

IWRM and Basin Management in a developing African country:  
A look at Namibia

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Abstract

Basin management involves interactive management of all resources and activities affecting the functioning of a river basin. Basin management, therefore, offers an appropriate approach to integrated water resources management and fulfilling its principles. Further, basin management can support developing countries towards sustainable development through decentralisation, participation and integrative approaches to livelihoods. This approach in Namibia, supported by legislation, is: iterative; transparent; open to voluntary participation; information rich; based on shared vision and understanding; enhances capacity of all stakeholders and encompasses multi-sectoral approaches. Despite their promise, roles of basin management committees continue to evolve and their implications for sustainable development require further clarification. Nevertheless, these evolving committees provide a valuable, established platform for use by and support to identified interventions. Comparative analysis of two river basin management committees is based on results of ongoing monitoring.

Introduction

Developing countries especially in Africa face development challenges related to pressures over scarce resources including water. One of the main thrusts behind natural resources management is to provide sustainable use of natural resources and promote economic growth (Hirji et al. 2002). Water is an increasingly scarce resource, however the demand for it in the provision of food, the maintenance of sanitation and health, the sustenance of other resources and ecosystems and support to industry and economic growth is growing dramatically. Over time there has been increased pressure on river basins and the resources within them around the world and particularly in sub-Saharan Africa where water and related resources are vulnerable (Davies and Day 1998, Pallett (ed.) 1997). The increase in pressure has resulted from, *inter alia*, rapidly growing populations, political instabilities, expansion of irrigated agriculture and industry, resettlement, urbanisation, excessive cultivation and overgrazing and global climate change. Water scarcity has prompted an increasing need to implement mechanisms towards bringing about efficient use and management of water and related natural resources. The necessary mode of management is complex and multi-dimensional, requiring approaches that reflect and support this complexity. Given the interrelatedness of natural resource issues, there is need for integrated solutions based on understanding of the whole system rather than just some of its parts. There has been a growing consensus among governments, scientists, water planners and civil society that supply, use, and management of water resources will have to be integrated across sectors and among regions sharing the same resources (Hirji et al. 2002).

This paper aims to look at the emergence of integrated water resources management (IWRM) as a step towards integrating efforts of resource management and development (GWP 2000), and shows how the basin management approach in its fulfilment of IWRM also serves to support the broader development pathways of developing countries through decentralisation and participation. The paper suggests that the basin management approach, with its focus on water and integrated resources, is a means of achieving goals of IWRM while further contributing to the

development agendas of developing countries (but see Wester and Warner 2002). Using Namibia as a developing African country context these ideas are explored (e.g. Amakali and Shixwameni 2003). The focus of analysis and discussion is on the implementation of the basin management approach in two cases in Namibia. A discussion of the successes and challenges of achieving both the four main principles of IWRM as laid out in the Dublin principles (Solanes and Gonzalez-Villarreal 1999), as well as developing country goals of decentralisation and participation within these specific case studies, is undertaken to conclude the paper.

Integrated Water Resources Management - Overview

Concern over effects of increasing pressure on water and related resources emerged in the 1970s, sparking a series of international meetings and conferences to address major issues and to develop new approaches. Emanating from three of the major meetings - the United Nations (UN) Water Conference held at Mar del Plata, Argentina in March 1977, the International UN Conference on Water and Environment in Dublin in 1992 and the UN Conference on Environment and Development in Rio de Janeiro in 1992 - was a new way of thinking that sought to link water with land and other resources while considering the direct connection between this holistic way of viewing resources with the development needs and activities of people (UNDPI 1993). This resulted in the formulation of the concept of fully Integrated Water Resource Management (IWRM) that became encapsulated in several conventions and initiatives resulting from these conferences. IWRM is based on the perception that water is a natural resource, an integral part of the ecosystem and a socio-economic good.

The International UN Conference on Water and Environment in Dublin in 1992 was a major driver in the formulation of IWRM, and set out recommendations in the form of the four principles of water resource management that came to be known as the Dublin Principles (Solanes and Gonzalez-Villarreal 1999). These are guiding principles for action at local, national and international levels, and they attempt to concisely state the main issues and purposes of water management. The four principles are as follows:

- Principle 1: Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment
- Principle 2: Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels
- Principle 3: Women play a central part in the provision, management and safeguarding of water
- Principle 4: Water has an economic value in all its competing uses and should be recognized as an economic good

The Integrated Water Resource Management (IWRM) concept reflects a broader framework for dealing with water issues, building and expanding upon the traditional technically-oriented methods of water management to include more socio-economic aspects. IWRM includes a wide spectrum of issues and sectors including, *inter alia*, land-use planning, agricultural policy and erosion control, environmental management and other policy areas. It covers all human activities that use or affect freshwater systems. Rather than simply being an end-point goal of actions, IWRM is a dynamic process using various means to achieve efficiency, equity and environmental sustainability (GWP 2000).

Turner (2004) stresses the importance of 'case-by-case management', advocating that each case must be analysed on its own premises, using previous experiences, but always being modified to fit the present context. IWRM is best designed and carried out based on local contexts, using a diverse set of information, experiences and innovations. Countries in Sub-Saharan Africa are diverse in terms of their natural resources, level of development, human capital, institutional arrangements and local capacity. A holistic approach to land and water management must therefore be adopted in response to each country's conditions, needs and priorities. IWRM is a dynamic, flexible approach that can be adapted to various situations and to fulfil various goals.

### Developing country goals

Developing countries are often striving to address a number of outstanding needs. In addition to infrastructure development, including water provision, they are addressing such issues as capacity development on all levels, decentralisation, participation by a multiplicity of stakeholders as well as improved livelihoods for all their people. This often results in a different, more integrated, emphasis toward development than is found in developed countries.

Participation, for example, is one of the cornerstones of IWRM. Natural resource management has become gradually more people-centred during the 1980s and 1990s. Experiences from a wide range of development projects worldwide have taught us the importance of public participation and bottom-up approaches. The Rio Declaration of 1992 that resulted in, e.g., the Convention on Biological Diversity (UNCBD), the Framework Convention of Climate Change (UNFCCC) and the Convention to Combat Desertification (UNCCD) clearly signalled that there was a paradigm change in resource management thinking. People became an integral part of resource development and conservation (UNDPI 1993). At the same time, development projects have changed focus from a macro to a local level perspective. The local communities are playing a more central role and are identified as active participants, not only receivers of aid (Chambers 1994a,b,c, 1997). However, participation is not a self-evident term and there is no agreement on what participation is or what type of participation is desirable in IWRM. Pretty (1990, 1995a,b, Pretty et al 1995) suggested seven categories of participation ranging from 'passive participation' where people are being told what to do and what is going to happen or already has happened to 'self mobilisation' where initiatives are taken independently of external institutions.

### The Basin Management Approach

A river basin, also called a watershed, is the land area between the source and the mouth of a river including all lands that drain into the river (e.g. Jacobson *et al.* 1995). Basin has a wide meaning; it includes both surface and ground water systems, and it also includes rearrangements of natural and artificial links as provided by pipelines and canals (De Laat and Savenije, 2000). Thus, river basins are complex systems. They represent ecosystems that are highly responsive to influences, both natural and man-made. River basins are important as they fulfil many important functions, such as water supply for households, industry and agriculture, navigation, fishing, recreation, and 'living space'.

River basins are open systems where the boundaries are sometimes not very well defined. Different criteria are used for defining and demarcating a manageable basin. In Namibia the criteria for demarcating the basins on a national level are mainly based on the surface and groundwater catchments of the larger river systems. A basin will then be defined as the area, including any underlying underground storage, from which any rainfall will drain into the watercourse through surface or underground flow (e.g. Jacobson *et al.* 1995). In most cases two or more rivers are combined in a larger basin or the groundwater straddles more river basins. Here, criteria such as water supply and consumption, population and political or administrative regions, infrastructure and socio-economic and cultural units are considered when delimitating a basin (Bittner 2005). A basin may fall entirely within in one or several countries.

New approaches in integrated water resources management have found the river basin to be an appropriate and effective level on which to implement activities towards achieving the earlier outlined principles for effective, holistic water resources management (see Amakali and Shixwameni 2003 but also Wester and Warner 2002). National action plans based on river basins can meet the responsibilities with respect to Agenda 21 because the unit of planning and implementation is the hydrological basin, i.e. the ecological unit, and is not limited by national borders, administrative units, sectoral splits or other barriers which might prevent coordination and long-term sustainability.

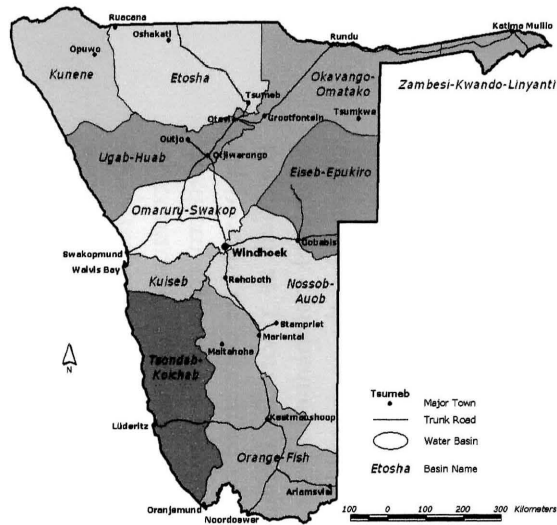
Important aspects of the basin management approach to IWRM are involvement of all stakeholders especially local communities, information sharing, coordination, decentralisation, improved services, improved efficiency and democratisation. Establishment of new institutions and committees can also alter the political relations and power within a community. Although not

attempting to create new structures that interfere with or compete with traditional or relevant existing structures, formation of a new, cross-cutting organisation such as a basin management committee may inadvertently do so. Basin management can provide support and platforms for existing groups to operate in an integrated way with other relevant sectors and stakeholders. Nevertheless, issues of equity are involved, and some changes in power relations may be inevitable.

### A Namibian example - overview

Namibia, located on the south-western coast of Africa, is bordered by South Africa, Botswana, Zimbabwe, Zambia, Angola and the Atlantic Ocean (Figure 1). It is the most arid country south of the Sahel, with annual mean rainfall ranging from less than 20 mm along the Atlantic coast to 500 mm in the north east. Although 823 680 km<sup>2</sup> in extent, it supports only 1.8 million people over 50% of whom live within 50 km of the northern border. All of its internal rivers are ephemeral with perennial rivers only shared with neighbouring countries on its northern and southern borders (Mendelsohn *et al.* 2002). For much of the past century, Namibia's water scarcity was addressed by application of technical solutions including conjunctive use of ground and surface water, inter-basin transfers and purification and recycling of waste water (Heyns *et al.*, 1998). These solutions were directed toward water supply in urban and larger settlement areas, although 70% of Namibia's population lives in rural areas.

Within the past decade, community based natural resource management has been identified, developed and implemented in communal farming areas throughout Namibia for a number of resources including wildlife, forests and, more recently, water (Davis 2004, Zijlma 2004). In the water sector, this has resulted in establishment of a multitude of committees managing water supply, from grass roots upwards, ranging from water point committees supervising one communal water tap or one groundwater borehole, to local water committees supervising water taps on one branch-line, to regional water committees (Zijlma 2004) and, more recently, basin management committees (Amakali and Shixwameni 2003). All of the principles of IWRM have been applied in designing these various committees, although a low level of education, lack of experience in cooperative management and a variety of cultural constraints have influenced the success of this approach.



**Fig. 1 Map of the basins in Namibia (Bittner 2005)**  
 The name of the Cuvelai basin is still under discussion. On this map it appears as the Etosha basin. A compromise may be adopted to call the basin in Namibia the Cuvelai-Etosha basin. The lishana sub-basin is located in the central part of the Etosha basin as depicted, extending in a north-south direction.

**Profiles of the case study river basins**

The Kuiseb comprises a well-defined ephemeral river 420 km long, originating above 2000 m and ending in the Atlantic Ocean (Jacobson *et al.* 1995) (Table 1). It traverses three land-tenure systems, with more than 90% of its population located in the harbour town of Walvis Bay. Groundwater, from hard-rock aquifers in the upper reaches and the Kuiseb alluvial aquifer in the lower reaches, supplies the relatively small basin population of less than 60 000. The basin of approximately 15 500 km<sup>2</sup> lies entirely within Namibia and straddles two political regions. Water from the lower Kuiseb alluvial aquifer is transferred out of the Kuiseb basin to supply nearby coastal towns and a uranium mine.

The population of Walvis Bay is culturally diverse and includes members of all thirteen ethnic groups in Namibia (Table 2). While most are permanently resident in this coastal town, there is a sizable migrant population who service the fish processing industry. Bordering on the town and resident along the Kuiseb River in the Namib-Naukluft Park are the Topnaar communal farmers. Approximately 300 people are resident along the river with the remainder of the 3000 strong population residing in Walvis Bay. Until 1980, they were dependent on shallow hand-dug wells accessing the alluvial aquifer. During the 1980's the government provided them with diesel powered pumps (recently converted to solar power) and reservoirs replacing the hand-dug wells. This resulted in the rural Topnaar population settling in approximately thirteen permanent villages ending their semi-nomadic herding lifestyle. It has had no apparent impact on the water table. In the upper catchment, a diverse assortment of mainly white commercial farmers and indigenous farm workers use wind and diesel powered pumps to access water from hard-rock aquifers. Associated earth dams are said to enhance groundwater recharge in these aquifers and also provide open water for livestock and wildlife on the approximately 100 freehold land tenure farms averaging 5000 ha in area. Currently there is a shift in this area from livestock farming to more diversified land use including tourism, game farming and trophy hunting. Misperceptions concerning equitable access to water and overuse of riparian vegetation as well as health and

unemployment were identified as primary issues in the basin and as challenges for the basin management committee.

The Cuvelai-Etosha basin comprises an ephemeral wetland of low relief averaging 1100 m above sea level with numerous watercourses originating in Angola (Marsh & Seely 1992, Mendelsohn *et al.* 2000) (Table 1). The upstream part of the basin originates in Angola where it supports perennial flow. Further down in the basin in Namibia flow is ephemeral. This ephemeral wetland is 130 km broad as it crosses the Namibian border and terminates approximately 150-200 km downstream in the Etosha Pan. The wetland area is approximately 10 000 km<sup>2</sup>, excluding Etosha Pan. It is underlain by a saline aquifer. From the time the area was first permanently settled approximately 400 years ago until the beginning of the 20<sup>th</sup> century, the population depended on almost annual flow of the oshanas in the ephemeral wetlands. This recharged perched aquifers accessed through hand-dug wells. Today, the domestic and industrial water supply originates at Calueque Dam, Angola, from the neighbouring Kunene River basin and is distributed by canal and pipeline throughout most of the Cuvelai basin. This international basin system, the Cuvelai, dependent on inter-basin transfer that supplies all purified water to the basin, and some non-purified irrigation water, contrasts with the inter-basin transfer scheme developed to export water from the Kuiseb basin.

The Cuvelai basin lies across four political regions in Namibia (Table 2). Non-freehold land tenure prevails except in the rapidly developing urban centres with the basin supporting approximately 500 000 people and numerous livestock. Rapid population growth, low land productivity, limited and over-used natural resources, food insecurity, poor health, high unemployment and urbanisation were identified as important issues in the basin and challenges for the basin management committee. The Cuvelai basin area is primarily occupied by one indigenous ethnic group, differentiated in the rural areas by tribal affiliation (Marsh & Seely 1992, Mendelsohn *et al.* 2000). They speak a common language comprised of nine mutually intelligible dialects. Traditional authorities regulate land, and hence associated water, although land boards have been recently introduced to ensure greater equity of access.

**Basin Management in Namibia**

During a recent review of water management in Namibia, basin management was identified as a valuable approach aimed at enhanced management and functioning of a water basin (MAWRD 2000). Basins were considered to be the appropriate units for operational management of water and other renewable natural resources (Amakali and Shixwameni, 2002). Part IV of the Water Resources Management Act, 2004 (Act No. 24 of 2004) addresses formation, functions, coordination and dissolution of Basin Management Committees. The basin management approach in Namibia is: an iterative process; transparent to all; open to voluntary participation; information rich; based on shared vision and understanding; enhances capacity of all stakeholders; focuses on sustainable development; encompasses IVRM; encompasses integrated, multi-sectoral approaches; and reflects the Constitution, Vision 2030 and all relevant Namibian policy and legislative instruments. One of the main purposes of basin management in Namibia is to bring a wide range of communities of interest together to reduce conflicts related to water management by improving understanding, management and decision making with respect to shared water resources.

Establishment of a Basin Management Committee (BMC) involves three phases: a 'start-up phase' in which basin area, stakeholders and issues are identified and preliminary meetings and information dissemination take place. During the 'forum phase' a Forum of Stakeholders is established, a shared information base is initiated and stakeholder capacity needs are identified and plans made to address these needs. During the 'basin management committee phase' the idea of a basin management committee is introduced and discussed and a committee is established that begins activities, elaborates a constitution and vision and obtains the Minister's confirmation. After establishment, the BMC and the Forum identify and facilitate or implement activities that support integrated land and water management in the basin.

Three basin management committees are functioning in Namibia: the Karst and Stampriet, both focused on groundwater aquifers, the Kuiseb, based on one of twelve western ephemeral river basins, and one is currently being established: the lishana sub-basin of the Cuvelai-Etosha. Characteristics and issues in the Kuiseb (first river basin committee established) and Cuvelai

(second river basin committee currently being established) basins are very different (e.g. Tables 1, 2 and 3). Nevertheless, lessons learnt from the Kuiseb Basin Management Committee have been analysed and serve as a basis for recommendations to a sub-basin of the Cuvelai, the Iishana sub-Basin Management Committee.

Overall, basin management has been recognised in Namibia as a useful approach, however a number of drawbacks have been experienced. Key issues have been identified and are elaborated in Table 3. These key issues and challenges range from appropriate representation to sustainability and are receiving ongoing attention.

## Discussion

Basin management, as an approach to management of water and other natural resources, is based primarily on the premises of integrated water resources management (IWRM). Considering the background of IWRM, which includes a move towards greater participation and decentralisation in natural resources management, basin management approaches appear to be an appropriate tool. In implementation of IWRM, the four Dublin principles are of paramount importance. Basin management as an approach of IWRM addresses these principles.

- First, fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment. Basin management takes that as its central thesis, while integrating the relatively finite and vulnerable character of other natural resources, essential to sustain life, development and the environment, into the overall approach. This integrated approach is a key consideration in all aspects of basin management for sustainable development.
- Second, water development and management is based on a participatory approach, involving users, planners and policy-makers at all levels. As with the first principle, basin management takes this as a central thesis while integrating management and development of all natural resources into the participatory approach. It is premised on appropriate representation from stakeholders at all levels.
- Thirdly, basin management recognises that women play a central part in the provision, management and safeguarding of water but also in many other aspects of natural resource management, governance and decision-making. While this is often focused on the household level, it is just as applicable at broader levels of management. In the Kuiseb basin and the Iishana sub-basin, care has been taken to include women in the committees and make sure they have a voice.
- Fourthly, water has an economic value in all its competing uses and should be recognized as an economic good. It is also recognised, however, that other natural resources are dependent on water for their economic value and that water must, in most instances, be used in conjunction with other natural resources for its economic value to be fully realised. Implementation of the basin management approach ensures that the economic value and competing uses of water, integrated with other natural resources, are given due recognition. As an economic good water must be paid for somehow but who pays, how much and how are issues that are still being clarified in the basins of Namibia. Education about the idea that water is a natural commodity with economic value like oil and minerals will require a change in educational approach from one in which, typically, people assume that it should be free to one where they accept that it costs money to extract, purify, distribute and generally manage. The question of whether a certain amount of water (for mere subsistence) be given free of charge has been addressed differently in various countries of southern Africa and is still hotly debated.

Thus we can recognise that basin management not only embodies IWRM and the Dublin principles but also adds value to IWRM by integrating consideration of related and conjunctively used resources and primary development issues, e.g. decentralisation and participation, into the overall focus.

### **Basin management and the backbones of IWRM: participation and decentralisation**

Basin management, as designed and intended, fully supports decentralisation, a major thrust in many developing countries including Namibia (GRN 1997). It is recognised, however, that decentralisation requires capacity and broad understanding, not the least of all concerning the four principles of IWRM as integrated with all natural resources. In terms of Namibia's Water Resources Management Act 2004, awareness raising, capacity building and development of understanding are key foci for the basin management committee members themselves, the broader basin forum and the community at large. Collecting, managing and sharing information and data are also responsibilities of the committee that contribute directly to decentralisation.

The basin management committee itself represents a step toward decentralisation of responsibilities to key stakeholders on different levels within the demarcated basin area. The committee includes regional and local representatives in its membership and liaises closely with other regional and local authorities during the course of its programmes and activities.

Basin management, as it is designed and intended, is firmly based on principles of participation. Any and all interested and affected parties are welcome to be members of the basin forum and to share information with the management committee and its members. On the other hand, it is the responsibility of the basin management committee to promote broad community interaction through awareness raising, information sharing and involvement with activities.

During the development, establishment and functioning of basin management committees the entire range of the seven categories of participation (Pretty \*\*\*\*) are taking place at different times and places and with different groupings. In basin management in Namibia efforts are made to achieve interactive participation, but consultative participation is maybe most common. The very basic approach of basin management, being iterative and inclusive, contributes to enhancing participation on an ongoing basis. Moreover, a specific effort must be made to involve the powerless, poor and usually 'quiet' members of the basin's population.

### **Challenges for IWRM and basin management**

Although basin management is a relatively recent approach, a broad background referring to participatory approaches is relevant (Pretty\*, Chambers 1994a,b,c,1997). Nevertheless, there are further broad challenges encountered when applying this approach in addition to those described in the preceding section, e.g.:

- Policies do not work the way they are intended both because of imperfect policies and imperfect implementation of policies
- Understanding of participation and its application in resource management differs widely amongst stakeholders
- The number of capable professionals is limited and government officials are often bound by antiquated guidelines and regulations
- Facilitators of change processes are not always able to completely understand the views and perspectives of local communities and may overlook important aspects in the community, e.g. the power relations, the rights system and intra-community conflicts.
- Facilitators have a tendency to think that communities have one voice, and that all agree. But in reality, there is a diversity of opinions and perspectives, and even if it can be difficult to hear the "quiet voices" it does not mean that they are not there, and they should be taken into account.

Basin management has received extensive attention over the past several decades and positive and negative reviews have been received (e.g. Amakali and Shixwameni 2003, Newson 1997, Wester and Warner 2002,). International attention has tended to focus more on international river basins rather than river basins within country (e.g. Falkenmark and Lundqvist 1995, Pallett (ed.) 1997). Trans-boundary basins with their potential for conflicts and formal commissions are receiving extensive attention while basins entirely within one country are less frequently cited (but see Pigram 2000). Nevertheless, internal river basins, and the development platforms they provide, are important within individual countries and Namibia's experiences can contribute to this discussion but require further in-depth analysis.

## Conclusion

The basin management approach takes time and basin management committees are not easy to establish. The lengthy process requires the involvement of a variety of stakeholders not usually working together. As a consequence, formation of the basin management committees and the associated approach, focused around identified conflicts and critical issues, is best initiated and implemented by involved stakeholders, NGOs and governments with possible support from outside donors. Once established, basin management institutions provide a useful platform for those wishing to contribute to sustainable development in the areas concerned. Concomitantly their status and effectiveness can be enhanced when they are used as a platform for support to a variety of interventions ranging from decentralisation to improving water infrastructure.

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Table 1 Overview of biophysical characteristics of the Kuiseb and Cuvelai-Etosa (in Namibia) basins (derived primarily from Jacobson *et al.* 1995, Marsh and Seely (eds.) 1992, Mendelsohn *et al.* 2000, 2002).

Characteristic	Kuiseb basin	Cuvelai-Etosa basin
Size	>15 500 km <sup>2</sup>	*Approximately 85 000 km <sup>2</sup>
Elevation range	0 – 2080 m	1000 - 1200 m
Rainfall range	0-350 mm per annum	250-700 mm per annum
Mean annual temperature	<16 - >22° C	>22° C
Biomes	Namib Desert, Nama Karoo, tree&shrub savanna	Tree&shrub (palm&bush) savanna
Aquifer types	Hard rock & alluvial	Primarily saline
Water infrastructure	Boreholes, earth dams, pipelines	Canals, pipelines, earth dams, hand-dug wells
Watercourse characteristics	One main ephemeral river course; alluvial aquifer recharge dependent on Kuiseb flow	Ephemeral wetlands with numerous courses; grazing and perched aquifer recharge dependent on Cuvelai flow
Water flow characteristics	Lies entirely within Namibia; ephemeral throughout the basin	Cuvelai-Etosa basin originates in Angola where flow is perennial; ephemeral flow in Namibia
Resources supported	Aquifer recharge, riverine vegetation	Fish, renewed grazing, perched aquifer recharge
Dams	Earth dams (most <20 000 m <sup>3</sup> ) capture limited amount of water in upper basin (used for commercial farming)	Dams perceived to block Cuvelai flow upstream in Angola; few large excavation dams throughout basin in Namibia
Evaporation losses	High evaporation losses from earth dams; high rate of siltation of earth dams	High evaporation losses from earth dams (although more requested by people in basin)
Inter-basin transfers	Lower Kuiseb alluvial aquifer is a source of water for neighbouring coastal towns and uranium mine in neighbouring basin	Canals transfer water from Kunene river basin (in Angola) which is purified and distributed in the Cuvelai basin via complex pipeline system as primary source of domestic water

\* This refers to the four central-northern political regions; the actual Cuvelai ephemeral wetland basin occupies approximately 10 000 km<sup>2</sup> excluding surrounding groundwater aquifers and Etosha Pan.

Table 2 Comparison of social characteristics and conditions of relevance to basin management in the Kuiseb and Cuvelai-Etoshia (in Namibia) basins (derived primarily from Jacobson *et al.* 1995, Marsh and Seely (eds.) 1992, Mendelsohn *et al.* 2000, 2002).

<b>Kuiseb basin</b>	<b>Cuvelai-Etoshia basin (in Namibia)</b>
Population approximately 60 000 (55 000 in Walvis Bay)	Population approximately *785 000 (primarily rural)
Rapid population growth and urbanisation; sparse rural population	Rapid population growth and urbanisation; dense rural population
Urbanisation only in Walvis Bay	Urbanisation promoted and occurring in numerous population centres
High unemployment	High unemployment
High poverty levels, >20% HIV/AIDS infection	High poverty levels, >20% HIV/AIDS infection
Seasonal in-migration to Walvis Bay for fishing industry	Extensive out-migration for employment elsewhere in Namibia
All 13 Namibian languages, primarily: Afrikaans, German, Khoekhoegowab, Oshiwambo	All 13 Namibian languages, primarily: Oshiwambo (9 dialects with mutual understanding)
Three land tenure systems: freehold land tenure on commercial farms, state (park with communal farmers resident), municipality	One main land tenure: state owned, communally occupied outside of municipal areas
Land use: agriculture, tourism, conservation, mining	Land use: agriculture
Agriculture: livestock, game farming	Agriculture: dryland crops, livestock
Prior to 1600's area occupied for seasonal hunting and grazing	Prior to 1600's area occupied for seasonal hunting and grazing
Overuse of vegetation and riverine woodlands	Poor land use and agricultural practices
Households headed by women: 0 - 20%	Households headed by women: 10 - >50%
Main housing type: brick and mortar	Main housing type: traditional (poles & thatch)
Energy for cooking: primarily electricity	Energy for cooking: primarily fuel wood
Fewer potential stakeholders	More potential stakeholders
Two political regions involved	Four political regions involved
Limited political focus on basin area	Strong political focus on basin area
Distinct population groups who have previously not worked together	Existing political mechanisms cover entire population
Few existing committees with diverse aims	Multiplicity of existing committees in area with same members, limited action

\* This refers to the four central-northern political regions; the actual Cuvelai ephemeral wetland basin (encompassing the lishana sub-basin) has an estimated population of 500 000.



Table 3. Key issues identified through implementation of the basin management approach in Namibia.

Key issues	Description of experience from Namibia
Slowness of process	Implementation of basin management is a slow process. It takes time for stakeholders to know and trust one another. It took three years for The Kuiseb Basin Management Committee to be formed and recognised by the Minister responsible. The establishment of the Iishana sub-Basin Management Committee of the Cuvetai Basin has taken more than two years, and recognition is expected during 2005.
Strong, dedicated Initial implementation	Implementation of basin management must be initiated and driven in its early stages by a funded, dedicated body with direct interest in the process. In the Kuiseb, European Union funding to the local NGO (Desert Research Foundation of Namibia) facilitated the process in its early stages. In the Iishana sub-basin, the Department of Water Affairs took the lead supported by the Kuiseb basin example. Funding from the German government (GTZ) supported the process. In all stages, a basin management committee requires extensive collaboration, for example, among local communities, government, NGOs and donors.
Conflict identification	The process of establishment can be supported when clearly defined conflicts are readily apparent. In the Kuiseb Basin, downstream users perceived the upstream commercial farmers to be holding back most of the occasional flow. It was only during the second year of implementation that a field excursion to the area clarified and eliminated long-held misperceptions. Dialogue continues concerning perceived over-abstraction from the downstream alluvial aquifer moderated by the basin management committee. In the Iishana sub-basin, overall water supply, and particularly its cost, is perceived to be a major challenge. Clearly defined conflicts amongst stakeholders in the Cuvetai basin, as observed in the Kuiseb basin, are not evident. This could be the result of a more homogenous population. Changing conditions of water provision have affected most people similarly, particularly the introduction of cost-recovery after independence in 1990. Paying for water, which had been previously been provided free of charge, is an issue that has affected all people and unites rather than divides the population. Similarly, introduction of community based water management has changed relationships within communities but has affected all rural communities similarly.
High level political support	Support from high political levels is essential for committee formation and functioning. In the Kuiseb basin and the Iishana sub-basin, the relevant Minister took personal interest as basin management committees were an important part of new legislation he was backing. To date, some other key ministries, e.g. Ministry of Lands and Resettlement and Ministry of Regional and Local Government and Housing are not yet involved to the degree expected. Ongoing awareness-raising amongst key, high-level decision makers is an important function of the committees and the relevant ministry.
Enhanced understanding	A focus on enhanced understanding by all stakeholders is essential for the process to become fully established and for the basin management committee to be accepted. In the Kuiseb basin, sufficient number of stakeholders

	represent diverse socio-economic, ethnic, linguistic and educational backgrounds. Finding common ground, as well as to work together successfully and a way to resolve conflicts peacefully have to be developed. Basin management committees are an imposed grouping, not one that existed previously or that exists naturally, so time and awareness raising and rapport building is essential. For example, although Namibia promotes decentralisation as a key development issue, the connection between the basin management approach and decentralisation has not been recognised by many key stakeholders. Nevertheless, basin management has been integrated into Namibia's Vision 2030 and National Development Plans and adopted by key stakeholders.
Representation	The concept of representation is not well understood by many stakeholders in both basins. Being a designated representative means that the stakeholders not only represent themselves but gather information about the viewpoint of their sector and report back to their sector on outcomes of decisions undertaken. It is clear during forum and committee meetings that some stakeholders on acting and taking decisions individually.
Cross sectoral integration	Integration of sectoral approaches, e.g. agriculture, water and forestry, in the same ministry but with different extension services, has been enhanced by the basin management approach. This has been integrated into a strongly cross-sectoral approach known as the Forum for Integrated Resource Management or as Community Based Natural Resource Management or Community Forestry and serves to address many development goals of Namibia. Nevertheless, line ministries and departments are typically designed to have good vertical flows of communication and command, but horizontal flows for cooperation and coordination are a new approach and are not natural or easy to establish.
Monitoring, evaluation and adjustment of processes and impacts	A programme of monitoring, evaluation and adjustment was established within the Kuiseb basin management committee. Initially facilitated during the establishment period, M&E&A is not fully functional. Monitoring of committee activities themselves is ongoing, but monitoring of state of the basin's environment and resource use has not yet become fully functional. Members of the forum outlined a very ambitious list of indicators to be monitored, e.g. soil, vegetation cover, but without suggesting how monitoring would be done and who would do it. A modest but fully developed monitoring programme is required. A similar situation currently exists in the Iishana sub-basin committee. Currently, a monitoring system with input from water point committee members is being initiated and will eventually provide information to the basin management committee.
Sustainability of basin management approach	Sustainability of the approach and maintaining long-term interest appears to be another issue as experienced in the Kuiseb basin. During the three year, project-supported, start-up period, attendance at forum meetings increased with each quarterly meeting. Since the establishment of the basin management committee as an independent entity, participation by those involved directly in water management and research has been regular but participation by those less directly involved has been minimal. Time and increased understanding by all members needs to be considered.