Okavango River Basin Transboundary Diagnostic Analysis Technical Report

OKACOM

The Permanent Okavango River Basin Water Commission

Okavango River Basin Environmental Flow Assessment Project Initiation Report Report No: 01/2009

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June 2009

Environmental protection and sustainable management of the Okavango River Basin

EPSMO

ENVIRONMENTAL FLOW ASSESSMENT SERIES

DOCUMENT DETAILS

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List of reports in report series

Report 01/2009: Project Initiation Report
Report 02/2009: Process Report
Report 03/2009: Guidelines for data collection, analysis and scenario creation
Report 04/2009: Delineation Report
Report 05/2009: Hydrology Report: Data and models
Report 06/2009: Scenario Report: Hydrology
Report 07/2009: Scenario Report: Ecological and social predictions
Report 08/2009: Final Report

Other deliverables:
DSS Software
Process Management Team PowerPoint Presentations

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Acronyms and abbreviations

DRIFT	Downstream Response to Imposed Flow Transformations
EF	Environmental Flow
EMP	Environmental Management Plan
HEP	Hydroelectric Power
HPP	Hydropower Project
IFR	Instream Flow Requirements (often used as a synonym for EF)
MAR	Mean Annual Runoff
M amsl	metres above mean sea level
MCM	Million Cubic Metres
ToR	Terms of Reference

1. Background

1.1. Planned Biokavango Environmental Flows study

In the early 2000s the Biokavango Project at the Harry Oppenheimer Okavango Research Centre (HOORC) of the University of Botswana began planning for an Environmental Flows Study of the Okavango Delta. At an early stage of this planning HOORC organised a Planning Workshop for the EFlows Delta study from 24-26 September 2007. In August 2007, Dr J King of the University of Cape Town was invited to introduce the concept of EFlows at this meeting. She made three presentations:

- Environmental Flows: Holistic Methods
- International development toward Integrated Flow Management
- What are EFlows and why are they important?

Dr King produced notes after the meeting (Appendix 1) that suggested, among other things, that a trial EFlows study should be initiated using presently available knowledge and data. This should use a multidisciplinary team, made up of specialists in the:

- Abiotic sciences:
    - Hydrology
    - Hydraulics
    - Water Chemistry
    - Fluvial geomorphology
- Biological sciences:
    - Vegetation
    - Aquatic invertebrates
    - Fish
    - Water birds
    - Wildlife
- Social sciences:
    - Resource economics
    - Rural sociology, including health
    - Macroeconomics
    - Tourism
- Process advisor/coordinator

It was recommended that the project should liaise with local and national government and the Okavango River Basin Commission (OKACOM). It would capacity build, through providing the Botswanan team and government with first-hand experience of an EFlows Assessment, and would also provide deliverables that could be used to motivate for international funding for a basin-wide EFlows study.

It was agreed that HOORC would take up and act upon the findings of the workshop, proceeding with plans for a short-term trial EFlows study.

1.2. The EPSMO project

Also during 2007 a basin-wide study of the Okavango Basin was revived, funded by GEF and the three riparian governments. Titled the Environmental Protection and Sustainable Management of the Okavango River Basin (EPSMO) project, this was an OKACOM initiative implemented by the United Nations Development Program (UNDP) and executed by the United Nations Food and Agriculture Organization (FAO). The long-term objective of the

EPSMO Project was to achieve global environmental benefits through concerted management of the naturally integrated land and water resources of the Okavango River Basin. This was to be done through a standard process used by all GEF funded International Waters projects: an objective assessment -the Transboundary Diagnostic Analysis (TDA) - and the development of a Strategic Action Programme (SAP) of joint management to address threats to the basin's linked land and water systems. The SAP would package initiatives that address issues raised by the TDA and would help overcome barriers to regional co-operation in order to ensure that development of the basin would be sustainable and equitable. In the case of the Okavango Basin, the traditional approach, designed for rehabilitating degraded rivers, would have to be modified because of the near-pristine nature of the river ecosystem. It was suggested that this be done by incorporating an EFlows Assessment as a major part of the TDA.

1.3. Biokavango and EPSMO collaboration

The Okavango Delta Management Plan and OKACOM Secretariat were launched at an international conference and ceremony in Maun, Botswana from 31 January to 2 February 2008 (Appendix 2) at which presentations were again made on the concept and practice of EFlow Assessments. Following this, Dr King sent suggestions to HOORC and OKACOM on how the EFlows work could continue and expand into a study for the whole Basin. Dr Dominic Mazvimavi developed this into a project plan for an Environmental Flow Assessment for the Okavango River Basin, which was presented at a meeting of the Okavango Basin Steering Committee in Windhoek in March 2008. At this stage, EPSMO and HOORC finalised details of a joint EFlows study with three full multidisciplinary teams – one for each country. EPSMO would be responsible for the country teams and data collection in Angola and Namibia, and Biokavango responsible for the Botswanan team and activities in the Delta other than the social research. Further discussion led to the inclusion of an international Process Management Team lead by Dr King.

2. The Planning Meeting

A Planning Meeting for the EFlows module of the TDA was held in Pretoria from 15 to 16 July 2008, attended by 14 people (Table 2.1). The objectives (Appendix 3) were to:

- familiarise all with the EPSMO project and the agreement with Biokavango;
- to familiarise all with the EFlows concept, the proposed EFlows module and its contribution to the TDA/SAP;
- to agree on the scope of the project in terms of the number of development scenarios and sites that would be considered;
- and to develop a workplan for the module.

The agenda was guided by a proposal submitted by what would become the Process Management Team in April 2008, which covered the suggested:

- project design
- time allocations
- required disciplines
- work programme
- budget
- deliverables
- Terms of References for all disciplines.

Table 2.1 Attendance at the EFlows Module Planning Meeting, Pretoria, July 2008

Name	Role	Institution
Chaminda Rajapakse	EPSMO project manager	FAO
Nkobi Moleele	Director Biokavango	HOORC
Dominic Mazvimavi	Team Leader, Botswana, EFlows study	HOORC
Tracy Molefi	National Project Coordinator	GoB
Belda Mosepele	Ecologist	HOORC
Manuel Quintino	Team Leader, Angola, EFlows study	EPSMO
Carlos Andrade	Okavango Basin Steering Committee	OKACOM
Gabriel Luis Miguel	Team Representative, Angola	Faculty of Science, Augustinho Neto University
Kevin Roberts	Team Representative, Namibia	MAWF-DWAF, Namibia
Jackie King	EFlows Team Leader, International Process Management Team	Water Matters/UCT
Cate Brown	Technical Integrator, International Process Management Team	Southern Waters
Hans Beuster	Basin hydrologist, International Process Management Team	Beuster and Associates
Peter-John Meynell	TDA Report Coordinator	EPSMO
Akiko Yamamoto	Regional Portfolio Manager for International Waters Eastern and Southern Africa	UNDP

Chaminda Rajapakse (CR) provided background information on the Okavango TDA and the roles of EPSMO, Biokavango and the EFlows Module. Nkobi Moleele (NM) then outlined the Biokavango Project and its focus on biodiversity. Many human activities can impact diversity, including water-resource developments so the programme sought guidance on flows needed to maintain the Delta ecosystem. CR continued with an explanation of the TDA implementation strategy, and particularly the central role of the EFlows Assessment. There

would be four principle teams completing the EFlows Assessment: one from each country and an international Process Management Team. These would also, in various ways, contribute to the parent TDA activities.

Jackie King (JK) then introduced the EFlows concept, pointing out that the teams would be aiming to provide scenarios of possible future pathways for decision-makers to use in discussion and negotiation. She continued with an explanation of the suggested Okavango EFlows project as per the proposal submitted by the Process Management Team, which would have the following features:

- Three scenarios plus present day (baseline) would be addressed. The scenarios would be chosen in a later exercise involving country representatives and OKACOM (this took place in Maun in November 2008 and the scenarios are reported in the Scenario Report dated July 2009).
- For each of the three future scenarios, predictions would be provided of the ecological and socioeconomic impacts of water-use scenarios, using a structured process; most if not all ecological impacts would be negative, whilst some of the social impacts might be negative and some positive.
- The macroeconomic impacts (mostly beneficial) would be predicted for each scenario, in a parallel exercise outside the EFlows study.
- Eight sites would be used for the EFlows Assessment: three in Angola; two in Namibia; and three in Botswana.
- Country teams should consist, at a minimum, of a hydrologist/hydraulician, a fluvial geomorphologist, a water chemist, a botanist, a fish biologist, an aquatic invertebrate biologist, an ornithologist, a wildlife zoologist, and a socio-economist. There would thus be about 30 people in the combined basin team.
- The international Process Management Team would consist of a Project Leader, a basin hydrologist, a Technical Data Integrator and a Resource economist.
- The main deliverable would be a Scenario Report detailing extensively the predicted ecological, social and economic outcomes of the chosen scenarios for zones along the river system from the headwaters in Angola to the outlet of the Delta.

The scheduled discussion on data collection followed but was short as it was felt it should be dealt with when the whole basin team was present. Instead, the meeting focussed on completing a work plan and setting dates and responsibilities for all activities.

3. The Workplan

Eleven main activities were agreed upon (Table 3.1):

- Appoint national teams
- Delineate basin
- Collate and synthesis hydrological data
- Identify scenarios
- Select representative sites
- Select discipline indicators to represent major issues/groups
- Collect data
- Write specialist reports and review
- Set-up, populate and calibrate the Decision Support System (DSS)
- Analyse scenarios and write Scenario Report
- Integrate findings in TDA Report.

The breakdown of activities under each major heading, with the participants, the responsible person and the time lines, are detailed in (Table 3.1). Essentially, there would be four major streams of activities.

The first involved the specialist biophysical and social teams. After appointment, they would participate in a joint activity to divide the basin into homogeneous biophysical and social units, harmonise these into a short series of Integrated Units of Analysis, and choose representative a study site/area in each to be used in the investigations and scenario analysis. The specialists would then work in discipline groups to identify a number of indicators that represented variables that they felt could change with flow changes. These indicators would form the focus for site visits, data collection, literature reviews and analysis over the time period October 2008 to March 2009, culminating in the writing of specialist reports: one per discipline per country, with each specialist focussing on the representative sites/areas in her/his country.

The second stream of activity would involve a hydrological team consisting of the International basin hydrologist and hydrologists from each of the three riparian countries. They would collate and synthesise hydrological data for the whole basin and assess hydrological models in terms of their suitability for use in the project. They would then set up the models and simulate flow regimes at the chosen sites for each development scenario.

The third parallel activity would consist of discussions between the countries, project members and OKACOM on what development scenarios would be used in the study, and whether they would describe increasing levels of overall water-use or each focus on a sector (e.g. maximising agriculture; maximising hydropower generation etc.).

The fourth stream of activity would be configuration of the software for capturing specialists' knowledge and linking it with the simulated flow regimes for each scenario to produce predictions of ecosystem and social impacts per scenario.

Table 3.1 The Eflows Module workplan

Tasks	Activities	Participants	Accountable person	July	August	September	October	November	December	January	February	March	April	May	June	July
National Teams	Appoint teams	National Team Leaders	CR	Hydrologists to be appointed in July/early												
	In-country briefing sessions	NTLs	Botswana: DM: Namibia - SB: Angola - MQ													
Basin delineation	Guidelines for delineation and information required and report templates/examples	Process Team	JK													
	Information gathering	National Team Specialists (NTS)	Botswana: DM: Namibia - SB: Angola - MQ													
	Delineation exercise	NTS plus Process Team Members	JK													
	Report writing	NTLs	Botswana: DM: Namibia - Unknown: Angola - MQ													
	Dissemination of information	Project Management Unit (PMU)	CR													
Hydrological data collation and synthesis	Inventory of modelling work already done	NT Hydrologists plus HB	DM													
	Hydrological (and hydraulic) model decisions, including delta model		HB			Approval from Hydrology Task Force										
	Data collection		HB													
	Catchment hydrology		HB					If needed	If needed							
	Set up of system model		HB													
	Delta hydraulic model		DM	Dependent on outcome of model												
	Simulate scenario hydrology		HB						Ranges of hydrological change							
	Report writing	Hans Beuster to lead with contributions from NT hydrologists	HB			Model Selection Appendix										
	Dissemination of information	Project Management Unit (PMU)	CR													

Table 3.1 The Eflows Module workplan (cont)

Tasks	Activities	Participants	Accountable person	July	August	September	October	November	December	January	February	March	April	May	June	July
Scenario identification	Guidelines for scenario indentification	Process Team	JK													
	ID of likely country issues from NAPs	NTLs	Botswana: DM: Namibia - SB: Angola - MQ													
	NCU feedback on country issues	National Project Coordinators (NPC)	Botswana: TM: Namibia - LN Angola - MQ													
	Technical integration of basin-wide scenarios (development of longlist)	NTLs/Process Team	JK													
	OBSC endorsed scenarios (final list of four, plus present day)	PMU	CR													
Site selection	Update of guidelines for selection of river zones and sites	Process Team	JK													
	ID of longlist of river zones by country	NTLs	Botswana: DM: Namibia - SB: Angola - MQ													
	Desktop prioritisation of 3/2 river zones and sites per country for TDA EFs	NTLs, NCU	Botswana: DM: Namibia - SB: Angola - MQ													
	Field-based finalisation of study sites	NTS, Process Team	CR				Linked with data collectn									
Identification of social use/issues and ecological issues	Guidelines for identification of indicators and links between indicators	Process Team	JK													
	Identification of indicators	NTS, Process Team	JK			Linked with basin delineation										
	Identification of links between indicators	NTS, Process Team	JK			Linked with basin delineation										
Data collection	Guidelines for data collection for EFs	Process Team	JK													
	International and national literature reviews	NTS	Botswana: DM: Namibia - SB: Angola - MQ													
	Initial Data Collection	NTS, Process Team	Botswana: DM: Namibia - SB: Angola - MQ				Linked with site selection trip									
	Ongoing data collection	NTS	Botswana: DM: Namibia - SB: Angola - MQ													
Report writing and review	Guidelines for reports, incl. Creation of response curves	Process Team	JK													
	Flow categories	NTS,Process Team	CB													
	Response curves capacity building session		CB													
	Three country workshop on response curves creation	NTS, Process Team	JK													
	Submit draft reports	NTS	Botswana: DM: Namibia - SB: Angola - MQ													
	Internal Review	Process Team	JK													
	Task Force Review	Task Force	CR													
	Revision and Final Reports	NTS, NTLs	Botswana: DM: Namibia - SB: Angola - MQ													

Table 3.1 The Eflows Module workplan (cont)

Tasks	Activities	Participants	Accountable person	July	August	September	October	November	December	January	February	March	April	May	June	July
EF Models	Feedback from hydrologists on ranges of hydrological change		HB													
	Set up of DSS	Process Team	CB													
	Population of DSS with response curves	Process Team	CB													
	Cross-checking of response curves/DSS function	NTS, Process Team	CB													
Scenario analysis	DRIFT Hydrological Analysis - plus capacity building	Process Team, plus nominated team members														
	Scenario Analysis capacity building sesion	Process Team, plus nominated team members														
	Technical scenario analysis workshop	Process Team, NTS	CB													
	Draft Scenario Workshop Report	NTL, Process Team	JK													
	OBSC Demonstration Day	NTL, Process Team	CR													
	Final EF Scenario Report	Process Team, NTL	JK													
Integration into TDA Final Report		PMU	CR													

All of these streams would liaise during the course of the project through a series of team meetings, and the project would culminate in a Scenario Workshop where the scenarios would be finalised and then described in a Scenario Report. Following this, the main findings of the EFlows module would be incorporated in the TDA Report.

4. Conclusion

The project proposal was accepted with some revision, and began immediately.

The deliverables are listed at the beginning of all the EFlow Module reports.

Appendix 1

Notes emanating from the Planning Workshop for an Environmental Flow Study of the Okavango Delta
26 September 2007. Maun, Botswana

Written by Jackie King, University of Cape Town

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1. Comments heard by JK during previous two days

- Scenarios have already been done
- An EF study has already been done
- An EF study has not been done
- Lots of projects have been done but not linked to see how they fit together
- We do not know what kinds of data to collect
- We need more hard scientific data, not more scenarios
- There are no dams, no water-development threats
- Dams and abstractions are planned, the future of the Delta is threatened.

2. Suggestion for a way forward

Do a trial run through the whole EF process using presently available data and knowledge. The sequence could be:

- identification of possible development scenarios over the next 30-50 years
- physical and chemical modeling of the scenarios
- biological response
- social impacts
- economic implications
- demonstration output to political decision-makers and other stakeholders.

All this could be done within Botswana, but maybe in liaison with a parallel exercise running in Namibia.

Advantages of such a process:

- Produces several reviews (one per discipline and one of all known relevant projects/activities etc) that define the baseline knowledge on the system
- Allows all disciplines to see where they fit into the multidisciplinary Integrated Flow Assessment process
- Allows all specialists to understand what data are needed from them
- Identifies the gaps in knowledge and data, and enables prioritization of research
- It produces a product – albeit of low confidence – which can be used to demonstrate to political decision-makers and other stakeholders what could be achieved with additional focused research
- It provides a product that can be used to search for international funding for a basin-wide Integrated Flow Assessment (all three countries).

3. Points to consider

- Three water-resource development levels could be considered in the demonstration run, reflecting what could possibly happen in the next 30-50 years: maybe low, medium and high development?
- Outputs would need to be quantified or at least semi-quantified (on a rating scale of maybe 1 to 5) in order for social and (particularly) economic interpretation
- To the query of how would a layman know if water would be available to him, the response would be – we would not be ensuring availability but would be explaining in each scenario what the availability situation would be. It would then be up to that stakeholder, along with all other stakeholders, to respond by showing which scenarios are acceptable or unacceptable to them.
- In the prediction process, the social-ecological links are usually weaker than the physicochemical-ecological links, and it is suggested that care needs to be taken to include an appropriate number and variety of socio-economic experts in the multidisciplinary team.
- We would not be producing a *fait accomplis* set of scenarios to politicians that says that we know everything, but rather a demonstration of what could be produced and its use to politicians. We would need close liaison with government along the way to ensure we are producing information that can help them. We would be employing a process that is not pro-development or anti-development but a neutral technical activity designed to provide decision-makers with information upon which to make development or other water-management decisions. They would need a decision-making process to deal with the information provided to them.

4. Workshop process

The workshop participants agreed that we should go forward with a trial run. It was seen as a very useful exercise to bring all available knowledge together and use it to gain experience in working as a multi-disciplinary team in partnership with the government.

To begin the process, three groups were formed as below:

Group A Socio-economics: sociology, anthropology, people and livestock health, resource use and economics, food security, regional macro-economics

Group B Ecological: aquatic, riparian and relevant terrestrial vegetation; aquatic invertebrates; fish; herpetofauna, mammals, water birds

Group C Abiotic: hydrology, hydraulics, geomorphology, water chemistry

The groups met for three hours to identify the issues relative to water in the Delta and to each prioritise five topics for research.

5. Outputs of the groups

5.1 Group A – Socioeconomics

Background thoughts

1. There should be a trial run of an Integrated Flow Assessment for the Delta, if possible in parallel with Namibia (and one participant later suggested that Angola needed to be informed and included in order to not negate a later basin-wide Flow Assessment).
2. Realistic scenarios should be used in the trial run so that decision-makers and other stakeholders can relate to them.
3. Real stakeholders should be identified to take part in the process, both from the local level and the decision-making level.
4. We must review what is already known and what has already been done, as the first step and build on that. For instance, we should look at policies re settlement, environmental Acts, studies of tourism, livelihoods at the village level, economic evaluations RAMSAR resource evaluation, etc.
5. Available information may not be easy to access, and policies may not necessarily be being implemented.

Main water-related issues

1. ***Settlement patterns and wetland resource use***: human induced pressure; resilience to coping; cost of impacts on traditional coping mechanisms (such as being unable to move and settle elsewhere as in the past). Settlements tend to be as close to the water as possible, for cheaper pumping, livestock access, relaibale boreholes, molapo farming, vegetable gardening, fishing, drinking water (surface and boreholes), construction materials (thatching, timber, reeds). Uses include floodplain grazing, Tswii and other foods, firewood, medicinal herbs, crafts and fishing gear.
2. ***Resource valuation and vulnerability***: flood dynamics; wetland productivity; cost of needing alternative livelihood options. Links to income. Vulnerability – extent of reliance of livelihoods on the water and its resources; traditional coping strategies.
3. ***Wellbeing:*** health of people and livestock; cultural; wilderness aspect; opportunity cost of changing flow patterns. Well-being issues include traditions, religion and culture related to the water.
4. ***Commercial use***: water and wetlands; direct economic, social and ecological impacts. Tourist lodges (charged for water at same rate as households), irrigation, pricing/tariffs.
5. ***Maintaining biological diversity***: impacts at all levels; international biodiversity obligations; need to maintain local wetland use, natural flow pattern and variability

Links to other groups

1. Settlement patterns and wetland resource use

Need from physicochemical team:

- Teaching and understanding on flow dynamics

Need from ecological team:

- Information on water needed to retain riparian woodlands (NB from JK. The social team does not need this information; they need to know how the riparian woodlands are used and what the impacts would be if they changed. The hydrologists will tell the ecologists if and how flooding patterns would change and the ecologists will then tell the social team how the woodlands would change in terms of area and species).
- Spawning sites and conditions for fish in order to determine practical regulations (ex JK: again, this is not part of a Flow Assessment).
- Dynamics of fire on flood plains (JK: they need to explain what the issue is here before ecologists can give them relevant information)

Social scientists can provide:

- Information from traditional knowledge

2. Resource valuation and vulnerability

Need from physicochemical team:

- Potential channel shifts and micro-topography

Need from ecological team:

- How much water is needed and for what to keep the Delta healthy (JK: that is what this whole exercise is about!)
- Where are the thresholds (in ecological functioning and form?)
- Understanding of climate change and the carbon cycle (JK: most of these requests are for basic understanding and not for information that they could use to make predictions of social impact)

Social team can provide:

- Economic values of, for example, fish and reeds
- Understanding of resource value depending on changing conditions
- Priority research for social team

3. Well-being

Need from physicochemical team:

- Water quality and quantity

Need from ecological team:

- Wetland/ecosystem health
- Aesthetic values
- Impact of water changes on disease transmission
- Condition of livestock and wildlife, and value

Social team can provide:

- Cultural values
- Tourism expectations
- Value of tourism at the local level and CBNRM
- Health records
- Opportunity costs
- Photographic and hunting values

4. Commercial use

Need from physicochemical team:

- Current and potential water demand (DWA)
- Known abstraction rates

Need from ecological team:

- How much water this system needs now to maintain biodiversity (JK: this is what we are trying to determine!)

Social team can provide:

- Development plans and water needs
- Current and potential water demands
- Agricultural needs
- Village use figures, per person and for livestock
- Pricing strategies – water demand management and cross subsidies

5. Maintaining biological diversity

Need from physicochemical team:

- Flow variability and how it translates into ecosystem health and water requirements for functioning biogeochemical cycles (JK: the social team does not need this info!)

Need from ecological team:

- Information on habitats
- Status of species (IUCN Red Data list)
- Threats in terms of flow

Social team can provide:

- Significance of species used by people
- Current uses by communities, tourists, industry and value
- Information on who is responsible for natural resource management and governance

6. General comments

- Need to understand what each team within the Flow Assessment thinks the other groups think
- Need integrated approach that includes communities and aspirations
- Information from groups can be complementary; we need to work together
- We need harmonized policies and approaches; look at broader issues
- Mechanisms for sharing information within the Delta could include:
    - Set up open network

- Get people out of their comfort zones, talking and understanding each other;
- Participatory planning
- Retain momentum
- Balance of expertise
- Champions and drivers and mentor
- Lead institution(s)

A final comment from JK: much of the above does not form part of a Flow Assessment and is more closely related to implementation. Some of the remainder is not really the responsibility of the social team. Their job would be to *interpret* physical, chemical and biological change in terms of social and economic impacts (positive and negative). The whole process of defining limits to each person's work plans will be very important – in fact, critical to the success of the Assessment.

Five priorities for social research

- Evaluation of wetland resource values
  - Pertinent to communities living alongside the delta (molapo farming)
  - Pertinent to tourism industry
- Evaluation of opportunity costs especially wellbeing values
- Review of real value of wetland tourism at local level (lodges, water use, pollution costs, how the community benefits)
- Threats to present coping mechanisms of wetland resource users
- Assessment of wetland biodiversity value to people of Ngamiland

5.2 Group B – Ecology

Dr Dominic Mazvimavi has the Powerpoint presentation

5.3 Group C – Physicochemical

The physicochemical experts act as an information provider to the remainder of the team, and need to be able to predict changes in water quantity, water quality and sediments, explaining these in terms of:

- Water levels (and quality and suspended solids)
- Discharge
- Velocity
- Frequency
- Duration
- Timing
- Variability
- (JK: also channel changes)

Their question is: what does the full team need from them? At what spatial and temporal resolution? Are their current models adequate? The following could be considered.

Water quantity

If necessary, they can improve the existing hydrodynamic models or develop new ones. Possible areas of improvement could be:

- Proper calibration
- DEM
- Parameterization of overland flow
- Evaporation/transpiration studies

Water quality

They could:

- do monitoring for calibration of the models
- develop an understanding of biogeochemical processes along the system and quantification of these

- develop models (transport and biogeochemical reactions and processes.

Sediments

They could improve their understanding of:

- sediment dynamics in relation to discharge
- effects of sedimentation on floodplain inundation dynamics
- long-term changes in flow distribution
- channel blockages
- role of suspended sediment in the ecosystem
- suspended sediment transport processes.

6. Suggested strategy for the Integrated Flow Management study

- Appoint a coordinator for the whole process
- Identify research areas/disciplines to be included in the Flow Assessment study
- Write concise and critical reviews of all past projects, activities, papers, data (several reviews – per discipline and an overall look at all relevant projects, activities etc)
- Develop a scheme for the flow of information between groups and the mechanisms for sharing information
- Conduct new research as per discipline priorities and as funds allow
- Complete a demonstration run through the whole process, using ?three possible levels of development
- Liaise with similar exercise in Namibia
- Disseminate the outputs?
- Use as foundation of new basin-wide proposal.

7. Wrap-up workshop discussion

- HOORC will take up and act on the outputs from the workshop
- Trial run for Okavango based on existing data agreed on – how can this happen? How do we move on? Need a proposal for kick starting the process
- Need to identify a team of specialists. Important disciplines for the process would be:
    - Process coordinator
    - Physicochemical
        - Hydrologist
        - Hydraulician/hydrodynamic modeler
        - Fluvial geomorphologist/sedimentologist
        - Water chemistry??
    - Ecological
        - Vegetation
        - Mammals
        - Water birds
        - Fish
        - Aquatic invertebrates
    - Socio-economic
        - Resource economist/macroeconomist
        - Rural sociologist including health
        - Tourism
    - Institutions (need to work with)
        - OKACOM
        - DWA
        - MEWT (inc ODMP)
        - Local government

Workshop closed at 16h00 on Wednesday 26 September 2007.

Appendix 2

Schedule and abstracts for international conference in Maun January/February 2008

"SHARING LESSONS AND EXPERIENCES FOR BETTER IMPLEMENTATION OF WETLANDS MANAGEMENT"
Guest speaker
Dr Peter Ashton
CSIR – Natural Resources and the Environment, Pretoria, South Africa

Schedule of Presentations

Maun Lodge, Maun
31st January to 1st February 2008

31st January 2008
Registration: 07:30 – 08:15
Session 1: Ceremonial Session 08:15 – 10:00

Facilitator: Mr Stevie Monna, Director, Department of Environmental Affairs

08.15 – 08.20	**Pastor Thamaku**	Opening Prayer
08.20 – 08.30	**Ms Bernadette Malala** District Commissioner, Ngamiland District	Introductions
08.30 – 08.40	**Kgosi Kealetile Moremi** Chief of the BaTawana	Welcome Remarks
08.40 – 08.50	**Mr Steve Monna** Director, Department of Environmental Affairs	Objectives of the Conference
08.50 – 09.10	**Dr Lucas Gakale** Permanent Secretary, Ministry of Environment, Wildlife and Tourism	Official Opening
09.10 – 09.50	**Dr Peter J. Ashton** Principal Researcher and Divisional Fellow, CSIR, South Africa	**Keynote Speech**: "Key challenges facing downstream management of the Okavango River - a shared, transboundary river basin."

Abstract:
Sustainable management of the catchment of the Okavango River relies on the collective goodwill and collaboration of the three basin states - Angola, Namibia and Botswana. While the territorial sovereignty and the right of each state to direct and manage its own resources are acknowledged, states also have associated responsibilities that direct an underpin interactions with their neighbours. In particular, an individual state should not act unilaterally in a way that may have an adverse impact on a neighbouring state, and all states should collaborate openly in all matters related to the management of a shared resource. These principles require the three Okavango River basin states to work closely together to ensure that both national and basin-wide objectives can be achieved harmoniously. The provisions of national and international water law, as well as international and regional watercourse management treaties and protocols ratified by the basin states help to inform and guide the activities of each country. However, in the final analysis, it is the decisions and actions of national governments and individual stakeholders in each country that play a decisive role in sustainable management of the resource.

09.50 – 10.00	**Honourable Mr Vista Moruti** Member of Parliament, Okavango	Vote of Thanks

Break: 10.00 to 10.30

Session 2: Integrated Water Resources Management in the Okavango 10:30 - 12:15

Facilitator: Mr Pheto Phage, Director, Department of Meteorology

10.30 – 11.00	**Ms Portia Segomelo** Deputy Director, Department of Environmental Affairs	"Integrated Planning – Case Study on the *Okavango Delta Management Plan*"

Abstract:

a) The integrated plan to manage the resources of the Okavango Delta takes account of the inter-related nature of the economic, social and environmental elements of development. Planning should consider the links between the three, to avoid losing opportunities for yielding the desired results within real budget and time constraints.
b) Social, bio-physical and economic systems are complex, dynamic and not particularly easy to pursue either. The Okavango Delta represents a good case study which demonstrates the strength of these elements within a planning context.
c) The ODMP project document provided preliminary material for a comprehensive plan but still needed an analytical framework and a robust participatory process to focus, prioritise and deliver outputs accordingly and within the wide sectoral interests in the Okavango Delta Ramsar Site
d) It was a challenge to evaluate the inter-connected factors and options in order to agree on a common framework which will be a basis for a management Plan of the Okavango Delta
e) Key *integrated planning* elements will in this presentation describe the following:
    - governance (institutions, policy, laws, education (capacity) and awareness
    - participatory elements – partnership building (public, planning institutions, regional (basin-wide)
    - technical planning aspects to address key issues for sustainable management of the Okavango Delta
    - sustainability and long-term gains within the planning area ODRS)

11.00 – 11.25	**Dr Hillary Masundire** Head of Department of Biological Sciences, University of Botswana	"Applying the Ecosystem Approach in Wetland Management: the ODMP Case Study"

Abstract:
The ecosystem approach is *a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way*. The ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of ecosystems.

In applying the ecosystem approach, one should be guided by the following philosophies:
1. Focus on the functional relationships and processes within ecosystems
2. Enhance benefit-sharing
3. Use adaptive management practices
4. Carry out management actions at the scale appropriate for the issue being addressed, with decentralization to lowest level, as appropriate
5. Ensure inter-sectoral cooperation

The process of developing of the ODMP was planned and implemented with intent to demonstrate the efficacy of the Ecosystem Approach. This involved identifying key stakeholders, stakeholder participation, objective setting, prioritization of activities and formulation of the plan. The ODMP is now a demonstration case study on how to apply the Ecosystem Approach to management of a wetland ecosystem within the a national planning framework. The many lessons learned from the ODMP process to date provide critical advice to any person, institution, government or agency wishing to apply the Ecosystem Approach. A number of criticisms/challenges face anybody wishing to promote the application of the Ecosystem Approach. Some of these will be analysed in relation to the ODMP.

11.25 – 11.50	**Dr Lapologang Magole** Research Fellow, HOORC, University of Botswana	"Linking People and Policies: The drive for stakeholder participation in the Okavango Delta Management Plan (ODMP) process"

Abstract:
At the core of the ODMP process was the notion of stakeholder consultation and partnership. The idea was not only to 'participate' stakeholders, but to create a partnership around the management and wise use of the Delta resources. The overall guiding principle for stakeholder participation was:
'the creation and strengthening of ownership.' *ODMP Project Proposal (2002).*
The story of stakeholder participation in the ODMP is best captured by the reaction of consulted communities. We started here: *"You have already progressed so far with the ODMP project without consulting the communities. We doubt that our comments will be incorporated now." "We are tired of all the meetings, as solutions are never implemented."*
And then came to: *"We need educational workshops to improve our participation and understanding and benefit from the project. We need education so that after three years of planning we become part of the management process."*
And ended up here: *"This is an opportunity to have our concerns and suggestions included in the plan. We are thankful that Government has changed its approach and is acknowledging our expertise and gives us a chance to have an input before decisions are made."*
But we could do better……

11.50 – 12.15	**Mr Samuel Bota** Regional Member, GWP-SA Steering Committee	"IWRM Plans: Experiences, Challenges, and Lessons from GWP-SA"

Abstract:
GWP-SA has been assisting member countries to develop their IWRM/Plans. Country Water Partnerships have been fully involved in facilitating the process on behalf of their governments. Through the PAWD Project in Zambia, Malawi, Swaziland, and Mozambique, GWP-SA has gained substantial experience of facilitating development of IWRM/WE Plans.

A fairly similar process was followed, although some variations occurred based on country situation. Major steps followed were:

- Setting up institutional structures such as project management unit, multi-sectoral project coordination team, and clarifying the roles, responsibilities, and systems/procedures.
- Enhancing IWRM/WE capacity of the project staff and coordination team through country and regional training and workshops.
- Soliciting support and political will from government.
- Analysing the situation of water and related resources to establish a base.
- Engagement of a wide range of stakeholders to dialogue the situation and suggest corrective action.
- Development of the Plan.
- Selling back the Plan for commitment for implementation.

Challenges in facilitating the process included:

- understanding of the concept of IWRM;
- Integration of IWRM in on-going processes
- managing change;
- balancing power relations across sectors;
- sustaining participation momentum.

From the process, we have learnt that:

- Full involvement of stakeholders at early stages of the process leads to commitment;
- Government leadership and involvement of Ministry of Finance at early stage is critical

Capacity building is essential throughout the process

Break: 12.15 – 13.45

Session 3: Wetlands Governance in the Okavango and Neighbouring Basins 13:45 – 16:15

Facilitator: Mrs Rapelang Mojaphoko, Director, Department of Wildlife and National Parks

13.45 – 14.10 **Ms Tabeth Chiuta**, Regional Programme Coordinator, IUCN-ROSA, South Africa — "Wetland Ecosystem Governance:-The Challenges of Managing Multi-Sectoral and Multi-Stakeholder Natural Resources in Southern Africa"

Abstract:
Southern Africa is well endowed with wetlands of varying types. These range from the smallest systems such as dambos to very large flood plains and marshes such as the Okavango Delta in Botswana and the Bangweulu swamps in Zambia. The experience of the region over the years, have shown that wetlands are among the most productive natural ecosystems found in the region, attracting large numbers of people and wildlife. This paper on *"Wetland Ecosystem Governance – The Challenges of Managing Multi-Sectoral and Multi-Stakeholder Natural Resources in Southern Africa"* will highlight the experiences and challenges faced by countries and river basin organizations in their endeavour to deal and address the governance challenges around wetland ecosystems and relevant resources.

The paper will describe wetlands as multi sectoral natural resources, highlighting the governance challenges posed in terms of policies and legislation, institutional arrangements, decision making processes and the teething problems of stakeholder dialogue and networking. The paper will also highlight experiences and lessons, and conclude by providing recommendations that countries and basin organizations in Southern Africa should consider in improving wetland ecosystem governance.

14.10 – 14.35 **Mr Hastings Chikoko**, Component Manager - Awareness Creation, Regional Water Sector Programme, SADC, South Africa — "The Informed Stakeholder: Communication and Stakeholder Participation in Integrated Planning"

Abstract:
The launch of the ODMP seeks to share information, experiences and lessons that enable stakeholders to implement the plan better. A shared river basin such as the Okavango has a stakeholder base with different interests, expectations, practices, capacities and "centres" of power. Despite the heterogeneity of the stakeholder base, genuine stakeholder participation remains a panacea for effective management of shared resources. However, stakeholders can only participate if they are empowered to work with others as equal partners bringing to the "job" their comparative advantage. Among other things, empowerment is firmly rooted on the availability of information and knowledge necessary for effective involvement in any activity. Other things given, an informed stakeholder is an empowered stakeholder. The presentation re-emphasizes the place of communication in stakeholder empowerment and participation. It recognizes that communication is a common thread throughout the entire implementation process of an integrated management plan. The presentation gives some pointers on how practitioners can ensure that communication efforts result in creating a stakeholder who is informed enough to take the required action. It concludes by proposing options for mobilizing funding for communication activities within the context of an integrated management plan.

14.35 – 15.00 **Mr Felix Monggae**, Chief Executive Officer, Kalahari Conservation Society – Every River Has Its People Project — "Stakeholder Participation in River Basin Management – The Every River Project"

Abstract:
Since its inception, the Every River has its People (ERP) project on shared river basin

management has significantly contributed to the effective and sustainable management of the Okavango River Basin. One of its major strengths has been the establishment of an efficient participatory process that is inclusive of all stakeholders, with particular focus on basin communities. This has allowed the ERP to gain access to and trust of the communities which in turn has paved the way for the project to add value to all users of the basin and relevant organisations. The project has developed a 5 years strategy which concentrates on the new challenges the ERP is facing, as well as investigating what past successes and lessons can be further developed.

Sustainability of projects and leaving a footprint of empowered people, through education and knowledge, effective institutional linkages and networks, sustainable resource management structures and practices, and economic growth through locally managed enterprises leading to improved livelihoods and poverty reduction, also forms a substantial part of the ERPs 5 years strategy. While it is envisaged that some of the activities will be completed within defined periods, it is hoped that others will be able to improve the livelihoods of people in the river communities for many years. With this in mind ERP has allowed for the advancement of an exit strategy, which investigates structures, capacity building and fundraising programs.

15.00 – 15.25 **Dr Scott McCormick**
Project Manager, Integrated River Basin Management Project

"Improved Governance for Environmental Management - Experience from Kuando-Kubango province , Angola"

Abstract:

Kuando-Kubango, a province of Angola located on the southeastern border of Angola with Namibia, contains a rich combination of natural and mineral resources, but has remained relatively underdeveloped due to problems of inaccessibility and the impacts of war. Communities and local government agencies have identified the major threats to the sustainable use of natural resources as: river water pollution, lack of proper waste collection and disposal, over-harvesting of natural resources, veld fire, and presence of landmines.

The USAID/Southern Africa Okavango Integrated River Basin Management Project (IRBM), coordinated by the Permanent Okavango River Basin Water Commission (OKACOM), developed and demonstrated an integrated governance and environmental management approach intended to create partnerships between OKACOM, local and national governments in Angola, and communities towards improved environmental management.

Results included four successful community environmental management projects in Menongue, providing better delivery and management of potable water supplies, an integrated community-based tourism operation linked to improved provision of solid waste management services, reduction in illegal charcoal production, and improved sanitation. Local government has taken ownership for the long-term support of these programs and seeks to expand the program throughout the municipality and province. A local NGO has been able to develop its organizational skills by partnering with USAID and OKACOM in this program.

15.25 – 15.50 **Dr Michael Tumbare**
Chief Executive, Zambezi River Authority, Zambia

"Operationalising the Zambezi Watercourse Commission (ZAMCOM)"

Abstract:

The Zambezi River is the largest in the SADC Region and is the fourth largest in Africa. Concerted efforts commenced in the mid 1980s to put in place a Zambezi Watercourse Commission (ZAMCOM) that would practice IWRM in the basin whilst promoting more efficient, equitable and reasonable utilisation of its water resources by the riparian states for their sustainable economic development.

More than twenty years have since passed and ZAMCOM and its organs are yet to be realised. This paper gives recent findings of the current water resources management status in the Zambezi riparian states as well as an overview of the ZAMCOM formation process, the challenges met and lessons learnt so far. The way forward to the eventual establishment of ZAMCOM and its organs is also proposed. The opinions and conclusions drawn in the paper are those of the author.

15.50 – 16.15 **Mrs Connie Masalila-Dodo**, Metadata Specialist, ARD Inc. "Information Management in the Okavango Delta Management Plan"

Abstract:

Information is key to developing an informed integrated plan to manage the Okavango Delta. One of the Specific objectives of the Data Management was to develop a data management system for the ODMP, to make existing data, information and knowledge available to partner institutions and other stakeholders in appropriate formats and a timely manner to support the development and initiated implementation of the Okavango Delta management plan (ODMP Project Document).
An information management system named Okavango Delta Information System (ODIS), was developed to serve information available for supporting the ODMP. The information consists of research work carried out at the University of Botswana, Harry Oppenheimer Okavango Research Center, Library resource at HOORC and data from government departments and other institutions.
Nowadays with improved technology information is accessed through the internet. Since ODIS the DEA is going a step further in developing an Environmental Information System which will now provide information globally through the internet.

1st February 2008

08.00 – 08.10 Recap of Day 1

Session 4: Ecosystems Management Instruments and Tools 08:10 – 11:00

Facilitator: Dr Lapologang Magole, Senior Research Fellow, Harry Oppenheimer Okavango Research Centre, University of Botswana

08.10 – 09.00 **Mr David Crawford** Quality Systems International, South Africa "The Relevancy of an Integrated Management Approach to the Okavango Delta Management Plan"

Abstract:

An Integrated Management System is defined as "a combination of the processes, procedures and practices used within an organization to implement the organization's policies". The Okavango Delta Management Plan can only be effectively managed if it is measured by addressing the issues in a holistic and integrated manner utilizing internationally recognized management systems to address quality, environment and safety. The effective implementation of the management plan must address the issues and the realities of managing for total risk which must be at the forefront of the top executive's agenda. More so, how do we effectively develop and deploy such an integrated system as part of the management plan. This paper addresses those hands-on issues which the Government and Business working together must acquire to ensure a sustainable future that continues to add value to the Okavango Delta and future generations.

09.00 – 09.25 **Dr Jackie King** Principal Research Officer, Freshwater Research Unit, University of Cape Town, South Africa "Sustainable Use of River Basins: Concepts and Tools for Informed Decision Making"

Abstract:
The last century has seen an unprecedented increase in global water-resource development, which has brought substantial benefits to most countries. Increasingly however, the costs of such developments are causing grave concern, as aquatic ecosystems degrade and linked social impacts escalate. The situation has driven development of a new science designed to inform on the ecological and social costs of development as well as the economic and social benefits. Focusing on integrated flow management, it is not pro or anti-development but aims (in its African, most advanced, form) to provide neutral technical information for decision makers on both the benefits and costs of development. This allows countries to make informed decisions on whether or not, and in what form, to proceed with river development or rehabilitation, basing their considerations on the full suite of ecological, social, resource economic and macroeconomic implications. Examples of the tools that have been developed and applied in several developing countries in Africa and Asia will be provided. A possible way forward for the Okavango system will be suggested.

09.25 – 09.50 | **Dr C. Naidu Kurungudla**, Head, Aquatic Weed Control Unit, Department of Water Affairs | "Partitioning of Flows in the Okavango Delta as a major challenge for environmental flow requirements in the Okavango Delta"

Abstract:
The sustainable management of water resources of the Okavango Delta requires balanced water allocation to various users (e.g. water supply to the villages and settlements, fishing and agriculture, tourism and biodiversity), through the engagement and participation of all key stakeholders. The process involves the characterization of water flowing into representative streams so as to determine relationships between flow extension and ecological processes.

The Mohembo inflows were analyzed to determine sharing and partitioning patterns for three major river systems in the Delta: Thaoge, Boro and Maunachira. This would act as a base for understanding the flow requirements for various users/uses. To better understand wetland storage areas, which are significant in maintaining the integrity of the Delta's biodiversity, critical sits along the three channels were selected for introduction of four new hydro-stations. The new stations are complemented with 44 already existing hydro-stations. The hydro data in the improved monitoring suggest that Thaoge River receives lesser flows, while competition exists inflow-sharing between Boro and Maunachira Rivers. The hydro dynamics reveal that Maunachira River has an advantage of being perennial all along its terminal Khwai River while the Boro River exhibits seasonal patterns. The systematic partition of inflows into the three rivers and lateral spill to their associated wetlands is necessary to determine the environmental flow requirements for the various sectors in the Okavango Delta.

09.50 – 10.15 | **Dr Jonathan Barnes**, Design and Development Services, Namibia | "Ensuring Economic Efficiency in the Management of Wetlands: The Okavango Delta Case Study"

Abstract:
A 2006 study of economic values associated with the Okavango Delta Ramsar Site and wetlands system illustrates the importance of ensuring economic efficiency in the development of wetlands. The study was primarily focused on the direct use values associated with use of the delta ecosystem for tourism, agriculture and natural resource harvesting. It also made estimates of indirect use values, in particular the value of wetland functions in carbon sequestration and as wildlife refugia. Non-use values for the delta ecosystem were not estimated but were considered, and will be studied in future. Estimation of the use values of the ecosystem was done within the framework of the national accounts. Thus the direct contribution and indirect impact of the ecosystem in the national economy was measured. This allowed integration of wetland management and conservation in the national development planning process. It also allowed treatment of the delta ecosystem as a natural asset within Botswana's natural resource accounting framework. The direct contribution of the ecosystem to livelihoods was also estimated. Knowledge of how different wetland uses and combinations thereof contribute to the economy, the development process, and to livelihoods, is essential to ensure optimal management in wetlands.

10.15 – 10.40 **Dr Nkobi Moleele**
National Project Manager, Biokavango Project, HOORC, University of Botswana

"Mainstreaming Biodiversity Conservation Objectives in Management of Wetland Resources in the Okavango Delta: Lessons and Experiences"

Abstract:
The Okavango Delta is a wetland ecosystem that harbors biodiversity of globally significance. The ecological integrity of the wetland remains largely intact in the face of gradually rising anthropogenic pressures. There is therefore need to balance competing uses of water and other wetland resources by production sectors, while providing for biodiversity conservation objectives. However, there are existing barriers to mainstreaming biodiversity conservation practices in the major production sectors of the Delta, and they include: a systemic and institutional capacity deficit for wetland management, conflicts over access to wetland resources between user groups, weak management of knowledge needed to guide decision making from the local user level to regulatory authorities, and absence of voluntary mechanisms and incentives to cultivate private industry involvement in conservation.

The Project adopts a two-tiered approach in facilitating the removal of barriers: i) that build capacity within the regulatory authorities and service providers to assimilate and supply biodiversity management objectives in decision making; and ii) that demonstrate how best to incorporate biodiversity management into day-to-day production practices through pilot projects. A strong emphasis is placed on participation and engagement between the various stakeholders, and building partnerships between government, private sector and rural communities. This paper draws from the implementation process (so far), lessons and experiences worth sharing in the integration of biodiversity conservation objectives in wetland management. The discussion will focus, among others, on governance, socio-economic, technical and sustainability issues related to biodiversity mainstreaming.

Break: 10.40 – 11.00

Session 5: Collective Management and Benefit Sharing in the Okavango Basin 11:00 – 13.05

Facilitator: Dr Akolang Tombale, Permanent Secretary, Minstry of Minerals, Energy and Water Resources

11.00 – 11.25	**Dr Gomes Da Silva** Co-Chair, OKACOM/Angola	"OKACOM as an Effort for Collaborative, Transboundary Management of the Okavango River Basin"

Abstract:
Under the OKACOM agreement, the three Okavango River Basin countries of Angola, Botswana and Namibia are working toward the implementation of an Integrated Management Plan for the entire basin. Since the inception of the OKACOM project in 1994, there has been much progress toward this goal of joint management. The mere fact that the three countries have agreed on joint management is a major achievement in itself.

OKACOM has seen the realisation of a number of its objectives through the implementation of several projects within the basin, resulting in effective resource management. Part of this management is the large Department of Environmental Affairs project that to develop a Strategic Action Plan for addressing issues at a transboundary level. Not least, however, is the formation and activation of a permanent revolving secretariat that will provide the organisational structure to facilitate better collaboration.

11.25 – 11.50	**Mr Chaminda Rajapakse** Project Manager, OKACOM GEF Environmental Protection and Sustainable Management of the Okavango River Basin Project, Angola	"Identifying What is 'Transboundary' for Effective Regional Management of the Okavango River Basin"

Abstract:
The long-term objective of the Environment Protection and Sustainable Management of the Okavango River Basin Project is to achieve global and regional environmental benefits through concerted management of the naturally integrated land and water resources of the Okavango River Basin. As a regional project, the challenge is to separate issues that are truly transboundary from those that can be addressed by national level initiatives such as the Okavango Delta Management Plan. To achieve this, it is important to understand the causal chain of events that may either be based at a local level, and yet combine synergistically to emerge as a transboundary problem at the regional level, or conversely, how a broadscale event may have different effects for each of the member countries.

The implications are that transboundary plans of action need to account for such scale factors. This requires an approach that explores all national initiatives together, so that commonalities and disparities are identified.

Solutions may be country-specific, and must be designed to complement national efforts but be regionally integrated to not only advance economies of scale but also to ensure complementary efforts. Part of the strategy needs to be the development of mechanisms within OKACOM that accommodate the cross-scale causal chain, and that are flexible enough to develop standardized principles for all countries where appropriate (such as environmental flows benchmarks). The Strategic Action Plan developed by OKACOM through the EPSMO Project will identify and implement a set of activities and initiatives that will lay the foundation for a basin-wide framework to address transboundary issues.

11.50 – 12.15	**Dr Anthony Turton** Strategic Research Leadership: Water Resource Competency Area, CSIR, South Africa	"Benefit Sharing as a Governance Paradigm for the Okavango Delta"

Abstract:
Recent work by the author on a Benefit Sharing Paradigm (Turton, 2008) indicates that there are ten key elements that differentiate it from a "conventional approach". Benefit-sharing is unlikely to become a reality unless these ten key elements are understood and managed in an active way. This paper will present these ten key elements and lay the foundation for a discussion on how they might be applied specifically to the Okavango Delta.

12.15 – 12.40	**Mr Steve Johnson** Project Manager, Wildlife Conservation and Management Project, DWNP	"What's in it for me……? Benefit Sharing in CBNRM Processes in Ngamiland"

Abstract:
Incentives drive the behaviour of people. Personal incentives or personal benefits lie at the heart of CBNRM across the globe - even where the benefits are deemed to be 'communal,' people evaluate the communal benefit to see what they will personally get out of the social good ie. A water tap near their house, and how far it is compared to others receiving the same benefit.

The history of benefit sharing in Ngamiland CBNRM processes is replete with instances where the 'elite' have captured the communal benefits leaving the 'ordinary' villager dissatisfied and demoralized. Where there is no or little recourse to law, in many instances this leads to disenfranchisement through apathy, despondency and disempowerment – just what the 'elite' want – no resistance or opposition. Where the constitutions and management systems and procedures of community based organisations are inadequate or unused, then the benefit sharing process becomes open to abuse. Where little or no link between the conversion of a natural resource to economic or social benefit is made in the community's mind, then apathy and indifference surface.

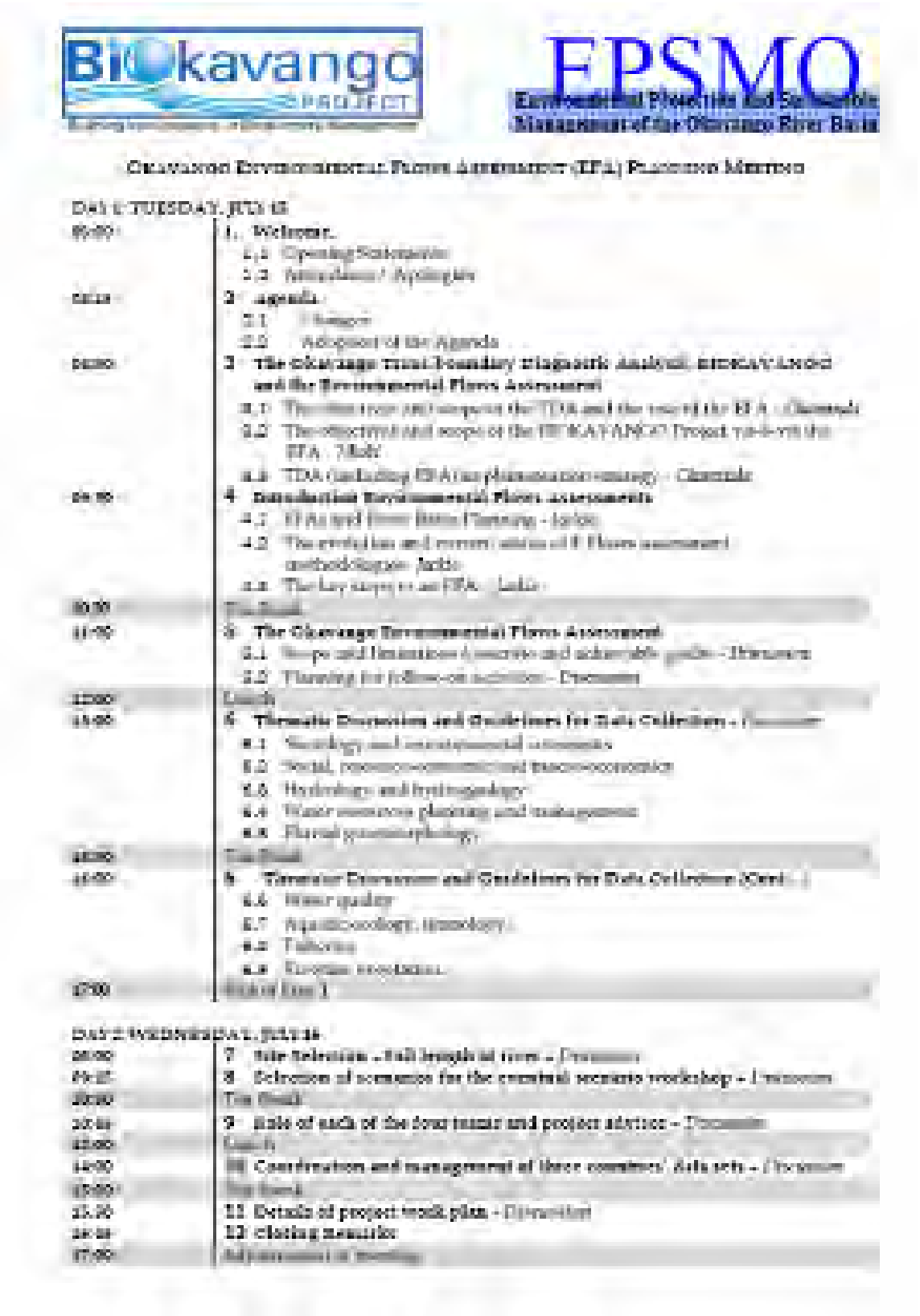
CBNRM linked benefit sharing processes need to be revisited across Ngamiland's CBNRM related CBOs and community institutions – both formal and informal – so that mechanisms may be developed and used to ensure that every community member receives a just and equitable portion of the overall benefit. Such mechanisms exist – it is just the political will to sanction their adoption and use that is needed.

12.40 – 12.55	**Mr Stevie Monna** Director, Department of Environmental Affairs	Way Forward
12.55 – 13.10	**Hon. Mr Ronald Ridge** Member of Parliament, Maun West	Closing Remarks

19.00 – 21.00 Reception hosted by Hon. Minister Mokaila, Ministry of Environment, Wildlife and Tourism

Appendix 3

Agenda for the Okavango EFlows Assessment Planning Meeting: 15-16 July 2008



BIOkavango PROJECT

EPSMO
Environmental Practices and Scenarios Management of the Okavango River Basin

Okavango Environmental Flows Assessment (EFA) Planning Meeting

DAY 1: TUESDAY, JULY 15

8h30	1. Welcome 1.1 Opening Statements 1.2 Introductions / Apologies
08h50	2. Agenda 2.1 Purpose 2.2 Adoption of the Agenda
09h00	3. The Okavango Trans-Boundary Diagnostic Analysis, BIOKAVANGO and the Environmental Flows Assessment 3.1 The links between the TDA and the need for EFA - Chonguiça 3.2 The objectives and scope of the BIOKAVANGO Project relative to the EFA - Tello 3.3 TDA (including EFA key phenomena ranking) - Chonguiça
09:30	4. Introduction Environmental Flows Assessments 4.1 EFAs and River Basin Planning - Jorge 4.2 The evolution and current status of E-Flows assessment methodologies - Jorge 4.3 The key steps in an EFA - Jorge
10:30	Tea Break
11:00	5. The Okavango Environmental Flows Assessment 5.1 Scope and limitations (resources and achievable goals) - Discussion 5.2 Planning for follow-on activities - Discussion
12:00	Lunch
13:00	6. Thematic Discussion and Guidelines for Data Collection - Discussion 6.1 Sociology and socio-economic elements 6.2 Social, socio-economic and socio-ecological 6.3 Hydrology and hydrogeology 6.4 Water resource planning and management 6.5 Fluvial geomorphology
15:00	Tea Break
15:30	6. Thematic Discussion and Guidelines for Data Collection (Cont...) 6.6 Water quality 6.7 Aquatic ecology, limnology 6.8 Fisheries 6.9 Riparian vegetation
17:00	End of Day 1

DAY 2: WEDNESDAY, JULY 16

08:00	7 Site selection - full length of river - Discussion
09:45	8 Selection of scenarios for the eventual scenario workshop - Discussion
10:00	Tea Break
10:30	9 Role of each of the four teams and project advisor - Discussion
12:00	Lunch
14:00	10 Coordination and management of three countries' data sets - Discussion
15:00	Tea Break
15:30	11 Details of project work plan - Discussion
16:30	12 closing remarks
17:00	Adjournment of meeting

The Okavango River Basin Transboundary Diagnostic Analysis Technical Reports

In 1994, the three riparian countries of the Okavango River Basin – Angola, Botswana and Namibia – agreed to plan for collaborative management of the natural resources of the Okavango, forming the Permanent Okavango River Basin Water Commission (OKACOM). In 2003, with funding from the Global Environment Facility, OKACOM launched the Environmental Protection and Sustainable Management of the Okavango River Basin (EPSMO) Project to coordinate development and to anticipate and address threats to the river and the associated communities and environment. Implemented by the United Nations Development Program and executed by the United Nations Food and Agriculture Organization, the project produced the Transboundary Diagnostic Analysis to establish a base of available scientific evidence to guide future decision making. The study, created from inputs from multi-disciplinary teams in each country, with specialists in hydrology, hydraulics, channel form, water quality, vegetation, aquatic invertebrates, fish, birds, river-dependent terrestrial wildlife, resource economics and socio-cultural issues, was coordinated and managed by a group of specialists from the southern African region in 2008 and 2009.

The following specialist technical reports were produced as part of this process and form substantive background content for the Okavango River Basin Transboundary Diagnostic Analysis.

Final Study Reports	***Reports integrating findings from all country and background reports, and covering the entire basin.***		
		Aylward, B.	*Economic Valuation of Basin Resources: Final Report to EPSMO Project of the UN Food & Agriculture Organization as an Input to the Okavango River Basin Transboundary Diagnostic Analysis*
		Barnes, J. et al.	*Okavango River Basin Transboundary Diagnostic Analysis: Socio-Economic Assessment Final Report*
		King, J.M. and Brown, C.A.	*Okavango River Basin Environmental Flow Assessment Project Initiation Report (Report No: 01/2009)*
		King, J.M. and Brown, C.A.	*Okavango River Basin Environmental Flow Assessment EFA Process Report (Report No: 02/2009)*
		King, J.M. and Brown, C.A.	*Okavango River Basin Environmental Flow Assessment Guidelines for Data Collection, Analysis and Scenario Creation (Report No: 03/2009)*
		Bethune, S. Mazvimavi, D. and Quintino, M.	*Okavango River Basin Environmental Flow Assessment Delineation Report (Report No: 04/2009)*
		Beuster, H.	*Okavango River Basin Environmental Flow Assessment Hydrology Report: Data And Models(Report No: 05/2009)*
		Beuster, H.	*Okavango River Basin Environmental Flow Assessment Scenario Report : Hydrology (Report No: 06/2009)*
		Jones, M.J.	*The Groundwater Hydrology of The Okavango Basin (FAO Internal Report, April 2010)*
		King, J.M. and Brown, C.A.	*Okavango River Basin Environmental Flow Assessment Scenario Report: Ecological and Social Predictions (Volume 1 of 4)(Report No. 07/2009)*
		King, J.M. and Brown, C.A.	*Okavango River Basin Environmental Flow Assessment Scenario Report: Ecological and Social Predictions (Volume 2 of 4: Indicator results) (Report No. 07/2009)*
		King, J.M. and Brown, C.A.	*Okavango River Basin Environmental Flow Assessment Scenario Report: Ecological and Social Predictions: Climate Change Scenarios (Volume 3 of 4) (Report No. 07/2009)*
		King, J., Brown, C.A., Joubert, A.R. and Barnes, J.	*Okavango River Basin Environmental Flow Assessment Scenario Report: Biophysical Predictions (Volume 4 of 4: Climate Change Indicator Results) (Report No: 07/2009)*
		King, J., Brown, C.A. and Barnes, J.	*Okavango River Basin Environmental Flow Assessment Project Final Report (Report No: 08/2009)*
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