

**THE CHALLENGE OF IMPLEMENTING INTEGRATED WATER
RESOURCES MANAGEMENT (IWRM)
IN THE LOWER OKAVANGO RIVER BASIN,
NGAMILAND DISTRICT, BOTSWANA**

PHEMO KAREN KGOMOTSO

A thesis submitted in partial fulfilment of the requirements for the degree of Master of Science in the Integrated Water Resources Management Program (IWRMP), Faculty of Science, University of the Western Cape.

Supervisor: Mr Lewis Jonker

UNIVERSITY of the
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If the misery of our poor be caused not by the laws of nature, but by institutions, great is our sin.

CHARLES DARWIN

The test of our progress is not whether we add more to the abundance of those who have much; it is whether we provide enough for those who have little.

FRANKLIN DELANO ROOSEVELT

DECLARATION

I declare that THE CHALLENGE OF IMPLEMENTING INTEGRATED WATER RESOURCES MANAGEMENT (IWRM) IN THE LOWER OKAVANGO RIVER BASIN, NGAMILAND DISTRICT, BOTSWANA is my own work, that has not been submitted before for any degree or examination in any other university, and that all sources I have used or quoted have been indicated and acknowledged by complete references.

PHEMO KAREN KGOMOTSO

NOVEMBER 2005

SIGNED.....



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CHAPTER 1

BACKGROUND TO THE STUDY

1. INTRODUCTION

Water resources management practice has undergone changes in management approaches and principles over time. It was previously characterised by what scholars refer to as the hydraulic mission where ‘extreme engineering’ was the order of the day (Allan, 2003). As Radif (1999) argues, water resources managers and policy makers were initially driven to manage and supply water to people for its direct use; these included drinking, growing food, and providing power for domestic and industrial use. This *modus operandi* continued until the end of the 1970s. Over two decades later, this focus is still prevalent in many countries in southern Africa including Botswana. As Swatuk and Rahm (2004) state, “augmenting supply is a continuing focus of government activity”.

The National Water Master Plan (NWMP) is the current policy document guiding water resources management in Botswana and it focuses on supply-side interventions in response to increasing water demand. According to SMEC et al. (1991), the consulting company that conducted the NWMP study, “the investigation and studies... indicated the need for the continuing development of water supplies throughout Botswana over the next 30 years”. Based on these observations, government has developed significant human and technical capacity in exploiting both surface and groundwater resources (Swatuk and Rahm, 2004).

Prevailing arguments in water management practice today are that this supply-driven approach is not sustainable (Davies and Day, 1998; Falkenmark and Rockström, 2004). It poses a threat not only to natural ecosystems but also to the livelihood security of human populations as renewable water resources continue to dwindle; this is particularly so as water has no known substitute (Abu-Zeid, 1998).

Recently, the 'sustainable development talk' has featured in virtually all international conferences concerning issues of the environment and development, since its coinage by the Brundtland Commission in 1987. The concept of sustainability in development of any kind began to be advocated as the most sensible approach to development. With regards to water resources management, sustainable development would entail the implementation of an Integrated Water Resources Management (IWRM) regime. As Kansime (2002:802) posits, "to ensure sustainable development through proper use of water resources, policies should address management, conservation and development of water resources in an integrated and holistic approach based on institutionalised gender and economic principles".

The southern African region is in the process of reforming water policies and legislation. According to Beukman (2002), the reforms attempt to reduce state subsidies for water; to decentralise sector involvement in water supply; and to ensure more equitable access to water resources for development. IWRM is actively being promoted through this reform and is being promoted by the Southern African Development Community (SADC) Water Division through its Regional Strategic Action Plan. Countries such as South Africa and Zimbabwe are of those in the region that have made considerable progress in this regard. Both countries promulgated new water legislation in 1998 and adopted IWRM principles (Tapela, 2002; Manzungu, 2002; Latham, 2002; Kujinga, 2002). South Africa's National Water Act (no.36 of 1998) and Zimbabwe's Water Act (Chapter 20:24 of 1998), among other things, sought to democratise water access and utilisation, as a measure to correct racially informed social injustices of the past (Latham, 2002).

Botswana is in the process of revising its water policy and legislation with the hope of bringing it on par with the SADC's recommended principles of IWRM. As the NWMP is the principal plan guiding policy in the interim, a number of shortcomings can already be observed that pose a challenge to sustainable management of water resources as well as the proper implementation of IWRM itself. As Swatuk and Rahm (2004) discovered, Water Demand Management (WDM), defined at the 1992 Dublin Conference, as 'actions that promote more desirable levels and patterns of water use' is not reflected in the

document. This document also does not refer to the concept of IWRM. A product of its time, however, the NWMP was created prior to this ‘new thinking’. There are acknowledgments by some water practitioners however that the new water policy and revised National Water Master Plan should reflect IWRM principles (Taylor, June 20, 2005, Okavango Delta Management Plan Office, interview).

Of particular concern in the water resources management practice in Botswana is the institutional framework of the water sector and management approaches this sector has adopted. As institutions are crucial and can be barriers or opportunities to an ecologically sustainable human development (Dovers, 2001), a closer look at the status of these must be taken to ensure that they are suitable for implementing new policies. Institutions are of prime importance in the implementation of IWRM as sectoral coordination and co-operation is critical here. As Dovers (2001) argues, a lack of progress towards resource management is widely attributed to institutional failure and inadequacy.

2. RATIONALE

The political and social context of managing resources, including water, changes, but there is an inevitable institutional dimension. The institutional settings of resource management cannot be ignored if a sustainable management of the resource is to be achieved (Dovers, 2001). Universal experience dictates that without formal institutional arrangements, which are carefully designed to ensure coordination in preparing policy advice to the decision-makers, decisions will not be taken on the best available information (SMEC et al, 1991). They will therefore often not be the wisest decisions. If institutional arrangements are to work well, they must be suited to the operating environment of the time; more than that they need to match emerging imperatives (Dovers, 2001).

Studying institutions and their arrangements in this area is in itself a motivation to learning the opportunities and barriers they present to managing the resource in a sustainable manner. The ability of these institutions to adapt and match emerging

imperatives is also at the heart of success in implementing IWRM. Studying the relations between the different institutions can also shed light on why the institutions operate the way they do and how this impacts on their performance in managing the resource. It is based on this reason that the author chose to conduct the study from an institutional perspective. In Botswana, access to resources or lack of it, is directly affected by institutional capacity. This is however not to suggest that other aspects of IWRM play a lesser role in the success of the approach, but the failure of institutions is often attributed to lack of success in implementation of policies and decisions.

The rationale for choosing Ngamiland as a study area is multi-fold. First, Ngamiland is the district where the Okavango River and Delta are found and wholly contained. Second, the Okavango River Basin is a shared resource, amongst three sovereign states. The use and management of this resource therefore has political and human security implications on the inhabitants and governments of all basin states. It is therefore an important river basin. Thirdly, the Okavango River basin is the largest surface water source in Botswana with a unique and sensitive ecosystem and supporting one of the largest varieties of biodiversity in the world. Fourthly and lastly, the Ngamiland district is the poorest district in all of Botswana, with more than 70% of its population living within 10km of the floodplain and most of which are directly dependent on the natural resources for its livelihoods. Moreover, this resource is also under pressure from different competing needs of the Botswana economy. Understanding the resource use dynamics and general use and management of this resource is therefore, of primary importance to research that could lead to informed decision-making.

3. RESEARCH OBJECTIVES

General objective

The general objective is to understand the institutional arrangements in the water sector in the Lower Okavango Basin (LOB) and how they impact on water resources management in the basin.

Specific objectives

1. To determine what water management institutions operate in the Lower Okavango Basin and what their roles and responsibilities are.
2. To determine the challenges that the water management institutions operating in the Lower Okavango Basin face and how these are dealt with.
3. To determine if the current institutional arrangements and management approaches present an enabling environment for the implementation of Integrated Water Resources Management (IWRM).
4. To highlight shortcomings of policy and practice and to make suggestions regarding possible institutional reform.

4. OUTLINE OF THESIS

The argument in this paper is framed in 8 chapters, including this introductory Chapter 1.

Chapter 2 presents the literature review. The focus of this chapter is Integrated Water Resources Management (IWRM) and related concepts, particularly institutions, decentralisation/subsidiarity, and stakeholder participation. The chapter also examines the global rationale driving the move toward IWRM, how it is being implemented, what it intends to achieve, and achievements. The literature suggests that IWRM is necessary for a sustainable future, that it is a process and way of thinking rather than a template, and that attempts to operationalise it in the developing world have had mixed results. This seems to be the general case for southern African states where a combination of institutional inertia, lack of political will, and shortages of human and financial resource capacity limit the shift toward 'full IWRM'. The chapter concludes by suggesting that perhaps 'light IWRM' may be a feasible strategy for going forward in both southern Africa and Botswana in particular.

Chapter 3 presents the methodology: a mix of participant observation; key stakeholder interviews; the analysis and reinterpretation of various sources of primary data; and the

use of appropriate secondary data interpreted within the context of my theoretical framework that combines institutional analysis with a political economy of natural resources.

Chapter 4 presents the study area: the Lower Okavango River Basin of Ngamiland. It shows how the L.O.B. is part of a transboundary river basin that rises in Angola, flows for a short space through Namibia before emptying as an endoreic system in the swamps of the Okavango Delta. The chapter also describes the characteristics of the population, the climate and hydrology, common sources of water and highlights the ecological footprint (i.e. the extended impact of human use on the Delta system) on the Delta margin. This region is growing and changing both in terms of absolute population numbers and economic activities, so putting increased stress not only on the natural resource base but on the primary stakeholder population that require access to these resources for their survival.

Chapter 5 presents Botswana's water policy and institutional framework. Here it will be seen that water policy in Botswana is driven by the goals of drinking water for all and water for rapid economic growth. Satisfying these goals requires commitment to a hydraulic mission focused primarily on 'big engineering': dams, pipes, boreholes, inter-basin water transfer schemes. Realising these goals is through a highly centralised planning infrastructure that seeks to lead and coordinate activities across several ministries, numerous departments, and various institutions at national and local level. Abernethy (2005) describes this as a 'traditional system of water management' that does not easily lend itself to IWRM principles. There may, however, be an inkling of hope for IWRM style management to emerge in Ngamiland through the Okavango Delta Management Plan (ODMP) project – a government project designed to arrive at a L.O.B. management plan based on an ecosystem approach. However, continuing institutional fragmentation, centralised planning, and under-resourced local level entities work against equitable, efficient and sustainable water resources management.

Chapter 6 explores further the principle of “access” and highlights the need for this ecosystem approach. It interprets ‘access’ through the lens of primary stakeholder interests in the resources of the L.O.B. This chapter draws on raw data from 43 *kgotla* meetings held between January-May 2005 as part of the ODMP stakeholder consultation process. The chapter shows how local people generally understand water as part of a holistic system of natural resources. Access to water for them, therefore, means much more than supply of potable water for household consumption. Government, however, shows little understanding of this complexity and responds to primary stakeholder concerns with a wide variety of top-down, expert-oriented information designed to enforce government policy. At the same time, however, primary stakeholder concerns reveal serious shortcomings with governance, in particular poor performance across all sectors. Such poor performance is due to, among other things, lack of human and financial resource capacity, centralised decision-making, mismanagement and (perceived) corruption. In analysing these stakeholder transcripts, and juxtaposing them with key interview findings, one is left with the clear impression that local people are being marginalized from their resource base, and thus are facing narrowing options for survival.

Chapter 7 also deals with “access” from the point of view of Botswana Government or water institutions. As mentioned above, the communities’ perspective of what access to water resources is, differs completely from the government’s perspective in that for communities it includes access to aquatic ecosystem goods and services while for the government it is limited to access to portable water/supply. This chapter examines government performance in supplying water for household and productive purposes to gazetted and non-gazetted villages/settlements of Ngamiland. The data is drawn from a number of primary government documents, unpublished and published studies undertaken by HOORC researchers, and information gleaned from key stakeholder interviews with the author. The chapter highlights how universal access to potable water is a Millennium Development Goal, how the government of Botswana is performing, and then subjects this to a deeper analysis. Delivery of supply is determined by national settlement policy whereby most settlements with more than 500 residents are eligible for government-supplied water. The evidence shows that in recognised settlements, delivery

is inconsistent, and the quantity and quality of supply varies greatly. In unrecognised settlements, the picture is far worse, with most people in the Boteti River area consuming less than 20 litres per person per day of untreated water. In response, the authorities responsible for delivery in major villages (DWA) and medium-small villages (District Council) acknowledge these problems, but are often complacent, diffident, or hostile to any criticism.

Chapter 8 revisits the findings of the substantive Chapters 5 (on institutional framework), 6 (on access to resources), and 7 (on access to supply). The chapter makes several recommendations for pursuing ‘light IWRM’ in the face of incredibly difficult circumstances – lack of human and financial capital, lack of political will, incomplete information, negative organisational culture, to name but four of the key impediments to realising full IWRM in Ngamiland.



CHAPTER 2

LITERATURE REVIEW

1. INTRODUCTION

“The worldwide movement towards integrated approaches to provide solutions to major problems, including the management of natural resources, such as water, represents a significant shift towards management focussed on the sustained use of these resources” (Jewitt, 2002:887). The concept of *integration* parallels that of *sustainable development*, that strives to instil the drive for sustainability in processes and goals of development at every level. Integrated Water Resources Management (IWRM) therefore emerges to address pressing issues of efficiency, equity and sustainability, among others, in land and water resources management.

As a result of these changes in global views on how resources should be managed, there has been a birth of new institutions and theories to couple these new concepts. This implies a shift in the power balance at all levels of resource management as talks of public or stakeholder participation as well as decentralisation, democracy and subsidiarity take precedence over centralised decision-making and government. The institutional dimension is inescapable in the management of any resource. Different views exist as to what form institutions should take in order to succeed. ‘Institutions for sustainability’ and ‘adaptive institutions’ have become new phrases when debating institutions, especially in resource management (Dovers, 2001:217). IWRM emphasises the importance of institutions in the successful implementation of the IWRM approach.

Whilst most southern African countries are well underway in adopting the IWRM approach to water resources management, it can be expected that they are facing many challenges. Most of these challenges involve the inability of institutions to implement the approach, be it due to issues of capacity, lack of political will or rigidity of institutions themselves.

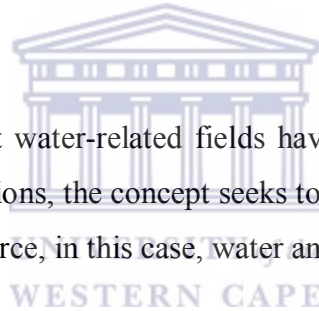
A number of terms and concepts will be used throughout this study, the next section therefore will focus on defining some of the key concepts and terms as used in the field of water resources management, particularly IWRM.

2. DEFINITION OF KEY CONCEPTS

i. Integrated Water Resources Management (IWRM)

The most widely used definition of IWRM is by the Global Water Partnership (GWP), an international networking organisation. This concept is defined as “a process, which promotes the co-ordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (GWP-TAC, 2000:22).

Various scholars from different water-related fields have put different definitions forth. Whatever the number of definitions, the concept seeks to particularly promote *integration* in the management of any resource, in this case, water and land.



Thomas and Durham (2003:24) define IWRM as “a sustainable approach of water management that recognises its multidimensional character—time, space, multidiscipline (science, technology) and stakeholders (regulators/users/providers/neighbours) – and the necessity to address, embrace and relate these dimensions holistically so that sustainable solutions can be brought about”. According to the authors, the **time dimension** here refers to sustainable development: actions made now should be in harmony with the long term to protect the interests of future generations. The **space dimension** recognises that the natural unit for all water management efforts is the river basin or the watershed. The **multidiscipline dimension** requires a large number of parameters to be considered in the decision making process. These include the ‘triangle of sustainability’ (economy, environment/ecology and social impacts); legislation and health issues; technique and technology; political and institutional issues; socio-economic impacts; and historical and cultural issues. The **stakeholder dimension** dictates that stakeholders have to be involved in the decision-making process as soon as possible in order to incorporate all the conflicting aspirations of the different decision participants.

For Jonker (2002:719), IWRM concerns “managing people’s activities in a manner that promotes sustainable development (improving people’s livelihoods without disrupting the water cycle)”. He argues that for IWRM to succeed as a management strategy, it should address issues of access and equity, resources protection, efficient use, governance as well as land use. Pollard (2002) defines IWRM as a subset of Integrated Catchment Management focussing on just the water resources of the catchment. In this regard, it is “equitable access to and sustainable use of water resources by all stakeholders at catchment, regional and international levels, while maintaining the characteristics and integrity of water resources at the catchment scale within agreed limits” (Pollard, 2002:943).

Van der Zaag (2005) defines IWRM as reconciling basic human needs, ensuring access and equity, with economic development and the imperative of ecological integrity, while respecting transboundary commitments. For van der Zaag (2005) IWRM is an approach through which current water resources management problems can be dealt with. He,

however, cautions us on the institutional challenge embedded in IWRM; that it requires institutional capacity to integrate and that this capacity is currently lacking.

ii. Institutions

There are a number of definitions for the term ‘institution’. The terms “institutions” and “organisations” are also often used interchangeably but according to Narain (2000) some scholars make distinctions between the two. For instance, North (1990, cited in Narain, 2000), defines institutions as “the rules of the game in a society, or more formally, the humanly devised constraints that shape human interaction” and organisations as groups of individuals bound by some common purpose to achieve objectives. These could be political organisations such as parliament or political parties, social organisations such as clubs and churches or educational organisations such as schools and universities (Narain, 2000).

For Jaspers (2003) institutions are organisations or establishments founded for a specific purpose based on a set of working rules originating from an established custom, law or relationship in a society or community. Ostrom (1990, cited in Jaspers, 2003), defines institutional arrangements as sets of working rules that are used to determine who is eligible to make decisions in some arena, what actions are allowed or constrained. Further, the rules describe what procedures must be followed, what information must or must not be provided and what payoffs will be assigned to affected individuals.

Meynen and Doornbos (2004) argue that in critical perspectives, institutions not only encompass sets of formal and informal rules, regulations and norms but also social meaning, namely, shared values, understandings and perceptions of ‘the right way of doing things’. Thus, institutions are intrinsically permeated and shaped by notions and ideologies of gender, class and other social divisions in societies. For these authors, related ‘deeply-sedimented social practices’ may also be considered as institutions, or as part of institutions.

Berry, (1993, cited in Meynen and Doornbos, 2004) argues that institutions are subject to multiple interpretations and frequent redefinition in the course of daily practice and often operate as arenas of negotiation and struggle. Meynen and Doornbos (2004) deduce that in other words, institutions constitute contested terrain in which different interests are played out, subject to the power dynamics of human agency. Dovers (2001), defines institutions as underlying and persistent rules, customs arrangements and patterns of behaviours, and organisations as the more immediate manifestations of these (institutions). In all these different definitions, there is an implication that institutions involve groups of people with a similar purpose who agree to have a set of working rules. Dovers' definition is easily understood and for the purposes of the study, will be adopted.

iii. Decentralisation and the principle of “subsidiarity”

Decentralisation and subsidiarity complement each other. Decentralisation has often been based on the principle of subsidiarity, which involves the premise that higher state bodies should not be doing what lower state organs can do better (Meyen and Doornbos, 2004). According to Reddy (1999), subsidiarity defines the rules and regulations for co-operation between different levels: public-private or large-small. In this regard, subsidiarity for the state implies that it abstains from becoming involved in anything better accomplished by smaller units; provides help and support to empower smaller units and encourages self-help; and becomes involved only when the next smaller unit is undoubtedly unable to perform.

Decentralisation denotes ‘transfer of authority, legislative, judicial or administrative, from a higher level of government to a lower level’ (Reddy, 1999:16). This is often part of the democratisation process that empowers people to eventually govern themselves. Manyurureni (1995:19, cited in Kujinga, 2002) defines decentralisation as a process that involves the legal transfer of authority and functions from central government to local institutions to plan and implement development activities and to manage resources at the local level.

Decentralisations therefore, is a way of widely distributing authority or decision-making powers, usually to a lower level of administration, to bring it closer to the point of service or action. In a democratic society, decentralised organisations are those that are created at a local level or created specifically to undertake decisions at a local level.

iv. **Public/stakeholder participation and decision-making**

Usually decentralisation is carried out to enable public participation and decision-making at the lowest appropriate or possible level. In this regard, the concepts of public participation, subsidiarity and decentralisation are co-dependent. Jaspers (2003:81) poses important questions: “In which processes should stakeholders participate? (In decision-making of course.), Can they also play a role in other functions of management: planning, monitoring and enforcement?”

Participation has been a key concept in development discourse for quite some time, extending across traditional rural development approaches (Chambers, 1983), to encompass all aspects of natural resources management (Benjaminsen, Cousins and Thompson, 2000; Fabricius et al, 2004; Vira and Jeffery, 2001), and now including ‘good governance’ and ‘democracy’ frameworks (Peters, 2000). Despite its ‘buzzword’ status, realising meaningful participation in natural resource management has proved particularly problematic. This is due in part to the fact that donors and governments are generally satisfied with a relatively low level form of stakeholder participation at the resource base. Jeffery and Vira (2001: 03) provide a useful typology of participation that should be kept in mind when considering the relative successes or failures of implementing IWRM:

1. **Passive Participation:** people participate by being told what is going to happen or has already happened.
2. **Participation in Information Giving:** people participate by answering questions posed by extractive researchers.

3. Participation by Consultation: people participate by being consulted and external agents listen to views. External agents define both problems and solutions and may modify these in the light of people's responses. Such a consultative process does not concede any share in decision-making and professionals are under no obligation to take on people's views.
4. Participation for Material Incentives: people participate by providing resources, e.g. labour, in return for food, cash or other material incentives.
5. Functional Participation: people participate by forming groups to meet predetermined objectives related to the project, which can involve the development or promotion of externally initiated social organisation. These institutions tend to be dependent on external initiators and facilitators, but may become self-dependent.
6. Interactive Participation: people participate in joint analysis, which leads to action plans and the formation of new local institutions or the strengthening of existing ones. These groups take control over local decisions and so people have a stake in maintaining structures or practices.
7. Self-mobilization: people participate by taking initiatives independent of external institutions to change systems. They develop contacts with external institutions for resources and technical advice that they need, but retain control over how resources are used. Such self-initiated mobilisation and collective action may or may not challenge existing inequitable distributions of wealth or power.

Given the multitude of stakeholders involved in IWRM, their different capabilities, interests and powers, participation levels will vary depending on the shape and form of the meeting and the project of which it is part. Most often, participation at the level of the resource itself rarely goes beyond types 1-3, so creating a wide variety of problems with implementation down the line (see below, Chapters 5-7).

Stakeholders may be defined as persons, groups or institutions with interest in a project or programme, which may be affected in a positive or negative manner by the decisions and actions made (Water Resource Management, 2000:11, quoted in Dube and Swatuk,

2002). From a river basin management perspective, Svendsen et al (2005:07) define stakeholders as “individuals or groups which have a legitimate interest in the management of water resources in a basin but which may or may not play an active role in basin planning and management processes” (also see Kujinga, 2002; and Manzungu, 2002). Direct stakeholder participation can be better facilitated if decision-making is decentralised; decentralisation is also meant to bring decision-making closer to where decisions are implemented (Jaspers, 2003). One of the reasons for this is that people are more likely to be committed to a development project or programme if they are involved in its planning and preparation because they can identify with it and see it as their project (Sharma, 1999). Participation is one of the core principles of IWRM (GWP-TAC, 2000). With regards to this, real participation can occur directly when communities come together to make water supply, management and use choices. Participation also occurs if democratically elected or otherwise accountable agencies or spokespersons can represent stakeholder groups. Jaspers (2003) argues that depending on the level of decision-making and the specific management function envisaged, stakeholder participation can also be instrumental in planning, monitoring and enforcement.



3. RATIONALE FOR IWRM / LIMITATIONS OF THE CONVENTIONAL APPROACH TO WATER RESOURCES MANAGEMENT

IWRM was initially advocated in the 1980s as a solution to the water problems as perceived then and as a response to the limitations of the supply-driven approach (Radif, 1999). According to GWP-TAC (2000), IWRM is needed as the answer to ‘the overall problem’. Abu-Zeid (1998:11) terms these “world water challenges”. This ‘overall problem’ is that water resources are under increasing pressure due to a rapid growth in the world population and that populations are under water stress. The impact of pollution on the available water resources is also among the main problems facing water resources today and all these problems are aggravated by shortcomings in the management of water (GWP-TAC, 2000:09). “These stresses have caused a reduction in the per capita usage of the limited fresh water resources in many countries to a scarcity level” (Radif, 1999:145).

For Abu-Zeid (1998), a vision for world water, life and the environment is fundamental to unifying world leaders and world opinion makers towards a common goal and shared objectives, clearly defined targets and realistic commitments. The World Water Council (WWC) as a result was set up to draw a vision for world water, life and the environment. This vision would be guided by a set of basic principles. Among the principles is the provision to support the application of Integrated Water Resources Management (IWRM) as a concept for wider and practical application. GWP was created in 1996 to foster IWRM, and it does this by creating fora at global, regional, and national levels, designed to support stakeholders in the practical implementation of IWRM (GWP-TAC, 2000). GWP uses the “Dublin principles” which were agreed to in Dublin in 1992 at the International Conference on Water and the Environment and adopted at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, 1992.

Whereas, according to GWP, these principles have since found universal support amongst the international community as the guiding principles underpinning IWRM (GWP-TAC, 2000), some of these principles have raised concern among some scholars. A case in point is Principle (IV), which states, “water has an economic value in all its competing uses and should be recognised as an economic good”. This principle has stimulated a lot of debate among water professionals, sociologists, political scientists and economists (Barlow and Clarke, 2002; McDonald and Ruiters, 2005; Shiva, 2002). The interpretation of this principle is at the core of the debate (Savenije, 2002; Savenije and Van der Zaag, 2002). For some it leads directly to the commercialisation of water, so subjecting an essential good to the vicissitudes of the market (McDonald and Ruiters, 2005). Bond (2002) argues that privatisation of water supply leads to ‘cherry picking’, i.e. better services for the wealthy few and increasing lack of access for the poor majority. For Bate and Tren (2002), while water itself may be ‘free’ in that it falls from the sky as a ‘gift of nature’, channelling this water for human use costs money and therefore should be paid for. Access to water in developing countries reflects the gross inequalities found there. Unlimited access for the influential few is a function of political decisions (such as providing free water to farmers), and leads to inefficient and unsustainable practices

(Bate and Tren, 2002). Moreover, if the water and sanitation portion of the Millennium Development Goals (MDGs) are to be met, including among other things, halving the proportion of people who lack access to safe drinking water and basic sanitation, a great deal of money will have to be mobilised – a great deal of it from the profit-oriented private sector (Strachan et al, 2005).

According to Radif (1999) integrated water resources management is based on the perception of water as an integral part of the ecosystem, a natural resource and a social and economic good whose quantity and quality determine the nature of its utilisation. He posits that this approach suggests “integrating the sub-sectors and the fragmented policies within a national economic framework to adopt the demand-driven approach where indigenous and new technologies are used in water allocation and conservation of fresh water supplies” (Radif, 1999:147). Much like the ecosystem management framework, most definitions of IWRM suggest that it should meet human requirements for the use of freshwater, whilst maintaining hydrological and biological processes and biodiversity, which are considered essential for the functioning of ecosystems, the sustainable use of water resources and the maintenance of goods and services provided by them (Jewitt, 2002). Jewitt (2002) argues that there is however a significant knowledge gap between management practice and the theory and philosophy that has led to the inclusion of these concepts as policy in most countries. Along the same lines, Radif (1999) states that recently experts have revealed in their work that although IWRM sees ecosystems as important users, it (IWRM) nevertheless pays little attention to the ecosystems’ role as a provider of water resources and other goods and services.

The rationale for IWRM is multi-fold since the approach is both multi-disciplinary and inter-disciplinary. An integrated water resources perspective ensures that social, economic, environmental and technical dimensions are taken into account in the management and development of water resources

<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTWRM/0,,menuPK:337246~pagePK:149018~piPK:149093~theSitePK:337240,00.html>). As (GWP-TAC, 2000) states, the need for IWRM arises from regular interactions, uses and interests of

interdependent groups that converge around a uniform whole. According to GWP-TAC (2000), these interactions are bound to result in competition and conflict between and among uses and users. Without proper water management strategies and approaches, these would become unmanageable.

An integrated approach such as IWRM has an important institutional dimension that is geared at creating an enabling environment for solving allocation issues and minimising conflict between competing uses and users. This ‘enabling environment’ (GWP-TAC, 2000:30) is seen as an important element in the IWRM framework and it is in the form of national policies, legislation and regulations and information for water resources management stakeholders. Conflicts and inefficiencies make it imperative that available water resources are managed in a comprehensive manner, which takes into consideration the multiple users of water resources, land use impacts, pollution control, environmental and public health issues. These are some of the issues that are addressed by the IWRM paradigm (Maganga, 2003). In the southern African region, IWRM is actively being promoted through the water reform process and is being promoted by the Southern African Development Community (SADC) Water Division through its Regional Strategic Action Plan (Beukman, 2002).

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4. IWRM HOW? /HOW IS IWRM TO BE IPLEMENTED/INTEGRATION ACHIEVED?

The key aspect in IWRM is the “integration” part of it. This implies making one, or a whole, or doing away with fragmentation (Collins Essential English Dictionary, 2003). In water resources management this manifests itself in many different ways at different levels of managing the resource. GWP (GWP-TAC, 2000) suggests that this integration can be considered under the categories of the natural system, with its critical importance for resource availability and quality; this integration is also critical to the human system, which fundamentally determines the resource use, waste production and pollution of the resource and which must set the development priorities. “Integration has to occur both within and between these categories, taking into account variability in time and space”

(GWP-TAC, 2000:23). IWRM is supposed to promote integration across sectors, applications, groups in society and time (Maganga, 2003).

Natural system integration should start at the hydrological/water cycle level. It should be recognised that in the natural hydrological system there are no distinctions between surface and groundwater or lake and river water. IWRM supporters argue that what is needed is a re-discovery of the water cycle (Savenije, 2002). Since conventional water resources management has made these misleading distinctions, IWRM promotes an integration of these and others. The natural system integration would therefore involve, among others, integration of freshwater management and coastal zone management; land and water management; green and blue water; surface and groundwater; quantity and quality of water; and upstream and downstream water-related interests (GWP-TAC, 2000).

Once the bigger picture is clear, the other distinctions between sectors and disciplines should become redundant – at least in theory – because understanding of human activities and their impacts on water resources is dependent on the understanding of the natural system, its capacity, vulnerability and limits. According to GWP (GWP-TAC, 2000), human system integration would involve attempting to ensure that governmental policies, financial priorities and planning (physical, economic and social) take account of the implications for water resources development, water related risks and water use; influencing private sector decision-makers to make technological, production and consumption choices based on the real value of water and the need to sustain natural resources assets over time; and providing fora and mechanisms to ensure that all stakeholders can participate in water resource allocation decisions, conflict resolution and trade-off choices. Achievements can already be seen in some areas. Tapela (2002) reports that in Zimbabwe, since the adoption of the IWRM approach, there has been a shift away from the past water laws' distinction between groundwater, surface water and private water towards recognition that all these are a part of the same watercourse system.

For integration to be effective, it should ideally begin at the planning level. Some scholars (e.g. Matondo, 2002) have even introduced the word “planning” into IWRM to make it Integrated Water Resources Planning and Management (IWRPM) arguing that integration can successfully be achieved at the planning level. This is because water resources planning should consider and prioritise all relevant societal water uses in their spatial distribution. According to Jaspers (2003) planning helps to assess the present situation in the basin and to develop a comprehensive set of measures to reach the desired situation; it also delivers an opportunity to streamline the participation process and helps increase the transparency of decision-making; and lastly forces the decision-makers into a process of horizontal and vertical coordination. According to Malano (1999, cited in Matondo, 2003), there are four major principles in IWRPM including:

- Sectoral (and sub-sectoral) integration that takes into account competition and conflicts among various users,
- Geographical integration,
- Economic, social and environmental integration that takes into account social and environmental costs and benefits, and
- Administrative integration that coordinates water resources planning and management responsibilities and activities at all levels of government.

Integrating water resources management is in itself a complicated exercise, and certain aspects need to be put in place for it to be feasible. GWP’s “important elements” are pivotal to the IWRM framework. These are the enabling environment, institutional roles and management instruments (GWP-TAC, 2000). The enabling environment is, as mentioned above, policies and legislation that enable stakeholders to play their respective roles in the development and management of water resources. The institutional roles, which are the focus of this study, are critical to the formulation and implementation of IWRM policies and programmes. “The need for the creation of an institutional framework that will coordinate water resources planning and management responsibilities and activities at all levels of government is imperative for the success of conventional and IWRPM” (Matondo, 2002:837). As Van der Zaag (2005) argues, the greatest challenge in

IWRM is the development of institutions with the capacity to integrate, not necessarily the creation of new, completely different ones as is currently happening. Management instruments would enable decision-makers to make rational and informed choices between alternative actions, and these choices should be based on agreed policies, available resources, environmental impacts and the social and economic consequences (GWP-TAC, 2000).

Falkenmark and Rockström (2004) posit that it is now accepted that the growing human use of fresh water has major impacts on ecosystems, and that water management has to include an integrated approach to water for socio-economic development while at the same time safeguarding vital ecosystems. For them, managing water for the future can only be achieved by integrating water for humans and nature.

5. WHAT IS IWRM TRYING TO ACHIEVE?

Despite advancements in water supply and sanitation over the last two decades, 1 billion people still lack access to supply of adequate drinking water and 2 billion people still do not have access to adequate sanitation (Falkenmark and Rockström, 2004). Lack of access to potable water for both domestic and productive purposes has become a direct result of poverty and vice versa. For Falkenmark and Rockström (2004), these frustrations are management failures and are not related to physical water scarcity. Ensuring efficient water use and its equitable distribution could be one of the solutions to the vicious cycle of poverty and water resources use (Kansiime, 2002). The IWRM perspective aims to promote some of these aspects in its approach to the management of water resources. GWP's overriding criteria points out three aspects that take account of social, economic and natural conditions, and should be considered when pursuing IWRM (GWP-TAC, 2000). These are: economic efficiency in water use, equity and environmental and ecological sustainability.

This study assumes the position that IWRM aims to achieve access, equity and sustainability in managing water resources. All these are related and interdependent and are similar to GWP's overriding criteria.

i. Managing for access

Water is both a social and an economic good and societal dependence on it is high (IHP/HWRP, 2005). Access to water of adequate quantity and quality is fundamental to survival and critical for reducing the prevalence of many water-related diseases. Widespread availability of clean and affordable water is a social good because such availability improves both individual and social wellbeing (Gleick et al, 2002). This is a consequence of water being essential and non-substitutable. It is therefore the responsibility of governments to make sure that there is safe access to water for domestic and other economic uses and that society is protected from water related hazards (Savenije, 2002). Social goods can have private good characteristics as well: more water for one individual can mean less water for other individuals who share a water-supply system (Gleick et al, 2002). Equitable access and allocation are therefore important.

Gleick (2000) argues that access to a basic water requirement is a fundamental human right implicitly supported by international law, declarations and state practice. He however cautions that a right to water cannot imply a right to an unlimited amount of water because there are resource limitations, ecological constraints, and economic and political factors that limit human water availability. Given such constraints, how much water is necessary to satisfy this right to water then? This is usually decided at state level. In South Africa, for instance, legislation provides for "the reserve". The reserve is defined as the quantity and assurance of water, as well as the quality of water, which are required to protect basic human needs and to protect aquatic ecosystems in order to secure ecologically sustainable development and utilisation (Jewitt, 2002). The reserve is allocated before any other use, and current policy has set basic needs at 25 litres per person per day (Schreiner and van Koppen, 2002). This is generally the case in most countries in southern Africa. Despite this, disparities in access to water still exist, and as

Robinson (2002) reports, these are symptomatic of the overall pattern of development in the urban and rural areas of countries such as Zambia and Zimbabwe. The typical situation is that high income urban areas have treated water piped into their homes and at the other end of the spectrum, poor households on the city margins have scant access to water, often having to carry water over long distances just to meet basic needs. The truth of the matter is that there are many reasons for both lack of access and inequitable access.

Scanlon et al (2003) propose three elements as essential to defining a right to water:

- Accessibility (within safe physical reach for all; affordable for all; accessible to all in law and fact).
- Adequate quality (water for personal or domestic use must be potable).
- Adequate quantity (water supply must be sufficient and continuous for personal and domestic uses).

However, 'access to water resources' may take a number of forms and varies across cultures. Beyond access to water for domestic purposes, which usually encompass food preparation, drinking and hygiene, there should also be access to water for productive purposes (e.g. farming) and access to water-dependent ecosystem goods and services. These include access to goods such as fish and reeds and services such as water transportation, aesthetic value of water as well as for religious purposes. Where proper water resources management exists, all these needs will be represented in an equitable manner.

ii. Managing for equity

Equity in allocation means that all users should have sufficient and continuous access to water needed in the fulfilment of their activities (Lévite and Sally, 2002). As mentioned above, this could be for domestic and economic purposes; it could also be for spiritual and cultural purposes as well. Equity should also not only be between allocations for human water use, there should also be equity in allocation for nature. This would ensure

the continual existence of ecosystems that provide the goods and services that are essential for human survival.

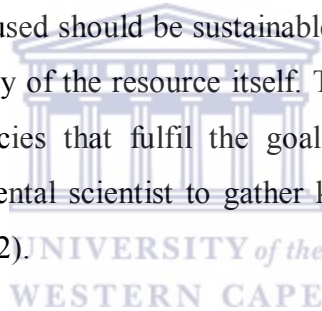
Equity in resource distribution should also exist among different sectors in an economy. Equitable distribution does not imply that all sectors must be allocated the same amount of water for their different activities. It means that all should receive enough to ensure efficient and beneficial use. Efficient and beneficial use of water for the society must include optimal economic as well as social gain for the people (Kansiime, 2002). In most countries in southern Africa prior to independence, access to a certain amount of water of a certain quality was determined by one's skin colour (Swatuk, 2002). Inequities do however still prevail between the rich and poor, between urban and rural dwellers and between small-scale and large-scale irrigation farmers, especially where there is not enough regulatory and institutional capacity to properly manage the resource, its allocation and use. Robinson (2002) reports that in existing vending schemes in Zambia, the poor are paying prices for water at kiosks that are as much as 3 times the unit price of water for a connected household. This arises when there is a lack of equity in access, where the resource is cheaply accessible for some sections of the society and less so for other sections of the society. These are some of the social inequities that current water reforms and IWRM seek to address. Translating the principle of equity in allocation and distribution into practice is, however, a challenge. Léville and Sally (2002) posit that it all boils down to trying to achieve a balance between allocation for equity and productive purposes while ensuring overall sustainable use of the water resource.

iii. Managing for sustainability

Sustainability is at the core of managing water resources, in fact all natural resources. It should be realised that aquatic ecosystems are the base from which resources are derived and without which human well-being and survival would not be possible. The sustainability of these ecosystems is therefore at the centre of human existence. This automatically calls for sustainable use of the resource. The concept of sustainability is a contested one (See Lélé and Norgaard, 1996; Orr, 1992). It can be defined as the ability

to maintain something undiminished over some time period (Lélé and Norgaard, 1996). Where ecosystems are over-exploited, their ability to provide goods and services is lost (Jewitt, 2002). Ecosystem functions can be considered as “the capacity of natural processes and components of natural or semi-natural systems to provide services and goods that satisfy human needs (directly or indirectly). Human actions can make them water resources non-renewable. For instance, some groundwater basins and lakes have extremely low rates of recharge and inflow, so water extracted from these basins and bodies in excess of the natural recharge reduces the total stock available for later use, and hence, is non-renewable and exhaustible (Gleick et al, 2002). In addition, polluting an aquifer is in effect reducing water from a flow resource to a stock (Homer-Dixon, 1994).

The principle of sustainability should be considered at all times in the undertaking of any activity. When it comes to ensuring access, it should be sustainable access. Equally, the policies, methods and systems used should be sustainable to ensure reliable access to the resource as well as sustainability of the resource itself. The role of resource managers is to implement and devise policies that fulfil the goal of sustainability, thus placing responsibility on the environmental scientist to gather knowledge and produce tools to assist the managers (Jewitt, 2002).



The principle of sustainability is important to incorporate in managing water resources because it is the only way the life of ecosystems and their ability to provide goods and service can be prolonged. Despite this, everything has a limit; there is also a limit to sustainability (Geoffrey and Todd, 2001, cited in Falkenmark and Rockström, 2004). This is the point at which deterioration makes the system unsustainable. At this level, the ecosystem has consumed its resilience, loses its stability, and changes into a new equilibrium. Very little can be done about some of these issues, but policy and legislation can determine acceptable changes in terms of closeness to the natural state (Falkenmark and Rockström, 2004).

6. SUMMARY: WHAT/HOW MUCH HAS IWRM ACHIEVED?

IWRM has necessitated a new water governance and management paradigm (GWP-TAC, 2000). The concept emphasises the importance of institutions and the participation of stakeholders in the decision-making processes that determine allocation and distribution of the resource. As Radif (1999) argues, it is the approach under which all water issues, and relevant parties and their particular socio-economic and environmental concerns can be brought together, with key elements being the sustainability of water resources, water policy and integrated management of the resource.

Despite the achievements of the IWRM approach, gaps can still be seen. Some experts argue that IWRM pays little attention to the ecosystems' role as providers of water resources and other goods and services (Radif, 1999; Jewitt, 2002; Falkenmark and Rockström, 2004). The ecosystem-based approach to the management of water resources has concurrently been suggested as a long-term strategy for water resources management (Radif, 1999). For Falkenmark and Rockström (2004) the IWRM approach remains, after all, narrow. To them, it concentrates on seeing water for human support as an economic good and has its main focus on blue water and water quantity. They suggest a socio-ecohydrologically oriented management that bridges the gap between hydrology and ecology. However, as demonstrated in the cases of South Africa ('the reserve') and Namibia (Bethune, Amakali, and Roberts, 2005), it is possible to legislate water for the environment. At the same time, there are efforts to 'rediscover the water cycle', so reintegrating surface with groundwater, blue with green water, amongst others.

A more serious critique of IWRM in practice, however, emerges from a review of the Southern African experience by Swatuk (2005). His study (Swatuk, 2005: 1), highlights several problems with IWRM implementation common to most southern African states:

Evidence shows, among other things, that governments have been reluctant to devolve power to stakeholders; that rural dwellers are suspicious of the motives behind reform; that already empowered actors dominate new institutions touting

broad-based participation; that efforts to fully recover costs in urban areas have been met with widespread civil resistance; and that new institutions have undermined existing forms of cooperation and conflict resolution, making matters worse not better.

However, he does highlight some areas of progress:

At the same time, these studies show the utility of decision support tools, capacity building exercises and research and knowledge production – all positive outcomes that should not be discounted.

Clearly, while IWRM continues to inform the water management discipline, new knowledge and understanding about the concept and the resource can be used to improve on the limitations of practice.

As will be seen in the case study of Ngamiland below, many of the impediments to sustainable IWRM highlighted by Swatuk above are present in Botswana. Does this mean abandoning IWRM for Falkenmark and Rockström's eco-hydrological approach? Personally, the answer is no. Realising IWRM is a long-term goal where process may be as important as the ultimate outcome. IWRM centres on a number of process-oriented, key innovations – a holistic perspective and integrated approach to resource management; devolution of authority through the principle of subsidiarity; active and meaningful participation especially by those closest to the resource itself; short-term activities undertaken with a long-term view toward sustainable socio-ecological development. These innovations have as their overall goal, 'some water (access), for all (equity), forever (sustainability)' – a catchphrase developed by South Africa's Department of Water Affairs and Forestry.

However noble the goal, IWRM does not enter a policy vacuum. Nowhere have the principles of IWRM been adopted *in toto*. It is perhaps for this reason that Moriarty,

Butterworth and Batchelor (2004:28) introduce the idea of ‘light IWRM’ (as opposed to ‘full IWRM’):

In situations where the kind of over-arching legal and institutional frameworks for river basin planning and allocation of water resources ... are either missing or ineffective, then ‘light’ IWRM based on the application of key principles to sub-sectoral activities ... provides an alternative approach. ‘Light’ approaches aim to develop guidelines, based on the application of IWRM principles at all stages of the project cycle. The idea behind taking a ‘light’ approach is that if all sub-sector actors try to apply good IWRM practice at their own level, in their own work, this will in turn lead to the emergence of better local level water resource management, and will be an important first step in the process of IWRM.

This suggests a rather pragmatic, ‘making progress where and when one can’, approach to resource management – a rather appealing idea in the case of Botswana and one to which I return in subsequent chapters.

According to Dovers (2001), most often institutions reflect ‘yesterday’s understandings and imperatives’. To alter long-established organisational routines – no matter how inequitable, inefficient, and environmentally degrading – is no small task, and will inevitably be met with resistance (Allan, 2003). All states’ governance frameworks have evolved piecemeal through time; this is no less the case for a rich state such as Sweden as it is for a developing state such as Botswana. These governance frameworks are complex and multi-layered. As will be seen below, in the case of water management in Ngamiland, there remains a wide gulf between stated IWRM aims and current practices. Could ‘light IWRM’ help move the structures of governance forward?

The next chapter describes the methodology underlying this study.

CHAPTER 3

RESEARCH METHODOLOGY

1. INTRODUCTION

This chapter describes the methods employed to address the research question. This is a qualitative study that is both explanatory and descriptive. Its episto-methodology straddles interpretive and constructionist social scientific approaches (Terre Blanche and Durrheim, 2001). According to Terre Blanche and Kelly (2001: 124), ‘interpretive research ... relies on first hand accounts, tries to describe what it sees in rich detail and presents its “findings” in engaging and sometimes evocative language’. Following from Geertz (1973 quoted in Terre Blanche and Kelly, 2001), the purpose of my interpretive analysis is to provide ‘thick description’ so as to better understand problems with sustainable water resources management in the study area. At the same time, while this study attempts to meaningfully interpret information gleaned from a wide variety of sources, it does not regard the language used as necessarily representative of objective reality. Rather, it recognises that human activity is partly determined/constructed by language, so one’s ability to claim to know something – to engage in a speech act – is an expression of (unequally held) power (Peterson, 2003: 41-43). The study therefore attempts to interrogate or deconstruct particular ‘truth claims’ in order to reveal the power dynamics underlying particular viewpoints regarding success/failure of water resources management in Botswana.

The study is guided by three working hypotheses. The central hypothesis driving this study is: In Botswana, institutions are at the heart of the failure to manage water resources sustainably.

To examine this hypothesis, the study describes the institutional framework within which decisions are made and sets these against different understandings of ‘access to water’: a holistic perspective based largely on traditional ‘ways of knowing’ (i.e. epistemology)

demonstrated by local residents; and a supply-side perspective based on modern, scientific and technological ways of knowing privileged by government. These contrasting epistemologies understandably lead to different conclusions regarding sustainable resource management.

A second hypothesis is that only determined political will on the part of decision makers in key policy positions can bring the necessary influence to bear to facilitate positive change in organisational and social cultures. The determined position taken by South Africa's former Water Affairs and Forestry Minister, Kadar Asmal, is the benchmark for such behavioural change.

A final hypothesis is: In Botswana there is little incentive to change current organisational routines. Prospects for overcoming current negative practices and instituting IWRM are therefore limited.

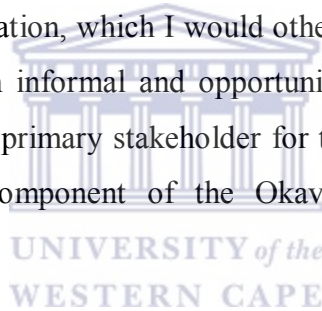
2. TRIANGULATION



In order to achieve 'exhaustion/saturation' in data gathering and analysis, a triangulation strategy was employed (Kelly, 2001). Briefly stated, 'triangulation entails collecting material in as many different ways and from as many diverse sources as possible' (Terre Blanche and Kelly, 2001: 128). Following Denzin (1970), triangulation was employed in four different ways: data triangulation; investigator triangulation; theory triangulation; and methodological triangulation. A fifth type, interdisciplinary triangulation, was also used (Janesick, 1994, quoted in Kelly, 2001). The rationale for triangulation is that no method alone can adequately treat all problems of discovery and testing. Since each method has restrictions, by combining several methods in the same study, the restrictions of one tool are often the strengths of another. The greater the triangulation in a research design, the greater the confidence a researcher may have in her/his findings.

Data were collected from different sources over time. Being resident in the study area gave me a participant observer perspective because I was exposed to the resource use

dynamic and conflicts in the area. My affiliation with the International Union for the Conservation of Nature (IUCN) gave me exposure and opportunity to be part of the conservation and development debate in Botswana and also influenced the framework for analysing stated intention and extant practice. During a working stint at IUCN, I had the opportunity to be involved in a resource use transect in Remote Area Dweller settlements. This gave an idea of what livelihoods and resource use strategies look like in these and related rural settlements in the study area (see, Kgomotso et al, 2003; and Wirbelauer et al, 2003 for details). During the study period, I established formal contacts with the University of Botswana's Harry Oppenheimer Okavango Research Centre (HOORC). The HOORC conducts research on natural resources use in the Lower Okavango Basin, in Botswana and in the southern African region. At this Centre there are experts and researchers in different fields through which I was able to get accumulated raw and analysed data in the form of research papers and unpublished research documents. I also had access to privileged information, which I would otherwise not have had access to, as well as expert opinion through informal and opportunistic interviews and discussions. HOORC is also the designated primary stakeholder for the Research, Data Management and Participatory Planning Component of the Okavango Delta Management Plan (ODMP) project.



This study relies on primary, secondary and tertiary data. Primary data sources include formal semi-structured interviews with key informants in each of the institutions involved in water management in the Lower Okavango Basin. These were recorded and later transcribed, written in English and coded according to relevant resource use themes. Several informal opportunistic interviews and discussions were held with researchers at HOORC. In the text below, I differentiate between these by the terms 'interview' (where it was formal and semi-structured) and 'personal communication' (where it was opportunistic and perhaps only designed to gain clarification on a particular issue).

Analysis was undertaken of existing raw data on natural resource use issues in the study area, particularly that collected by HOORC researchers at *kgotla* meetings held at 43 villages during the ODMP stakeholder consultation process throughout the LOB during

the time period 31/01/05 to 12/05/05. These transcripts were read and coded several times. Initial coding preceded key informant/elite interviews. Recurrent themes, such as declining access to fishing grounds or slow processing of land claims, helped structure key informant questionnaires. Following these elite interviews, the kgotla meeting transcripts were reread and recoded according to dominant themes.

In terms of secondary data sources, many official government documents – e.g., policy papers, legislation, study/inquiry reports, development plans – were accessed, read and interpreted. Quantitative data from sources such as these were used to calculate averages and totals for various socio-economic parameters (e.g. population of villages, number of gazetted and non-gazetted settlements, number of settlements with water supply problems). Statistical data from reviewed sources was also referred to as part of the analysis and interpretation of research results.

Other secondary sources were consulted to give perspective to the study and offer comparative examples. These included published data gathered over the two years during which I was pursuing my course. This published data was in the form of journal articles and books on IWRM and water resources management in general. Most journal articles used were from the journal *Physics and Chemistry of the Earth*, which included a special issue focusing on IWRM. Tertiary sources such as the media – print, television, radio, internet – were consulted on an *ad hoc* and/or opportunistic basis.

3. SATISFACTORY DATA ANALYSIS

Two checklists from Kelly (2001) were used to assist in determining when and if the study was complete. Exhaustion/saturation of data collection was reached following the following five checkpoints: (i) the kind of new thoughts I am having about the material are not adding anything new to the understanding I have already developed; (ii) it seems that the interpretive account answers the questions that I set out to answer and adequately represents the material I have collected; (iii) the interpretation is able to withstand critical interrogation; (iv) new material and new questions seem to add to the account rather than

break it down; and (v) I have shared my opinions with other researchers and my supervisor, and the account has provided responses to their questions

The following checklist was used to determine the completeness of the final study: (i) A thorough account of how findings were reached; (ii) Coherent and logically consistent; (iii) Weaves together the totality of the phenomena in question; (iv) Parts related to the whole; (v) Able to incorporate new or parallel textual material; (vi) Generalisable; (vii) Consistency, scope, fruitfulness, simplicity, accuracy; (viii) External evidence; (ix) A search for disconfirming evidences or cases has not undermined the account; (x) Consensus amongst researchers; (xi) Prediction of future events; (xii) Fits with other interpretations; (xiii) Gives rise to problem-solving action; (xiv) Opens up further areas of understanding; (xv) Covers a broad range of experience.

4. LIMITATIONS OF THE STUDY

Although attempts have been made towards rigorous assessment of the challenge of sustainable use and management of water resources in Ngamiland, certain logistical constraints concerning data collection have imposed limitations on the study. In particular, the study area is vast and this, coupled with no budget for field visits, compounded the difficulty of collecting data and observing the situation at first hand throughout the study area. Thus, much reliance on primary and secondary data was inevitable. Despite the high quality of the raw data from the 43 kgotla meetings, I was not able to attend any of these meetings. However, similar meetings attended for other purposes (e.g. Wirbelauer et al, 2003) show the transcribed data from Bendsen 2005a to be consistent with expectations.

Despite these limitations, I am confident that the findings are accurate and will contribute to the clarification of the problems that emerge out of the challenges that are faced in implementing IWRM or sustainably managing water and other resources in Ngamiland and indeed the whole of Botswana. These findings can have applications to similar cases elsewhere. The following chapter gives an overview of the study area.

CHAPTER 4

OVERVIEW OF THE STUDY AREA

1. THE LOWER OKAVANGO BASIN L.O.B. / NGAMILAND DISTRICT

i. Spatial delineation of the study area

The Lower Okavango Basin (L.O.B) is part of the larger Okavango River System that occurs in three states, Angola, Namibia and Botswana. The Okavango River rises in Angola as the Cubango, and is joined by the Cuito before crossing the Caprivi Strip of Namibia. It then flows into Botswana, where it forms the Okavango Swamps (Pallet, 1997), otherwise known as the Okavango Delta (see Figure 4.1). The Basin covers an area of 192,500 km², and includes the entire catchment area in Angola, as well as a zone 20 kilometres either side of the downstream Cubango/Okavango River and the Delta. The Basin's catchment is limited to Angola where there is active drainage (see Figure 4.2).

The river is often described as a linear oasis as it passes through regions of poor quality soils. For example, it is estimated that only 7 per cent of Kavangoland in Namibia is suitable for cultivation (Moyo et al, 1993: 177). The farming of drought-resistant crops such as sorghum and millet predominate in the basin, with maize and manioc being farmed in the better-watered uplands of Angola, and mixed maize, sorghum and millet in the Delta. With regard to livestock, the majority of cattle are found in the mid-stream and Delta regions of Kavangoland and Ngamiland. While livestock numbers are increasing over the entire region, and land degradation is evident in communal areas of Namibia and Botswana, Mendelsohn and Obeid (2004: 152) state 'that most increases occurred away from the river and that numbers close to the Okavango and Delta have been rather constant' (see Figure 4.3).

- National capital
- Regional capital
- Region, district or provincial border
- International boundary



Figure 4.1 Map showing the Okavango River Basin the Ngamiland District

Source: Harry Oppenheimer Okavango Research Centre, October 2005, Maun

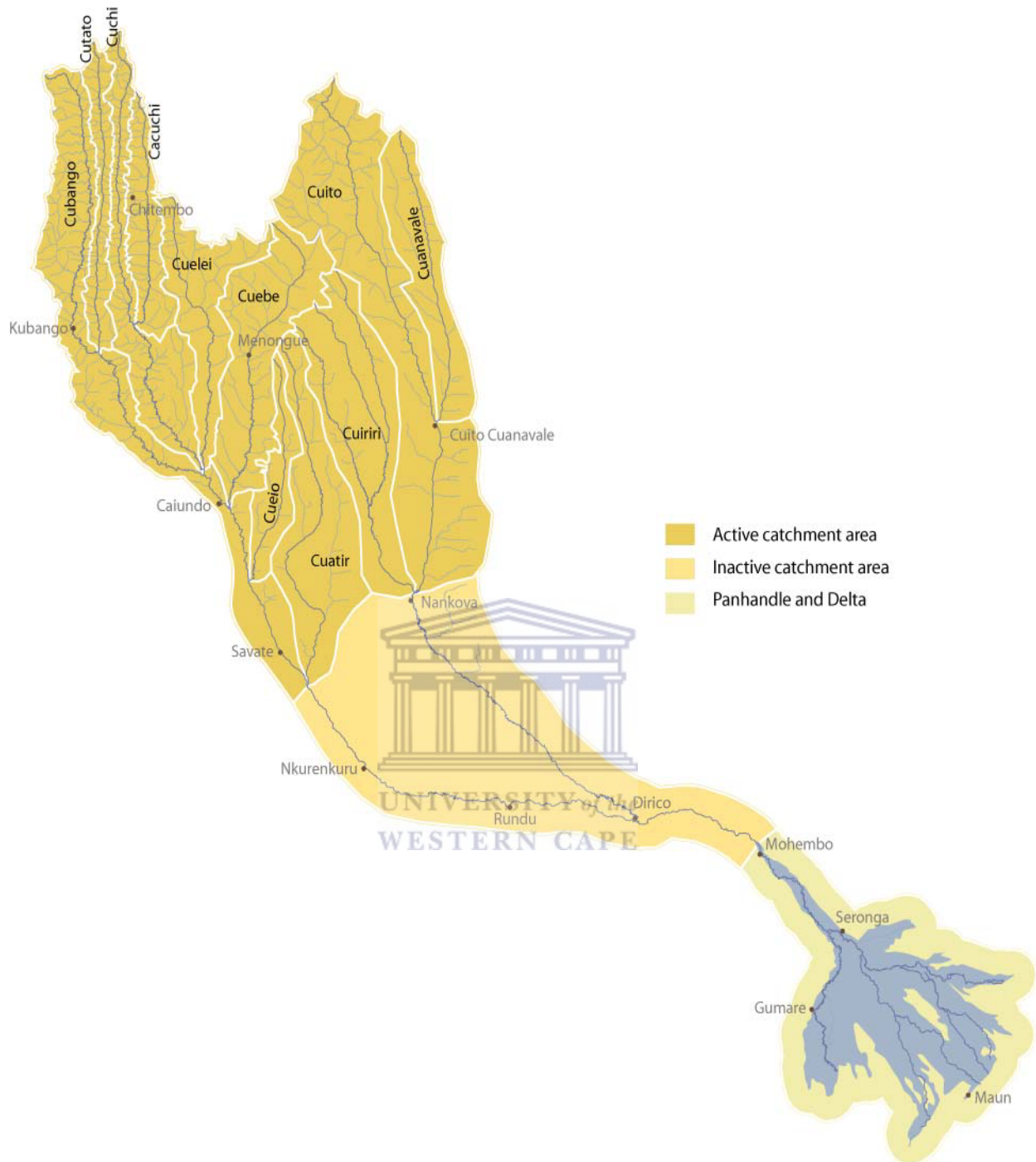


Figure 4.2 Map showing catchments of the Okavango River Basin

Source: Harry Oppenheimer Okavango Research Centre, October 2005, Maun

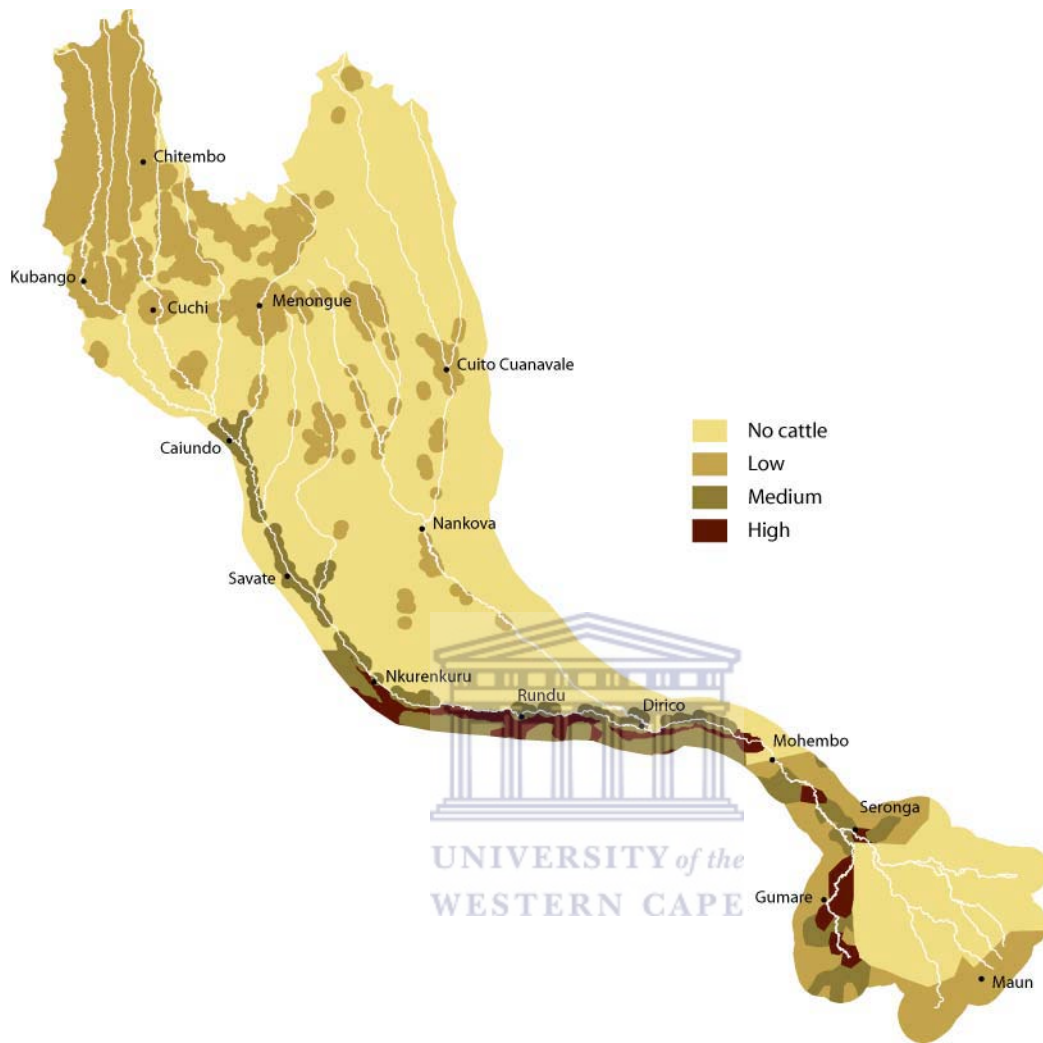


Figure 4.3 Map illustrating cattle density in the Okavango River Basin

Source: Harry Oppenheimer Okavango Research Centre, October 2005, Maun

The region around the river system in Botswana is normally referred to as Ngamiland because this is the district that encompasses the whole Delta (see Figure 4.1). Within Botswana, the Okavango flows in a broad well-defined channel with a clearly defined floodplain for a distance of 90 km before dispersing in an alluvial fan that can cover between 15,000 km² and 40,000 km² (el Obeid and Mendelsohn, 2004). South of the Delta, the river is known as Boteti and flows southeast until it reaches Lake Xau (restricted to wet years)(IUCN, 1992).

There is a continuing change in the distribution of the Delta waters. “As recently as 120 years ago, most water flowed to the southwestern areas along the Thaoge channel and Lake Ngami was regularly filled by the Thaoge. Flows into the Thaoge largely dried up in about 1880, and the Thaoge is now a relative trickle that disperses far to the north of Ngami” (el Obeid and Mendelsohn, 2004: 87). In 2003, a gradual shift occurred and most water flowed into the Maunachira and Khwai river systems. There is now evidence to suggest that the water is taking a westerly course again (Wolski, June 2005, pers. Comm. Maun). In years of high flow, floodwaters may reach the Kunyere and Thamalakane rivers in the far southeast. When levels are exceptionally high, the two rivers flow southwestwards bringing water to Lake Ngami and the Boteti River.

ii. Ngamiland Administrative District

Ngamiland district occupies the northwestern part of Botswana. Its northern and western boundaries are part of the international boundary between Botswana and Namibia (Caprivi Strip). It is bordered by the Chobe District in the northeast, Central District in the east and Ghanzi in the south. The whole Ngamiland district covers an area of 109 130 km² and lies between latitudes 19⁰ and 21⁰ and longitudes 21⁰ and 25⁰ (Plantec Africa, 2003).

According to the 2001 National Population Census, there are 124,712 people in the Ngamiland district, a 5% increase from the previous census held in 1991 (CSO, 2001).

The population, especially in the Okavango Delta area, has grown rapidly over the past two decades at an annual rate of 2.5%. In 1902 the district was populated with about 22,000 people; this total nearly doubled to 42,000 by 1964; and has since trebled to its current levels. In 1902, there were 2.6 km²/ person; in contrast to today's figure of 0.5 km²/person (see Figure 4.4). When combined with land-use changes (parks and wildlife management areas now constitute 40% of the total area of Ngamiland), the pressure on the land is apparent. The impact of 200-300,000 tourists who visit the Delta region annually contributes to this pressure.

For administrative purposes, Maun, being the only peri-urban settlement in Ngamiland, is the district headquarters. Maun is also the largest settlement with a population of about 44,000 as at 2001 (CSO, 2001), and covers a total area of about 446 km². District councils are in control at the district level, with responsibilities for the provision of water supplies, primary schools, clinics and other primary level services. They are served by a number of administrative departments that work in consultation with the relevant central ministries, under the supervision of the Council Secretary (IUCN, 1992). Ngamiland has one sub-district, Okavango sub-district, which is administered by the Okavango sub-district council and is headed by an Assistant Council Secretary with its headquarters in Gumare (Plantec Africa, 2003).

The majority of settlements in the Ngamiland district are along the Maun-Shakawe Road, Mohembo-Gudigwa Road and along the Okavango River, the Delta and Thamalakane River (NWDC et al, n.d.) (See Figure 4.5). Seventy per cent of the Ngamiland population is settled within ten kilometres of the main channel (CSO, 2001). Here people depend on the nearby water bodies for resources such as water, fish, building materials, jobs in the tourism sector, farming and use of the river as a means of transport. In the Delta alone, 99% of about 3,200 people reported to fish, are small-scale fishers catching for domestic consumption (Mendelsohn and el Obeid, 2004).

Due to the government's settlement policy stating that no development will be authorised for communities of fewer than 500 people, the majority of Ngamiland's people have been

affected. Settlements vary dramatically in size, with recognised localities varying from 0 to 44,000. The National Population Census found 624 localities in the study area (CSO, 2001). Of these only 48 are gazetted villages; 24 of these do not qualify for gazettelement as a village. At least four of these settlements have been gazetted under the Remote Area Development Programme. Six are located in the Delta. The rest are designated as growth points and/or service centres for outlying settlements. There are eight settlements – Sexaxa (534), Boro (842), Sekondomboro (655), Eretsha (616), Gudigwa (732), Roye (615), Samochima (847) and Etsha 1 (614) – large enough for village status, but remain ungazetted. Clearly, this variation in size and location poses severe logistical and technical difficulties for government service delivery; hence, the current policy of encouraging people to relocate to gazetted areas (see Chapter 7 below for details).

Villages in the Sehithwa area in the Ngami sub district are clustered around Lake Ngami, which had water for the first time in 20 years in 2004. The Okavango sub district also comprises several small villages located within a few kilometres of each other, making service provision rather expensive (NWDC et al, n.d.). Due to the remoteness of this area, subsistence agriculture is the predominant activity. Households headed by females generate income chiefly from handicrafts supplemented by fishing (Madzwamuse, 2005).

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The surface waters of the Okavango also provide a ready source of water for livestock. From the early days, farmers have sustained their livestock from the waters of the Delta, and grazed them on the grasses that grow in the seasonal swamps when the water recedes. Farmers also use seasonally flooded plains (*molapo*) for crop production (Pinheiro, Gabaake and Heyns, 2004). The *molapo* farming practice is a popular subsistence farming tradition practiced by inhabitants of Ngamiland, especially those living on the banks of the river.

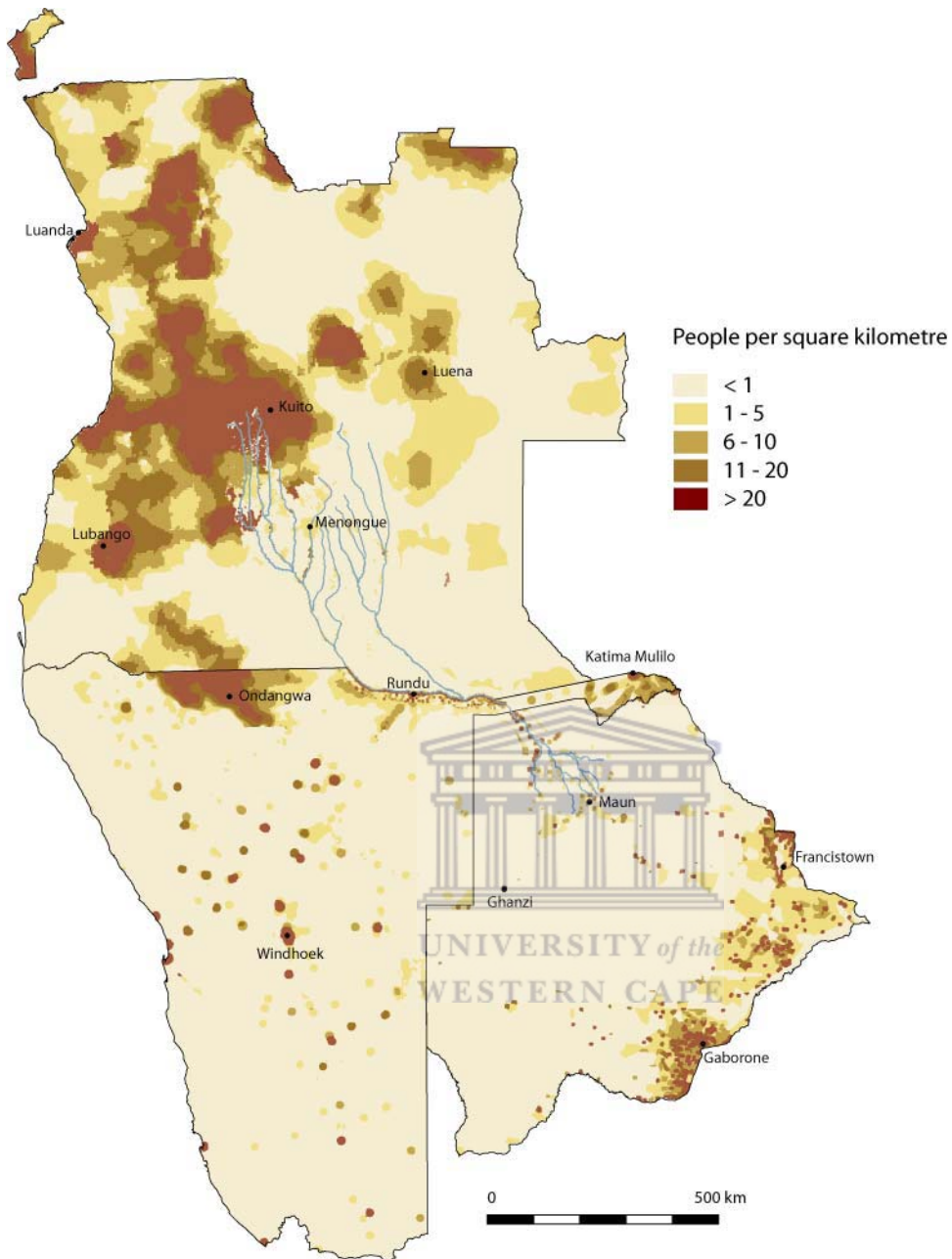


Figure 4.4 Map showing population densities in the Okavango River Basin

Source: Harry Oppenheimer Okavango Research Centre, October 2005, Maun

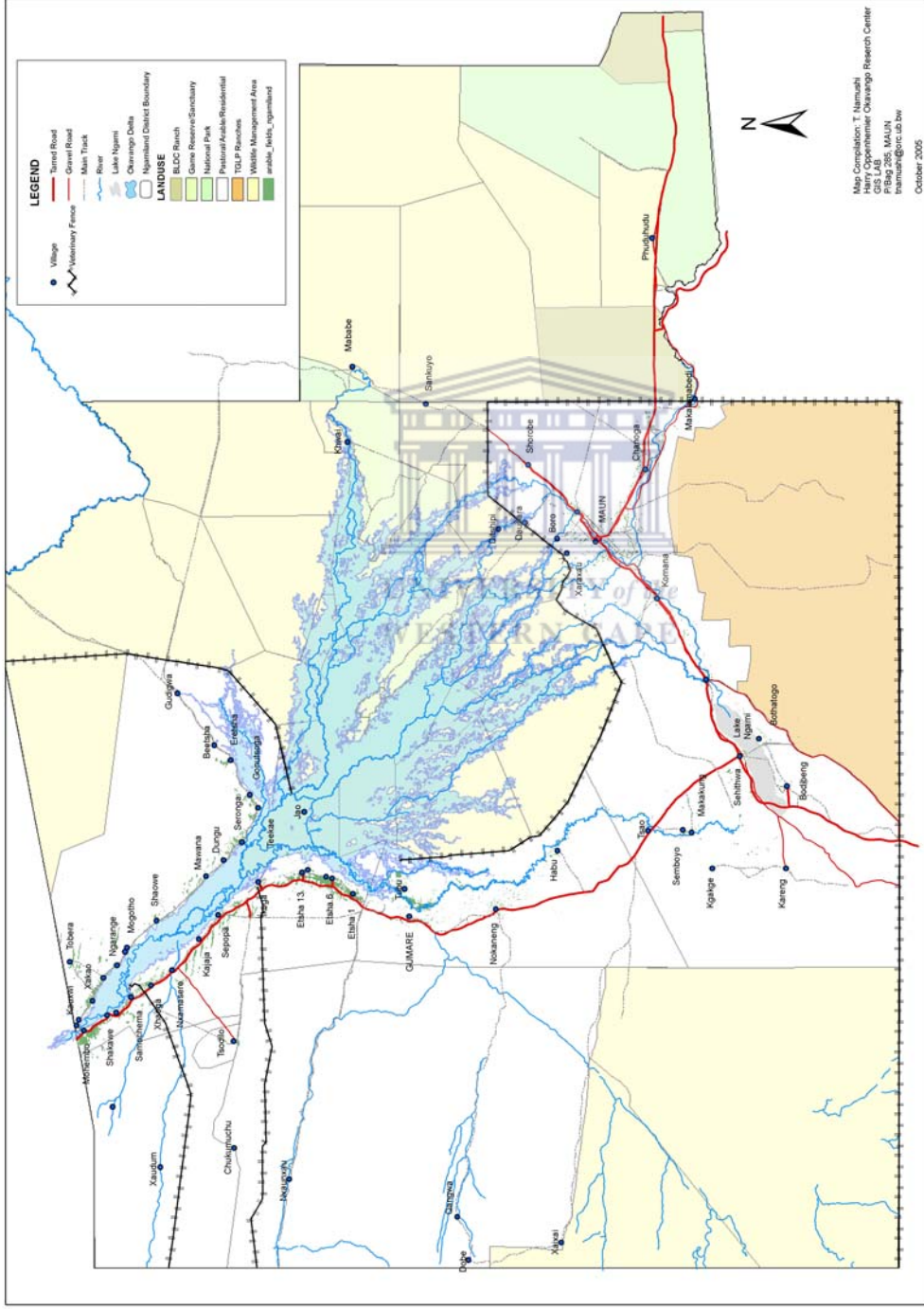


Figure 4.5 Land Use Patterns in Ngamiland
Source: Harry Oppenheimer Okavango Research Centre, October 2005, Maun

iii. Climate

The Okavango Basin's climate changes gradually from north to south, following the same trend as the river as it flows from higher to lower elevations. Thus, rainfall is higher in the north where the air is more humid, cloud cover is greater and evaporation rates are lower than in the southern areas around the Okavango Delta. The steady southward changes in these three features mean that the river flows progressively into drier country (Mendelsohn and el Obeid, 2004).

Annual rainfall for Ngamiland ranges from 450 mm to 660 mm, mostly occurring during the months of November to March. The annual average rainfall for Shakawe (situated upstream on the panhandle) is 547 mm and 455 mm for Maun (situated downstream of the Delta). Overall, the Angolan portion of the Okavango catchment provides some 94.5% of the total runoff in the Okavango River, with the balance shared between Namibia and Botswana (Ashton and Manley, 1999, cited in Ashton and Neal, 2004). During extended periods of low rainfall, the carrying capacity of the rangeland drops drastically, resulting in higher cattle mortality. During the long-lasting drought in the eighties (1982-88), cattle population in the Ngamiland district was decimated. About 10,000 heads of cattle (28% of the livestock population) died from starvation (Bendsen, 2002).

2. THE NATURE OF WATER AVAILABILITY IN THE L. O.B

i. Hydrology

The average annual inflow into the Delta measured at Mohembo is approximately 9.3 cubic km/year (ODMP, 2005). Rain that falls directly on the Delta adds another 3.2 cubic kilometres annually (Mendelsohn and el Obeid, 2004). A very small amount of this water, however, exits the Delta. On average, only 2 to 3% of inflow to the Delta exits the system through distributaries, with a roughly equal amount leaving through groundwater flow. The remaining 95% of inflow is lost through evapotranspiration (WRC, 2004).

According to Wolski, due to the nature of the Kalahari sand soils, groundwater recharge is very fast; so the system can continue “as usual” for a long time despite dry years (unlike some other ephemeral systems). Therefore, what sometimes looks like “disaster” is merely “natural variation” (pers. comm.).

Rainfall patterns vary dramatically from north to south, with Huambo town receiving roughly 1300 mm/a, Rundu (mid-stream) receiving roughly 560 mm/a, and Maun, situated downstream, receiving roughly 450 mm/a (Mendelsohn and Obeid, 2004: 63). Flows can also vary dramatically between years as shown in Table 4.1 below. This creates particular difficulties for planners.

Table 4.1: Annual flows in cubic kilometres per season at selected points in the ORB

Place and years of data	Average (cubic km/year)	Minimum (year)	Maximum (year)
Rundu (1945-2001)	5.207	2.260 (1971/72)	9.810 (1962/63)
Mohembo (1933-2001)	9.384	5.313 (1995/96)	15.977 (1967/68)
Maun (1951-1999)	0.271	0 (1995-1997)	1.174 (1954/55)

Source: Mendelsohn and Obeid, 2004: 83

Waters from the Okavango River feed the Selinda, Nqoga, Boro, Thaoge, Kunyere, Khwai, Gomoti and Santantadibe distributaries (Plantec Africa, 2003). Flows into the Delta depend primarily on the volume of water entering at Mohembo. Flows have however been decreasing over the years. A gradual shift in the flow has occurred over time from west to east, affecting the recharge of the groundwater system in the western parts of the Delta (NWDC, et al, n.d.).

The hydrogeology of Ngamiland is such that there are very few surface water sources. Aquifers in the Kalahari beds have greater potential in the Delta than in marginal areas for a variety of reasons. The Delta aquifers are more porous and permeable and there is

greater potential for recharge. Recharge to aquifers is through surface water infiltration during periodic river flooding. Rainfall recharge is inconsequential, largely due to the high rate of evapotranspiration from these aquifer systems (WRC, 2004).

ii. Sources of water

The main sources of potable water in Ngamiland District are boreholes and water from the Lagoons/Okavango River. Boreholes are drilled by government and private individuals, the total number having increased from 58 in 1960 to 1049 in 1999. However, data on the percentage boreholes still operational is unreliable. In the Okavango sub-district, three treatment plants treat river water and supply the neighbouring villages. These are in Mohembo East, Shakawe and Sepopa. Mohembo East treatment plant supplies some of the villages that are on the eastern side of the river, that is, Xakao, Mohembo East, Khauxwi, Jejeda, Sechenje, Sekondomboro, Kaputura and Goa. Shakawe treatment plant supplies Shakawe, Nxomokao, Samochima and Xhaoga, while Sepopa treatment plant supplies the villages of Sepopa, Mowana, Ikoga and Tamacha (Plantec Africa, 2003).

In the Ngami sub district, boreholes are a primary source of potable water, because villages are far from the main Okavango River channel. Some boreholes are interconnected and supply more than one village. Sehithwa Borehole Interconnection has four boreholes and two storage tanks of 200m³ (Plantec Africa, 2003) that supply the following villages: Sehithwa, Toteng, Bodibeng, Bothatogo, Kareng and Legotlhwane. The rest of the villages are supplied directly from individual boreholes through storage tanks. Table 4.2 below shows sources of water for the Ngami sub-district.

Table 4.2 Boreholes in Ngami Sub District by yields, tank capacity and number of standpipes

Village	Borehole number	Yield m ³ /h	Tank capacity	No. of standpipes
Matlapana	5175	5	75	28
Sexaxa	8162	9	30	3
Sankuyo	4617		30	6
Chanoga	3960 9100	2 4	30	7
Phuduhudu	9124	30	30	7
Sehithwa	8343	6.3	200x2	
Toteng	8305	6.6		
Bothatogo	8304	33		
Bodibeng	8342	27.3		
Kareng Legotlhwane				
Semboyo	5039 8612 7530	6.0 3.1	30	6
Makakung			50x2	7
Tsao	3183 8081 8082	8 2.5 2.8	200x2	
Mababe	7161		30	
Komana	4620	4.5	30	
Makalamabedi				
Somelo			50	5
Matsaudi	8348	5.3	30	3
Shorobe	1952	5.2	50	20

Source: Ngamiland Settlement Strategy (2003-2027), Plantec Africa (2003)

iii. Ecological Footprint on the Delta Margin

The growth of tourism and commercial farming in Ngamiland has resulted in dramatic land transformation and expanded the ecological footprint on the Delta. The Delta margins footprint is said to be very heavy, with environmental degradation (due to road construction and deforestation for example) radiating outward for approximately 25 km (Ringrose, pers. comm.).

At the same time, approximately 2000 new people look for work annually in the district. Most of these people end up in Maun, even though employment opportunities remain

scarce (formal employment in 1991 was 21,843 people; ten years later it was only 22,481). Service delivery in Maun has struggled to keep up with demand and waste and water pollution are serious issues there. Elsewhere in the District, since one-third of population live in small villages (i.e. <500 people), they have no rights to government-supplied water and waste facilities. District Council freely admits it is not coping with the following situations: the influx of people into Maun; the extremely scattered nature of settlement throughout the rest of Ngamiland; nor with tourism's increasing demand for land, services and special dispensations (all of this data from HOORC academic staff).

In the next chapter, I will examine the water policy and institutional framework within Botswana.



CHAPTER 5

BOTSWANA'S WATER POLICY AND INSTITUTIONAL FRAMEWORK

1. INTRODUCTION

As described in Chapter 2 above, southern African governments have taken an active part in the global movement of water reform towards Integrated Water Resources Management (IWRM) (Schreiner and van Koppen, 2003). These reforms are geared toward, inter alia: better integration in the management of water resources (including surface and groundwater, water quality and quantity, blue and green water etc.); better provision of domestic water supply; harmonisation of fragmented pieces of formal legislation into new policy and legislation; decentralisation and shifting of boundaries of lower level water management institutions to basins in order to better match hydrological reality; stimulation of users' participation, especially in basin level and lower-tier water management institutions; improvement of hydrological assessments and monitoring for surface and groundwater and ensuring public availability of data; and promotion of international cooperation in transboundary basins. These reforms are based on common aims agreed to by African states at the Accra Declaration of Africa's Regional Stakeholders Conference for Priority Setting (2002), which states:

“Water can make an immense difference to Africa's development if it is managed well and wisely. Given clear policies and strategies and real commitments to its implementation, water can help eradicate poverty, reduce water-related diseases and achieve sustainable development in Africa”(Africa Water Task Force, 2002, cited in van Koppen, 2003:1047)

Botswana is also in the process of reforming its water sector to suit these emerging imperatives. There are many challenges currently facing the water sector and Government argues confidently that most will be addressed by the reforms (UNDP, 2005). The Government estimates a steady increase in demand from 193.4 Mm³/year in

2000 to 335.2 Mm³/year by 2020 (NWMP, 1992, cited in Swatuk and Rahm, 2004) and groundwater exhaustion is suggested by 2020 (Lado, 1997). This general concern led to the formulation of the Botswana National Water Master Plan (BNWMP), which focuses on alternative options for water resources development, use and management to meet the requirements of all sectors of the society over a period of thirty years (Lado, 1997).

Typical of all societies, but particularly developing countries at the beginning of the 21st Century, addressing water security continues to be through what Allan (2003) terms ‘the hydraulic mission’ as solutions have generally been found in dam construction, intra- and inter basin transfer schemes, and technological interventions to better detect and utilise groundwater sources (Swatuk and Rahm, 2004).

Given Botswana’s limited water resources, sustainable management of these resources should guide the governance framework for water resources management. However, the policy and institutional framework itself is rife with challenges that will take time, commitment and political will and capacity to address in order to realize the sustainable management of the limited water resources. There is a need for more coordination, careful planning and management of water resources at all levels in order to meet the “ever-increasing water demands in the country” (Lado, 1997:44). The institutional framework is of particular concern as in most cases there is significant institutional incapacity to translate policy into reality. According to SMEC et al (1992), the current institutional arrangements in the water sector in Botswana leave a lot to be desired and this translates to the under-performance of institutions involved in water resources management. Writing a dozen years later, Swatuk and Rahm (2004) reached the same conclusions.

This chapter reviews Botswana’s water policy and institutional framework at both the national and local level. This discussion is necessary in preparation for the case studies of access to water resources in Ngamiland dealt with in Chapters 6 and 7. In order to pinpoint shortcomings of current management, understanding policy and its implementation is essential. At the same time, to make recommendations for

improvement (Chapter 8), it is important first to understand where the problems and positive possibilities reside.

2. WATER POLICY FRAMEWORK

Like other natural resources, water is public property. Its use and rights are defined and regulated by the Water Act and its subsidiaries, such as the Water Works Act and the Water Apportionment Act (Moyo et al, 1993). Since the state controls the water resources on behalf of the public, it delegates power to issue water rights to the Department of Water Affairs (DWA) and the Water Apportionment Board (Swatuk and Rahm, 2004). The Ministry of Minerals, Energy and Water Affairs (MMEWA) has overall responsibility for water policy, assisted by the Department of Water Affairs (DWA), Department of Geological Surveys (DGS), Water Utilities Corporation (WUC) and the Ministry of Local Government (MLG) through District Councils (DCs). The water sector of the Botswana Government has two main aims:

- To meet the water requirements of the population through provision of a clean, reliable and affordable water supply, which is available to all; and
- To meet water requirements for industrial, mining, agricultural, wildlife, commercial and institutional users in order to achieve the major aims of rapid economic growth and sustained development (NDP 9, 2003:218).

Public waters are not subject to private property rights. All citizens are allowed free access to public water for a number of purposes including watering livestock and domestic use (Moyo et al, 1993). Water from communal standpipes is free in the rural areas, thus ensuring that the population has access to safe and clean drinking water. This access is, however, only ensured in gazetted settlements/villages. Those with private connections in rural areas and using only a minimal amount of domestic water pay a price lower than the cost of production (Lado, 1997). Owners and occupiers of land are entitled to abstract public water by boreholes, dams, canals and other works for domestic and agricultural use. Abstraction in this case is not monitored. On tribal land, water use is in

accordance with customary rights and agreement with the owners of the water infrastructure (Moyo et al, 1993). In effect, water in tribal areas is treated as an open access resource, although it has common property characteristics.

With passing of the Water Act in 1968, water scarcity was considered the largest limiting factor for national development and adequate water security became the central feature of evolving water policy (Swatuk and Rahm, 2004). Currently guiding policy is the NWMP of 1991 (currently under revision), aimed at centralising all aspects of water control and usage (Moyo et al, 1993) and focusing on supply-side interventions in response to increasing demand (Swatuk and Rahm, 2004). ‘Sustainable development’ and talk around ‘sustainability’ is often referred to in policy papers (e.g. ODMP, 2005). In practice, however, sustainable options are often sidelined. As depicted by Lado (1997), reliability and sustainability of water resources (i.e. continuous water supply through appropriate management strategies that do not destroy the environment) should be developed. As suggested in the two aims above, however, government remains centrally interested in pursuing its hydraulic mission: capturing and storing water for human use and ‘rapid economic ... development’ – goals that must be acknowledged no matter how far they deviate from the ideals of IWRM.

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Government has developed significant human and technical capacity in exploiting both surface and groundwater resources (SMEC et al, 1991) with the functioning multi-billion dollar North South Water Carrier being an example of this. The project brings water from the Letsibogo Dam in the north of the country to Gaborone capital in the south via a number of large villages and towns along the eastern border region (Swatuk and Rahm, 2004).

In policy circles, controlling demand, improving current use practices and forms of delivery are considered ways to increase supply (Goldblatt et al, 2000). Recently, government policy has moved toward attempted recovery of “full recurrent costs of all the major village water supply schemes” (RoB, 1997:286). Controlling demand is primarily through traditional punitive measures: higher tariffs (that the wealthy are

generally able to pay) and cutting supply (a practice that mostly affects the poor). Due to rapid urbanization, the increase in total demand has been dramatic. Between 1997 and 1998, a 16% increase in water demand was recorded by WUC, but dropped to 4% between 2000 and 2001. This is reported to have been the result of both tariff increase and standpipe disconnection (RoB, 2003). However, with the commissioning of the North-South Carrier Water Project (NSCWP), demand has risen all along the pipeline.

3. NATIONAL LEVEL INSTITUTIONAL FRAMEWORK

3.1 Ministry of Minerals, Energy and Water Affairs (MMEWA)

According to NDP 9 (RoB, 2003), water resources management, which in this context includes all activities from planning and development up to water delivery at the customers' end, is the responsibility of a number of institutions. MMEWA has the responsibility to formulate, direct coordinate and implement national policies and programmes for the minerals, energy and water resources of the country. With regards to water resources, the Ministry performs these responsibilities through the Department of Water Affairs (DWA), the Department of Geological Surveys (DGS), and Water Utilities Corporation (WUC), a for-profit parastatal. Water resources management is however not limited to these mentioned organisations alone. The District Councils (DCs), Ministry of Local Government (MLG), Department of Environmental Affairs (DEA) and the new Department of Sanitation and Waste Management (DSWM) are also involved in the management of water resources. The Ministry of Agriculture (MoA) through its Small Dams Section also has a role to play in the management of water but is limited to agriculture.

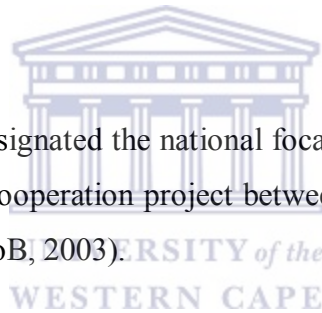
i. Department of Water Affairs (DWA)

The Department of Water Affairs has the responsibility for national water resources planning and/or water allocation. The department assesses plans, develops and manages water for short, medium and long-term purposes. It also administers water law and other

related legislation, liaises with riparian users of national and international rivers on the saving, conservation and protection of water resources (http://www.gov.bw/government/ministry_of_minerals_energy_and_water_affairs.html).

DWA is responsible for water supply development in rural areas, for surface water resource investigation and development, and for overall water resources planning. “This task involves making decisions about which next major source of water should be brought on line and to supply which part of the country” (RoB, 2003:216). The DWA is also responsible for protection of surface water resources from pollution and aquatic weeds and for administering the water legislation (RoB, 1997). Water supply systems in the major villages are planned, constructed, operated and maintained by the DWA. District Councils, through the Ministry of Local Government, are responsible for the operation and maintenance of water schemes in medium and small rural villages. Usually the DWA constructs these water schemes, and on completion, they are handed over to the respective District Councils.

The DWA has recently been designated the national focal point for water conservation in Botswana, through a bilateral cooperation project between the Government of Botswana and the Danish Government (RoB, 2003).



ii. Department of Geological Survey (DGS)

The primary responsibilities of the DGS are geological mapping, exploration, mineral resources and groundwater resource assessments and protection. It also administers the Boreholes Act and maintains the National Boreholes Register as well as groundwater research. Originally, the DGS was responsible for all groundwater exploration and development in Botswana. With the formation of the DWA in 1971 and the subsequent transfer of water supply authority to the DWA, the DGS was left with the responsibility for the investigation of the nation’s groundwater resources: their occurrence, extent, quality and development potential.

iii. Water Apportionment Board (WAB)

The Water Act of 1968 established the Water Apportionment Board (WAB), a quasi-judicial body responsible for administering conditional rights to abstract and use both surface and groundwater (SMEC et al, 1991). This institution is also responsible for controlling pollution (Water Act of 1968). The Director of DWA is the ex-officio secretary of the WAB and also serves as the Water Registrar. The Water Registrar is supported by eleven staff seconded from the DWA and operating from offices in Gaborone, Francistown, Maun, Lobatse and Mahalapye. The field inspectors monitor abstraction levels and are briefed by the pollution unit. All new boreholes and dams must be approved by the WAB. WAB is a fifteen-member board that “may grant to any person, the right to divert, store, abstract, use, or discharge any effluent into public water” (Water Act, 1968). Application for the grant of a water right is made to the Board through the Water Registrar (Director of Water Affairs). Section 15 (6) of the Water Act empowers the Water Registrar to, in consultation with the Director of Geological Surveys, authorise any public officer to construct or enlarge a borehole for the purposes of the State where reasonable cause exists for not making application to the Board. WAB meets four times a year to review applications and grant or refuse rights but applications are rarely refused.

iv. Water Utilities Corporation (WUC)

The Water Utilities Corporation Act of 1970 established the WUC as the water supply authority in designated urban centres and any other that the Minister may designate. It has a statutory authority to recover all its costs through revenue raised from the sale of water (WUC Act of 1970). WUC is also responsible for construction of dams and well fields, transfer from source to user point, and water reticulation at the end user point (RoB, 2003). Section 14 (1) of the Act stipulates that the function of the Corporation shall be to supply water in bulk or otherwise and in such areas as the Minister may, after consultation with the Corporation, designate by order published in the Gazette.

3.2 Ministry of Agriculture (MoA)

Water resources development for agricultural purposes is carried out as a joint venture between the government and individual farmers by way of drilling boreholes and the construction of small dams for livestock watering and irrigation. The Ministry of Agriculture (MoA) is divided into five main departments, with two directly involved in the use of water resources. These are the Department of Crop Production and Forestry (DCPF) and the Department of Animal Health and Production (DAHP).

i. The Department of Crop Production and Forestry (DCPF)

The DCPF is responsible for the mapping of soils, soil conservation, crop production, forestry and land use planning. Within the DCPF, there is a Small Dams Section (SDS) responsible for the construction of small dams. The main purpose of these dams is the provision of water for livestock: about 98% of the dams are built for this purpose (SMEC et al, 1991). By 1991, there were already 300 small dams constructed for this purpose. Some water is provided for irrigation as a secondary objective from some of the dams.

ii. The Department of Animal Health and Production (DAHP)

DAHP assists in controlling and preventing national and economically important animal diseases, developing livestock and providing veterinary services (RoB, 1997). This department also controls some of the boreholes used for livestock watering for purposes of the State.

3.3 Ministry of Environment Wildlife and Tourism (MEWT)

i. Department of Sanitation and Waste Management (DSWM)

The Department of Sanitation and Waste Management (DSWM), established by Section 3 of the Waste Management Act (1998) under the newly established Ministry of

Environment Wildlife and Tourism (MEWT) is the authority responsible for policing the wastewater/sanitation sector. According to section 6 of the Act, the functions of the department shall be among others: to provide policy direction and leadership in all matters pertaining to sanitation and waste management; enhance sectoral coordination by developing plans and programmes to guide the different sectors in the performance and discharge of their duties and closely monitor the work of the sectors. With regards to water resources, the department is expected to restrict, or prohibit waste management operations in or near rivers, ponds, lakes or underground water without adequate engineering works agreed in writing by the Director of DSWM (section 6(g)). The Department can also order the immediate closure of any existing waste management facility on the grounds of risk of polluting the environment or harming human, animal or plant life (Waste Management Act, 1998).

ii. Department of Environmental Affairs (DEA) /National Conservation Strategy Agency (NCSA)

The Department of Environmental Affairs (DEA) is a secretariat of the National Conservation Strategy Advisory Board housed in the Ministry of Wildlife, Tourism and the Environment. This new department (formed in 2005) replaces the National Conservation Strategy Coordinating Agency (NCSA) that was formed as a secretariat to the National Conservation Strategy Advisory Board and housed within the MLG. The Board has 17 members that advise the government on all matters concerning the implementation of the National Conservation Strategy, through coordination of the various government environmental and natural resources institutions (RoB, 2003). An NCS Action Plan was prepared in 1998 and its main thrust was the introduction of new and strategic approaches aimed at achieving the integration of the conservation of natural resources into the national development process. In Ngamiland, DEA is responsible for the development and implementation of the Okavango Delta Management Plan (ODMP).

4. WATER PLANNING AND MANAGEMENT AT LOCAL LEVEL

In Botswana, water resources management is not based on hydrological or catchment boundaries, so catchment management organisations, or any local level water management institutions for that matter, do not exist. Central State organs represent all the involved interests, resulting in a more centralised, public policy-oriented and technocratic approach to planning and management. District Council is closest to a local level management institution. However, this institution does not manage water but manages water supply as one of the many functions it has been given as a local government institution.

4.1 Water institutional structure

At the regional level (i.e. outside government headquarters in Gaborone), the DWA and Ministry of Local Government (MLG) through District Councils have the responsibility for the development and provision of water resources. DWA has outstations in most major villages and DC headquarters are located in these major villages as well. In the study area, this means a physical presence in Maun, the District HQ, and Gumare, the sub-district HQ. The DWA continues its responsibility for development of supply sources (dams and wellfields), supported by the DGS in the case of wellfields development, and the construction of water reticulation schemes for almost all rural villages. DWA also supplies major villages with water for drinking and commercial purposes besides being a water resources provider for all government institutions. The MLG's main responsibility is concentrated on operating and maintaining small to medium rural village water supply schemes through Water Units located in the District Councils (RoB, 2003). Responsibility for the provision of water borne sanitation and wastewater rest with the DSWM under MEWT. The DSWM is also mandated to promote and coordinate human resources development and institutional capacity within local authorities to effectively implement sanitation and waste management programmes (Waste Management Act, 1998). The Act also empowers the department to monitor the collection, disposal and treatment of controlled waste by local authorities and waste management industries in the

private sector, in accordance with such standards as may be prescribed. Most district councils have Environmental Health Units that usually deal with sanitation and waste issues.

As at the national level, other sectors are present at the local level (e.g., the Ministry of Lands and Housing and the Ministry of Works and Transport, both involved in the construction of *inter alia* hospitals, stadiums) and where needed they liaise with regional DWA offices and the District Council through its Land Use Planning Unit (DLUPU). With regard to water resources provision, DWA services major villages and District Councils service all smaller rural ones outside the DWA jurisdiction. Services (water provision, health and education services) are however mostly provided to gazetted villages and settlements. Gazetted or officially recognised villages and settlements have populations in excess of 500 people. Some villages with populations of 250 but less than 500 may fall under the Remote Area Development Programme (RADP) through which they may be provided with basic drinking water through tankers. This kind of water provision is extremely unreliable as problems of transport and poor quality of roads can hamper a routine delivery. Moreover, not all villages of this size are included in this programme (See Chapter 7 below).

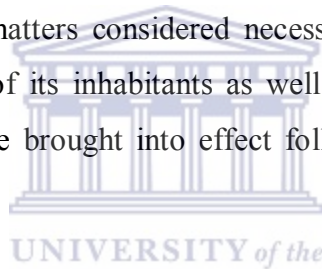
4.2 District Councils

An Act of Parliament established district councils in 1965. Chapter 40:01 Local Government (District Councils) establishes a Council as a body corporate having the name by which it is established and capable of suing and being sued under the said name. These were given statutory powers to exercise good governance and take responsibility for development in their areas of jurisdiction. According to the Act (sections 27 and 29), the functions that may be conferred on district councils include provision and operation of primary health care, primary education, non-gazetted roads, village water supplies and related items such as sanitation services, social and community development, self-help housing agencies, municipal abattoirs, markets, parks, cemeteries and social welfare.

They are also responsible for trade licensing, stray cattle management, remote area development, fire extinguishing and prevention, and physical planning.

District Councils comprise publicly elected officials and civil servants. Civil servants occupy a variety of positions, from Chief Executive Officer to technicians to unskilled labourers. As elected bodies, District Councils in theory are not merely extensions of any central government department or ministry. They constitute a second tier of government empowered by voters at the local level. They therefore should be key agencies for promoting rural development through the people's participation in development issues. However, in practice District Councils lack autonomy and are highly dependent on and subject to decisions taken by central government. Four key examples illustrate this.

First, Councils have the power to make by-laws for the area in which they are established, in respect of all matters considered necessary for the maintenance of the health, safety and well-being of its inhabitants as well as those conferred upon them. However, by-laws may only be brought into effect following the Minister's (of Local Government) approval.



Second, the Department of Unified Local Government Service Management (DULGSM) within the MLG is responsible for recruiting, training and developing staff of District Councils and Land Boards. The department also has to provide guidance to local authorities regarding staff deployment, promotion, transfers as well as the general administration and welfare of personnel.

Third, District Council's near total financial dependence on central government compromises their ability to act independently. 85-90% of District Councils' budgets consist of grants from central government. The balance of the budget has to be met through internally generated sources (property tax, water fees, stray cattle fees and other economically insignificant activities from within the district (RoB, 2001)). Moreover, if the DC proposes to spend more than 10% of the funds, there has to be an approval from the ministry. Meanwhile, activities within the District that raise a lot of money, e.g.

tourism and mining, are defined as “national assets” and revenue and taxes from these cannot accrue to local government.

Lastly, in terms of water provision, Council Water Units within the DCs take over water supply schemes designed and constructed by DWA and operate and maintain them. These are the schemes that the DCs use to supply water to the villages and settlements under its jurisdiction. Whereas in Ngamiland district, Water Units now have borehole-drilling equipment, they are not allowed to site or drill without central government approval.

4.3 District planning process

Central government predominance at the local level in Botswana is historically-rooted. Local government evolved out of tribal administration, which performed limited government functions before independence. According to Sharma (1999), the system grew under tribal administration during the colonial period with the introduction in 1956 of tribal councils under the leadership of the chiefs of majority tribes. The district councils were subordinate to the tribal councils. They comprised secondary tribal authorities as chairpersons, some nominated members and some elected at the *kgotla* (community meeting). This pattern of local government continued up to the time of independence when the government decided to introduce the present system of district and town councils controlled by elected representatives.

In theory, all the institutions mentioned above play a role in development activities at the local level. According to NDP 9 (RoB, 2003: 389) communities, Local Authorities and other district level institutions have a role to play in local level development through ‘a well-established and decentralised system.’ According to Lekorwe (1998), this is in line with the government’s commitment to the concept of bottom-up planning, though it has not been realised in practice. Local government organisations are expected to significantly contribute to decentralised district level development planning through their own projects. These have to be prioritised, elaborated, accepted and implemented through

various mechanisms involving horizontal and vertical linkages (Sharma, 1999). Studies on central-local government relations reveal a contradictory picture, showing highly centralised planning and policy-making (Mfundisi, 1998). Most ominously, perhaps, is the power given to the President under the Local Government Act. Under the Act, the President can abolish a District or Town Council; at the same time, he is free to issue any directive 'as may be deemed necessary' in the operation and constitution of District Councils (Mfundisi, 1998).

5. THE OKAVANGO DELTA MANAGEMENT PLAN: SPACE FOR IWRM?

Although Botswana persists with centralised water resources planning and highly fragmented management practices, the Lower Okavango River Basin is subject to an elaborate planning exercise whose philosophical starting points are integrated river basin management (IRBM), and thus IWRM (ODMP, 2005). Botswana participates in four transboundary river basin commissions: the Orange, Limpopo, Zambezi and Okavango. Each of these commissions has been created within the general ideals of IWRM.

With regard to the Okavango, the argument has been made that the decision to declare the LOB a Ramsar site (as a wetland of international importance) was a political decision to ensure global support for Botswana in the event that its upstream neighbours, Namibia and Angola, should decide to engage in hydraulic mission exercises possibly detrimental to the long term interests of Botswana and the ecological integrity of the Delta (Swatuk, 2003). Whatever the motivation, 97% of the population of Ngamiland now find themselves residing within the boundaries of the world's largest Ramsar site. The government further claims it will utilise an 'ecosystem approach', through the Okavango Delta Management Plan (ODMP) project, to manage this area (ODMP, 2005).

As the government organisation responsible for the implementation of the Ramsar Convention, the DEA may play an important role in the governance of natural resources of the LOB. Under the guidelines of the Ramsar Convention, the government of

Botswana, with financial and technical assistance from donor states and organisations, is undertaking the ODMP project. The DEA is facilitating, coordinating and supervising the management planning process of the ODMP. There are 12 components encompassing about that many institutions in the ODMP project:

- 1) Policy, planning and strategy: DEA and World Conservation Union (IUCN);
- 2) Dialogue, communication and networking: DEA and IUCN;
- 3) Research, data management and participatory planning: Okavango Research Centre;
- 4) Hydrology and water resources: DWA;
- 5) Wildlife management: Department of Wildlife and National Parks (DWMP);
- 6) Sustainable tourism and CBNRM: Department of Tourism (DoT) and North West District Council (NWDC);
- 7) Fisheries management: DWNP, Division of Fisheries;
- 8) Vegetation resources management: Department of Crop Production, Division of Forestry; and the Agricultural Resources Board (ARB);
- 9) Physical planning: Department of Town and Regional Planning through NWDC's Physical Planning Unit;
- 10) Land use planning and land management: Tawana Land Board in association with District Land Use Planning Unit (DLUPU);
- 11) Waste management: NWDC's Environmental Health Department;
- 12) Sustainable livestock management: Department of Animal Health and Production.

It is the task of the DEA to ensure integrated planning and management of the resource base of the Ramsar site. This includes the promotion of meaningful input from people resident in and primarily dependent on the natural resources of the LOB. Indeed, these people have been defined as 'primary stakeholders' (ODMP, 2005). It is in the interest of all those who support IWRM that the ODMP project succeeds. How likely is it that the ODMP will succeed? This will be addressed in the final chapter.

With regard to water resources development and management, under the auspices of the Hydrology and Water Resources component, the DWA plans to develop a hydrological model of the Delta and use this, in combination with the existing hydrological data, to develop an integrated surface-groundwater model for the Delta. This model will be used to test various scenarios such as changes in water volumes and flow patterns including increased or decreased rainfall, channel blockage or unblockage. This department will also undertake a thorough reassessment of the existing hydrological monitoring programme, including water quality monitoring, and make proposals to improve this programme while ensuring implementation of the improved schemes (ODMP, 2005). In theory, this hydrological modelling exercise will inform all activities of government under the ODMP project, and complement on-going projects such as the Maun groundwater resources development phase II project.

6. SUMMARY

This chapter has described and discussed Botswana's institutional and policy framework as it relates to the use and management of water resources. Table 5.1 provides a summary of this discussion.

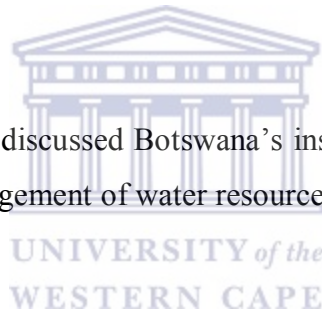


TABLE 5.1 Summary of actors and their roles in Water Management

ACTOR/ LEGISLATIVE BODY	ROLE IN WATER	COMMENTS
MMEWA	determines overall policy	oversees water as public resource
DWA	water supply (surface and groundwater) to major villages (BOM) to small/medium villages (B) water conservation	operates from central plan; no catchment or aquifer perspective
DGS	groundwater mapping Administers borehole act	poor borehole monitoring
WAB	approves boreholes/dams	lack of separation of powers compromises integrity
WUC	bulk and potable water to urban centres Dams and wellfields/boreholes	‘for profit’ orientation contradicts ‘wise use’
MoA		goal is more livestock; More irrigated agriculture
DCPF	small dams	coordination with other Departments lacking
DAHP	some boreholes	no livestock policy

MEWT		Nationally 'environment' junior ministry; regarded as special interest
DEA	natural resource conservation ODMP	coordination but junior Department lacks power
DSWM	wastewater management Monitor waste at water bodies/ water points	coordination but new entity
MLG	District Council staff/budget/plan approval	overrides all local interests
DC		many tasks; Limited capacities
CWU	small/medium village water supply (OM, BOM)/ boreholes	lacks autonomy money and technical capacity
EHU	sanitation and waste	same as CWU
Private Citizens	access to water for 'survival' based on customary law communal standpipe water free 'right' to water from canals/boreholes/dams secured from WAB	money determines access; communal supply open access and unsustainable

A 'traditional system' (Abernethy, 2005) of water management exists in Botswana, as in many other developing countries. In a traditional system, a number of service-providing agencies, each having a single service function (irrigation department; electricity authority; water supply board, and so on) exist independent of each other and each under

the patronage of a ministry. Abernethy (2005) argues that this pattern does not easily lend itself to integrated management, as the agencies and their patron ministries tend to show rivalry rather than cooperation. “Without integrating the actions of these agencies, there can be little prospect of bringing about coherent management and socially acceptable principles of allocation and disposal of water resources” (Abernethy, 2005:90).

In Botswana’s case, central state-dominated organs represent all of the involved interests. According to Svendsen and Wester (2005), this usually results in a more centralised, public policy-oriented and technocratic approach to planning and management. One might presume that such centralised authority is justified based on the scarcity of the resource. However, the outcome of this planning approach is unsustainable use of the resource at all levels of society.

Svendsen and Wester (2005) also argue that management institutions do not have to be embodied in a unitary organisational structure to be effective. A more dispersed set of organisations can also manage effectively if they knit together with suitable processes, rules and other institutions. “That said, when a country chooses to make a change in its organisational set-up for managing water resources, a comprehensive reassessment and restructuring may be an appropriate way to understand and introduce the interlinked set of changes that such a major reorganisation implies” (Svendsen and Wester, 2005: 228).

In Chapters 6 and 7, the study turns to a detailed examination of the consequences of this institutional framework for people’s access to water resources in Ngamiland.

CHAPTER 6

ACCESS TO WATER AND RELATED RESOURCES IN THE L.O.B.: PRIMARY STAKEHOLDER PERCEPTIONS

1. INTRODUCTION

Chapter 5 described the current national water institutional and policy framework in Botswana. In general, development planning, and particularly water resources planning, development and management, is highly centralised. The institutional matrix and mechanisms for delivery are designed to implement policies and decisions taken at the centre, in Gaborone. District Development Plans therefore reflect the overall national goals as articulated in various National Development Plans (NDP), in this case, Ngamiland District Development Plan 6 and NDP 9. The belief is that such a matrix will facilitate smooth delivery while maintaining a firm hierarchical chain of command, thereby avoiding confusion regarding, or deviation from, Central State-articulated developmental goals (Edge and Lekorwe, 1998; Good, 1992 and 1999). This process is reinforced by the near absolute dependence of Districts on the Central Government for human and financial resources.

However, a close analysis of primary stakeholder issues reveals the need for planning at basin level or, in the case of the transboundary Okavango River, at sub-basin level (the L.O.B.), with a clear view of management practices and developmental intentions upstream in Namibia and Angola. Perhaps the ODMP project is a step in this direction, although it is only in its initial stages. The concerns articulated by stakeholders living within the Ramsar site demonstrate the importance of devising policy within the unique parameters set by the L.O.B. and its ecosystems. However, government responses to the issues raised by people living within the L.O.B. – as revealed in *kgotla* meetings and key informant interviews – reveal a sectoral approach to resource management whose performance is limited not only by understaffing and lack of financial resources, but by its disintegrated nature and partial understanding of the resource base. At best, the

resource base is treated not as a whole, but as a mosaic of competing and contrasting government and civil society interests and capabilities. Centralised government planning and limited Departmental and District Council human and financial capacities reinforce this situation, thereby inhibiting the development and implementation of an integrated, locally-determined or resource-base sensitive initiative (Taylor, interview, 20/5/5). At the same time, there is little evidence that civil servants discern the need to rethink their mandates (interviews with Naidu, 19/9/5; Mosojane, 21/9/5; and Muchina, 5/7/5).

The focus of this and the next chapter is on 'access'. As described in the literature review (Chapter 2), access constitutes a key indicator of state commitment to IWRM. Falkenmark and Rockström (2004) argue that access to potable water for domestic and productive purposes is central to human development. Gleick et al (2002) state that because water is essential and non-substitutable, equitable access is important. They therefore lobby on behalf of 'access to a basic water right'. Scanlon (2003) suggests that accessibility has three elements: the resource must be within safe physical reach; it must be affordable; and it must be accessible to all both in law and in fact. Pollard (2002) states that IWRM is concerned with 'equitable access to and sustainable use of water resources by all stakeholders'; Van der Zaag (2005) says that IWRM involves 'reconciling basic human needs, ensuring access and equity, with economic development and the imperative of ecological integrity, while respecting transboundary commitments'; and Jonker (2002) argues that for IWRM to succeed as a management strategy it must address questions of access and equity, resources protection, efficient use, governance, and landuse.

What these authors are suggesting, it seems, is a definition of 'access' that goes beyond the traditional 'state supplies drinking water for people and bulk water for industry' approach that has defined the modern era and has been so evocatively described by Allan (2003) as the hydraulic mission. This approach to securing access is not water resources management; rather, it is water supply management. And far from being integrated, the water sector has long been segregated from other government functions and practices,

and has been dominated by engineers who generally feel ‘one can always find water’ (Diatchki, Gaborone, pers. comm.).

As will be shown below, there is a disjuncture between primary stakeholder (as defined by the ODMP in Chapter 2 above) perceptions on the one hand and key government stakeholder perceptions on the other hand; they differ as to the definition of water, and what access to the resource means. Primary stakeholders clearly demonstrate an understanding of water that is holistic; indeed, the seasonal and spatial variations of their livelihood strategies reflect the dynamic nature of the L.O.B. Their livelihoods are dependent on access to different kinds of water at different times of the year. At the same time, key government stakeholders (e.g. DWA, DAHP, DWNP, District Council) demonstrate a generally unwavering commitment to the stated goals of the water sector (potable water for all; bulk water for rapid economic growth and development) described in Chapter 5. Realisation of these goals basically entails pumping more and more water out of the ground for reticulation to designated communities, whilst limiting access to the resources of the Delta based on narrowly defined (e.g., conservation, commercial farming) criteria. Moreover, such broadly conceptualised goals ensure that water will continue to be treated not as the central element shaping basin-specific development options, but as one key factor common to all sectors (mining, tourism and wildlife, agriculture, housing, industry). It is not apparent how or if these problems can be overcome.

The issues described below are based on the analysis of reports from 43 village (*kgotla*) meetings held between January-April 2005 in the study area, as part of the participatory process of the Okavango Delta Management Plan (ODMP) project. This exercise was the 2nd round of *kgotla* meetings, the first having been held in November-December 2003 and February-March 2004. The first round of meetings canvassed 33 villages and was poorly attended – directly reaching only 1.5% (1841) of the total population of the area. Even adjusting for dissemination by word-of-mouth, this figure remains low. The second round of meetings was better advertised and reached approximately 18% of the total population. Percentage of population participating at these meetings varied inversely with village size

with less than 0.3% of people in villages with over 5000 inhabitants (i.e. Maun and Gumare) attending.

The proceedings of the second round of meetings have been presented in two documents. Bendsen (2005a) presents the direct transcripts from the *kgotla* meetings. Bendsen (2005b) disaggregates the comments made by community members and categorises them according to their relationship to one of the twelve project components. For the purposes of this research, this was only partially satisfactory. Too often, the coding was too general (Bendsen 2005b), so all the transcripts were recoded with particular attention paid to IWRM criteria as presented above.

At these meetings, communities and institutional representatives discussed issues that affect communities and the challenges they face when utilising the resource. Documented institutional challenges are also presented, and supplemented with results of interviews with key people in government.

2. RESOURCE USE ISSUES RAISED DURING THE 43 *KGOTLA* MEETINGS IN THE L.O.B

2.1 Background

The communities raised concerns on all the issues that affect the utilisation and sustainability of natural resources in the Okavango Delta. Out of 12 components of the ODMP project, eight are involved in the direct utilisation of the Delta resources. Presentation of the issues raised during the *Kgotla* meetings hinge on the activities of these components. Along with the components, the percentage frequency of the issues raised by communities is also shown. These include: Hydrology and Water Resources (15.8%); Wildlife Management (32.8%); Sustainable tourism and CBNRM (7.5%); Sustainable fisheries utilisation and management (6.9%); Vegetation Resources Management (13%); Land-use Planning and Land Management (13%); Waste Management (4.3%); and Sustainable Livestock Management (6.7%).

Upon recoding these transcripts, it seemed that much of the discussion boiled down to a question of access – to water, to land, to government services, and to a variety of natural resources necessary to people’s livelihoods, and those hydrological aspects that might impact on access.

2.2 Flow regime

After wildlife management, concerns relating to hydrology of the Delta was a key issue raised. As one of the project partners, the DWA will be responsible for the component of Hydrology and Water Resources. Under this component, the DWA will develop a hydrological model of the Delta and use this, in combination with the existing hydrological data, to develop an integrated surface-groundwater hydrological model for the Delta. This model will be used to test various scenarios (agreed with and modified by other project partners) of changes in water volumes and flow patterns, including increased or decreased rainfall, and channel blockage or unblockage. This department will also undertake a thorough reassessment of the existing hydrological monitoring programme, including water quality monitoring, and make proposals to improve this programme while ensuring implementation of the improved schemes (ODMP, 2005).

Two main institutions directly involved in the management of water resources at the local level are present in Ngamiland: the DWA and the Council Water Unit within the District Council. Even though the District Council is the primary provider of water in the whole of the district outside Maun, it holds no water or hydrological responsibilities in the ODMP. Its responsibilities are limited to tourism, physical planning and waste management. As a result, all the issues concerning hydrology and water resources were directed towards DWA. However, the DWA also has no water provision responsibilities in the ODMP.

Most of the concerns raised with respect to the hydrological regime of the Delta concerned channel blockages and the flow of the water in the Delta channels. In 22 villages, communities complained that channel blockages, which are caused by overgrowth of vegetation such as hippo grass, *Salvinia molesta* (the aquatic alien species

commonly called water hyacinth) and reeds. These plants block access to the river, so that villagers cannot use their *mokoro* (wooden, canoe-like boats). They struggle to reach their fishing grounds, veld products, grass harvesting grounds in forests, and other villages situated on other parts of the river. In some cases, communities complained that channel blockages severely reduce water flow to their villages. The communities requested that these blockages be cleared by DWA. In response, DWA has offered contradictory information. One answer provided in kgotla is that DWA has no mandate to clear channel blockages (Nokaneng kgotla, 23/2/5). A second answer, also provided in kgotla is that DWA only clears channels to gain access to its gauging stations for the collection of data on flow levels (i.e. it has a limited mandate) (Gudigwa kgotla, 31/1/5). Yet a third explanation is that they cannot clear the rest of the river due to lack of funds (Naidu, 19/09/05, interview, Maun; also Boro kgotla, 11/3/5). Some communities want to know why channels are blocked, while others blame DWA for disturbing the flow of the Delta, and elephants for pushing trees into the river thereby blocking flow. In Shakawe, a villager stated, “the DWA had intended to purchase machinery to clear channel blockages. Has this plan been carried out? When the river is blocked and water does not reach certain areas, people who use wetland resources such as reeds, and *molapo* (floodplain) land cannot make a living.” Other communities request that they be engaged in clearing channels of debris and *Salvinia molesta*.

With regards to the water flow, there is general confusion and scepticism as to why the Delta water flow shifts, fluctuates from year to year, or dries up completely in some parts. Some communities suspect large abstractions or storage upstream, in either Angola or Namibia. There is little understanding that water flow in the Delta is directly dependent on rainfall in the catchment basin of Angola. Since the Delta is dynamic, water may flow in any direction depending on the amount of aquatic vegetation present in the different channels. Even though DWA understands the basic regime of the Delta, no regular information is given to the public on the causes of channel blockages, fluctuating water flows, and or other factors affecting flow. One member of the community in Beetsha commented, “The communities need to be informed about the causes of changes in the flow pattern and the diminishing water flow”.

Water pollution concerns were raised in the four villages of Makalamabedi, Seronga, Ditshiping and Matlapaneng. In the village of Makalamabedi, members of the community complained about a water treatment plant in the village that disposes grey water into a lagoon used for watering livestock. One resident, Mr. Qai, stated, “our livestock are dying in large numbers because of lack of water. The little water that we are able to access from the lagoon has been polluted and is unpalatable.” Pollution of drinking water elsewhere was blamed on elephants; in many cases, drinking water sources are shared between communities and wildlife. To reduce this problem, communities requested that boreholes be drilled elsewhere for elephants, far away from the villages. DWA’s response to this was that the movement of elephants cannot be controlled (Gojamang, 19/09/05, interview, Maun). In Matlapaneng and Seronga, communities raised concerns about the possibility of pollution from fertilisers used in vegetable gardening on the riverbanks. DWA is aware of this possibility, but there is no mechanism in place to monitor these water use activities (Ramoshibidu, 19/09/05, interview, Maun).

2.3 Molapo farming

Issues of land and water are not easy to separate. People in this area depend on natural resources that occur on land and in water for their primary survival. Managing land and sustainable landuse, however, present various challenges, which have direct negative consequences for the people inhabiting the area. Landuse Planning is the responsibility of the Ministry of Lands and Housing, whose role it is to formulate policies and legislation related to landuse planning. At the District level, the Ministry operates through the District Land Use Planning Unit and the Land Board. Landuse planning is considered to be of paramount importance because it promotes optimal physical and economic use of land (NWDC et al, n.d.). The Land Board is responsible for land administration and management, while the District Land Use Planning Unit (DLUPU) offers technical advice to the Land Boards on all landuse related activities.

In the ODMF project, land issues are the responsibility of the Sustainable Land Use and Land Management component. The institution responsible for this is the Tawana Land

Board. Most of the concerns raised during the 43 meetings concerned allocation regulations, allocation procedures, landuse rights and conflicts. In most cases, there is general discontent among communities that their traditional landuse rights are, and will continue to be eroded by new regulations. For instance, a new regulation was introduced recently to stop the use of floodplains (*molapo*) for arable agriculture – this being a traditional type of agriculture practiced by the Delta inhabitants, dating back hundreds of years. This regulation, which currently applies to the panhandle area, states that no allocations for arable use should be made within a 500-metre strip from the floodplains. The 500 metre rule was raised by villagers in eight of the 43 kgotla meetings. Traditional farmers pointed out that prior to the enforcement of the Panhandle Management Plan, they were advised by Land Board to take their livestock away from the riverfront and use this fertile area for cultivation instead (Nxamasere kgotla, 17/2/5). Farmers who grow vegetables that need to be irrigated or watered by hand are particularly dependent on having their small gardens near open water sources. This regulation, however, does conflict with other landuse or land allocation regulations. For instance, one resident of Sekondomboro noted, “when applying the 500-metre allocation distance from the river, our entire village is not properly situated, since most residential plots are close to the river bank”. One resident of Etsha 6 also noted, “if we move 500 metres away from the river, this will not be *molapo* farming any longer.” A resident of Habu stated, “the dangers of allocating *molapo* fields are not clear. *Molapo* fields should be allocated by the Land Board, since most of our food is derived from floodplain cultivation”. Speakers in several villages turned to history, stating that they had practiced *molapo* for generations in their area, so why should they stop now?

In response to the 500-metre rule, the Tawana Land Board explained, “ploughing in the floodplains might have negative environmental impacts like erosion and water pollution. Land certificates are therefore not given to avoid compensation claims in these disaster prone areas” (Mongati, 01/02/05, Eretsha kgotla meeting).

2.4 Tourism

The Land Board is the statutory land allocation authority that holds land in trust for citizens. In larger districts like Ngamiland, the main Land Board works through subordinate Land Boards for allocation of customary grants for grazing, arable land, and residential purposes. It also grants leases under common law for the following purposes: commercial, industrial, residential and agricultural. It therefore also settles disputes. The Land Board is required to consult the District Council and other local authorities in the formulation of policy pertaining to any land-use. The ministry has found it necessary to prepare Integrated Landuse Plans for all districts; however, none has been prepared for Ngamiland and it is hoped that this will be done soon (NWDC et al, n.d.).

In allocating land for the different purposes, the Land Board is accused of discrimination, favouritism, corruption, and lack of communication with the land users, conflicting regulations and practices, and long processes and procedures for land allocation. A resident of Etsha 13 complained, “It takes ages for Batswana to be allocated land while foreigners are allocated land in a very short period of time”. Another commentator from Seronga stated, “foreigners are allocated river-front plots and prime tourism areas in the Delta, while locals are denied such rights”. There is also conflict between traditional and modern landuse. A resident of Seronga noted, “A large area between Xigera and Xumoxau has been allocated to a foreign individual for tourism purposes, even though there are traditional molapo fields on that island”. Tourism is currently the second largest revenue generator in the economy. From these comments, one can discern a tension between subsistence users fearing loss of access to their traditional resource base, and the perceived favouritism government is showing to tour operators, most of whom are foreigners.

The communities of Kareng, Nxamasere, and Toteng raised concern about the lack of monitoring of hunting and tourism activities in the Delta, expressing fears about the possible depletion of species. In Bodibeng, people complained of restrictions imposed upon them such as the prices for residents’ hunting permits and the general lack of access

to hunting areas. To acquire a hunting permit requires travel to Gumare or Maun – an arduous journey for most residents of Ngamiland.

The loss of traditional landuse rights and areas was raised in Ditshiping and other places in the Delta. Communities complained that even though they expressed discontent about the expansion of the Moremi Game Reserve, government went ahead and expanded the reserve anyway. M. Lengwase from Maun stated, “Different regulations seem to apply to local people and to tourism companies. Safari operators have cleared a channel at Jao and at Xugana. When local people want to excavate sand from the river for building, they are not allowed to do so. Tour operators deny local fishermen access to the lagoons in their concession areas and even confiscate their nets” (Maun kgotla, 01/03/05). A resident of Chanoga remarked, “Safari operators in our area keep dogs that do not allow our livestock to water near their camps.” The Department of Tourism’s response was that tour operators are supposed to allow villagers access to traditional lands for subsistence purposes, thus raising questions regarding legal rules and de facto regularities.

2.5 Livestock

Many communities raised concerns about access to water in areas away from the river. Subsequent to being asked to move their livestock from the river to the drylands in order to minimise conflict with wildlife at the riverfront, communities raised concerns of lack of water in drylands. A resident of Samochima noted, “our village is located at the river infested with crocodiles. Crocodiles frequently kill our livestock. We request the government to assist us with drilling boreholes in the dryland so as to be able to move our stock away from the river.” In contrast, another resident in Seronga mentioned “I reject the idea of drilling boreholes in the dryland since there are many predators in the area. This can lead to new conflict with wild animals.”

Since most residents of Ngamiland are holders of cattle or smallstock (e.g. goats, sheep), concerns about stock predation by lion, cheetah, hyena and wild dog were paramount. More than 1270 km of fencing designed to separate wildlife from livestock has been erected since 1964 (Van der Post, pers. comm.). The institution responsible for these

issues, the Department of Animal Health and Production (DAHP), compensates farmers for livestock (mostly cattle) that are killed for crossing the buffalo fence. In general, residents of Ngamiland support the fencing policy, but feel that the fences are poorly maintained. Speakers in Habu and Tsau enquired as to why the fences had not been electrified, since this was seen as the best way to keep elephants and rhinos from breaking them down. It is unfair of government (in this case the DAHP) to kill and bury cattle that cross the buffalo fence. One speaker from Gudigwa stated that the fence had not divided wildlife from people and livestock; it had merely divided various forms of wildlife. The fence also reduced villagers' access to arable lands. With regard to maintenance of the fences, DAHP admits that it is under-resourced and understaffed.

DWNP is another institution that sometimes deals with livestock issues, especially when there is conflict between wildlife and livestock. DWNP compensates farmers for livestock killed by wild animals, an amount higher than that compensated by DAHP. During the meetings, DWNP imparted contradictory information to residents. In Habu it was stated, "The suggestion to electrify the buffalo fence was submitted to the parliament but it was rejected" (Habu kgotla, 23/2/05). One day later, in Tsau, the same person, O. Sapula, stated that electrification was 'subject to the availability of funds' (Tsau kgotla, 24/2/05). In Shorobe, the Agricultural Demonstrator, Mr. Kwerepe, claimed, "The Minister of Agriculture mentioned in his speech that the electrification is being considered, however, it cannot be implemented without an EIA" (Shorobe kgotla, 03/03/05).

With regards to vegetation resources, most people complained about lack of grazing lands and depletion of grazing resources due to concentration of livestock in small grazing areas (most areas were fenced to keep wildlife and livestock apart). Some have also lost access to land to large commercial cattle and/or game farmers, putting a further squeeze on an already narrow resource base.

Compensation paid by government for stock loss due to predation was also a central concern, as was compensation paid by government for cattle killed for straying into the

wildlife side of the divide. Government policy states that buffalo straying into livestock areas will be driven back; cattle that stray must be killed. The reason for this is to protect Botswana's access to European Union beef markets. EU policy immediately freezes all exports from a country where it can be shown that a cow has been in possible contact with disease-carrying wildlife. Small-holders living alongside wildlife and who rarely sell cattle to an exporter are therefore paying a dear price to maintain markets accessed only by the large cattle ranchers of the country, whose stock is located as far as possible from contact points. A resident of Ngamiland stated that "We are the buffer zones; we have to suffer from it". Moreover, a resident of Tsau stated, "Government protects animals, not humans."

2.6 Fishing

Fishing is one of the most prevalent and important livelihood activities practiced by people living in the Delta, and anywhere else in Ngamiland where there is water. It is understandable that concerns related to fishing arose in all of the *kgotla* meetings. Concerns centred on lack of regulations to control fishing, fear of fishing regulations, lack of access to fishing grounds, fishing techniques and loss of traditional fishing grounds to other modern landuse activities such as tourism. In Sankuyo, one resident complained, "when I was growing up we ate a lot of fish, nowadays we do not fish any longer as the DWNP does not allow us to fish in Khwai and Mogogolelo." In Mababe, it was noted, "Our fishing activities are being hampered in many ways. We are no longer allowed to use nets of *mesh size three*, and we cannot use some of our traditional fishing grounds as they are inside the game reserve." In Maun, tour operators were reported to be denying access to fishermen. People in Boro complained about fishing regulations by the DWNP: "We depend on fishing and cannot support regulations that restrict our fishing activities. By declaring parts of the Delta as a game reserve, the DWNP is already preventing us from using traditional areas. Now we are given forms to register the number of fish we catch."

In Seronga, people complained, "since the Fisheries Department has been transferred to the DWNP its attitude towards fishermen has changed." It was felt that, "the department

is now more interested in conserving fish and imposing fishing regulations, and oppressing people'. Again invoking history and tradition, one commentator said, "traditional fishing method of using baskets is environmentally friendly and does not deplete the fish resources." Conflicts between subsistence fishermen and commercial fishermen were raised as a concern. In Khwai, one fisherman noted, "fishing regulations are needed, especially to control the activities of commercial fishermen". Another one noted in Maun, "Since fishing has been commercialised, fish numbers have gone down, does commercial fishing not impact negatively on the fish stock?"

Until recently, the Department of Fisheries fell under the Ministry of Agriculture; it has now been transferred to the Ministry of Environment, Wildlife and Tourism under the Department of Wildlife and National Parks. According to Mosojane (interview, 21/09/05, Maun), when the fisheries section was under MoA, it was more interested in supplying fish resources as opposed to managing them. With the transfer, this has changed, creating fears in the fishing industry.

2.7 Traditional landuse rights

There are also conflicts between the arable agricultural sector and wildlife. One Gudigwa resident stated, "Government should advise us where to plough to reduce conflicts between wildlife and the arable sector." Another from Xakao asked, "If a village is located on an elephant migration route, how can that problem be solved?" With regards to human-elephant conflict, DWNP is working with the Land Board towards devising a strategy whereby traditional elephant movement paths can be left unallocated in order to reduce the interaction and conflict between the two species (Mosojane, 21/09/05, interview, Maun).

With regard to other wildlife species, people raised concerns about depletion, lack of benefits from conserving wildlife, unsustainable wildlife numbers (especially elephants), destruction of vegetation, lack of monitoring of wildlife resource use, restricted access to wildlife resources and competition with wildlife for resources. In Sehithwa it was noted, "In the Lake Ngami areas birds were hunted in large numbers in the past, now guinea

fowls can hardly be found anymore.” Communities complained that wild animals, especially elephants, damage their crops and they see no reason why elephant populations should continue to grow uncontrolled since elephants are not a benefit to them. “The revenue that government receives from wildlife is not given to communities that suffer as a result of living close to wild animals”, one resident commented in Boro. Damage to vegetation and livestock is also a problem in most parts of Ngamiland. In Khwai, one resident reported, “The vegetation along the Chobe riverfront has been devastated. What is DWNP doing to conserve the vegetation in the national parks?” In Mohembo West it was reported, “elephants and lions are the major problem animals to arable and stock farmers.” Other villages complained of having to compete with hippo, crocodile and rhino for access to resources. As local residents become restricted by changes in landuse policy and practice on the one hand, and their own rising populations on the other, they find themselves increasingly at risk from wildlife who share the resource base.

In a few villages people raised concerns about lack of access to fishing and grazing grounds, as well as areas where they used to harvest reeds and veld products. Some of these have been lost to fencing by hunting concessions, tourism operations, and wildlife management areas. This has resulted in the de facto loss of traditional resource use rights. In response, the Fisheries Division from the DWNP asked communities to refer the matter to Land Board. They stated, “traditional subsistence user rights should not be affected by the commercial leases” (Manyamane, Ditshiping kgotla, 12/9/5). Communities also complained about the lack of access to grazing grounds and the pressure that elephants put on vegetation resources.

Loss of vegetation resources was also attributed to a variety of natural factors, such as veld fires and wildlife. In response, government has recently banned the use of fire as a vegetation management tool. This has raised complaints among villagers. “In the past we used to burn river vegetation. Nowadays we are no longer allowed to set fires. As there are no fires anymore, rivers get overgrown and blocked with vegetation and weeds are spreading,” a Matlapaneng resident noted. In Seronga, one resident noted, “Veld products help us in various ways, we use them for eating, house building, medicine and production

of crafts. We have not over-harvested them. Many veld products, however, are destroyed by elephants and are becoming scarce.” In Shakawe, one person mentioned, “It seems that fish and wildlife numbers and veld products are declining in the Delta. We, the poor people, need to have access to natural resources like thatching grass, as we cannot afford to build houses out of commercial building materials”

People in Eretsha called for regulations for veld product utilisation, while some thought it would be better for communities to set their own regulations because the government only initiates limits and control measures. In Etsha 6, one resident noted, “we are denied permission to harvest grass and veld products in the floodplains, and are not allowed to cultivate our *molapo* fields.” In Mababe, people lamented on the loss of power by traditional leaders who in the past could control the use of natural resources. The Agricultural Resources Board, who is responsible for vegetation resources issues, failed to attend meetings, and efforts to interview officers from the department were unsuccessful.

3. GOOD GOVERNANCE?

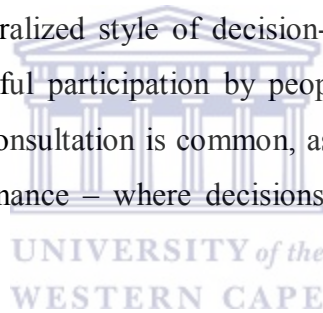
For many primary stakeholders, loss of access to their resource base reflects poor governance. In all 43 *kgotla* meetings, communities expressed dissatisfaction about the way things are done: from basic communication and information dissemination to decision-making processes and the implementation of rules and regulations. In some cases, the different institutions agreed on their inefficiency (e.g. DWNP respondent in Shakawe *kgotla* meeting 15/02/05 and in Gudigwa 31/01/05). Issues of participation, consultation, communication, limited knowledge, unclear responsibilities and lack of accountability by the government and implementing institutions in particular were some of the key governance issues mentioned.

3.1 Participation

There is evidence that communities are not being included in implementation of projects, and would like to participate more. A speaker from Mohembo West stated, “we are prepared to assist in the studies and planning of activities.” Another from Nokaneng

noted, “The department should...get advice from communities.” Communities indicated that they would also like to be consulted more. While one speaker from Samochima noted, “we appreciate being consulted on landuse and resource management issue”, most shared the feeling expressed by a speaker from Sankuyo: “Government comes up with policies and plans and they are implemented without listening to communities.”

Some people expressed lack of faith, as they often have not been given any feedback after consultations. This shows that consultation is not enough, people would like to participate more in issues that affect them. A speaker from Beetsha stated, “We would like to participate in water management issues.” One from Makalamabedi observed, “What you presented is mere lip service.” Another from Tsao stated, “It is quick and easy to get concerns from communities but the response and the feedback take a long time.” A speaker from Makalamabedi mentioned, “I do not believe that action will be taken to solve our problems.” The centralized style of decision-making in Botswana, however, leaves little room for meaningful participation by people at the level of the resource. Passive participation through consultation is common, as it draws on the *kgotla* meeting as a traditional form of governance – where decisions continue to be taken by elites (Good, 1996).



3.2 Institutional capacity

In many of the villages, there was a serious lack of knowledge about procedures and general information about how things are accomplished. This is compounded by either slow, or no response from government. A speaker from Sepopa requested, “The Land Board should inform us.” One from Boro observed, “Land Board is holding up progress.” Another from Chanoga mentioned, “Tawana Land Board is not working efficiently.” In Etsha 6, one resident asked, “Where do we get application forms for land?” One from Sehithwa stated, “The procedures followed by Tawana Land Board are not transparent.” In some cases, corruption has been alleged. A speaker from Bothatogo observed, “Just last year, raffles for commercial livestock farms were won only by Land Board officials.” One speaker from Matlapaneng requested, “Land Board should not only allocate land to their relatives, but the community at large.”

Overall, at least one primary stakeholder in every one of the 43 *Kgotla* meetings expressed dissatisfaction with at least one of the following issues:

- Slow and/or no responses to applications (land, licenses), complaints (predator-related losses of livestock), and inquiries (borehole sitings)
- Corruption and lack of accountability at all levels of government
- Imposition of regulations masquerading as ‘consultation’ and ‘participation’
- Ignoring valuable traditional methods of conservation (fish, fauna, flora)
- Lack of respect for traditional leaders and traditional knowledge systems
- Lack of regulations and enforcement of regulations
- Delivery of poor or wrong advice, lack of feedback or reflexivity
- Generally poor communication skills and practices
- Bias toward modern/foreign applications/enterprises

3.3 De facto governance practices

In the face of so many (real and perceived) policy, legal and institutional barriers to sustainable and equitable resource access and use, local people and government resort to a patrimonial form of governance typical of developing countries. This translates as a combination of special pleading on the part of the relatively unempowered, and promises and chastisements on the part of the empowered. For example, primary stakeholders often prefaced their remarks, as did one speaker from Shakawe, with “We the poor people”. One speaker from Gudigwa stated, “Before you [take action] please come back”.

Government departments in turn made a variety of promises: e.g., “We will come up with”; “DAHP will come”; “We [DWNP] will keep trying”; “I [DWA] will follow up.” However, at the same time, they often aggressively confronted villagers: “Last year you requested us [DWA] to ... now you complain.” Rather than truly listen to what people had to say, government departments fell back on reciting rules and regulations – land board allocation procedures; government policy on the right of affected persons to kill problem animals; the ambit of DWA activities in the Ramsar site; the logic of

government pay-outs for livestock killed by wildlife; the dynamics of the spread of *Salvinia*; tourism concession waste management practices; and proper procedures for lodging complaints or acquiring hunting and fishing licenses. At several *kgotla* meetings, government departments (DAHP, DWNP, Tawana Land Board) acknowledged that limited human and financial resource capacity contributed to their poor performance (in maintaining fences, processing land applications, and compensating for animal losses).

4. SUMMARY AND CONCLUSION

This chapter presented a comprehensive analysis of the issues that residents of Ngamiland deal with on a day-to-day basis. It reveals the issues important to people, the power dynamics between the government as ruler, and people as the ruled. In some cases, the government is perceived to hold the answer to many resource use problems; in others government is perceived as a threat to the continued use of natural resources for sustainable livelihood of the people of Ngamiland. Ngamiland's population is directly dependent on natural resources - more than any other district in Botswana.

For people of Ngamiland who have historically depended on the Okavango River ecosystem, access to water entails more than domestic water supply. In fact, water for drinking and cooking purposes is one of the least of their problems, because it contributes minimally to their livelihoods. Residents do wish to benefit from a reliable supply of potable water, and have expressed their desire for such a service. But, as shown above, most livelihoods depend on activities associated with the river: fishing, floodplain agriculture, transport, harvesting of reeds that grow in rivers and lagoons, watering livestock, harvesting of vegetables that grow in the river and tourism activities such as *mokoro* (canoe) trips. Most often these activities are carried out on a subsistence level; sometimes, profit is used for schooling, improved housing, and care of the sick. Access to the river and other natural resources (such as the veld) is of paramount importance to people of Ngamiland. Gaining access to potable water, while losing access to the river and its varied resources, is not a desirable trade-off for these people.

For the people of Ngamiland, therefore, water is part of a system that requires a holistic management framework sensitive to the abovementioned and related needs. Institutions that control the use and management of these resources have, however, often failed to ensure access to these resources. This is a result of the policy and institutional framework of the institutions responsible: each has its own limited mandate to carry out in sectoral fashion; each department faces serious human and financial resource constraints; and all departments respond to policy fashioned at central state level. Even if there was the will to respond effectively to local issues, centralized structures of governance prohibit such initiatives. This approach to policy-making and implementation is leading to a gradual marginalisation of Ngamiland residents from their resource base. In other words, it is access increasingly denied.



CHAPTER 7

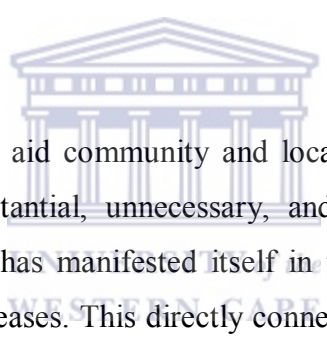
ANALYSIS OF ACCESS TO WATER SUPPLY IN THE LOWER OKAVANGO BASIN (L.O.B.)

1. INTRODUCTION

Chapter 6 argued that people of Ngamiland view water within a holistic understanding of the overall resource base. Water is neither substitutable for humans, nor the ecosystem as a whole. As a population heavily dependent on the local resource base, Ngamiland's people understand the ecosystem they inhabit. Sustainability of the resource base requires an ecosystem approach (which the Government purports to adopt in the ODMP project) that must mean maintaining local people's ability to access water and related resources of sufficient quantity and quality for their needs. This access, as Moriarty, Butterworth and Batchelor (2004) state, must be in law as well as in fact. However, Chapter 6 suggests that people's access to the resource base is diminishing; definitive reasons are not immediately apparent and would require further analysis.

A likely reason is government's approach to development and particularly support for tourism and commercial farming activities that are favoured above subsistence practices. With development, government is pursuing a settlement policy that encourages people in Ngamiland to abandon their traditional system of small settlements and cluster in designated growth points and major villages (Plantec Africa, 2003; SMEC, 1991). As incentives, government provides basic services – water supply, clinic, school – at designated centres as well as offering cattle to people willing to 'settle' in these areas. Leaving aside a critique of the wisdom behind attempting to stabilise settlements in an inherently dynamic ecosystem, this chapter looks at government's delivery of water services to the people of Ngamiland. Following on from Government's two main goals for the water sector described above, how has supply and service performed in the study area?

Universal access to basic water services is a fundamental condition of human development (Gleick, 2000). Access to this resource is a fundamental human right that is safeguarded by international law and practice. Often basic water services means drinking water and proper sanitation. However, is this enough? No. As Abrams (2001) argues, basic needs go beyond our daily dietary requirement – it includes the need for water to maintain a basic standard of personal and domestic hygiene sufficient to maintain health. Looking at the current achievements of the human race, the world is more than capable of providing every person with adequate drinking water and sanitation. Yet, at the turn of the century, a billion people lack access to adequate drinking water and two billion still do not have access to adequate sanitation. “It is alarming as well as unacceptable that in the 21st century there are still large numbers of women and children in the developing world who are forced to collect untreated or impure drinking water from various sources, often having to travel great distances to reach them” (Falkenmark and Rockström, 2004:26).



The failure of the international aid community and local organisations to satisfy basic human needs has led to substantial, unnecessary, and preventable human suffering (Gleick, 2000). This suffering has manifested itself in the form of preventable deaths brought on by water related diseases. This directly connects water, sanitation and health; a connection taken for granted in wealthier communities but a stark reality in poor ones. Water and health are related in a number of ways. Abrams (2001) documents four ways: Firstly, there is the direct impact of consuming contaminated water – increasing the risk of contracting water borne diseases such as diarrhoea, typhoid, viral hepatitis A, cholera and dysentery. Secondly, there is the effect of inadequate quantities of water available for personal hygiene or of un-hygienic practices that contaminate water and cause diseases. Skin and eye infections and faecal-oral diseases are easily spread in this way. Thirdly, there are water-based diseases and water-related vector-borne diseases in which the aquatic environment provides an ideal habitat for the mosquito vectors and intermediate host (e.g. snails) parasites that cause human diseases. Malaria, schistosomiasis, lymphatic filariasis, onchocerciasis and Japanese encephalitis are examples of these diseases. The last group includes chemically contaminated water such as those containing excessive

amounts of arsenic or fluoride. Some contaminants are added to drinking water because of natural processes and some due to human activities such as industry and mining. Poor communities, especially in urban fringe areas, are particularly susceptible to dangers from polluted water from a variety of sources due to the lack of or poorly enforced pollution regulations. As mentioned above, most if not all of these diseases are preventable. The world, however, fails to protect those who are susceptible. Gleick (2002) terms this “the greatest development failure of the 20th century”.

This is not necessarily a direct consequence of the physical scarcity of water. Water is one of the most abundant natural resources, yet it is a finite resource that is unevenly distributed throughout the globe (De Souza et al, 2003). This uneven distribution exists in all geographical settings; it includes small communities, and is exacerbated by unequal allocation of the resource. Even in areas where water is abundant, scarcity affects someone. After calculating a ‘desired’ human water need of 1500m³/person/year, Falkenmark and Rockström (2004) concluded that there would always be enough water to secure domestic water for all, irrespective of population size. This means that now there should be enough water for everyone, but there is not. Falkenmark and Rockström (2004), Abrams (2001), and Gleick (2002) all argue that the current problems related to water supply and sanitation are management failures and are not related to scarcity.

In Botswana, the proportion of the population without access to safe drinking water – a key MDG indicator – is 12.1% (2001), a good record for a developing country. A high, consistent national income based on diamond exports has provided the country with the financial resources to facilitate supply-side provision. Eighty per cent of the population is clustered within 50km of the Lobatse-Francistown road along which the multi-billion dollar North South Water Carrier was built; proximity thus facilitating access for the vast majority of Botswana (Swatuk and Rahm, 2004).

There are, however, abiding disparities regarding access to this resource as illustrated in Table 7.1 below.

Table 7.1: Access to potable water in Botswana, urban/rural

Location	Inside house/plot	outside plot	other
Urban	52.1	47.9	0.0
Urban village	50.1	49.7	0.2
Rural	9.1	84.2	6.7
National	37.1	60.6	2.3

Source: UNDP 2005.

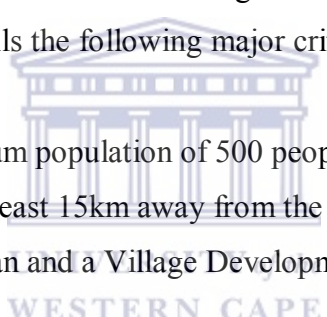
There are also important questions raised regarding the strategy for its provision in Ngamiland. As with the rest of the country, exploitation of groundwater resources constitutes the main form of supply. However, according to SMEC et al (1991), “groundwater resources... certainly cannot be characterised as abundant because of the very low rates of recharge over the greater part of the country – virtually zero over much of the Kalahari. Moreover, its quality is often deficient with high salinity and excess concentrations of fluorides, nitrates and other harmful elements in some regions.”

2. RURAL VILLAGE WATER SUPPLY PROGRAM IN BOTSWANA

As mentioned in Chapter 5, in Botswana, water, like other natural resources, is public property whose use and rights are defined and regulated by the Water Act and its subsidiaries (Water Works Act and the Water Apportionment Act) (Moyo et al, 1993). It is therefore controlled and allocated by the state. Three organisations are responsible for water supply in Botswana: Water Utilities Corporation, Department of Water Affairs and District Councils. WUC is responsible for urban water supply, DWA for major village water supply and District Councils for small/medium rural village water supply. With regards to rural village water supply, water services are only provided to officially recognised villages. In 1994, WUC provided services to 21.5% of the population, DWA to 22.5% and the District Councils to 22%. The remaining 34%, living in thinly populated settlements (mainly cattle posts), do not have a reliable source of water

(Talenyana and Maunge, 1994). People living in these areas are responsible for their own water supply. These are usually sourced from privately owned boreholes; hand dug open wells, rivers or hauling water from major villages or towns.

The Botswana National Settlement Policy (White Paper No.2 of 1998) influences the availability or lack of a water supply scheme in a village or settlement. This policy is a long-term comprehensive spatial development policy whose main aim is to achieve balanced development. One of its basic features is the creation of settlement hierarchy to facilitate growth of settlements in support of agricultural production and other productive activities. The main aim of this is to concentrate scarce financial resources in selected settlements with the highest potential for development (RoB, 1997). For a settlement to be provided with water by the government, it has to be gazetted a village; the latter having to satisfy certain requirements. According to this policy, a settlement may be defined as a village when it fulfils the following major criteria:

- 
- It should have a minimum population of 500 people
 - It should be situated at least 15km away from the nearby village
 - It should have a headman and a Village Development Committee

Settlement populations are reviewed, on average, once every ten years. At that time, the District Council may decide to reclassify a settlement as a village. This is done in consultation with the District Physical Planning Unit and the District Land Use Planning Unit. Recommendations are then forwarded to the Minister of Local Government with whom the final decision rests. Certain settlements may not be declared villages. An example is when they are located close to an existing village, as with the case of Sexaxa located nearby to Maun. Beyond the basic guidelines, however, it is clear that decisions are often taken on an *ad hoc* basis.

The National Settlement Policy has developed a three-tier hierarchy with primary, secondary and tertiary centres. In Ngamiland district, only Maun is classified as a

primary centre. Other villages are still recognised as tertiary centres of varying levels. According to NWDC et al (n.d.), the criteria for determining settlement hierarchy is:

- Economic potential and employment generation
- Availability of natural resources especially water to sustain it
- Population size
- Availability of infrastructure and services or the ease with which these can be provided
- The role of the settlement as a service centre or its potential as a service provider to its hinterlands

Table 7.2 shows the settlement hierarchies as they exist in the Ngamiland district.

Table 7.2 Ngamiland Settlement Hierarchies

Hierarchical Level	Population Range	No. of settlements in the district
Primary Centres	20 000- 100 000	1 (Maun)
Secondary Centres	10 000- 19 999	1 (Gumare*)
Tertiary Centres I	5 000- 9 999	0
Tertiary Centre II	1 000- 4 999	12
Tertiary Centre III	500- 999	17
Tertiary Centre IV	250 – 499	45

Source: Ngamiland District Settlement Strategy, Plantec Africa, 2003

* Gumare's population is 6,067 but its status as a secondary centre is based on its administrative function as sub-district headquarters.

Primary centres are large urban and rural settlements with a population of more than 20 000 offering employment opportunities as well as social and infrastructure services. Secondary centres are immediate settlements where the population ranges between 10 000 and 20 000, or which are District or sub-District headquarters (even if the population is less than 10 000). The tertiary centre category is subdivided into four categories viz I-IV as shown on the table above. According to the Ngamiland District Settlement Strategy

(Plantec Africa, 2003), the recent review of the NSP now restricts Tertiary IV centres to Remote Area Dweller settlements.

In total, according to the 2001 census report, there are over 562 settlements in Ngamiland District. Of these, only two, Gumare and Maun, have a population of more than 5 000 people. Table 7.3 below shows that the vast majority of settlements in Ngamiland District consist of fewer than 249 people – far below the required level for gazettelement.

Table 7.3 Ngamiland District Settlement sizes and numbers, 2001*

Population size	Number of settlements	% of settlements
<249	478	87
250-999	61	11
1000-4999	10	2
5000-9999	1	0.2
>10 000	1	0.2

Source: Ngamiland District Settlement Strategy, Plantec Africa, 2003

* Total number of settlements vary between 551 and more than 600 depending on the study consulted



Since water is a basic need, it is first established in all newly confirmed villages before the establishment of other infrastructural services such as primary education or health. At present, there are more than 460 rural village water supply schemes operated and maintained by various District Councils in Botswana. According to currently adopted standards, a typical village supply scheme consists of four major water supply components. These include: Energy and Pumping Components, Transmission Main, Distribution Network and a Storage Tank. The service levels provided by these schemes are measured using the currently adopted Botswana Rural Village Water Supply Design Manual. According to this manual, minimum requirements should be achieved (Hagos, 1994), and include:

- 30 litres per person per day through public standpipes

- People should not walk more than 400m one way to fetch water
- One public standpipe with two taps to serve roughly 200 people
- Storage facilities with a capacity that can meet short time balancing and 48 hours emergency requirements
- A back up water source in order to secure availability of water in case main operational sources fail

The main water source for most recognised villages in Botswana is groundwater. Usually more than two boreholes are drilled per village. The groundwater table for all these boreholes varies from place to place, with depths ranging between 50m and 150m (Hagos, 1994). During the initial development of most village water supply schemes, emphasis was placed on minimising the initial capital costs by drilling the boreholes close to the villages (within 5 to 7km radius) rather than transporting water having a reliable source from longer distances. According to Hagos (1994), this development approach has resulted in many problems such as the drying of many boreholes annually especially during droughts, because they were drilled in relatively poor aquifers (reaffirmed by Masamba, interview, 24/10/05). In such situations, it is difficult to secure reliable and sustainable services.

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The lack of users' participation in money or labour, and the large organisational structure of the District Council's Water Units, lead to very high overhead costs, and thinly spread services (in order to cover all villages with at least 500 people). This makes district water supply service expensive, inefficient and unsustainable (Hagos, 1994; Makgasane, interview, 22/09/05). Supply costs in rural water supply include, among others, development, initial construction, running, upgrading and rehabilitation. Virtually none of these costs is recovered through payment. Water provided through village standpipes is currently free to the users (government intends to introduce metered standpipes in gazetted villages). Where water is reticulated to households (either on-plot or in-house), the billing system is ineffective (Makgasane, interview, 22/09/05; also RoB, 2001). People have become used to poor service and not having to pay for services (although some have expressed willingness to pay for a *reliable* – both quality and quantity –

service; see, Mmopelwa et al, 2005). These and other problems such as unaccounted for water losses raise questions about the sustainability and reliability of district water supply services.

3. ACCESS TO WATER SUPPLY BY RECOGNISED VILLAGES IN NGAMILAND/L.O.B.

Most of Ngamiland is rural, with the exception of Maun that is considered a major village. Village water supply service provision is one of the Ministry of Local Government's statutory functions. The Ministry empowers District Councils to provide reliable and sustainable water supply services to all people living in recognised villages. With the exception of Maun, the rest of Ngamiland relies on the Rural Village Water Supply programme for its water services. Maun, as both primary centre and major village, gets its water supply from the Department of Water Affairs. Some unrecognised settlements get services through the Remote Area Development Programme; an unreliable programme, which was only developed for drought emergencies. Reliable water supply is therefore limited outside recognised villages.

The majority of settlements in Ngamiland district are along the Maun-Shakawe road, Mohembo-Gudigwa road and along the Okavango River, the Delta and the Thamalakane River (NWDC et al, n.d.). Villages in the Sehithwa area (located in the Ngami Sub-district) are clustered around Lake Ngami. The settlement pattern in the Okavango sub-district is also such that there are several villages with small populations located within a few kilometres of each other; a good example here is Etsha 1 through 13. The traditional settlement pattern in Ngamiland is that people settled near permanent water sources and areas where they could graze their cattle and plough fields (see Map 4.5 above). The bushman family group (also known as 'band' or 'camp') formed the basic settlement unit in Ngamiland. Bands numbered on average 20-85 people whose distinct territories usually covered between 500 and 1000 square kilometres (Van der Post, 2000: 113). Over time, these groups were forced to coexist with cattle herders such as the BaHerero and BaTawana. Such spatial division of settlements facilitated resource management in a

harsh environment. National settlement policies did not accommodate these traditional settlement patterns and resulted in forced removals, resettlements and most importantly, resistance to move into already populated areas, making service provision more difficult and expensive, but subject to political factors as well (Madzwamuse, 2005; Good, 2003).

There are no major water storage facilities in Ngamiland; pumping of groundwater is the preferred option because it has been the least controversial of the supply practices. The Okavango Delta is a protected resource with no major developments that can be built on it or having its waters diverted for storage (Baeti, interview, 19/05/2005, Maun). In 1986, the Government of Botswana had plans to dredge part of the Delta and build major dams and pipelines for the nearby mining town of Orapa and Maun, and to develop irrigated agriculture. The project attracted a lot of local and international opposition (IUCN, 1992). Following a damning EIA conducted by the IUCN (invited by government to conduct the study), the central government shelved the programme in the early 1990s but reserved the right to revive it when, and if needed.

The current demand for potable water supply in Ngamiland exceeds supply. According to the Ngamiland District Development Plan 6 (NWDC et al, n.d.), most of the settlements in Ngamiland have adequate water from boreholes. The quality of this water is however often questionable because not all water supply schemes have treatment facilities. Rehabilitation schemes to clean the water in most of the villages are still under construction. For those villages without adequate water, water bowsers/tankers are used to supply the villages. Delivering water by tanker truck is very expensive. Sandy roads also make access difficult and hence the need to identify more sustainable sources of water (NWDC et al, n.d.; Makgasane, interview, 22/09/05). Most of these villages still experience seasonal shortages. Table 7.4 shows principal sources of water supply for most villages and settlements in Ngamiland.

Table 7.4 Sources of drinking water supply for households in Ngamiland

Principal source of water supply	Ngamiland East	Ngamiland West	Delta
Piped indoors	1846	438	55
Piped outdoors	2929	752	105
Communal tap	7790	6198	97
Bowser/Tanker	287	271	2
Well	419	357	1
Borehole	1426	482	2
River/Stream	484	1569	252
Dam/Pan	124	9	0
Rainwater Tank	19	53	0
Spring	9	21	0
Other	265	27	0
Unknown	17	7	0
TOTAL	15615	10184	514

Source: Ngamiland District Development Plan 6: 2003-2009 (n.d.)

As indicated in Table 7.4, 26 313 households were located in Ngamiland during the 2001 National Population Census with 20 210 (76.8%) having access to tap water. 2 339 (11.5%) of these households have water piped indoors, 3 786 (18.7%) have water piped outdoors and the remaining 14 085 (69.9%) depend on communal stand pipes. Besides these three sources of reticulated water supply, the remaining 23.2% of the population rely on other sources. Of these sources, boreholes are the next reliable source and only 1910 (i.e., 31.3% of the 23.2%) of the households get their water via this source. 2305 (37.7% of 23.2%) of the households depend on rivers or streams for their water supply with most of these households located on the eastern side of the Okavango River and Delta, where there are permanent water sources. 12.7% of the 23.2% use wells, 9.2% depend on tankers that are extremely unreliable, 2.2% rely on dams and pans, 1.2% rely on rainwater tanks, 0.5% on springs, and the remaining 5.2% rely on other sources that

could include hauling from nearby villages, or buying from boreholes owners. Non-reticulated sources of water (wells, pans, rivers, rainwater tanks and springs) are affected by seasons and accessibility of the area (bowser/tanker). During the dry season, droughts and periods of no-flow in the Delta or its outflows (March-July or August-December), all sources of water supply are affected. Unreliable sources such as wells, pans, ephemeral rivers and streams are affected more as the people have to seek other distant sources. Water availability is unreliable in the entire Ngamiland area and not all households in recognised villages such as Maun rely on reticulated water supply. Some households still depend on the other sources such as tankers, wells, rivers, streams, and dams/pans.

Maun 'is the centre of economic activities in the district ... a focal point for tourism, and a business centre for local craft industries such as basketry, skins and Basarwa crafts' (Mmopelwa et al, 2005). Water supply for Maun comes from two wellfields (the Thamalakane and Shashe) and is augmented with surface water during certain times of the year. The Shashe wellfield has however been depleted and will soon be decommissioned (Gojamang, interview, 19/09/05, Maun). Four electricity-powered and 19 diesel-powered boreholes help deliver this supply. Borehole depths range from 20-60 metres (Plantec Africa, 1997). Mmopelwa et al (2005) conducted a survey in the high-employed, middle-income suburb of Chobe in Maun. According to the authors, 89% of respondents reported unreliable and unpredictable water supply; 74% reported year-round water shortages; and 19% experienced irregular water supply during the year. Bombo (pers. comm.) attributed problems of water supply to, inter alia, frequent breakdown of borehole engines, old equipment and machinery used for the reticulation of water, pipe bursts and power cut-offs (quoted in Mmopelwa et al, 2005). Between January-October 2004, DWA recorded 249 breakdowns with a total repair cost of P329, 540, a significant amount of money given that these are recurrent problems. Households interviewed revealed a number of contingency plans to ensure supply, and listed them as: travel to other places (35%); stored water in containers (53%); asked for water from people with overhead storage tanks (12%). Households also revealed poor quality of water, including unusual taste (saltiness), discolouration, and high degree of sedimentation and staining of

baths (suggesting high mineral content). Mmopelwa et al (2005) tested the water and found the quality to be unreliable.

Given that Maun is the District Headquarters and that the mentioned suburb is one of the wealthier parts of the village, it would not have been unreasonable to expect better quality and quantity of supply. However, these are common problems throughout Maun (personal observation), often becoming worse during the driest parts of the year.

4. ACCESS TO WATER SUPPLY IN UNRECOGNISED SETTLEMENTS OF NGAMILAND

Thirty three percent of the Ngamiland population live in areas/settlements of less than 500 people. For these people, the Okavango River and its outflows are an important source of water. In a study of six ungazetted settlements and one gazetted settlement (Chanoga) along the Boteti River, Tsholofelo (2005) found that whereas all households interviewed in Chanoga obtain water for domestic purposes from standpipes supplied from boreholes by the District Council, 89% of all 80 interviewed households in ungazetted settlements “satisfy their domestic water requirements through abstracting and using untreated water from the Boteti River during the period when the river is flowing” (a total of 1480 people are said to live in these six settlements; the 80 households canvassed equate to about 37% of this population). The remaining 11% travel to collect water at standpipes in Chanoga or other gazetted villages.

During the dry season (March-July and August-December), 69% of households “obtain water from unprotected hand-dug wells often located within the bed of the same river”. Some of these wells can be up to 30 metres deep (Bendsen, personal comm., 2005). Other households haul water in tanks and drums from nearby villages with stand pipes using donkey carts and vans; otherwise people walk to reach a source of water and carry buckets on the head. This division of labour is gendered, as men collect water via donkey cart and women carry buckets. Tsholofelo (2005) found that distances covered to the

water source in ungazetted settlements range from 0.5 to 4.0km, and in some cases more. In one case, ‘relocating to Maun’ was found as a viable dry season strategy.

In most places, communities share these water sources with their livestock and wild animals. Sixty nine percent of the ungazetted households interviewed use water for watering livestock; 64% of residents of Chanoga (the gazetted settlement) use the same river for the same purpose (Tsholofelo, 2005). Often, people are unable to collect water due to the presence of predators such as crocodiles or other aggressive mammals such as hippos and elephants. Crocodiles are reported to attack livestock while elephants attack people and also stir up the water thereby altering its quality and colour.

The open access nature of the river also creates problems of pollution. According to the Member of Parliament for Maun Mr R. Ramsden, ‘some places like Maun Lodge and Riley’s Hotel drain their sewage straight into the river’ (Chanoga kgotla meeting, 04/03/05). According to two residents, ‘Waste is dumped everywhere, particularly by people from Maun who hold parties along the river banks’; and ‘Government officials who camp in our area also leave litter around their camps’ (Chanoga kgotla meeting, 04/03/05; confirmed by personal observation, June 2005).

Given the unreliability of the source itself, consumption levels in ungazetted households are correspondingly low. Tsholofelo (2005) found that 73% of the households consume no more than 20 litres per person per day; while only 5% consumed 40l-50l/p/d. Water carried to the household is only used for drinking and cooking; bathing and laundry is done at the river. While this reduces the demand for potable water, it poses other problems such as pollution from activities carried out at the river.

Within Botswana borders, only 90 km is in the form of a permanent river, the rest are seasonal and permanent swamps that constitute the Delta and its outflows. Most of the district depends on groundwater for its water supply. Usable groundwater resources are generally limited in much of the district outside the Delta, with a high risk of striking saline or brackish water (NWDC et al, n.d.). Away from the Delta, the only source of

clean water is fresh aquifers that are extremely sensitive because they are surrounded by saline aquifers (WRC, 2004). The practice of settling around boreholes in the context of highly permeable Kalahari sands subjects the aquifer itself to pollution by humans and animals (Huntsman-Mapila, pers. comm., 2005). Treatment of this water and care of the water source is therefore essential if water of acceptable quality is to be regularly supplied. Other sources include rainwater harvested in natural depressions/pans, and rainwater tanks attached to staff houses and public facilities (NWDC et al, n.d.; Mmopelwa et al, 2005). In most ungazetted settlements people depend on the river when it is flowing, and dig wells (by hand) during the dry season.

Water quality is a common problem in most water sources in Ngamiland. Sometimes the quality is so bad that even wild animals and livestock cannot drink it (Masamba, interview, 24/10/05). Water quality problems include: high salinity, offensive odour and colour (Tsholofelo, 2005). Water from some boreholes used for wildlife watering around Kumaga has been reported to have red algae (Mosojane, interview, 21/09/05, Maun). When there is no water purification system, such as in most ungazetted settlements, communities have to deal with these kinds of issues. According to Tsholofelo (2005), most communities have resorted to boiling the water, letting it settle and sieving it. This was also suggested by a water chemist at HOORC as a method to be recommended for all residents of Ngamiland, including those residing in high-cost housing in Maun (Masamba, interview, 24/10/05). In Xaxaba, an ungazetted settlement, there have been cases where community members, mostly children, allegedly fell sick after drinking water from the river (Ngami Times, 14-21/10/2005). Communities that depend on rivers for domestic water supply and livelihoods in general also worry about upstream-downstream activities that may affect both the quantity and quality of the water (Bendsen, 2005a and 2005b).

Of the more than 600 settlements in Ngamiland, 48 have been recognised as villages. Contrary to government policy, 24 of the 48 villages have populations less than 500 (these range from 67 to 472). Some of these were declared villages because they were identified as growth points for their hinterlands (cattle posts, lands etc.) and therefore

provided with basic services including water, while others were the Remote Area Dwellers under the RADP programme and therefore afforded minimal services, most of which is water supply.

Remote Area Dwellers (RADs) are those people who are defined on the basis of their (1) spatial location (remote areas outside villages), (2) socio-political status (marginalized), and (3) socio-economic status (impoverished and subject to discrimination) (www.kalaharipeoples.org/documents/Educ-san.htm). The numbers of people designated as Remote Area Dwellers in Botswana vary, depending on the source of the information, with estimates ranging from 60,000 - 100,000. Of these people, some 50,000 are San or Bushmen.

One of the major problems of RADs in Botswana is that some of them live in areas not only outside of gazetted villages, but also outside of remote area settlements where there are basic services such as schools and clinics. This is true for those people living in rural agricultural areas, known in Botswana as lands areas, and those living on cattle posts (*meraka*), as well as those living on freehold farms such as the Ghanzi Farms in western Botswana, the Tuli Block farms along the Limpopo in eastern Botswana, and the Molopo Farms of southern Botswana in Ngwaketse District.

The Remote Area Development Programme (RADP) seeks to improve the living conditions of those who are socio-economically lagging behind the rest of the population, and those who live far from basic services (Tshipinare, 2003). Through this program, the government has been able to provide considerable development assistance in social services such as schools, water supply, health services and others. To encourage economic activity and improve the economic welfare of the target group, the program includes the Economic Promotion Fund (EPF), which aims to enhance and promote sustainable local economic development initiatives of remote area dwellers (Tshipinare, 2003).

Having explained the rationale for the Remote Area Development Programme (RADP), it is clear that not all settlements with populations of less than 500 people benefit from this program. According to the Ngamiland District Settlement Strategy, (Plantec Africa, 2003), in Botswana there are currently 67 settlements under the Remote Area Development Programme and about 90% of these have basic infrastructure services. Thirteen of these are in Ngamiland. These are: Mabele, Phuduhudu*, Somelo, Qangwa*, Xaixai, Dobe, Nxauxau*, Chukumuchu, Gani*, Khwai, Kaure, Tsodilo and Gudigwa (*gazetted as villages). The rest of the settlements with populations of less than 250 people get no water supply services whatsoever and have to fend for themselves. There are a number of other unrecognised settlements with more than 500 people. Often these are close to larger villages such as Maun and Gumare. As the section on the Boteti area above suggests, proximity to a gazetted village – and proximity to the major village of Maun – is no guarantee that potable water will be readily available.

5. WATER SUPPLY PROBLEMS IN NGAMILAND

While in absolute terms Botswana has made remarkable progress in providing water services to most of its population residing in other parts of the country, the same cannot be said for Ngamiland. WHO/UNICEF estimated that the proportion of the rural population with access to safe water in Botswana had increased from 88% in 1990 to 90% in 2002 (WHO/UNICEF, 2004). Most of the remaining 10% without access to safe water is resident in Ngamiland. Ngamiland comprises about 8% of Botswana's population, and in 2001, 48% of the population in Ngamiland East had no access to piped water, while in Ngamiland West this percentage was approximately 28.2%. While this chapter deals with access to water supply, it should also be noted that access to water resources in Ngamiland means more than just water supply for drinking and cooking. As shown in Chapter 6, people in Ngamiland are extremely dependent on the Okavango River's ecosystems and the goods and services that it has to offer. No other district in Botswana is as dependent on natural resources for livelihoods like Ngamiland District (CSO, 2001).

Table 7.5 Water supply and water related problems in some villages and settlements in Ngamiland

Sample of village	Status (Gazetted or non-gazetted)	Population	Source of water	Type of service available	Water authority	Issues/problems present
Mababe	Gazetted	157	Borehole	Standpipes	DC (CWU)	Seasonal/ periodic shortages
Komana	Gazetted	186	Borehole	None	DC (CWU)	No reticulated water supply
Xaxaba	Gazetted	78	River and borehole	None	None	Borehole not working Water quality poor Long distances covered to fetch water
Ditshiping	Gazetted	238	River	None	None	Water stirred up by elephants Water quality no good Long distance covered to fetch water
Sexaxa	Non-gazetted	534	Borehole	Standpipes	DC (CWU)	Only 3 standpipes
Tsodilo	Non-gazetted	172	None	None	DC (RADP)	No drinking water
Khwai	Non-gazetted	395	River	None	DC (RADP)	No reticulated water

Senkondomboro	Non-gazetted	655	River	None	None	supply
Chanoga	Gazetted	381	Boreholes	Standpipes	DC (CWU)	Crocodiles in the river threat to people Periodic/seasonal shortages
Shakawe	Gazetted	4 389	Treated river water	Standpipes and private connections	DC (CWU)	Water problems
Gumare	Gazetted	6 067	Boreholes	Standpipes and private connections	DC (CWU)	Water shortages (some boreholes dry) Water colour and quality poor
Maun	Gazetted	43 776	Boreholes	Standpipes and private connections	DWA	Seasonal shortages Poor and inconsistent quality Erratic supply

Table 7.5 above shows a sample of all types of villages and settlements in Ngamiland; their water sources; the type of service they receive; the water authority responsible; and the problems with their water services. This section highlights the responses of key interviewees to perceived supply problems. These problems or challenges either hamper a reliable supply of water services or impede progress toward sustainable use and management of water resources. As shown below, DWA and the District Council are well aware of these problems but face their own problems in trying to supply and manage water resources in the district.

i. The challenge of providing a reliable domestic water supply

As shown in Sections 3 and 4 above, there is a serious water supply problem in Ngamiland. This is especially so in non-gazetted settlements where one third of the district population lives. Officers from both the DWA and the District Council responded as follows: “Nothing can be done about water supply problems of these settlements” (Reakae, interview, 19/09/05, Maun). There is an element of anger in some officers when one mentions the issue of water supply to the areas. The supply manager from DWA responded: “They must go back to larger villages where they can get water. Why are they refusing to move?” (Gojamang, interview, 19/09/05, Maun). Remote dryland settlements, like Tsodilo, requested to be connected to the district water supply system. In larger villages like Etsha and Nokaneng the supply of water to individual homes was highlighted. DWA’s response to most of these issues was that it only develops systems and hands them over to the District Council. District Council on the other hand maintains that it fails to keep up with the demand because of lack of sufficient resources, both financial and human, to build water supply schemes and supply gazetted settlements. Where the DWA supplies water (i.e. Maun), most water shortages are blamed on the supply scheme’s inability to pump water to some parts once the water table drops (Gojamang, interview, 19/09/05, Maun). The system is simply not capable of supplying the rapidly growing demand in Maun and its localities. With regards to the availability of water resources to cater for Ngamiland, DWA posits that the current abstraction levels are very insignificant and neither projected increase in population nor per capita demand

is expected to have a significant impact on the hydrology of the Delta (DWA, 2005). This suggests that water shortages in Ngamiland are an issue of management failure, not physical water scarcity. Key interviewees attributed water supply problems to one or more of the following:

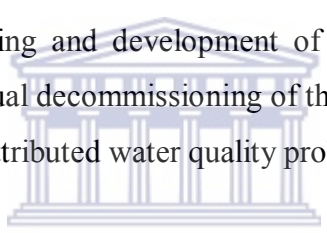
- Growing demand from increasing population
- Lack of enough boreholes to pump water
- Settlement patterns in the district
- Lack of sufficient funds by DC to supply more villages
- Shortage of labour at both DWA and DC to carry out activities such as building water supply schemes (due to the government's zero growth policy that has been in place for the past 5 years), maintenance and operation
- Shortage of staff with relevant skills (management, technicians, supervisors etc)
- Centralisation of staffing decisions
- The expensive nature of water development in the district (groundwater abstraction)
- Delayed responses to attend to pump breakdowns due to transport problems, resulting in pump breaks not being attended to for long periods of time
- Destruction of water storage tanks in remote areas by large mammals, particularly elephants, especially in the dry season, and the difficulty of attending to these problems

ii. The challenge of managing water quality, minimising pollution and protecting water resources

The threat of water pollution by inadequate management of fluid wastes in the villages, river activities such as laundry and bathing, floodplain gardening, wastewater handling in tourist camps and lodges in the Delta are regarded as a potential danger by both primary and key stakeholders (Bendsen, 2005a). DWA responded that there are indications that the authorities responsible for issuing licences for lodges and monitoring adherence to environmental standards lack the resources to carry out proper control (DWA, 2005).

DWA itself does not monitor the activities that pose a threat to the quality of water resources (Ramoshidu, interview, 19/09/05, Maun).

DWA is also currently doing nothing to prevent the drying up of aquifers, as there are no regulations dealing with this (Reakae, interview, 19/09/05, Maun). An example of a depleted aquifer is the Shashe wellfield aquifer. The freshwater lens, which has developed in the Shashe River Valley, has been continuously exploited for the domestic water supply of Maun and is now reported to have declined by 15m (Bauer et al, 2005). The extended period of no flow in the Shashe River has resulted in deterioration of water quality in many production boreholes due primarily to increasing salinity. Additionally the proximity of Maun to the Shashe wellfield has facilitated the continuing encroachment of settlements into the wellfield, creating a serious threat of contamination (WRC, 2004). This has raised concerns about the sustainability of the present freshwater pumping and led to the planning and development of new wellfields along different seasonal streams, and the eventual decommissioning of the current abstraction site (Bauer et al, 2005). Key stakeholders attributed water quality problems to the following:

- 
- Lack or insufficient laws governing groundwater abstraction and use
 - Lack of monitoring of abstraction levels from boreholes
 - Over abstraction resulting in salt water intrusion into freshwater aquifers
 - Land use activities such as agriculture, pit latrine toilets in areas with high water table
 - High solar radiation resulting in high evaporation, leaving salts in the water
 - Climate change resulting in declines in water tables
 - Lack of recharge of aquifers

iii. Challenges of supplying productive water

Government continues to view 'productive water' as that which facilitates concentration of people and cattle away from the Delta. This means a continuing emphasis on borehole development. Borehole development in Ngamiland District has increased exponentially,

from fewer than 50 in the early 1960s to more than 1100 to date (Vander Post, pers. comm.). Demand for these sources continue to grow while government's ability to monitor development and use is severely limited (Bendsen, pers. comm.). The vast majority of these boreholes are either privately owned by households or commercial livestock farmers. Smallholders who keep livestock for subsistence purposes depend on seasonal or perennial (river, pan) water sources, or pay a fee to borehole owners who have developed these water points on communal land. The density of boreholes has increased tremendously as the distance between them has been reduced from 8km to 6km (Ramoshibidu, interview, 19/09/05, Maun). The tourism industry is also allocated a lot of water as boreholes for watering wildlife are also increasing especially in dry areas that are mostly used by farmers for grazing their livestock. Competition for both grazing areas and water by wildlife and livestock is increasing (Naidu, interview, 19/09/05, Maun). This puts pressure on both vegetation and water resources.

Despite numerous warnings regarding borehole development and its impact on aquifers (SMEC et al, 1991), government is reluctant to restrict the ability of people to search and exploit their own water – be they large-scale cattle farmers through borehole development or subsistence dwellers in ungazetted villages through hand dug wells.

6. SUMMARY

Chapter 7 has highlighted the universally perceived importance of supply of water of sufficient quality and quantity for domestic and productive activities. In this regard, Botswana, as a developing country appears to be performing very well, with 88% of the population having access to water. The government is rightly proud of this achievement. However, this chapter has attempted to show how national aggregates hide realities at local level. Eighty four percent of rural Batswana have off-plot access to water, with 'off-plot' varying dramatically from well-functioning communal standpipes to 30m deep hand-dug wells. As shown in this chapter, all of this water varies in quality and quantity.

Water supply is tied directly to Botswana's national settlement policy that encourages settlement in limited areas so that services may be concentrated. In recognised settlements, supply is erratic, expensive, and often unreliable in terms of both quality and quantity. This is prevalent even in the District Headquarters of Maun, where fully 33% of Ngamiland's entire population resides. While not an outright management 'failure' perhaps (especially considering the important human, financial, technical and decision making constraints operative at District level), this does suggest that water supply management institutions in Ngamiland (DWA in Maun; District Council in association with DWA elsewhere) are dramatically underperforming and in need of serious reform.

In ungazetted villages the picture is far less optimistic. As shown above, the majority of residents of six ungazetted settlements along the Boteti River use less water than globally accepted standards (25 l/p/d or 50l/p/d depending on the source). The quality of this water is unreliable while access to its supply is often fraught with competition from wild animals. This suggests not only a management failure, but also a failure of policy, in particular a settlement policy that refuses to recognise the mobile livelihood patterns and processes of most Ngamiland residents.

Indeed, residents in the Boteti area prefer to migrate to collect water rather than resettle permanently; this reflects their own understanding of livelihood sustainability being dependent on seasonal mobility. This seems an important point, for not only does it contrast with government policy, it also brings under the spotlight the sustainability of fixed settlement policy in a dynamic physical environment. At the same time, government is making decisions in the absence of scientific data – hence the desire of the DWA to undertake hydrological modelling within the context of the ODMP.

Key stakeholders in government recognise and often acknowledge the limitations of their performance. Working within standard bureaucratic and sectoral frameworks, however, local water suppliers ascribe to performance criteria set down by superiors located in Gaborone. To them, 88% looks quite good as an aggregate performance indicator. Theirs is a completely unreflective style of policy making and implementation. To challenge this

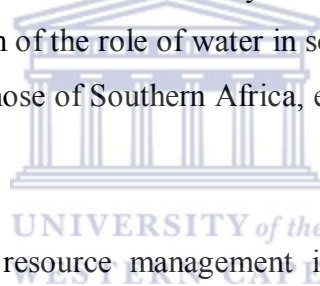
and other aspects of delivery is often met with resentment and aggression. The researcher's inquiries sometimes were dismissed outright, such as 'there are no problems with grazing lands in Ngamiland' (Muchina, interview, July); or refusal to discuss (the Agricultural Resources Board); or complacency, such as 'As long as the water [rain in Angola] is coming down, the aquifer will recharge, so there is no problem' (Naidu, interview, 19/09/05). However, as shown in this chapter, there are serious problems with water supply in Ngamiland. These are problems that arise from a combination of policy decisions, institutional arrangements and organisational practices, each of which is examined and reflected upon in Chapter 8.



CHAPTER 8

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter presents a brief summary of the argument made thus far, reaches several conclusions and makes a number of recommendations for improving water resource management performance in Botswana in general and Ngamiland in particular. As shown in Chapter 2, institutions are perceived to be at the centre of the world's water crisis. Centralised decision-making, lacking both transparency and accountability, based on narrow scientific understandings of the definition of water, and often made in the service of political and big business interests has led to unsustainable, inequitable and inefficient practice around the world. This process has been captured by Allan (2003) in terms of the 'hydraulic mission' – a phenomenon that was most prevalent in the early modern period in Western societies, but still dominates in many developing societies. This form of decision-making and conception of the role of water in society is particularly problematic in water scarce states such as those of Southern Africa, especially Botswana (Chenje and Johnson, 1996).



Another problem with water resource management in the developing world is the fragmented nature of institutional decision-making. The water cycle has not been the determining factor in decision-making, neither within nor across sectors. To the contrary, decisions have been taken, after which the search for water – i.e. overcoming the limitations of the water cycle – begins. Southern Africa is characterised by numerous inter-basin transfer schemes and big dams. Although little water is abstracted or captured from the Okavango River Basin in this way, there are numerous plans in all three riparian states to do just this (Turton, Ashton and Cloete, 2003; IUCN, 1992).

As shown in Chapter 5, and keeping in mind the objectives as stated in Chapter, all of these problems are prevalent in water resources management in Botswana. Table 8.1 summarizes some of these issues. Integration is lacking; decision-making remains top-down and radiates outward from the centre to the periphery; stakeholder participation is

limited to consultation at best; and both transparency and accountability are lacking. The reasons for the persistence of this pattern of decision-making may be seen to lie in a combination of bureaucratic routine, organisational culture, institutional framework, the apathetic and parochial nature of Botswana society and a hierarchical political economy. As shown in Chapter 5, the overall institutional framework for water resources management exacerbates this negative behaviour. Moreover, an organisational culture that lacks reflexivity and often promotes complacency shows little inclination toward changing bureaucratic routines. As Abernethy (2005) describes it, Botswana's management style is traditional in the sense that departments across ministries are more likely to compete and be suspicious of each other than they are to cooperate and work toward a common good.

How can these problems be overcome? One is left with the admittedly vague variable of political will. In Botswana, there simply is no incentive to change standard operating procedures. This contrasts with water stressed countries such as Namibia and South Africa whose water resource endowment is not dissimilar to Botswana's. However, those states seem to have gone much farther toward IWRM style practices, perhaps because each society was united in a long struggle against (race-based) oppression. Despite many difficulties, decision-makers in each state seem determined to change the way things have been done in the past; and a developmental mission appears to be in place in these societies. A powerful minister, such as South Africa's Kadar Asmal when he was Minister of Water Affairs and Forestry and later Minister of Education, may drive a progressive process. Unless there is support from the highest echelons of power it is unlikely that past practice will change.

Perhaps a practical step in the direction of IWRM in Ngamiland could be the formation of sub-basin commissions in the Lower Okavango. Rather than give these new institutions decision-making power, I am inclined to follow Van der Zaag's idea (2005) that this new institution be given advisory power, and a voice throughout the current institutional framework – it could be considered an environmental and social 'watchdog'. One of the biggest problems with water reform in southern Africa has been the ill-considered push to empower weakly entrenched institutions such as catchment councils,

resulting in domination of these new institutions by already powerful groups such as farming and industry (Swatuk, 2005).

The need for resource-based institutional structures (River Basin planning based on an ecosystem approach) is clear. As shown in Chapters 6 and 7, current systems of delivery are inefficient; legal frameworks tend to favour those already empowered in society – commercial ranchers; tourism operators; wealthy individuals who are free to pursue ‘self-help’ through borehole development; government policy and practice regarding access to water supply leaves rural people particularly vulnerable; and access to water related resources is diminishing for people most dependent for survival on the resource base. Importantly, decisions are taken without adequate data. As a result, water appears to be treated as an open-access resource in Ngamiland, where the powerful are free to capture as much of the resource base as the law (however weakly implemented) will allow: money allows the wealthy to pump as much groundwater as is possible, free of charge. When these boreholes run dry, more are drilled. Faith, not science, seems to underpin this practice, as the quotation regarding aquifer recharge from Naidu in Chapter 7 suggests. But can a resource be sustainably managed on faith?

To reiterate a point made earlier, this situation persists, it seems to me, due to a difficult knot inter-linking the political economy of an unequal society (Botswana has a gini coefficient of inequality of 0.56; UNDP, 1998, high, considering size of Botswana’s economy), bureaucratic routine and organisational culture. In Ngamiland, this is made worse by limited human and financial resources (as described in Chapter 7).

Yet, there may be some hope for moving toward ‘light IWRM’. Clearly, changing the overall way things are done in Botswana is a long-term process. In the short-term there seem to be several viable interventions.

First, with regard to planning within the resource base, the ODMP presents an opportunity to continue experimenting along these lines. It is true that there are different voices reflecting various views regarding the resources of Ngamiland (e.g. the IUCN’s ‘ecosystem approach’ that seems to be supported by DEA compared with the sectoral

‘wish lists’ drawn up by project partners). If IWRM is a process – and not a template – then the ODMP provides the context wherein these contrasting views can continue to debate ways forward (personal observations). Stakeholder participation and data gathering exercises are extremely important in this regard. If inequitable, inefficient and unsustainable practice is to be overcome, then the voices of those who suffer at the hands of bureaucratic routine and organisational culture must be heard, and their views must be supported by good science.

Second, capacity building linked to research is also a way forward. All organisations within Botswana suffer from human resource constraints. Like other developing countries, Botswana lacks sufficient data to make informed decisions. Training a new generation of managers, schooled in the values of IWRM, who conduct necessary research within the resource base, can only help change organisational culture and bureaucratic routine in the long-term. Developed countries took several hundred years to move toward IWRM; how reasonable is it to ask developing countries to do the same within a generation or two?

Third, water must be treated as an economic good. District Councils are tasked with the difficult project of providing water to scattered small villages. This is only one of the many responsibilities of a financially crippled organization. As politically unpopular as it may be, the indiscriminate and unmonitored pumping of groundwater must be regulated. How better to regulate groundwater abstraction than through charging fees for doing so? Granted, the ability to monitor is already limited, even in Maun. Improving this situation in the short-term requires support from central government in terms of revenue and human resources.

Fourth and last, overcoming these numerous problems of water resource management in Ngamiland, and in the country as a whole, may require a champion – a popular and influential political personality who could press for change. Could the President-in-waiting, Ian Khama, be Botswana’s ‘Mandela factor’? If not the future president of the country, then who?

In conclusion, I return to the hypotheses articulated in Chapter 3.

Hypothesis 1: In Botswana, institutions are at the heart of the failure to manage water resources sustainably.

This hypothesis seems to be confirmed in the analysis. However, one must acknowledge that government, operating within its own parameters and pursuing its own objectives, regards its achievements as laudatory and explains shortcomings as a consequence of human and financial limitations. At the same time, people in Ngamiland do not expect much from government; their generally low expectations and low threshold of satisfaction place minimal pressure on government to change. Lack of active civil society and collective bargaining also deters the government from making any additional efforts beyond what it has already planned to undertake.

Hypothesis 2: Only determined political will on the part of decision-makers in key policy positions can bring the necessary influence to facilitate positive change in organisational and social cultures.

This hypothesis may be considered as affirmed with regard to implementing ‘full IWRM’. As shown above, however, there is space and scope for pursuing ‘light IWRM’.

Hypothesis 3: In Botswana, there is little incentive to change current organisational routines. Prospects for overcoming current negative practices and instituting IWRM are therefore limited.

This study seems to affirm the findings of both SMEC (1991), and Swatuk and Rahm (2004). Government, on their part, are not ignorant of these conditions. Almost every detailed consultancy study – for the development of Maun, for the development of Ngamiland, for the implementation of the National Settlements Policy, to name but three – include sections highlighting the negative consequences (for sustainable resource use;

for poverty alleviation) of current practice. The simple truth is, most of the incentives to move toward IWRM in the country are driven by external actors (e.g. donors) and forces (e.g. global conventions). There is little local ownership of IWRM, particularly at the top echelon of decision-making. Facing drought in the densely populated eastern part of the country in 2003, the Permanent Secretary in the Ministry of Minerals, Energy and Water Resources, Mr. Tombale, stated in his opening remarks to the 4th annual meeting of WaterNet/WARFSA held in Gaborone, ‘I am a farmer ... In the end, I look to God and pray for rain’ (personal observation). Two years later, the Gaborone dam is 17% full, and the North-South Water Carrier is failing to make up the shortfall; what has government done in the past two years? Praying for rain, it seems to me, is not a firm basis for water resources management in Botswana.

Table 8.1 Summary of findings and proposed recommendations

Aspect of IWRM	Author	Performance	Explanation	Cause	Remediation
Integration	GWP-TAC (2000)	No	- Centralised planning - Consultation across departments ex post facto - ODMP difficulties	Bureaucratic routine	RBC's as advisory boards across departments
Subsidiarity	GWP-TAC (2000)	No	- Decentralisation of tasks only	- Institutional framework - Political economy (Hierarchy)	- Political will? (Namibia model?)
Stakeholder Participation	GWP-TAC (2000) Jeffrey and Vira (2001)	Yes but 1-3 in chapter 2 (Participation section)	- ODMP stakeholder consultation process but not in overall national policy	- Institutional framework - Political economy (Hierarchy)	Political will?
Accountable	Narain (2000)	No but yes in theory	-Decision-making	Organisational culture	Political will?

			hierarchy - Performance penalties		
Transparent	Narain (2000)	No	- Centralised decision before 'consultation' then imposition	Organisational culture	Political will?
Legal Framework/ Rights to water	Narain (2000)	Yes	- Everybody has legal right to sufficient water for sustainability (and water stock)	Organisational culture	Political will?
Ecosystem Approach/ IRB Planning	Radif (1999) Jaspers (2003)	No, but possibilities	- Highly centralised but ODMP provides framework to think about modalities	Bureaucratic routine	ODMP as pilot project; better information from science
Efficiency	GWP-TAC (2002)	No	- Lack of financial resources/ cost of maintenance of poor infrastructure/ delivery system	-Human/ financial shortages - Organisational culture	- Training - Water as an economic good - Penalties for non-performance - Water point management
Sustainability	Pollard (2002) Jonker (2002)	No	- Mining of aquifers - Decisions taken with poor information - Pump rather than precaution	"Open access" de facto treatment of resources - "Big development"	- Data on consequences of unsustainable practice
Access (water	MDGs Gleick	Yes/No	- Nationally, good %	- Organisational	- Training: Revenue

supply)	(2000)		improvement through time - Rural people vulnerable -(Peri) urban erratic supply and quality	l culture - Human and financial resource shortages	generation
Equity	Levite and Sally (2002)	No	Big farmers, tourism companies, individuals self-help, urban better than rural	- Political economy of unequal society (0.56 Gini Coefficient, UNDP, 1998)	- Champion? - Exposure through research
Access (Water-related resources)	IUCN	Yes/ but decreasing	- Loss of fishing grounds - Loss of <i>molapo</i> - Loss of access to grazing + traditional veld products harvesting grounds - More people on less space (Delta footprint)	- Bureaucratic routine - Organizational culture - Political economy	- Champion? - Exposure through research

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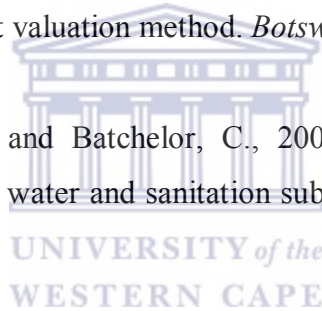
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INTERVIEWS

Mr Mpateng Gojamang, Water Supply Section, Distribution Manager, Department of Water Affairs, Maun 19/09/05

Mr Koketso Baeti, Hydrology and Water Resources, Head of Section, Department of Water Affairs, Maun, 19/09/05

Mr Johnson Reakae, Design and Construction, Head of Section, Department of Water Affairs, Maun, 19/09/2005

Dr Kurugundla Naidu, Aquatic Vegetation Control, Head of Section, Department of Water Affairs, Maun, 19/09/05

Mr Gabalaiwe Ramoshibidu, Groundwater Section, Groundwater Officer, Department of Water Affairs, Maun, 19/09/05

Mr Alec Makgasane, District Council- Council Water and Wastewater Unit, Principal Technical Officer, 20/09/05

Mr Sibangani Mosojane, Department of Wildlife and National Parks, District Wildlife Coordinator, Maun, 21/09/05

Dr Eliot Taylor, Okavango Development Management Plan, Chief Technical Advisor, Maun, 20/05/05

Dr W.M. Muchina, Department of Animal Health and Production, Veterinary Officer, Maun, 05/07/05

Dr Wellington Masamba, Water Chemist, Harry Oppenheimer Okavango Research Centre, Maun, 24/10/05