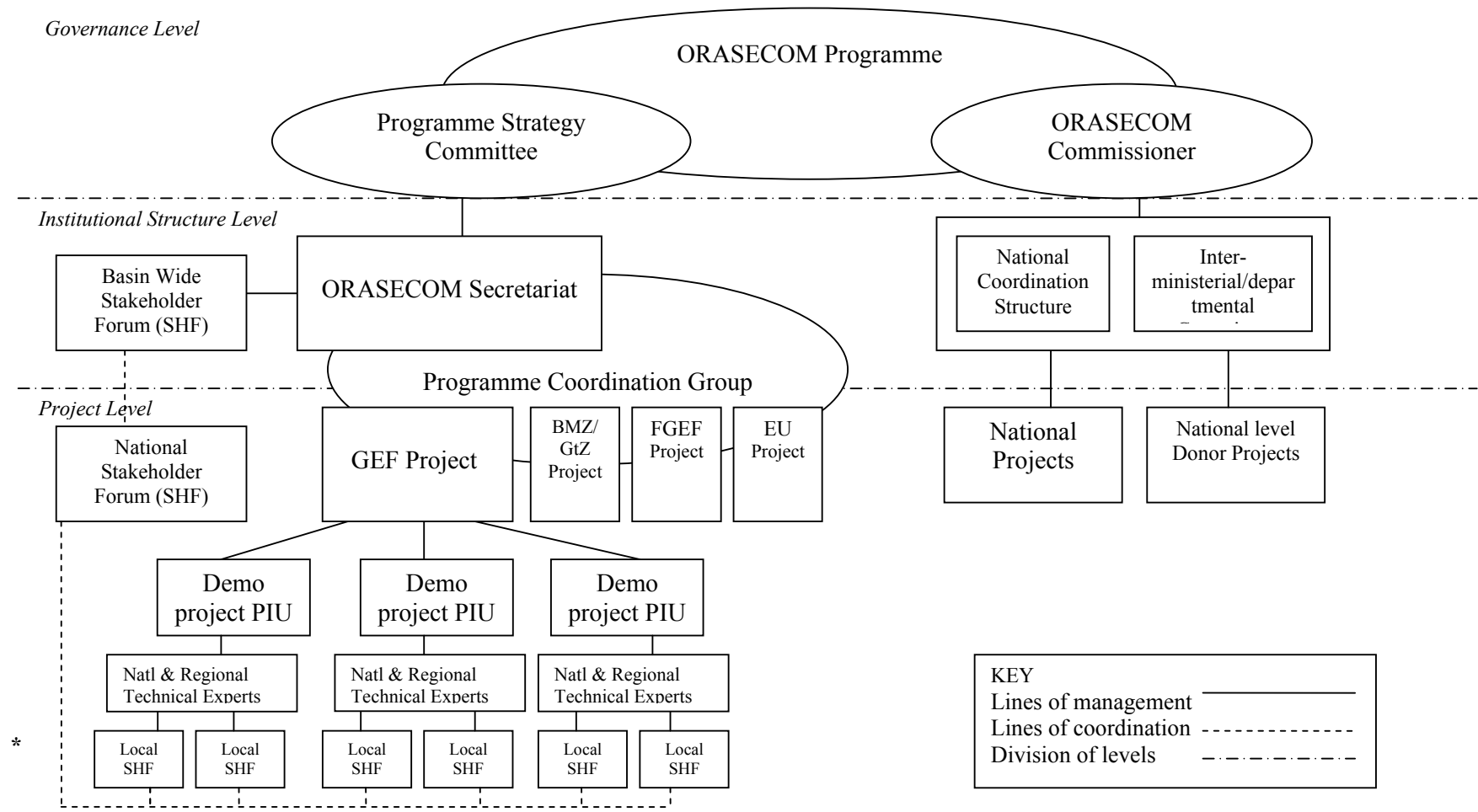
Quarterly work plan (continued)	Orange-Senqu River Basin															
	Full Sized Project Timeline															
	Q1 Yr 1	Q2	Q3	Q4	Q1 Yr 2	Q2	Q3	Q4	Q1 Yr 3	Q2	Q3	Q4	Q1 Yr 4	Q2	Q3	Q4
<b>Activity</b>																
<b>Component 4 – Basin wide stakeholder involvement activities</b>																
4.1 Support to Basin Wide Stakeholder Forum and national forums																
4.2 Water conservation campaign																
4.3 Education and marketing campaign																
<b>Component 5 – Demonstration projects on Environmental flows, Irrigation sector reforms, community led range land management</b>																
<b>5.1 – Environmental Low Flows</b>																
Inception Report																
Stakeholder consultation																
Final project design																
Baseline assessment																
Application of environmental flows methodology and selection of scenarios																
Design and implementation of long-term monitoring programme, including M&E framework																
Monitor and disseminate results																
<b>5.2 Water conservation and quality control in the irrigation sector</b>																
Inception report and site selection																
Stakeholder consultation																
Baseline assessment																
Design of improved management measures, including M&E framework																
Implementation of improved systems and training programme																
Monitor and disseminate results																
<b>5.3 Improved land/range management</b>																
Inception report and site selection																
Stakeholder consultation																
Baseline assessment																
Development of management plan, including M&E framework																
Implement management plan																
Monitor and disseminate results																
<b>5.4 Dissemination Workshops</b>																
<b>Component 6 – Project Management</b>																
6.1 Establish and maintain PCU																
6.2 Attend and support Programme Coordination Group					*		*		*		*		*		*	
6.3 Inception report and Steering Committee meetings					*				*				*		*	

**SECTION IV : ADDITIONAL INFORMATION**

**PART I : Other agreements**

See the endorsement letters and co-finance letters in the separate files.

**PART II : Organogram of Project within ORASECOM Programme**



### **PART III : Terms of References for key project staff and main sub-contracts**

#### **Terms of Reference**

#### **Project Coordinator**

##### ***Brief Description:***

The Orange-Senqu river basin countries (Republic of Botswana, the Kingdom of Lesotho, the Republic of Namibia and the Republic of South Africa) singly and jointly are strongly committed to a basin wide approach to addressing threats to the shared water resources. Each of the countries has in place, is developing, and continues to improve upon domestic legislation that provides a framework for basin-wide cooperation in the arena of Integrated Water Resource Management. This is given further substance in bilateral and basin-wide agreements between the riparian countries, including the Orange-Senqu River Basin Agreement which was concluded in 2000. It is the first basin-wide agreement on the Orange-Senqu River involving all four basin states and lead to the formation of the Orange-Senqu River Commission (ORASECOM ).

At the regional level, all Orange-Senqu River riparian states – Botswana, Lesotho, Namibia and South Africa – are members of the Southern African Development Community (SADC). The SADC Protocol on Shared Watercourses (hereafter the SADC Protocol) is the regional framework agreement dealing with the management of shared watercourses in SADC. The SADC Protocol received the required number of ratifications and entered into force on 22 September 2003 for all countries that ratified it, which includes all Orange-Senqu River riparian states. The SADC Protocol is drafted largely in line with the provisions of the 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses (hereafter the UN Convention). Of the Orange-Senqu River riparian states, to date only Namibia and South Africa have ratified the UN Convention.

The project has been designed in close collaboration with ORASECOM as part of a wider Orange – Senqu Water Resources and Environmental Programme (OSWREP). It has been developed in coordination with the other major ORASECOM donors, inter alia French GEF, BMZ/GtZ, European Union and InWent, to ensure maximum synergy and minimum overlap between supporting projects. The project will support the institutional strengthening of ORASECOM through development of an informational management system, establishment of OSWREP technical working groups, developing guidelines for water allocation, climate change scenarios, to be applied in water resource planning, and transboundary EIA. During the transboundary diagnostic analysis five priority transboundary problems were identified as affecting the Orange Senqu River Basin: Stress on surface and groundwater resources, altered water flow regime, deteriorating water quality (surface and groundwater), land degradation and alien invasives. This project in finalising the TDA will undertake a number of gap filling activities related to these transboundary issues including: a review of the impacts of artisanal mining on the middle and lower Orange; an assessment of Persistent Organic Pollutants levels in the Orange Senqu basin; and a detailed yield assessment and demand forecast for the Orange Senqu basin for the next 25 years based on an agreed methodology. . Though climate change and biodiversity are not independent priority trans-boundary concerns, these issues will be highlighted and integrated throughout the project. The final TDA will serve as the scientific basis for development of an agreed programme of interventions for the introduction of Integrated Water Resource Management approaches throughout the basin under the framework of a

Strategic Action Programme (SAP). The SAP will incorporate a basin vision, water resource quality objectives, targets and interventions in the short and medium term to meet the targets. In parallel to SAP development the project will implement three pilot projects which will demonstrate new techniques and methodologies in three critical SAP areas of concern: the setting of ecological flows; water demand and quality management in the irrigation sector; and land/range management.

**Location:**

The Project Coordinator will lead the Project Coordination Unit (PCU) which is to be located in Pretoria, South Africa, hosted in the ORASECOM Secretariat. The Project Coordinator will be required travel in the project region in line with project demands and to international locations consistent with these Terms of Reference.

**Project Coordination Unit:**

The PCU will provide a coordination and management structure for implementation of the UNDP-GEF Project in accordance with the rules and procedures of UNDP as executed through UNOPS. The PCU will comprise the Project Coordinator, Scientific Officer and part-time Public Participation Expert. The PCU will also include a Financial and Administration Officer, Administrative Assistant and local and international consultants as may be required.

**General Responsibilities:**

The Project Coordinator shall be responsible for the overall coordination of all aspects of the UNDP-GEF project. He/she shall liaise directly with ORASECOM Secretariat, members of the PSC, the Implementing Agency, the Executing Agency, UNDP Country Offices, OSWREP donors, and others as deemed appropriate and necessary by the PSC or by the Project Coordinator him/her self. The budget and associated work plan will provide guidance on the day-to-day implementation of the approved Project Document and inception report and the integration of the various OSWREP donor funded parallel initiatives. He/she shall be responsible for delivery of all substantive, managerial and financial reports from and on behalf of the Project. He/she will provide overall supervision for all staff in the Project Coordination Unit, as well as guiding and supervising all external policy relations.

**Specific Duties:**

The Project Coordinator will have the following specific duties:

- Management of the UNDP-GEF PCU, its staff, budget and if established the imprest account;
- Prepare an Annual Work Plan of the program on the basis of the Project Document and inception report, under the general supervision of the Project Steering Committee and in close consultation and coordination with related Projects, National Focal Points, GEF Partners and relevant donors;
- Coordinate and monitor the activities described in the work plan;
- Coordinate the TDA/SAP development process and ORASECOM strengthening component;
- Oversee the pilot project implementation and design the replication strategy;
- Ensure project compliance with all UN and GEF policies, regulations and procedures;
- Ensure consistency between the various program elements and related activities provided or funded by other donor organizations;
- Assure preparation of Terms of Reference for consultants and contractors;

- Coordinate and oversee preparation of the substantive and operational reports from the Program, including revised TDA;
- Promote the Project and seek opportunities to leverage additional co-funding
- Represent the Project at meetings and other project related for a within the region and globally, as required; and
- Submit quarterly reports of relevant project progress and problems to the PSC.

**Qualifications:**

- Post-graduate degree in Water Resource or Environmental Management, or a directly related field;
- At least fifteen years experience in fields related to the assignment;
- Demonstrated diplomatic and negotiating skills;
- Familiarity with the goals and procedures of international organizations, in particular those of the GEF, UNDP and regional organizations related to Project activities, and currently identified Project donors;
- Fluency in English, both speaking and writing; and
- Previous work experience in one or more of the participating countries, and previous work experience in the region on issues related to the Project will be very favorably considered.



## **Terms of Reference**

### **Scientific Officer**

#### **General Responsibilities:**

The Scientific officer shall act as Deputy Project Coordinator and shall assist the Project Coordinator in the overall coordination of all aspects of the UNDP-GEF project. He/she shall assume the responsibilities of the Project Coordinator in their absence including communications with the ORASECOM Secretariat. The Scientific Officer will have general responsibility for ensuring the Project's high quality technical output.

#### **Specific Duties:**

The Scientific Officer will have the following specific duties:

- Assist the Project Coordinator in preparation of an Annual Work Plan of the Project on the basis of the Project Document and inception report;
- Ensure close collaboration with the major technical partners (BMZ/GtZ, EU and FGEF).
- Oversee development of the ORASECOM information management system in consultation with BMZ/GtZ and EU;
- Manage the TDA update and have day-to-day responsibility for management of the TDA gap filling activities;
- Have day-to-day oversight of pilot project implementation;
- Preparation of Terms of Reference for Consultants and Contractors; and
- Represent the Project at technical meetings within the region and globally, as required.

#### **Qualifications:**

- Post-graduate degree in Water Resource planning or a directly related field;
- A good background in Information Technology;
- At least ten years experience in fields related to the assignment;
- Demonstrated management and team building skills;
- Familiarity with the goals and procedures of international organizations, in particular those of the GEF and UNDP and regional organizations related to Project;
- Fluency in English both speaking and writing; and
- Previous work experience in one or more of the participating countries, and previous work experience in the region on issues related to the Project will be very favorably considered.

## **Terms of Reference**

### **Public Participation Expert (Part-time)**

#### **General Responsibilities:**

The Public Participation expert shall have responsibility for all aspects of public involvement and participation relating to the project and shall report directly to the Project Coordinator. He/She shall also work with the Project Coordinator to promote the project regionally and the development of promotional materials and events.

#### **Specific Duties:**

The Public Participation Expert will have the following specific duties:

- Assist with formation of the Basin Wide Stakeholder Forum and coordination of its input into the TDA/SAP development process;
- Development of a Communications and Public Participation Strategy in line with the ORASECOM stakeholder road-map;
- Provide day-to-day management oversight of the project's public involvement component;
- In close collaboration with the Scientific Officer develop stakeholder involvement activities linked to the pilot projects and provide management oversight;
- Assist the Scientific Officer with the development and maintenance of the Project web-site, in consultation with BMZ/GtZ and EU;
- Prepare a quarterly news bulletin (internet based) to be distributed as widely as possible in the region;
- Preparation of Terms of Reference for Consultants and Contractors; and
- Represent the Project within the region and globally, as required and appropriate.

#### **Qualifications:**

- Post graduate qualification in environmental management, social sciences, or related discipline;
- Demonstrated experience in development of public participation in international waters projects;
- At least five years demonstrated and successful experience in preparing and implementing public involvement projects;
- Demonstrated ability to discuss, negotiate and facilitate stakeholder group consultations in the region;
- Familiarity with the goals and procedures of international organizations, in particular those of the GEF, UNDP and regional organizations related to Project ;
- Fluency in English both speaking and writing; and
- Previous work experience in one or more of the participating countries, and previous work experience in the region on issues related to the Project.

**Part IV Institutional arrangements for the Orange-Senqu Water Resource and Environmental Programme**

# Orange-Senqu River Basin Water Resource and Environment Programme

INSTITUTIONAL ARRANGEMENTS

(Adopted by ORASECOM in April 2007)

## TABLE OF CONTENTS

Programme structure .....	3
Steering Committee:.....	3
Programme Coordination Unit:.....	3
The Government Representative:.....	3
National Coordination Structures:.....	3
The Technical Advisory Groups .....	3
National Stakeholder Forums.....	3
Basin Wide Forum .....	3
Funding Arrangements and Responsibilities.....	3

## **Programme structure**

1. The Orange-Senqu River Basin Environment Programme (ORSBEP) has participation on basin wide, national, and international levels and has as its basis a concept paper approved in August 2005 in Johannesburg by the members of ORASECOM.

2. The OSRBEP is a programme for and from the four Riparian States of the Orange-Senqu River Basin, Botswana, Lesotho, Namibia and South Africa under the auspices of ORASECOM, aiming to halt the deterioration of environmental conditions of the basin and to promote sustainable development in the area. The process is currently being supported by ORASECOM's International Partners, Global Environmental Facility (GEF), French GEF, BMZ/GTZ, UNDP, InWent and European Union, other international organizations and the private sector, in particular the mining sector. In the first phase of the programme, OSRBEP objective will be to develop and adopt a Strategic Action Programme (SAP) for the protection and rehabilitation of the basin environment in five trans-boundary environmental concern areas:

- Stress on surface and groundwater resources;
- Deteriorating water quality (surface and groundwater);
- Altered water flow regime;
- Land degradation;
- Alien invasives;

and, implement demonstration projects addressing specific aspects in each of the areas of concern.

3. Within the context of the OSRBEP and the implementation framework provided by its various programmes and projects the main responsibilities of ORASECOM and its secretariat will include the following:

- to provide overall coordination of the national and international component projects supporting the implementation of the SAP.
- to contribute to the overall strategic policy and management direction to the OSRBEP through their representation in the Steering Committee;
- to provide technical and management advice to the OSRBEP through their representation on the Advisory Groups;
- to provide national policy guidance for the OSRBEP through their National Coordination Structures (NCS) and Inter-sectoral Coordination Groups (ICG);
- to ensure that policy guidance from the Steering Committee is reflected in national OSRBEP-related policies and programme activities, as appropriate; and
- to contribute and commit, financially and in kind, to implementation of the Strategic Action Programme.

4. In its first four years the ORASECOM secretariat through the OSRBEP will undertake the following activities supported by the Riparian states (ORASECOM), UNDP-GEF, BMZ/GTZ and French GEF:

- Establish a OSRBEP management and coordination structure including a Steering Committee, Basin Wide Stakeholder Forum and within the ORASECOM secretariat, a Programme Coordination Unit (PCU) and technical advisory groups
- Undertake a comprehensive Trans-boundary Diagnostic Analysis (TDA)
- Agreement on long-term basin vision underpinned by Environmental Quality Objectives
- Development and adoption a Strategic Action Programme (SAP), incorporating current IWRM plan
- Development of a Orange-Senqu River Basin Information System including an interactive web-site
- Implementation of demonstration projects targeting the specific trans-boundary environmental areas of concern

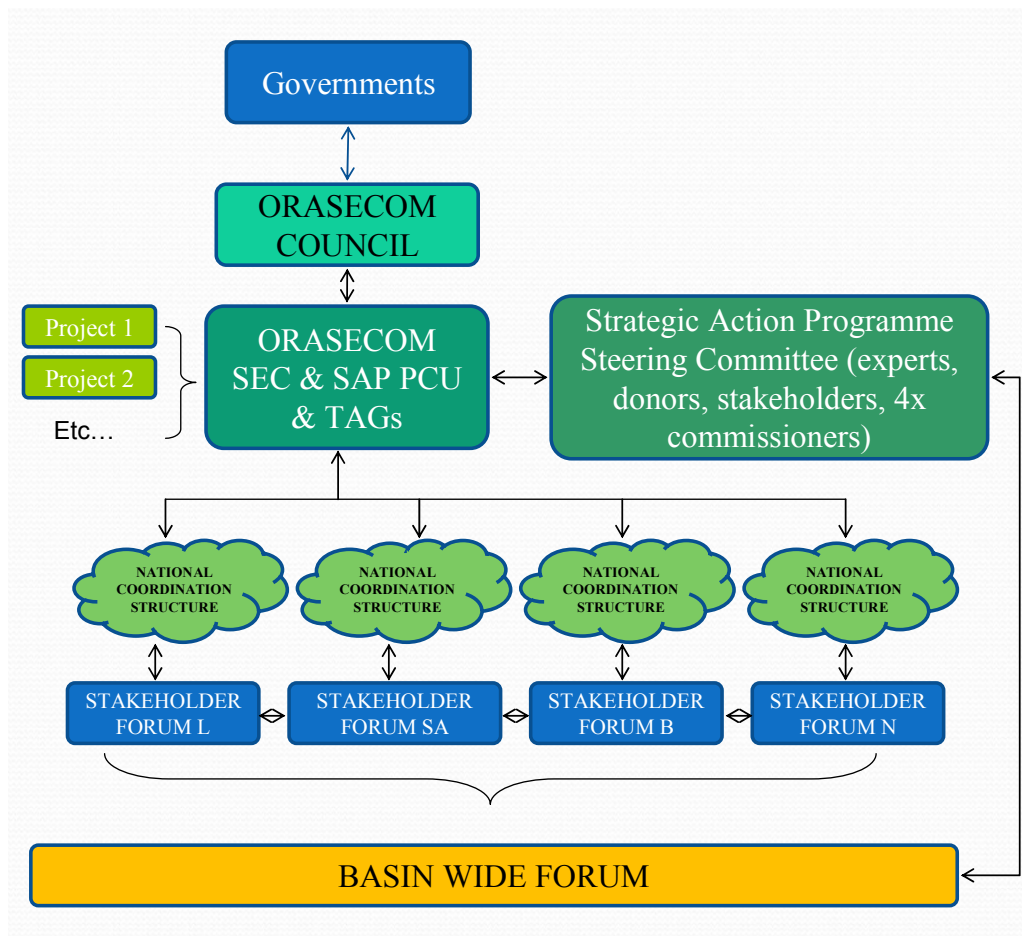
OSRBEP will concentrate efforts in the longer term on the implementation of the adopted SAP. Implementation of the SAP will be supported by the OSRBEP with the assistance of the International Partners at both the national and basin wide levels. During SAP implementation it is anticipated that other international agencies will apply to have their projects included under the OSRBEP umbrella and in so doing become full international partners.

5. The OSRBEP Institutional Arrangements will need to be modified in the future, in particular if the ORASECOM agreement and attendant bi-lateral agreements are revised.

6. The overall programme structure is shown as Figure 1. The overall governance is provided by the Steering Committee. The ORASECOM National Focal Point and the National Coordination Structure (NCS) provide coordination at the national level. Overall OSRBEP coordination implementation is under the guidance of the ORASECOM secretariat and Programme Coordination Unit, led by the Programme Coordinator.

FIGURE 1

Structure of the Orange-Senqu River Basin Environment and Water Resources Programme



7. Each of these elements is discussed below and their respective Terms of Reference will be provided later.

*Steering Committee:*

8. The Steering Committee comprises the ORASECOM national government representative (a commissioner) from each Orange-Senqu River Basin State, one representative from the five International Partners, European Union, French GEF, BMZ/GtZ, InWent and UNDP, and representatives from the Basin-wide Forum. Project Managers of projects and experts operating under the OSRBEP umbrella may attend meetings as observers, subject to the discretion of the Steering Committee Chairman. Other interested parties may be invited as observers at the Steering Committee's discretion.

9. The Steering Committee is responsible for ensuring policy implementation (set by Council), through the activities of the OSRBEP. The Committee will provide direction to the Programme Coordination Unit (PCU) within the ORASECOM Secretariat on issues pertaining to the basin wide governance of the OSRBEP, and, when appropriate, to the National Coordination Structures (through the PCU) on issues pertaining to national governance.

10. Funding of Ordinary Steering Committee meetings will be shared between the countries and International Partners. The country chairing the Steering Committee will be expected to host and bear the costs of the Steering Committee meeting in its year of office whilst the other countries and International Partners shall bear the costs of attendance at the meeting by their representatives. Attendance of observers will be at their own cost.

*Programme Coordination Unit:*

11. *In accordance with the recommendations of the ORASECOM, the Programme Coordination Unit (PCU) will be located within the ORASECOM Secretariat.*

12. The PCU will carry out the day-to-day coordination of the regional components of the OSRBEP and subsequent implementation of the SAP, and will act as the Secretariat for the Steering Committee. The PCU will comprise of a Programme Coordinator, and an Assistant and the necessary support staff. It is envisaged that the Executive Secretary of ORASECOM will act as the Programme Coordinator, however, in the short term the responsibility could if agreed by the Steering Committee be given to one of the Project Managers of the projects.

13. Project Managers of projects will be subject to coordination of the Programme Coordinator, and, where project staff is located within the PCU, the Programme Coordinator's management authority with regard to office administration matters.

14. Each individual Project Manager of a project will be responsible to the Steering Committee, as per project application and the stated project beneficiary, for his/her project activities.

15. The ORASECOM Secretariat will provide appropriate furnished accommodation, for projects which chose to be located within the OSRBEP PCU.

*The Government Representative:*

16. The designated Government Representative who is the main contact in each Country for the OSRBEP, will sit on all meetings of the Steering Committee and will likely also be a Commissioner.

17. The Government Representative must maintain regular contact with the National Coordination Structure and encourage full inter-sectoral participation in OSRBEP nationally, including participation by ministries, academia, NGOs, private sector and other pertinent stakeholders.

*National Coordination Structures:*



18. The National Coordination Structure (NCS) in each country is responsible for coordination of national SAP implementation and provision of national input into the regional programme. The NCS will likely consist of a coalition of many implementing partners, such as government agencies, NGOs, consultants, etc. These partners will be the implementers of programme activities on the ground.

19. The NCS is a permanent body reports to and from the PCU and guided by the Steering Committee. It should be aware of all PCU activities and it should disseminate information widely within country.

#### *The Technical Advisory Groups*

20. Initially four Technical Advisory Groups (TAG) will be established, they are as follows:

- Advisory Group on water use and integrated management
- Advisory Group on pollution control and water quality
- Advisory Group on land degradation and biodiversity
- Advisory Group on stakeholder participation

Each riparian state will chair and host one of the Advisory Groups.

21. The Technical Advisory Groups purpose is to assist OSRBEP PCU coordinate activities in the priority regional environmental concern areas. The Technical Advisory Groups will oversee implementation of the SAP in their specific concern area and, where required, develop specific implementation plans. Through the Technical Advisory Groups the riparian states will contribute to the overall regional coordination of the OSRBEP.

22. The Technical Advisory Groups will operate on the basis of working parties, involving the participation of all riparian states, PCU representation, and, when necessary, outside experts. Each riparian state, through the NFP, will appoint a technical expert from the appropriate authority to sit on each Technical Advisory Group and act as the country focal point, reporting to the NCS and NFP.

23. The Technical Advisory Groups will meet at least twice a year. The host riparian state will bear the costs of convening the Advisory Group meetings. The other riparian states and PCU shall pay the costs of their representatives' attendance at the meeting.

24. The National Coordinating Structure of the host country shall act as the Secretariat to the Technical Advisory Group and shall prepare meeting minutes and an annual report on the activities of the Group to be submitted to the host country's National Focal Point and the PCU. The Steering Committee will be informed regarding the activities of the Technical Advisory Groups through the PCU. The PCU will assist in assuring relevant communication and data exchanges across the Technical Advisory Groups.

#### *National Stakeholder Forums*

25. Members of the NSF's will consist of stakeholders representing a cross section of the relevant interests in the country component of the basin.

26. The role of the NSF will be to identify the issues, problems and opportunities within the basin in the country and communicate this via the NCS and BWF to the PCU and SC respectively. They will also facilitate communication widely within the country
27. The NSF will meet as regularly as they need to, considering local circumstances and constraints. Representatives of each NSF will sit as members of the BWF.

#### *Basin Wide Forum*

28. Members of the BWF will be drawn from the national stakeholder forum and will consist of 12 stakeholders representing a cross section of the relevant interests in the basin.
29. The role of the BWF will be to communicate issues raised by the NSFs to the SC and to facilitate information exchange between the countries, on the issues, problems and opportunities within the basin.
30. The BWF will meet twice a year to review all programme products and will make an annual report to the Steering Committee. Representatives of the BWF will sit as members of the Steering Committee.

#### **Funding Arrangements and Responsibilities**

***31. It is recognized that the OSRBEP International Partners in funding projects must abide by their own rules and regulations governing the provision and administration of project funds.***

32. Within these regulations and conditions, the Steering Committee will have the ability to pass comment on project work plans through an annual review. Subsequently, it will be the responsibility of the Project Managers of projects (in coordination with the OSRBEP Programme Coordinator and in consultation with the NFPs through the National Coordination Structures) to revise the work plans where appropriate.

33. The Orange-Senqu riparian states shall:

- Provide funding for operation of the ORASECOM Secretariat, including hosting of the OSRBEP and its PCU.
- Mobilize resources to implement all national activities and support all regional activities, specified in OSRBEP Strategic Action Programme in accordance with programme dates.
- Provide all projects with appropriate work space where requested.
- Provide the NCS and its staff with the necessary financial support to execute its Terms of Reference; this includes adequate office space, utilities, meeting expenses and administrative support.
- Provide access to all data and information required for implementation of the OSRBEP.

- Each country shall, as the incumbent Chair of the Steering Committee, host and support the Steering Committee meeting and Technical Advisory Group meetings, providing venue, logistical support and translation.
- Provide support for their representatives to attend the Steering Committee meetings and the meetings of the Basin-Wide Forum.

## PART V Draft Demonstration Project Documents



### **DEMONSTRATION PROJECT FOR INCLUSION INTO THE GEF FULL SIZE PROJECT:**

**1. Country(s):** Botswana, Namibia, South Africa

**2. Title:**

Pilot study of water conservation in the irrigation sector of the Lower Orange River

**3. Executing Agency:** UNOPS

**4. Cost of Project:** GEF: US\$850,000; Co-Finance: US\$ 1,600,000

**5. Linkage to Orange-Senqu River Basin SAP Priorities:**

The Water Resource Quality Objectives outlined in the preliminary SAP include the conservation of water resources and the improved pollution control in the Orange-Senqu river basin.

**6. Linkage to National Priorities and Programmes**

#### **Botswana**

1. Botswana realizes that augmentation of its internal water resources through the utilization of internationally shared supplies (border-rivers and perhaps trans-boundary aquifers) will become extremely important over the next decade. An International Water Unit has been established within the Ministry of Natural Resources to provide technical support for the management of shared river basins. The Unit represents Botswana at meetings pertinent to the Orange River Basin – ORASECOM, the JPTC, and the JPWC - as participants in water related fora created by SADC. There is strong executive support for environmental issues which has positive implications for matters pertaining to land and water management within the region. The GEF is to support the development of an Integrated Water Resource Management Plan as a component of the Sub-Saharan sustainable project. Coordination between the two GEF projects will be a priority management task.
2. Botswana has addressed, in part, its growing water scarcity concerns through adoption of the Botswana National Water Master Plan Study (Plan). Although the Plan is now over a decade old, it has been revised and adjusted over time. The Plan places an emphasis on water conservation and resource development the following activities: close monitoring of groundwater well-fields to avoid excessive depletion; ensuring greater use of alternative technologies, such as desalination, to develop and conserve water resources; management and the development of water supplies by

local communities; ensuring greater coordination between government institutions in the planning and development of water resources; requiring environmental impact statements (EIS) as an integral part of all project feasibility and subsequent studies for water development projects; and building interconnecting water supply schemes as a measure to respond to drought.

## **Namibia**

3. The Namibian Water Resources Management Review (NWRMR) was an institutional reform process initiated in 1997, within the then Ministry of Agriculture, Water and Rural Development (MAWRD), and supported by the World Bank, BMZ/GTZ and UNDP. An objective of NWRMR was to create a more effective and appropriate institutional structure for the Water Sector. It reflects the decentralization policy of the Government. Many issues such as strategic water resources assessment, human resources development, regulation, and conflict regulation were considered. The Water Resources Management Act approved in August of 2004 contains a set of “fundamental” principles for water management, such as access to water, harmonization of water needs and the protection of ecosystems. It is based on the acceptance of integrated planning and management, transparency and sustainable development; while meeting Namibia’s international obligations and “promoting respect for Namibia’s rights with regard to internationally shared watercourses”.
4. Several new institutions have to be established in terms of the Water Resources Management Act. They include a Water Advisory Council, Basin Management Committee, Water Regulatory Board and a Water Tribunal. Part X of the Act is devoted to “international water resources”. This may be of particular importance and provides a basis for integrating Namibia’s arrangements with the future activities of regional institutions. Additionally there is the Environmental Management Act which was gazetted at the end of 2007 which provides for a comprehensive arrangement with respect to environmental matters.

## **South Africa**

5. South Africa completely reformed its water law after the democratic elections held in 1994. This resulted in the enactment of the Water Services Act (Act 108 of 1997) and the National Water Act (Act 36 of 1998) supported by Regulations.
6. The National Water Act, 1998 contains fundamental principles for water management and has comprehensive provisions for water management strategies and the protection of water resources.
  - The national government is the public trustee of the nation’s water and must ensure that water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner.
  - All water rights are limited in time and are granted by the state (or its authorized representative bodies) in terms of licences and general authorizations.
  - Catchment Management Agencies (CMAs) are being established for each of the 19 Water Management Areas (WMAs) defined in the country (Chapter 7 of the Water Act).
  - The most important document is the National Water Resource Strategy 2004, which became operative in January 2005.
  - According to the South African Water Act, the Water User Associations (WUAs) were identified as the agents to implement and co-ordinate irrigation water use efficiency.

7. In the Orange-Senqu River Basin alone, 5 CMAs should be created: Upper Vaal, Middle Vaal, Lower Vaal, Upper Orange, and Lower Orange according to national legislation. Full implementation of the CMAs will likely take many years as the National Water Resources Strategy will determine a framework for the delegation of water resources management responsibility to the CMAs, and CMAs will then, as is suggested above, have to develop water resource management approaches as deemed necessary. Thus activities related to the institution of CMAs are likely to occur in parallel with this project.

## **7: Name and Post of Government Representatives endorsing the Demonstration Activity**

*To be inserted*

## **8: Project Objectives and Activities**

### **8.1. Background**

8. The water resources of the Orange-Senqu basin are heavily utilized with the average flow reduced by nearly 50% from virgin conditions. Water demand or requirements are predicted to rise steeply in the next twenty years whilst the potential for new water resource development is limited; this is particularly the case in the Lower Orange basin where new agricultural irrigation schemes are being planned in Botswana, South Africa and Namibia. The key challenge for the sustainable development of the water resources of the Orange-Senqu system will be a more realistic reconciliation of water demand and supply and focus on demand management.
9. In accordance with forecasts of the Department of Water Affairs of South Africa (DWA) the projected 'base scenario' annual water *requirement* for 2025 within the Orange – Senqu system which included irrigation, urban, rural and mining requirements represents an increase of 8% over 24 years over the most recently (2002) quoted bulk requirement. This figure excludes any additional transfers out of the system, for example to the Fish-Sundays Rivers and the Eastern Cape to support an additional planned 4000 ha of irrigation lands. Looking in detail, the projected 8% incremental increase in water requirement from water use within the system is almost entirely from planned irrigation expansion in the Upper Orange and Lower Orange. In the Lower Orange basin the agricultural sector already uses more than 92% (estimated 1,393 Mm<sup>3</sup>/a estimated for 2005) of the consumptive demand (excluding river requirements and environmental requirements).
10. According to a study of water conservation and demand management document in the Agricultural Sector (South Africa DWA, February 2001 Version) water losses of between 30% and 40% can occur during the irrigation process, it is estimated that less than 60% of water abstracted from water resources reaches the plants' root systems for absorption.
11. The Lower Orange River Management Study (LORMS) conducted by **DWA** South Africa has recognized the need for demand management in the irrigation sector where water is currently provided at prices below its true economic value; a major reason for the inefficient allocation and use of water.
12. There are not yet any clear policy guidelines on water conservation in the irrigation sector in Namibia. After the promulgation of the Water Resources Management Act in 2004, it may take a significant time to draw up regulations and guidelines. The concern of the South African Government (**DWA**) and Water User Associations for water demand management is evident

from the number of initiatives already in place; activities that will serve as forerunners to provide information for further valuable guidelines in this regard. However application of these initiatives needs to be reviewed and lessons learned shared within the broader basin community.

13. Experience elsewhere in the world has demonstrated that demand management in the irrigation sector has been successful if the farmers benefited through the implementation. A good example is the “Water for Profit” scheme in Queensland (Australia) where farmers are assisted by the Government to improve irrigation systems and farm management to save water and to increase crop production. With an investment of A\$ 41 million by the Queensland Government, 180 Mm<sup>3</sup>/a was saved and the value of crop yield improvement was A\$ 280 million/annum.
14. In addition to water quantity issues there are also water quality issues related to the existing and planned expansion of the irrigation sector in the Lower Orange. Discharges of nutrients and agro-chemicals, including persistent organic pollutants, from irrigation lands are of increasing concern in regions where existing resources are under stress. The diffuse pollution of precious groundwater with nitrates and pesticides aggravates an already critical water supply situation. Problems of inadequate education of and self-regulation by the irrigation farmers need to be addressed.

## **8.2. Objectives and Activities**

### **Objectives:**

15. The overall objective of the project will be better managed irrigation demand in the basin, realistic pricing of water to make best economic use of water and better pollution control. The project will address the issue of conflicting uses of water in the basin in line with SP3 and demonstrate ways in which irrigation demand management can provide savings to meet improved ecological flow requirements.
16. The demonstration project will show selected farmers what water savings and improved yields can be made through scheduling, metering and pricing and improved irrigation methods. There is a lack of local information in southern Africa on possible water savings and improved yields resulting from the implementation of water demand management initiatives. Table 1 provides a summary compiled from international experience of potential water savings and higher crop yields with the introduction of scheduling, metering and improved irrigation systems.

Table 1: *International Experience of Water Savings and Higher Crop Yields for scheduling, metering and improved irrigation systems*

Water Demand Management Initiative	International Experience	
	Water Savings*	Increased Yield
Scheduling	13% to 15%	8%
Metering & Tariffs	9% to 31%	0%
Irrigation Systems	30% to 70%	20% to 90%

\* These do not quantify or mention the influence of return flows and may be over optimistic.

17. The project will also show the best practice in application of agro-chemicals and pollution control and monitoring. The project will assist in the formation of water user associations where they do not already exist, and provide structured training to farmers. The project will serve as a model for improved water management in the irrigation sector and as a source of information dissemination to all irrigation farmers in the Orange-Senqu basin.

**Output 1: Project plan and inception report, including review of basin wide and international best practice, and site selection.**

▪ **Activity 1: Project plan and inception report**

18. The design of the demonstration project will be finalized in the first three months of the Full Size Project. This will include the development of a detailed budget and timeline to be included in an inception report. The inception report shall be reviewed by the basin-wide stakeholder forum before being submitted to the project Steering Committee for approval. The inception report will include an initial desk study of best practices for irrigation management at the basin wide, and international level, drawing on applicable lessons learned to delineate options to be introduced through this project. Additionally criteria for site selection will be developed within the report.

▪ **Activity 2: Site Selection**

19. Irrigation water demand is influenced by a large number of variables that need to be taken into account in the selection of sites for the pilot project. In South Africa it is proposed to focus on the area from Neusberg to the Common Border, but it may also include farms identified in the Neusberg/Upington area and some of the newly developed farms in Namibia along the Common Border Area as benchmarks, and potential sites in Botswana.

20. A set of criteria will be applied for site selection including age of farm, irrigation methods, type of crop, willingness of farmers to participate, etc. Final site selection and location of the main Water Efficiency Unit for collection and dissemination of information will be approved by the project Steering Committee.



- **Activity 3: Review of best international practice in water management in the irrigation sector**

21. The project team will undertake a thorough literature review to determine most appropriate best practice for the selected sites in the introduction of scheduling and metering/tariffs and the potential water savings and increased crop yields possible taking into account return flows. The review will specifically look at means of influencing the type of crop grown in order to make best economic use of the water resource. The review will also determine the most efficient irrigation systems for southern Africa and effective water quality management practices. The results of the review will be presented in the inception report.

## **Output 2: Establish Stakeholder Advisory Forum and Water Efficiency Unit**

- **Activity 1: Hold open meetings at the chosen sites to discuss project.**

22. At each of the demonstration sites, stakeholders will be invited to attend open meetings which will be held at the demonstration sites to discuss the project in detail and answer any questions. Based on this meeting, necessary adjustments will be made to the project methodology. The purpose of the meetings, which will be attended by the full project team, will be to engage the farmers and other stakeholders to obtain their full support for the project, to learn from their experiences and to address their concerns about the project.

- **Activity 2: Form stakeholder forums and hold regular meetings to review project outputs and effectiveness**

23. At each demonstration project site the representative stakeholders will be asked to form a stakeholder forum which will meet regularly to review the project outputs and effectiveness and provide input into its on-going management. The stakeholder forum will provide advice to the project and will be asked to ensure that stakeholder interests are taken into consideration during project implementation. They will also work with the Water Efficiency Unit, in the collection of data as needed. If requested, the project will support the development of the stakeholder forums into Water User Associations at the demonstration sites.

- **Activity 3: Establish a Lower Orange Water Efficiency Unit**

24. The project will establish a Water Efficiency Unit for the Lower Orange basin, the location to be determined. The main tasks of the Water Efficiency Unit will be to assist the farmers to identify and move towards higher water use efficiency and increase the value of irrigated agricultural production. The Water Use Efficiency Unit should play an important role in the collection and processing of data from the farmers on crop yields, actual water use as well as detailed weather data. The Water Use Efficiency Unit should also help to identify tasks in consultation with farmers for greater private sector involvement (i.e. providing of scheduling services) and co-ordinate the training of farmers. It is important that the operation of the Water Efficiency Unit is sustainable beyond the life time of the project; this will be a key indicator of the success of the demonstration project.

## **Output 3: Assessment of existing practices on selected sites (baseline assessment), including agro-chemical management and water quality discharge monitoring**

- **Activity 1: Assessment of water usage in the demonstration site over the growing season**

25. The project team will determine the existing water usage (inflow and return flow) at each demonstration site in historically wet, average and dry years for various crops taking account of

soil conditions and other factors specific to the site that may influence specific water consumption.

▪ **Activity 2: Survey of irrigation infrastructure and drainage water quality**

26. A survey will be undertaken at each site to assess the structural condition of the irrigation infrastructure and assessment of existing transfer efficiency and over a twelve month period, the levels and fluxes of chemical contaminants in the drainage systems will be calculated.

▪ **Activity 3: Collection of data from farmers**

27. A data collection programme will be initiated and database constructed for data and information at each site on crops grown, yields, irrigation practices, system maintenance, agro-chemical storage, fertilizer and pesticide application rates and methods, and any other related information. The database will be maintained by the Water Efficiency Unit and will be made available on the internet through the main project web-site.

▪ **Activity 4: Review of economic indicators and costs for baseline scenarios**

28. The project will undertake a desk-top review of the economic conditions during the last five years which will have had an impact on crop selection and profitability as well as water usage. The study shall take into account the findings of the economic evaluation studies undertaken as part of the main project.

#### **Output 4: Design and implementation of improved management measures**

▪ **Activity 1: Feasibility report on means of improved management measures to be introduced (metering, conservation tariffs, scheduling) for improved irrigation/drainage systems.**

29. The project team shall prepare a detailed design report for each site which shall include the following:

- location of commercial scheduling service or recommendations for an alternative approach;
- Number and location of weather stations for the pilot project;
- Design norms and indicators;
- Metering costs;
- Tariff structures;
- Recommendations for improved irrigation infrastructure, including cost estimates;
- Recommendations for improved agricultural pollution control;
- Monitoring and Evaluation framework;

The key information will be presented in information sheets for distribution to the farmers and other stakeholders.

▪ **Activity 2: Implement scheduling and metering at selected sites**

30. The project will implement scheduling and metering at the sites and determine the elasticity of demand to differing tariff regimes. The impact on water use and crop yields will be monitored closely over a two year period through the monitoring and evaluation framework designed in the feasibility report.

▪ **Activity 3: Design and implementation of improved systems**

31. Based on the findings of the feasibility report the project will, where required, design improvements on existing irrigation systems. The project will provide part financing to farmers willing to implement the improvements and monitor the impacts over the project life time. A detailed cost benefit analysis will be undertaken at selected farms. A final design report will be produced at the end of the project incorporating the major findings.

#### **Output 5: Design and conduct training with communities near farms, agricultural departments, agro industry and irrigation farmers and farm workers**

- **Activity 1: Develop training curriculum**

32. Based on the assessment and feasibility report (Output 4, activity 1), the project will develop an easily accessible training curriculum in scheduling, operation of improved system and agro-chemical management. The training programme is also intended to increase awareness of the water conservation and pollution control measures and provide the stakeholders with the impetus to further improve their water management. The training materials will also emphasize the importance of passing on knowledge and lessons learned and will provide support for stakeholders.

- **Activity 2: Recruit training participants and training delivery**

33. In coordination with the stakeholder advisory forum the project will recruit participants from local communities and farms, as well as agro industries and regulatory agencies to participate in training. The training shall be delivered in accordance with an agreed training curriculum.

- **Activity 3: Develop and implement a selected training of trainers**

34. The project shall hold training of trainer sessions for people outside the project area, which will act as showcases for what can be done. There will be an emphasis on hands-on training and the possible strategies that can be employed and transferability to other farms. The participants will be asked to assist the project to develop ideas for how lessons can be effectively transferred, and be shared with other stakeholder groups. The participants will also be asked to provide documented training to neighbours, colleagues and others so that this information is more widely disseminated to the broader communities.

#### **Output 6: Adaptive Management and Learning**

- **Activity 1: Project implementation**

35. Project implemented in a cost-effective manner in accordance with agreed work plans and budgets.

- **Activity 2: Monitoring and Evaluation**

36. In order for the demonstration efforts to be most effective, the monitoring of outputs, both socially and technically should be carefully tracked using a specifically designed monitoring and evaluation framework, in addition to the project logframe. The social indicators should capture the stakeholder perceptions and concerns and improvement in the environment whilst the economic indicators should include the levels of financial benefits and capital investments generated.

- **Activity 3: Draft report and disseminate results**

37. A final demonstration project report will be drafted which will document the demonstration project's implementation strategies, challenges, successes, barriers and assumptions, as well as

recommendations for future project replication. The report will be widely disseminated through neighbouring communities, to relevant national and regional stakeholders, and to the broader community involved in water conservation, irrigation and environmental protection.

### **8.3. End of Project Landscape (Outputs)**

38. The end of project outputs of the project will include, *inter alia*:

- Improved water conservation at the sites through scheduling and improved irrigation systems and serve as a target for water usage in the irrigation sector throughout the Orange-Senqu river basin.
- Improved drainage water quality and reduced costs of agro-chemicals through better application methods and strategies.
- A project plan and inception report including the site criteria and sites selection report. These will provide guidance both for the project, but also clear documentation on the development of any replication of the demonstration project. By having a common template subsequent projects will be able to learn from the challenges faced by the initial demonstration project and reduce costs and time invested in future efforts.
- The establishment of stakeholder advisory forums and where requested Water User Associations.
- Baseline assessments will be established from which future improvements in water conservation, yield improvements and water quality improvements can be measured and demonstrated to other farms in the basin.
- Valuable knowledge of metering and tariff strategies to improve water allocation strategies and through better water management, increased yields and thereby increased investment.
- Through training of stakeholders an increase in stakeholder awareness, broadening strategies for water conservation measures at the local level, and diversifying stakeholder understanding of the challenges involving water management within the region.

### 9. Rationale for GEF Involvement and Fit with GEF Operational Programmes and Strategic Priorities

39. This demonstration project matches the GEF Operational Programmes and Strategic Priority 3 Balancing overuse and conflicting uses of water resources in transboundary surface and groundwaters, emphasizing stakeholder involvement in addressing the challenges of improving water use efficiency in the irrigation sector. The project will demonstrate the potential water savings in the irrigation sector which can be allocated to meet enhance ecological flow requirements. The project focuses on combining local knowledge with best practices garnered from experienced from around the world. This project has potential for replication in agricultural communities throughout the basin, and in areas where irrigation based agriculture in arid areas requires innovative solutions that result in concrete outcomes.

40. This demonstration project builds on the applied principles of integrated land and water management, through activities specifically designed to reduce anthropogenic impacts on sensitive water resources, and improvement of conditions impacting water flows within the basin.

## **10. Project Management Structure and Accountability**

41. The project will be contracted out under international tender procedures. There will be an open invitation for expressions of interest and a short-list of tenderers will be assembled in consultation with ORASECOM. The project execution will be overseen by the Project Coordination Unit based in the ORASECOM secretariat. A demonstration project implementation Unit (PIU), which will also act as the Water Efficiency Unit, will be established with satellite offices at each demonstration site. The PIU will report to the GEF project manager and the national project coordinators who in turn will report to the National Focal Points. The demonstration project through the PCU shall report regularly to the Steering Committee.

## **11. Stakeholders and Beneficiaries:**

42. The stakeholders involved in this project, and the beneficiaries include farmers, agronomists, traditional leaders, and local authorities, community organizations, agro-chemical industry, water management parastatals, and agriculture ministry officials, as well as ecologists, conservationists, and educators.

## **12. Long-term Sustainability Strategy**

43. The long term sustainability for this project is built into the project design through relying on the farmers to support the design of the specific project based options and finance implementation. The project will seek to identify win-win situations where increased investment will bring about water cost savings and increased yields, encouraging further investments. Initially the investments will be subsidized by the project but it is hoped future investments will be made without subsidies encouraged by the project results. Similarly improved application methods and management of agro-chemicals will encourage the farmers to make the necessary investments to improve pollution control.

## **13. Replicability**

44. The results of the project will be used by ORASECOM to develop a demand management campaign throughout the Orange-Senqu River basin for the irrigation sector and encourage existing users to make the necessary investments to improve irrigation systems and practices. It will also set the standard throughout the basin for new developments and using the metering/tariff studies as a basis for water allocation criteria. The demonstration project may also be replicated in other basins in southern Africa and be a model for similar projects in semi-arid areas in other parts of the World.

## **14: Monitoring and Evaluation Process**

45. The Project Implementation Unit will produce a brief quarterly Progress Report updating the National Coordinators and the project PCU on the progress of the pilot project based on the approved Logical Framework Matrix (Annex 1) and the project workplan (Annex 2) Once every year a detailed report will be submitted through the Project Coordination Unit to the Steering Committee. This report will provide a full review of the work plan to identify project achievements and deliveries versus the approved schedule, budget expenditures, recommendations with respect to any amendments to workplan and budget, staff contracting and performance, and any other information required by the Steering Committee and/or the Executing Agencies.

46. The pilot project will also be subject to:

- Internal Project Implementation Reviews to be conducted by the PC and submitted to the implementing agency every six months.
- An independent final project evaluation to be undertaken in conjunction with the Terminal Evaluation for the FSP.

47. The project evaluations will be carried out in accordance with UNDP-GEF requirements and will cover all aspects of the project. They will include: an assessment of (a) the outcomes generated, (b) the processes used to generate them, (c) project impacts, and d) lessons learned. Advice will be given on how the M&E results can be used to adjust the work if needed and on how to replicate the results in the region.

**15: Co-Funding**

48. The total cost of the pilot project is USD 2,450,000 The total contribution requested from GEF is USD 850,000 within a 4 year period (see budget below for details).

<b>TOTAL PROJECT WORKPLAN AND BUDGET</b>						
<b>Award ID:</b>						
<b>Project Title: Pilot study of water conservation in the irrigation sector of the Lower Orange River</b>						
<b>GEF Outcome/Atlas Activity**</b>	<b>Sub-components</b>	<b>Amount (\$) Year 1</b>	<b>Amount (\$) Year 2</b>	<b>Amount (\$) Year 3</b>	<b>Amount (\$) Year 4</b>	<b>Total (\$) All Years</b>
1. Project Plan and inception report, including review and regional and international best practice, and site selection.	Activity 1: Project Plan and inception report	25,000				25,000
	Activity 2: Site Selection	10,000				10,000
	Activity 3: Review of best international practice in water management in the irrigation sector.	15,000				15,000
	<b>Sub-total</b>	<b>50,000</b>				<b>50,000</b>
2. Established stakeholder advisory forum and water-user association	Activity 1: Hold open meetings at the chosen sites to discuss project.	20,000				20,000
	Activity 2: Form stakeholder groups and hold regular meetings to review project outputs and effectiveness	10,000	10,000	10,000		30,000
	Activity 3: Establish and maintain Lower Orange Water Efficiency Unit	20,000	15,000	15,000		50,000
	<b>Sub-total</b>	<b>50,000</b>	<b>25,000</b>	<b>25,000</b>		<b>100,000</b>
3. Assessment of existing practices on selected sites (baseline assessment), including agro-chemical management and water quality discharge monitoring	Activity 1: Assessment of water usage in the demonstration site over the growing season	15,000				15,000
	Activity 2: Survey of irrigation infrastructure and drainage water quality	15,000	10,000			25,000
	Activity 3: Collection data from farmers	5,000				5,000
	Activity 4: Review of economic indicators and costs for baseline scenarios	5,000				5,000
	<b>Sub-total</b>	<b>40,000</b>	<b>10,000</b>			<b>50,000</b>
4. Design and implementation of improved management measures	Activity 1: Feasibility report on means of improved management measures to be introduced (metering, conservation tariffs, scheduling) for improved irrigation/drainage systems.	50,000				50,000
	Activity 2: Implement scheduling and metering at selected sites	50,000				50,000
	Activity 3: Design and implementation of improved systems		400,000			400,000
	<b>Sub-total</b>	<b>100,000</b>	<b>400,000</b>			<b>500,000</b>
5. Design and conduct training with stakeholders	Activity 1: Develop training curriculum		10,000			10,000
	Activity 2: Recruit training participants and deliver training		40,000	40,000		80,000
	Activity 3: Develop and implement a selected training of trainers			10,000		10,000
	<b>Sub-total</b>		<b>50,000</b>	<b>50,000</b>		<b>100,000</b>
6. Adaptive Management and Learning	Activity 1: Project Implementation,					
	Activity 2: Monitoring and evaluation			20,000		20,000
	Activity 3: Draft report and disseminate results				30,000	30,000
	<b>Sub-total</b>			<b>20,000</b>	<b>30,000</b>	<b>50,000</b>
	<b>Total</b>	<b>240,000</b>	<b>485,000</b>	<b>95,000</b>	<b>30,000</b>	<b>850,000</b>

## ANNEX 1: Logical Framework

Water conservation and quality control in the irrigation sector	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks	
<b>OUTCOME</b>	<b>Water conservation and quality control in the irrigation sector - Demonstration</b> at two sites of best practice in irrigation water usage developing a model to be replicated throughout the ORS.			
<b>ACTIVITIES</b>	<p><b>1. Project Plan and inception report, including review and regional and international best practice, and site selection.</b></p> <ul style="list-style-type: none"> <li>▪ Project Plan and inception report</li> <li>▪ Site Selection</li> <li>▪ Review of best international practice in water management in the irrigation sector.</li> </ul>	<p>Project Plan and inception report drafted -PI</p> <p>Sites criteria defined and selected -PI</p>	<p>Project plan and inception report</p> <p>Site criteria and sites selection report</p>	<p>Willingness of farmers to support project</p> <p>Appropriate and available sites</p>
	<p><b>2. Established stakeholder advisory forum and water-user association</b></p> <ul style="list-style-type: none"> <li>▪ Hold open meetings at the chosen sites to discuss project.</li> <li>▪ Form stakeholder groups and hold regular meetings to review project outputs and effectiveness</li> <li>▪ Establish a Lower Orange Water Efficiency Unit</li> </ul>	<p>Demo project stakeholder advisory forum and water user association established -PI</p>	<p>Stakeholder advisory forum and water user associate meeting reports</p>	<p>Support from farmers and other stakeholders</p>
	<p><b>3. Assessment of existing practices on selected sites (baseline assessment), including agro-chemical management and water quality discharge monitoring.</b></p> <ul style="list-style-type: none"> <li>▪ Assessment of water usage in the demonstration site over the growing season</li> <li>▪ Survey of irrigation infrastructure and drainage water quality</li> <li>▪ Collection data from farmers</li> <li>▪ Review of economic indicators and costs for baseline scenarios</li> </ul>	<p>Baseline assessment conducted -ESI</p>	<p>Baseline assessment report</p>	<p>Sites selected for baseline indicative of the basin and replicable</p>
	<p><b>4. Design and implementation of improved management measures</b></p> <ul style="list-style-type: none"> <li>▪ Feasibility report on means of improved management measures to be introduced (metering, conservation tariffs, scheduling) for improved irrigation/drainage systems.</li> <li>▪ Implement scheduling and metering at selected</li> </ul>	<p>Proposals for improved water quantity and quality management - -PI</p> <p>Improved systems designed and implemented - SRI</p>	<p>Water management recommendations report</p> <p>Water conservation and quality reports</p>	<p>Improved management measures cost effective</p>



Water conservation and quality control in the irrigation sector		Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
	sites <ul style="list-style-type: none"> <li>▪ Design and implementation of improved systems</li> </ul>			
	<b>5. Design and conduct training with stakeholders</b> <ul style="list-style-type: none"> <li>▪ Develop training curriculum</li> <li>▪ Recruit training participants</li> <li>▪ Develop and implement a selected training of trainers</li> </ul>	Stakeholder trainings conducted- SRI	Training materials	Trainings effective
	<b>6. Monitor and disseminate results</b> <ul style="list-style-type: none"> <li>▪ Monitor social and technical results,</li> <li>▪ Review technological outputs</li> <li>▪ Draft report and disseminate results</li> </ul>	Results disseminated-PI	Dissemination materials Final report	Project replicability
	<b>7. Adaptive Management and Learning</b> <ul style="list-style-type: none"> <li>▪ Project implemented in a cost-effective manner in accordance with agreed work plans and budgets</li> <li>▪ Monitoring and Evaluation Plan provides inputs for robust adaptive management</li> <li>▪ A clearly defined mechanism for replication of the Environmental Flow programme to be implemented in comparable situations</li> </ul>	Lessons learned report drafted to include budget review and recommendations for additional activities	Study report on replicability of study Project budget review	Replication of project and findings

**ANNEX 2: Work Plan**

Component and Activities	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Outcome 1: Project Plan and inception report, including review and regional and international best practice, and site selection.</b>																
Activity 1: Project Plan and inception report																
Activity 2: Site Selection																
Activity 3: Review of best international practice in water management in the irrigation sector.																

Component and Activities	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Outcome 2: Output 2: Established stakeholder advisory forum and water-user association</b>																
Activity 1: Hold open meetings at the chosen sites to discuss project.																
Activity 2: Form stakeholder groups and hold regular meetings to review project outputs and effectiveness																
Activity 3: Establish a Lower Orange Water Efficiency Unit																

Component and Activities	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Outcome 3: Assessment of existing practices on selected sites (baseline assessment), including agro-chemical management and water quality discharge monitoring.</b>																
Activity 1: Assessment of water usage in the demonstration site over the growing season																
Activity 2: Survey of irrigation infrastructure and drainage water quality																

Activity 3: Collection data from farmers																			
Activity 4: Review of economic indicators and costs for baseline scenarios																			

Component and Activities	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Outcome 4: Design and implementation of improved management measures</b>																
Activity 1: Feasibility report on means of improved management measures to be introduced (metering, conservation tariffs, scheduling) for improved irrigation/drainage systems.																
Activity 2: Implement scheduling and metering at selected sites																
Activity 3: Design and implementation of improved systems																

Component and Activities	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Outcome 5: Design and conduct training with stakeholders</b>																
Activity 1: Develop training curriculum																
Activity 2: Recruit training participants																
Activity 3: Develop and implement a selected training of trainers																

Component and Activities	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Outcome 6: Adaptive Management and Learning</b>																
Activity 1: Project implementation																
Activity 2: Monitoring and Evaluation																
Activity 3: Draft report and disseminate of results																



**DEMONSTRATION PROJECT FOR INCLUSION INTO THE GEF FULL SIZE PROJECT:**

**1. Country(s): Namibia, South Africa**

**2. Title: Ecological flows study of the Lower Orange and a seasonal tributary**

**3. Executing Agency:**

**4. Cost of Project:** GEF: US\$1,000,000; Co-Finance: US\$2,304,000

**5. Linkage to Orange-Senqu River Basin SAP Priorities:**

SAP Priority – Agree and establish ecological flow requirements at critical locations in the Orange-Senqu basin

**6. Linkage to National Priorities and Programmes**

The Lower Orange River Management Study (LORMS) was a joint Namibian-South African study of the potential for water resource development and management of the lower Orange River. The study was commissioned by the Permanent Water Commission (PWC) on behalf of the governments of the two countries. LORMS identified three possible sites for a large dam on the lower Orange River. The yield from this potential water resource, however, will be strongly influenced by the volume of releases made to satisfy the Ecological Flow Requirements (EFR) for the downstream aquatic ecosystems, in particular the river and its estuary. The Orange River Mouth is the 7<sup>th</sup> most important system in South Africa in terms of conservation importance. The fact that the Orange River Mouth comprises one of only two perennial river mouth/estuarine systems on the Namibian coast also highlights its biodiversity importance on a regional scale. The Orange River Mouth Wetland was designated Ramsar status in 1991 and has an area of about 2,000 ha. The wetlands are situated between the north and south flood margins of the Orange River, extending from the Sir Ernest Oppenheimer Bridge to the Atlantic Ocean, a distance of about 10 km. Initial studies have been undertaken in the mouth but much more work is required to establish an environmental baseline and to develop a methodology for determining environmental flow requirements and therefore resource yields throughout the basin. The new methodology will also be applied at critical sites on seasonal/ephemeral rivers which have as yet been given limited attention from the water resources and scientific communities.

**7: Name and Post of Government Representatives endorsing the Demonstration Activity**

**To be completed**

**8: Project Objectives and Activities**

**8.1. Background**

27. Since the early 1980's there has been a 50% reduction in average annual flow rates in the Lower Orange River compared to virgin conditions. In summer months this reduced flow is a fraction of pre-development figures. The current mean annual flow at Vioolsdrift of  $464 \times 10^6 \text{ m}^3$  when balanced against the agreed annual water allocation to Namibia of  $50 \times 10^6 \text{ m}^3$  per annum (which in recent years has reported demands that are 50% higher), additional South African demands, and in-stream environmental flow requirements, provides a residual flow to the estuary estimated to be of the order of  $290 \times 10^6 \text{ m}^3$ . Clearly, even in an average year, and bearing in mind the significant further river losses over the 280 km of river length between Vioolsdrift and the estuary, the total pressure on the resource is acute and the prospects for reliable further water yields in the future are poor.
28. Although a remnant, vestigial flood season is identifiable between February and April / May, it is 4 to 5 months shorter than it formerly was, while the usual month of peak discharge has been set back from February to March. This radical modification of the regime means that the former natural dynamic equilibrium of the biophysical environment in the Lower Orange River, and other parts of the basin, has been all but destroyed resulting in a much degraded fluvial, ecological and environmental situation.
29. Current ecological flows, established in the early 1990s, although honoured, do not provide the protection required in the Lower Orange and a re-evaluation of these flows, and thereby a re-evaluation of the water resources of the Lower Orange system, is now required. Furthermore, a new methodology for establishing ecological flows throughout the river basin, in the main river channel and the seasonal rivers, is now required based on best international practice. This understanding came out the LORMS study of water resources of the Lower Orange undertaken in 2004.
30. The Lower Orange River Management Study (LORMS) was a joint Namibian-South African study of the potential for water resource development and management of the Lower Orange River. The study was commissioned by the Permanent Water Commission (PWC) on behalf of the governments of the two countries. The study recommended that the Vioolsdrift Dam be investigated at a feasibility level of study. The yield from this potential water resource development option will affect the cost and overall viability. The yield, however, will be strongly influenced by the volume of releases made to satisfy the Ecological Flow Requirements (EFR) for the downstream aquatic ecosystems, in particular the river and its mouth. Initial work on the EFR for the river and mouth was undertaken as part of the LORMS study. Furthermore, the operation (and therefore possible yield) of extended water resource developments in the middle reaches of the Orange River, in particular the Vanderkloof Dam, may also be affected by new dams in the lower Orange River and EFRs for downstream aquatic ecosystems.
31. There is a need to set ecological flow requirement at key locations throughout the Orange-Senqu River Basin and establish an EF methodology which all ORASECOM countries can agree on. The methodology must meet best international practice, but still be cost effective in terms of application. It also must be flexible enough to be applied to ephemeral and seasonal rivers as well as the main river reaches.

## 8.2. Objectives and Activities

Objective:

32. The overall objective of this demonstration project is to set guidelines for establishing Environmental Flows in the Orange-Senqu basin, based on best international practices and accomplished through:
  - undertaking EF assessments for key sites in the Lower Orange-Senqu River basin and its mouth;
  - producing an interactive EF database to allow evaluation of impacts of flow-related scenarios for those selected sites;
  - developing and implementing a Baseline Data Collection Programme to inform the EFRs;
  - assessing the non-flow related impacts at the selected sites and the likely outcome for overall ecological condition of their possible amelioration;
  - designing a long-term Monitoring Programme designed to assess the efficacy of any EF and/or other management interventions (i.e. non-flow related) that are implemented.
  
33. The assessments should aim to develop data sets for the selected sites, which will allow the evaluation of scenarios of both flow change (i.e., change in the volume and timing of water) and changes in the extent of non-flow related impacts in terms of: effects on overall downstream river condition; changes in the abundance of key biophysical components of the riverine ecosystems; changes in the availability of resources used directly by the people living alongside the river and estuary; and possible impacts on the health of people, or their livestock, living alongside the river and estuary.
  
34. The results of the study in the Lower Orange River and the estuary will be used to provide guidelines to be incorporated into future management plans and to evaluate the feasibility and impacts of new water resource developments including an in-channel impoundment at Violsdrift; altering the flow regime controlled by releases from Vanderkloof Dam; and subsequent phases of the Lesotho Highlands project.

## **Project Outputs and Activities**

**Output 1:** Project plan and inception report, including site selection and review and selection of appropriate methodologies, and issues assessment

- **Activity 1: Project Plan and Inception Report**

35. Develop a project plan and prepare an Inception Report. The Inception Report will include final details of the approach to be adopted, including: the study team; methodology; issues assessment; preliminary EF reach selection based on agreed criteria; programming; project monitoring and quality control system; and assumptions, strengths and weaknesses of the proposed study approach.

- *Activity 2: Preliminary assessment*

36. Undertake a preliminary assessment of potential sites to include: the geographical extent, present condition, ecological or other importance of the river reach in a local and regional context, past problems related to water management; species or features of special significance; a summary of the demographics of the human population that utilise the river and the nature of their dependence on the river and estuary; and other relevant aspects such as river-related diseases or important cultural sites.

- **Activity 3: Scientific literature review**

37. Collate and summarise the available scientific data and literature on the selected sites including: information on the nature of the river channel and any associated wetlands and floodplains; water chemistry; flow information, i.e., hydrological records/models; general bank and channel biotic communities along the river; any information on the flow and physical habitat preferences of the biotic communities; and information on non-flow related impacts along the lower river.

▪ **Activity 4: Selection of the appropriate methodologies**

38. Identify or develop appropriate methodologies that will meet the objectives of identifying environmental flow limits for the Orange-Senqu River. These will include the identification, or development of methodologies which are compatible for the river (including seasonal tributaries) and mouth; appropriate for assessing the effect on ecological condition of non-flow related impacts; and, suitable for assessing the present ecological status and defining natural conditions for the river and mouth. At a minimum, the selected methodologies will be sufficiently documented as to allow peer review and meet the approval of ORASECOM.

**Output 2: Study area delineation and scenario selection**

▪ **Activity 1: EF site selection**

39. Undertake field visits to each of the potential site locations within each of the EF river reaches identified. Prepare a Site Selection Report describing each site in full, the selection criteria and potential for replicability. Recommended sites are to be agreed with ORASECOM.

▪ **Activity 2: Study area delineation and characterization**

40. Undertake a characterization survey of selected sites, conduct an ecological condition assessment on the present conditions for use as the baseline, use accepted methods of rapid riverine/estuarine ecosystem appraisal, and draft a clear description of what natural conditions would have been.

▪ **Activity 3: Biophysical data collection and preparation of the Biophysical Reference Reports**

41. Design and implement a Data Collection Programme aimed at providing the data required for the EF selected methodology. All relevant information should be collected at designated EF sites, under as wide a range as possible of flow conditions to cover one annual hydrological cycle. Standard, well-accepted methods within each discipline should be used, and justified, to the extent possible.

▪ **Activity 4: Selection of key scenarios and detailed descriptions of their biophysical implications**

42. Provide detailed description of the biophysical consequences for a short-list of four key scenarios combining flow and non-flow changes at each site. The key scenarios should be identified through yield analysis and discussed with ORASECOM.

**Output 3: Identify the relevant stakeholders at selected sites and establish site specific stakeholder advisory forums**

▪ **Activity 1: Identify relevant stakeholders**

43. Identify relevant stakeholders for the project sites which include, *inter alia*, stakeholders from relevant economic sectors involved in water use within the site study area, riparian communities within the area with special attention to traditional leaders and community

based organizations, government stakeholders at the municipal, district and national level, those from the scientific community.

- **Activity 2: Stakeholder Consultation**
44. Hold stakeholder meetings at key milestones during the project to ensure the capture of the flow and non-flow related impacts on all relevant stakeholders.

#### **Output 4: Socio-economic study of the impact of flow scenarios**

- **Activity 1: Resource economics study and preparation of Resource Economics Reference Report**
45. The Resource Economics study should determine the social and economic value to the riparian population and collect information on a wider range of socio-economic aspects relating to the value of the Orange-Senqu River and its estuary ecosystem goods and services.
- **Activity 2: Determination of the resource economic implications of key scenarios**
46. Using the predicted biophysical changes (including climate change) for each scenario and the likely consequences for the riparian population in terms of changes in resource availability, assess the impacts on cultural activities, cost of lost resources and health-related impacts.

#### **Output 5: Report on application of EF methodology and selection of scenarios based on flow and non-flow impacts**

- **Activity 1: Application of Environmental Flow Scenarios**
47. Apply the agreed EF scenarios selected in output 2, activity 4 and describe the overall biophysical impacts of the annual and seasonal modified flow regimes, and where possible determine the thresholds of potential concern.
- **Activity 2: Assessment of non-flow related impacts**
48. Determine the influence of non-flow related impacts on the biophysical condition of the river reach and mouth, in accordance with the selected methodology. This knowledge will be used to create overlay scenarios to determine the ecological conditions resulting from implementing restorative management actions in combination with the predicted flow related changes.

#### **Output 6: Final report, design of long-term monitoring programme**

- **Activity 1: Preparation of Environmental Flows Summary Report**
49. Prepare an EF Summary Report that combines the biophysical and socio-economic impacts for each applied flow scenario and identifies thresholds of potential concern. The report should also summarize for each flow scenario the non-flow impacts, including mitigation measures. The summary report will include recommendations for the environmental flow to be adopted at each site and will form the basis for technical guidelines on the determination of environmental flows in the Orange-Senqu basin. The guidelines will be presented to ORASECOM for approval.
- **Activity 2: Development of a Long-term Monitoring Programme**
50. Design of a long-term Monitoring Programme, based on key biophysical and social parameters, as indicators of agreed site specific Environmental Quality Objectives (EQOs). If the target condition is not being achieved, this should provide criteria for adjustments to be made to the EF, the target condition or the restoration activities.



## **Output 7: Adaptive Management and Learning**

### **▪ Activity 1: Project Implementation**

25. Project implemented in a cost-effective manner in accordance with agreed work plans and budgets.

### **▪ Activity 2: Monitoring and Evaluation**

25. Design and application of project monitoring and evaluation plan based on logframe to provide inputs for robust project management.

### **▪ Activity 3: Dissemination of results and replication strategy**

26. The results of this demonstration project will be widely disseminated to neighbouring communities, to relevant national and regional stakeholders, and to the broader community involved in water management. A specifically designed strategy will be devised to replicate the results throughout southern Africa where possible.

## **8.3 End-of Project Landscape (Outcomes)**

27. The conclusion of the demonstration project will result in a heightened awareness and understanding of the environmental flow requirements of the Orange-Senqu River Basin.

28. As a result of the project there will be a review and selection of appropriate methodologies to be employed in river systems within arid and semi-arid zones. This review of methodologies once applied will provide added protection to the riverine environment in general and at critical locations, such as the river mouth, in particular, and can serve as a resource for other projects in the region and within river systems, to provide guidance to regulating authorities.

29. The establishment of site specific stakeholder advisory forums, in coordination with the national forum, to ensure that the interests of all relevant, impacting and impacted stakeholder groups are recognized and taken into due consideration when establishing environmental flow requirements.

30. The project will deliver a solid baseline of information and data from each study area including a clear delineation and characterization of river reaches, assessment of ecological conditions, selection of environment flow sites, biophysical data collection, setting of baseline flows and an evaluation of existing environmental goods and services at the local level.

31. The inclusion of the socio-economic study of the impact of flow scenarios emphasizes the cross disciplinary approach and includes key players whose involvement or lack of can either make or break the long term sustainability of these efforts. The inclusion of human impacts, often driven by economic forces, must be considered in order to effectively address the challenges of managing environmental flows in a highly altered river system. This study will provide decision makers with an economic value for the water and the goods and services provided by the environment which can influence policy formation.

32. The design and implementation of a long-term monitoring programme ensures the compliance of the environmental flow regime and ensures that the environment quality objectives are met. The programme will enable the environmental flow setting methodology to be refined and strengthened to address trends (e.g. climate change),

challenges to and shifts in the approach. It will provide valuable data on the overall environmental status of the Orange-Senqu and assist in identifying basin-wide trends and changes.

#### 9. Rationale for GEF Involvement and Fit with GEF Operational Programmes and Strategic Priorities

33. The Orange-Senqu river and river mouth ecosystems are severely degraded and are facing ever growing pressures to their integrity. Demand for water resources in the basin is forecast to increase to meet economic and social objectives and a long-term balance between environmental requirements and human development needs to be found – all of which is against a backdrop of climate change which could severely constrain future available water resources. Establishing a methodology for determining environmental flows is the first step to setting bounds to water demand and establishing a vision for the Orange-Senqu River Basin environment. GEF needs to encourage good management throughout the Orange-Senqu River Basin and to get agreement between the basin countries on water allocation priorities.

#### **10. Project Management Structure and Accountability**

34. The project will be contracted out under international tender procedures. There will be an open invitation for expressions of interest and a short-list of tenderers will be assembled in consultation with ORASECOM. The project execution will be over seen by the Project Coordination Unit based in the ORASECOM secretariat. A demonstration project implementation Unit (PIU) will be established with satellite offices at each demonstration sites. The PIU will report to the GEF Project Coordinator and the national project coordinators who in turn will report to the National Focal Points. Through the PCU the demonstration project shall report regularly to the Steering Committee.

#### **11. Stakeholders and Beneficiaries:**

35. The stakeholders involved in the project, and the beneficiaries include: local rural communities within the region, conservationists and ecologists, farmers/ pastoralists, and local authorities, Water Affairs Departments, NGOs, Environmental Departments, Tourism and recreational users, fisheries departments, Mining regulating agencies, Agricultural Departments, Regional governmental officials, Agricultural industry, and scientists.

#### **12: Long-term Sustainability Strategy**

36. The demonstration project has the full support of both South Africa and Namibia and is a critical element of their IWRM plans. The demonstration project will be complimented by monitoring programmes and studies already ongoing in the Lower Orange river and mouth (see Incremental Cost Analysis Section II Part 1). The implementation of long term monitoring programmes at the critical sites are assured as part of the regulatory system once a clear baseline has been established and methodology agreed. However, the project will seek guarantees through ORASECOM that the long term monitoring programmes will be maintained.

#### **13: Replicability**

37. The overall objective is to refine methodologies for establishing ecological flow requirements throughout the Orange-Senqu river basin and as such will be applied in all

four basin states and therefore replicability is inherent in the project. The methodology will address environmental requirements in ephemeral and seasonal rivers as well as the main river branches. The methodology will have application outside the OSRB and will be demonstrated through specific workshops in other river basins in southern Africa. The final report of the project will include lessons learned and recommendations for a strategy for replication in other regions.

#### 14: Monitoring and Evaluation Process

38. The Project Coordination Unit will produce a brief quarterly Progress Report updating the Steering Committee and the Project Execution and Implementation Agencies on the progress of the project based on the approved Logical Framework Matrix (Annex 1) and the project workplan (Annex 2). Once a year a detailed report will be submitted through the PCU to the Steering Committee. This report will provide a full review of the work plan to identify project achievements and deliverables, budget expenditures, amendments to workplan and budget, staff contracting and performance, and any other information required by the Steering Committee and/or the Executing Agencies.

39. In addition, the pilot project will also be subject to:

- Internal Project Implementation Reviews to be conducted by the PC and submitted to the implementing agency every six months.
- An independent final project evaluation to be undertaken in conjunction with the Terminal Evaluation for the FSP.

40. The project evaluations will be carried out in accordance with UNDP-GEF requirements and will cover all aspects of the project. They will include: an assessment of (a) the outcomes generated, (b) the processes used to generate them, (c) project impacts, and d) lessons learned. Advice will be given on how the M&E results can be used to adjust the work if needed and on how to replicate the results in the region.

#### 15: Co-Funding

41. The total cost of the pilot project is US\$3,304,000. The total contribution requested from GEF is USD 1,000,000 within a 4 year period (see Annex 5 for details).

15.

TOTAL PROJECT WORKPLAN AND BUDGET						
<b>Award ID:</b>						
<b>Project Title: Ecological flows study of the Lower Orange and a seasonal tributary</b>						
GEF Outcome/Atlas Activity**	Sub-components	Amount (\$) Year 1	Amount (\$) Year 2	Amount (\$) Year 3	Amount (\$) Year 4	Total (\$) All Years
1. Project plan and inception report	1. Project Plan and Inception Report	30,000				
	<u>2. Preliminary assessment</u>	30,000				
	3. Scientific literature review	10,000				
	4. Selection of the appropriate methodologies	20,000				
	<b>Sub-total</b>		<b>90,000</b>			
2. Study area delineation and scenario selection	1. EF site selection	10,000				
	2. Study area delineation and characterisation	30,000	50,000			

	3. Biophysical data collection and preparation of the Biophysical Reference Reports	50,000	200,000	100,000		
	4. Selection of key scenarios and detailed descriptions of their biophysical implications			50,000		
	<b>Sub-total</b>	<b>90,000</b>	<b>250,000</b>	<b>150,000</b>		<b>490,000</b>
3. Identify the relevant stakeholders at selected sites and establish site specific	1. Identify relevant stakeholders	10,000				10,000
	2. Stakeholder Consultation	10,000	10,000	10,000	10,000	40,000
	<b>Sub-total</b>	<b>20,000</b>	<b>10,000</b>	<b>10,000</b>	<b>10,000</b>	<b>50,000</b>
4. Socio-economic study of the impact of flow scenarios	1. Resource Economics study and preparation of Resource Economics Reference Report			50,000		
	2. Determination of the resource economic implications of key scenarios			50,000		
	<b>Sub-total</b>			<b>100,000</b>		<b>100,000</b>
5. Report on application of EF methodology and selection of scenarios based on flow and non-flow impacts	1. Application of Environmental Flow Scenarios			50,000		
	2. Assessment of non-flow related impacts			30,000		
	<b>Sub-total</b>			<b>80,000</b>		<b>80,000</b>
6. Final report, and design of long-term monitoring programme	1. Preparation of Environmental Flows Summary Report				50,000	
	2. Development of a long-term Monitoring Programme			10,000	50,000	
	<b>Sub-total</b>				<b>100,000</b>	<b>100,000</b>
<b>Adaptive</b>						
7. Adaptive Management and Learning	1. Project implementation in accordance with workplan	35,000	25,000	25,000	25,000	110,000
	2. Monitoring and Evaluation			10,000	20,000	30,000
	3. Project Replication strategy				60,000	60,000
	<b>Sub-total</b>	<b>35,000</b>	<b>25,000</b>	<b>25,000</b>	<b>105,000</b>	<b>190,000</b>
	<b>Total</b>	<b>235,000</b>	<b>285,000</b>	<b>365,000</b>	<b>215,000</b>	<b>1,100,000</b>

## ANNEX 1 Logical Framework

Ecological flows study of the Lower Orange and a seasonal tributary	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks	
<b>OUTCOME</b>	<b>Ecological flows study of the Lower Orange and a seasonal tributary</b> - Establishment of a methodology for determining the ecological flows in the Orange-Senqu River basin and setting of the environmental bounds from which the sustainable water resources of the OSR can be measured.			
<b>ACTIVITIES</b>	<b>1. Develop project plan and inception report</b> <ul style="list-style-type: none"> <li>▪ Draft Project Plan and Inception Report</li> <li>▪ Assess Issues</li> <li>▪ Review Scientific literature</li> <li>▪ Select the appropriate methodologies</li> </ul>	Project plan and inception report drafted -PI	Project plan and inception report	Appropriate methodology selected
	<b>2. Study area delineation and scenario selection</b> <ul style="list-style-type: none"> <li>▪ Draft study area delineation and characterization report</li> <li>▪ EF site selection</li> <li>▪ Collect biophysical data and prepare the Biophysical Reference Reports</li> <li>▪ Select key scenarios and provide detailed descriptions of their biophysical implications</li> </ul>	Study report and baselines developed – PI/ESI  Scenarios selected --PI  Biophysical Reference Reports drafted	Study report  Study report with selected scenarios  Reference Reports	Optimal scenarios selected  Availability of information
	<b>3. Identify the relevant stakeholders at selected sites and establish site specific stakeholder advisory forums</b> <ul style="list-style-type: none"> <li>▪ Identify relevant stakeholders</li> <li>▪ Stakeholder Consultations</li> </ul>	Demo project stakeholder forum established -PI	Stakeholder forum roster and meeting reports	Appropriate stakeholders in group with no significant groups missing
	<b>4. Socio-economic study of the impact of flow scenarios</b> <ul style="list-style-type: none"> <li>▪ Conduct Resource Economics study and prepare Resource Economics Reference Report</li> <li>▪ Determine resource economic implications of key scenarios</li> </ul>	Report on socio-economic impacts of flow scenarios - ESI	Socio-economic study	All major sectors and impacts considered in evaluation
	<b>5. Report on application of EF methodology and selection of scenarios based on flow and non-flow impacts</b> <ul style="list-style-type: none"> <li>▪ Apply Environmental Flow Scenarios</li> <li>▪ Assess non-flow related impacts</li> </ul>	Flow application reports and assessments drafted	Study reports	Appropriate methodology developed.

Ecological flows study of the Lower Orange and a seasonal tributary	Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
<p><b>6. Final report and design of Long-term Monitoring Programme.</b></p> <ul style="list-style-type: none"> <li>▪ Prepare Environmental Flows Summary Report</li> <li>▪ Develop a Long-term Monitoring Programme</li> </ul>	<p>Monitoring programme in place -PI</p> <p>Summary report drafted-PI</p> <p>Results disseminated -PI</p>	<p>Monitoring programme design</p> <p>Dissemination materials</p>	<p>Monitoring programme sustained by countries</p> <p>Methodology replicable in other OR sites</p>
<p><b>7. Adaptive Management and Learning</b></p> <ul style="list-style-type: none"> <li>▪ Project implemented in a cost-effective manner in accordance with agreed work plans and budgets</li> <li>▪ Monitoring and Evaluation Plan provides inputs for robust adaptive management</li> <li>▪ A clearly defined mechanism for replication of the Environmental Flow programme to be implemented in comparable situations</li> </ul>	<p>Lessons learned report drafted to include budget review and recommendations for additional activities</p>	<p>Study report on replicability of study</p> <p>Project budget review</p>	<p>Replication of project and findings</p>

ANNEX 2: Workplan

	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Output 1:</b> Project plan and inception report																
Activity 1: Project Plan and Inception Report																
Activity 2: Issues assessment																
Activity 3: Scientific literature review																
Activity 4: Selection of the appropriate methodologies																

	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Activity 1: EF site selection																
Activity 2: : Study area delineation and characterization																
Activity 3: Biophysical data collection and preparation of the Biophysical Reference Reports																
Activity 4: Selection of key scenarios and detailed descriptions of their biophysical implications																

	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4

<b>Output 3:</b> Identify the relevant stakeholders at selected sites and establish site specific stakeholder advisory forums																	
<b>Activity 1:</b> Identify relevant stakeholders																	
<b>Activity 2:</b> Stakeholder Consultation																	

	Year 1				Year 2				Year 3				Year 4				
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
<b>Output 4:</b> Socio-economic study of the impact of flow scenarios																	
<b>Activity 1:</b> Resource Economics study and preparation of Resource Economics Reference																	
<b>Activity 2:</b> Determination of the resource economic implications of key scenarios																	

	Year 1				Year 2				Year 3				Year 4				
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
<b>Output 5:</b> Report on application of EF methodology and selection of scenarios based on flow and non-flow impacts																	
<b>Activity 1:</b> Application of Environmental Flow Scenarios																	
<b>Activity 2:</b> Assessment of non-flow related impacts																	



	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Output 6:</b> Final report and design of Long-term Monitoring Programme																
Activity 1: Preparation of Environmental Flows Summary Report																
Activity 2: Development of a Long-term Monitoring Programme																

	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Output 7: Adaptive Management and Learning</b>																
Activity 1: Project implemented in a cost-effective manner in accordance with agreed work plans and budgets																
Activity 2: Monitoring and Evaluation Plan provides inputs for robust adaptive management																
Activity 3; A clearly defined mechanism for replication																



**DEMONSTRATION PROJECT FOR INCLUSION INTO THE GEF FULL SIZE PROJECT:**

**1. Country(s): Botswana, Lesotho**

**2. Title: Improve range land management in the Orange-Senqu River Basin**

**3. Executing Agency: UNOPS**

**4. Cost of Project:** GEF: US\$650,000 Co-Finance: US\$ 700,000

**5. Linkage to Orange-Senqu River Basin SAP Priorities:**

SAP Priority – Mitigation of landscape degradation and desertification

**6. Linkage to National Priorities and Programmes**

**Botswana**

1. A significant challenge facing environmental protection and conservation of natural resources, particularly wildlife resources, is increasing pressure from other forms of land use. Traditional livestock rearing, which requires large expanses of land, is the main form of land use for the majority of the people in the basin in Botswana. This form of land use poses a significant challenge especially to wildlife conservation in the area. Data from the Department of Wildlife and National Parks show that areas with high populations of livestock have low populations of wild animals. In addition, some people in the area are of the view that the protected areas (i.e. Gemsbok National Park and the Wildlife Management Areas) deprive them of land, which could have been used for livestock grazing.
2. Botswana has an emerging number of community inputs into rangeland management through the Community Based Natural Resources Management Policy. This policy aims at fostering conservation of natural resources by local communities. These programmes address these issues, through providing community inputs into project development, implementation and monitoring within the broader national context of sustainable rangeland management. It is intended to promote rural development through community participation and the creation of economic incentives for sustainable use. In the Kgalagadi District, the Policy has benefited communities and trusts such as Khawa, Koinaphu, Maiteko and Ukhwi. These communities mostly utilize Wildlife Management Areas with the exception of Maiteko which is based on salt harvesting. In the Wildlife Management Areas, community utilization of wildlife resources is permissible but it is regulated with a view of ensuring its sustainability. Some of the activities regulated in these areas under the Wildlife Conservation and National Parks Act (1992) include the grazing of any stock therein and any conditions or limitations concerning the husbandry of stock.

## Lesotho

3. Lesotho is an egalitarian society where access to land is unrestricted. As a consequence, therefore, natural resources and in particular biodiversity are under constant threat. Threats to Lesotho's biodiversity resources are many and varied but all are human induced. Habitat degradation, fragmentation, the impact of introduced species, and the altered regimes (reservoirs and weirs) are all human induced threats to biodiversity and rangeland health in Lesotho. Amongst all these threats, habitat destruction is considered to be the most damaging and in particular threats relating to overgrazing and extensive land clearing have resulted in the loss and fragmentation of habitat across the country
4. The government has established Range Management Areas specifically designated in the mountain rangelands in which rights to graze one's livestock have been restricted by the chief to a specific group of livestock owners who have formed themselves into a Grazing Association. The impact of these will be reviewed within the project. Yet the grasslands of Lesotho appear to be deteriorating at an alarming rate due to unsustainable range management practices. At present, approximately 359,680 ha of rangeland have been invaded by Karoo shrub, *Chrysocoma ciliate sehalahala*). This degraded area represents about 16% of the entire rangeland, and incidents of lowland overgrazing are also problematic.
5. The community led demonstration projects to be implemented will test various approaches to management of commonly owned lands in Botswana and Lesotho based on principles of sustainable use. The project will be designed and governed by the communities themselves with the intention of creating local institutions that will allow the communities to be self regulating and preserve resources. These local institutions will be created within the boundaries of the national policies listed above and will serve as model approaches to be used within the national and basin wide range land management approaches.

### **7: Name and Post of Government Representatives endorsing the Demonstration Activity**

*To be determined during the inception phase.*

### **8: Project Objectives and Activities**

#### 8.1 Background

6. Communal land tenure systems and ensuing consequences for land management are pervasive throughout Sub-Saharan Africa. Communal land is owned by the State, while its residents have usufruct rights over the land and its resources such as grazing. Group rights and their enforcement have weakened and this undermines the ability of many residents to prevent appropriation of their land by wealthy individuals and settlers and herders from other areas. At the same time, traditional livelihoods, based on the use of natural resources through livestock husbandry and cultivation of land, have come under threat due to many human and natural causes. Traditional land management practices evolved to adapt to the physical conditions of the southern Africa climate and historically, resource use is considered to have been largely sustainable. Today, in the Orange-Senqu basin, people on communal land still largely lead subsistence lifestyles, due to traditional practices, and the absence of employment opportunities to earn significant monetary incomes. As affordable alternatives are not available, food, fuel, housing materials, and even medicines continue to be extracted directly from the land, in most cases barely covering the needs of the respective resource users. Dependence on the

exploitation of natural resources locks residents into a cycle of short-term over-exploitation of the resource from changing weather patterns, shifts in demographics and increasing demands on the land. For example, traditional land use practices are increasingly marginalized: rainfall, and therefore the availability of fodder are highly variable in terms of time and space.

7. In the past, communities employed a flexible rangeland management system, moving herds to distant pastures to benefit from better rainfall and grazing. Given severe demographic pressures, sedentarisation is now a reality in most of the communal areas of the basin, and the traditional practices of the more nomadic lifestyles of the past are no longer sustainable. Currently the capacities of communities to make informed management decisions are limited. Though some programmes in range land management have been working towards this, an easy to operate, locally based decision-support system providing information on important parameters like rangeland condition, bush densities, carrying capacity, livestock condition and rainfall, is urgently needed. Based on their own information, collected by themselves, resource users should be able to identify problem areas and make appropriate mitigation decisions (e.g. marketing of livestock, movement of livestock to key resource areas, additional fodder supply, etc). Knowledge is necessary but not sufficient for sustainable land management. Especially where sustainable land management involves investments of time and money (even if only initially) favourable (economic) incentives and respect for traditional cultural significance of livestock herds are also required. There is no single best approach and therefore it is critical that multiple approaches are trialed and results compared in order to address these challenges.
8. Apart from land tenure, weak or absent market systems in the rural economy lead to coping strategies, which are often sub-optimal from the perspective of sustainable land management. Markets and market infrastructure for other indigenous products (e.g. reeds, crafts, skins) are little developed if existing at all, and participation of the local communities in these are highly dependent on outside support. Where markets exist they value pure extraction but not sustainable use, thus again leading to overexploitation of the resources. The absence of these markets limits the opportunities of rural people to diversify their livelihoods away from livestock production or extensive dryland cultivation. At the same time, limited rural financial markets restrict saving and borrowing possibilities. Commercial banks do not provide adequate banking facilities to communal farmers on a regular basis, which leaves farmers with few options other than to re-invest their money in livestock which leads to over grazing. A lack of alternate income sources, from a functional small scale market system also increases dependence on grazing of livestock.
9. Some of this is a legacy of the past (land tenure and land distribution), others arise from present policy preferences which adhere to an economic development paradigm - agriculture as the engine of growth and poverty eradication. At the bottom line however, it clearly shows: poverty at local level leads to land degradation, which in turn erodes livelihoods. Given these inter-linkages, combating land degradation in new and innovative ways must form an integral part of any feasible poverty reduction strategy as well as any sustainable development strategy.
10. The linkage between land use and water resource management under a integrated river basin management (IRBM) approach is not well developed in the basin. Focus on has been on the management of water resources through IWRM, balancing of the social, economic and environmental demands for water, rather than the wider basin approach. It

is hoped that through this pilot project the interactions, both positive and negative, between land use and water resources will become clearer and encourage more cross-sectoral policy development.

## 8.2. Objectives and Activities

### Objective:

11. The objective of the demonstration project is to empower local communities to address landscape degradation resulting from overgrazing by implementing locally designed agreed measures favouring sustainable management of communal land. The project will rely on indigenous knowledge and understanding of the challenges of rangeland degradation, the importance of rangelands in traditional culture, and the awareness of degraded conditions. This will be supplemented by expertise in rangeland ecology and sustainable development, which together with the selected communities will design and implement a strategy to reduce pressures on sensitive areas, while also expanding alternate sustainable economic opportunities for communities. The formation of this local management strategy is based on proven principles for governing the communal land: it will be applied within clearly defined boundaries; it will be sensitive to the challenges of the local conditions; those who will be bound by the rules will participate in deciding them; there will be an active internal monitoring system; if the rules are broken the sanctions will be graduated as appropriate; there will be an agreed low-cost easy access conflict resolution mechanism built into the system; there will need to be government acceptance of the right of the organization to form and operate; and the organization will work clearly within the confines of the existing legal institutions.
12. The project will be supported through local stakeholder activities and guidance and designed with the intention of post-project long term sustainability, institutional fit with other institutions, and training of trainers to enable the lessons learned here to be shared with neighbouring communities facing similar challenges. Through respect for indigenous knowledge, support of local institutions, development of alternate sources of income, and a strong emphasis on replicability, this demonstration project seeks to improve rangeland conditions while also preserving local understanding of the ecology of these areas.

### Output 1: Inception report and Site selection

- **Activity 1: Conduct literature review**
  13. The literature review will cover a wide array of strategies to determine best practices of indigenous populations in implementation of *range* management and communal land protection in environmentally sensitive areas. The review of projects will include arid regions as well as mountainous highlands. Also the review will cover strategies of projects implemented in targeted cultures that address environmental management of communal lands.
- **Activity 2: Develop overall project plan based on recommendations from stakeholders**
  14. The project team, including select members of ORASECOM's Basin Wide Stakeholder Forum and National Stakeholder forums, will develop an overall project plan based on findings of the literature review. The plan will be refined with inputs from local specialists familiar with project implementation within communities, range land ecologists, traditional leaders, farmers/ pastoralists, and local authorities, and community organizations.

- **Activity 3: Develop site selection criteria for demonstration sites**
15. Sites will be nominated and selected based on the weighted criteria developed by the project team based on the literature and with inputs from stakeholders. It is anticipated that two communities in each country will be selected. The criteria will likely consider the following:
- likelihood of success and input of community for sustainability;
  - potential for replication;
  - current resources availability to the community;
  - trends, challenges and conflicts existent in the area;
  - potential for training local population to train others in neighbouring communities;
  - inter-community tensions over resources, range land use and other issues;
  - ethnic make-up as relevant;
  - community leaders able and willing to accept responsibility for project implementation.
- **Activity 4: Site selection**
16. Based on the criteria and available communities the project will make the selection of sites with inputs of project staff, experts, National Focal Points, and stakeholders. This will also take into account other community based range land management practices currently underway in the basin, and will work to compliment these efforts as appropriate. The selection process will involve nomination of candidate communities, through coordination with other development projects, project staff familiar with communities within the basin, Wildlife Management Area affiliates in Botswana and Grazing Association liaisons in Lesotho, and through the literature review. The candidate sites will be visited by the project staff before final site selection.

## **Output 2: Assessment of baseline and identification of land management issues**

- **Activity 1: Conduct baseline studies**
17. With community leader and identified community stakeholders, the next step is to identify the land management issues, major challenges, and potential solutions. Local studies will be undertaken to establish baseline conditions, and will include documentation of current management practices, photographic surveys, interviews with the elderly who can relate how changes have occurred and assessments of the recent climatic change impacts.
- **Activity 2: Conduct a community specific socio-economic evaluation**
18. Concurrently with the assessment of the baseline, the project will conduct community specific socio-economic evaluations. It will characterize the selected communities by variables which will be needed for future comparison and replication. These include:
- The social role of herds within the traditional culture and impacts on existing herding behaviours and beliefs regarding rangeland management;
  - The economic importance of herding at local, district, national, and basin-wide levels;
  - The role of environment and environmental stewardship within communities via surveys with individuals;
  - The economic impact of current overgrazing practices, and impacts of alternate scenarios;
  - The shifts in gender roles, if any, as a result of demographic changes in the region;

- Potential for alternate income sources within the community that may decrease the overall dependence on grazing for economic sustenance.
- 19. Following the socio-economic evaluations, the project will draft community specific socio-economic reports to be presented at community meetings, emphasizing the range of strategies available based on the scenarios developed within the literature review and inception report.
- **Activity 3: Hold meeting with community to identify options**
- 20. In order to decide how to best address and improve the conditions, the community will be asked to gather at an open meeting for presentations on the strategies, the overall plan, the summary findings of the baseline studies, and the results of the community specific socio-economic evaluation. With as many community stakeholders as possible, the meeting will select appropriate preliminary approaches to use within the specific community. Community feedback throughout the meeting will be critical to ensure support for the project and consensus building regarding rangeland management strategies to be employed in the area.

### **Output 3: Formation of community land management committees (CLMCs)**

- **Activity 1: Select CLMCs**
- 21. At the open community meeting, the group will be asked to nominate members of a local CLMC to provide more in depth information and to be directly involved with the project implementation. The CLMC members will need to be closely related to the issues to be addressed and able to commit time for meetings, assistance with monitoring and evaluations. The CLMC members may include, inter alia, community elders, herders, farmers, teachers, and community leaders. These members should be representative of the community demographics and should be weighted for those who are most economically dependent on animal husbandry.
- **Activity 2: Train CLMC**
- 22. Once recruited, the CLMC will receive training on aspects of the project that will enable them to implement and enforce the agreements made by the community, such as where to graze, what times of year to use which pastures, and how to reduce range land erosion and what the boundaries of the governed area include. Additionally, they will receive more advanced training on principles of range land management, including issues of soil degradation, desertification, and flora and fauna identification, rudimentary climatology, and basic ecology. Monitoring and evaluation strategies will also be introduced to the CLMC. In later parts of the project the CLMC will receive “training of trainers” and curriculum implementation training to be shared with neighboring community.

### **Output 4: Develop management plan based on best practices, including long term monitoring plan**

- **Activity 1: Develop community specific management plans and alternate income sources**
- 23. Based on the inputs from the community meetings and CLMC trainings, the CLMC and the project experts will develop a management plan based on best practices and governance principles outlined in the project objectives to be applied locally. The plan will need to conform to local traditional justice systems, as well as national laws and regulations and will need formal support of the agencies responsible for oversight of range land management. The management plans will be presented to the whole

community for comment and revision in order to insure acceptance and buy-in to the project.

24. The management plan will set objectives and targets to restore the lands, as well as explore options for alternate income sources for communities to reduce pressures brought about by grazing. Though land tenure patterns will be difficult to adjust, they will be addressed and where agreed, altered to enhance preservation of sensitive areas. The alternate income activities, will be explored, which will need to stem from local understanding of the needs and capacities and necessary support assessed.

▪ **Activity 2: Design of a long-term monitoring plan**

25. The project experts and CLMC will develop and agree a long monitoring programme and they will review the status of the grazing lands, and make certain that the strategy is being implemented as agreed by the community. The monitoring plan will track the implications of the alternate income source development, its impact on the communities and potential for sustainability following project completion. The monitoring plan will be presented to the community, emphasizing the involvement of herders, to garner further support for the project, with clear delineation of the boundaries, protocols for modifying the agreed rules, role of graduated sanctions, conflict resolution mechanisms, and roles and responsibility of monitors.

**Output 5: Implementation of Strategy and Final report**

▪ **Activity 1: Implement management plans and alternate income strategies**

26. The community and CLMCs will be asked to implement and police the agreed management plan measures and using the monitoring plan to carefully track the benefits and challenges faced on a regular basis. The project team will regularly visit sites to ensure proper implementation and prepare site visit reports. Community monitoring should be overseen by specialists and verified by visits as needed, and adjustments supported in order to refine the strategies to fit the needs of the communities and the ecological conditions.

▪ **Activity 2: Implementation reviews**

27. Annual reviews of the management plan will be undertaken and adjustments made as needed. This will include development of ideas on how to improve conditions for those in communities who are not actively herding livestock, and initial steps towards implementation of those efforts in conjunction with other development projects.

▪ **Activity 3: Final report**

28. For each community and for the full demonstration project, reports will be drafted that include implementation effectiveness, benefits and challenges of the project implementation and detailed lessons learned.

**Output 6: Adaptive Management and Learning**

• **Activity 1: Project implementation**

Project implemented in a cost-effective manner in accordance with agreed work plans and budgets

• **Activity 2: Monitoring and Evaluation**

In order to for the demonstration efforts to be most effective the monitoring of outputs, both socially and technically should be carefully tracked using a specifically designed monitoring and evaluation framework, in addition to the project logframe. The social



indicators should capture the stakeholder perceptions and concerns and improvement in the environment whilst the economic indicators should include the levels of financial benefits and capital investments generated.

▪ **Activity 3: Disseminate of results and replication strategy**

The results of the final report will be widely disseminated through neighbouring communities, to relevant national and regional stakeholders, and to the broader community involved in range management. The project will develop a clear strategy for its replication in the basin, region and in other parts of the world where similar conditions exist.

### **8.3. End-of Project Landscape (Outputs) outcomes**

29. At the conclusion of the demonstration project the following will be available:

- A literature review of best practice in strategies for community based range land management which will inform additional projects in the region, as well as within the broader SADC and GEF portfolio of projects. This will include a set of criteria for site selection and review of which strategies work most effectively in which conditions.
- A baseline assessment of local conditions at selected sites, including physiological and socio-economic factors which will influence project implementation. These baseline assessments can serve as a model for future projects, and for future reviews of local conditions.
- Design and implementation of the project at the local level, by the local stakeholders will provide a proven outline for community involvement and resource management projects, with development of alternate income sources to diversify local economies. The reliance on local understanding and knowledge, supplemented by experts as needed increases the sense of project ownership, while also increasing sustainability and overall knowledge base. Local stakeholders are always far more aware of local conditions and have much higher incentives to adapt, especially when that knowledge is harnessed and treated with the respect it deserves. This sets a precedent of increasing strategy effectiveness by building on local knowledge which will benefit similar projects throughout the GEF portfolio.
- Since these strategies will be locally and legally legitimate within the contexts of existing traditions and regulations and because members of the CLMC have been trained as trainers, additional projects are expected to emerge. It is assumed that they will be sustainable within the communities.
- Improved range land conditions through decline in non-sustainable grazing practices, allowing for long term adherence to traditional activities, while improving local capacities and conditions
- Increased empowerment of local communities to address the challenges of rangeland management based on indigenous knowledge and documentation of this knowledge for future generations

### *9. Rationale for GEF Involvement and Fit with GEF Operational Programmes and Strategic Priorities*

30. This demonstration project matches the GEF Operational Programmes and Strategic Priorities through emphasizing community involvement in addressing trans-boundary challenges, that focuses on combining local knowledge and action with experienced from around the world. This project has potential for replication in communities throughout the basin/ region, and in areas where common property management requires innovative solutions that result in concrete outcomes.

31. This demonstration project also builds on the applied principals of integrated land and water management, through activities specifically designed to reduce anthropogenic impacts on sensitive landscapes, and improvement of conditions impacting water flows within the basin. This is done through reduced land degradation and desertification so that ecosystem function can be improved.

#### **10. Project Management Structure and Accountability**

32. The project will be contracted under international tender procedures. There will be an open invitation for expressions of interest and a short-list of tenderers will be assembled in consultation with ORASECOM. The project execution will be over seen by the GEF Project Coordination Unit based in the ORASECOM secretariat. A demonstration Project Implementation Unit (PIU) will be established with satellite offices at each demonstration site. The PIU will report to the GEF project manager and the national project coordinators who in turn will report to the National Focal Points. The demonstration project through the PCU shall report regularly to the Steering Committee.

#### **11. Stakeholders and Beneficiaries:**

33. The stakeholders involved in this project, and the beneficiaries include local rural communities within the region, herdsman, traditional leaders, farmers/ pastoralists, local authorities, community organizations, as well as ecologists, conservationists, educators, and public health care providers.

#### **12: Long-term Sustainability Strategy**

34. The long term sustainability for this project is built into the project design by the implementing community design. The project is based on the recipients' needs rather those of the donor. The self regulation of the management plan is an ideal aspect of the plan's sustainability and will need to be carefully nurtured. The long-term monitoring plan and regular reporting on its results will demonstrate the management plan's effectiveness, and should provide stakeholders with clear incentives to continue to implement the project.

#### **13: Replicability**

35. The project includes a literature review and investigation of socio economic and physiological conditions that impact project strategy and implementation. The array of options that will be presented to the communities on strategies for community based range land management can be used with other similar projects and the methodology employed here will be further refined with the intention of being applied elsewhere. The training of trainers component will also enable the lessons learned here to be spread to neighboring communities by local stakeholders. The final project report includes recommendations for additional replication in other communities in the basin and wider region.

#### **14: Monitoring and Evaluation Process**

36. The Project Coordination Unit will produce a brief quarterly Progress Report updating the Steering Committee and the project Execution and Implementation Agencies on the

progress of the pilot project based on the approved Logical Framework Matrix (Annex 1) and the project work plan (Annex 2). Once every year a detailed report will be submitted through the Steering Committee to the Executing Agencies. This report will provide a full review of the work plan to identify project achievements and deliveries versus the approved schedule, budget expenditures, recommendations with respect to any amendments to workplan and budget, staff contracting and performance, and any other information required by the Steering Committee and/or the Executing Agencies.

37. The demonstration project will also be subject to:

- Internal Project Implementation Reviews to be conducted by the PC and submitted to the implementing agency every six months.
- An independent final project evaluation to be undertaken in conjunction with the Terminal Evaluation for the FSP.

38. The project evaluations will be carried out in accordance with UNDP-GEF requirements and will cover all aspects of the project. They will include: an assessment of (a) the outcomes generated, (b) the processes used to generate them, (c) project impacts, and (d) lessons learned. Advice will be given on how the M&E results can be used to adjust the work if needed and on how to replicate the results in the region.

#### 15: Co-Funding

39. The total cost of the pilot project is US\$1,350,000 The total contribution requested from GEF is US\$850,000 within a 4 year period (see budget below for details).

<b>TOTAL PROJECT WORKPLAN AND BUDGET</b>						
<b>Award ID:</b>						
<b>Project Title: Improve range land management in the Orange-Senqu River Basin</b>						
<b>GEF Outcome/Atlas Activity**</b>	<b>Sub-components</b>	<b>Amount (\$) Year 1</b>	<b>Amount (\$) Year 2</b>	<b>Amount (\$) Year 3</b>	<b>Amount (\$) Year 4</b>	<b>Total (\$) All Years</b>
1. Inception report and site selection	1. Conduct literature review	10,000				10,000
	2. Develop overall project plan based on recommendations from stakeholders	20,000				20,000
	3. Develop site selection criteria for demonstration sites	5,000				5,000
	4. Make selection of sites	15,000				15,000
	<b>Sub-total</b>	<b>50,000</b>				<b>50,000</b>
2. Baseline assessment	1. Conduct baseline studies	30,000				30,000
	2. Conduct a community specific socio-economic evaluation	10,000				10,000
	3. Hold meeting with community to identify the problems, root causes and options for addressing these	10,000				10,000
	<b>Sub-total</b>	<b>50,000</b>				<b>50,000</b>
3. Formation of community land management committees	1. Select CLMC	5,000				5,000
	2. Train CLMC	20,000	25,000			45,000
	<b>Sub-total</b>	<b>25,000</b>	<b>25,000</b>			<b>50,000</b>

4. Develop management plan based and long-term monitoring plan	1. Develop community specific management plans and alternate income sources	50,000				50,000
	2. Design a long-term monitoring plan		30,000			30,000
	<b>Sub-total</b>	<b>50,000</b>	<b>30,000</b>			<b>80,000</b>
5. Implement of management plan and final report	1. Implement management plan and alternate income strategy					
	2. compare to baseline and adjust on regular basis		200,000	150,000		350,000
	3. Final Report				20,000	20,000
	<b>Sub-total</b>		<b>200,000</b>	<b>150,000</b>	<b>20,000</b>	<b>370,000</b>
6. Adaptive Management and Learning	1. Project implemented in a cost-effective manner in accordance with agreed work plans and budgets					
	2. Monitoring and Evaluation Plan provides inputs for robust adaptive management		10,000	10,000	10,000	30,000
	3. A clearly defined mechanism for replication of the programme				20,000	20,000
			<b>10,000</b>	<b>10,000</b>	<b>30,000</b>	<b>50,000</b>
	<b>Total</b>	<b>175,000</b>	<b>265,000</b>	<b>160,000</b>	<b>50,000</b>	<b>650,000</b>

## ANNEX 1

Improved Rangeland Management Practices		Objectively Verifiable Indicators	Sources of Verification	Assumptions and Risks
<b>OUTCOME</b>	<b>Improved land/range management</b> – <i>Demonstration</i> of self-governance in land/range management in selected communities, principally in Lesotho and Botswana.			
<b>ACTIVITIES</b>	<b>1. Inception report and site selection</b> <ul style="list-style-type: none"> <li>▪ Conduct literature review</li> <li>▪ Develop overall plan based on recommendations from stakeholders</li> <li>▪ Develop sit selection criteria for demonstration sites</li> <li>▪ Make selection of sites</li> </ul>	Project Plan and inception report drafted-PI Sites criteria defined and site selected-PI	Project Plan and inception report Criteria and site selection report	Appropriate sites selected
	<b>2. Assessment of baseline and identification of land management issues</b> <ul style="list-style-type: none"> <li>▪ Conduct baseline studies</li> <li>▪ Conduct a community specific socio-economic evaluation</li> <li>▪ Hold meeting with community to identify the root causes and options</li> </ul>	Baseline assessment conducted-ESI  Socio-economic study drafted-ESI	Baseline assessment  Socioeconomic evaluation	Baseline reflective of actual conditions Socio-economic evaluation using appropriate variables  Community committees have appropriate authority to over see project implementation
	<b>3. Formation of community land management committees with stakeholder advisory forums</b> <ul style="list-style-type: none"> <li>▪ Select SHAF</li> <li>▪ Train SHAF</li> </ul>	Community land management committees/stakeholder forums formed-PI	Community committee meeting minutes Management plans	Stakeholder advisory forum supportive of project goals
	<b>4. Develop management plan based on best practice, including M&amp;E framework.</b> <ul style="list-style-type: none"> <li>▪ Develop community specific management plans</li> <li>▪ Design a M&amp; E framework</li> </ul>	Management plans developed-PI	Evaluation and lessons learned report	Applicability of best practices
	<b>5. Implement improvement measures</b> <ul style="list-style-type: none"> <li>▪ Implement management plan</li> <li>▪ Compare to baseline and adjust on regular basis</li> </ul>	Improvement measures designed and implemented- SRI	Report on implementation	Improvement measures effective
	<b>6. Monitor and disseminate results</b> <ul style="list-style-type: none"> <li>▪ Verify monitoring with specialists</li> <li>▪ Draft report on lessons learned</li> </ul>	Results disseminated--PI	Dissemination materials	Project replicability
	<b>7. Adaptive Management and Learning</b> <ul style="list-style-type: none"> <li>▪ Project implemented in a cost-effective manner in accordance with agreed work</li> </ul>	Lessons learned report drafted to include budget review and recommendations for additional	Study report on replicability of study Project budget review	Replication of project and findings

	<b>Improved Rangeland Management Practices</b>	<b>Objectively Verifiable Indicators</b>	<b>Sources of Verification</b>	<b>Assumptions and Risks</b>
	plans and budgets <ul style="list-style-type: none"> <li>▪ Monitoring and Evaluation Plan provides inputs for robust adaptive management</li> <li>▪ A clearly defined mechanism for replication of the Environmental Flow programme to be implemented in comparable situations</li> </ul>	activities		

ANNEX 2

Component and Activities	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Outcome 1:</b> Inception report and site selection																
Activity 1: Conduct literature review																
Activity 2: Develop overall plan based on recommendations from stakeholders																
Activity 3: Develop sit selection criteria for demonstration sites																
Activity 4: Make selection of sites																

Component and Activities	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Outcome 2:</b> Assessment of baseline and identification of land management issues																
Activity 1: Conduct baseline studies																
Activity 2: Conduct a community specific socio-economic evaluation																
Activity 3: Hold meeting with community to identify the options																

Component and Activities	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Outcome 3:</b> Formation of community land management committees with stakeholder advisory forums																

Activity 1: Select CLMC																		
Activity 2: Train CLMC																		

Component and Activities	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Outcome 4:</b> Develop management plan based on best practice, including long-term monitoring plan.																
Activity 1: Develop community specific management plans and alternate income strategies																
Activity 2: Design of long-term monitoring plan																

Component and Activities	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Outcome 5:</b> Implement management plan and Final report																
Activity 1: Implement management plan																
Activity 2: Implementation review																
Activity 3: Final Report																



Component and Activities	Year 1				Year 2				Year 3				Year 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Outcome 6: Adaptive Management and Learning</b>																
Activity 1: Project Implementation																
Activity 2: Monitoring and Evaluation																
Activity : Dissemination of results																

**PART VI: Orange-Senqu Water Resource and Environment Programme integrated workplan**

See the separate excel file titled “ORASECOM Integrated Work Plan.”

**ANNEX 1: Stakeholder Involvement Plan**

**Stakeholder Involvement Strategy**

**for the UNDP/GEF Project**

**Development and Implementation of the Strategic Action Programme  
for the Orange-Senqu River Basin**

## **Introduction:**

1. Stakeholder involvement in trans-boundary projects increases the range of opinions, ideas and participating populations. In cases where multi-stakeholder involvement has not been widely utilized in decision making processes, or where there are groups who have been marginalized by the norms ingrained in the decision making process, a stakeholder involvement strategy provides guidance for increasing inclusion and a sense of ownership among a broad array of stakeholder groups. The benefits of increased stakeholder involvement in project development and implementation includes obtaining inputs and diverse perspectives from stakeholder groups, incorporating these into project design, development and implementation. Additional benefits include increasing sustainability of project impacts by increasing the range of stakeholders whose interests are met by the project and through an enhanced sense of region wide responsibility for common resources.
2. The rationale for developing a stakeholder involvement strategy for the Orange-Senqu River is that until recently low levels of attention have been paid to the need to secure broad-based public support for uses associated with the Orange – Senqu River Basin. The ORASECOM *Roadmap for Stakeholder Participation* has been commissioned in order to address this oversight through development of an overarching guiding document for ORASECOM. It is anticipated that this *Roadmap* will provide broad guidance for how to increase stakeholder input into decision making of ORASECOM and will provide guidance for ORASECOM about how to appeal to the broader public as beneficiaries of the efforts undertaken by ORASECOM. Additionally, it is anticipated that this *Roadmap* will provide ORASECOM with suggested activities that can be undertaken in order to facilitate stakeholder buy-in to ORASECOM activities to be implemented primarily at the national level and utilizing formal civil society stakeholder organizations.
3. In conjunction with the *Roadmap*, this UNDP/GEF Project Stakeholder Involvement Strategy focuses specifically on the objectives of the UNDP/GEF Orange-Senqu River Basin Project and will delineate the activities and tactics to meet the stakeholder involvement objective of obtaining high quality contributions to the project development and implementation from engaged, diverse and informed stakeholder groups. This will include activities to ensure multi-stakeholder inputs into the Strategic Action Programme, and determining public awareness building and outreach activities, education targeting specific stakeholder groups, public involvement components in demonstration projects, and monitoring and evaluation of the effectiveness of the project.
4. This will be accomplished through a series of activities based on creating a dynamic flow of information to and from the project staff based on a variety of stakeholder ideas and opinions, and allowing a significant portion of the public and stakeholder involvement to be driven by the stakeholders themselves. The findings of the Stakeholder Analysis conducted during the PDF-B phase of the project serve as the empirical basis for both the specific issues to be addressed and approaches to be employed to reduce tensions between groups through collective action towards common goals.
5. The activities of the UNDP/GEF Stakeholder Involvement Strategy are intended to link with the activities of other ORASECOM component projects such as the French GEF, BMZ/GTZ, InWEnt and EU, as well as others working on related activities. Additionally, it is anticipated that the Stakeholder Involvement Strategy will be based on and fully in line with the ORASECOM Roadmap.
6. This strategy outlines the activities of the Stakeholder Involvement Strategy (SIS) through: description of the activity; rationale; recommended tactics for accomplishing the

activity; timeframe within the project; and, suggested monitoring indicators. Definitions for major terms used in this strategy are available in Annex 1.

7. This strategy should be viewed as a framework for more specific actions within the project that will be developed as the project is implemented relying on stakeholder inputs during the SAP development phase of the full sized projects (FSP). This will include constructing a project communication strategy to facilitate broad project outreach and public awareness, public involvement inputs into the demonstration projects, and monitoring of project effectiveness and impacts. It is expected that fulfilment of the strategy will include exchange of knowledge, ideas, challenges and experiences between communities from various other river basins in southern Africa, including the Okavango, Incomati, Zambezi and the Limpopo, as well as other trans-boundary water projects.

### **Background information**

8. The need to support stakeholder involvement and public participation in trans-boundary water management within the UNDP/GEF OSRB Project is based on the findings of the stakeholder analysis, and the need to meet the needs of multiple stakeholder groups with an interest in and/or impact on the ecology of the river basin while avoiding exacerbating tensions among stakeholder groups. The combination of these two will determine the makeup of the Basin Wide Stakeholder Forum (BWSF) and will contribute to the formation of the National Stakeholder Fora (SHF), as well as provide direction for the implementation of the strategy.
9. The Stakeholder Analysis (SHA) for the UNDP/GEF OSRB Project was conducted in February-June 2007. The first phase involved qualitative analysis based on in-depth person to person interviews with over 35 stakeholders in all OSRB countries. This was followed by development of stakeholder analysis surveys administered to over 500 stakeholders representing 37 distinct stakeholder groups in Botswana, Lesotho, Namibia, and South Africa. The survey was designed to gauge stakeholder group opinions, concerns and priorities regarding the specific issues addressed by the UNDP/GEF OSRB Project. These surveys were statistically analyzed and the findings combined with those from the qualitative analysis.
10. The findings of the SHA suggests that there is a need to include a much broader range of stakeholders in the process of decision making so that the needs of many groups can be addressed in a way that does not infringe upon the needs of others. The SHA demonstrated that there were potential tensions between stakeholder groups. These are detailed in the full SHA, and the SIS was designed to assist the project in taking steps to assuage these potential tensions through cooperative mechanisms and goal oriented efforts.

### **Objective and activities:**

11. As noted above the primary objective of the strategy is to obtain quality contributions into the project development and implementation from engaged, diverse and informed stakeholders through inputs into project planning/design, implementation and monitoring of the activities at the national and regional levels. This is to be accomplished through a set of 5 activities stemming from the findings of the SHA and emanating from the inputs of the regional BWSF and National SHF.

**I. Create four national stakeholder fora and one Basin Wide Stakeholder Forum (BWSF) based on findings of the completed stakeholder analysis and drawing on inputs from a wide array of stakeholder groups with diverse interests within the Orange-Senqu river basin.**

**II. Provide input into the project development, including Strategic Action Programme development and demonstration project implementation through the BWSF with linkages to national stakeholder fora charged with supporting National Orange-Senqu Action Programmes.**

**III. Based on the input of the BWSF, develop an iterative communication and outreach strategy for the project that emphasizes broad public awareness building and specific stakeholder group targeted education activities to be implemented through a small grants programme.**

**IV. Develop hands-on stakeholder and public involvement activities at the local level in close coordination with the project SAP Demonstration Projects to be implemented by relevant role-players within the basin.**

**V. Create and maintain an empirical mechanism to monitor and evaluate the effectiveness of the activities to determine what works, what needs improvement and how sustainable efforts are without long term project funding.**

12. This work will be done in accordance with the ORASECOM Roadmap, and will be linked to the activities of the Roadmap. It is intended that these activities will be the starting point for the implementation of the ORASECOM *Roadmap* and they will be mutually reinforcing and complimentary. These efforts will also coordinate with and compliment other national, basin wide and regional projects in order to minimize redundancy and increase complimentary efforts.

13. The following section outlines the tactics that may be employed to accomplish these activities. Additions and adjustments will be made as the project develops and more information becomes available.

**I. Create four national stakeholder fora (SHF) and one Basin Wide Stakeholder Forum (BWSF) for the project based on findings of the completed stakeholder analysis and drawing on inputs from a wide array of stakeholder groups with diverse interests within the Orange-Senqu river basin.**

14. In order for the public involvement strategy to most accurately reflect the needs, concerns and priorities of stakeholders within the region, it will be critical that stakeholders from a broad spectrum of interests and backgrounds are represented on the Basin Wide Forum and the Stakeholder Forum at both the national and basin levels. The make-up of these groups will be based on the findings of the stakeholder analysis and will be selected based on the division over particular project related issues, the degree of salience within specific stakeholder groups and the degree to which these stakeholders are impacted by the conditions.

15. In accordance with ORASECOM's Roadmap for Public Participation the national SHF and BWSF will focus on those groups who do not have a formal voice within the decision making process at the regional level. This will include stakeholders from: Non-Governmental Organization (NGOs), scientists, industrial sector, mining industry representatives, construction industry representatives, agro-industry representatives, regional government officials, district water management officials, municipal government officials, municipal waste manager, nature preserve staff, community based organizations (CBOs), educators and teachers, students, farmers, pastoralists, public health care

providers, member of community near the river, tourism and recreation industry officials and employees, press and media.

16. Other officials from various government sectors may be invited by ORASECOM members to participate in the SHF and BWSF as appropriate. Members of international funding institutions and bilateral development agencies and governmental sectors also are stakeholders who may be included in project activities as appropriate; however they will not be participating members of the BWSF.
17. The members of the BWSF will be elected from amidst the members of the national SHFs.
18. Both the BWSF and SHFs will be run on a consensus based decision making model, with no member given more prominence than any other, regardless of social, economic, or political standing. The emphasis will be placed on building mutual respect, consideration and understanding. The goal of these groups is to create win-win positive sum situations whenever possible, and in cases where it is not, to reduce negative impacts on stakeholders.

**II. Provide input into the project development, including Strategic Action Programme (SAP) development and demonstration project implementation through the BWSF with linkages to national SHFs charged with supporting National Action Programmes for the Orange-Senqu.**

19. Initially members of the national SHFs and the BWSF will be introduced to the project through a workshop that explains the UNDP/GEF TDA/SAP approach, the findings of the stakeholder analysis, the work of the Technical Task Team and the resulting recommendations that emerge from those.
20. The BWSF will then be charged with reviewing the TDA for back ground information, and will be asked to specifically comment on the feasibility and additions to the recommendations that emerge from that. While these recommendations may or may not be followed it is anticipated that this will familiarize the BWSF members with SAP Ecosystem Quality Objectives (EQOs), and set the stage for the development and contributions to the UNDP/GEF OSRB Project Basin Vision.
21. The BWSF will be asked to assist the project to develop the final version of the Basin Vision, and to work with the project and SAP Formulation Team members to develop meaningful EQOs that will favour win-win situations, address concerns of multiple stakeholders in the region and be realistically attainable.
22. The national SHF will also play a similar role to the BWSF with regards to the development of the National Action Plans, though where national planning procedures already allow for stakeholder input their involvement may be less critical. It is hoped that these groups will be able to have an impact and work with National Coordinators to improve conditions for stakeholders at the local and national levels.
23. The BWSF will also be charged with assisting the project to determine optimal public and stakeholder involvement activities to support and compliment the GEF Pilot Projects. It is hoped that these pilot projects will provide a model for public participation in future SAP implementation. This is more fully developed in Activity IV below.

**III. Based on the input of the BWSF and national SHFs, develop an iterative communication and outreach strategy for the project that emphasizes broad public awareness building and specific stakeholder group targeted education activities to be implemented through a small grants programme.**

24. An iterative communication and outreach strategy for the UNDP/GEF OSRB Project is intended to reach a broad array of stakeholders, and the general public, as well as more specific and targeted stakeholder groups. The messages to be sent to these will be different and based on both awareness raising about the nature of the challenges to the Orange-Senqu River environment, and shifting behaviours and actions of specific stakeholders to reduce negative impacts on the environment.
25. A second more focused effort will be developed to increase educational outreach to specific stakeholder groups through targeted activities specifically outlined in the stakeholder involvement component of the project document and the demonstration projects. The intention is to increase awareness and introduce alternative practices to stakeholders in the region. These efforts will be focused on specific stakeholder groups, such as public health care providers, sustenance farmers, ranchers, or educators. The approach will be to demonstrate the logic behind current approaches, the empirical evidence of the impacts of these approaches, and introduction of alternative practices.
26. The BWSF will serve as the body that provides the critical inputs for the more detailed development and implementation of the strategy and the specific stakeholder education projects based on the findings of the SHA and the TDA. The BWSF will be asked to help identify specific areas where these efforts will be most effective and then develop specific messages to target groups and over all awareness building. The support of an environmental communications expert may be obtained in order to ensure optimal outputs and strategy design. The communication and outreach strategy should use social marketing approaches to reach the public and should be done through a series of iterated activities and information campaigns so that they can build on one another, and increase understanding and need for action gradually and more effectively. This will be based on the strategy guidelines developed by UNDP/GEF in the manual *“Communicating for Results! A Communications Planning Guide for International Waters Projects”*
27. Once the efforts and activities have been identified and initially developed through the strategy, expressions of interest including specific approaches to be used, budgets, trans-boundary areas and such will be solicited from trans-boundary partners. These will be awarded based on criteria established by the BWSF and will be supported through activity specific small grants administered by the project. The small grants will have a specific monitoring and evaluation criteria and may be administered based on the criteria for NGO selection set by ORASECOM within *the Roadmap*.

**V. Develop hands-on stakeholder and public involvement activities at the local level in close coordination with the project SAP Demonstration Projects to be implemented by relevant role players within the region.**

28. The BWSF and concerned national SHFs will also be charged with advising the project in the development of public involvement activities that are directly linked to the technical demonstration project to be implemented during the SAP development phase of the project. The BWSF will provide ideas, and assist in the development of strategies to increase the public in communities near the selected sites for the demonstration projects. It is anticipated that the respective BWSF and national SHF members will have a unique set of vantage points that can provide much needed understanding of how these issues are currently viewed and how communities can be recruited to assist in the project, and as a result become more invested in the outcomes.



29. For these activities, the BWSF will assist in the development of ideas, provide criteria for selection for proposals from NGOs and other relevant organisations, and devise monitoring and evaluation indicators for the public involvement strategy. These activities will be conducted in line with activities of the ORASECOM *Roadmap* and will, where possible and appropriate, reflect the findings of the IW:LEARN *B4 Component on Improving Public Involvement in GEF IWPs*.

**VI. Create and maintain an empirical mechanism to monitor and evaluate the effectiveness of the activities to determine what works, what needs improvement and how sustainable efforts are without long term project funding.**

30. A significant challenge to the field of public participation and stakeholder involvement is adequate and meaningful monitoring and evaluation of activities. The causality of changes in behaviours, the impacts of outreach activities, and the effectiveness of projects are often inappropriately measured and lack empirical validity. As such it becomes difficult to know if the activities had the intended impacts. Therefore this strategy includes the development of an empirical mechanism to monitor and evaluate the effectiveness of activities. This is intended to gauge what is effective, where improvements can be made and how to increase long term sustainability after funding from the project is no longer driving activities.
31. A second end-of-project stakeholder analysis should be conducted to identify where changes have or have not been effective. This will be based on the findings of the initial SHA and target specific issues and stakeholders identified as critical during the FSP phase of the project. Additionally, the broader public will also be surveyed to determine if the project has had inputs on the specific groups. This will be a significant portion of the monitoring and evaluation of the communication strategy and stakeholder education activities.
32. A critical review meeting will be held with project staff and select members of the BWSF to determine the quality and impact of inputs into the SAP development. It is anticipated that there will be significant lessons to be learned through this and the critical review meeting will provide an opportunity to assess the positive and negative impacts of this so that both this and future projects can benefit from the findings and conclusions reached in this meeting.
33. Finally, BWSF, the concerned national SHFs and project staff will be charged with reviewing the impacts of the public involvement in the demonstration project activities. These will be reviewed in terms of the unique approaches employed, the receptivity of communities and the long term impacts these activities have on communities.
34. The final output from the monitoring and evaluation of the public participation and stakeholder involvement activities will be critically reviewed and lessons learned report will be produced to provide information for related projects and inputs, as well as for ORASECOM to consider for future public involvement activities.

## Stakeholder Involvement Strategy ANNEX 1

### Definition of Terms

There are several terms that continue to present conceptual challenges to the development of public involvement strategies. The terms “public”, “stakeholder”, and “participation”, are routinely, and often erroneously, interchanged in discussions and project designs. The working definitions for this particular strategy are as follows:

*Public:* The population as a whole, including a wide array of stakeholders, both those active and latent, who are not specifically defined by their status as members of other professional, social, civic, hedonistic, or economic stakeholder groups in relation to the river basin.

*Stakeholder:* A member of a specifically defined group sharing a common interest in river issues, based on professional, social, civic, hedonistic, or economic concerns. It is possible that an individual can be a member of several stakeholder groups at the same time. Stakeholder interests can be active and organized or latent and unorganized. Stakeholders can be actively or passively involved in the issues addressed by the project. They can either be impacted by and/or impacting the issues addressed by the project.

Stakeholders for this project include the following groups: Non-Governmental Organization (NGOs), scientists, industrial sector, mining industry representatives, construction industry representatives, agro-industry representatives, regional government officials, district water management officials, municipal government officials, municipal waste manager, nature preserve staff, community based organizations (CBOs), educators and teachers, students, farmers, pastoralists, public health care providers, member of community near the river, tourism and recreation industry officials and employees, press and media, and members of international Funding Institution and bilateral development agencies. Governmental sectors also are stakeholders who may be included in project activities as appropriate.

*Participation:* The act of taking part in activities of the project in order to reach the goal of a healthier Orange-Senqu River system. This may be done through receptive participation, in terms of receiving information and education about actions that can be taken to improve conditions, and through active participation by taking part in activities and potentially continuing to be involved in those activities.

*Involvement:* Making a direct contribution to the project through providing direct input and assisting in guiding the project design and development. Involvement is more dynamic and multidirectional than participation, and stresses a sense of ownership through consensus building and extended interactions based on establishing and maintaining an ongoing relationship with the project, and project activities.

Therefore a stakeholder involvement strategy involves encompassing the broader public through interactions specifically designed to support the participation of a wide array of stakeholders in activities in support of the project.

<b>Stakeholder Group</b>	<b>Type of involvement</b>
1. Water, Hydro-meteorological Department/Ministry	Interministerial/interdepartmental/interdepartmental Committee, Technical working group, Review Team, Capacity building, SAP/NAP Development working group, BW Water Preservation Campaign support, Education outreach, Demonstration project(s)
2. Conservation/Environmental Dept./Ministry	Interministerial/interdepartmental/interdepartmental Committee, Technical working group, Review Team, Capacity building, SAP/NAP Development, BW Water Preservation Campaign support, Education outreach, Demonstration project(s)
3. Fisheries Dept./Ministry	Interministerial/interdepartmental/interdepartmental Committee, Technical working group, Review Team, SAP/NAP Development, BW Water Preservation Campaign support, Demonstration project(s)
4. Industry Dept./Ministry	Interministerial/interdepartmental/interdepartmental Committee, Review Team, SAP/NAP Development
5. Energy Dept./Ministry	Interministerial/interdepartmental/interdepartmental Committee, Review Team, SAP/NAP Development
6. Mining regulation agency	Interministerial/interdepartmental/interdepartmental Committee, Technical working group, Review Team, BW Water Preservation Campaign support, Demonstration project(s)
7. Finance Dept./Ministry	Interministerial/interdepartmental/interdepartmental Committee, Review Team, , Demonstration project(s)
8. Foreign Affairs Dept./Ministry	Interministerial/interdepartmental/interdepartmental Committee, Review Team, International Legal review, SAP/NAP Development, , Demonstration project(s)
9. Agriculture Dept./Ministry	Interministerial/interdepartmental/interdepartmental Committee, Technical working group, Review Team, SAP/NAP Development, BW Water Preservation Campaign support, , Demonstration project(s)
10. Social Welfare / Public Health Dept./Ministry	Interministerial/interdepartmental/interdepartmental Committee, Technical working group, Review Team, SAP/NAP Development, BW Water Preservation Campaign support, Demonstration project(s)
11. Labour Dept./Ministry	Interministerial/interdepartmental/interdepartmental Committee, SAP/NAP Development
12. Elected politician	SAP/NAP Development support, BWSF/NSHF, Demonstration project(s)
13. Water management parastatal	Technical working group, Review Team, Review Team, Capacity building, BW Water Preservation Campaign support, Demonstration project(s)
14. Power utility	Review Team, BWSF/NSHF, BW Water Preservation Campaign support, , Demonstration project(s)
15. Tourism/Recreation Sector	Review Team, BWSF/NSHF, BW Water Preservation Campaign support, Education outreach, Demonstration project(s)
16. Mining sector	Review Team, BWSF/NSHF, BW Water Preservation Campaign support, , Demonstration project(s)
17. Industrial sector (factory)	Review Team, BWSF/NSHF, BW Water Preservation Campaign support, , Demonstration project(s)
18. Construction industry	BWSF/NSHF, BW Water Preservation Campaign support, , Demonstration project(s)
19. Agro-industry	Review Team, BWSF/NSHF, BW Water Preservation Campaign support, , Demonstration project(s)
20. National/regional government official	Technical working group, Review Team, Capacity building, SAP/NAP Development, BWSF/NSHF, BW Water Preservation Campaign support, Demonstration project(s)
21. District water management official	Review Team, Capacity building, BWSF/NSHF, BW Water Preservation Campaign support, Education outreach, Demonstration project(s)
22. Municipal Government	Capacity building, BWSF/NSHF, BW Water Preservation Campaign support, Education outreach, Demonstration project(s)
23. Municipal waste official	Capacity building, BWSF/NSHF, BW Water Preservation Campaign support, Demonstration project(s)
24. Non-Governmental Organization (NGO)	Review Team, Capacity building, BWSF/NSHF, BW Water Preservation Campaign support, Education outreach, NGO Forum, , Demonstration project(s)
25. Scientists	Technical working group, Review Team, Capacity building, BWSF/NSHF, BW Water Preservation Campaign support,, Education outreach, NGO Forum, , Demonstration project(s)
26. Conservationist	Technical working group, Review Team, Capacity building, BWSF/NSHF, BW Water Preservation Campaign support, NGO Forum,, Demonstration project(s)
27. Community based organization (CBO)/ Village development committee	Review Team, BWSF/NSHF, BW Water Preservation Campaign support, Education outreach, NGO Forum, , Demonstration project(s)
28. Educator/teacher/academic	Capacity building, BWSF/NSHF, BW Water Preservation Campaign support, Education outreach, NGO Forum, , Demonstration project(s)
29. Student or youth group member	BWSF/NSHF, Education outreach
30. Stock Farmer	BWSF/NSHF, BW Water Preservation Campaign support, , Demonstration project(s)
31. Factory farmer (chickens, feed-lot piggery)	BWSF/NSHF, BW Water Preservation Campaign support,
32. Irrigation Farmer	BWSF/NSHF, BW Water Preservation Campaign support, , Demonstration project(s)
33. Dry land cropping farmer	BWSF/NSHF, Demonstration project(s)
34. Health care provider	BWSF/NSHF, Education outreach, Demonstration project(s), Demonstration project(s)
35. Member of community living near the river	BWSF/NSHF, BW Water Preservation Campaign support, Education outreach, Demonstration project(s)
36. Press/media	BWSF/NSHF, BW Water Preservation Campaign support, Education outreach, NGO Forum,, Demonstration project(s)
37. International Funding Institution/ Bilateral development org.	Review Team, Donors Meeting, NGO Forum, , Demonstration project(s)

**Annex 2: Stakeholder Analysis**

**Development and Implementation of the Strategic Action Programme  
for the Orange-Senqu River Basin**

**UNDP/GEF**

**STAKEHOLDER ANALYSIS**

**February – July**

**2007**

## **EXECUTIVE SUMMARY:**

The Trans-boundary Diagnostic Analysis (TDA) for the UNDP/GEF Development and Implementation of the Strategic Action Programme for the Orange-Senqu River Basin calls for a Stakeholder Analysis (SHA) based on GEF International Water Projects (IWP) Best Practices. This Qualitative SHA is a key component and results from a set of interviews conducted with stakeholders in the countries of Botswana, Lesotho, Namibia, and Republic of South Africa in February and March of 2007. The Quantitative SHA (QN SHA) was developed and implemented between February and June 2007, and involved survey based analysis of more than 400 stakeholders from 37 groups across the basin.

This Stakeholder Analysis report includes an introduction of the project and the place of the SHA in the project, followed by a short review of the methodology employed and a list of stakeholders interviewed and their respective professional positions. The SHA then outlines the specific findings based on these interviews, including the salience levels for specific stakeholder groups. These findings are delineated by major themes identified during the QL SHA interview processes. These themes are:

- Water quantity
- Impacts of Climate Change on water regime including quality, quantity and ecosystems
- Water regime influences on biodiversity
- Water quality
- Other social and economic issues impacting project design and implementation

This analysis was conducted in two major segments, a Qualitative SHA (QL SHA) and a Quantitative SHA (QN SHA). The QN SHA is based on 36 interviews in Botswana, Lesotho, Namibia and South Africa with employees of departments dealing with environmental affairs, tourism, water affairs, meteorology, forestry, agriculture, national water managers and parastatals, agronomic boards, mining industry, scientists, NGOs, tour guides, river community members, members of ORASECOM, and other international organizations working on other ORASECOM projects, including French GEF, and BMZ/GTZ.

In more detail, the main issues of concern voiced during of the SHA interviews are: Stakeholders had two sets of concerns related to water quality and the current flow regime in the river basin. The first set of concerns was on the policies for current use and the second set was on the impacts of those policies. The current policies are perceived to favour short term economic development needs such as industrial development, energy industry, and non-sustainable agriculture practices. Stakeholders voiced a concern that South Africa as the major economic power in the basin drives the majority of water use policy; with a ripple effect that impacts the full basin. The impact of policies for water use in the basin cited as concerns for stakeholders were the lack of monitoring of abstraction rates throughout the basin, depletion of groundwater resources, impact on the natural ecology throughout the basin, lack of adequate amounts of potable water for communities in some portions of the river basin, and regulated river flows that are not in accordance with natural seasonal flow variation.

Stakeholders raised concerns about the potential impacts of climate change as it related to the current water regime as well, with specific concerns regarding the impact of reduced water quantity and quality on humans, the environment and economic development within the basin. Almost every stakeholder raised concerns about the potential decline in rainfall and snowfall in the catchment area significantly impacting water resources and the negative economic conditions that could result in. Stakeholders were apprehensive about how climate change could affect human health through severe weather events, increase in waterborne illnesses and other human and economic developmental issues. Additionally, stakeholders noted that weather patterns seemed to have changed noticeably within their lifetimes. Many felt that there was a need for pre-emptive planning and for more attention to various scenarios within the water management process.

Stakeholders also voiced their trepidation regarding the biodiversity in the basin as it has been influenced by the existing water regime. There was concern that economic development policies reduced available water for ecosystem health within the river basin. Specific examples included the need to preserve the ecosystem of the Lesotho highlands, which have been disrupted by human activities. The increase in human populations and grazing of livestock has diminished soil quality and led to erosion. The erosion is exacerbated by an increase in ice rat populations burrowing into wetlands combined with the decline in natural predators such as birds of prey and jackals, due to human activities. This has resulted in degradation of the Lesotho highland wetland sponges, which will have potential impacts on water flows if not restored. Concern was expressed that fish species are being lost due to the construction of dams, such as the Lesotho mullet minnow which is threatened by introduced species, such as North American trout.. Overfishing of Yellow Fish in the Orange River has raised concerns among some stakeholders. The fragile and degraded Ramsar sites in the Lower Orange are also concerns for stakeholders.

Some stakeholders, especially those downstream, were distressed about the water quality of the Orange-Senqu River. While some specifically drew attention to pollution from Blue Green Algae and municipal wastes, others felt that the water in the Lower Orange was pristine. Still others mentioned pollution from mining, from industrial use and from the energy industry as degrading the waters, though this concern was more nationally, rather than internationally, relevant to stakeholders.

Stakeholders raised other concerns such as confusion regarding border delineation between RSA and Namibia. They also discussed the perceived need for public involvement in basin water management, and a lack of government involvement in building capacity for the next generation of water managers. Social issues, such as HIV/AIDS and unequal economic development, and social transitions in the post-Apartheid era were raised as issues within the basin that may also impact water use schemes in the future.

Recommendations regarding next steps and future actions include targeting under-represented stakeholder groups within the next phase of the analysis with the quantitative stakeholder analysis; take steps to initiate implementation of stakeholder fora in order to provide feedback for the project and the programme at an early stage in its development; and, stress cooperation and coordination with other companion projects throughout the TDA/SAP process.

The QN SHA demonstrated that there are more commonalities among stakeholders, both between groups and between countries than initially expected. Despite these similarities, there are divergent areas which will need to be addressed by the project.

The QN SHA first reviews the major trans-boundary issues identified by the TDA Technical Task Team (TTT), then addresses salience of issues for specific stakeholder groups. Within this framework, stakeholders respond to questions addressing issues of water quantity, landscape degradation and desertification, water quality, alteration in river flow, biodiversity and invasive species, and perception-based issues pertaining to other groups and the sources of information.

The most significant and salient issue for stakeholders in the QN SHA is water scarcity, closely linked with landscape degradation and desertification. The stakeholders who are more immediately dependent on sustenance agriculture and herding are more heavily impacted, while other stakeholders are less directly involved. Nonetheless, the similarities between stakeholders, including those with economic incentives for water withdrawals, remained strong and should be built upon within the project. These “economic stakeholders” will be critical to project success and implementation as they hold tremendous influence within the basin.

Also important to stakeholders was the issue of biodiversity and environmental protection. Stakeholders across the board appear to be very aware of the economic importance of the preservation of wildlife, of human impacts on biodiversity in the basin and the need to take steps to improve conservation measures. There appears to be a lack of developed intersectoral linkages and contacts between governmental organizations to make these improvements and there was some degree of frustration voiced by some civil society stakeholder groups in this regard. It is hoped that within the project this will be addressed through coordination mechanisms.

Overall there is a strong need for education and efforts to build awareness, and it appears that support for these efforts will be available from a broad range of government institutions at a number of levels. The stakeholders seem eager to know more, and expansion of understanding and awareness of the importance of the Orange-Senqu River in Southern Africa can be fostered through the project. Additionally, sector specific training efforts will substantially improve water based environmental stewardship, especially if designed to focus on win-win scenarios.

The findings of the QL SHA and QN SHA culminate in a series of project recommendations focusing on:

- Awareness raising and social marketing that increase the prominence of these issues and empower stakeholders to take action to improve their conditions.
- Sector specific recommendations that target specific groups through activities that may improve conditions.
- Training that provides specific educational opportunities to stakeholder groups and builds basin capacity.

- Stakeholder involvement in project activities that feature key groups to consider for specific project inputs.

The SHA and recommendations to date should be viewed as an empirical baseline that can serve as a gauge for project activities, as well as other inputs within the basin to improve stakeholder involvement in trans-boundary water management.



## Table of Contents:

I. Introduction	7
II. Methodology	8
Quantitative	
Qualitative	
III. Qualitative Analysis Findings: Issues of Concern	10
Water Quantity issues and flow regimes:	
Impacts of Climate Change on water regime including quality, quantity and ecosystems:	
Water regime impacts on biodiversity:	
Water quality issues:	
Other issues:	
IV. Quantitative Analysis Findings by Issue	18
Stress on surface and groundwater resources	
Changes to hydrological regime	
Deterioration of water quality	
Land degradation/ Desertification	
Climate change impacts (current and future)	
Alien invasive species (new plants and animals)	
Biodiversity	
General Attitudinal Questions	
V. Quantitative Analysis Findings Responses by Stakeholder Group	31
VI. Conclusions	78
VII. Recommendations for Next Steps	80
Annex 1 – QL SHA Interview participants and schedule	84
Annex 2 – QN Stakeholder Analysis Survey	87
Annex 3 – QN SHA Group Representation	91

## **I. Introduction:**

The overall goal of the Project is to improve the management of the Orange Basin's trans-boundary water resources through integrated approaches to Water Resource Management (IWRM) that remediate threats and root causes. An IWRM approach considers the interrelationships between natural resource systems, biophysical processes and socio-economic systems and objectives. IWRM seeks to integrate broad ecological, social and economic objectives into the management of the overall water resource, taking into account factors outside of the water sector (e.g., agriculture and energy and such issues as land degradation and climate change). The Project will develop mechanisms to ensure the cooperative and sustainable use of the land and water resources of the Orange River Basin; develop and support short, medium, and long term management objectives and strategies for the river basin; build capacity to adapt river basin management as circumstances change; develop and implement measures to sustain and enhance overall environmental health within the basin; create a comprehensive stakeholder involvement programme; and strengthen basin institutions, particularly ORASECOM, to ensure the long term sustainability of interventions. The Project will create synergies with and build upon a range of initiatives being undertaken in the Basin by the four countries and affiliated donor bodies. The focus of GEF involvement will be on addressing trans-boundary water management issues, as identified in priority sequence through a trans-boundary diagnostic analysis (TDA) process, and addressed in a Strategic Action Programme (SAP). GEF funding will be drawn upon for preparation of the TDA and SAP, and the implementation of interventions identified in the SAP as basin priorities.

As part of the TDA and in preparation for the SAP a Stakeholder Analysis (SHA) is being conducted. The objective of the Stakeholder Analysis is to identify the major stakeholder groups affected by and impacting the degradation of the OSRB in order to empirically gauge the perceptions of stakeholder groups and incorporate their concerns, perceptions and priorities in project development. The SHA also serves as a base for creating a stakeholder involvement plan, public participation strategy and communication strategy.

The SHA involves identification of major stakeholder groups throughout the basin, and their concerns regarding issues pertaining to IWRM. Once all relevant groups were identified, a consultative qualitative stakeholder survey based on open question interviews was administered to establish a baseline of stakeholder perceptions, referred to as the Qualitative Stakeholder Analysis (QL SHA). This survey was conducted through a basin-wide ground-truthing mission by the SH Analyst, with support of the National Consultants and Regional Consultant. This initial study has informed the Trans-boundary Diagnostic Analysis meeting. It serves as the foundation information for the larger closed question based survey Quantitative Stakeholder Analysis (QN SHA), which was conducted in March and April 2007. The combined results of these create an empirically valid baseline measure of the major challenges perceived by multiple stakeholder groups throughout the basin.

The objective of QL SHA is to ascertain who the stakeholders are for the project, what their interests are and how significant those concerns are throughout the basin,

so as to inform the initial TDA priority issue identification and to develop the survey for the QN SHA.

The secondary objective of the QL SHA is to establish the project within the basin, especially in regard to other donors working in the area and those institutional stakeholders with whom we are collaborating, and hope to continue to do so in the future.

This report presents methodologies for the QL SHA and the QN SHA, the findings of the QL SHA outlining the specific findings based on these interviews, including the salience levels for specific stakeholder groups. These findings are delineated by major themes identified during the QL SHA interview processes. These themes are: water quantity issues; impacts of climate change on water regime including quality, quantity and ecosystems; water regime impacts on biodiversity; water quality; and, other socio-economic issues impacting project design and implementation.

The Findings of the QN SHA are presented, both by major issues identified by the Technical Task Team (TTT) in the TDA development process, and then by individual stakeholder group views and opinions, focusing on the most important issues for these groups. Following the presentation of findings, recommendations are made that are intended for consideration and potential application within subsequent phases of the project.

It should be noted that there are some changes in issues and priorities to be addressed by the project, as well as in the terminology employed between the QL SHA and the QN SHA. The QN SHA is a more advanced reflection of project activities and thinking, as well as the future direction of this project within the Full Sized Project (FSP). The QN SHA was administered to over 400 stakeholders across the basin, from 37 different stakeholder groups. The survey is provided in the annexes, as is the breakdown of respondents by group and country. The analysis for the QN SHA identifies trends within stakeholder groups specifically and suggests what these responses may indicate as they pertain to the group as well as to the project over all.

## **II. Methodology:**

The methodology of the stakeholder analysis is based on UNDP/GEF International Waters Best Practices. The dual approach of combining a Qualitative Stakeholder Analysis with a Quantitative Stakeholder Analysis allows the project to more fully explore an interview topic, in an effort to best understand the causes and concerns of a wide array of individual stakeholders in the Qualitative analysis. Then in the Quantitative analysis a standardized survey instrument is developed, which is less in depth than individual interviews, but covers a wider population of representative stakeholders. This, combined with desk studies in preparation, provides a triangulation of efforts to understand the incentives, issues, perceptions, and concerns of stakeholders throughout the basin.

## **Qualitative**

The qualitative stakeholder analysis methodology must be specifically tailored to the conditions in the basin, the available time, resources and specific needs of the project in the development stages. In the case of the Orange-Senqu River Basin, the presence of three additional large scale international donor projects working to reach similar objectives has resulted in a dual approach to the Stakeholder Analysis, combining interviews with those who are basin project stakeholders and those who are stakeholders to the specific issues being addressed.

A part of the stakeholder analysis has involved conducting meetings with representatives of both of these types of groups and discussing the potential linkages between the projects in order to reduce redundancy, improve project implementation and best serve the needs of the basin. The methodological approach employed here has involved interviewing stakeholders to the project of trans-boundary water management coordination within the basin, specifically representatives of governments, international donor agencies, and ORASECOM, the Orange-Senqu Commission, the local intergovernmental organization for coordination of initiatives within the basin.

Those involved in water management, in project development at the national and basin levels; industry representatives; advocates for sustainable management practices, and NGOs, as well as those living within the basin have been queried during the interview process regarding current major environmental concerns, and what future environmental concerns are likely to develop. These interviews were conducted within a two week time span at the very beginning of the project, in February and March 2007, just prior to the first Technical Task Team (TTT) Trans-boundary Diagnostic Analysis (TDA) meeting. This provided a broad spectrum of concerns and opinions to be taken into account by the project development team.

Stakeholder representatives were selected within the basin based on desk study findings and through the assistance of National Coordinators, project management and recommendations from interview subjects. Annex 1 contains a list of stakeholders interviewed, with dates of interviews. The views presented in this report represent the perceptions of stakeholders voiced, including their perceptions of how others view the situation in the river basin from their unique vantage points.

The approach used to interview stakeholders involved introducing the project, the goals and the role of the stakeholder analysis within project design and development. The stakeholder representatives were asked open ended questions pertaining to their environmental concerns within the river basin, about concerns relating to current conditions and about the impacts of the current water regime on the ecosystem of the basin. Follow-up questions were asked to assist the stakeholders in thinking about these issues and identifying the causes of the problems. Copious notes were taken and served as the basis for drafting this report – most discussions lasted between one and three hours, depending on time availability of the interview subject and the interviewer.

Following the interviews the meeting notes were carefully reviewed to identify trends among and between stakeholder groups. While a small number of highly focused interviews were conducted initially, these findings will serve to inform the larger

scale Quantitative Stakeholder Analysis, which is based on a survey to be distributed throughout the basin.

### **Quantitative**

The methodology employed in the study is based on UNDP GEF IWP Best Practices. The survey was based on the findings of the Qualitative SHA, TDA meetings and inputs from national and basin consultants. The Quantitative Stakeholder Analysis (QNSHA) for the Orange-Senqu River Basin Project was conducted using a standardized survey of 440 individuals representing 37 unique stakeholder groups. (see Survey in Annex 2) The survey was conducted in all OSRB countries in the first quarter of 2007 by National Coordinators and their assistants. In Lesotho, some surveys were translated into the local language (Sesotho); all others were administered in English. The surveys were then coded into a database and statistically analyzed for trends in stakeholder groups and throughout the basin.

All surveys were conducted on condition of anonymity, in order to protect the identity of respondents and individually, to ensure the most honest answers possible. The representative of respondents is presented in Annex 3, by country and by group. Because of the short time frame, it was not always possible to collect equally representative numbers of each group, and in some cases there were no stakeholders from specific groups in specific countries available to participate. These cases were noted within the text and factored into the analysis. The findings of the QNSHA are presented by major issue. As stakeholder concerns are identified and priorities regarding these issues are delineated, areas of potential tensions are highlighted. The second section of findings is broken down by the concerns of specific stakeholder groups.

## **III. QUALITATIVE ANALYSIS FINDINGS: ISSUES OF CONCERN**

### **Water Quantity issues and flow regimes:**

- 1. The economic development issues favour short term benefits, and are often water intensive** - Development plans favour industrial development, power generation and mining interests. The water sector also implements licensing sectors, which sell water at low cost to farmers. The townships now receive water as a result of the RSA constitutionally guaranteed right to access water, and a significant portion of water goes to industrial development, mining and power generation. The water management schemes within RSA which profoundly impact both abstraction rates from Lesotho and outfall to Namibia are adjusted every 6 months based on models that incorporate the sectoral demands described above. Extreme weather events, including severe droughts and floods beyond those within the range of the past 10 years are rarely included within these models, according to engineers. This planning mechanism allows the RSA to drive economic, ecological and even some social conditions in neighbouring countries, and there is growing dissatisfaction among a wide array of stakeholders in both Lesotho and Namibia about this. Botswana is less directly impacted.

2. **RSA economic development strategies dominate the basin.** Historically RSA economic development has been largely based on extractive, manufacturing and agricultural industries. The predominant water schemes that are in place continue to support the economic development in RSA, and a significant portion of the water withdrawal from the river system is for these uses as it was in the past. In the post-Apartheid era the new government focus on social development and equality in South Africa, including the right to access to water has been enshrined in the new RSA Constitution. However, the economic drivers – specifically mining, power generation, agriculture and manufacturing continue to place high demands on the water sector. In addition, the water management legacy of the RSA was built on approaches that focused on economic development rather than the ecological concerns of the wider basin.

Stakeholders shared that there are water releases for environmental demands in the river basin, though they raised concerns that the water releases are not timed to natural cycles and as a result environmental degradation has occurred. These concerns were also raised by the neighbouring states of Lesotho and Namibia, as well as other stakeholders with RSA. While RSA continues to achieve significant economic growth, the benefits are highly concentrated within the country and the concerns of non-economic based stakeholders and those from neighbouring countries are perceived by some stakeholders as immaterial in the decision making sectors of the RSA. In Lesotho, Botswana and Namibia, stakeholders generally advocated for inclusion in water management strategies, however some stakeholders noted a lack of mechanisms and economic support to actively involve non-governmental stakeholders in water management issues. This may be a result of the variation in stakeholders interviewed within each country, but nonetheless remained a prevalent concern.

3. **Current policies pertaining to water favour industry and mining rather than environmental concerns** – Stakeholders felt that additional challenges arise in RSA water planning as water becomes more scarce and the economy shifts towards more heavily industrialized and extractive sectors and as farmers experienced increased costs associated with farming. Stakeholders said that farmers often sell their water rights to industry through water withdrawal permit sales instead of farming lands due to the costs of agricultural development. Stakeholders cited other industries, such as tourism, that also impact the development schemes. The recent proliferation in golf estates, which are highly water intensive, are seen, rightly or wrongly by the local communities, as having placed additional strains on basin water resources.. Again, this results in perceived income and priority discrepancies among stakeholders with significantly lower GDP/capita in the basin, both nationally and internationally. The stakeholders who are more economically marginalized are generally more dependent on immediate environmental conditions, and they perceive the excessive use of water and attitude of entitlement to resources of some more economically prosperous stakeholders to be an affront to collective ownership of resources and sound environmental stewardship.

4. **Slower development of dam schemes in Lesotho and differentiated expectations and national budgets set on trans-boundary sales** – A number of stakeholders throughout the basin cited concerns about Lesotho and the dam development schemes. Although not accurate it was said that Lesotho had sold water rights to RSA in exchange for infrastructure development. The initial plans involved the construction of five dams throughout the Lesotho highlands for storage of water to be released to RSA. However, after the second phase (it is actually called phase 1b – phase 2 is undergoing feasibility studies, some stakeholders assert that RSA claims that the full five phases will not be completed within the agreed time frame, and that there will possibly be only a third dam built within the Lesotho highlands in the foreseeable future. Throughout the basin, stakeholders pointed out that this creates significant challenges for Lesotho for two reasons. First, Lesotho national budget forecasts were based on a five phase dam scheme, and the resulting sale of water and pending infrastructure development anticipated within the national government has not emerged. Second, the low rate of development in Lesotho is perceived by stakeholders to have been stymied by the lack of access to water within their own country, and the need to dedicate money from limited national budgets to purchase water held on their own lands from RSA risks creating tensions between some stakeholders in RSA and Lesotho. While some stakeholders point out that Lesotho now has excellent roads and improved infrastructure, stakeholders counter that Lesotho is suffering from a lack of access to water and social dislocation as a result of environmental marginalization, a human health crisis, and a substantial deficit in the national budget.
5. **GW abstraction rates without replenishment** – The abstraction of ground water from bore holes through unregulated uses for agricultural and pastoral/livestock is a concern for hydrologists and scientists. It appears to be less of a concern for other stakeholders at this point. However, salinization of ground water, minimal to negative replenishment rates from surface waters and overuse have the potential to increase strains on water resources especially in extremely arid zones within the basin. To date, a majority of stakeholders feel that there is not sufficient monitoring or regulation of ground water aquifers and future usage scenarios suggest depletion of these resources. The bore hole dependency of the cattle industry in Botswana and Namibia, as well as a wide number of those in the South African agricultural sector in the lower reaches of the basin suggests that attention to this will be warranted, especially as surface waters are depleted or become unavailable.
6. **Impact of low water flow on farming, including livestock and early grape production, and irrational use practices** - The decline in water flow has impacts on farming, especially in highly lucrative micro climates capable of producing table grapes for sale in upscale European markets 3 weeks prior to other areas. Water releases are timed to ensure that these grapes reach maturity in a timely fashion so that the window of opportunity for favourable market conditions is not missed. This is a very active agro-industry in the lower Orange River in both South Africa and Namibia. The timed releases of water to optimize the early harvest of these table grapes is counter to natural river flow cycles and impacts other down stream stakeholders, including the Ramsar site at the mouth of the Orange River and the environment in general. In addition the use of outdated

irrigation technologies which are highly evaporative have significant impacts on the river systems, and though there is a decline in large scale farming in RSA, the smaller farms now owned by those with traditional land claims continue to use the same water wasting irrigation practices, and the strong emphasis on developing agriculture in already very arid areas which may not be able to support this in the long term.

7. **Inadequate monitoring of farming sectors withdrawal of water from the river** – Withdrawal amounts from the river in RSA are based on licensing schemes, however it is believed that amounts are rarely, if ever, monitored and the increasing drought conditions result in some farmers selling water rights to industry, as a more profitable endeavour than growing crops. Farmer’s withdrawals from the Caledon River bordering Lesotho creates tension between those in Lesotho who must pay RSA for the water, once it is released from the dams for local consumption, and the riparian RSA farmers who withdraw water into their own reservoirs free of charge. For example, the capital city of Maseru is water starved in the current drought; however they must pay RSA for water to be released from the dams within the Lesotho territory. This water, once released, will be initially absorbed by the soils in the river bed. Once those are saturated, the water flows down stream towards Maseru. Once it flows past the farmlands on RSA, farmers there withdraw water from the river for storage in their own reservoirs. As a result the amount of water that reaches Maseru is substantially lower than the amount released and paid for by the government of Lesotho, while the farmers on the RSA are able to top up their water supplies with the water purchased for Maseru by the Lesotho government.
8. **Impact of low water flow on townships with rights to “potable” water sources** The RSA constitutionally guarantees all citizens the right to potable water sources. This requires management of water to ensure that all communities have access to clean water. There was a general perception that in the event of droughts, that water supply to industry rather than the townships would be prioritized.. This creates significant challenges for the water management sector, especially as management rights between those in the national governmental sector and those in the provincial sectors collide in terms of delivery and assurances of access to water to constituencies. This is also problematic in riparian border communities where neighbouring communities do not enjoy this same guaranteed access and view those withdrawing water without paying for it as “stealing” their water. Should drought conditions worsen in this basin, this could result in significant trans-boundary tensions.
9. **Additional dam construction scenarios on the lower Orange River basin** – the potential for construction of a dam between RSA and Namibia has raised some degree of concern with stakeholders in the Namibian water sector. While some are strongly in favour of it in order to reintroduce natural flow streams into the basin, others are less eager to further disrupt water flows throughout the basin. Other stakeholders were eager for the dam to be built in support of the Namibian “Green Scheme”. However, other stakeholders pointed out that the potential for construction of this dam and the issues pertaining to the legal status of the river



and the territorial dividing lines between Namibia and RSA suggest that until these are firmly settled no further dam construction should take place.

**Impacts of Climate Change on water regime including quality, quantity and ecosystems:**

10. **Impacts of climate change on water regime, lack of “scenarios” and the needs for pre-emptive planning** - Throughout the QL SHA interview process climate change was introduced within discussions pertaining to the current drought conditions as an issue which may impact the current water regime. This topic was sometimes introduced by the interviewer, however, often it was after stakeholders discussed how weather patterns seem to be different now than in the past. Some stakeholders suggested that there are unclear scenarios, some of which favour more rainfall, others which suggest marked declines and others which indicate extremes of both floods and droughts for the river basin. Overall a significant majority of stakeholders interviewed agreed that there will be significant impacts, even if exact forecasts are unknown. The general agreement among stakeholders is that planning must begin immediately to address these climatic shifts, especially as they pertain to water regimes within the basin. There were some stakeholder groups in key positions who said that until specifically identified predictive models were available that they would not be able to adjust current schemes to accommodate such patterns.
11. **Potential impacts on economic development and social systems** – In discussions with stakeholders, those who felt that climate change is a reality and a serious threat believed that climate change could seriously impact economic development in the basin by impacting water availability to farmers, industry, mining and the energy production sectors. These disruptions could potentially destabilize current development trends in RSA, with reverberating impacts throughout the basin. In addition, the impacts could most significantly affect those countries and marginalized populations that are already dependent on immediate environmental conditions for survival. The impacts of this could result in increased tensions between those with economic means to adapt to shifting conditions and those displaced by a lack of access to basic environmental services. Further, if resources, such as water become increasingly scarce, tensions between poor communities would be expected to increase. One stakeholder told of the impacts of a recent drought in Lesotho: People went to springs and wells in neighbouring communities to collect water. The residents of the towns threw rocks and chased away the people from drought stricken communities, claiming that the water in the springs and wells belonged only to the members of these towns and could not be shared. If there are extreme weather events this may become a significant micro social challenge with large impacts.
12. **Potential impacts on ecology and biodiversity** – The impacts of climate change could significantly affect the overall ecological functions in the basin, as well as the biodiversity throughout the basin. Shifts in biomes, increased susceptibility to extreme conditions, and opportunities for invasive species will likely all be impacted by a shift in climate. Though this did not rank as an especially high level

concern for stakeholders, it was considered to be quite important in terms of the overall impact of climate change throughout the basin.

13. **Questions and concerns about severity expected and need for preparation** – While most stakeholders believed that climate change is real and would impact the basin, there were those who questioned the severity and need for extreme planning. Several stakeholders in the water sectors were dubious about the potential severity of climate change and said that they could adjust to climate change if and when it happened. However, other stakeholders, including those in the agricultural sector, ecologists, range land specialists, rural community members and scientists felt that immediate action is required. As one advocate for ecology stated “During the Cold War we planned for the worst case scenario and invested heavily in avoiding catastrophes, now when facing Climate Change scenarios we plan for the best case scenarios, if at all. Why is that?” Though this question is complicated, it makes the point that these impacts should be considered seriously, and many stakeholders expressed a hope that this project may be a means for increasing awareness and action among the various governments involved in the project.
14. **Health impacts of climate change and water borne illnesses** – Several stakeholders mentioned that a concern of pending climate change is that malaria could spread into the Orange River basin. While this disease is not waterborne and not specifically a trans-boundary water issue, the presence of malaria in this basin could put further stress on populations and impact social and economic development scenarios.
15. **Shift in microclimates as a result of the current water regime** – In an interview with stakeholders living in the Lesotho Highlands, as well as others, mention has been made that they feel there has been a shift in the local climate towards much colder and harsher winters since the construction of the nearby dams. Other stakeholders have wondered if all of the dam construction could have resulted in a significant shift in the weather in the basin. Though this would potentially apply to the micro climate, there is little evidence that the larger trends have also produced these results.

#### **Water regime impacts on biodiversity:**

16. **Development impacts on biodiversity** - Some stakeholders felt that requirement of Environmental Impact Assessments (EIAs) in RSA development projects has come under fire for not being effectively utilized, allowing developers to unduly influence EIA reviews, and to pressure those conducting them to provide development oriented assessments. Though it may be pointed out that few projects are ever stopped because of the EIA review, they can play an important role in more sustainable development practices and should be considered as such, especially as large scale development schemes move forward. Nonetheless there is a sense that additional development is largely unavoidable and yet has the potential to be even more detrimental to biodiversity throughout the basin.
17. **Lesotho Sponges/highland wetlands preservation** – An area of important trans-boundary impact with significant biodiversity preservation needs is the Lesotho

highlands wetlands referred to as sponges. These “sponges” act as buffers for strong rains and snowfall in the highlands and decrease the rate of release of water downstream. However, due to over grazing by livestock, the quality and absorptive capacity of these sponges is declining. A current French GEF project is being developed to address this, as is a US Government Millennium Challenge Grant, however, the remoteness of the highlands, incentive for herd boys to allow stock to graze in these rich pastures and monitoring challenges increases the difficulties of successfully implementing projects to preserve and restore these highlands. Further, in times of drought these sponges provide critical sources of food for livestock in this area.

18. **Lesotho mullet minnows** - Some stakeholders discussed impacts of construction of the Lesotho Highland dams including the loss of habitat for the Lesotho mullet minnows. These minnows were significantly impacted by this loss of habitat as well as by the increase in introduced species including trout intended to attract international anglers. Unfortunately, the dam reservoirs were too deep for trout to thrive, though they did severely impact the threatened minnows. While this in itself is not a trans-boundary issue, it is a result of a trans-boundary water management scheme. The World Bank funded research into these species, however dam construction continued and as a result these minnows have been largely decimated.
19. **Lesotho ice rats and lack of predators** – Unlike the Lesotho Mullet Minnow, the Lesotho ice rat thrives on changing conditions. Stakeholder explained that when the sponges become vulnerable due to drought and over grazing these ice rats burrow into the soils of the sponges, digging networks of tunnels and warrens. When rains do occur, these subsurface tunnels fill with water, and often rupture the surface of the sponge resulting in increased erosion and damage to the vulnerable sponges. The natural predators of these ice rats – populations of raptors and jackals have been severely reduced by human activities, fed by the belief that both jackals and raptors will kill livestock.
20. **Lower Orange and Ramsar sites** – The lower Orange River basin at the mouth of the river is listed as a Ramsar site. However, stakeholders noted that this protection does not reduce mining activity for alluvial diamonds. While those larger companies working in the river bed area will take steps to restore the surface soils after mining is completed, stakeholders pointed out that smaller firms working outside of these areas often fail to redress the damage they do, in part because of a lack of economic resources. The South African side of the Orange river is listed as a severely degraded wetland as a result of the mining practices, and to date it is believed by stakeholders that no substantive activity is being taken to remedy that situation.
21. **Eco-Tourism needing preservation and water** – Stakeholders voiced a concern that there was an assumption that ecotourism would continue to be a very profitable business in many parts of the basin; however there is a need for ecological water flows that reflect the natural seasonal variations. At the moment these are not occurring and the impacts on wildlife are also having potential impacts on tourism. Further, there was concern voiced that the tourists also need

access to water and failure to assure this could limit future growth of the tourism industry.

22. **Over fishing of Yellow Fish and netting along river reducing species** – Several stakeholders, especially those working in the river itself have noted that over fishing of yellow fish by sports fishermen and riparian residents has reduced the stock of that species. Also it was noted that gill netting is increasing, with impacts on fish populations as well, though that was not a highly relevant issue.

**Water quality issues:**

23. **Pollution from mining, industry and energy** Though not addressed as a trans-boundary issue by stakeholders because of the significant portion of the river basin within RSA, water quality was raised as an issue occurring within RSA and assumed to be a significant problem downstream. There was a belief among some stakeholders that the diamond and mineral mining industry as well as energy generation and coal mining were impacting overall water quality issues in the basin, though effluents were believed to be diluted downstream. It should be noted that while interviewing a river guide working on the lower Orange, he commented that the water quality is fine, and they often drink water directly out of the river without any treatment. “We canoe with a cup and only the city folks with delicate systems ever have any trouble with it.”
24. **Blue green algae due to agricultural runoff** – The issue of blue green algae blooms impacting Namibia water withdrawals is significant for the water management and agricultural sectors in Namibia. In RSA, however, the belief is that downstream pollution in the lower Orange River is a lower priority issue because of the lower population downstream and forbidden zones for diamond mining due to alluvial deposits. Conversely, in Namibia there is significant animosity among some stakeholders as a result of high nutrient loads causing these algae blooms and impacting both the agricultural and tourism sectors.

**Other issues:**

25. **Border delineation between RSA and Namibia** – Stakeholders from RSA shared the belief that the territory of RSA extends to the northernmost border of the Orange River. In Namibia most national stakeholders believe that the “gentleman’s agreement” between past presidents indicates that the midline of the river is the territorial divide as per standard river law. At stake here are substantial alluvial diamond deposits. Stakeholders who discussed this in Namibia stated that until this issue is decided, and formally agreed by both sides, additional development along the river may become increasingly difficult.
26. **Need for public involvement and inputs into water management** – In the RSA water sector some stakeholder group representatives are dubious about the need for public involvement in the water sector despite the increasing demands for this according to international standards. However, stakeholders in Botswana, Lesotho and Namibia were much more favourably inclined toward this and felt that without public input to management decisions, these would ultimately not be as successful as they could be. Projects such as the RSA DWAF “Working for

Water” project were highlighted as potential models for including public involvement and improving environmental conditions.

27. **Variation and decline in capacity for water management throughout the basin**– There is concern among many in the several sectors that there is a notable lack of capacity building for future generations in the engineering sectors and other water management sectors in the basin. They feel that as current specialists retire there will not be adequate personnel to replace them and that Universities are not currently producing sufficient graduates to fill these capacity gaps.
28. **HIV/AIDS anticipated impacts on social structures and economic development in basin** – The infection rates of HIV/AIDS in the riparian states are between 25% and 50% of the population, with the percentages impacted by the disease even greater.. Though currently anti-AIDS medications are available in Botswana and Lesotho to those who test positive for HIV, the impacts this disease may have on population, economic development and social systems in the coming years is expected to be significant. Additionally, the loss of government revenues due to HIV/AIDS may be significant as populations are impacted and costs of care for those suffering from HIV/AIDS is both directly and indirectly felt in the basin. While it is difficult to determine the direct impact of HIV/AIDS on trans-boundary water and environmental issues, the diversion of resources to address this crisis will certainly indirectly impact on water resource planning and development and environmental protection.
29. **Post-Apartheid transitions** – Changing identity in the basin, especially with regards to RSA, with a significant shift of government policy towards social programmes as opposed to economic development programmes was raised by some stakeholders as an issue of concern. Further, the adjustment of the society to the post apartheid era has resulted in a decline in capacity within the basin, an increase in crime and significant challenges towards implementing effective economic and social development schemes.

#### **IV. QUANTITATIVE ANALYSIS FINDINGS BY ISSUE**

Following the meeting of the Technical Task Team (TTT), to identify the issues to be addressed by the TDA, it was decided that the major trans-boundary issues in the OSRB for the UNDP/GEF project are: stress on surface and groundwater resources; deteriorating water quality (surface and groundwater); alteration in naturally occurring water flow in the river; land degradation such as erosion and desertification; alien invasive species (new plants and animals); climate change impacts (current and future); and loss of biodiversity (wildlife, including plants and animals). Stakeholders were asked to prioritize these in comparison to one another within the survey. Overall the ranking of importance for the combined stakeholder survey participants and for specific groups is presented in Table 1, Stakeholder Group Priorities by Issue.

The highest priority issue for all stakeholders together is the stress on surface and ground water resources. This was also the highest priority for many individual groups.

<b>Table 1 Stakeholder Group Priorities by Issue</b>		Stress on surface and groundwater resources	Deteriorating water quality	Alteration in naturally occurring water flow in the	Land degradation such as erosion and desertification	Alien invasive species	Climate change impacts	Loss of biodiversity
Key:		High	Medium	Low				
<b>All Stakeholder Groups combined ranking</b>		<b>1</b>	<b>3</b>	<b>6</b>	<b>2</b>	<b>7</b>	<b>4</b>	<b>5</b>
1.	Water, Hydro-meteorological Department/Ministry							
2.	Conservation/Environmental Dept./Ministry							
3.	Fisheries Dept./Ministry							
4.	Industry Dept./Ministry							
5.	Energy Dept./Ministry							
6.	Mining regulation agency							
7.	Finance Dept./Ministry							
8.	Foreign Affairs Dept./Ministry							
9.	Agriculture Dept./Ministry							
10.	Social Welfare / Public Health Dept./Ministry							
11.	Labour Dept./Ministry							
12.	Elected politician							
13.	Water management parastatal							
14.	Power utility							
15.	Tourism/Recreation Sector							
16.	Mining sector							
17.	Industrial sector (factory)							
18.	Construction industry							
19.	Agro-industry							
20.	Basin government official							
21.	District water management official							
22.	Municipal Government							
23.	Municipal waste official							
24.	Non-Governmental Organization (NGO)							
25.	Scientists							
26.	Conservationist							
27.	Community based organization (CBO)/ Village dev.committee							
28.	Educator/teacher/academic							
29.	Student or youth group member							
30.	Stock Farmer							
31.	Factory farmer (chickens, feed-lot piggery)							
32.	Irrigation Farmer							
33.	Dry land cropping farmer							
34.	Health care provider							
35.	Member of community living near the river							
36.	Press/media							
37.	International Funding Institution/ Bilateral development org.							

The second and third highest were land degradation such as erosion and deforestation and deteriorating water quality, respectively. These three were almost always the highest priority issue, or at least a high priority concern for all stakeholder groups. (In some cases stakeholder groups did not rank any of the issues as a high priority issue which is reflected in Table 1.) The issues ranked as medium priorities are climate change impacts and loss of biodiversity. The lowest priority concerns for the stakeholders are alteration in naturally occurring water flow in the river, and alien invasive species. This prioritization ranking focuses on the most obvious and immediately observable impacts and challenges, while the lower priority concerns are more subtle and less dire for most stakeholders. This is more fully explored as each issue is discussed below. In order to be the most efficient in the presentation of the findings by issues, the issues will be presented with those to which they are most closely linked.

### **Stress on surface and groundwater resources**

The first cluster of issues combines stress on surface and groundwater resources, land degradation such as erosion and desertification, and alteration in naturally occurring water flow in the river, because of the very close linkages between these issues.

In response to the statement “*Economic development in the short term is important and must use whatever resources possible, including water resources*” there were only two groups in strong disagreement: Conservation/Environmental Department/Ministry Officials and Industry Department/Ministry officials. Those in less adamant disagreement were: Fisheries Department/Ministry officials, Non-Governmental Organizations (NGO), Scientists, Educator/teacher/academics, Health care providers, and Press/media. For the most part these groups are members of the environmental elite, which is made up of those who have a clear understanding of the importance of long term environmental stewardship. The Industry Department/Ministry SHG was a bit of a surprise, however it is possible that this group focuses more on longer term development as well, or those selected to answer the survey have a specific environmental background.

In contrast, those that were in strong agreement with this statement were Finance Department/Ministry officials, members of the Foreign Affairs Department/Ministry, Agriculture Department/Ministry, Social Welfare / Public Health Department, as well as elected politicians. Also in this cohort were representatives from power utilities, the mining sector, the Industrial sector and the Construction industry. Also in strong agreement were District water management officials, Municipal Government representatives, Municipal waste officials, Community based organizations (CBO)/Village development committee members, and Members of community living near the river. Additionally, Stock farmers, Factory farmers (chickens, feed-lot piggery), Irrigation Farmers, and Dry land cropping farmers all agreed strongly. Those groups that were in agreement, though somewhat less resolute include: Water, Hydro-meteorological Department/Ministry officials, Energy Department/Ministry officials, Labour Department/Ministry officials, Mining regulation agents, Water management parastatal employees, those in the Tourism/Recreation Sector, Agro-industry, Basin government officials, Student or youth group members and those who are in the International Funding Institution/ Bilateral development agency.

Groups generally more interested in short term development issues are those whose livelihoods depend either more directly on availability of water, such as those in the farming profession, those who see immediate economic development as needed to meet basic societal needs, such as the social welfare agency, or those who tend to have shorter term horizons for economic health, such as elected politicians. Those in less adamant agreement also fit within these categories.

The division between those in agreement and those in disagreement may not result in significant tensions but will most likely experience ongoing low level tensions. It should be noted that in comparison, when asked to agree or disagree with the statement “*Economic development is more important than environmental protection*” all stakeholder groups were in disagreement, except for irrigation farmers, who agreed strongly. This may be a result of increased drought conditions threatening their livelihood and reducing access to available water supplies. Overall this suggests there is a possible need to shift attitudes towards longer term environmental stewardship within the basin, though this may be difficult to accomplish in the shorter term. However, using social marketing strategies with non-judgmental messages may be effective for linking water conservation with environmental issues and the importance of long term planning for water resource use in the Orange-Senqu River Basin.

When focusing more directly on water management issues, and how water is distributed, stakeholders tend to be in more cohesive agreement. In response to the statement “*Use of water for affordable energy and improving economic conditions is more important than environmental protection.*” All groups disagreed with the exception of the Industrial sector (factory), Construction industry, and Irrigation Farmers, who agreed, though not strongly. Again this mirrors the trend noted above that these groups have a direct interest in meeting short term economic goals and may view environmental protection measures as onerous, and interfering with their livelihoods.

There was division across stakeholder groups when asked to respond to the statement “*Communities in the basin have enough water for everyone who lives there.*” There was strong disagreement from a significant majority of stakeholders groups. This included the communities near the river, Municipal Government, Municipal waste officials, Non-Governmental Organizations (NGO), Scientists, Conservationist, Community based organizations (CBO)/ Village development committees, Educator/teacher/academics and Student or youth group members, as well as representatives from the Water, Hydro-meteorological Department/Ministry, Conservation/Environmental Department/ Ministry, Fisheries Department/ Ministry, Energy Department/ Ministry, Mining regulation agency, Finance Department/ Ministry, Foreign Affairs Department/ Ministry, Social Welfare / Public Health Department/ Ministry , Labour Department/ Ministry and Elected politicians. Also strongly disagreeing were Water management parastatal, Tourism/Recreation Sector, Mining sector, Industrial sector (factory), Construction industry and Agro-industry stakeholders. In contrast, the one group that strongly agreed that communities in the basin have enough water for everyone who lives there was the irrigation farmers. This discrepancy may be a result of the large amount of water that these farmers use and are generally entitled to, while others, especially those along the river and in river basin communities, do not have as much access to the water. They may also see that



the irrigation farmers are taking more water than they should, which reduced amounts available for other users.

Additionally, when presented with the statement “*Crops and livestock should always have all the water that they need*” most stakeholder groups were in agreement, with the exception of the “environmental elite” this time consisting of Water, Hydro meteorological agencies, and Water management parastatal who may see agriculture as demanding more water than is available. Also Non-Governmental Organizations (NGO), Scientists, Conservationists and Educator/teacher/academics disagreed, as would be expected from those with an investment in longer term protection of resources. This tension again will probably be long term, but perhaps steps can be taken to reduce unnecessary strains on water resources in the agriculture and livestock industries.

In comparison the stakeholders demonstrated very similar trends with regards to industrial water use. In response to the statement “*Industry should always have all the water it needs*” there was strong disagreement from conservationists, and general disagreement from Conservation/Environmental Department/ Ministry officials, Fisheries Department/ Ministry officials, Water management parastatal agents, Non-Governmental Organizations (NGO), and Scientists. The Construction industry was also in weak disagreement with this. Most other stakeholder groups were in agreement, while those in strong agreement included representatives from Industry Department/ Ministry, Energy Department/ Ministry, Mining regulation agency, Finance Department/ Ministry, Social Welfare / Public Health Department/ Ministry, Labour Department/ Ministry, as well as Elected politicians, those from Mining sector Agro-industry sectors, the Basin government officials, Municipal waste officials, Community based organizations (CBO)/ Village development committees, Student or youth group member, Factory farmer (chickens, feed-lot piggery, Dry land cropping farmer, Members of community living near the river and the Press/media. Most likely, this results in the belief that industry is the economic driver for the basin and should be fostered as much as possible. Again, the division within the groups suggests that helping industry to cut excessive water use may increase stewardship without being seen as punitive to economic development. This may be beyond the purview of the project; however, if possible these measures may improve relations between groups and improve water management in the basin.

The survey results for questions pertaining directly to concerns of stress on surface waters show that there are divisions across stakeholder groups that focus on who has access to water and for what reason. Short term economic interests versus long term environmental concerns is the major line of division and should be actively addressed by the project, as possible and appropriate within the development of the Full Sized Project and Strategic Action Programme.

### **Changes to hydrological regime**

The change in hydrological regime, which includes alteration in naturally occurring flow in the river, is a low priority concern for stakeholders. Only elected politicians and municipal waste managers ranked this as a high priority concern. It is higher on average in South Africa and Namibia and lower in Botswana and Lesotho

Despite the low level priority of the changes in hydrological regimes, the additional alteration in naturally occurring water flow in the river is significantly divisive among nations and between stakeholder groups. In response to the statement “*Building more dams in the river will have positive impacts for me and my country*”, there were large discrepancies among stakeholders throughout the basin. At the national level those in Lesotho felt most favourably towards additional dam construction, while those in Namibia were least favourably inclined, overall. The national responses are to be expected because the economy of Lesotho would be enhanced through additional construction and secondary economies that support this. Alternatively, the additional construction of dams would further reduce flows in the lower Orange for Namibia, with negative impacts.

Among stakeholder groups the division was even more pronounced. Those in strong disagreement that additional dam construction is favourable are Non-Governmental Organizations (NGO) and Conservationists. Those also in less adamant agreement include: Conservation/Environmental Department/ Ministry, Foreign Affairs Department/ Ministry, Scientists and Health care providers. In contrast, those who were in strongest agreement were Industry Department/ Ministry, Agriculture Department/ Ministry, Social Welfare / Public Health Department/ Ministry, Labour Department/ Ministry, Power utility, Tourism/Recreation Sector, Industrial sector (factory), Agro-industry, Municipal waste officials, Stock Farmers, Irrigation Farmers and Members of community living near the river. All other groups were in agreement, including Water, Hydro-meteorological Department/Ministry, Fisheries Department/ Ministry, Energy Department/ Ministry, Mining regulation agency, Finance Department/ Ministry, and Water management parastatal agents. The overall support for additional dam construction can be interpreted as the “environmental elite” were opposed, while those who perceive water as being more readily available and directly linked to short term economic benefit as being more actively in favour of additional construction. The ties to economic prosperity are very closely linked and should be considered carefully as the project develops. Additionally, measures to reduce negative environmental impacts of construction and flow management should be included in subsequent dam schemes.

The precedent of water withdrawal for human use raises the question of impacts on downstream users, including the environment. This long term practice has the potential to exacerbate tensions between users, especially when conditions reduce the available flows that people become accustomed to and come to expect. In response to the statement “*some water users take too much water from the river without consideration for other users*” there was either strong agreement or agreement from all stakeholder groups with a significant majority of stakeholders in strong agreement. Irrigation farmers from further upstream tended to agree less strongly than those in downstream communities. This finding suggests that as the water resources become scarcer, either due to additional managed flows from new dams, or from climate change, there is potential for tension throughout the basin due to perceptions of “other” users taking too much water. It is suggested that steps to emphasize water conservation through a broad scale public awareness/social marketing campaign be instituted throughout the basin.

### **Deterioration of water quality**

The deterioration of water quality was ranked as the third highest priority for stakeholder groups and overall was listed as a high priority for 14 stakeholder groups. The issue of deteriorating water quality is divisive among stakeholder groups. This issue was addressed through concerns for impacts on human health, on overall environmental problems from polluted waters and the question of variation in the water quality throughout the basin.

In response to the statement “*My community always has enough good water for people to drink*”, the stakeholder groups were significantly divided. Those in strong disagreement were Fisheries Department/ Ministry, Industry Department/ Ministry, Mining regulation agency, Finance Department/ Ministry, Agriculture Department/ Ministry, Student or youth group members, Stock Farmer, Factory farmers (chickens, feed-lot piggery), and Press/media. The Water, Hydro-meteorological Department/Ministry, Conservation/Environmental Department/ Ministry, Energy Department/ Ministry, Foreign Affairs Department/ Ministry, Social Welfare / Public Health Department/ Ministry, Labour Department/ Ministry, Mining sector, Industrial sector (factory), Agro-industry, Scientists, Conservationists, Community based organizations (CBO)/ Village development committees, and Dry land cropping farmers also disagreed.

In contrast, those who agreed include Water management parastatal, Tourism/Recreation Sector, Construction industry, Basin government officials, District water management official, Municipal Government, Municipal waste official, Educator/teacher/academics and Health care providers. Those who agreed most strongly that there is always enough good water for people to drink in their communities represent stakeholders from Irrigation Farmers, and International Funding Institution/ Bilateral development agency. It is interesting to note that the stakeholders who are members of community living near the river disagreed mildly, though there was significant division within the group that can not be explained through either rural/urban divisions, or national divisions.

In comparison, the variations between stakeholder groups responding to the statement “*People in my community have had illnesses because of the water*” were more significant. At the national level there is low agreement with this in Namibia, variation in South Africa and Botswana and high level of agreement in Lesotho. There is also high level of division between the stakeholder groups. Those who disagree strongly include Energy Department/ Ministry, Construction industry, District water management official, Irrigation Farmer, and those who disagree less strongly include Water, Hydro-meteorological Department/Ministry, Fisheries Department/ Ministry, Power utility, Tourism/Recreation Sector, Mining sector, Agro-industry, Basin government officials, Scientists, Conservationists, Community based organizations (CBO)/ Village development committees, and International Funding Institution/ Bilateral development agency. In contrast, there is strong agreement from Foreign Affairs Department/ Ministry, Social Welfare / Public Health Department/ Ministry, Elected politician, Industrial sector (factory) and Press/media, with milder agreement from Conservation/Environmental Department/ Ministry, Industry Department/ Ministry, Mining regulation agency, Labour Department/ Ministry, Water management parastatal, Municipal Government, Municipal waste officials, Non-

Governmental Organizations (NGO), Educator/teacher/academics, Student or youth group members, Stock Farmers, Dry land cropping farmers and Health care providers.

It is interesting to note that given the statements above the stakeholders either very strongly disagreed or disagreed with the statement “*I believe that the water in the Orange-Senqu River is safe to drink.*” Only Elected politicians, Tourism/Recreation Sector, Stock Farmers, Irrigation Farmers, and Dry land cropping farmers agreed and no groups were in strong agreement. In the case of the members of community living near the river the disagreement was consistent throughout the group and the disagreement was relatively strong.

This finding is supported by the response to the statement “*The water in the Orange-Senqu River is very polluted in some parts.*” All groups either agreed or agreed strongly. Those living near the river agreed very strongly, suggesting that pollution levels are especially challenging for these stakeholders. Additionally, while pollution is often diluted by the flow of the river, the stakeholders overwhelmingly disagreed with the statement “*Any pollution in the river is diluted so it is not a problem for me.*”

### **Land degradation/ Desertification**

Land degradation such as erosion and desertification was ranked as the second highest priority concern for stakeholders overall. Across the stakeholder groups, only the construction industry ranked this as a low priority concern, while a majority ranked it very highly. Within the issue of land degradation, survey respondents addressed issues pertaining to water availability impacting desertification trends, impacts on personal and economic interests, and perceptions about availability. The omnipresent issue of climate change is also addressed here, as the most profound impacts of climate change, including desertification and erosion due to wind and flooding events, are encompassed in this section.

In response to the statement, “*Communities in the basin have enough water for everyone who lives there*”, the overall response was disagreement. At the national level, Botswana, which is water stressed, and Lesotho had the highest levels of disagreement, while Namibia and South Africa voiced less adamant disagreement. There was strong disagreement from most stakeholders groups. Others also in less adamant agreement were those in professional groups, such as Agriculture Department/ Ministry, Power utility, Basin government officials, District water management officials, and International Funding Institution/ Bilateral development agency. In contrast, the irrigation farmer stakeholder group agreed strongly in support of this, though there was clear division between those in Lesotho who disagreed and those in other countries who agreed strongly. This may be because the irrigation farmers outside of Lesotho feel that they have enough water and are able to draw water easily from the river, while those in Lesotho have limited water rights. The division within this group should be addressed, if possible, since there is potential for tensions among farmers with limited access to water. Additionally, taking steps to increase the irrigation farmers’ awareness of their impacts on other stakeholders may be recommended, if done in a manner that focuses on joint management.

In comparison to the responses outlined above there were strong levels of cohesive disagreement from stakeholders in response to the statement “*There will always be enough water available to everyone who needs it.*” This suggests that stakeholders

throughout the basin are aware of limited availability of water, especially in this arid zone. It also suggests that there is the realization that water resources are not infinite and that there is competition among users for water uses. The consensus on disagreement with the statement also extends throughout the national stakeholders with all four countries in strong disagreement. The acknowledgement of this scarcity issue will be helpful for raising public awareness, and inducing conservation measures for water use. Further, consensus on this within the basin suggests a high level of receptivity to improved water management practices.

Two related issues impacted by this decline in the dependence on a regular supply of water are the perception of the economic importance of water and the importance of a regular water supply for individual economic wellbeing. In response to the statement “*The economy depends on a regular water supply from rivers and groundwater*”, all groups were in strong agreement. Similarly, in response to the statement “*My own livelihood depends on a regular water supply from rivers and ground water*” all groups were in strong support. This again suggests that people are very sensitive to issues of water depletion and impacts on low water and drought in the basin. This again also suggests the understanding among stakeholders that there is a clear link between water availability and access to water. This awareness of limited resources and economic linkages would indicate a potentially important starting point for social marketing for water conservation efforts.

#### **Climate change impacts (current and future)**

The shifts in the climate impact the basin cut across all issues, as increased droughts and potential severe flooding events lead to further land degradation and desertification negatively impacting populations throughout the basin. Climate change impacts was ranked fourth among all stakeholder as a priority concern, with only the construction industry stakeholder groups ranking this as a low priority.

The shift in climate has been detected across all stakeholder groups as all groups agreed strongly with the statement “*I have noticed that the weather is different now than it was when I was younger.*” The stakeholders from Lesotho and Botswana were in strongest agreement with this, perhaps since they have been more directly impacted, either due to being more profoundly impacted by the changes or by experiencing more extreme changes. The agreement from stakeholders in South Africa and Namibia was also high for noticing changes in weather. This suggests that the trends are significant enough to make an impact on stakeholders. Stakeholders also have noticed that there are some places in the Orange-Senqu river basin with different climates than were there in the past, and all agreed strongly that “*Possible shifts in climate will impact the ecology of my basin.*” Again, this may be a point of entry for increasing awareness and inducing behaviour changes as people adapt to climate change issues.

#### **Alien invasive species (new plants and animals)**

The issue of the presence of alien invasive species of plants and animals was the lowest priority concern of stakeholders in the basin. This issue paled by comparison to issues of stress on water, degradation of land and water, and loss of biodiversity. It is not uncommon that the issue of alien invasive species fails to attract the attention of stakeholders unless it becomes pervasive and interferes with normal ecological functioning. It should be noted that at the national level, stakeholders in South Africa

ranked this as a higher priority concern than those in other countries. The South African stakeholder ranked this issue third, above alteration in naturally occurring water flow in the river, land degradation such as erosion and desertification, climate change impacts (current and future) and loss of biodiversity (wildlife, including plants and animals). In all other countries it was ranked as the lowest priority concern.

In response to the statement “*There are new types of wildlife – plants or animals, in and near the river now.*” There was division among stakeholders and within stakeholder groups. Those stakeholders from South Africa, and to a lesser extent Namibia, tended to see more, while others did not. In addition, those who are part of the “environmental elite” such as Conservation/Environmental Department/ Ministry, Fisheries Department/Ministry, Scientists, Conservationists, and Educator/teacher/academics strongly agreed. These groups have increased access to information and are more closely aware of trends in invasive species. In contrast, those who strongly disagreed were district water management officials and the press and media. Other stakeholder groups vacillated between the two extremes, though overall this issue failed to spark significant levels of relevance among stakeholder groups. Most groups were very close to neutral on this issue, with division being mainly driven by nationality. In regard to the environmental elite who are in strong agreement that there are new types of wildlife in and near the river now, and those in strong disagreement, specifically the press and media, this may present an ideal opportunity to increase overall basin-wide awareness of the challenges of invasive species, through a concerted education campaign. The “environmental elite” could provide expertise for journalists interested in environmental issues, which in turn could increase the overall understanding of invasives throughout the basin.

#### **Loss of biodiversity (wildlife, including plants and animals)**

The issue of loss of biodiversity ranked fifth out of seven as a priority concern among all stakeholders. Most groups expressed this as a mid-level concern, with the expected environmental elite, and tourism industry ranking this higher, while others such as construction and industry ranked it as a lower priority concern. At the national level, Lesotho ranked loss of biodiversity as a high level concern, while South Africa, Namibia and Botswana rank it as a mid-level priority concern. The higher prioritization in Lesotho may be due to the perception that there is far less wildlife there now than previously, and the development of game reserves drawing economic benefits from tourism has not been realized in Lesotho as it has in the other Orange River countries.

In response to the statement “*Economic development has impacted the number of animals and plants in the basin*”, most stakeholder groups were in strong agreement. Only the construction industry and the irrigation farmers disagreed with this. These groups were not geographically biased in their responses. It is possible that these two groups may feel that they may be targeted as responsible for the decline in some species, and seek to divert the issue. Alternately, it may be a result of low levels of information about loss of biodiversity in the basin. Overall the strong agreement that there is a correlation between economic development and impacts on species in the basin suggests that the stakeholders acknowledge that this is an issue and there is an understanding that development has ecological consequences. This may suggest an opportunity for educating stakeholders about how to reduce negative impacts of

development on biodiversity, especially those in the planning departments of various government agencies. The strong public awareness of this issue could serve as a catalyst for implementing shifts in policies that are more ecologically friendly and support biodiversity in the basin.

Similarly, in response to the statement “*Without wildlife the economy will suffer*”, stakeholders agreed either strongly or more generally. There were no stakeholder groups in disagreement. The only stakeholder group that did not agree clearly and was internally divided were the mining regulation agencies, which likely see that mining is a strong economic driver in the basin, rather than ecological tourism. Lesotho had a lower rate of agreement overall as a country, likely because the tourism industry focusing on wildlife has not been developed there. In response to the statement “*More efforts should be put into preserving protected ecological sites for future generations*” all stakeholder groups were in strong agreement. This suggests that there is an awareness of the degradation of ecologically important areas, and the need to preserve them. Again, this provides strong support for lobbying government actors, funding organizations and increasing awareness among the public on how to preserve these sites.

### **General Attitudinal Questions**

Within the surveys there were several statements presented to stakeholders intended to gauge their attitudes toward environmental and water management issues. These questions focus on future capacity, environmental stewardship, responsibility for water management, and decision making in water use. These attitudinal questions highlight where stakeholder involvement can be targeted, and provide additional insight into stakeholder perceptions.

In the Qualitative SHA some stakeholder groups expressed strong concern that there would not be sufficient numbers of water management specialists within the next decade. This was due to attrition and retirement rates of those in the top echelons without sufficiently trained officials to replace them. In response to the statement “*There are many trained professionals dealing with water issues, and will be in the future*”, those who strongly disagreed were the: Water, Hydro-meteorological Department/Ministry, Fisheries Department/ Ministry, Foreign Affairs Department/ Ministry, Foreign Affairs Department/ Ministry, Power utility, and Industrial sector (factory). Those who disagreed less strongly were from Conservation/Environmental Department/ Ministry, Energy Department/ Ministry, Mining regulation agency, Agriculture Department/ Ministry, Elected politician, Water management parastatal, Mining sector, Agro-industry, District water management officials, Municipal Government, Non-Governmental Organizations (NGO), Conservationists, Educator/teacher/academics, Stock Farmers, Irrigation Farmers, Dry land cropping farmers, and International Funding Institution/ Bilateral development agency. These groups tend to be more aware of the challenges of water management. This suggests that those who understand the challenges presented by the decline in water management capacity are concerned about the lack of available future water managers. Steps should be taken to address this imminent challenge, either through supporting scholarships or other capacity building measures such as mentoring programmes for junior water managers, possibly advocated by the project.

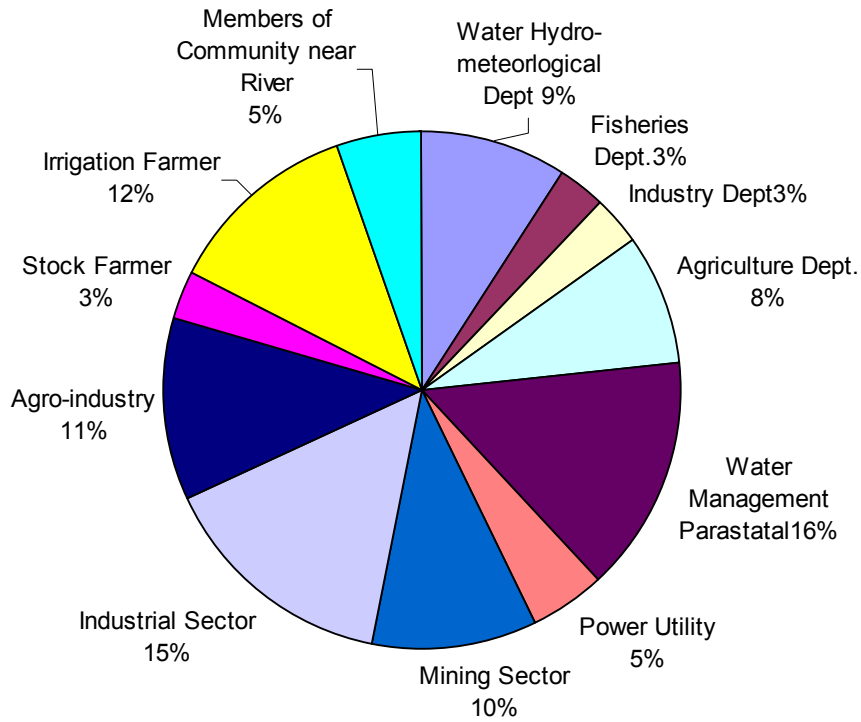
In regard to general attitudes towards the environment there was strong consensus among stakeholders. There was very strong disagreement among all stakeholder groups with the statement “*People should take all they can from nature to survive because there will always be more.*” This suggests that stakeholders are aware that there is a finite amount of ecological resources, and that the environment will not always be replenished. This finding is mirrored by the response to the statement “*I feel everyone is responsible for the environment in the Orange-Senqu River basin.*” All stakeholder groups were in strong agreement. This again suggests that not only are the stakeholders aware of the finite resources, but there is a sense of collective ownership for the environment of the Orange-Senqu River Basin.

However, when asked specifically about water use, there was an interesting response which counters this. Stakeholders were presented with the statement “*People do not think much about the water they use.*” All stakeholder groups, except Social Welfare / Public Health Department/ Ministry, were in agreement or strong agreement. This suggests that people are not aware of water related issues, such as scarcity, water pollution or other ecological problems related to water use. If users are not considering these, it is possible that there is a need to increase awareness, and to make water use and water conservation more important to people. The disagreement from the social welfare and public health departments, suggests that people do consider water, especially as it pertains to their health, within the purview of those responsible for public health. This finding suggests that there may be an opportunity to support the social welfare and public health departments in highlighting water issues for the public and recruiting other sectors to assist in this effort, including water and hydro/meteorological departments, conservationists, agricultural departments, Water management parastatal, Power utility companies, the Tourism/Recreation Sector, Basin government officials, Municipal Government and Municipal waste officials. Working together, these groups may be able to increase the awareness of water issues and to induce conservation measures among water users in their sectors.

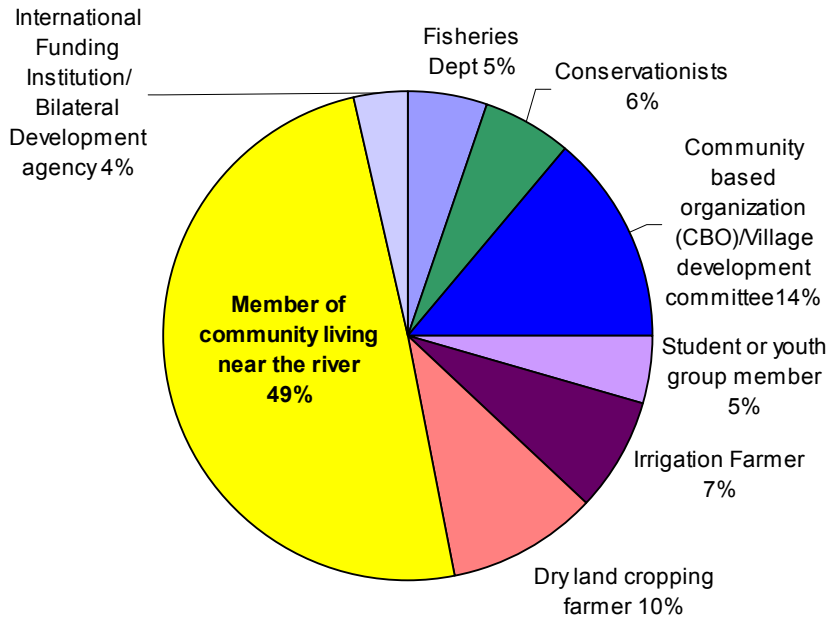
Survey participants were asked two questions pertaining to current water practices and those who are perceived to benefit the most and the least from these existing practices. Responses are presented in the figures below based on the responses by individuals, rather than groups. These findings suggest that there is less agreement about who benefits most, while there is more consensus about who benefits least. This actually bodes well for the project, because the groups that are perceived to benefit most are diverse, while those who benefit least are more concentrated. The diversity of groups perceived to benefit most is generally that it is “economic” stakeholders who benefit financially from current practices, while those who benefit least generally wield less economic influence. As a result, bringing these groups together to find common ground on goals and objectives will be a challenge for the project, however early indications of the positions of different groups, and which groups they feel are benefiting most and least will be helpful. The group specific views of who benefits most and least is presented in the subsequent section of analysis by group.



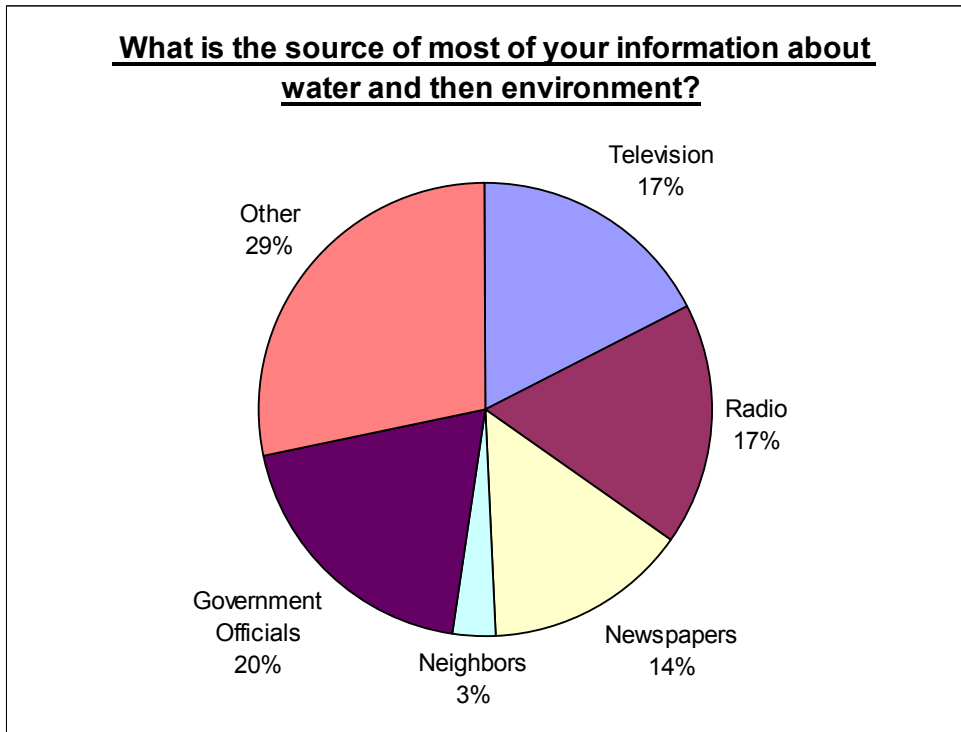
**Who benefits most from current water management practices?**



**Who benefits least from current water management practices?**



Stakeholders were also asked what their sources of information were on water and the environment. Presented below are the percentages by each group. Main stream media (television, radio and news papers) account for almost half, while government officials make up twenty percent. Other sources may include internet, peer review journals, and other sources. These are also broken down in terms of main sources for groups in the subsequent section.



## **V. QUANTITATIVE ANALYSIS FINDINGS: Responses by Stakeholder Group**

In order to transect the perceptions in the basin, the analysis is conducted both by issue specific statements above and by stakeholder group below. The stakeholder group section presents each stakeholder group, including their stake in the Orange-Senqu River Basin, and their top priority issues. Their perceptions by topic are presented where opinions are especially relevant. In the event that there was no relevance these were omitted, unless issues pertained directly to the specific group. This is followed by a brief section on the perceptions of the stakeholders within the group, including who they believed benefits most and least presented in tabular format, and the source of their information on water and environmental issues. Each section concludes with recommendations pertaining to the group within the overall project activities. These recommendations are combined with those from the topic specific section and the QL SHA.

## **1. Water, Hydro-meteorological Department/Ministry**

Members of this stakeholder group are those who are in government positions with responsibility for water and/or hydro-meteorological management issues. The highest priority issues for this group are stress on surface and groundwater resources, deteriorating water quality (surface and groundwater), followed by climate change impacts (current and future).

### *Surface and groundwater use*

The stakeholders in the Water, Hydro/meteorological Department/Ministry disagreed strongly with the statements “Use of water for affordable energy and improving economic conditions is more important than environmental protection”, “Economic development is more important than environmental protection” and “Communities in the basin have enough water for everyone who lives there.” This suggests that they are very sensitive to issues of water and environmental concerns as closely interlinked and, as expected, not eager to use water solely as an end resource, but are aware of the importance of environmental protection as a way to protect water resources.

### *Changes to hydrological regime*

In response to the statement “Building more dams in the river will have positive impacts for me and my country” there was stronger agreement from the stakeholders in the Water, Hydro/meteorological Department/Ministry in Lesotho and Namibia, disagreement in Botswana and neutral responses from South Africa. This is to be expected from Lesotho, and perhaps Namibia, in need of more water from the Orange. The response from Botswana is likely due to the lack of dam activities in the Orange tributaries and more in response to rivers in other parts of the country.

### *Deterioration of water quality*

Stakeholders in the Water, Hydro/meteorological Department/Ministry strongly agreed with the statement “The water in the Orange-Senqu River is very polluted in some parts.” This suggests an awareness of the problems of pollution, of hotspots and of this as an issue with which they must deal on a professional basis.

### *Land degradation*

Stakeholders in the Water, Hydro/meteorological Department/Ministry strongly disagreed with the statements “Communities in the basin have enough water for everyone who lives there” and “There will always be enough water available to everyone who needs it.” As expected, this group must tackle the significant challenges of conservation, over exploitation, competition between users, and the associated problems with water scarcity.

### *Biodiversity/ Alien invasives*

The stakeholders in the Water, Hydro/meteorological Department/Ministry Economic group strongly agreed that “development has impacted the number of animals and plants in the basin.”

### *Perceptions*

As in the Qualitative SHA, the stakeholders in the Water, Hydro-meteorological Department/Ministry strongly disagreed with the statement that “There are many trained professionals dealing with water issues, and will be in the future.” This issue

was raised as a high priority concern earlier and is very strongly echoed here. It is suggested that the project take measures to address this concern.

Stakeholders in the Water, Hydro/meteorological Department/Ministry strongly agreed with the statements “People do not think much about the water they use” and “I am involved in decision making regarding water use.” These responses are to be expected in the sense that people do not give consideration to water use issues, while this group bears significant responsibility for water management. Any future work building awareness should include the input of these stakeholders in order to benefit from their extensive insight and experience.

*Who benefits from the current water management policies? Opinion of:*

<b>Water, Hydro-meteorological Department/Ministry</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Agriculture Dept./Ministry industrial sector (factory) agro-industry Stock Farmers Irrigation farmers	Dry land cropping farmer member of community living near the river

This group receives information about water and the environment from government officials and other sources.

#### *Recommendations*

- Institute a scholarship programme for water management officials, junior staff, and students to learn more about water management, with an emphasis on environmental management components of water management in coordination with top regional universities. The capacity building measures could include a mentoring programme between senior and junior officials, mid-career certification programmes to advance the environmental management capacity of rising professionals, and scholarships for students who agree to work in the basin for 5 years following completion of the programme.
- Include the stakeholders from the Water, Hydro/meteorological Department/Ministry in the development of awareness building activities for water users throughout the basin, including a survey within this group of the most effective awareness raising strategies employed within the basin for replication where possible.

## **2. Conservation/Environmental Department/Ministry**

Members of this stakeholder group are those who are in government positions with responsibility for ecological and environmental management issues. The highest priority issues for this group are land degradation such as erosion and desertification, stress on surface and groundwater resources and deteriorating water quality (surface and groundwater).

#### *Surface and groundwater use*

As expected, stakeholders from the Conservation/Environmental Department/Ministry disagreed strongly with the following statements “Economic development in the short term is important and must use whatever resources

possible, including water resources”; “Use of water for affordable energy and improving economic conditions is more important than environmental protection”; “Economic development is more important than environmental protection”; and “Communities in the basin have enough water for everyone who lives there”. This indicates the strength of opinion and cohesion within this stakeholder group, as well as the potential challenges in the perceived trade-off between economic development and environmental stewardship.

#### *Changes to hydrological regime*

Stakeholders from the Conservation/ Environmental Department/Ministry agreed strongly with “Some water users take too much water from the river without consideration for other users”. This suggests that the perception of unequal distribution of resources is something this group has observed, and that water conservation measures would be welcomed by these stakeholders.

#### *Deterioration of water quality*

Stakeholders from the Conservation/Environmental Department/Ministry disagreed strongly “I believe that the water in the Orange-Senqu River is safe to drink” and “Any pollution in the river is diluted so it is not a problem for me.” They agreed very strongly with “The water in the Orange-Senqu River is very polluted in some parts.” It would be expected also that these responses would come from this group as they are often involved with monitoring and regulation of water quality issues.

#### *Land degradation*

With regard to land degradation, including desertification, the stakeholders from the Conservation/Environmental Department/Ministry disagreed strongly with “Communities in the basin have enough water for everyone who lives there” and “There will always be enough water available to everyone who needs it.” This group has the ecological training to understand the destructive challenges of desertification, and to assist in adapting to those challenges as they occur.

#### *Biodiversity/Alien invasives*

As expected, stakeholders from the Conservation/Environmental Department/Ministry agreed strongly with the following statements, “There are new types of wildlife – plants or animals, in and near the river now”, “Economic development has impacted the number of animals and plants in the basin”, and “Without wildlife the economy will suffer.” This group is closely involved in these issues and responsible for monitoring these trends in biodiversity and invasive species, and this confirms the TTT attention to these as a basin wide issue. It should be noted that the degree of relevance within groups other than this regarding invasive species is very low.

#### *Perceptions*

As in the Qualitative SHA, the stakeholders in the Conservation/Environmental Department/Ministry agreed with the statements “People do not think much about the water they use” This response is to be expected in the sense that people do not give consideration to water use issues, while this group bears significant responsibility for environmental management. Any future work building awareness should include the input of these stakeholders in order to benefit from their extensive insight and experience.

*Who benefits from the current water management policies? Opinion of:*

<b>Conservation/Environmental Department/Ministry</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
industrial sector (factory) Irrigation farmers	member of community living near the river

This group receives most of its information about water and the environment from government officials and other sources. Some reported that they receive information on water and the environment mostly from television.

*Suggestions*

- Take steps to unlink the perception of a trade off between sound environmental management and economic development, possibly taking advantage of expertise regarding economic and environmental losses that result from desertification. Ask the Conservation/Environmental Department/Ministry to assist in demonstrating strategies to adapt to those challenges as they occur, possibly through exhibition projects and development of educational materials.

**3. Fisheries Department/Ministry**

Members of this stakeholder group are those who are in government positions with responsibility for fisheries management issues. The highest priority issues for this group are climate change impacts (current and future) and land degradation such as erosion and desertification.

*Surface and groundwater use*

Stakeholders from the Fisheries Department/Ministry disagreed strongly with the following statements “Use of water for affordable energy and improving economic conditions is more important than environmental protection”; “Economic development is more important than environmental protection”; and “Communities in the basin have enough water for everyone who lives there.” These responses are expected from a group that is dependent on the environmental health of the water for their mission to be effective. Low water levels concentrate potential pollutants and minerals as well as reducing fish habitat. This group is also familiar with the challenges of the perceived trade-off between environmental stewardship and economic development, and they likely recognize that these issues are complimentary rather than competitive.

*Changes to hydrological regime*

Stakeholders from the Fisheries Department/Ministry agreed strongly with the “Some water users take too much water from the river without consideration for other users”. Again this suggests that there is awareness of the competition for resources among users which will need to be addressed, including issues pertaining to fisheries.

*Deterioration of water quality*

Stakeholders from the Fisheries Department/Ministry disagreed strongly with the following statements, “My community always has enough good water for people to drink” and “I believe that the water in the Orange-Senqu River is safe to drink.” This suggests that the low water quality is a significant issue in that members of this group

are monitoring water quality for fisheries health when fisheries are within the river basin. Additionally this group strongly agreed that "... water in the Orange-Senqu River is very polluted in some parts" and disagreed with "any pollution in the river is diluted so it is not a problem for me." Again this emphasizes the perceived challenges of water quality conditions, especially as seen by those involved from the perspective of fisheries management and the health of the river systems as it pertains to viability as a productive ecosystem.

*Land degradation*

Stakeholders from the Fisheries Department/Ministry disagreed strongly with the following statements "Communities in the basin have enough water for everyone who lives there" and "There will always be enough water available to everyone who needs it." This suggests that problems of overabstraction, competition among users for limited resources and the challenges of overdevelopment in the basin can be linked to water shortages which impact the fisheries sector as well as others. As climate change continues it is expected that this will also have an impact on fisheries. This group strongly agrees with the statement "I know some places in the Orange-Senqu river basin with different climates than were there in the past." As water presumably becomes more scarce the impacts on the fisheries may be felt by increased concentration of pollutants in the river systems.

*Biodiversity/Alien invasives*

The Fisheries Department/Ministry stakeholders strongly agreed with the statements "There are new types of wildlife – plants or animals, in and near the river now" and "Economic development has impacted the number of animals and plants in the basin." This suggests that these stakeholders who are closely monitoring the ecology of the river systems are seeing impacts of invasive species as well as the loss of some endemic species within the basin.

*Perceptions*

The Fisheries Department/Ministry stakeholders strongly disagreed with the statement that "There are many trained professionals dealing with water issues, and will be in the future." This reflects the agreement found in other government sectors that indicates a future shortage of professionals and the importance of taking steps to build this capacity now.

The Fisheries Department/Ministry officials also strongly agreed that "people do not think much about the water they use" suggesting a sense of frustration in the lack of awareness among stakeholders about the challenges of water management.

*Who benefits from the current water management policies? Opinion of:*

<b>Fisheries Department/Ministry</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
industrial sector (factory) Construction industry Irrigation farmers	member of community living near the river

The main the source of most of their information about water and the environment comes from sources other than those listed, such as television, government sources. The information may come from professional periodicals and reports.

#### *Recommendations*

- Include fisheries officials in intersectoral committees as possible to provide a clear linkage between water quality, ecosystem health and economic development of water resources. This group's insights into these issues may be helpful in emphasizing an ecosystem approach to water use that would also focus on potential sustainability.

#### **4. Industry Department/Ministry**

Members of this stakeholder group are those who are in government positions with responsibility for industrial development and management issues on behalf of the government. The highest priority issues for this group are those involving loss of biodiversity (wildlife, including plants and animals). Unfortunately, the lack of responses available from this group precludes inclusion in this portion of the analysis. It may be suggested that steps be taken in the next phase of the project to include their opinions as possible.

#### **5. Energy Department/Ministry**

Members of this stakeholder group are those who are in government positions with responsibility for energy issues including management, regulation and monitoring. The highest priority issues for this group are: land degradation such as erosion and desertification; loss of biodiversity (wildlife, including plants and animals); climate change impacts (current and future); and stress on surface and groundwater resources.

#### *Surface and groundwater use*

Respondents from the Energy Department/Ministry stakeholder group strongly disagreed with the statements, "Use of water for affordable energy and improving economic conditions is more important than environmental protection", "Economic development is more important than environmental protection", and "Communities in the basin have enough water for everyone who lives there." This indicates that these stakeholders are aware of the importance of water conservation and are sensitive to water scarcity. The Energy Department/Ministry stakeholder group also agreed strongly with the statements "Crops and livestock should always have all the water that they need" and "Industry should always have all the water it needs." This indicates that, though this group has learned the language of conservation noted above that environmental stewardship must be a priority, the means to protect the water sources through limiting the agricultural and industrial sectors is not supported. This could mean either that this group feels that water demand issues can be resolved through other approaches, or that industrial and agricultural development should still take precedence over water conservations.

#### *Changes to hydrological regime*

Members of the Energy Department/Ministry stakeholder group strongly agreed with the statement, "Some water users take too much water from the river without



consideration for other users.” This suggests that the respondents are sensitive to excess water use by some groups, possibly including themselves, though that is difficult to determine.

#### *Deterioration of water quality*

The Energy Department/Ministry stakeholder group strongly disagreed with the statements “People in my community have had illnesses because of the water”, and yet they also strongly disagreed with the statement, “I believe that the water in the Orange-Senqu River is safe to drink.” This suggests that they are not drinking water directly from river, but also that they are sensitive to perceived pollution within the river. They also strongly disagreed with the statement, “Any pollution in the river is diluted so it is not a problem for me”, suggesting that they feel some degree of concern for water quality and are aware of the thinking behind the old adage stating that the solution to pollution is not dilution.

#### *Land degradation*

Stakeholders from the Energy Department/Ministry group disagreed strongly with the following statements, “Communities in the basin have enough water for everyone who lives there” and “There will always be enough water available to everyone who needs it.” This suggests that problems of overabstraction, competition among users for limited resources and the challenges of low water levels in the basin are linked to water shortages that impact the energy sector, as the cooling of generators is often dependent on water sources. As climate change continues it is expected that this will also have an increased impact on energy generation. This group strongly agrees with the statement, “I know some places in the Orange-Senqu river basin with different climates than were there in the past.” As water presumably becomes more scarce the impacts on the energy sector may be felt more significantly, both in terms of demand for energy and energy sector demand on water resources.

#### *Biodiversity/Alien invasives*

Members of the Energy Department/Ministry stakeholder group strongly agreed that “Economic development has impacted the number of animals and plants in the basin.” This awareness of the perceived loss of biodiversity as a result of human and economic development suggests that this group is sensitive to these impacts and, in turn, the importance of environmental conservation, as noted above.

#### *Perceptions*

Stakeholders from the Energy Department/Ministry group strongly agreed that “people do not think much about the water they use”, suggesting an awareness among stakeholders about the challenges of water management, but, in combination with the response above regarding agriculture and industrial sectors having unlimited access, this suggests that this group may benefit from an awareness raising campaign that focuses on the importance of water conservation and the potential economic benefits of such measures.

It is of special importance that this group indicated that the power utilities benefit the least from current water management policies. As this stakeholder group works closely with these utilities, it may be worthwhile to further investigate why these groups are perceived to be at a disadvantage.

*Who benefits from the current water management policies? Opinion of:*

<b>Water, Hydro-meteorological Department/Ministry</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Water management parastatal Irrigation farmers	Power utility member of community living near the river

The source of most information about water and the environment for the stakeholders from the Energy Department/Ministry group is television and government officials.

*Recommendation:*

- Consider examining the potential impact increasing water scarcity and potential increases in water temperatures will have on power generation as a way to boost energy sector concerns about water sector management and climate change impacts.

## **6. Mining regulation agency**

Members of this stakeholder group are those who are in government positions with responsibility for regulation of mining activities within the countries. The highest priority issues for this group are climate change impacts (current and future), deteriorating water quality (surface and groundwater), stress on surface and groundwater resources, and land degradation such as erosion and desertification. Though the response rate of this group was below optimal, the findings remain relevant.

### *Surface and groundwater use*

Members of the mining regulation agency stakeholder group demonstrated environmental concern by strongly disagreeing with the statements, “Use of water for affordable energy and improving economic conditions is more important than environmental protection” and “Economic development is more important than environmental protection.” They acknowledged the challenges created by water scarcity by strongly disagreeing with “Communities in the basin have enough water for everyone who lives there.” Yet in contrast they strongly agreed with the statements, “Crops and livestock should always have all the water that they need” and “Industry should always have all the water it needs”. This indicates that, though they agree with basic principles of environmental protection, the belief that there should be sufficient water to farming and industry suggests that economic development continues to take precedent over practical environmental stewardship pertaining to water resources.

### *Deterioration of water quality*

The mining regulation agency stakeholder group strongly agrees with the statement, “My community always has enough good water for people to drink”, suggesting that these individuals feel that local water quality is not a priority concern in the areas in which they live.

### *Land degradation*

It should be noted that, though this group felt that people within their community always have enough good water for people to drink, they strongly disagreed with the statement, “Communities in the basin have enough water for everyone who lives there”. There was disagreement with the statement that “There will always be enough water available to everyone who needs it”, again suggesting an awareness of water scarcity issues and potential challenges that will emerge as a result.

There was internal division within the mining and industry stakeholder group with regard to further alteration of the river system. The stakeholders from Botswana, Namibia, and South Africa disagreed with the statement “Building more dams in the river will have positive impacts for me and my country” while the stakeholders from Lesotho strongly agreed. This reflects economic dependence on the dam construction scheme in the basin, which will benefit the Lesotho economy a great deal, as noted in the Qualitative Stakeholder Analysis.

### *Perceptions and opinions*

The mining regulation agency strongly disagreed with the statement that they are involved in decision making regarding water management. This belief that they are not involved in the decision making suggests that these regulators are not overseeing water use within the scope of their administrative responsibilities and may indicate that recruitment of members of this group on the interministerial/interdepartmental/interdepartmental committee could be advantageous to the project.

### *Who benefits from the current water management policies? Opinion of:*

<b>Mining regulation agency</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Water management parastatal	member of community living near the river

Members of the Mining regulation agency receive most of their information about water and the environment from radio and government officials

### *Recommendation*

- Inclusion of the Mining regulation agency stakeholder group on interministerial/interdepartmental/interdepartmental committees to increase effective management and oversight.

## **7. Finance Department /Ministry**

Members of this stakeholder group are those who are in government positions with responsibility for financial management issues. They often oversee the allocation of government spending. The highest priority issues for this group are climate change impacts (current and future), land degradation such as erosion and desertification, and loss of biodiversity (wildlife, including plants and animals). Only respondents from Lesotho and Botswana were available to participate in this survey.

### *Surface and groundwater use*

Members of the Finance Department /Ministry stakeholder group strongly agreed with the statement, “Economic development in the short term is important and must use whatever resources possible, including water resources.” As their professional responsibilities include oversight of economic development trends, this response should be expected. It is countered, however, by their strong disagreement with the statements “Use of water for affordable energy and improving economic conditions is more important than environmental protection”, and “Economic development is more important than environmental protection”, which indicates a level of awareness of the economic benefits provided by the environment.

Further, the members of the Finance Department /Ministry stakeholder group strongly disagreed with the statement, “Communities in the basin have enough water for everyone who lives there”. This suggests that they are aware of the challenges presented by water scarcity in the basin. They felt this strongly while agreeing that “Crops and livestock should always have all the water that they need”, yet there were national divisions in response to the statement “Industry should always have all the water it needs”, with Lesotho agreeing strongly and Botswana disagreeing, though less adamantly. This may indicate that while this group recognizes the importance of the agricultural sector, the devotion of resources to the industrial sector is divided nationally. This may reflect the overall state of the economies in these countries, where Botswana is more economically secure, while Lesotho continues to strive to gain economic stability.

### *Changes to hydrological regime*

Members of the Finance Department /Ministry stakeholder group strongly agreed with the statement “Some water users take too much water from the river without consideration for other users” indicating that they are aware of the problems of over-extraction of water, and the impact that this has on other users. It is important that the Finance Department /Ministry stakeholder group recognizes this, so that they may be called upon to help increase programmes encouraging more equitable water use in the basin.

### *Deterioration of water quality*

The stakeholders from the Finance Department /Ministry group strongly disagreed with the statement “My community always has enough good water for people to drink.” This suggests that in Botswana and Lesotho potable water scarcity is a salient issue, and if those stakeholders in the Finance Department /Ministry are aware of this issue, it may be more prevalent as an economic issue than may otherwise be indicated. Additional input from analogous groups in Namibia and South Africa may bolster this finding, if available.

### *Land degradation*

As noted above the Members of the Finance Department /Ministry stakeholder group strongly disagreed with the statement, “Communities in the basin have enough water for everyone who lives there.” They also strongly disagree with the statement, “There will always be enough water available to everyone who needs it.” This suggests that this influential group of stakeholders is sensitive to the challenges of water scarcity and may be supportive of interventions that directly address these issues. Again, input

from analogous groups in Namibia and South Africa may bolster this finding, if available.

*Biodiversity/invasive species*

The Finance Department /Ministry stakeholder group strongly agreed with the statement, “Economic development has impacted the number of animals and plants in the basin” suggesting there is awareness that anthropogenic factors influenced the natural ecosystem. As the body responsible for oversight of economic development, this bodes well for making improvements in sustainable development strategies.

*Perceptions and opinions*

Members of the Finance Department /Ministry stakeholder group strongly agreed with the statement, “People do not think much about the water they use.” This suggests that the awareness of the low salience of this issue again could be grounds for increasing support for the social marketing campaign targeting the raising of public awareness with regard to water scarcity issues. Additional input from analogous groups in Namibia and South Africa may bolster this finding, if available.

*Who benefits from the current water management policies? Opinion of:*

Finance Department /Ministry	
Benefit Most	Benefit Least
Water management parastatal	member of community living near the river

The source of most information about water and the environment for the Finance Department /Ministry stakeholders is newspapers and neighbours, indicating that inter-ministerial outreach may be needed, with a potential training on environmental economics made available to this group.

*Recommendation*

- Need to get input from the Finance Department /Ministry stakeholders in Namibia and South Africa to bolster these findings.

**8. Foreign Affairs Department/Ministry**

Members of this stakeholder group are those who are in government positions with responsibility for formal foreign relations of the state, including international agreements, treaties, and formal trans-boundary relations. The highest priority issues for this group are climate change impacts (current and future), land degradation such as erosion and desertification, and loss of biodiversity (wildlife, including plants and animals). Only respondents from Lesotho and Botswana were available to participate in this survey.

*Surface and groundwater use*

The members of the Foreign Affairs Department/Ministry stakeholder group strongly agreed with the statement, “Economic development in the short term is important and must use whatever resources possible, including water resources”, but strongly disagreed with the statement, “Economic development is more important than environmental protection.” This suggests that there is an environmental sensitivity present, accompanied by an acute sensitivity to economic realities that are resource

extraction based to meet short term needs. This group holds responsibility for formal trans-boundary relations, which suggests that there may be a need for additional awareness raising activities on sustainable development and IWRM principles where possible.

#### *Deterioration of water quality*

Members of the Foreign Affairs Department/Ministry stakeholder group strongly agreed with the statement, “People in my community have had illnesses because of the water.” They strongly disagreed with the statement, “I believe that the water in the Orange-Senqu River is safe to drink”, and strongly agreed with the statement, “The water in the Orange-Senqu River is very polluted in some parts.” This suggests that the awareness of water quality, its relation to public health and hotspot pollution is on the radar of this group, at least within Lesotho and Botswana. Additional information from Namibia and South Africa may verify these findings.

#### *Land degradation*

In regard to issues of landscape degradation and climate change, the members of the Foreign Affairs Department/Ministry stakeholder group strongly disagreed with the statement “Communities in the basin have enough water for everyone who lives there”, and strongly disagree with the statement “There will always be enough water available to everyone who needs it.” Again this signifies an awareness of water scarcity issues and the potential challenges created therein. It may be surmised that this also indicates a challenge of the trans-boundary implications, however it would be premature to conclude this without additional input from Namibia and South Africa to verify these findings.

#### *Biodiversity / Alien invasives*

The Foreign Affairs Department/Ministry stakeholder group strongly agreed with the statement, “Economic development has impacted the number of animals and plants in the basin”, and, “Without wildlife the economy will suffer.” This suggests that this group is aware of anthropogenic effects on the environment and the need to preserve the environment for economic development. Like the Finance Ministry stakeholder group, additional capacity in sustainable development principles may be beneficial for this group.

#### *Perceptions and opinions*

The Foreign Affairs Department/Ministry stakeholder group strongly disagreed with the statement that, “There are many trained professionals dealing with water issues, and will be in the future.” This suggests some sensitivity to the forthcoming challenges of water management as attrition of current water professionals occurs and the need to train more increases.

Members of the Foreign Affairs Department/Ministry stakeholder group strongly agreed with the statement, “People do not think much about the water they use.” This suggests that there is would-be support for increasing awareness among the public about water issues, and perhaps, with the support of this group, the importance of trans-boundary water issues as well.

*Who benefits from the current water management policies? Opinion of:*

<b>Foreign Affairs Department/Ministry</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Water management parastatal	Students Irrigation farmers

The source of most information about water and then environment for the Foreign Affairs Department/Ministry comes from radio and newspaper sources.

*Recommendations*

- Need to get input from the Foreign Affairs Department/Ministry stakeholders in Namibia and South Africa to bolster these findings
- Develop intersectoral capacity building measures to increase awareness and understanding of sustainable development, IWRM, and environmental economics

**9. Agriculture Department/Ministry**

Members of this stakeholder group are those who are in government positions with responsibility for agricultural development and management issues. There were no stakeholders from this group in South Africa available to participate in the survey, and only one from Botswana. A significant majority of responses are from Namibia, which is factored into this analysis. The highest priority issue for respondents from this group is land degradation, such as erosion and desertification.

*Surface and groundwater use*

The members of the Agriculture Department/Ministry stakeholder group agreed strongly with the statement, “Economic development in the short term is important and must use whatever resources possible, including water resources.” They also strongly agreed with the statement, “Crops and livestock should always have all the water that they need.” Though they disagreed with the statement, “Economic development is more important than environmental protection,” there is an indication that the participating respondents felt that environmental protection was not as high a priority as agriculturally based economic development, as indicated in the responses above.

*Changes to hydrological regime*

Stakeholders from the Agriculture Department/Ministry group strongly agreed that “Building more dams in the river will have positive impacts for me and my country.” This response is as expected, especially for Lesotho and Namibia, which rely on dam construction and dam holdings for irrigation for economic development within the countries. There was some internal division within the group, as several respondents from Namibia and a respondent from Botswana disagreed with the statement.

*Deterioration of water quality*

The stakeholders from the Agriculture Department/Ministry group strongly disagreed with the statement, “My community always has enough good water for people to drink.” They strongly agreed with the statement, “The water in the Orange-Senqu River is very polluted in some parts.” This indicates that within the areas where the Agricultural Ministry/Department is most active there may be water quality issues,

and that there is an awareness of these issues as a high priority concern. It should be noted that, because of the prevalence of respondents from Namibia, this issue may take a higher precedent due to trans-boundary water quality issues there. Information from the South African Agriculture Department/Ministry group would provide more clarity on this issue.

*Land degradation*

While the Agriculture Department/Ministry group strongly agreed that land degradation and desertification was the highest priority concern here, there was not strong agreement within the group regarding statements pertaining to this. For example there was only weak agreement with the statement, “Communities in the basin have enough water for everyone who lives there”. Though there was some disagreement, including most stakeholders from Lesotho, there are no clear trends within the data that explain the division. Additionally there was tepid disagreement with the statement, “There will always be enough water available to everyone who needs it”, but again this did not break among specific identifiable groups and was generally given low importance as an issue. It is possible that the responses trended this way due to either an awareness that the agricultural sector is perceived to have undue access to water resources and therefore stakeholders are hesitant to address these statements more aggressively, or a lack of full knowledge of water and ecosystem functioning. Because these responses are predominantly from Namibia and Lesotho, it is not possible to draw meaningful conclusions regarding basin wide perceptions of this group.

*Biodiversity/Alien invasives*

With regards to traditional ecosystem management issues the Agriculture Department/Ministry group strongly agreed that “Economic development has impacted the number of animals and plants in the basin” and that “Without wildlife the economy will suffer.” This indicates that the members of this group are sensitive to environmental issues overall, as these are traditionally tied to biodiversity and habitat preservation.

*Perceptions*

Stakeholders from the Agriculture Department/Ministry group strongly agreed that “People do not think much about the water they use” suggesting that they would be amenable to projects that increase water use awareness. They also strongly agreed with the statement, “I am involved in decision making regarding water use.” As a result it will be imperative that representatives of these ministries/departments are included in interministerial groups, future stakeholder work, and demonstration projects. Their input and support will be critical and should be solicited wherever possible to ensure more effective project implementation.

*Who benefits from the current water management policies? Opinion of:*

<b>Agriculture Department/Ministry</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
No clear agreement	member of community living near the river



The source of most information about water and the environment for the Agriculture Department/Ministry group is other government officials.

*Recommendation*

- Investigate perceptions of Agriculture Department/Ministry group from South Africa, as a major source of agricultural development in the basin and to ensure stakeholder buy in for the project.

**10. Social Welfare / Public Health Department/Ministry**

Members of this stakeholder group are those who are in government positions with responsibility for oversight of social welfare and public health management issues, including epidemiology and public health education. The highest priority issues for this group are stress on surface and groundwater resources, climate change impacts (current and future), land degradation such as erosion and desertification, and loss of biodiversity (wildlife, including plants and animals), followed by deteriorating water quality (surface and groundwater). Only respondents from Lesotho and Botswana are included in this analysis, as none were available in Namibia and South Africa.

*Surface and groundwater use*

Members of the Social Welfare / Public Health Department/Ministry Strongly disagreed with the statement, “Communities in the basin have enough water for everyone who lives there.” It is suggested that this reflects an awareness of the lack of potable water, especially in Botswana where there are problems with salinization of groundwater and low water availability overall and in Lesotho, where there currently are not significant amounts of potable water available. While there is a constitutional right to potable water guaranteed by the government of South Africa it is not possible to conclude whether this is being met at this time.

*Deterioration of water quality*

The Social Welfare / Public Health Department/Ministry stakeholder group strongly agreed that “The water in the Orange-Senqu River is very polluted in some parts,” which indicates that even in upstream countries this pollution level is of concern to those who monitor epidemiological concerns at the national level. This may warrant further investigation at some point in time.

*Land degradation*

Stakeholders from the Social Welfare / Public Health Department/Ministry group strongly disagreed with the statement, “There will always be enough water available to everyone who needs it.” As above, this indicates an awareness within this group that a lack of water has significant health and social welfare repercussions, which may significantly impact the health of the human population within the basin.

*Biodiversity/Alien invasives*

The members of the Social Welfare / Public Health Department/Ministry strongly agree with both statements, “Economic development has impacted the number of animals and plants in the basin” and “Without wildlife the economy will suffer.” This indicates an awareness of the impact humans have on environmental indicators

within the basin and an appreciation that the environmental health of the basin also impacts the economic conditions. This is important for this group, because of the linkages between environmental health, economic sustainability, and social and human welfare. This may be worth exploring more with regard to Namibia and South African stakeholders from this group, as well as within the overall health of populations within the basin.

*Perceptions and opinions*

The Social Welfare / Public Health Department/Ministry stakeholder group was the only group that strongly disagreed with the statement, “People do not think much about the water they use.” This disagreement indicates that these stakeholders are aware of water related problems and may be privy to information from other organizations that indicate a higher level of awareness regarding water use. Also, because these stakeholders are only representative of Lesotho and Botswana, they may not be fully representative of the full basin, and additional investigation may be warranted.

*Who benefits from the current water management policies? Opinion of:*

<b>Social Welfare / Public Health Department/Ministry</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Agriculture Dept./Ministry	member of community living near the river

The main source of water and environmental information for the Social Welfare / Public Health Department/Ministry stakeholder group is television and government agencies.

*Recommendations*

- Study of South African Water Law effectiveness guaranteeing the right to access to potable water
- Conduct a basin wide study of water related impacts on the health of human populations

**11. Labour Department/Ministry**

Members of this stakeholder group are those who are in government positions with responsibility for labour oversight issues on behalf of the government. The very highest priority issues for this group are deteriorating water quality (surface and groundwater) and climate change impacts (current and future). Other high priority concerns include: stress on surface and groundwater resources, especially in Botswana, and land degradation, such as erosion and desertification and loss of biodiversity (wildlife, including plants and animals), especially in Lesotho. Namibia and South Africa are not represented in this sample.

*Surface and groundwater use*

The members of the Labour Department/Ministry strongly disagreed with the statement, “Communities in the basin have enough water for everyone who lives there,” suggesting that there is an awareness among this group that water scarcity is

an issue impacting human populations. Additionally, they strongly agreed that “Some water users take too much water from the river without consideration for other users,” suggesting that water distribution is an issue that they are aware of, however, the equity of this is difficult to determine. In comparison they strongly agreed with both “Crops and livestock should always have all the water that they need” and “Industry should always have all the water it needs” suggesting that there is a low level of awareness of the challenges to finding equitable distribution of water resources. This dichotomy may be better understood with a larger sample size, including South Africa and Namibia.

*Changes to hydrological regime*

Labour Department/Ministry stakeholders strongly agreed with the statement, “Building more dams in the river will have positive impacts for me and my country.” This is expected because of the labour intensity of dam construction and supporting industries, especially in Lesotho, where dam construction is a major economic driver.

*Land degradation*

Stakeholders from the Labour Department/Ministry group strongly disagreed with the statement, “Communities in the basin have enough water for everyone who lives there,” and “There will always be enough water available to everyone who needs it.” This suggests that the low water levels are impacting labour and populations and, as a result, becoming an issue for employment within the basin. This may be an issue across the basin, but additional data are needed to verify this conclusion.

*Biodiversity/Alien invasives*

Labour Department/Ministry stakeholders strongly agreed with the statements, “Economic development has impacted the number of animals and plants in the basin,” and “Without wildlife the economy will suffer.” In Botswana, which has a high level of eco-tourism, as well as Lesotho, which also has had a significant drop in fauna as a result of humans, the awareness of the importance of charismatic mega-fauna, and habitat protection may be a result of tourism industry employment levels, or lack thereof. Again, this may be an issue across the basin, but additional data are needed to verify this conclusion.

*Perceptions*

Labour Department/Ministry stakeholders strongly agreed with the statements, “There are many trained professionals dealing with water issues, and will be in the future.” This contrasts notably with all others in the water profession. It may be prudent to build support for increasing this capacity with support from the Labour Department/Ministry officials in the basin.

*Who benefits from the current water management policies? Opinion of:*

<b>Labour Department/Ministry</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Water management parastatal Agro-industry Member of community living near the river	Finance Dept./Ministry Power utility Dry land cropping farmer

Most information on water and environmental issues for the Labour Department/Ministry comes from television and radio.

*Recommendation*

- Work with the Labour Department/Ministry to increase the capacity of future water management officials, including recruitment, employment opportunity awareness and possible educational opportunities.

**12. Elected Politician**

Members of this stakeholder group are those who are elected to government and responsible for policy making at the local and national levels. The highest priority issues for this group are land degradation such as erosion and desertification. Also high priority issues include alteration in naturally occurring water flow in the river, and stress on surface and groundwater resources. Only members from the elected politician stakeholder group from Lesotho and Namibia were represented in this analysis.

*Surface and groundwater use*

Members from the elected politician stakeholder group strongly disagree with the statements, “Economic development is more important than environmental protection,” and “Communities in the basin have enough water for everyone who lives there.” This suggests an awareness of the challenges of water scarcity and the impact this has on communities within the basin. As these individuals are often responsible for policy making and legislation, this awareness bodes well for the support of the project. However, without full basin-wide participation of this stakeholder group this assertion can not be confirmed.

Elected Politician	
Benefit Most	Benefit Least
Water management parastatals	Irrigation farmers

Most information on water and environment comes to elected politicians through television, news papers, and government officials

**13. Water Management Parastatal**

Members of this stakeholder group are those who are in positions with responsibility for water resource management.. The highest priority issue for this group is any degradation such as erosion and desertification. The lowest is alteration in naturally occurring water flow in the river. This may be because of a comfort level and confidence in the issues pertaining to river flow management within the sphere of their experience.

*Surface and groundwater use*

The Water Management Parastatal stakeholder group strongly disagrees with the statements, “Use of water for affordable energy and improving economic conditions is

more important than environmental protection,” and “Economic development is more important than environmental protection.” This disagreement belies an appreciation of the environment as a contributor to water management, however, the low prioritization of concerns regarding alteration in naturally occurring water flow in the river may indicate that this appreciation flows unidirectional. This bears further investigation in the future, as feasible.

The Water Management Parastatal stakeholder group strongly disagrees with the statement, “Communities in the basin have enough water for everyone who lives there.” As the party responsible for water management, this suggests that the stress of water scarcity is significant to this stakeholder group, as would be expected.

*Perceptions*

Members of the Water Management Parastatal stakeholder group strongly agree with the statement, “People do not think much about the water they use.” This indicates that these stakeholders are aware of the challenges, as expected, and would be supportive of a campaign to increase awareness of water scarcity throughout the basin.

*Who benefits from the current water management policies? Opinion of:*

Water Management Parastatal	
Benefit Most	Benefit Least
Industrial sector (factory)	member of community living near the river

Most information on water and environment comes from “other sources” and television for the Water Management Parastatal stakeholder group.

*Recommendation*

- Determine why alteration in river flow is a low priority concern for this group and what their support for this is within an environmental context, to better understand this stakeholder group’s perceptions.

**14. Power utility**

Members of this stakeholder group are those who are in government positions with responsibility for power supply and maintenance. The very highest priority issues for this group are deteriorating water quality (surface and groundwater), loss of biodiversity (wildlife, including plants and animals). Also high priority concerns include climate change impacts (current and future) and stress on surface and groundwater resources

*Surface and groundwater use*

Members of the power utility stakeholder group strongly agreed with the statement “Some water users take too much water from the river without consideration for other users.” They strongly agreed with the statement “People do not think much about the water they use.” This suggests that this group views water resources as a resource that is becoming scarcer and as a result should be carefully used by all users.

### *Perceptions*

The members of the power utility stakeholder group strongly disagreed with the statement, “There are many trained professionals dealing with water issues, and will be in the future.” This perception may be due to challenges to power generation as a result of water regulation, though current laws support power utilities as priority users in South Africa, and possibly in other countries within the basin.

*Who benefits from the current water management policies? Opinion of:*

<b>Power Utility Representatives</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Mining sector	member of community living near the river international lending agencies

Most information for the Members of the power utility stakeholder group regarding water and environmental issues comes from unnamed sources other than media, neighbours, and government.

### *Recommendation*

- Include members of the power utility stakeholder group on either the basin wide stakeholder forum, or national stakeholder forums. Their input as priority water users may provide important insights into the issues addressed by the project, including the creation of win-win scenarios.

## **15. Tourism/Recreation Sector**

Members of this stakeholder group are those who are in positions active in tourism and recreation. The highest priority issues for this group are land degradation such as erosion and desertification followed closely by stress on surface and groundwater resources and loss of biodiversity (wildlife, including plants and animals).

### *Surface and groundwater use*

Stakeholders from the tourism and recreation sector strongly disagreed with the statement “Use of water for affordable energy and improving economic conditions is more important than environmental protection.” This indicates that there is a high level of awareness and dependence on the environment within the basin as an economic draw, and if conditions are degraded there may be a decline in sector specific revenues.

They also strongly disagreed with the statements, “Economic development is more important than environmental protection,” and “Communities in the basin have enough water for everyone who lives there.” This further suggests concerns with regard to the water scarcity issue, though economic development also may include construction of golf resorts, which are highly water intensive. It is not possible to determine at this time if these respondents are involved in this particular form of

tourism. Inclusion of golf resort owners, administrators, and workers may be especially informative to the project in the future.

*Changes to hydrological regime*

Members of the tourism and recreation sector stakeholder group strongly agreed with the statement, “Building more dams in the river will have positive impacts for me and my country.” This is likely due to the recreational activities that emerge near the reservoirs created by these dams, as well as increased water for resort landscaping. This response puts this group at odds with NGOs and conservationists, both of whom strongly disagree with this statement.

The members of the tourism and recreation sector stakeholder group strongly disagreed with the statement, “Some water users take too much water from the river without consideration for other users.” Though difficult to discern at this juncture, this may indicate a sense that there is distributional equity for water recourses already, or an awareness of downstream users.

*Perceptions*

The statements above are consistent with the strong agreement with the statement, “People do not think much about the water they use.” This may indicate that members of the tourism and recreation sector see water use as an issue which involves consternation, though does not necessarily reflect the realities of distributional equity.

*Who benefits from the current water management policies? Opinion of:*

<b>Tourism and Recreation Sector</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Power Utilities Mining Sector industrial sector (factory) agro-industry	member of community living near the river

Most information on water and environmental issues for the tourism and recreation sector comes from unnamed sources other than media, neighbours, and government.

*Recommendations*

- Make efforts to incorporate views of this group within stakeholder activities and demonstration project on water scarcity to increase awareness and reduce impacts where possible.
- Develop or enhance environmental and water system awareness training for tourism / recreation stakeholders in order to improve stewardship and reduce impacts of this economically important industry.

## 16. Mining sector

Members of this stakeholder group are involved professionally in extraction of minerals and ores. The highest priority issues for this group are climate change impacts (current and future) and stress on surface and groundwater resources.

### *Surface and groundwater use*

Members of the mining sector stakeholder group strongly disagreed with the statement, “Economic development is more important than environmental protection,” however, they strongly agreed with the statement, “Economic development in the short term is important and must use whatever resources possible, including water resources.” This suggests that the mining sector respondents are aware of environmental issues but are also focused on short term demands at the expense of the environment. This dichotomy warrants attention in the future, with possible technological improvements offered to this industry to reduce water impacts.

Members of this group also strongly disagreed with the statement, “Communities in the basin have enough water for everyone who lives there.” This suggests that they are aware of water stresses and challenges that this creates. Only in Namibia and South Africa was there strong agreement among the mining sectors that “My community always has enough good water for people to drink”, while in Botswana and Lesotho there was disagreement. Again, this likely reflects the level of water infrastructure development, however, it may warrant attention in the future to reduce negative impacts on water resources.

### *Perceptions*

*Who benefits from the current water management policies? Opinion of:*

Mining Sector	
Benefit Most	Benefit Least
Water parastatals agro-industry Irrigation farmers	member of community living near the river

Most information on water and the environment comes to the mining sector stakeholder group through television.

### *Recommendation*

- Introduce technological improvements and water conservation measures to mining industry to minimize impacts on the water environment and improve environmental stewardship.

## 17. Industrial sector (factory)

Members of this stakeholder group are those who are in private sector positions with involvement in industrial development and industrial activities. The highest priority issues for this group are deteriorating water quality (surface and



groundwater) and land degradation such as erosion and desertification. Namibia was not represented in this sample.

#### *Surface and groundwater use*

Stakeholders from the industrial sector strongly agree that, “Economic development in the short term is important and must use whatever resources possible, including water resources.” They also agree that “Use of water for affordable energy and improving economic conditions is more important than environmental protection.” This suggests that the industrial sector, as a key economic stakeholder, is more interested in economic advancement than in environmental protection. This vantage point is common for industrial sector stakeholders in many basins of the world, though the increase in green awareness, and the benefits of more environmentally friendly strategies are being embraced as a way to reduce costs for the industrial sector. Therefore it may be helpful to engage the industrial sector in project activities through introduction of clean technology strategies that reduce excess water use while increasing profits.

It is interesting to note that there was neither strong agreement nor strong disagreement from the industrial sector stakeholders in response to the statement, “Industry should always have all the water it needs.” While overall there was some agreement, on average, the strongest agreement came from Lesotho, whereas the disagreement came mainly from some stakeholders in South Africa.

#### *Changes to hydrological regime*

Members of the industrial sector stakeholder group strongly agreed that “Building more dams in the river will have positive impacts for me and my country”, suggesting that the industrial sector view that more dams will support economic development, as well as provide water reserves.

#### *Deterioration of water quality*

Stakeholders from the industrial sector strongly agreed that “People in my community have had illnesses because of the water.” They strongly disagreed with the statement “I believe that the water in the Orange-Senqu River is safe to drink.” This suggests that around areas where there is industry water quality is believed to be poor, and impacting human populations. This would indicate that members of this group may be eager to accommodate training on cleaner technologies and reducing environmental impacts of industries as possible.

#### *Land degradation*

The industrial sector stakeholders strongly disagreed that “Communities in the basin have enough water for everyone who lives there” and “There will always be enough water available to everyone who needs it.” Again this suggests that there is an awareness of human impacts on water resources and the emerging challenges of water conservation facing the basin. This again may indicate that this group would be amenable to reducing water usage if they are given the opportunity to learn how.

*Perceptions*

*Who benefits from the current water management policies? Opinion of:*

<b>Industrial Sector</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Water management parastatals	member of community living near the river

Most information about water and environment comes to the industrial sector stakeholders through television and radio.

*Recommendations*

- Engage the industrial sector in project activities through introduction of clean technology strategies that reduce excess water use and pollution while increasing profits
- Build broad awareness within the industrial sector regarding environmental and economic benefits of improving current water use strategies

**18. Construction industry**

Members of this stakeholder group are those who are involved in all levels of the construction industry throughout the basin. There were no high priority issues for this group. Medium priority issues were stress on surface and groundwater resources and deteriorating water quality (surface and groundwater). The very lowest priority was climate change impacts (current and future). For all of these there was wide internal division within the group with no identifiable trends other than an overall low prioritization of the issues presented.

*Surface and groundwater use*

The construction industry stakeholder group strongly agreed that “Economic development in the short term is important and must use whatever resources possible, including water resources.” This was in direct opposition to stakeholders from NGOs and Conservationists who were most adamantly opposed to this.

In contrast there was strong disagreement from the construction industry stakeholder group with the statement, “Economic development is more important than environmental protection.” This may reflect an eagerness of the respondents to appear environmentally responsive or it may be an indication that they are aware that environmental degradation increases challenges and difficulties for the construction sector.

*Deterioration of water quality*

Members of the construction sector stakeholder group strongly disagreed with the statement, “People in my community have had illnesses because of the water” suggesting that water quality in areas where they are active is perceived to be healthy.

*Land degradation*

In contrast to the statement above the construction industry stakeholder group strongly disagreed that “Communities in the basin have enough water for everyone

who lives there.” This suggests that while water quality is not an issue, awareness of water scarcity is a concern for this group and may be a point of entry to engage the construction industry in project activities and awareness building.

*Perceptions*

Construction industry stakeholders strongly agree that “People do not think much about the water they use.” This suggests again that the venue to approach this stakeholder group in the future is through water scarcity issues.

*Who benefits from the current water management policies? Opinion of:*

<b>Construction Industry Sector</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
(no agreement)	member of community living near the river

Most information on water and the environment comes to the construction industry stakeholders through television, radio, newspapers and other unnamed sources.

*Recommendations*

- Seek to engage stakeholders from the construction industry sector through water conservation and water scarcity issues as this is a high level concern, based on responses to statements, where they will be in agreement with project objectives

**19. Agro-industry**

Members of this stakeholder group are those who are involved in supporting the agricultural sector, through supplying agricultural goods, including agro chemicals, and farm supplies. The highest priority issues for this group are stress on surface and groundwater resources, loss of biodiversity (wildlife, including plants and animals), land degradation such as erosion and desertification, and climate change impacts (current and future).

*Surface and groundwater use*

Members of the agro industry stakeholder group strongly disagreed with the statements, “Use of water for affordable energy and improving economic conditions is more important than environmental protection”, and “Economic development is more important than environmental protection.” This indicates that there is a degree of environmental concern within this group, possibly pertaining to the fact that without a healthy environment, agricultural development will be difficult. There may be a bias among respondents to be more environmentally inclined, and thus agreeing to participate in the survey, though this cannot be verified. Nonetheless the appreciation of environmental services for the agro industry should be expanding and included within project activities.

*Deterioration of water quality*

The stakeholders from the agro industry are in agreement, though not strongly, with the statement “I believe that the water in the Orange-Senqu River is safe to drink.” There are no identifiable national or urban/rural trends.

*Land degradation*

Stakeholders from the agro industry sector strongly disagree with the statement, “Communities in the basin have enough water for everyone who lives there.” This suggests an awareness of the challenges of water scarcity across the basin and a potential point of entry for inclusion of this stakeholder group in project activities. This may also indicate a potential for increased manufacture and sales of water saving technologies by this stakeholder group.

*Perceptions*

*Who benefits from the current water management policies? Opinion of:*

<b>Agro Industry Sector</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Mining sector	member of community living near the river

The majority of information on water and environmental issues comes to the agro industry sector stakeholders through radio, newspapers, government officials and other unidentified sources.

*Recommendation*

- Build upon the appreciation of economic benefits from environmental services to engage the agro industry stakeholders within project activities, especially pertaining to water scarcity issues.
- Provide information about alternatives to high water use technologies to the agro industrial sector, emphasizing profitability to farmers

**20. Basin government official**

Members of this stakeholder group are those who are in government positions with responsibility for subnational administrative responsibilities. The highest priority issues for this group are land degradation such as erosion and desertification, stress on surface and groundwater resources, and loss of biodiversity (wildlife, including plants and animals).

*Surface and groundwater use*

The basin government official stakeholder group strongly disagreed with the statement, “Economic development is more important than environmental protection” suggesting that they have an awareness of the importance of environmental issues. However they strongly agreed with the statements, “Crops and livestock should always have all the water that they need”, and “Industry should always have all the water it needs.” The belief that these sectors should have unlimited access to water suggests that the environmental awareness does not necessarily extend to resource use

and perhaps should be a basis for awareness building within this group. This is especially important in areas where these officials are making pledges that water access will be made available to all stakeholders within their jurisdiction.

*Perceptions*

Members of this stakeholder group strongly agreed that “People do not think much about the water they use.” This suggests that there is a perceived need to increase awareness of water use within the basin and support of this sector may be an important component in reaching populations on a broad scale.

*Who benefits from the current water management policies? Opinion of:*

<b>Basin Government Officials</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Stock Farmers	Community based organization (CBO)/ Village development committee member of community living near the river

Most information on water and environmental issues for the basin government officials comes from television and news papers.

*Recommendation*

- Increase awareness of challenges creating water scarcity and garner support of the basin governmental officials in the development of an overall awareness raising campaign

**21. District water management official**

Members of this stakeholder group are in government positions with responsibility for water management issues.. The highest priority issue by a significant margin is deteriorating water quality (surface and groundwater).

*Surface and groundwater use*

Members of the district water management official stakeholder group strongly agreed that “Economic development in the short term is important and must use whatever resources possible, including water resources”, yet they strongly disagreed with the statement “Economic development is more important than environmental protection.” Further, they strongly agreed with “Crops and livestock should always have all the water that they need.” This indicates that while this group appreciates the benefits of environmental stewardship pertaining to water, there are also clear indicators that economic uses of water are critical for this group. Developing a means to increase economic performance within districts without increasing water withdrawals may be a significant, yet beneficial challenge for this project to undertake with the support of this stakeholder group.

*Deterioration of water quality*

District water management official stakeholders strongly disagreed with the statement, “People in my community have had illnesses because of the water.” This may indicate that water quality concerns addressed by this group are not accessing information from the public health departments about water borne illnesses.

*Land degradation and desertification*

Despite the role of district water management officials in water distribution, there was almost complete neutrality in response to the statement, “Communities in the basin have enough water for everyone who lives there.” This may signify that they are aware of the challenges of water scarcity, but are unable to comment on equitable distribution issues.

*Biodiversity/Alien invasives*

The stakeholders from the district water management officials group strongly disagreed with the statement “There are new types of wildlife – plants or animals, in and near the river now.” This may indicate a low level of awareness of invasive species, which may become an important concern for this group in the future.

*Perceptions*

There is disagreement from this sector with the statement, “There are many trained professionals dealing with water issues, and will be in the future” which supports concerns voiced in the qualitative stakeholder analysis suggesting that there is a dire need for increasing capacity for future generations of water managers in the basin.

*Who benefits from the current water management policies? Opinion of:*

<b>District Water Management Officials</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
industrial sector (factory)	member of community living near the river

Information on water and environmental issues come to district water management officials through television, radio and government officials.

*Recommendation*

- Work with the district water management officials to identify strategies to increase economic performance within districts without increasing water withdrawals

**22. Municipal Government**

Members of this stakeholder group are those who are in local government positions with responsibility for oversight of municipal issues, including the provision of water and sanitation services. The highest priority issues for this group are deteriorating water quality (surface and groundwater) and land degradation such as erosion and desertification.

*Surface and groundwater use*

The members of the municipal government stakeholder group strongly agreed with the statement “Economic development in the short term is important and must use whatever resources possible, including water resources.” Yet they strongly disagreed with the statement “Economic development is more important than environmental protection.” And while they strongly disagreed with the statement “Communities in the basin have enough water for everyone who lives there”, they strongly agreed that “Crops and livestock should always have all the water that they need.” These seeming contradictions suggest that members of this group would benefit from training on the role of environment and water conservation as it pertains to the benefits of sustainable development.

*Deterioration of water quality*

Members of the municipal government stakeholder group strongly disagreed with the statement “I believe that the water in the Orange-Senqu River is safe to drink”, suggesting that these officials are dubious about water quality of the river within their specific communities.

*Land degradation*

The stakeholders from the municipal government group strongly disagreed with the statement, “There will always be enough water available to everyone who needs it.” This implies that water scarcity continues to be a challenge for these stakeholders, and that increased conservation measures would be supported by them.

*Perceptions*

*Who benefits from the current water management policies? Opinion of:*

<b>Municipal Government Officials</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
industrial sector (factory)	member of community living near the river

Most information regarding water and environmental issues is obtained from the government sources for the municipal government official stakeholders.

*Recommendation*

- Engage municipal government officials in efforts to raise water conservation awareness.

**23. Municipal waste official**

Members of this stakeholder group are those who are in municipal government positions with responsibility for waste management issues. The highest priority issues for this group are alteration in naturally occurring water flow in the river and climate change impacts (current and future). The relatively small sample size here means that the assertions made for this group are not reliably reflective of the broader population. Nonetheless, the findings bear review.

### *Surface and groundwater use*

Members of the municipal waste management official group strongly agreed with the statement “Economic development in the short term is important and must use whatever resources possible, including water resources”, yet they strongly disagreed with “Use of water for affordable energy and improving economic conditions is more important than environmental protection”, and “Economic development is more important than environmental protection.” However they strongly agreed with the statements “Crops and livestock should always have all the water that they need” and “Industry should always have all the water it needs.” The dichotomies within this group suggest that they may benefit from training on sustainable development strategies and water conservation efforts.

### *Changes to hydrological regime*

They strongly agreed with “Building more dams in the river will have positive impacts for me and my country.” This implies that altered water flow is perceived to be beneficial to the municipal waste management officials.

### *Deterioration of water quality*

Members of municipal waste management stakeholder group weakly agreed that “My community always has enough good water for people to drink”, and “People in my community have had illnesses because of the water.” They strongly disagreed that they “...believe that the water in the Orange-Senqu River is safe to drink.” This indicates that while water quality is a priority concern for this group, they are hesitant to strongly support some of the impacts that can occur as a result of poor water quality. This may be due to deflection of concerns, or it may be a low level of information. Without additional data, this can not be determined at this stage.

### *Land degradation*

Members of the municipal waste management stakeholder group strongly disagreed that “Communities in the basin have enough water for everyone who lives there.” This supports that notion that water scarcity is an issue for this stakeholder group. It may be possible to reduce water demand at the municipal level through new, low/no water options for human waste disposal in the basin, such as use of composting toilets.

### *Perceptions*

The members of municipal waste management stakeholder group strongly agreed that “People do not think much about the water they use.” This again supports the idea that efforts to raise awareness with regard to water scarcity would be well supported throughout the government levels.

*Who benefits from the current water management policies? Opinion of:*

<b>Municipal Waste Management Officials</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Water management parastatals industrial sector (factory)	member of community living near the river



Members of municipal waste management stakeholder group obtain most of their information regarding water and environmental issues from media and government sources.

#### *Recommendations*

- Explore the perceptions of this group more extensively in future analyses, if possible
- Consider introduction of low/no water use waste management strategies at the municipal level

#### **24. Non-Governmental Organization (NGO)**

Members of this stakeholder group are those who are in groups which provide services to populations and environments outside of the government, generally not for profit. They may represent groups of stakeholders with specific interests including social development, gender balance, a range of environmental concerns, and other issues. The highest priority issues for this group are stress on surface and groundwater resources, climate change impacts (current and future), and loss of biodiversity (wildlife, including plants and animals).

#### *Surface and groundwater use*

The NGO stakeholders strongly disagree with the statements “Use of water for affordable energy and improving economic conditions is more important than environmental protection”, and “Economic development is more important than environmental protection.” This is consistent with what is expected from this group of stakeholders, especially those with an active interest in environmental preservation. This puts the NGOs at odds with several prominent economic stakeholder groups, and in order to reduce tensions it may be advisable to focus on goal-oriented management strategies with stakeholders, rather than approaches which are process oriented and assign blame for past grievances.

#### *Changes to hydrological regime*

Some members of the NGO Stakeholder group strongly disagree with the statement, “Building more dams in the river will have positive impacts for me and my country.” Only conservationists were in strong disagreement, while many others, including those in the agricultural, industrial, finance and labour sectors agreed strongly with the statement.

#### *Land degradation*

The NGO stakeholders strongly disagree with the statements “Communities in the basin have enough water for everyone who lives there”, and “There will always be enough water available to everyone who needs it.” These NGOs are often involved more directly at the community level than some other stakeholders and these responses may reflect challenges they encounter in their work.

#### *Perceptions*

The NGO stakeholders strongly agree with the statements “People do not think much about the water they use” which may be helpful in building support from the NGOs for awareness raising campaigns focusing on water use and conservation.

*Who benefits from the current water management policies? Opinion of:*

<b>NGOs</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Mining industry sector industrial sector (factory) Irrigation farmers	Agriculture Dept./Ministry member of community living near the river

Most information on water and environmental issues comes to NGOs through sources other than traditional media and government.

*Recommendations*

- In order to build upon the expertise of the NGOs while reducing tensions, it will be important to create goal oriented activities that empower stakeholders to change behaviours

**25. Scientists**

Members of this stakeholder group are those who are in positions that address water management and ecological issues through scientific inquiry. The highest priority issues for this group are stress on surface and groundwater resources, land degradation such as erosion and desertification, and deteriorating water quality (surface and groundwater).

*Surface and groundwater use*

Members of the scientist stakeholder group strongly disagreed with the statement, “Use of water for affordable energy and improving economic conditions is more important than environmental protection”, and “Economic development is more important than environmental protection.” These stakeholders often examine issues independent of the economic factors and their assessments frequently focus on conditions and causality. As a result, it is expected that they prioritize environmental protection because of the role the environment plays in the function of the ecosystem and its component parts.

*Deterioration of water quality*

Members of the scientist stakeholder group strongly disagreed with the statement, “I believe that the water in the Orange-Senqu River is safe to drink.” This may indicate that they believe that water quality is low within the river and, assuming that these scientists are actively studying water issues, may be a red flag for water quality, especially in areas where these scientists are working.

*Land degradation*

Members of the scientist stakeholder group strongly disagreed with the statements “Communities in the basin have enough water for everyone who lives there” and “There will always be enough water available to everyone who needs it.” This suggests that these stakeholders are increasingly concerned about water scarcity, its implications for the basin and challenges that will be presented as a result.

*Biodiversity/Alien invasives*

The members of the scientist stakeholder group strongly agreed with the statement “There are new types of wildlife, plants or animals, in and near the river now”, “Economic development has impacted the number of animals and plants in the basin”, and “Without wildlife the economy will suffer.” As scientists are monitoring these issues more closely than others, their input here is especially informative. While other groups do not see invasive species as critical, members of this group clearly do. Further, they see the link between economic development and the economic importance that is associated with a clean environment. This suggests that inclusion of these stakeholders on National and Basin Wide stakeholder Forums will be key to a broader understanding of the forces at work behind the immediate challenges.

*Perceptions*

Members of the scientist stakeholder group strongly agreed with the statements “People do not think much about the water they use.” This may suggest that inclusion of social scientists in the project and on various stakeholder bodies will assist in identifying causality and root causes.

*Who benefits from the current water management policies? Opinion of:*

<b>Scientists</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Water, Hydro-meteorological Department/Ministry Water management parastatals Power utilities Tourism and recreational sectors Mining sector Industrial sector (factory) Irrigation farmers	Conservationists Member of community living near the river

Most information on water and environmental issues comes to scientists through sources other than traditional media and government.

*Recommendation*

- Inclusion of scientists (including social scientists) on National and Basin Wide Stakeholder Forums will be key to a broader understanding of the forces at work behind the immediate challenges.

**26. Conservationist**

Members of this stakeholder group are those who self identify themselves as having a personal, civic, or professional interest in preserving and restoring ecological health to the basin. The highest priority issues for this group are everything except alteration in naturally occurring water flow in the river and alien invasive species (new plants and animals).

### *Surface and groundwater use*

Members of the conservationist stakeholder group strongly disagree with the statement “Use of water for affordable energy and improving economic conditions is more important than environmental protection”, and “Economic development is more important than environmental protection.” The conservationists are the only stakeholder group to strongly disagree that “Industry should always have all the water it needs.” This suggests that the members of this stakeholder group believe that economic activity is a hindrance to environmental protection. It may be implied that the equitable distribution of water should balance the environment as much as economic and industrial development.

### *Changes to hydrological regime*

Members of the conservationist stakeholder group strongly disagree with the statement, “Building more dams in the river will have positive impacts for me and my country.” As noted above, only NGOs and conservationists strongly disagreed with this, likely due to the environmental impacts has on natural river flows, and their dependent ecosystems. It may be suggested that the project advocate inclusion of conservationists on stakeholder groups addressing future dam construction scenarios with the intention of reducing negative environmental impacts of these issues.

### *Land degradation*

Members of the conservationist stakeholder group strongly disagreed with the statements “Communities in the basin have enough water for everyone who lives there”, and “There will always be enough water available to everyone who needs it.” This suggests that these stakeholders are increasingly concerned about water scarcity; it’s implications for the basin, and challenges that will be presented to ecosystems as a result.

### *Biodiversity/Alien invasives*

The members of the conservationist stakeholder group strongly agreed with the statement “There are new types of wildlife, plants or animals, in and near the river now”, and “Economic development has impacted the number of animals and plants in the basin.” Conservationists are routinely monitoring ecosystems. While many other groups do not see invasive species as present, members of this group clearly do.

### *Issues of internal division*

Stakeholders from the conservationist group strongly disagree that “People do not think much about the water they use.” This may indicate that their input into project activities, especially the social marketing campaign would be advantageous because they are able to articulate the externalities of excessive water use.

*Who benefits from the current water management policies? Opinion of:*

<b>Conservationists</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Power Utilities Mining sector Industrial sector (factory) Agro-industry	Dry land cropping farmer member of community living near the river

Most information on water and environmental issues come from newspapers and other unnamed sources for the conservationists

*Recommendations*

- Support conservationist input into future potential dam construction committees, to provide input on how to reduce impacts
- Include conservationists in the social marketing campaign in order to articulate the challenges of water scarcity and the impacts on the environment

**27. Community based organization (CBO)/ Village development committee**

Members of this stakeholder group are those who are involved in community based groups, including traditional leaders and village development committees. The highest priority issues for this group are stress on surface and groundwater resources and land degradation such as erosion and desertification.

*Surface and groundwater use*

Members of the Community based organization (CBO)/ Village development committee stakeholder group strongly agreed with “Economic development in the short term is important and must use whatever resources possible, including water resources.” They strongly agree with both “Crops and livestock should always have all the water that they need” and “Industry should always have all the water it needs.” However, they strongly disagree with the statements “Use of water for affordable energy and improving economic conditions is more important than environmental protection”, and “Economic development is more important than environmental protection.” This may suggest that they recognize both the challenges of economic development and the immediate pressures to meet those goals, but also as more sustenance dependent stakeholders, they may also realize that their concerns are more susceptible to environmental degradation.

*Land degradation*

Members of the Community based organization (CBO)/ Village development committee stakeholder group strongly disagreed with “Communities in the basin have enough water for everyone who lives there” and “There will always be enough water available to everyone who needs it.” Again, this implies a sense of consternation that water scarcity is already an issue, and that communities and villages are already sensitive to the implications of this.

*Biodiversity/Alien invasives*

The members of the Community based organization (CBO)/ Village development committee stakeholder group strongly agree that “Economic development has impacted the number of animals and plants in the basin”, and that “Without wildlife the economy will suffer.” Because members of these groups are in more remote areas, their awareness of the decline of species and numbers of flora and fauna in the basin, combined with their appreciation of the economic importance of wildlife overall, would indicate that their input in terms of preservation measures, tracking shifts in biodiversity, and overall efforts to increase awareness of these issues should be developed.

### *Perceptions*

*Who benefits from the current water management policies? Opinion of:*

<b>Community based organization (CBO)/ Village development committee</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Water, Hydro-meteorological Department/Ministry Agriculture Dept./Ministry	Community based organization (CBO)/ Village development committee member of community living near the river

The Community based organization (CBO)/ Village development committee stakeholder get most of the information on water and environmental issues from television and radio

### *Recommendations*

- Work closely with these groups to monitor shifts in biodiversity
- Provide training and targeted awareness raising on sustainable development measures that include water conservation measures to members of the Community based organization (CBO)/ Village development committee

## **28. Educator/teacher/academic**

Members of this stakeholder group are those who are actively engaged in teaching at all levels. The highest priority issues for this group are stress on surface and groundwater resources with and degradation such as erosion and desertification and climate change impacts (current and future)

### *Surface and groundwater use*

The stakeholders from the academic sector strongly disagree with the statements “Use of water for affordable energy and improving economic conditions is more important than environmental protection”, and “Economic development is more important than environmental protection”. This suggests that they have been exposed to environmental issues and understand the importance of ecosystem preservation, and may be supportive of introducing it in a curriculum.

### *Land degradation*

The stakeholders from the academic sector strongly disagree with the statements “Communities in the basin have enough water for everyone who lives there”, and “There will always be enough water available to everyone who needs it.” In their experience they may have encountered water scarcity issues, and again may be amenable to introducing conservation measures in the classroom where possible and appropriate.

### *Perceptions*

Stakeholders from the academic sector strongly agree with the statement, “People do not think much about the water they use.” Once again, this suggests that they may be willing to help students become more aware of water use and how to reduce this in order to conserve and protect resources.

*Who benefits from the current water management policies? Opinion of:*

<b>Educator/Teacher/Academic</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
industrial sector (factory)	Irrigation farmer member of community living near the river

The stakeholders from the academic sector get their information about water and the environment from sources other than general media, neighbours, and governments.

*Recommendation*

- Work closely with educators and academics to increase awareness and develop age appropriate curriculums to build an understanding of the importance of ecology and water management within the basin, as well as measures that can conserve water and protect resources.

**29. Student or youth group member**

Members of this stakeholder group are those who are enrolled in university as students or are active members in youth groups. Respondents who self identified themselves within the category were age 21-27. There were no high priority issues for this group. The lowest priority was alien invasive species (new plants and animals).

*Surface and groundwater use*

The student stakeholder group members strongly disagreed with the statements “Use of water for affordable energy and improving economic conditions is more important than environmental protection”, and “Economic development is more important than environmental protection.” However they strongly agreed with the statement “Industry should always have all the water it needs.” This suggests that they believe environmental protection is important, but also feel that economic development through industry is also supportable.

*Deterioration of water quality*

The student stakeholder group members strongly disagreed with the statements “My community always has enough good water for people to drink”, and “I believe that the water in the Orange-Senqu River is safe to drink.” This indicates that these stakeholders are aware of environmental hotspots in the river and the challenges of water scarcity as it pertains to human populations.

*Land degradation*

Members of the student stakeholder group strongly disagreed with the statements “Communities in the basin have enough water for everyone who lives there” and “There will always be enough water available to everyone who needs it.” Again this indicates that these groups are familiar with decreasing water availability. As a younger demographic the awareness of water scarcity challenges suggests that

throughout their lifetimes the low level of water available is a norm, and as they age it may be becoming more severe.

*Alien invasives*

The student stakeholder group members strongly agreed with the statements “Economic development has impacted the number of animals and plants in the basin”, and “Without wildlife the economy will suffer.” Again, this indicates that given the youth of these respondents that this awareness is either due to information introduced within their educations (both formal and informal) or it is due to independent observations, which may speak to the rate of the decline in biodiversity in the basin.

*Perceptions*

Student stakeholder group members strongly agreed with the statements “People do not think much about the water they use.” As above, this would suggest that there is a rudimentary understanding that issues are due to human activities, yet a lack of awareness of these challenges will be a significant challenge for future generations.

*Who benefits from the current water management policies? Opinion of:*

Student and Youth Group Members	
Benefit Most	Benefit Least
Water management parastatals	member of community living near the river

Most information on environment and water issues comes to students and youth group members through television and radio.

*Recommendation*

- Include students and youth group members in social marketing campaign to help the project target and reach future generations

**30. Stock Farmer**

Members of this stakeholder group are those who raise cattle, goats, and other livestock professionally. The highest priority issues for this group are stress on surface and groundwater resources, land degradation such as erosion and desertification, and climate change impacts (current and future).

*Surface and groundwater use*

Members of the stock farmer stakeholder group strongly disagreed with the statement “Economic development is more important than environmental protection.” However, they also strongly agreed with “Economic development in the short term is important and must use whatever resources possible, including water resources”, and “Crops and livestock should always have all the water that they need.” This divergence of attitudes is likely due to differentiating between broad ideals of environmental protection and the realities of requiring access to water for immediate economic conditions. The stock farmers are directly dependent on regular water supplies, and the lack of access has very dire consequences for them, especially in traditional cultures where wealth is invested in cattle.



### *Changes to hydrological regime*

Members of the stock farmer stakeholder group strongly agreed with the statement, “Building more dams in the river will have positive impacts for me and my country.” This support for dam construction is due to increased access to water for livestock, as well as other agriculture.

### *Deterioration of water quality*

The members of the stock farmer stakeholder group strongly disagreed with the statement, “My community always has enough good water for people to drink.” This suggests that these farmers are aware of low water quality issues and the challenges that these create throughout the basin, as well as at the community level. They did not strongly agree that waterborne illnesses were common, however, so it is difficult to differentiate between the issue of scarcity and quality at this point.

### *Land degradation*

Members of the stock farmer stakeholder group strongly disagreed with the statements “Communities in the basin have enough water for everyone who lives there”, and “There will always be enough water available to everyone who needs it.” Again this speaks to the challenges of water scarcity in the basin and the direct impact it has on those who are most immediately dependent on water for sustenance. Stock farmers encounter environmental conditions directly, and shifts in these conditions can profoundly impact them.

### *Perceptions*

The members of the stock farmer stakeholder group strongly disagreed with the statement “People do not think much about the water they use.” This suggests that the stock farmers feel that water usage is not a priority for most people, and the impacts of this are significant, as indicated by the responses above.

*Who benefits from the current water management policies? Opinion of:*

<b>Stock Farmers</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Water, Hydro-meteorological Department/Ministry Agriculture Dept./Ministry industrial sector (factory)	Community based organization (CBO)/ Village development committee Stock Farmer Irrigation Farmer member of community living near the river

Most information on water and environmental issues for stock farmers comes through radio.

### *Recommendation*

- Work with stock farmers to institute water conservation measures, and to protect sensitive areas in rangelands

### 31. Factory farmer (chickens, feed-lot piggery)

Members of this stakeholder group are those who work in or own factory farms such as poultry or pig lots. The highest priority issues for this group are climate change impacts (current and future), stress on surface and groundwater resources, and deteriorating water quality (surface and groundwater). No factory farmer respondents from Namibia participated in this survey.

#### *Surface and groundwater use*

Members of the factory farmer stakeholder group strongly disagreed with the statement “Economic development is more important than environmental protection.” Yet they strongly agreed with “Economic development in the short term is important and must use whatever resources possible, including water resources”, “Crops and livestock should always have all the water that they need”, and “Industry should always have all the water it needs.” Like the stock farmers above, this divergence of attitudes is likely due to differentiating between broad ideals of environmental protection and the realities of requiring access to water for immediate economic conditions. The factory farmers are also directly dependent on regular water supplies, and the lack of access has dire consequences for them.

#### *Deterioration of water quality*

Members of the factory farmer stakeholder group strongly disagreed with the statements “My community always has enough good water for people to drink”, and “I believe that the water in the Orange-Senqu River is safe to drink.” This indicates a high level of concern for water quality and may represent concerns over water quality, especially around factory farms, where effluents often enter the water sources untreated, resulting in poor quality and nutrient loading.

#### *Land degradation/ Desertification*

The members of the factory farmer stakeholder group strongly disagreed with the statements “Communities in the basin have enough water for everyone who lives there”, and “There will always be enough water available to everyone who needs it.” This suggests that water scarcity issues and the impact these have on water dependent industries is creating significant challenges and will require concerted efforts. The lack of water and the impacts it has on driving up prices for animal feed will significantly impact this group, especially as soil fertility is compromised due to encroaching desertification.

#### *Perceptions*

*Who benefits from the current water management policies? Opinion of:*

<b>Factory Farmers</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
industrial sector (factory)	member of community living near the river

Factory farmers get most of their information on water and environmental issues from radio and government sources.

### *Recommendation*

- Work with factory farmers to reduce impacts of waste water run off and increase water use efficiency.

## **32. Irrigation Farmer**

Members of this stakeholder group are those who farm using irrigation technology. The lowest priority issues for this group are loss of biodiversity (wildlife, including plants and animals). There were no agreed high priority issues, however of the issues the top ranked concern was alteration in naturally occurring water flow in the river. There were no respondents from Botswana included in this group.

### *Surface and groundwater use*

Members of the irrigation farmer stakeholder group strongly agreed with the statements “Economic development in the short term is important and must use whatever resources possible, including water resources” and “Crops and livestock should always have all the water that they need.” These responses are expected as these stakeholders are directly dependent on access to water resources for their economic viability. The issue of environmental protection was not a high priority for them, as indicated by their strong agreement with the statement “Economic development is more important than environmental protection.” They were the only stakeholder group of all groups surveyed to strongly agree with this and most other groups disagreed with that statement.

This unique vantage point suggests that the irrigation farmer’s forthcoming responses indicate that they are aware of environmental issues, but more immediately concerned with economic conditions. The Qualitative Stakeholder Analysis found that increasing drought conditions were taking a heavy toll on irrigation farmers, who were often not able to turn a profit once they paid for water, agro chemicals, seeds and other farming expenses. It is likely that these put significant strains on these farmers, who often end up selling their water rights to other stakeholders, such as industry. The immediacy of their circumstances, including the continual need for access to water in order to realize profits likely explains their divergence from the other stakeholder group responses to these statements.

### *Changes to hydrological regime*

Members of the irrigation farmer stakeholder group strongly agreed with the statement “Building more dams in the river will have positive impacts for me and my country.” Dam construction, especially between Namibia and South Africa in the Lower Orange River would increase water for the agricultural sector, specifically irrigation farmers. This may indicate that the top prioritization of alteration in naturally occurring water flow in the river is not a concern in the impacts this has on the river ecosystem, but rather the perceived need to be able to access more reliable water sources which are critical for growing certain crops, especially during naturally dry seasons.

### *Deterioration of water quality*

The members of the irrigation farmer stakeholder group strongly agreed with the statement “My community always has enough good water for people to drink” but they have also strongly agreed with the statement “People in my community have had

illnesses because of the water.” This may imply that the first response is interpreted in regards to water quantity, where as the second is more directly in dealing with water borne illnesses encountered in rural areas, possibly from water quality and agricultural runoff. This warrants further exploration into rural health issues in farming communities.

*Land degradation*

Members of the irrigation farmer stakeholder group strongly agreed with the statement “Communities in the basin have enough water for everyone who lives there.” They were the only group to strongly agree with this statement, and the stakeholders from Namibia and South Africa agreed much more strongly than those in Lesotho who tended to disagree. This outlying response may be because they are differentiating between communities, who are now guaranteed rights to access water, and others water users such as farmers, industry and others who have stricter withdrawal limits.

*Biodiversity/ Alien invasives*

Despite the overt focus on economic needs taking precedence over environmental concerns, members of the irrigation farmer stakeholder group strongly agreed with the statement “Without wildlife the economy will suffer.” This indicates both an awareness of the importance of environmental issues, and the dependence of countries on wildlife as an economic driver in the basin.

*Perceptions*

Members of the irrigation farmer stakeholder group strongly agreed with the statement “People do not think much about the water they use.” This suggests that they are sensitive to water use issues, and perceive that “others” often do not consider scarcity issues in their water use habits.

*Who benefits from the current water management policies? Opinion of:*

Irrigation Farmers	
Benefit Most	Benefit Least
No agreement	Irrigation farmers

Irrigation farmers receive most of their information on water and environmental issues from sources other than traditional media and government.

*Recommendations*

- Examine public health conditions in rural farming communities, specifically pertaining to illness resulting from water
- Work closely with irrigation farmers to assist them to develop low water use crops, water efficient technologies and to develop water saving measures that will increase profits while reducing output costs.
- Work with irrigation farmers as part of stakeholder groups to increase their sense of empowerment to address water scarcity challenges and to assist other stakeholders to understand the challenges they face.

### 33. Dry land cropping farmer

Members of this stakeholder group are those who farm without irrigation. The highest priority issues for this group are stress on surface and groundwater resources, land degradation such as erosion and desertification, and loss of biodiversity (wildlife, including plants and animals). There were no respondents from Lesotho in this sample.

#### *Surface and groundwater use*

Dry land crop farmer stakeholders strongly agree “Economic development in the short term is important and must use whatever resources possible, including water resources”, “Crops and livestock should always have all the water that they need”, and “Industry should always have all the water it needs.” Yet they strongly disagree with the statement “Economic development is more important than environmental protection”, suggesting that while they are under economic strains due to a lack of water access, they also understand that environmental protection is required to sustain conditions that make their work possible.

#### *Land degradation*

Members of the dry land crop farmer stakeholder group strongly disagree with the statement “Communities in the basin have enough water for everyone who lives there”, yet they strongly agree with the statement “There will always be enough water available to everyone who needs it.” This may suggest that ‘communities’ is understood as settlements, whereas the availability of water to everyone who needs it may extend to others, such as themselves or other sectors.

#### *Perceptions*

Dry land crop farmer stakeholders strongly agree that “People do not think much about the water they use.” This suggests that they are sensitive to water scarcity issues, and perceive that people fail to think about this because they are not as directly impacted by scarcity issues.

*Who benefits from the current water management policies? Opinion of:*

<b>Water, Hydro-meteorological Department/Ministry</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Industrial sector	member of community living near the river

Dry land crop farmers receive most of their information on water and environmental issues from radio, government and other unnamed sources.

#### *Recommendation*

- Provide training on water conservation and soil moisture preservation measures for dry land farming communities.

### 34. Health care provider

Members of this stakeholder group are those in the health care profession who provide medical support to those in the basin. There are no high priority issues for this group as a whole, though there is significant division within the group, with those

from Lesotho minimizing priorities, while others highlighted climate change impacts (current and future), deteriorating water quality (surface and groundwater), and stress on surface and groundwater resources. There were no respondents in this group from South Africa.

*Surface and groundwater use*

Members of the health care provider stakeholder group strongly disagreed with the statement “Economic development is more important than environmental protection.” This may reflect an awareness of environmental health as a contributor to public health.

*Deterioration of water quality*

Members of the health care provider stakeholder group strongly disagreed with the statement “I believe that the water in the Orange-Senqu River is safe to drink.” While there was not strong agreement there was almost unanimous agreement across health care provider stakeholders with the statement “People in my community have had illnesses because of the water.” While the overall sample size of this group is small, this issue merits further investigation into health related problems from waterborne sources.

*Land degradation/ desertification*

Members of the health care provider stakeholder group strongly disagreed with the statements “Communities in the basin have enough water for everyone who lives there” and “There will always be enough water available to everyone who needs it.” This suggests that water scarcity issues are significant, and when combined with potential human health problems as a result of water scarcity and increasing desertification, increased rates of illness may occur.

*Perceptions*

The members of the health care provider stakeholder group strongly agreed that “People do not think much about the water they use.” This may indicate that the lack of attention given to water use by individuals could be impacting the health of other users, either through water quality or water quantity degradation.

*Who benefits from the current water management policies? Opinion of:*

<b>Health Care Providers</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Water management parastatals Power Utilities Municipal waste managers	Community based organization (CBO)/ Village development committee

Health care providers receive most of their information on water and environmental issues from television, radio, newspapers, and neighbours.

*Recommendations*

- Examine the linkages between waterborne illnesses and water quality and quantity degradation.

- Include health care providers in stakeholder forums and in the social marketing campaign, where possible, to increase linkages between environmental health and human health.

### **35. Member of community living near the river**

Members of this stakeholder group are those who live within a relatively close proximity to the river and/or the tributaries. The highest priority issue for this group is stress on surface and groundwater resources.

#### *Surface and groundwater use*

River community stakeholders strongly agreed with the statements “Economic development in the short term is important and must use whatever resources possible, including water resources”, “Crops and livestock should always have all the water that they need”, and “Industry should always have all the water it needs.” This demonstrated a strong concern regarding the need for water to support economic growth. Like the irrigation farmers this group probably feels that the economic challenges require immediate attention, where as environmental issues are secondary.

#### *Changes to hydrological regime*

Members of the river community stakeholder group strongly support the statement “Building more dams in the river will have positive impacts for me and my country.” This supports the concern that economic conditions lead these stakeholders to support activities which alter the naturally occurring environmental order.

#### *Biodiversity/Alien invasives*

The river community stakeholders strongly agree with the statements “Economic development has impacted the number of animals and plants in the basin” and “Without wildlife the economy will suffer.” This indicates awareness on the part of this group that humans have impacted the environment, and that the environment, specifically wildlife, is important to the economy. However, the comments above suggest that economic demands continue to take precedence over environmental concerns.

#### *Perceptions*

Members of the river community stakeholder group strongly agree that “People do not think much about the water they use.” Again, this suggests that people do not think that others are using water conscientiously, which often leads to problems of overuse due to lack of awareness.

The river communities are those most directly impacted by the environmental conditions of the rivers, however, their responses are more closely aligned with economically oriented stakeholders, such as farmers and industry, rather than with conservationists and NGOs. This is in part due to the river settlements that are in agricultural communities, as well as the presence of industry, including alluvial mining, in the river communities.

*Who benefits from the current water management policies? Opinion of:*

<b>River Community Stakeholders</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
Water, Hydro-meteorological Department/Ministry Agriculture Dept./Ministry Mining sector agro-industry	Finance Dept./Ministry Community based organization (CBO)/ Village development committee member of community living near the river

Members of the communities living near the river obtain most of their information on water and environmental issues from television, radio, government and other unnamed sources.

*Recommendations*

- Work with communities near the river to improve water conservation measures.
- Increase educational outreach and campaigns to emphasize the importance of environmental stewardship in preserving river system health and functions.

**36. Press/media**

Members of this stakeholder group are those who are involved in the press and media, including print, telecommunications, and internet. The highest priority issues for this group are deteriorating water quality (surface and groundwater), climate change impacts (current and future), and stress on surface and groundwater resources.

*Surface and groundwater use*

Members of the press and media strongly disagree with the statements “Use of water for affordable energy and improving economic conditions is more important than environmental protection”, and “Economic development is more important than environmental protection.” Yet at the same time they strongly agree with the statements “Crops and livestock should always have all the water that they need”, and “Industry should always have all the water it needs.” This indicates that while the environmental stewardship ethic is understood, the realities that accompany implementation of sound environmental management are not fully recognized. This demonstrates that there may be a need to increase training and awareness raising for the media in terms of environmental issues.

*Deterioration of water quality*

Members of the press and media strongly disagree with the statement “My community always has enough good water for people to drink” and strongly agree with the statement “People in my community have had illnesses because of the water.” This combination suggests that this group witnesses waterborne illnesses, either directly or through other media channels reporting on these issues.

*Land degradation*

The members of the press and media strongly disagree with the statements “Communities in the basin have enough water for everyone who lives there” and “There will always be enough water available to everyone who needs it.” This shows



that they are aware of water scarcity issues and the challenges that result from this. Additional training would enable them to more directly focus on this and the environmental impacts of land degradation that results from water scarcity and desertification.

*Biodiversity/ Alien invasives*

Members of the press and media strongly agree with the statements “Economic development has impacted the number of animals and plants in the basin” and “Without wildlife the economy will suffer.” Yet they strongly disagree with the statement “There are new types of wildlife – plants or animals, in and near the river now.” These findings suggest that though the media is aware of basic environmental issues, as noted above, and the economic importance of the environment, that invasive species have not emerged as significant, newsworthy issues. This may explain why the presence of invasive species ranks as a lower priority for most stakeholders, except those directly involved with this issue.

*Perceptions*

The press and media strongly agree with the statement “People do not think much about the water they use.” Increasing awareness of water use, through media and the press will be tremendously beneficial to outreach efforts, and their agreement that people currently do not consider this will be helpful for increasing their support of this issue.

*Who benefits from the current water management policies? Opinion of:*

<b>Water, Hydro-meteorological Department/Ministry</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
industrial sector (factory)	Dry land cropping farmer member of community living near the river

The media and press receive most of their information on water and the environment from television, radio, newspapers, and neighbours.

*Recommendations*

- Develop a basic environmental awareness training programme for the press and media, that emphasizes cause and effect relationships of ecology of the basin, focusing on water issues.
- Engage the press and media in project activities, including press releases and announcements about the project and ORASECOM.
- Develop a media kit for the press that includes contact information for experts who are available to answer questions and comment on stories, suggested story lines for media, and basic facts about the ecology of the Orange-Senqu River.

**37. International Funding Institution/ Bilateral development agency**

Members of this stakeholder group are those who are in positions of project oversight and implementation from international funding institutions and

development agencies. The highest priority issues for this group are land degradation such as erosion and desertification, climate change impacts (current and future), and stress on surface and groundwater resources. There are no representatives from South Africa included in this sample.

*Surface and groundwater use*

Members of the International Funding Institution/ Bilateral development agency stakeholder group strongly disagree with the statements “Use of water for affordable energy and improving economic conditions is more important than environmental protection” and “Economic development is more important than environmental protection.” Yet they also strongly agree that “Crops and livestock should always have all the water that they need.” This implies that while they are aware of environmental contributions to the economy of the basin, they also are aware that without adequate water supplies for the agricultural industry, the impacts on the human populations and economy will be significant.

*Deterioration of water quality*

The members of the International Funding Institution/ Bilateral development agency stakeholder group strongly agree with the statement “My community always has enough good water for people to drink.” This may be because these individuals are located in areas where there is access to potable water.

*Land degradation*

Members of the International Funding Institution/ Bilateral development agency stakeholder group strongly disagree with the statement “There will always be enough water available to everyone who needs it.” This supports the earlier finding that the water scarcity issue is a high priority for this group and that they are supportive of measures to address this.

*Biodiversity/Alien invasives*

Members of the International Funding Institution/Bilateral development agency stakeholder group strongly agree with the statements “Economic development has impacted the number of animals and plants in the basin” and “Without wildlife the economy will suffer.” This is likely due to the awareness that the ecosystem of the basin is significantly altered, yet eco tourism remains a high income earner for governments in this basin.

*Perceptions*

Members of the International Funding Institution/ Bilateral development agency stakeholder group strongly agree that “People do not think much about the water they use.” Again, this reflects the notion that the lack of awareness of water issues is in part a root cause of water scarcity issues within the basin.

*Who benefits from the current water management policies? Opinion of:*

<b>International Funding Institution/ Bilateral development agency</b>	
<b>Benefit Most</b>	<b>Benefit Least</b>
industrial sector (factory)	member of community living near the river

Most information on water and environmental issues comes to the members of the International Funding Institution/ Bilateral development agency stakeholder group through television, and governments.

#### *Recommendations*

- Develop information and training curriculum for development agencies on water related issues, including conservation, environmental protection and sources for additional information.

## **VI. CONCLUSIONS**

The initial QL SHA demonstrated notable complexity of issues pertaining to the trans-boundary water management in this basin. The political issues, layered with social, economic and ecological challenges, in turn create significant challenges for this project.. There is a wide array of SHGs in a very large area and at many different levels, which will require a multi-level approach for addressing stakeholder concerns, incorporating stakeholder support and buy-in to the project. It will be important for the project to build a foundation of strong support from stakeholders established thus far. If this can be accomplished there is potential for this to be a very strong project with benefits for all, from the small scale farmer and herdsmen along the river to the governments of the basin and ORASECOM and SADC.

The QN SHA demonstrated that the wide array of interests within the basin should be included in any project activities, and inclusion of those groups with economic interests, the “economic stakeholders” will be critical to project implementation. Additionally, the QN SHA demonstrated that the lines of division of priorities between groups, such as those who prioritize environmental preservation over economic development versus those who are more concerned with immediate economic circumstances exist, though in less severity than initially expected. There also appears to be a lack of intersectoral coordination within countries which is not uncommon but can result in competing priorities, and can be addressed through concerted efforts within the project. Despite the lack of coordination between sectors, there is relatively strong cohesion among groups that cross borders, which will be helpful for the project, as the basin similarities help to foster trans-boundary cooperation.

The issue that seems to draw the most attention and is most salient for stakeholder groups pertains to water scarcity. The economic service provided by the environment pertaining to water does not seem to be broadly appreciated; however there seems to be a willingness to consider this as evidenced by responses regarding attention to water management of individuals. The issue of biodiversity and wildlife is also well understood by most stakeholders, especially given the significant economic earnings generated by game park tourism throughout the basin. Extending this to broader ecosystem awareness should be pursued, and the environment extends well beyond the preservation of charismatic mega fauna. Landscape degradation and desertification are harsh realities which are shown to be more profoundly felt by those who are more dependent on sustenance based economies, such as small scale farmers in rural areas, though even large scale irrigation farmers appear to be significantly

stressed by loss of soil moisture and increasing desertification. These issues warrant further attention, and should serve as baseline gauges for the project.

Overall there is a clear need for more education and awareness building pertaining to the river system and its role in the basin, expanding upon specific knowledge held by some groups, but not widely shared. The venue for this should be mainstream media, as possible, as well as activities which bring groups together to work towards a common goal. Developing a focus on future goal oriented activities will enable stakeholders with potentially competing interests to realize their similarities and commonalities, resulting in win-win scenarios.

## **VII. RECOMMENDATIONS FOR NEXT STEPS:**

Recommendations for the project stemming from this analysis are divided into 4 categories. Additional recommendations are within the main texts, specific to issues and stakeholder groups. The 4 main categories here are:

- Awareness raising and social marketing that increase awareness of the importance of these issues and empower stakeholders to take action to improve their conditions.
- Sector specific recommendations that target specific groups through activities that may improve conditions.
- Trainings which provide specific educational opportunities to stakeholder groups and build basin capacity.
- Stakeholder involvement in project activities that feature key groups to consider for specific project input.

### **Awareness Raising**

- The awareness of the limited resources and economic linkages would indicate a potentially important starting point for social marketing for water conservation efforts. The acknowledgement of water scarcity issues in the SHA will be helpful for building public awareness, and inducing conservation measures for water use. Further, consensus on the need for conservation within the basin suggests a high level of receptivity to improved water management practices. Using social marketing strategies, with non-judgmental messages may be effective for linking water conservation with environmental issues and the importance of long term planning for water resource use in the Orange-Senqu River Basin.
- The SHA finding suggests that there may be an opportunity to support the social welfare and public health departments in making water issues more prominent, and recruiting other sectors to assist in this effort, including water and hydro/meteorological departments, conservationists, agricultural departments, Water management parastatal, Power utility companies, the Tourism/Recreation Sector, Basin government officials, Municipal Government and Municipal waste officials.

By working together these groups may be able to increase the awareness of water issues and to induce conservation measures among water users in their sectors.

- Include the stakeholders from the Water, Hydro-meteorological Department/Ministry, the Conservation/Environmental Department/Ministry in development of awareness building activities for water users throughout the basin, including a survey within this group of the most effective awareness raising strategies employed within the basin for replication where possible.
- Increase awareness of challenges creating water scarcity and solicit support from basin governmental officials in the development of an overall awareness raising campaign. Garner support from municipal government officials for water conservation awareness raising efforts.
- In regard to the environmental elite, who are in strong agreement that there are new types of wildlife in and near the river now, and those in strong disagreement, specifically the press and media, this may present an ideal opportunity to increase overall basin-wide awareness of the challenges of invasive species, through a concerted education campaign. The “environmental elite” could provide expertise for journalists interested in environmental issues, which in turn could increase the overall understanding of invasives throughout the basin. This may suggest an opportunity for educating stakeholders about how to reduce negative impacts of development on biodiversity, especially those in the planning departments of various government agencies. The strong public awareness of this issue could serve as catalyst for implementing a shift to policies that are more ecologically friendly. Again, this provides strong support for lobbying government actors, funding organizations and increasing awareness among the public on how to preserve these sites.
- Trends in data regarding climate are significant enough to make an impact on stakeholders. Again, this may be a point of entry for increasing awareness and inducing behaviour change as people adapt to climate change issues.
- Include students and youth group members in social marketing campaigns to help the project target and reach future generations.

### **Sector Specific Recommendations**

- Develop intersectoral capacity building measures to increase awareness and understanding of sustainable development, IWRM, and environmental economics within the interministerial/interdepartmental committees.
- The division within groups suggests that helping industry to cut excessive water use may increase stewardship without being seen as punitive to economic development. The division within this group should be addressed, if possible, since there is potential for tension among farmers with limited access to water. Additionally, taking steps to increase the irrigation farmers’ awareness of their impacts on other stakeholders may be recommended, if done in a manner that focuses on joint management across the basin as well as locally.
- Introduce measures to reduce negative environmental impacts of construction and flow management. These should be included in additional dam schemes, and may include input from conservationists.
- Take steps to unlink the perception of a trade-off between sound environmental management and economic development, possibly taking advantage of expertise regarding economic and environmental losses that result from desertification. Ask the Conservation/Environmental Department/Ministry to assist in the demonstration of

strategies to adapt to those challenges as they occur, possibly through exhibition projects and development of educational materials.

- Conduct a basin wide study of water related impacts on the health of human populations. Examine public health conditions in rural farming communities, specifically pertaining to illness resulting from water. Within this study examine the linkages between water borne illnesses and water quality and quantity degradation.
- Increase educational outreach and campaigns in river communities to emphasize the importance of environmental stewardship in preserving river system health and functions
- Develop a basic environmental awareness training programme for the press and media that emphasizes cause and effect relationships of ecology in the basin, focusing on water issues. Work to engage the press and media in project activities, including press releases and announcements about the project and ORASECOM.
- Develop a media kit for the press that includes contact information for experts who are available to answer questions and comment on stories, suggested story lines for media, and basic facts about the ecology of the Orange-Senqu River.
- Work with the Labour Department/Ministry to increase the capacity of future water management officials, including recruitment, employment opportunity awareness and possible educational opportunities.
- Develop or enhance environmental and water system awareness training for tourism / recreation stakeholders in order to improve stewardship and reduce impacts of this economically important industry.
- Build broad awareness within the industrial sector regarding environmental and economic benefits of improving current water use strategies, and introduce technological improvements and water conservation measures to the mining industry to minimize impacts on the water environment and improve environmental stewardship. Engage the industrial sector in project activities through introduction of clean technology strategies that reduce excess water use and pollution while increasing profits.
- Build on the appreciation of economic benefits from environmental services to engage agro industry stakeholders within project activities, especially pertaining to water scarcity issues. Provide information about alternatives to high water use technologies to the agro industrial sector, emphasizing profitability to farmers.

### **Training**

- Work closely with educators and academics to increase awareness and develop age appropriate curriculums to build an understanding of the importance of ecology and water management within the basin, as well as measures that can conserve water and protect resources.
- Address the challenges presented by the decline in water management capacity due to the lack of available future water managers, and take steps to address this imminent challenge, either through supporting scholarships or other capacity building measures such as mentoring programmes for junior water managers, possibly advocated by the project.
- Institute a scholarship programme for water management officials, junior staff and students to learn more about water management, with an emphasis on environmental management components of water management in coordination with top basin universities. The capacity building measures could include a mentoring programme between senior and junior officials, mid-career certification programmes to advance the environmental management capacity of rising professionals, and scholarships for

students who agree to work in the basin for 5 years following completion of the programme.

- Provide training and targeted awareness raising on sustainable development measures that include water conservation measures to members of the Community based organization (CBO)/ Village development committees.
- Work closely with irrigation farmers to assist them in developing low water use crops, water efficient technologies and to develop water saving measures that will increase profits while reducing output costs.
- Work with irrigation farmers as part of stakeholder groups to increase their sense of empowerment in addressing water scarcity challenges and to assist other stakeholders to understand the challenges they face.
- Provide training on water conservation and soil moisture preservation measures for dry land farming communities.
- Work with stock farmers to institute water conservation measures, and to protect sensitive areas in rangelands.
- Work with factory farmers to reduce impacts of waste water run off and increase water use efficiency.

#### **Stakeholder Involvement in Project Inputs**

- In order to build upon the expertise of the NGOs while reducing tensions, it will be important to create goal oriented activities that empower stakeholders to change behaviours.
- Inclusion of scientists (including social scientists) on National and Basin Wide stakeholder Forums will be key to a broader understanding of the forces at work behind the immediate challenges.
- Include health care providers in stakeholder forums and in the social marketing campaign, where possible, to increase linkages between environmental health and human health.
- Inclusion of the Mining regulation agency stakeholder group on interministerial/interdepartmental committees to increase effective management and oversight.

**SHA Annex 1 – QL SHA Interview participants and schedule**

<b>Country</b>	<b>Name</b>	<b>Position</b>	<b>Organization</b>	<b>Meeting Date</b>
<b>South Africa</b>	Wynand Fourie	Director Environmental Impact Management	RSA Department: Environmental Affairs and Tourism	26 Feb
	Paul Skelton	Managing Director	South African Institute for Aquatic Biodiversity	
	Ronnie McKenzie	Managing Director, Consulting Engineer	WRP – Water Resource Planning and Conservation	27 Feb
	Kribbs Moodly	Director French GEF National Consultant to RSA	PD Naidoo & Associates	
	Peter Pyke	Senior Specialist Engineer Options Analysis	RSA Department of Water Affairs and Forestry	28 Feb
	Nick King	Executive Director: Sustainability	Endangered Wildlife Trust	
	Nigel Coni	Past President	International Association for Impact Assessment – South Africa Affiliate	
<b>Botswana</b>	Dr. Horst Vogel	Programme Coordinator	German Development Cooperation - Southern African Development Community	1 March
	Boikanyo Mpho	Secretary	ORASECOM Interim Secretariat	2 March
	Mr. Setloboko	Engineer – Water sector	Department of Water	3 March
	Felix Monggae	CEO	Kalahari Conservation Society	
<b>Lesotho</b>	M'e 'Makopano, Ponto's'eng	Community Area Liaison Committee (CALC) Member	Mohale Dam	4 March
	Mr M. Ts'ehlo,	Country Coordinator	Participatory Ecological Land Use Management – PELUM Lesotho	5 March
		Director	Meteorological Agency of Lesotho	
	Mr P. Nthathakane,	Water Commission		
	Mr M. Seqhee		Transformation	



			Resource Centre	
	Mabusetsa Lenka	Advocacy & Community Empowerment	Transformation Resource Centre	
	Miss Matseliso Ntsoelikane	Director	Transformation Resource Centre	
	Ms E. Thulo	Member	Lesotho Environmental Justice Advocacy Network (formerly known as Highlands Church Action Group (Lesotho))	
	Mrs M. Morokole	Relocated highlands resident	Community Area Liaison Committee Mohale Dam	
	Sekhoyana Lerotholi	Water Department Engineer	Water Affairs	6 March
	Limphe Motanya	Water Department Engineer		
	Emmanuel Lesoma	Comissioner of Water	Lesotho Government	
<b>Namibia</b>	Tertius Basson	Deputy Director: Agricultural Engineering	Ministry of Agriculture, Water and Forestry	7 March
	P.J. Lienenberg	Chief Engineer	Ministry of Agriculture, Water and Forestry	
	Piet Heyns	Under Secretary: Water Affairs and Forestry	Ministry of Agriculture, Water and Forestry	
	Sem Shikongo	Deputy Director	Ministry of Environment and Tourism	
	Holger Kolberg	Ecologist, wetlands	Ministry of Environment and Tourism	
	Dr. Stefan de Wet	Director, Resource Management	Ministry of Agriculture, Water and Forestry	8 March
	Anna Shiweda	Deputy Permanent Secretary	Ministry of Agriculture, Water and Forestry	
	NP Du Plessis		NamWater-Namibian Water Corporation, Ltd	
	Martin Harris	Senior Manager: Planning and Investigations	NamWater – Namibian Water Corporation, Ltd	
	Fiona Olivier	Environmental Manager	DeBeers Marine	9 March
	Christoph	CEO	Namibia Agronomic	

	Brock		Board	
	Brendon Butcher	Tourism Guide on Orange River	Felix River Tours	

## SHA Annex 2 – QN Stakeholder Analysis Survey

Survey number: \_\_\_\_\_  
 Survey Administrator Initials: \_\_\_\_\_  
 Personal or Telephone: \_\_\_\_\_

### Stakeholder Analysis Survey Orange-Senqu River Basin

The United Nations Development Programme is implementing a project to study trans-boundary issues of the Orange-Senqu river basin waters. As part of this project, a basin wide stakeholder analysis is being conducted in Botswana, Lesotho, Namibia, and South Africa. This survey is a part of this analysis. You have been selected to take part in this survey. The information you provide will help determine the priorities and objectives of this project. Your answers will be completely confidential and nothing you say directly will be used in any report as a result of this. Please answer as accurately as you can.

1. \_\_\_\_\_ Country BT, LS, NM, SA
2. \_\_\_\_\_ City, town or region in which you live \_\_\_\_\_
3. \_\_\_\_\_ Gender (Male or Female)
4. \_\_\_\_\_ Age
5. \_\_\_\_\_ What best describes the area you live?
  - a. Mountains
  - b. Plains
  - c. Lowlands
  - d. Desert
6. \_\_\_\_\_ What describes the area when you live? U. Urban or R. Rural
7. \_\_\_\_\_ What is the approximate distance in kilometers of your home to the river?
8. \_\_\_\_\_ From the list below please indicate which stakeholder group(s) do you belong to?

*Stakeholder Groups (Please select a maximum of 2 groups)*

1. Water, Hydro-meteorological Department/Ministry	14. Power utility Sector	27. Community based organization (CBO)/ Village development committee
2. Conservation/Environmental Dept./Ministry	15. Tourism/Recreation Sector	28. Educator/teacher/academic
3. Fisheries Dept./Ministry	16. Mining sector	29. Student or youth group member
4. Industry Dept./Ministry	17. Industrial sector (factory)	30. Stock Farmer
5. Energy Dept./Ministry	18. Construction industry	31. Factory farmer (chickens, feed-lot piggery)
6. Mining regulation agency	19. Agro-industry	32. Irrigation Farmer
7. Finance Dept./Ministry	20. Basin government official	33. Dry land cropping farmer
8. Foreign Affairs Dept./Ministry	21. District water management official	34. Health care provider
9. Agriculture Dept./Ministry	22. Municipal Government	35. Member of community living near the river
10. Social Welfare / Public Health Dept./Ministry	23. Municipal waste official	36. Press/media
11. Labour Dept./Ministry	24. Non-Governmental Organization (NGO)	37. International Funding Institution/ Bilateral development agency
12. Elected politician	25. Scientists	
13. Water management parastatal	26. Conservationist	

9. \_\_\_\_\_ What is the source of your drinking water
  - e. Municipal sources
  - f. well water or bore hole
  - g. spring water from pipes
  - h. river water
  - i. do not know
10. \_\_\_\_\_ What is the source of local irrigation water:
  - j. Municipal sources

- k. well water or bore hole
- l. spring water from pipes
- m. river water
- n. do not know

Please rank these issues as high, medium or low priority concerns for you with 5 for highest priority, 4 for high priority, 3 for medium, 2 for low priority, and 1 for lowest priority

- 11. \_\_\_\_\_ Stress on surface and groundwater resources
- 12. \_\_\_\_\_ Deteriorating water quality (surface and groundwater)
- 13. \_\_\_\_\_ Alteration in naturally occurring water flow in the river
- 14. \_\_\_\_\_ Land degradation such as erosion and desertification
- 15. \_\_\_\_\_ Alien invasive species (new plants and animals)
- 16. \_\_\_\_\_ Climate change impacts (current and future)
- 17. \_\_\_\_\_ Loss of biodiversity (wildlife, including plants and animals)

For Questions 18 – 46 please indicate your level of agreement with the following statements, with 1 being strongly disagreement, 2 disagree, 3 no agreement or disagreement, 4 agree and 5 being strongly agree. There are no correct or incorrect answers. We want your honest opinion.

strongly disagree	disagree	Do not agree or disagree	agree	strongly agree
1	2	3	4	5

- 18. \_\_\_\_\_ Economic development in the short term is important and must use whatever resources possible, including water resources.
- 19. \_\_\_\_\_ Use of water for affordable energy and improving economic conditions is more important than environmental protection.
- 20. \_\_\_\_\_ The economy depends on a regular water supply from rivers and groundwater.
- 21. \_\_\_\_\_ My own livelihood depends on a regular water supply from rivers and ground water.
- 22. \_\_\_\_\_ There will always be enough water available to everyone who needs it.
- 23. \_\_\_\_\_ Crops and livestock should always have all the water that they need.
- 24. \_\_\_\_\_ Industry should always have all the water it needs.
- 25. \_\_\_\_\_ Communities in the region have enough water for everyone who lives there.
- 26. \_\_\_\_\_ Building more dams in the river will have positive impacts for me and my country.
- 27. \_\_\_\_\_ Some water users take too much water from the river without consideration for other users.
- 28. \_\_\_\_\_ My community always has enough good water for people to drink.

29. \_\_\_\_\_ Economic development is more important than environmental protection.
30. \_\_\_\_\_ I have noticed that the weather is different now in than it was when I was  
younger.
31. \_\_\_\_\_ People in my community have had illnesses because of the water.
32. \_\_\_\_\_ I know some places in the Orange-Senqu river basin with different climates than  
were there in the past.
33. \_\_\_\_\_ Possible shifts in climate will impact the ecology of my region.
34. \_\_\_\_\_ Economic development has impacted the number of animals and plants in the  
region.
35. \_\_\_\_\_ Some types of wildlife can help improve water conditions.
36. \_\_\_\_\_ There are new types of wildlife – plants or animals, in and near the river now.
37. \_\_\_\_\_ Without wildlife the economy will suffer.
38. \_\_\_\_\_ People should take all they can from nature to survive because there will always  
be more.
39. \_\_\_\_\_ More efforts should be put into preserving protected ecological sites for future  
generations.
40. \_\_\_\_\_ I believe that the water in the Orange-Senqu River is safe to drink.
41. \_\_\_\_\_ The water in the Orange-Senqu River is very polluted in some parts.
42. \_\_\_\_\_ Any pollution in the river is diluted so it is not a problem for me.
43. \_\_\_\_\_ Water management is only the responsibility of the governments.
44. \_\_\_\_\_ There are many trained professionals dealing with water issues, and will be in the  
future.
45. \_\_\_\_\_ I feel everyone is responsible for the environment in the Orange-Senqu River  
basin.
46. \_\_\_\_\_ People do not think much about the water they use.
47. \_\_\_\_\_ I am involved in decision making regarding water use.
48. \_\_\_\_\_ From the list of stakeholders above, who do you think benefits the most from  
current water management practices?
49. \_\_\_\_\_ From the list of stakeholders above, who do you think benefits least from current  
water management practices?
50. \_\_\_\_\_ What is the source of most of your information about water and then  
environment:
- o. Television
  - p. Radio
  - q. News papers
  - r. Neighbours
  - s. Government officials
  - t. Other

**Thank you for your participation!**

If you have any questions about this survey, please do not hesitate to ask the person giving this survey,  
or contact

Mary M. Matthews, PhD at [mary.matthews@tethysconsultants.com](mailto:mary.matthews@tethysconsultants.com)

### SHA Annex 3 – QN SHA Group Representation

<b>Quantitative Survey Stakeholder Group Representation</b>	<b>Botswana (BT)</b>	<b>Lesotho (LS)</b>	<b>Namibia (NM)</b>	<b>South Africa</b>	<b>Total</b>
1. Water, Hydro-meteorological Department/Ministry	7	5	6	3	21
2. Conservation/Environmental Dept./Ministry	9	5	7	4	25
3. Fisheries Dept./Ministry	2	3	3	1	9
4. Industry Dept./Ministry	0	3	0	0	3
5. Energy Dept./Ministry	4	4	1	0	9
6. Mining regulation agency	1	3	1	1	6
7. Finance Dept./Ministry	2	3	0	0	5
8. Foreign Affairs Dept./Ministry	2	3	0	0	5
9. Agriculture Dept./Ministry	1	3	6	0	10
10. Social Welfare / Public Health Dept./Ministry	3	3	0	0	6
11. Labour Dept./Ministry	2	3	0	0	5
12. Elected politician	0	3	5	0	8
13. Water management parastatal	3	4	4	3	14
14. Power utility	2	2	4	1	9
15. Tourism/Recreation Sector	6	3	3	3	15
16. Mining sector	3	3	3	1	10
17. Industrial sector (factory)	1	3	0	4	8
18. Construction industry	1	2	1	3	7
19. Agro-industry	3	3	4	3	13
20. Regional government official	3	2	4	3	12
21. District water management official	3	1	4	1	9
22. Municipal Government	1	3	4	3	11
23. Municipal waste official	0	3	1	1	5
24. Non-Governmental Organization (NGO)	5	5	5	3	18
25. Scientists	5	4	10	7	26
26. Conservationist	4	2	6	5	17
27. Community based organization (CBO)/ Village dev.committee	7	4	4	3	18
28. Educator/teacher/academic	7	3	4	3	17
29. Student or youth group member	2	2	2	3	9
30. Stock Farmer	4	5	3	4	16
31. Factory farmer (chickens, feed-lot piggery)	1	4	0	2	7
32. Irrigation Farmer	0	3	2	4	9
33. Dry land cropping farmer	3	5	0	2	10
34. Health care provider	3	3	4	0	10
35. Member of community living near the river	10	10	8	14	42
36. Press/media	2	3	1	2	8
37. International Funding Institution/ Bilateral development org.	2	4	2	0	8
<b>Total</b>	<b>114</b>	<b>127</b>	<b>112</b>	<b>87</b>	<b>440</b>

**ANNEX 3: Basin wide preliminary TDA**

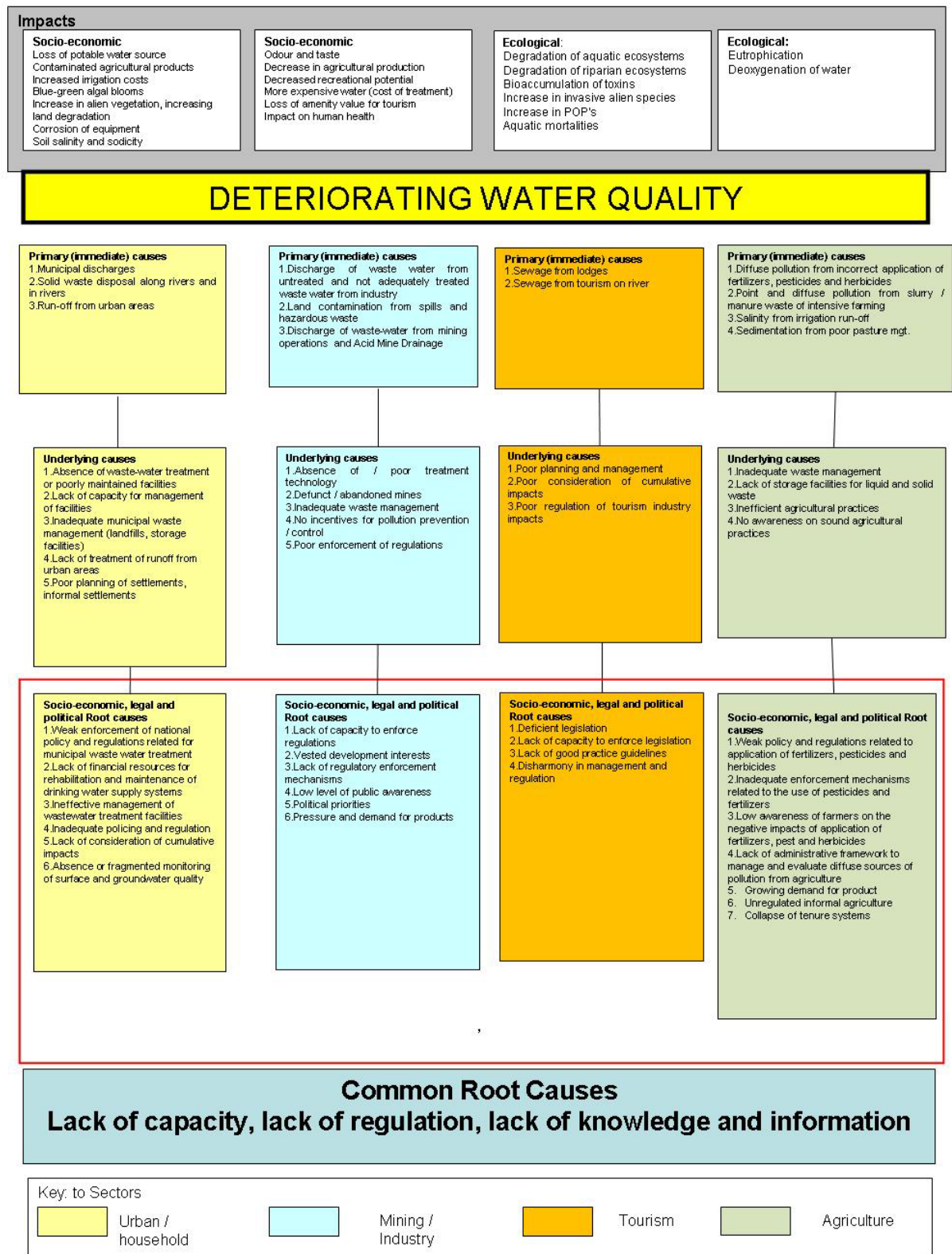
**Basin wide Preliminary TDA, adopted by the ORASECOM  
at its April 2008 Council meeting**

**Executive Summary and Main Report available at  
[http://www.iwlearn.net/iw-projects/Fsp\\_112799470774/reports/](http://www.iwlearn.net/iw-projects/Fsp_112799470774/reports/)**

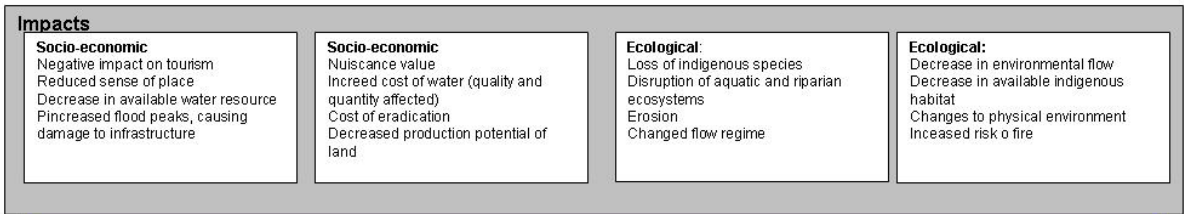




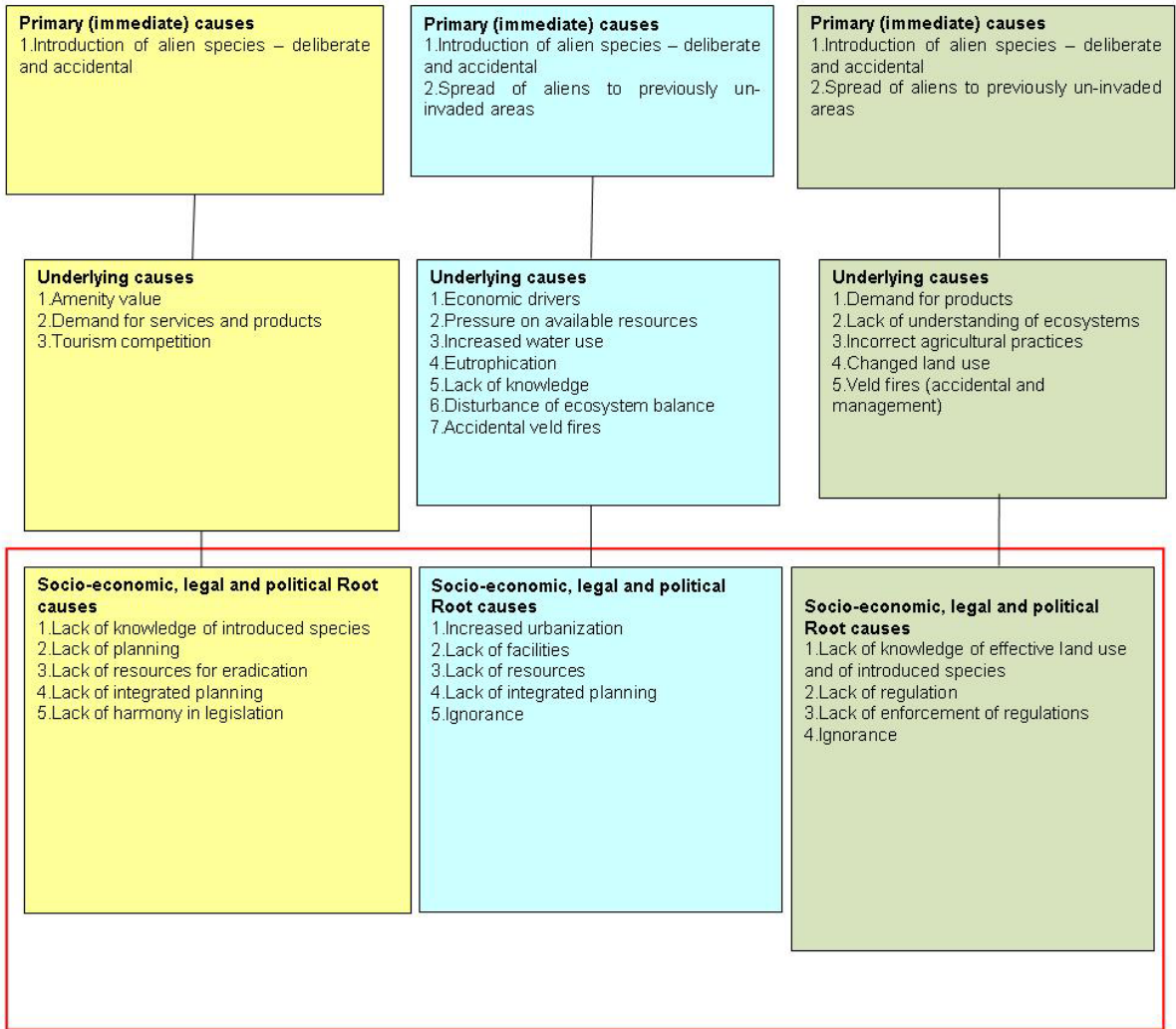
## Annex 4: Causal Chain Analyses



CCA diagram for the Transboundary problem of Deteriorating Water Quality



## INCREASE IN ALIEN INVASIVES



### Common Root Causes Ignorance, lack of knowledge, Lack of monitoring, Lack of enforcement of regulations, Climate change

Key: to Sectors



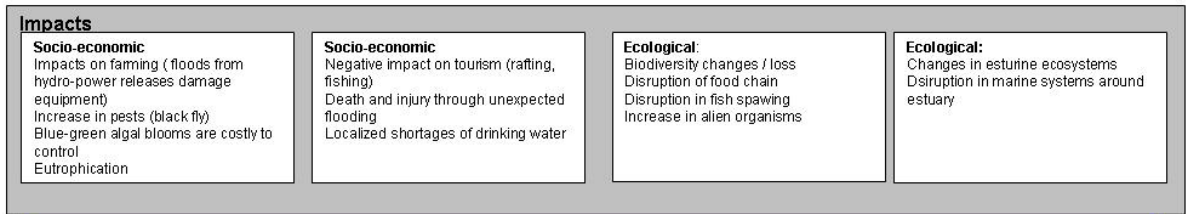
Tourism



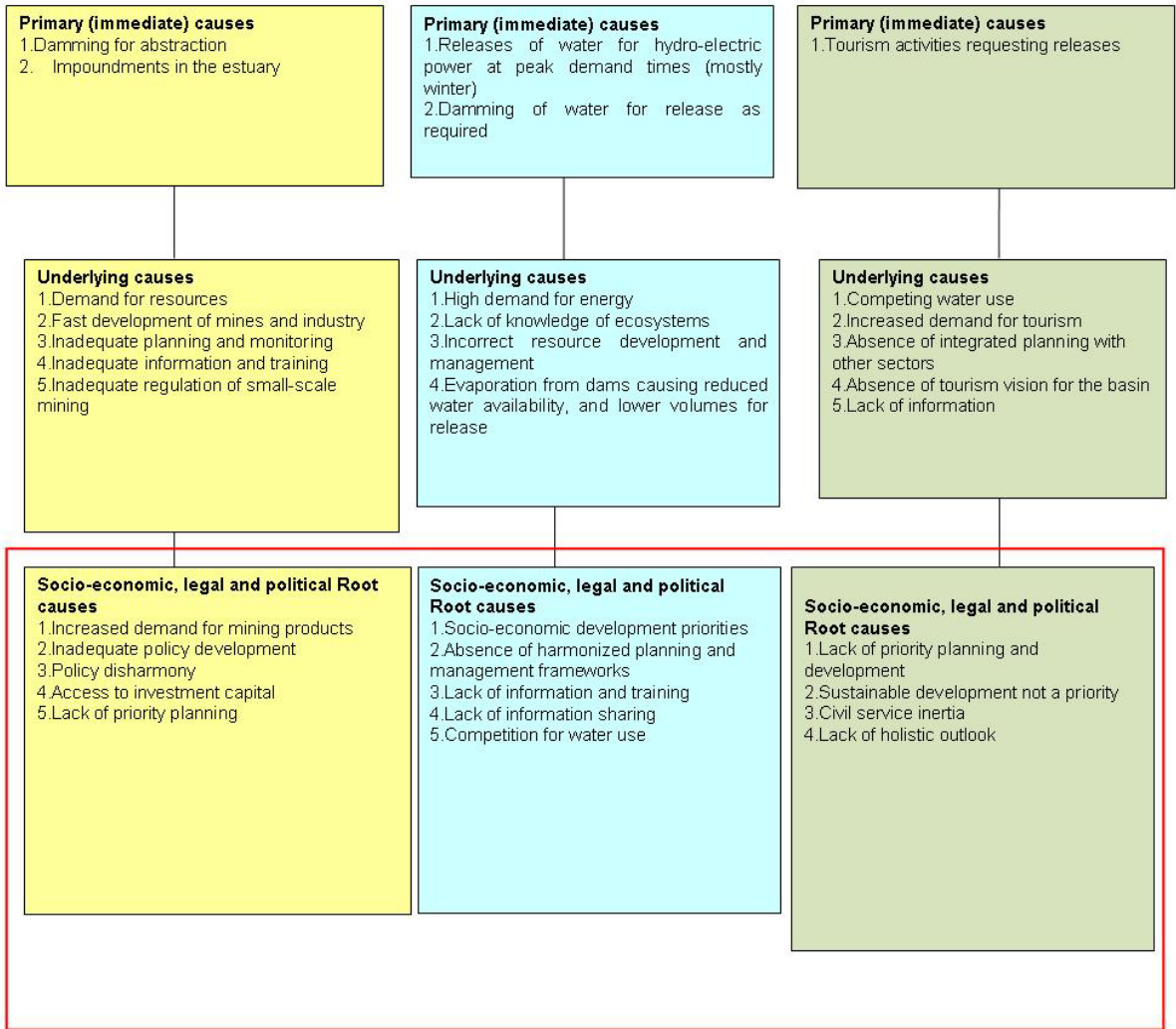
Urban / household



Agriculture



## ALTERED FLOW REGIME



### Common Root Causes

**Socio-economic growth, Population pressure, Lack of capacity, lack of regulation, lack of research, lack of compliance**

Key: to Sectors



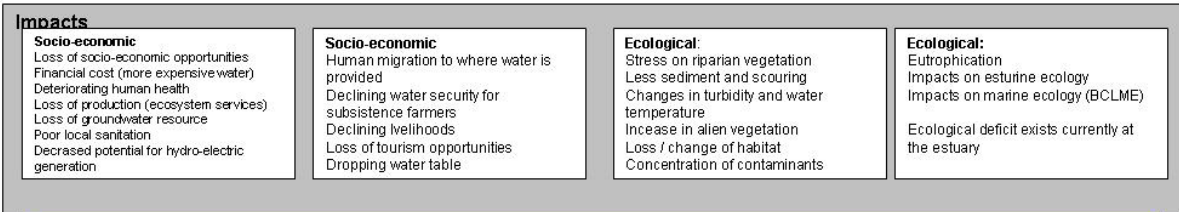
Mining



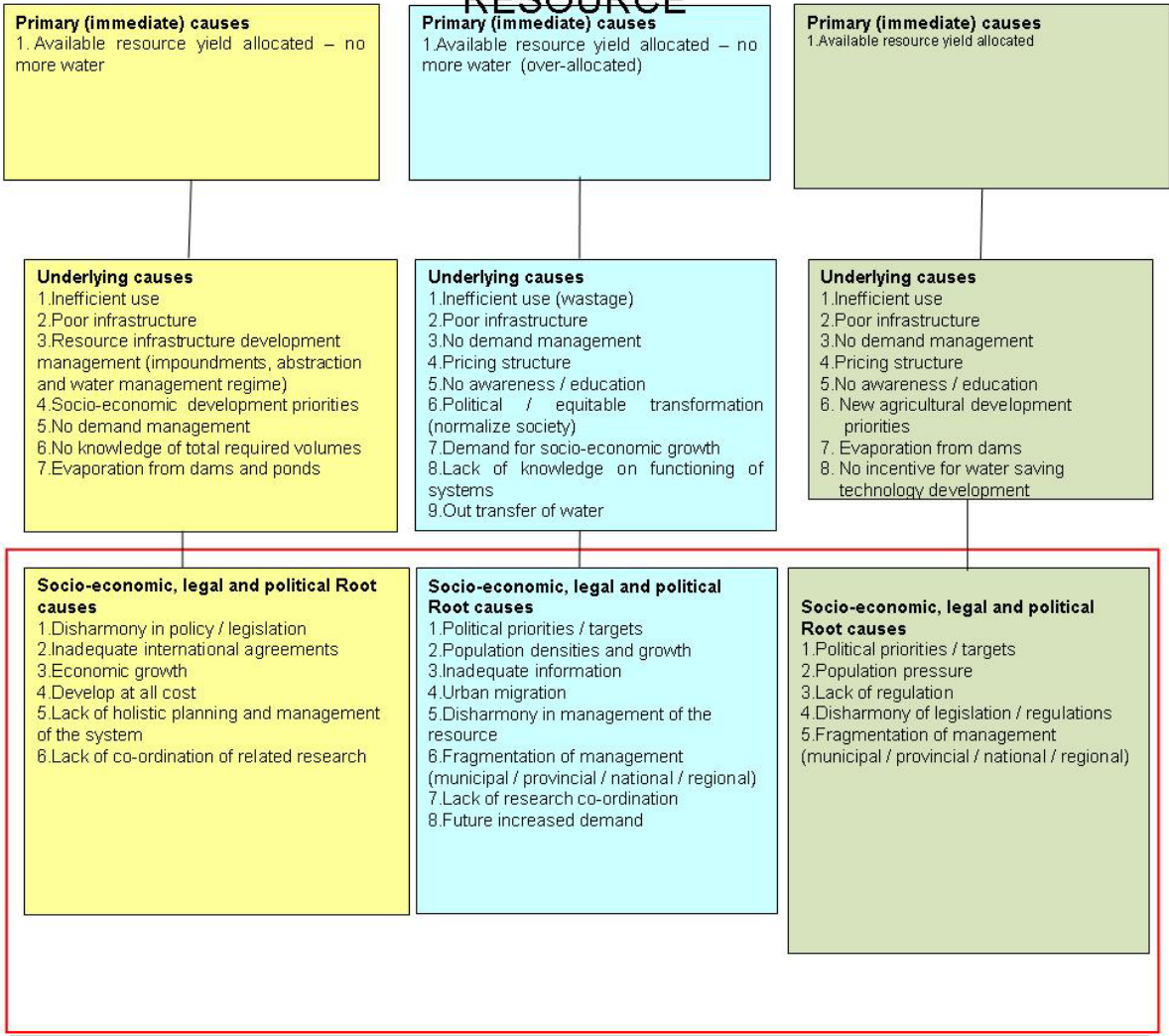
Energy /  
Industry



Tourism

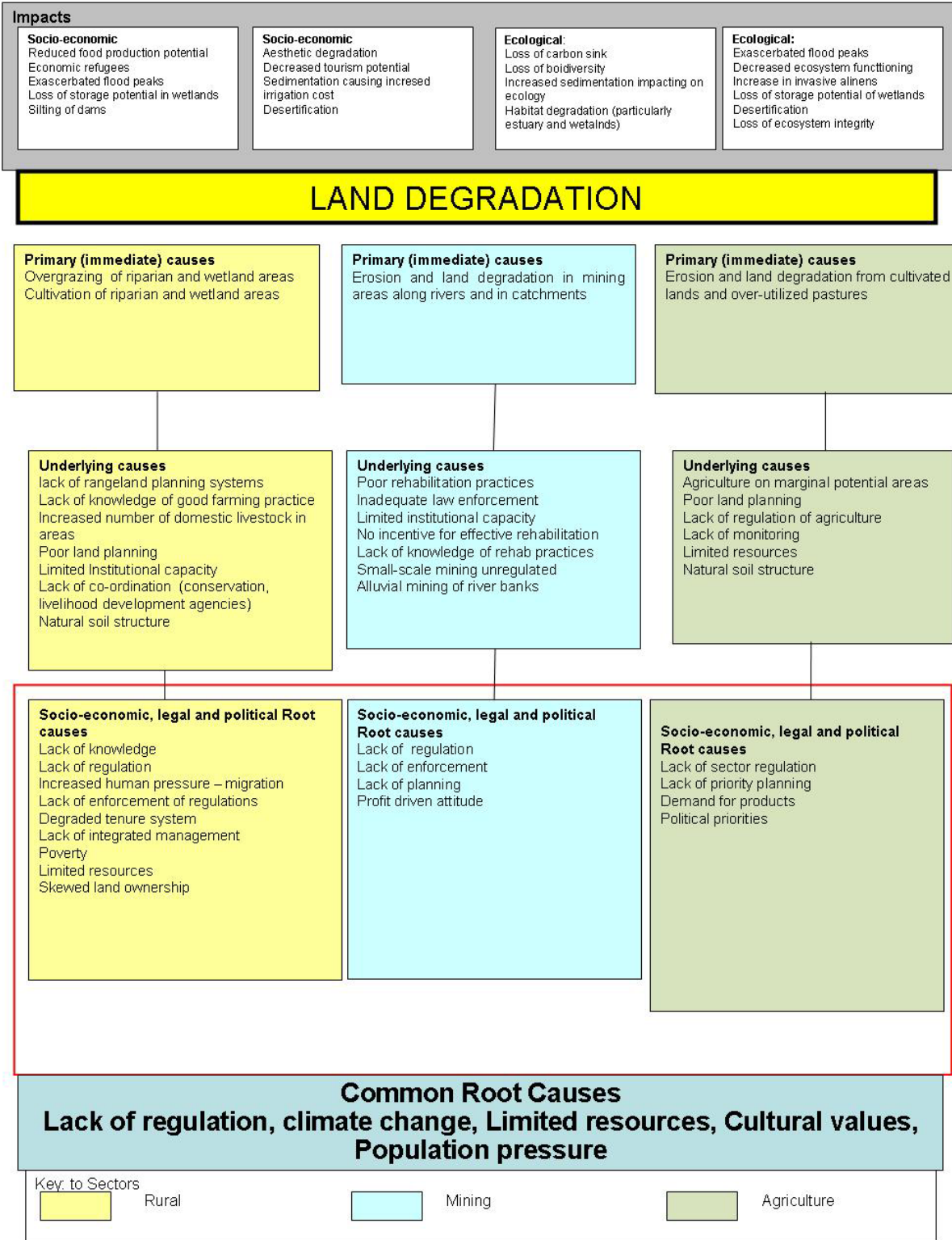


**STRESS ON SURFACE AND GROUNDWATER RESOURCE**



**Common Root Causes**  
**DEVELOPMENT PRESSURE, LACK OF MOTIVATION (Attitude), STRATEGIC PRESSURE, IGNORANCE, POPULATION GROWTH**





## ANNEX 5: EPAC Meeting Minutes

### MINUTES OF THE EXTERNAL PROJECT APPRAISAL COMMITTEE (ePAC) FOR THE UNDP/GEF ORASECOM PROJECT 19<sup>TH</sup> JUNE 2008

BIRCHWOOD HOTEL, BOKSBURG, JOHANNESBURG, RSA

**Project: Development and adoption of a Strategic Action Program for  
balancing water uses and sustainable natural resource management in the  
Orange – Senqu River Transboundary Basin**

*Chair: Lenka Thamae, Executive Secretary, ORASECOM*

Agenda agreed

- 1 Welcoming remarks and objectives of the meeting**  
*Lebogang Motlana, Deputy Resident Representative, UNDP/Namibia*
  - i Welcomed all present.
  - ii Emphasised the importance of the river basin to all basin states and the value of water to all.
  - iii Demand for water is increasing but the water quality is deteriorating.
  - iv There is enough water for all but one in six people in the basin are deprived of access to safe drinking water and proper sanitation.
  - v Thanked all for input to drafting of Project Document (Prodoc).
  - vi Stressed the importance of close collaboration between all donors and ORASECOM to ensure the success of the project.
  - vii This meeting is to finalise the Prodoc and move forward to next stage.
  
- 2 Opening remarks on behalf of ORASECOM**  
*Reggie Teka-Teka, Chairman of ORASECOM*
  - i Welcomed all to meeting.
  - ii Stressed the importance of the UNDP-GEF project along with all other concurrent projects.
  - iii ORASECOM want to ensure the successful completion of the project – one of the indicators of success will be that the project has been carried out in collaboration with other initiatives in the basin.
  - iv ORASECOM is still a young organisation and want to ensure a coordinated approach to the river basin and want to get it right first time.
  - v At end of meeting today want agreement on way forward.
  
- 3 Overview of the project**  
*Akiko Yamamoto, UNDP/GEF Regional Portfolio Manager: International Waters*

### **Progress in preparatory phase (Oct 06 - present)**

- Transboundary priorities identified by ORASECOM
- TDA/SAP process training conducted on the Orange-Senqu specific issues
- Preliminary TDA endorsed
- Stakeholder Analysis conducted
- Stakeholder Involvement and Communication Plan developed based on the ORASECOM Stakeholder Roadmap
- PIF approved by GEF Council
- Prodoc developed and revised to reflect contents of EU/GTZ/FGEF documents, discussions from various coordination meetings and the coordination Gantt Chart

### **Outputs from the project preparation phase (PDF B)**

- Transboundary priority issues confirmed and underlying and root causes identified (March & May workshops).
- Qualitative and quantitative stakeholder analysis conducted to determine Stakeholder perceptions and ranking of the priority transboundary issues.
- Draft public involvement and communication strategy prepared to contribute to the implementation of the *ORASECOM Roadmap towards Stakeholder Participation*
- Preliminary TDA developed, incorporating new thematic basin studies on water quantity and quality and climate change and studies undertaken by GTZ as the first step to development of an Integrated Water Resource Management Plan for the Orange- Senqu River Basin.
- The institutional arrangement for an Orange-Senqu River Basin umbrella programme agreed under which all the projects supporting ORASECOM will be coordinated and the SAP will be implemented. (April 2007 ORASECOM Council Meeting)
- Draft basin vision and water resource quality objectives agreed, corresponding to the priority transboundary issues & providing the framework for the Strategic Action Program
- Scope, activities, outputs and outcomes agreed for 3 demonstration projects addressing environmental low flows, water conservation in the irrigation sector and range land management

### **Plans**

- Prodoc to be appraised by the External Project Appraisal Committee in June
- Prodoc to be submitted to GEF Sec by mid July for CEO endorsement
- Prodoc endorsed by GEF Sec
- Prodoc approved by UNDP/HQ
- Prodoc signed by all parties

### **Outstanding Issues**

- Financing letters to be secured from ORASECOM and partners. Waiting to receive letters from ORASECOM and partners – this is slowing up process because cannot get endorsement without these letters

=> Submission for CEO endorsement

- PCU location. Not yet confirmed – waiting for confirmation from ORASECOM. Needs to be in one of the basin states. Cannot be funded from project funds and needs to be funded by in-kind funding from basin states.

=> Project Management Structure

**Project Goal:** To improve the management of the Orange Senqu River Trans-boundary water resources through Integrated Water Resource Management (IWRM) approaches that remediate threats and root causes.

**Project objective:** The focus of GEF involvement will be on addressing **transboundary** water management issues, **as identified in priority sequence** through a transboundary diagnostic analysis (TDA) process, and addressed in a Strategic Action Program (SAP).

GEF funding will be drawn upon for preparation of the comprehensive TDA and SAP, and the implementation of selected interventions identified as **basin priorities**.

**Project components (details for each component please see attached PPT):**

1. Institutional Strengthening of ORASECOM
2. Completion of TDA
3. Preparation of SAP and NAPs
4. Basin-wide Stakeholder Involvement Activities
5. 3 Demonstration projects (Environmental Flows, Water Conservation in Irrigation Sector and Community-based Rangeland Management)
6. Project Management

**Project components:**

**1 Institutional strengthening of ORASECOM**

- GIS based information management system will be created in cooperation with GTZ and EU
- Technical working groups established
- Transboundary EIA guidelines and procedures prepared
- Strengthening of water resource practitioners

**Deliverables:**

- Functional GIS based information system (and web page – may be done by GTZ)
- Technical working groups must be established
- Agreed climate change scenarios developed
- SEA guidelines and procedures prepared
- Practitioners capacity improved based on needs assessment done by FGEF

**2 Completion of TDA (existing TDA is only preliminary based on desk study)**

- Info gaps filled by for the TDA (coordinated with FGEF, GTZ and GTZ) eg review of impacts of artisanal mining; assessment of POPs; land degradation in lower Orange; invasive spp eradication programme
- TDA revised and updated (coordinated with FGEF, EU, GTZ)
- Revised TDA widely disseminated



Draft TDA mock-up circulated for comment on cover designs

**Deliverables:**

- Gaps filled for components listed above including water resources yield and demand forecasts (not being covered by GTZ – **CHECK on Gantt chart**)
- Revised CCA and causal loop diagrams
- SAP interventions
- Pre-feasibility studies for key interventions

**3 Preparation of SAP and NAPs**

- Institutions established
- SAP and NAPs formulated and endorsed
- Donor conference to be held to mobilise resources for IWRM implementation

**Deliverables**

- Endorsed SAP and NAPs
- Operational GEF M&E framework for SAP implementation
- Financial support leverage

**4 Stakeholder involvement**

- Basin wide stakeholder forum and national stakeholder forum established as proposed by the roadmap (coordinated with FGEF, GTZ, EU)
- Awareness on water conservation raised (with EU and GTZ)
- Educational and social marketing campaign materials produced (EU, SADC, GTZ)

**Deliverables**

BWSF  
Environmental educational curriculum  
Coffee table book

**5 3 demonstration projects**

- 3 priorities identified: environmental flow requirements (develop guidelines for setting environmental flows in basin based on best international practice especially estuaries and seasonal streams); irrigation water management (aim to demonstrate to farmers how water savings can be achieved through better practice – to compliment GTZ studies); community-based rangeland management in upper basin – to build upon FGEF study which is currently being done.
- Represent key IWRM components in SAP
- Done in pilot scale for future replication in the basin and wider southern Africa scale

**Deliverables**

- Agreed method for setting eco flows
- Demo of water conservation and WQ management best practice in irrigation projects

- Demo of best practice in land/range management and development of basin wide guidelines

## 6 Project Management

- Establish a small PCU
- Attendance and support of the programme coordination group (quarterly)
- Inception and steering committee meetings (to meet at least once per year)

### Timelines:

- Project Duration: 4 years
- TDA gap filling: commence Q1 2009 and continue for two years
- SAP/NAP development: begin Q3 2009 and be endorsed by Q1 2012
- Demonstration projects: begin Q1 2009 and run for 3/4 years
- Donor Conference: Q1/Q2 2012

.....

*SAP Implementation Phase: 2012 –*

### Project budget:

The Project budget is as follows (in USD):

1. Strengthening of ORASECOM	\$750,000
2. TDA	\$700,000
3. SAP/NAP development	\$600,000
4. Stakeholder Involvement	\$900,000
5. Demonstration Projects	
Environmental Flows	\$1,100,000
Irrigation water management	\$850,000
Improved land/range management	\$650,000
Dissemination activities	\$150,000
6. Project Management	\$600,000
<b>TOTAL</b>	<b>\$6,300,000</b>

### 4. Summary of Discussions:

- National benefits (p.52): Can this be elaborated further? – To be discussed further during the inception phase
- Timing: Annotated time table from now to the inception phase (the best case scenario) to be shared with all
- Gantt chart will be a part of Prodoc
- Financing letters: UNDP to provide sample for ORASECOM and sample ORASECOM letter to ORASECOM (by tomorrow); ORASECOM to ICPs (by tomorrow); ICPs to ORASECOM (by end next week)
- SAP/NAP development: will follow ORASECOM structure and procedure
- Phrase it as “Contribute to”
- Gantt Chart to be refined and Integration of SAP/IWRM Plan: 1 pager to be provided by ORASECOM ES to ORASECOM and to be attached to Prodoc
- PCU to be hosted with ORASECOM Secretariat

### **Comments from Chair:**

Good to see how the projects will be coordinated and the focus on environmental sustainability vis water resources management which was key point for ICP discussion.

### **5. Discussion and Comments:**

1. Ernest Fausther, UNDP Lesotho: p 52 of Prodoc re national benefits – is there a way we can expand on the national benefits so it will be easier to motivate the project to get countries final endorsement
  - o *RT: asks what is meant by national benefits*
  - o *TT: not possible at this stage to indicate exactly how much each country will get of the \$6.3 mill because we don't know yet where eg the demo projects will be, where the consultants will come from etc. But in implementation phase, these benefits can be quantified.*
  - o *Martha M: suggests that national benefits are quantified during project inception phase*
  - o *RT: UNDP/GEF project is part of overall approach being taken by ORASECOM so it may be difficult to separate out the UNDP project from the rest of the initiatives. May want to state the benefits in the context of the broader initiatives.*
  - o *Chair: agreed that it may be difficult to quantify the contribution to each riparian state*
  - o *PvN: 4 countries have agreed to ORASECOM, therefore do not need a discussion in Prodoc on national benefits.*
  - o *LM: any document from the projects has to be endorsed by ORASECOM who in turn have to respond to their principles, therefore recommend that the paragraph on national benefits is left in the document.*
2. PP: question on timing – originally the programme was going to commence in Q3 of 2008 and now it is shown as Q1 of 2009 – is this slippage?
  - o *Answer: Delays in holding council meetings caused delay in anticipated start up time.*
  - o *TT: project approval will still be in Q3 of 2008, but will take time for funds to be approved, secure project signatures by four countries and set up the project management unit etc, so work will start in Q3 but actual project will start in Q1 2009.*
3. MM: want to check that Gantt chart will still be refined and finalised.
  - o *Chair: yes, will be done in 1-2 weeks and will be reincorporated into final Prodoc.*
  - o *AY: noted difference between EU meeting yesterday and today's meeting – this is not an Inception meeting and therefore today's discussion will not be in as much detail as EU meeting*
4. PVN: when will inception phase start?
  - o *AY: inception phase will start as soon as Prodoc is signed by the countries. Ideal we should aim at Prodoc to be signed by end Q3 and then will start recruitment process and have the Project Manager on board by end 2008, which will kick start the inception period.*
  - o *TT: In the best case scenario, the Pre-Inception Report will be completed by end Jan 09 and will have an Inception meeting and then finalise inception Report so that we can start with actual implementation around end Feb 09.*

5. Martha: timing is dependent on next action – which could impact on the whole programme. Need to have the co-financing financial letters signed, finalise the CEO Endorsement Request then make a Submission etc.
6. Chair: financing letters were discussed in April by Council and agreed that Exec Secretary would write letters. Requested UNDP to provide sample/templates to ORASECOM by end of the week
  - *AY: must have these letters before can submit Prodoc, but numbers and figures must be correct for all partners. Warned that GEF may ask many questions regarding co-financing. If this information is delayed, it will delay whole process again. Appealed to all commissioners to speed up country signatory process because without signatures, funding cannot be dispersed. Ask for understanding and cooperation.*
  - *MM: need letter of request from ORASECOM before can provide letter of support.*
  - *LM: supports request from AY to ensure that all partners can provide as much information as possible to speed up the process.*
7. SDW: please can AY provide detailed/exact dates for what has to be done asap to help commissioners speed up process
  - *AY will send an email to all with using best case scenario then we need to work backward.*
8. Chair: re office space for UNDP/GEF project staff – want confirmation that request from ORASECOM has been received.
  - *PVN: yes, letter received this week and will be attended to in due course.*
9. GQ: in interests of strengthening ORASECOM would like to see SAP/NAPs pushed through ORASECOM structures and procedures
  - *AY: UNDP/GEF wants to support countries to manage the basin. Not limited to strengthening ORASECOM which is why all 4 countries are also involved. There are other issues that need to happen at national level (ORASECOM does not have mandate to do everything). This is a small but crucial difference between UNDP and other projects. When SAP is developed, the focus will be on agreement of basin wide initiatives.*
  - *TT: SAP/NAP process is at national level.*
10. LM: will the formulation of SAP and NAPs comply with ORASECOM's mission?
  - *PVN: ORASECOM went into this project as the de facto client (though not the de jure client). Our understanding is that everything must go through ORASECOM.*
  - *AY: ORASECOM's endorsement will be sought all along the way.*
11. SC: how will the SAP and NAPs be aligned?
  - *TT: the formulation of the SAP is an iterative process – formulate SAP, meet and discuss, revise, discuss and check national and regional activities. May need several iterations. Countries will have to weigh national vs regional priorities.*
12. TF: number of deliverables is dependent upon other projects, so it would be better if you describe involvement as a 'contribution' from other partners. Do you not need endorsement from ORASECOM as well as individual countries?
  - *AY: No, but it all goes through ORASECOM. All along the way we sought ORASECOM endorsement although strictly speaking it is not a requirement for e.g. the signatures on the project document are by countries.*

13. GQ: concerned that the WRM and environmental issues are split between GEF and GTZ supports – cannot address one without the other. How will this be resolved?
- *Chair: this was agreed at a recent meeting as being the best way to proceed. What would be a viable solution then?*
  - *MM: when 3 ICPs are working together it is difficult to coordinate.*
  - *Chair: the timing of the various programmes makes it difficult to integrate totally – the EU support is starting now; GEF will start next year and GTZ will only start in 2011. So by 2012 will have a full IWRM plan.*
14. PVN: ORASECOM does not want each ICP to come up with different recommendations and plans for the same aspects –in the end we don't want a 'SAP' and an 'IWRM Plan'
- *TT: we do need to tackle this issue, but we need to collaborate. GEF looking at water governance and environmental issues rather than water technical engineering components which is being done by GTZ.*
15. PVN: please could ORASECOM produce a concise document regarding responsibilities
- *AY: outcome from coordination meeting was that GTZ and GEF projects are both based on IWRM approach, but that we should concentrate on our relative strengths ie GEF focuses on environmental issues and GTZ on technical issues, but this should not be mutually exclusive. It was agreed that SAP and basin wide plan should speak to each other.*
  - *Agreed for ORASECOM Secretariat to coordinate and come up with a brief summary (1 pager) to clearly show the different contributions, can be done as part of the Gantt chart finalisation process.*
  - *TT: there won't be several plans – there will only be one IWRM plan for the basin and we need a one pager showing the contributions of all the partners to this plan.*

## **6. Programme Management Arrangement and ORASECOM Umbrella financing letter**

- *AY is going to produce a sample endorsement letter in next 2-3 days for sign off.*
- *PCU location in RSA is being worked on through the secretariat*
- *No further issues (see discussion above).*

## **7. Monitoring and Evaluation of UNDP/GEF Projects on International Waters** *Martha Mwandangi, Head of Energy and Environment Unit, UNDP Namibia*

- Provided overview of GEF Trust Fund and operational framework.
- Use results based management approach at 3 levels: outcome (result of country programme), project (output) and activities (deliverables of project)
- Explained roles of: Country office, Regional coordination units, Headquarters
- Adopt an adaptive management approach based on M&E results to ensure that lessons learnt are accounted for in project planning and execution
- Emphasise the need to identify risks, manage them carefully so as not to distract project implementation
- Gave overview for PIR as reporting tool for the UNDP/GEF, contributes to PPR
- *See detailed presentation*

**Comments:**

- MM: each project should strive towards a joint reporting mechanism so ORASECOM does not receive 4 different reports.
- RT: endorse that idea
- ML: would have to coordinate and agree a common template.
- GQ: payments are related to quarterly reports so we will develop our own which will then feed into annual project report
- Chair: needs to be discussed and elaborated by ORASECOM

**8. Vote on cover of TDA folder:**

Folder design 1:

Folder design 2:

Folder design 3 (to be same as TDA cover):

Decision: use one design for folder and cover.

Use the Orange rotated 90 degrees i.e. amend it.

**Discussion and recommendations**

- Minutes of this meeting will be attached to Prodoc when submitted to UNDP, GEF and ORASECOM Secretariat.

**9. Endorsement for project**

- Question: would the meeting be happy to endorse project on this basis?  
Meeting agreed to briefly summarise discussion points before final endorsement or rejection can be sought.

**10. Way forward**

- 1 National benefits will be quantified during the inception and implementation phase where possible. No changes in Prodoc.
- 2 Gantt chart to be included in project document and attached to CEO Endorsement Request Template
- 3 AY to draft samples and give to ORASECOM secretariat and ICPs for signatures by end of tomorrow (20/06/08)
- 4 Letters to ICPs from ORASECOM to be sent out on same day
- 5 Responses to be returned within one week ie 27/06/08
- 6 SAP/NAP development will follow ORASECOM structure (wording will be changed to reflect ICP contributions). Changes to be made in Prodoc.
- 7 One pager will be developed by ORASECOM and will be agreed at a meeting soon (date to be agreed).
- 8 ORASECOM is working on the provision of office space for PCU. Amend the Prodoc to reflect project management location

Chair: need a motion to endorse document with amendments as itemised above.

**Proposer: Namibia**

**Seconded: RSA**

## ATTENDANCE REGISTER AT UNDP-GEF MEETING ON 19 JUNE 2008

NAME	ORGANISATION	TELEPHONE	EMAIL
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## SIGNATURE PAGE

### Participating Countries:

**Botswana, Lesotho, Namibia and South Africa**

UNDAF Outcome(s)/Indicator(s):

*(Link to UNDAF outcome, if no UNDAF, leave blank)*

### **Expected Outcome(s)/Indicator (s):**

**Outcome 1:** Capacity of ORASECOM strengthened to coordinate initiatives, national institutions and donors in a harmonized manner to effectively promote the implementation of IWRM principles in the basin.

**Outcome 2:** Transboundary issues analyzed through additional studies, immediate and root causes of priority transboundary issues identified, and the resulting more comprehensive TDA

**Outcome 3:** Priority transboundary issues and basin-wide strategies to implement IWRM policies agreed through the endorsement of SAP and NAPs; Sustainable financial arrangements agreed for SAP implementation.

**Outcome 4:** Stakeholder involvement in project activities ensured; Public awareness raised on transboundary issues in the basin

**Outcome 5:** Ecosystem-based IWRM approaches encouraged and strengthened through the successful implementation of the demonstration projects.

### **Expected Output(s)/Indicator(s):**

1.1. GIS-based Information Management System created

1.2. Technical Working Groups established

1.3. Transboundary EIA guidelines and procedures prepared

1.4. Capacity of water resource practitioners strengthened

2.1. Information gaps filled for the TDA

2.2. TDA revised and updated

2.3. Revised TDA widely disseminated

3.1. Institutions established to support the national process for the NAP development

3.2. SAP and NAPs formulated and endorsed

3.3. Donor conference held to mobilize resources for SAP Implementation

4.1 Basin Wide Stakeholder Forum and National Stakeholder Forum established

4.2. Awareness on water conservation raised

4.3. Education & Social marketing campaign materials produced

5.1. Mechanisms established to assure preservation of environmental flows for the surface and subsurface flows of the Lower Orange.

5.2. Water use efficiency improved at the transboundary pilot sites and best practices in irrigation water usage developed and

5.3. Soil erosion reduced at the pilot site and self-governance lessons and best practices for improved land/range management established

### **Implementing partner:**

**UNOPS**

○ **Other Partners:**

**ORASECOM**

Programme Period: 2008-2012  
Programme Component: \_\_\_\_\_  
Project Title: Development and adoption of a Strategic Action Program for balancing water uses and sustainable natural resource management in the Orange-Senqu River transboundary basin  
Project ID: PIMS 3243  
Atlas proposal ID: 00056936  
Atlas Project ID: 00070094  
Project Duration: 4 years  
Management Arrangement: Agency Execution

Total budget: 38,365,500US\$

Allocated resources: 38,366,500US\$

- GEF 6,300,000US\$
- Co-finance 16,621,500US\$ (Governments)
- Other:
  - BMZ/GtZ 3,864,000US\$
  - InWEnt 280,000US\$
  - FGEF 2,100,000US\$
  - EU 3,500,000US\$
  - 
  - DRFN 1,500,000US\$
  - CI 4,200,000US\$



<b>On Behalf of</b>	<b>Signature</b>	<b>Date</b>	<b>Name/Title</b>
Government of Botswana			<b>Mr. B. Paya, Deputy Permanent Secretary Water Resources – Ministry of Minerals, Energy and Water Resources</b>
Government of Lesotho			<b>Mr. Mosito Khethisa, Principal secretary Ministry of Finance and Development Planning</b>
Government of Namibia			<b>Mr. Andrew Ndishishi Permanent secretary Ministry of Agriculture, Water and Forestry</b>
Government of South Africa			<b>Mrs. Nosipho Ngcaba Director General Department of Environmental Affairs</b>
UNDP			<b>Israel Dessalengne Resident Representative, a.i. UNDP South Africa</b>
UNOPS			<b>Mr. Vitaly Vanshelboim Deputy Executive Director</b>