

# **WATER RESOURCES MANAGEMENT PLAN FOR THE KUISEB BASIN**

**Water and wetland related environmental education in Namibia and an environmental education strategy for integrated water resources management of the Kuiseb Basin.**

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## 1 Summary

This report gives a brief history of water and wetland related environmental education in Namibia since Independence and based on this experience presents an environmental education strategy for integrated water resources management of the Kuiseb River Basin for the Kuiseb Basin Management Committee to consider. This report informed Action Plan 7 dealing with Stakeholder Participation that gives a programme to ensure progressively increasing community participation in relevant aspects of basin management such as water conservation, water awareness, pollution prevention, water demand management and ongoing sharing of information about the Kuiseb River Basin and its water and wetland resources.

The drought of 1992 focussed the attention of the Government of Namibia on the importance of educating the Namibian public about the importance of our scarce water and wetland resources and the National Water Awareness Campaign was launched. In 1995, Namibia joined the Ramsar Convention to affirm its commitment to the conservation of its water resources and wetlands, recognising their international importance. Over the last 16 years, the Directorate of Resource Management in the Department of Water Affairs and Forestry together with the Wetlands Working Group of Namibia and the Desert Research Foundation of Namibia, have been responsible for coordinating the efforts of Government, NGOs and the private sector to create an awareness and appreciation of our vital water and wetland resources.

The Ministry coordinates the annual World Water and Wetland day event. For example, in April this year, an awareness conference on "*Healthy River Basins*" was held alongside the Okavango River to mark World Wetland and World Water days. This allowed those involved in the river basin management throughout Namibia to share experiences. Mr Usurua Usurua, vice chairman of the KBMC, attended and gave a presentation on the Kuiseb Basin Management Committee. It is recommended that the KBMC continues to be involved in the annual World Water Day and World Wetland Day national events and possibly take the lead in the 2009 celebration, hosting it in the Kuiseb Basin.

Each year, schools are invited to participate in annual, national water and wetland competitions and Nature Conservation students at the Polytechnic of Namibia, who, in future, will be the ones responsible to care for our precious water and wetland resources, are encouraged to do their practical research projects, investigating pertinent river basin issues. During the last 15 years several Polytechnic Nature Conservation, UNAM and international students have been based at Gobabeb for their in-service training and have focused their research on aspects important to the Kuiseb River and its management.

The new Water Resources Management Act No. 24 of 2004, made provision for the establishment of river basin management committees run by representative stakeholder organisations within each river basin. This decentralisation of functions is a challenge that can only succeed if the members of the basin management committees share their knowledge and experience of the basin and collaborate with each other. The formal establishment of the KBMC in 2003, preceded this legislation as a pilot project called ELAK (Environmental Learning and Action in the Kuiseb) to test the viability of the initiative. The ELAK project made a concerted effort to educate and raise awareness of the Kuiseb River and its resources amongst all the stakeholder groups in the basin and arranged several successful exposure visits for stakeholders to gain first-hand knowledge of their basin.

Other basin management committees have not had the benefit of such environmental education initiatives and even for the Kuiseb many of the original members who were involved during the ELAK process have since been replaced by new members. Therefore there is a need to assist both the members of new basin management committees and new members of existing basin management committees, to gain some basic knowledge about their responsibilities in terms of general river basin management and more specific knowledge about their own particular river basin.

This has created a new challenge to the team that over the years, has worked towards educating the public about water and water resources in Namibia. With financial assistance from GTZ, the Namibia Nature Foundation, NNF, and the Southern African Institute of Environmental Assessments, SAIEA, is developing a generic basin management training course, that will be tested first on the newly established Omaruru Basin Management Committee this year before being made available to other basin management committees in Namibia. It is recommended that the KBMC arrange to have a specific basin management training course for their members next year. This generic training course is designed in such a way that it can be adapted specifically to the particular needs of each river basin, a six week period is allowed prior to each course to enable the lecturers to customise the course in consultation with the KBMC chairman.

This narrative report provides the background that informed the development of Action Plan 7 on Stakeholder Participation for the Water Resources Management Plan for the Kuiseb Basin commissioned by the KBMC. Essentially the action plan outlines the environmental education strategy proposed for the KBMC. The goal of the action plan is to achieve extensive well – informed stakeholder participation in Kuiseb Basin Management and the implementation of the water resources management plan for the Kuiseb Basin. The strategy involves both short term actions to be implemented within the next year to 18 months as well as several longer term, ongoing actions that the KBMC should consider implementing.

In the short term it is considered important to remain involved in the annual, national World Water and World Wetland Day events, particularly as the theme for 2009 will be river basins and their management under the slogan “Upstream – Downstream, Wetlands connect us all”.

To better share information on the Kuiseb River, the KBMC is strongly recommended to commission, complete and publish the “Kuiseb Basin Profile” and to include pertinent information gained during the course of the development of this water resources management plan for the Kuiseb Basin. The KBMC should consider making the information collected for the Kuiseb Basin Profile and from the specialist reports from the water resources management plan development available as simple, easy to read fact sheets for schools, visitors to the Gobabeb Training and Research Centre and to hand out a public meetings in Walvis Bay or elsewhere. KBMC should consider supporting community IWRM demonstrations at Walvis Bay and Gobabeb and holding “open days” where these can be demonstrated to share this experience with other basin groups. Another short term activity suggested is to co-operate with the DWAF river basin co-ordinator, Ms Aune Amwaama, and to participate in national river basin meetings and meetings of other river basin committees, to review lessons learnt and to maintain an active ongoing file of these.

In the longer term, the strategy proposes that the KBMC continues to offer at least one exposure visit a year to a place of interest to basin stakeholders in the Kuiseb Basin and that this coincides with the annual Stakeholder Forum meetings. To improve “buy in” from the regional councils, both Erongo and Khomas, MET and NamWater. Attendance of their representatives on the committee could be improved by actively targeting the Deputy Director of the Division Rural Services and planners on the councils, by holding discussions with both the Minister and the PS of MET, possibly inviting them to an “open day” and by requesting NamWater to provide a practical demonstration

with information at or about the Kuiseb Water Supply Scheme and water supply to the communities alongside the river. KBMC should consider including a session to provide feedback from the WADE project to the Regional councillors, MET, NamWater and other stakeholders within the KBMC.

The KBMC is urged, possibly through the Coastal Bulk Water Users Forum, to make a concerted effort to identify and actively involve larger water users in KBMC activities as sponsors of awareness and information sharing activities and publications. With time they should slowly continue to build up the educational resource materials available on the Kuiseb Basin, by each year targeting a different group of stakeholders in the basin and preparing sound, factual resources for their use. Here the KBMC should consider linking some of these activities to the Coastal Environmental Trust of Namibia, CETN who have an annual water and wetland quiz for all the high schools at the coast.

Finally it is recommended that together with the GTRC, the KBMC continue to offer opportunities for young Namibians from the Polytechnic of Namibia and UNAM to do their in-service training and applied research projects with the Kuiseb Basin environment. The KBMC should provide guidance on research projects appropriate to the ongoing implementation of the Kuiseb Basin Management Plan and other activities of the KBMC.

## **2 Development of Water and Wetland related Environmental Education**

Despite being moved to emergency grazing on the verges of national roads, cattle were dying. Crop fields were laid waste, dust coated the parched earth and water was rationed in towns and cities. After that drought of 1992 the Government of Namibia launched the National Water Awareness Campaign, with founding President, Sam Nujoma, as patron, to educate the Namibian public about the importance of our scarce water and precious wetland resources. Since then, a variety of educational resources have been jointly developed and funded through the collaboration of Government, NGOs and donors such as Sida, Norad, GTZ and USAID.

In Namibia, our water resource challenge is not only our limited water resources but more often the sound management of these water resources and the maintenance of the infrastructure to store and distribute this water at basin level. The Government aims to teach all water users, be they large mining companies or a small rural community dependent on hand-dug wells in an ephemeral river, about the wise use of water and making the most efficient and productive use of the little water we have, without polluting or harming the wetlands and aquifers that supply this water.

In December 1995, Namibia affirmed its commitment to the conservation of wetlands by ratifying the Convention on Wetlands of International Importance, better known as the Ramsar Convention (Kolberg undated) and designated the Walvis Bay wetlands, Sandwich Harbour, the Orange River Mouth and Etosha Pan as its first four Ramsar sites (Shaw *et al.* 2004, Bethune *et al.* 2008, Kolberg & Kolberg undated). The Kuiseb, like all rivers, is included in the Ramsar definition of wetlands.



The Department of Water Affairs, in collaboration with NGOs like DRFN and donor partners have made a concerted effort to produce at least one factual, educational, resource on water or wetlands each year. A special publications committee, headed by Piet Heyns, was formed under the National Water Awareness Campaign to oversee this. Table 1 lists the water education materials produced in collaboration with the MAWF over the last 16 years, many of them with the DRFN.

**Table 1. Educational resources on water developed in collaboration with MAWF since 1992**

Year	Educational Resource on Water	Reference	Collaborating Partners
1992	<i>Oshanas – sustaining people, environment and development in central Owambo</i> <i>Water in Namibia – a resource package to develop awareness of water</i>	Marsh & Seely 1992 Ward 1992	DRFN, DWA, Sida DRFN, NORAD, DWA, WWGN
1993	<i>Managing boreholes and grazing areas in Namibia, Okavango &amp; Otjozondjupa</i>	Katjiua <i>et al.</i> 1993a 1993b	DRFN, SARDEP , MAWRD, UNICEF, MHSS, Sida
1994	<i>More about..water in Namibia</i> <i>Understanding the Oshana Environment</i>	Ward 1994 Pallett 1994	DRFN, NORAD, DWA, WWGN DRFN, Sida
1995	<i>Sink or swim. Water and the Namibian Environment</i> <i>Ephemeral rivers and their catchments – sustaining people and development in western Namibia</i>	Du Toit <i>et al.</i> 1995 Jacobson <i>et al.</i> 1995	EnviroTeach -DRFN, DWA, Sida DRFN, Sida, DWA
1996	<i>Managing water points and grazing areas in Namibia, the Cuvelai</i>	Forbes-Irving 1996	DRFN, SARDEP , MAWRD, UNICEF, MHSS, Sida
1997	<i>An environmental profile and atlas of the Caprivi</i> <i>Sharing water in southern Africa</i>	Mendelsohn & Roberts 1997 Pallett <i>et al.</i> 1997	MET, DWA DWA, DRFN, WWGN
1998	<i>Guide to the common plants of the Cuvelai wetlands</i> <i>Namibia's Water – a decision makers guide</i>	Clarke 1998 Heyns <i>et al.</i> 1998.	DWA, NBRI, SABONET, WWGN DWA, DRFN, Sida
1999	<i>Managing water points and grazing areas in Namibia, Erongo &amp; northern Kunene &amp; Caprivi</i> <i>Managing water points and grazing areas in Namibia, Karas and Hardap &amp; Omaheke &amp; southern Kunene</i> <i>State of the Environment Report – Water in Namibia</i>	Forbes- Irving & Ward 1999a, 1999b, 1999c Ward & Forbes-Irving 1999a, 1999b, 1999c. Seely 1999	DRFN, SARDEP , MAWRD, UNICEF, MHSS, Sida DRFN, SARDEP , MAWRD UNICEF, MHSS, Sida MET, MAWRD, DRFN, WCE
2000	<i>A profile of north-central Namibia</i>	Mendelsohn <i>et al.</i> 2000	MET, DWA
2001	<i>Water Plants of Namibia</i>	Clarke & Klaassen 2001	DWA, NBRI, Sida, WWGN
2002	<i>Water Pollution: A resource book for IGCSE in Namibia</i> <i>Atlas of Namibia- a portrait of the land and its people</i>	Tarr & NWAC 2002 Mendelsohn <i>et al.</i> 2002	National Water Awareness Cam DWA, WWGN, Sida MET, Govt of Finland.

Year	Educational Resource on Water	Reference	Collaborating Partners
2003	<i>Sand and Water: a profile of the Kavango Region</i>	Mendelsohn & el Obied 2003	MET, DWA
2004	<i>Teachers Resources on the Okavango River Basin</i>  <i>Best practices and approaches for promoting shared river basin management</i>  <i>Okavango River: the flow of a lifeline</i>  <i>Wetlands of Namibia</i>	Bethune & van Wyk 2004  Every River has its People 2004  Mendlesohn & el Obied 2004 Shaw <i>et al.</i> 2004	Every River Project – Sida Kalahari Conservation Society DRFN, WWGN NNF, Sida, ERP  Every River Project – Sida, WWGN DWA, WWGN, Sida, IUCN, NNF
2005	<b>Exploring the Okavango River, a teachers guide to: <i>Okavango River: the flow of a lifeline</i></b>  <b>Okavango River and Basin – One river, three countries: African tapestry of people and wildlife. Tourist Information Map</b>	Ward 2005  Ward 2005	DRFN, DWA, EU  DRFN, DWA, EU
2006	<i>Namibian wetlands- Wetlands are special places – lets preserve them</i>	Shigwedha & Bethune 2006	MET, WWGN, <i>The Namibian</i> newspaper
2007	<i>Water is Life – Bush Telegraph</i>  <i>Caring for our water – a resource book</i>  <i>Field Guide to select trees of Kaundo Kubango</i> <i>Etosha Pan a wetland of international importance</i>	Keding. V 2007  Roberts & Sguazzin 2007 Curtis & Mannheimer 2007 Bethune & Roberts 2007	NaDeet Environmental Education C. DWAf, WWGN, GEF SGP, Sida  DWAf, WWGN, Sida, GEF SGF  IRBM, USAID, WWGN, NBRI  MET, WWGN, DWAf
2008	<i>Wetlands of Namibia</i> <i>Okavango River- Whose delta is it?</i>	Bethune <i>et al</i> 2008 Bethune <i>et al</i> 2008	WWGN, DWAf, Sida MET, WWGN, DWAf

DRFN – Desert Research Foundation of Namibia  
DWAf – Department of Water Affairs and Forestry  
GEF SGP – Global Environment Facility, small grants fund  
MET – Ministry of Environment and Tourism  
MAWRD- Ministry of Agriculture, Water & Rural Development (now MAWF)  
NBRI – National Botanical Research Institute  
NORAD- Norwegian Agency for Development Cooperation  
USAID- United States Agency International Development

DWA- Department of Water Affairs (now DWAf)  
ERP – Every River has its People project  
IRBM– Integrated river basin management project  
MAWF–Ministry of Agriculture, Water & Forestry  
NNF – Namibia Nature Foundation  
Sida – Swedish international Development Agency  
WWGN- Wetland Working Group of Namibia



### 3 Annual celebration of World Wetland Day and World Water Day

Over the last 16 years the Directorate of Resource Management in the Department of Water Affairs and Forestry together with the Wetlands Working Group of Namibia has been responsible for coordinating the efforts of Government, NGOs and the private sector to celebrate World Wetland Day (2 February) and World Water Day (22 March) every year, to create an awareness and appreciation of our vital water and wetland resources.

Each year, different partners within the water sector collaborate to create a national water event linking these two international water awareness days. In addition to the staff from the MAWF and the Wetlands Working Group, stalwart members over the years have been NamWater, the water utility company, the Ministry of Environment and Tourism, the Namibia Nature Foundation, the Desert Research Foundation of Namibia and the Coastal Environmental Trust of Namibia. The international themes for world water and world wetland day are taken into account when selecting a national theme. Materials produced include wetland and water posters, brochures and stickers.

Ten years ago, the Coastal Environmental Trust of Namibia, CETN, initiated an annual wetland quiz for all the high schools in the coastal towns of Walvis Bay and Swakopmund as well as Arandis. With time this evolved into a series of regional school quizzes or art competitions that culminate in a national competition. The aims of these annual celebrations are to educate the general public and to teach our scholars and students about important water issues.

This year the joint celebration for World Wetlands Day and World Water Day focused on River Basin Management and was held beside the Okavango River.

The objectives of this national “*Healthy River Basins*” conference were to:

(Ortmann 2008)

1. Celebrate World Wetland and World Water days,
2. Create an awareness of keeping our River Basins Healthy and actively involve students and scholars,
3. Allow different national and international river basin organisations to share their experiences and so learn from one another.
4. Allow those responsible for managing the water and wetland resources of the Okavango River to share their experience and learn from one another,
5. Gauge local interest in the establishment of a national Okavango Basin Management Committee.

Next year the international theme selected by the Ramsar secretariat, will be river basin management under the slogan “Upstream – Downstream, Wetlands connect us all”. and provides an opportunity for the KBMC to collaborate with the national World Water/Wetlands Day committee to host the event in the Kuiseb Basin, possibly at Friedenau Dam.

#### 3.1 Involvement of Scholars and Students and production of resource materials on water

Each year, schools are involved in national water and wetland competitions. The annual water and wetland quizzes organised by CETN, involve all 10 high schools at the coast and in some years these quizzes are also held in other regions with the winners then competing nationally at the World Wetland/Water day event. In 2003 the NNF produced a poster on Wetlands of Namibia and the next year a booklet specifically for schools was launched (Shaw *et al.* 2004) this year it was revised, updated and reprinted by Sida (Bethune *et al.* 2008). Two books on water pollution issues using

Namibian examples have been produced, one aimed at high schools (Tarr *et al.* 2002) and the other for junior schools (Roberts & Sguazzin 2007).

For the last decade students from the Polytechnic of Namibia have been encouraged to base their practical research projects on pertinent river basin issues. For the last three years the Okavango IRBM project has sponsored 12 such projects on the Okavango River (Bergmann 2008) and this year the Omaruru Basin project sponsored four students. The Wetlands Working Group has sponsored and supervised an additional eight students and has funds for two more students working on wetland birds in 2008 and 2009. Currently, interns from the Polytechnic of Namibia are working with an in-depth study of water recharge in the Kuiseb alluvial aquifer funded by the Gobabeb Centre. This is part of a long-term programme held at Gobabeb to provide hands-on experience of research for development.

As the concept of basin management was developing, Sida funded a thirteen-year programme known as the Summer Desertification Projects, SDP, whereby tertiary education students spent two intensive months learning about and researching key aspects of river basins under the supervision of the DRFN. These took place in the Kuiseb (3x), Omaruru (1x), Cuvelai (2X).

### **3.2 Education of Water Point Committees**

During the 1990s, the Directorate of Rural Water Supply set up a multitude of Water Point committees across the country with the aim of allowing rural water users to manage the maintenance and distribution of local water supplies. This initiative was supported by a strong education campaign that included posters, brochures and a series of books on *Managing water points (including boreholes) and grazing areas in Namibia*. A book was produced for each region and translated into the most widely spoken language (Katjiua *et al.* 1993a, 1993b, Forbes-Irving 1996, Forbes-Irving *et al.* 1999a, 1999b, 1999c, Ward *et al.* 1999a, 1999b and 1999c). These addressed the very real concern that opening up new water points could lead to unsustainable grazing practices in dryland areas. These books were prepared for use by Rural Water Supply Extension Offices and were used with varying degrees of success in the various regions. The book specific to the Erongo Region and thus much of the Kuiseb Basin is by Forbes-Irving and Ward (1999a) entitled "*Managing water points and grazing areas in Namibia, Erongo.*"

## **4 River Basin Management in Namibia**

To devolve water resource management to the lowest appropriate level, Namibia's new Water Resources Management Act 24 of 2004 makes provision for River Basin Management Committees, BMCs. These BMCs will allow stakeholders within each designated river basin to manage their own water resources. To date, two river basin management committees have been set up, the Kuiseb Basin Management Committee (KBMC) established in 2003 and the Iishana sub-basin Management Committee (IBMC) established in 2005. Several more, including ones for the Omaruru, Okavango, Fish and Ugab rivers have been initiated. There are also two active groundwater basin committees, one for the Karstveld aquifer in central Namibia, which predates the new Act, and one for the Stampriet aquifer in the south.

### **4.1 The Kuiseb Basin Management Committee**

The KBMC emerged from the Environmental Learning and Action in the Kuiseb (ELAK) project, funded by EU, which represented a first response to the Namibian Water Resources Management

Review undertaken to review water management in Namibia. This Review proposed the concept of basin management in Namibia and developed the Water Resources Management Act which was signed-off in 2004. The ELAK project pioneered the concepts surrounding the development of a BMC, including initial awareness raising and involvement of a larger Forum of interested people ranging from local subsistence farming communities to the responsible bulk water supplier. ELAK also undertook training and educational activities for the forum members, including such activities as exposure excursions so that forum members could learn about their basin. The project integrated the results of the SDP projects on the Kuiseb Basin and used this overall approach to raise awareness on various fronts about IWRM in general and basin management in particular.

The KBMC includes representatives from twelve different institutions: the Coastal Environmental Trust of Namibia CETN, the commercial and communal farmers, NamWater, Government service providers – DEES, DWAF, MET, RWS, the Erongo and Khomas regional councils, the Walvis Bay Municipality and the Gobabeb Research and Training Centre (Usurua 2008).

#### **4.2 River Basin IWRM Demonstration Projects**

An emerging concept in river basin management is the involvement of communities through support of pilot projects that practically demonstrate integrated water resource management. The newly formed Omaruru Basin Management Committee. OmBMC, supports two such projects. The initial establishment of the OmBMC is being funded by the SADC Water Sector through Danida support of IWRM, Integrated Water Resource Management, projects. Here, the Namibia Nature Foundation is actively involved in assisting the stakeholders within the Omaruru Basin to initiate an Omaruru Basin Management Committee and community members are directly involved in practical water resource management issues through selected community IWRM demonstration pilot projects.

The two community-driven IWRM, demonstration pilot projects are:

- A women's garden project at Hakahana that aims to improve the livelihoods of women in an informal settlement on the riverbank, through improved productivity and the incorporation sound water and energy practices.
- A *Prosopis* harvesting project that aims to maximise environmental and economic benefits of harvesting alien invasive trees alongside the Omaruru River near Okambahe, providing employment to 20 community members including women and youth.

These community projects serve an educational role in that they provide practical demonstrations of integrated water resource management and serve as examples that can be replicated elsewhere. The Stakeholder Forum members have been given the opportunity during their regular meetings to visit both projects and it is hoped that in future members of other BMC's may visit too and be encouraged to promote similar community-driven IWRM projects in their areas. Four Nature Conservation students from the Polytechnic of Namibia have been directly involved in assisting these communities and have based their water and natural resource related research on aspect of these pilot projects, further emphasizing the educational value of this project.

Throughout this process awareness and education have played a vital role in firstly soliciting the interest of stakeholders and later to improve their knowledge of the river basin and its resources. Currently a poster showing the main features of the basin, its water resources and water supply infrastructure is being developed in consultation with the eighty members of the Omaruru Basin Stakeholder Forum (Muroua 2008).

It is recommended that the KBMC explore opportunities to support similar community pilot projects demonstrating IWRM with the Kuiseb River Basin. It has proved a successful way of engaging grassroots community members in the activities of the OmBMC.

### 4.3 Guidelines to improve River Basin Management.

To assist new and emerging BMCs, the DRFN in collaboration with GTZ has produced a useful guidebook to explain a practical and tested *Basin management Approach* (DRFN undated). This useful resource booklet clearly sets out the background to river basins management, the legal obligations and simple steps to soliciting interest and setting up a basin stakeholder forum and a eventually a BMC.

The *Basin Management Approach* guidebook was part of a GTZ-funded programme establishing a training programme for the Lishana sub-basin management committee. Components of the training programme prepared and used with Lishana sub-basin committee included: training in the roles and responsibilities of a BMC, the meaning of 'representation' while serving on a committee, how to mobilise the community being represented, how to develop awareness raising materials and to raise awareness, how to study water issues in the sub-basin, monitoring water issues in the sub-basin, how to raise funding for the BMC and similar aspects.

It is recommended that this booklet be revised and updated to reflect lessons learnt over the last few years with the implementation of river basin management in Namibia.

In the Okavango River Basin the *Every River has its People project*, funded by Sida, has actively contributed towards educating stakeholders living alongside and dependent on the resources of, the Okavango River for the past six years (Mwazi 2008). Working with the *Every River Project* has given rural communities the confidence to engage other stakeholders. This confidence has been achieved by expanding their knowledge, helping them to understand the views and perspectives of others and exposing them to best practices in basin management (Waminyuma 2008). Based on their experience in community-based natural resource management (CBNRM) within the Okavango River basin, the *Every River Project*, has published a booklet that provides practical information for stakeholders to use to carry out joint planning of basin development and monitoring (*Every River has its People* 2004).

### 4.4 River Basin Profiles

The Okavango Basin also serves as an excellent example of the value of basin profile publications in sharing information about river basins. Two important resource books with excellent maps on the Okavango River have been produced by the *Every River project* in collaboration with the Research and Information Services of Namibia, RAISON. One is a profile of the Namibian section of the river called *Sand and Water* (Mendelsohn and el Obied 2003) and the other is on the Okavango Basin as a whole called *Okavango River: the flow of a lifeline* (Mendelsohn and el Obied 2004). In addition to this the project developed a detailed resource package for scholars of all age groups living in the 50 villages around the Okavango Delta in Botswana (Bethune and van Wyk 2004). A teachers guide directly interpreting and keyed to the book *Okavango River: the flow of a lifeline* (Mendelsohn and el Obied 2004) was developed under the Water and Ecosystem Resources in Regional Development project (WERRD) funded by the EU (Ward 2005).

Prior to the profile on the Kavango Region, the Ministry of Environment and Tourism, produced profiles on the Caprivi, (Mendelsohn and Roberts 1997) the region richest in surface waters mainly linked to the Zambezi River and its floodplains and the north central regions (Mendelsohn *et al.* 2000) that includes the Cuvelai drainage area, a largely shallow area subject to seasonal flooding

via a network of “oshanas” from Angola that in exceptional years culminates in the inundation of the Etosha Pan. DRFN has produced useful educational resource materials on these Oshanas (Marsh & Seely 1992, Pallett 1994) and translated it into Oshiwambo to be truly useful.

To share information about the Kuiseb River amongst its diverse stakeholders, a Kuiseb Basin Profile has been started by Carole Roberts at DRFN. It will outline the water and other natural resources of the basin and highlight current concerns such as the high water supply requirements of the new and proposed uranium mines. It is strongly recommended that this work continues and that new or pertinent information from the work on the Water Resources Management Plan for the Kuiseb Basin be incorporated into the Kuiseb Profile as appropriate. This profile should be completed and published as a priority KBMC activity within the next 18 months.

#### 4.5 Education as a tool in River Basin Management

The new Water Resources Management Act, 24 of 2008, currently under revision, makes provision for the establishment of river basin management committees run by representative stakeholder organisations within the main river basins and sets out their obligations. (MAWF, 2004)

All surface water resources are closely linked to the hydrological cycle and a report commissioned by the water ministry and funded by GTZ identified 24 hydrological basins (Bittner & Dierkes 2004). See Figure 1. As it would be difficult to manage all 24 basins, experts used agreed criteria to reduce these to 11 proposed water management units that take into account both surface and groundwater sources and present water transfer schemes so combining the water source, water use and water users. Figure 2 shows the proposed main river basin management units (Bittner & Dierkes 2004).

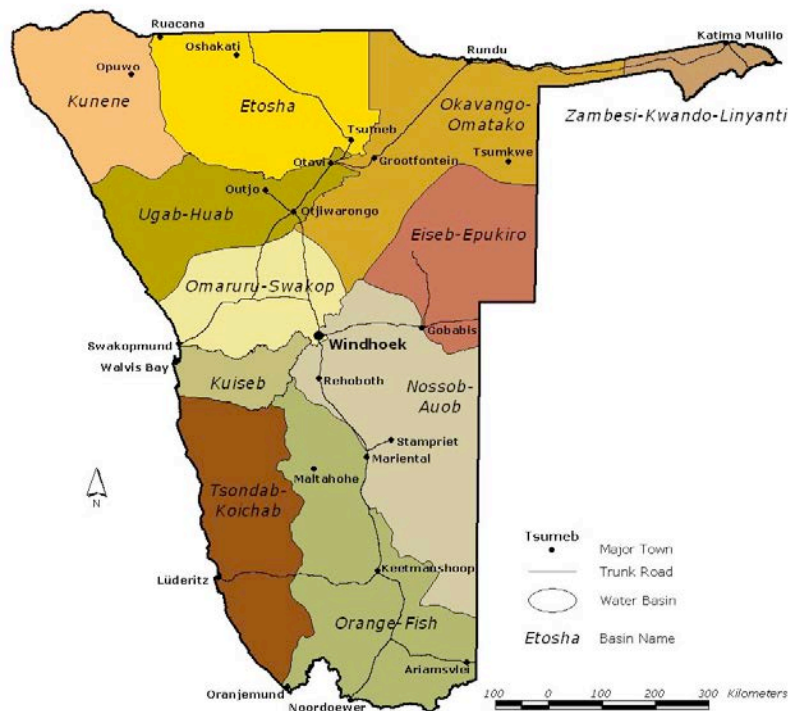


Figure 2. Proposed Basin Management Units (Bittner & Dierkes 2004)

As set out in the new Water Resources Management Act, Namibia seeks to establish Integrated River Basin Management “*to ensure equitable access to, and sustainable use of, water resources without detriment to the environment nor functioning of the water cycle.*” (MAWF, 2004).

Such an integrated management approach takes the wetland resources, their uses, all users and their impacts into account. This integrated basin management approach is a community-centred approach that links people, water, land, plants, animals and the whole basin ecosystem.

According to the Water Resources Management Act 24 of 2004, this approach aims “*to ensure equitable access to and sustainable use of water resources; to decentralise water resources management to communities; to recognise the unity of the hydrological cycle and to encourage stakeholder participation in the management of our national water resources.*”

This new law states that the establishment of basin management committees can be initiated by Government or by interested persons. It further requires that: it should be an open and transparent process with the focus on hands-on management; the members should undertake to communicate with the communities they represent and that although their main task is advisory, their active support with data collection, water use monitoring, planning of water-related development activities and financing the committees is encouraged (MAWF 2004).

Currently the Kuiseb and Iishana BMCs have been formally established, whilst the Omaruru, Ugab and Fish rivers each have an active Stakeholder Forum working towards the establishing BMCs soon. The Okavango has recently formed the Okavango Basin Management Committee and there are two recognised basin management units dealing with groundwater; the Karst and Stampriet Water Management Bodies. To help interested stakeholders form their own river basin management committee the GTZ recently commissioned a guidebook on “*Basin Management Approach*” (Desert Research Foundation of Namibia undated). This serves as a practical illustration of the role of education in river basin management.

#### **4.6 Proposed Education for Basin Management Committees**

The proposed decentralisation of river basin management functions to stakeholders at basin level is a challenge that can only succeed if the members of the new basin management committees are well able to handle their responsibility. This has created a new and challenging role for education in basin management that is being embraced by the same team that over the years has worked to improve the public perception of water and wetlands in Namibia. With financial assistance from GTZ, water scientists and educators are developing a generic basin management training course. This training course on “Sustainable Development and Environmentally Sound Decision-making in river basins” for BMCs is being developed by NNF and SAIEA in close cooperation with the Department of Water Affairs and Forestry and the Ministry of Environment and Tourism. It will be undertaken in two phases:

- Phase 1. Development of a generic training course for all river basins in Namibia and the development of a specific training course on the Omaruru Basin and testing the first training course for the future Omaruru Basin Management Committee in November 2008.
- Phase 2. If successful, rolling out this training to at least eight other river basins in Namibia on request over the next two years 2009 – 2010.

Maps and posters giving background material will be prepared for each Basin, starting with the Omaruru River Basin and a manual compiled for each specific basin. Available resource materials developed over the last 16 years by the DWAF - National Water Awareness Campaign, the DRFN, the NNF, MET (particularly the regional profiles and atlas), and the Wetlands Working Group of Namibia will be available as background reading to the participants – available maps and videos on Namibian water resources will be incorporated into the presentations. Excellent maps include the

ephemeral rivers map developed by DRFN for Sida and the ERP project map of Okavango Basin (Ward undated). Both include pertinent facts about the basins on the reverse side. Table 2 sets out the proposed components of the planned training course.

**Table 2. Main components of the proposed Basin Management Committee course.**

<b>Components of the proposed Basin Management Committee (BMC) Training: 2008 – 2010</b>
<b>The BMC's mandate:</b> based on revised Water Resources Management Act 24 of 2004 – Using material developed by Department of Water Affairs and Forestry – Namibia
<b>What is sustainable development?</b>
<b>The Basin in perspective:</b> Maps and background material will be prepared for each River Basin to show available water resources, wetlands, developed water supply infrastructure, demand and current water users and utilization as well as vulnerable wetlands.
<b>Introduction to water resources planning:</b> information will be shared about future demand, infrastructure expansion, water demand management, environmental flows + wetland conservation
<b>Introduction to sound land use planning</b> including a comparison of land-use options
<b>Basin opportunities:</b> specific to each River Basin
<b>Introduction to Development Planning;</b> with emphasis on the challenges of sustainable development in a country with limited water resources.
<b>Community-based Natural Resources Management CBNRM</b> including water resource management and the role of water point committees and water point associations
<b>Integrated Water Resource Management IWRM</b>
<b>Sustainable resource management plans:</b> using river basin and water case studies – where available, from the specific basin, e.g. Omdel dam for the Omaruru River
<b>Checklist for consideration of sustainable development and environmental issues</b> in BMC planning and coordination
<b>Monitoring, Research and data sharing</b> – a practical component on what to monitor, how to monitor e.g. rainfall, water quality, pollution, water quantity, flows, environmental health, where to obtain such data and how to use it – with assistance of the Hydrology and Water Quality and Environment sections at the Department of Water Affairs and Forestry and the Wetlands Working Group of Namibia.

## 5 An Environmental Education Strategy for IWRM of the Kuiseb River Basin

Based on the last sixteen years of experience in water and wetland related environmental education nationally, and to address issues pertinent to the Kuiseb Basin, a practical environmental education strategy is suggested targeting schools and communities in the Kuiseb Basin. This strategy includes awareness and training components and recommends activities to be implemented in the short term as well as several ongoing activities that the KBMC should consider over the longer term.

This first half of this report provided the background information used to design this environmental education strategy. This strategy was used to develop Action Plan 7: Stakeholder Participation for the Water Resources Management Plan. Essentially the action plan outlines and gives a timeframe to the environmental education strategy proposed here for the KBMC.

The goal of the action plan is to achieve extensive well – informed stakeholder participation in Kuiseb Basin Management and the implementation of the water resources management plan for the Kuiseb Basin. It lists six short term actions to be implemented within the next year to 18 months

as well as seven longer term, ongoing actions for the KBMC water resources management plan. Action Plan 7: Stakeholder Participation is given as Annexure 1 of this narrative report.

## **5.1 Short term Actions**

Taken together these six actions will serve to initiate an effective environmental education strategy and should continue to promote water awareness and the involvement of stakeholders in integrated water resource management within the Kuiseb Basin. Compared to other BMCs in Namibia, the KBMC is already well ahead and should continue with their active engagement in environmental education activities in collaboration with partners such as the GTRC, CETN, GTZ and the basin coordinator at DWAF. The six short term actions are:

### **5.1.1 Review lessons learnt:**

With the co-operation of the Department of Water Affairs and Forestry river basin co-ordinator, Ms Aune Amwaama, the KBMC should request information on river basin management elsewhere in Namibia. KBMC representatives should continue to actively participate in the annual national river basin coordination meetings and whenever possible try to attend the BMC meetings of other river basin committees to gain an insight into other basin management approaches and to share the experience of the KBMC. The KBMC together with the national BMC coordinator should review lessons learnt in their own and other basins and maintain an active ongoing file of these. Initially the KBMC was very active in assisting the newly formed Omaruru River Basin Committee but over the last year their meetings have often coincided making it impossible for them to attend each others meetings. One of the tasks of the national coordinator at DWAF should be to keep a record of proposed meetings and avoid simultaneous meetings in future. The KBMC already takes their task of assisting other emerging basin committees seriously and will host the OmBMC as observers at their meeting in November 2008.

### **5.1.2 Coordinate preparation of expert information in lay terms:**

The KBMC should consider making the technical information collected and contained in the specialist reports for this water resources management plan development available as simple, easy to read fact sheets for schools, visitors to the Gobabeb Training and Research Centre and to hand out a public meetings in Walvis Bay or elsewhere in the basin. Similarly the information available about water management for the Kuiseb Water Supply scheme and produced over the years by DRFN as well as the information collected for the for the Kuiseb Basin Profile and from research activities such as the recently completed WADE project on the recharge of alluvial aquifers in ephemeral rivers including those in the lower Kuiseb Basin should be made available in clear, easy to follow, lay mans language and disseminated to the public when the opportunity arises. Information from the Coastal Bulk Water Users Forum, about the desalination plants to supply the new Uranium mines should be made available as fact sheets. Earlier resource materials such as the EnviroTeach book "*Sink of Swim*" and in consultation with teachers from schools in the Kuiseb Basin ways should be explored of how best to make such resource material on water issues available to schools. Such an ongoing environmental education programme should be integrated into the Gobabeb Training and Research Centre's training and education programme.

### **5.1.3 Establish Integrated Water Resource Management (IWRM) demonstrations:**

The KBMC should try to arrange practical IWRM demonstrations at Walvis Bay and Gobabeb on "open days" where information about integrated water resource use can be shared and made



available to interested school and other groups. Here too it might be possible to work with the GTRC and even with teachers to develop suitable resource materials to provide the participants with factual, written, take – home information after the demonstrations. Schools, students and community groups should be encouraged to develop their own practical IWRM demonstration projects and to serve as guides to share their experiences with others.

Over the last year the Omaruru Basin project has supported two community based IWRM demonstration projects, one a women's gardening project at Hakahana on the outskirts of Omaruru and the other and *Prosopis* harvesting project at Okambahe where youth are involved in the clearing of alien invasive trees and wood product sales an alternative income source in the village. It is suggested that representatives of the KBMC visit these projects and consider supporting similar IWRM community projects in the Kuiseb Basin.

#### **5.1.4 Take up offer of training course for KBMC members**

It is strongly recommended that the KBMC make use of the opportunity offered by the week-long GTZ-funded basin management course next year. This basin management committee training course is designed in such a way that it can be adapted specifically to the particular needs of each river basin and allows a six week period prior to each course to enable the lecturers to customise the course in consultation with the particular BMC. The KBMC chairman, should approach the GTZ to request a customised training course for the BMC members, given that many of the present members did not have the benefit of the ELAK training and exposure prior to 2003.

#### **5.1.5 Commission, complete and publish the Kuiseb Basin Profile**

To better share information on the Kuiseb River, the KBMC is strongly recommended to commission, complete and publish the "Kuiseb Basin Profile" and to include pertinent information gained during the course of the development of this water resources management plan for the Kuiseb Basin as well as new information from the Uranium mine EIA;s and recent desalination developments.

Work on the Kuiseb Basin Profile should continue and aim to be completed within the next 18 months possibly targeting World Water Day (22 March) 2010. If it is at all possible to complete the profile and publish it by this time next year, the publication could celebrate the 6th anniversary of the establishment of the KBMC. As with other river basin profiles such as "*Okavango River – a flow of a lifeline*" (Mendelsohn and el Obied 2004), once published the Kuiseb Basin Profile will serve as an important reference for all future studies on the Kuiseb system and provide important factual information to future KBMC members.

#### **5.1.6 Host World Wetland, World Water Day event 2009:**

Also important in the short-term is for the KBMC to remain involved in the annual, national World Water and World Wetland Day events. According to Ramsar (The international convention on wetlands), the 2009 international theme for World Wetland Day (2 February 2009) will be river basins and their management under the slogan "Upstream – Downstream, Wetlands connect us all". It should be remembered that the Ramsar definition of wetlands includes ephemeral rivers such as the Kuiseb. The KBMC should grasp this opportunity to liaise with the national World Wetland/Water day committee via their chairperson, Ms Cynthia Ortmann of the Division Resource Management at DWAF to collaborate to host the 2009 celebration in the Kuiseb River Basin, possibly at Friedenau Dam. This national event annually involves scholars, students, NGOs, the

regional councils, municipalities, the media and government departments responsible for water and wetland resources in Namibia.

## **5.2 Longer term Actions**

In addition to the short term activities discussed above, there are several ongoing actions that will help to ensure the long term effectiveness of the KBMC environmental education strategy. Some of these are already being implemented by the KBMC and the message is simply to continue with them whilst others specifically address shortcomings identified at the 2007/2008 national basin coordination meetings. They are:

### **5.2.1 Arrange exposure excursions associated with Stakeholder Forum meetings:**

The strategy proposes that the KBMC continues to offer at least one exposure visit a year to a place of interest to basin stakeholders in the Kuiseb Basin and that this coincides with the annual Stakeholder Forum meetings. Such visits should involve visits to the IWRM practical demonstration sites discussed in 4.1.3. Funding for these exposure visits could be requested from local sponsors or donors involved in research in the Kuiseb or in basin management projects nationally. The excursions could also target pertinent water developments outside the basin e.g. the desalination plant at Wlotzkasbaken. The opportunities to participate in these exposure excursions would attract more stakeholders to the annual meetings. Learners and students could be involved in the identification of and presentations at interesting sites for such visits.

### **5.2.2 Involve Regional Councils, division for Rural Services and planners actively**

To improve “buy in” from the regional councils, both the Erongo Regional Council and the Khomas Regional Council it is suggested that this could be done by actively targeting the Deputy Director of the Division Rural Services that has now taken on the tasks of the former Directorate of Rural Water Supply and the planners on the councils. It is important that the KBMC identifies individuals, in consultation with Mr Usurua, the vice chair of the KBMC, who is the regional head for DRWS in the Erongo Region. Regional council members should be invited on the exposure visits (4.2.1.)

### **5.2.3 Involve the Ministry of Environment and Tourism and Namib Naukluft Park staff:**

To ensure the attendance and active involvement of MET in KBMC meetings and activities it is suggested that discussions be held with both the Minister and the PS of MET to discuss the best approach regarding official invitations to KBMC meetings. Further consider inviting the Minister and PS to an “open day” event at Gobabeb where the KBMC activities are included in the activities on display. Include the activities such as the anniversary of the Namib Naukluft Park, impacts of Uranium mine exploration, tourism in the NNP, in the KBMC agenda to make the work of the KBMC more relevant to MET officials. Consider asking the MET member on the KBMC to organise the next KBMC exposure visit to the park. If necessary, request the assistance of the basin management coordinator at DWAF.

### **5.2.4 Involve NamWater actively in KBMC meetings and activities:**

To improve attendance and interest from NamWater consider requesting the NamWater representative on the KBMC to provide a practical demonstration with information at or about the Kuiseb Water Supply Scheme and water supply to the communities alongside the river. Further, in consultation with the GTRC, consider inviting the NamWater representative to a special session at

the GTRC to provide feedback from the WADE project, also invite other interested stakeholders within the KBMC to this feedback session. Include time to show and demonstrate the interesting equipment installed in the river for the monitoring of groundwater recharge at Gobabeb.

#### **5.2.5 Identify larger water users with money and involve them in KBMC water awareness activities:**

Possibly through the Coastal Bulk Water Users Forum, the KBMC should make a concerted effort to identify and actively involve these larger water users in KBMC activities, possibly as sponsors of awareness and information sharing activities and publications in the long term. The KBMC should send personal invitations to identified CEOs of larger industries such as the mines and institutions such as the banks at the coast and invite them to exposure excursions and "open days" to provide them with information about KBMC. They may be willing to assist with the publication of information and educational resource materials about the Kuiseb Basin in exchange for advertising i.e. having their logo on the published materials. The KBMC should identify selected activities for corporations to sponsor e.g. the publication of the Kuiseb Basin Profile mentioned in 4.1.5, school exposure visits to Gobabeb, prizes for school quizzes.

#### **5.2.6 Target different levels of community - grassroots, learners and students, urban and rural users and technical stakeholders and extension workers and build up a library of suitable environmental education resource materials:**

With time slowly continue to build up the educational resource materials available on the Kuiseb Basin. This can be done by each year targeting a different group of stakeholders in the basin and preparing sound, factual resources for their use.

The KBMC should consider linking some of these activities to the Coastal Environmental Trust of Namibia, CETN who have an annual water and wetland quiz for all the high schools at the coast. CETN can be requested to include information made available by the KBMC like the fact sheets mentioned in 4.1.2 for the annual school quiz competition and to include questions about river basin management and the Kuiseb River Basin and the activities of the KBMC. KBMC should involve CETN and groups such as Rotary to help identify clubs, educational programmes, actively interested school teachers and programmes of other organisations that could assist to improve the outreach of KBMC.

#### **5.2.7 Organise internships in the basin for both local and international students**

Finally it is recommended that together with the GTRC, the KBMC continue to offer opportunities for young Namibians from the Polytechnic of Namibia and UNAM to do their in-service training and applied research projects with the Kuiseb Basin environment. The KBMC should provide guidance on research projects appropriate to the ongoing implementation of the Kuiseb Basin Management Plan and other activities of the KBMC. This could involve an internship with NamWater to develop suitable resource materials to better explain the bulk water supply scheme in the lower Kuiseb or it could involve the GIST programme at Gobabeb. Such ongoing six-month internships could if properly managed and supervised, could contribute to all the other Environmental Education outreach activities of the KBMC and would equip young Namibian professionals with a sound appreciation of river basin management in their future careers.

## 6 Conclusion

To achieve the Southern African Vision for Water, Life and Environment in the 21st Century: *“Equitable and sustainable utilization of water for social and environmental justice, regional integration and economic benefit for present and future generations”*, Namibia has chosen an integrated river basin management approach with a strong educational component to enable the stakeholders within our river basins to effectively implement sound river basin management both within the country and for our internationally-shared river basins (Ortmann 2008).

This narrative report explores the practical implementation of water education through the National Water Awareness Campaign and other environmental education initiatives and traces some of the successes in Namibia. This experience is now being harnessed to develop educational resources and a training course to prepare stakeholders to manage the water resources within their river basins successfully and to use our scarce, valuable water and wetland resources sustainably.

Over the last 16 years a variety of water and wetland educational resources have been developed and the Department of Water Affairs and Forestry together with partners such as the Wetlands Working Group has also been responsible for coordinating the efforts of Government, NGOs and the private sector to celebrate World Wetland and World Water day each year. This year a national conference on Healthy River Basins was held.

Since its Independence, Namibia has done much to implement a successful National Water Awareness Campaign that is effective, not only within Namibia, but also in the neighbouring countries sharing our international river basins. Now this experience is being harnessed to develop a training course to prepare river basin management committees responsible for our national and internationally shared river basins to successfully manage and sustainably use our scarce, valuable water and wetland resources without any detrimental impacts on our scarce water resources and precious wetlands.

Throughout the period under review community members particularly those involved in water point committees have been targeted by specific water education materials. Throughout the water awareness campaign, scholars and students have been actively involved to teach them a greater awareness and appreciation of our water and wetland resources.

Realising the need to assist these BMCs to better manage their water resources, a generic training course was proposed in the GTZ-backed proposal to the EU-ACP which was recently funded, and, more recently, a short, practical, training course tailored to each particular river basin, its resources and development potential was developed. These week-long training courses will be offered to BMC members to help them to better understand the responsibilities placed on them and to share knowledge of their river basin and its resources. Funding for this was made available by GTZ and the first training course will be held this year for the future Omaruru Basin Management Committee.

This narrative report provides the background that informed the development of Action Plan 7 on Stakeholder Participation for the Water Resources Management Plan for the Kuiseb Basin commissioned by the KBMC. Essentially the action plan outlines the environmental education strategy proposed in this report for the KBMC. The goal of the action plan is to achieve extensive well – informed stakeholder participation in Kuiseb Basin Management and the implementation of the water resources management plan for the Kuiseb Basin.

The proposed environmental education strategy involves both short term actions to be implemented within the next year to 18 months as well as several longer term, ongoing actions that the KBMC should consider implementing.

In the short term the environmental education strategy is that the KBMC should:

- Remain involved in the annual, national World Water and World Wetland Day events, particularly as the theme for 2009 will be river basins and their management under the slogan “*Upstream – Downstream, Wetlands connect us all*”,
- Take up the offer of training the present KBMC members next year,
- Complete and publish the Kuiseb Basin Profile to share information on the Kuiseb River soon,
- Compile easy to read fact sheets from the information collected for the Kuiseb Basin Profile and from the specialist reports for dissemination to schools, visitors to the GTRC and to hand out at public meetings in Walvis Bay or elsewhere,
- Consider supporting community IWRM demonstrations at Walvis Bay and Gobabeb and holding “open days” where these can be demonstrated to share this experience with other basin groups and,
- Co-operate with the DWAF river basin co-ordinator and participate in national river basin meetings and meetings of other river basin committees to share experiences

In the longer term, this environmental education strategy proposes that the KBMC:

- Continues to offer at least one exposure visit a year to a place of interest to basin stakeholders in the Kuiseb Basin and that this coincides with the annual Stakeholder Forum meetings,
- Improves “buy in” from the regional councils, MET and NamWater by actively targeting the Deputy Director of the Division Rural Services and planners on the councils, holding discussions with the Minister and PS of MET, possibly inviting them to an “open day” and by requesting NamWater to provide practical demonstrations about the Kuiseb Water Supply Schemes,
- Make a concerted effort to identify and actively involve larger water users in KBMC activities as sponsors of awareness and information sharing activities and publications possibly through the Coastal Bulk Water Users Forum,
- Continue to build up the educational resource materials available on the Kuiseb Basin, by each year targeting a different group of stakeholders in the basin and preparing sound, factual resources for their use and possibly linking to CETN and their annual water and wetland quiz for all the high schools at the coast.
- Continue in collaboration with the GTRC, to offer opportunities for young Namibians from the Polytechnic of Namibia and UNAM and other students to do their in-service training and applied research projects with the Kuiseb Basin environment.

## 7 Acknowledgements

We would like to acknowledge the assistance of all who over the years have worked towards improving the awareness of Namibians from all walks of life about water and wetlands and we would like to thank the World Wetland/Water Day committee for each year organising a national event to celebrate water and wetlands.

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## 8 References

- Bergmann, B. 2008 Okavango Integrated River Basin Management Project – Learning with the river’s resources Biodiversity Conservation in Mucosso Coutada, Angola. Summary and Presentation. In: Bethune, S., C. Ortmann, S. Nakanwe, K.S. Roberts and the World Water/Wetland Day committee. 2008. Proceedings of the World Water/Wetland Day conference “ Healthy River Basins” held in Rundu, Namibia 2 – 4 April 2008.
- Bethune, S. 1996. Namibia’s challenge Sustainable water use. In: Namibia Environment Vol. 1: 185 – 189.
- Bethune, S. and K.S. Roberts. 2007. Etosha Pan a wetland of international importance. *Conservation and the Environment in Namibia 2007/8*: 20 -21.
- Bethune, S. and K.S. Roberts. 2008. Integrated Flow Management. Summary and Presentation. In: Bethune, S., C. Ortmann, S. Nakanwe, K.S. Roberts and the World Water/Wetland Day committee. 2008. Proceedings of the World Water/Wetland Day conference “ Healthy River Basins” held in Rundu, Namibia 2 – 4 April 2008.
- Bethune, S. and A. van Wyk. 2004. Teacher’s Resources on the Okavango River Basin (Angola, Namibia and Botswana). Every River has its People project, Desert Research Foundation of Namibia and Kalahari Conservation Society, Windhoek.
- Bethune, S., L. Namene and K.S. Roberts. 2008. Okavango River. Whose delta is it? *Conservation and the Environment in Namibia 2008/9*. : 24 – 25.
- Bethune, S. (Editor), D. Shaw, K.S. Roberts and the Wetlands Working Group of Namibia. 2008. *Wetlands of Namibia*. John Meinert printing, Windhoek.
- Bittner, A. and K. Dierkes. 2004. Demarcation of Water Basins on National level. Unpublished report by Biwac to GTZ\* and the Department of Water Affairs Namibia. Windhoek.
- Chonguica, E. 2008. Operational Approach to transboundary river basin management, the Okacom Initiative. Summary and Presentation. In: Bethune, S., C. Ortmann, S. Nakanwe, K.S. Roberts and the World Water/Wetland Day committee. 2008. Proceedings of the World Water/Wetland Day conference “ Healthy River Basins” held in Rundu, Namibia 2 – 4 April 2008. Summary and Presentation.
- Clarke, N.V. 1998. *Guide to the common plants of the Cuvelai wetlands*. SABONET, Windhoek.
- Clarke, N.V. and E.S. Klaassen. 2001. *Water Plants of Namibia. An identification manual*. Occasional contributions 2. National Botanical Research Institute of Namibia, Windhoek.
- Curtis, B. and C. Mannheimer. 2007. *Field Guide to selected trees of Kuando Kubango*, IRBM, Windhoek

- Desert Research Foundation of Namibia. undated. *Basin Management Approach. A Guidebook*. Desert Research Foundation of Namibia, Windhoek.
- du Toit, D., T. Sguazzin and A. Karita. 1995. *Sink or Swim.. Water and the Namibian environment. An environmental resource book for Namibian teachers*. EnviroTeach, Desert Research Foundation of Namibia and Ministry of Education and Culture, Windhoek.
- Every River has its People. 2004. *Best practices and approaches for promoting shared river basin management. Lessons learnt for methodologies used by the Every River has its People Project for the Okavango River Basin from 2000 – 2004*. Impression House, Gaborone.
- Forbes-Irving, T. 1996. (M. Seely and S. Montgomery Eds.) 1996. Managing water points and grazing areas in Namibia, the Cuvelai. Desert Research Foundation of Namibia, Windhoek.
- Forbes-Irving, T. and V.Ward. (M. Seely Ed.) 1999a. Managing water points and grazing areas in Namibia, Erongo. Desert Research Foundation of Namibia, Windhoek.
- Forbes-Irving, T. and V.Ward. (M. Seely and L.Dentlinger Ed.) 1999b. Managing water points and grazing areas in Namibia, northern Namibia. Desert Research Foundation of Namibia, Windhoek. (also translated into Otjiherero)
- Forbes-Irving, T. and V.Ward. (M. Seely and L. Dentlinger Eds.) 1999c. Managing water points and grazing areas in Namibia, Caprivi. Desert Research Foundation of Namibia, Windhoek. (also translated into Losi).
- Heyns, P., S. Montgomery, J. Pallett, and M.K. Seely (eds.) 1998. *Namibia's water – a decision maker's guide*. Department of Water Affairs and Desert Research Foundation of Namibia, Windhoek.
- Jacobson, P.J., K.M. Jacobson and M.K. Seely. 1995. *Ephemeral rivers and their catchments – sustaining people and development in western Namibia*. Desert Research Foundation of Namibia, Windhoek.
- Katjiua, M., T. Healy and T. Forbes-Irving. (M. Seely Ed.) 1993a. Managing boreholes and grazing areas in Namibia, Okavango. Desert Research Foundation of Namibia, Windhoek. (also available in Rukwangali)
- Katjiua, M., T. Healy and T. Forbes-Irving. (M. Seely Ed.) 1993a. Managing boreholes and grazing areas in Namibia, Otjozondjupa. Desert Research Foundation of Namibia, Windhoek. (also available in Otjiherero)
- Keding, V. 2007. *Water is Life. Bush Telegraph* Vol. 6 (1), 12 pp.
- Kolberg, C. and H. Undated. Series of pamphlets on each of Namibia's four "wetlands of international importance" Ramsar sites: *Orange River Mouth, Etosha Pan, Walvis Bay and Sandwich Harbour*. Ministry of Environment and Tourism, Windhoek.
- Kolberg, H. Undated. *Preliminary Inventory of Namibia's Wetlands*. Ministry of Environment and Tourism, Namibia and Ramsar, Windhoek.
- Marsh, A. and M. K. Seely. 1992. *Oshanas – sustaining people, environment and development in central Owambo, Namibia*. Desert Research Foundation of Namibia, Windhoek.
- Mendelesohn, J. and C.S. Roberts. 1997. *An environmental profile and atlas of the Caprivi*. Directorate of Environmental Affairs, Windhoek.

- Mendelsohn, J., S. el Obied and C.S. Roberts. 2000. *A profile of north-central Namibia*. Ministry of Environment and Tourism, Windhoek.
- Mendelsohn, J., A. Jarvis, C. Roberts and A. Robertson. 2002. *Atlas of Namibia. A portrait of the Land and its People*. David Philip, Cape Town.
- Mendelsohn, J. and S el Obied. 2003. *Sand and Water: a profile of the Kavango Region*. Struik, Cape Town.
- Mendelsohn, J. and S. el Obied. 2004. *Okavango River. The flow of a lifeline*. Struik, Cape Town.
- Ministry of Agriculture, Water and Forestry. 2004. Water Resources Management Act no 24 of 2004. Government Gazette, Windhoek.
- Muroua, D. 2008. The Omaruru Basin Management Committee. Summary and Presentation. In: Bethune, S., C. Ortmann, S. Nakanwe, K.S. Roberts and the World Water/Wetland Day committee. 2008. Proceedings of the World Water/Wetland Day conference "Healthy River Basins" held in Rundu, Namibia 2 – 4 April 2008.
- Mwazi, M. 2008. Sustainable utilization of resources – Every River has its People's experience. Summary and Presentation. In: Bethune, S., C. Ortmann, S. Nakanwe, K.S. Roberts and the World Water/Wetland Day committee. 2008. Proceedings of the World Water/Wetland Day conference "Healthy River Basins" held in Rundu, Namibia 2 – 4 April 2008.
- Ortmann, C. 2008. Objectives of the "Healthy River Basins' Conference. Summary and Presentation. In: Bethune, S., C. Ortmann, S. Nakanwe, K.S. Roberts and the World Water/Wetland Day committee. 2008. Proceedings of the World Water/Wetland Day conference "Healthy River Basins" Rundu, Namibia April 2008.
- Pallett, J. 1994. *Understanding the Oshana Environment. Euvoko lyoshana nomudhingoloko*. Translated by P. Mbenzi. Gamsberg Macmillan publishers, Windhoek.
- Pallett, J. (Ed.), P. Heyns, M. Falkenmark, J. Lundqvist, M. Seely, L. Hyden, S. Bethune, O-J, Dranger and K. Kemper. 1997. *Sharing water in southern Africa*. Desert Research Foundation of Namibia, Windhoek.
- Roberts, C.S. and T. Sguazzin (Eds.) and the Wetlands Working Group of Namibia. 2007. *Caring for our water. A resource book for upper primary teachers and learners*. John Meinert Printing, Windhoek.
- Seely, M. et al. 1999. State of the Environment Report. Water in Namibia. Unpublished report, Ministry of Environment and Tourism. Volumes 1 and 2.
- Shaw, D., S. Bethune, K.S. Roberts and the Wetlands Working Group of Namibia. 2004. *Wetlands of Namibia*. Solitaire Press, Windhoek.
- Shigwedha, A. and S. Bethune. 2006. Namibian wetlands. Wetlands are special places – let's preserve them! *Conservation and the Environment in Namibia*. 2006/7. :48 -50.
- Siyere, A. 2008. Basin Wide Forum. Summary and Presentation. In: Bethune, S., C. Ortmann, S. Nakanwe, K.S. Roberts and the World Water/Wetland Day committee. 2008. Proceedings of the World Water/Wetland Day conference "Healthy River Basins" held in Rundu, Namibia 2 – 4 April 2008.



- Tarr, J. and the National Water Awareness Campaign. 2002. *Water Pollution A resource book for IGCSE in Namibia*. John Meinert Printing, Windhoek.
- Usurua, U. 2008. The Kuiseb River Basin Management Committee. Summary and Presentation. In: Bethune, S., C. Ortmann, S. Nakanwe, K.S. Roberts and the World Water/Wetland Day committee. 2008. Proceedings of the World Water/Wetland Day conference "Healthy River Basins" held in Rundu, Namibia 2 – 4 April 2008.
- Waminyuma, D. 2008. Healthy River, Healthy People – the Every River has its people project. Summary and Presentation. In: Bethune, S., C. Ortmann, S. Nakanwe, K.S. Roberts and the World Water/Wetland Day committee. 2008. Proceedings of the World Water/Wetland Day conference "Healthy River Basins" held in Rundu, Namibia 2 – 4 April 2008.
- Ward, V. 1992. *Water in Namibia. A resource package to develop awareness of water*. Desert Research Foundation of Namibia, Windhoek.
- Ward, V. 1994. *More about...water in Namibia. Part two of a resource package to develop awareness of water*. Desert Research Foundation of Namibia, Windhoek.
- Ward, V. 2005. *Okavango River and Basin One river, three countries: African tapestry of people and wildlife*. 1st Edition Explore Map. Map Studio, Cape Town.
- Ward, V. 2005. *Exploring the Okavango River, a teachers' guide to: Okavango River: the flow of a lifeline*. Desert Research Foundation of Namibia, Windhoek.
- Ward, V. 2005. Okavango River and Basin – One river, three countries: African tapestry of people and wildlife. Tourist Information Map. *Desert Research Foundation of Namibia, Windhoek*.
- Ward, V. and T. Forbes-Irving. (M. Seely and L. Dentlinger Eds.) 1999a. Managing water points and grazing areas in Namibia, Karas and Hardap. Desert Research Foundation of Namibia, Windhoek. (also translated into Afrikaans)
- Ward, V. and T. Forbes-Irving. (M. Seely and L. Dentlinger Eds.) 1999b. Managing water points and grazing areas in Namibia, Omaheke. Desert Research Foundation of Namibia, Windhoek. (also translated into Afrikaans)
- Ward, V. and T. Forbes-Irving. (M. Seely and L. Dentlinger Eds.) 1999c. Managing water points and grazing areas in Namibia, southern Kunene. Desert Research Foundation of Namibia, Windhoek. (also translated into Afrikaans)