



# Orange-Senqu River Basin

Orange-Senqu River Commission Secretariat  
Governments of Botswana, Lesotho, Namibia and South Africa

UNDP-GEF  
Orange-Senqu Strategic Action Programme  
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## **Demonstration Project on Community Based Rangeland Management in Botswana**

Scoping Study

Technical Report 4  
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UNDP-GEF  
Orange-Senqu Strategic Action Programme

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### Scoping Report

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# Glossary

## Abbreviations and acronyms

BIDPA	Botswana Institute for Development Policy Analysis	IUCN	International Union for Conservation of Nature
BMC	Botswana Meat Commission	LURRMP	Land Use and Range Resources Management Plan
BORAVAST	Community trust, comprising of the communities of Bokspits, Rappelspan, Vaalhoek and Struizendam	LSU	Livestock Unit
BWP	Botswana Pula (currency)	MEWT	Ministry of Environment, Wildlife and Tourism
CBNRM	Community Based Natural Resources Management	MOMS	Management Oriented Monitoring System
CWARAP	Country-wide Animal and Range Assessment Project	NAP	National Action Plan
CBOs	Community Based Organisations	NGO	Non-Governmental Organisation
CHA	Controlled Hunting Area	ORASECOM	Orange-Senqu River Commission
CKGR	Central Kalahari Game Reserve	RAD	Remote Area Dwellers
DDP	District Development Plan	RADP	Remote Area Development Programme
DFRR	Department of Forestry and Range Resources	SADC	Southern African Development Community
DWNP	Department of Wildlife and National Parks	SAP	Strategic Action Programme
FAP	Financial Assistance Policy	SGL	Special Game License, hunting license
GDP	Gross Domestic Product	TAC	Technical Advisory Committee
IVP	UNDP-funded Indigenous Vegetation Project	TDA	Trans-boundary Diagnostic Analysis
IWRM	Integrated Water Resources Management	TFCA	Transfrontier Conservation Area
KD/1	Management area KD/1 of Kgalagadi District	TGLP	Tribal Grazing Land Policy
KTP	Kgalagadi Transfrontier Park	UNDP	United Nations Development Programme
ICP	International Cooperating Partner	UNEP	United Nations Environment Programme
		WMA	Wildlife Management Area

# 1. Background

## 1.1 Orange-Senqu Strategic Action Programme

The Orange-Senqu River riparian States (Botswana, Lesotho, Namibia and South Africa) are committed to jointly addressing threats to the shared water resources. This is reflected in bilateral and basin-wide agreements between the riparian States and led to the formation of the Orange-Senqu River Commission (ORASECOM) in 2000.

The 'Orange-Senqu Strategic Action Programme' Project supports ORASECOM in developing a basin-wide plan for the management and development of water resources, based on integrated water resources management (IWRM) principles. The Project will finalise the preliminary Trans-boundary Diagnostic Analysis (TDA). This final TDA will then serve as the scientific basis for developing an agreed set of interventions under the framework of a basin-wide Strategic Action Programme (SAP) and associated National Action Plans (NAPs) in the riparian States. In addition, demonstration projects shall focus on:

- Community based rangeland management, with sites in Botswana and Lesotho;
- Environmental flows for the Fish River in Namibia and the Orange Mouth, shared by Namibia and South Africa; and
- Water resources management in the irrigation sector, with sites in Namibia and South Africa.

## 1.2 Rationale

Land degradation due to human activity is a critical trans-boundary concern in the Basin. A significant challenge facing environmental protection and conservation of natural resources, particularly wildlife resources, is increasing pressure from other forms of land use. Traditional livestock rearing on marginal grasslands in the drier parts of the Basin in Botswana, requires large expanses of land. Whereas this is the main form of land use for the majority of the people it also poses a significant challenge especially to wildlife conservation in the area. Data from the Department of Wildlife and National Parks show that areas with high populations of livestock have low populations of wild animals.

The Demonstration Project on community based rangeland management shall empower local communities to address landscape degradation by implementing locally designed measures. The demonstration project will rely on indigenous knowledge and understanding of the challenges of rangeland degradation, the importance of rangelands in traditional culture, and the awareness of degraded conditions, while also expanding alternate economic opportunities for communities. The wealth of experience gained from past rangeland initiatives and projects shall be duly recognised and built upon.

More specifically the demonstration project shall:

- Be consistent with broader Government policies and initiatives in Botswana, but not a simple extension of ongoing work and so run the risk of being subsumed by it;
- Explore the nexus between poverty and environmental degradation, by targeting disadvantaged and vulnerable communities;
- Be set within a viable institutional framework and realistically attainable within the timescale and allocated budget;
- Focus upon rangeland management, but also explore alternative income sources; and
- Establish management and monitoring methodologies that are replicable in other parts of the Basin.

### **1.3 Opportunities for collaboration**

Various opportunities for collaboration between this demonstration project and other recently started initiatives exist. They include inter alia:

#### **UNEP-GEF funded Enhancing Decision Making Through Interactive Environmental Learning and Action in Molopo-Nossob Basin in Botswana, Namibia and South Africa**

The regional Kalahari-Namib Project, implemented by IUCN in collaboration with the Ministry of Environment, Wildlife and Tourism of Botswana, the Ministry of Ministry of Environment and Tourism of Namibia, and the Ministry of Agriculture of South Africa. GEF funding is in the tune of USD 2.1 million, additionally the participating countries will provide USD 1.9 million co-funding as well as in-kind contributions. The project aims to address desertification and alleviate poverty through a holistic approach based on the wider landscape and the needs of the local people. Actions will be directed into three thematic lines: (i) to restore and sustainably manage dryland ecosystem services in a participatory manner; (ii) to improve land tenure rights through multi-stakeholder dialogue and increased community-policy linkages; and (iii) to assist communities to develop alternative income sources through the development of markets for natural resources based products. In Botswana the project will focus will be on the Khawa communities on Omaheke and Hardap in Namibia, and the Siyanda District Municipality in South Africa.

#### **EC funded Securing Rights and Restoring Lands for Improved Livelihoods in Botswana, Jordan, Mali and Sudan**

A multi-country project, implemented by IUCN will be active in Botswana, Jordan, Mali and Sudan. Also a four year project and currently starting up. It aims at combating land degradation and desertification and enhancing the livelihoods of communities dependent on these marginal dryland areas. It shall, inter alia, establish a trans-border forum to enhance regional exchange of best practice, and cooperation and joint decision making on sustainable land management issues. Geographically the project will focus on the BORAVAST communities in Botswana.

## 2. Rangeland management in Botswana

Botswana is a landlocked country in Southern Africa with a surface of 600,370 km<sup>2</sup> and a population of 1.9 million inhabitants. It is bordered by South Africa, Namibia and Zimbabwe. Botswana's economy is one of the strongest in Africa and the country has one of the world's highest growth rates. Impressive development gains have been made, with significant improvement in most social and economic indicators since independence in 1966, but a highly uneven distribution of income has become increasingly evident. The progress is largely attributed to abundant diamond resources coupled with sound macroeconomic policies. With diamonds accounting for 70 percent of annual export earnings and more than one-third of GDP, the country's economy is heavily dependent on a single commodity. There are efforts to diversify the economy through promoting manufacturing and construction, and the financial and service sectors.

### 2.1 Physical geography

Some 7 million hectares of land in south western Botswana falls within the Orange-Senqu River Basin, which comprises the Molopo and Nossob fossil river valleys. There is evidence of perennial or semi-perennial flow within the Molopo valley between 16-12,000 years before present with additional fluvial events during the mid-Holocene. The Molopo had ancient links with other valley and river systems to the north, with the drying up of this once strong and permanent river not solely attributed to a decrease in rainfall. Indeed, an old Boer story suggests that the Okavango had once 'watered the Kalahari', while Schwarz (1926) suggested a "Proto-Orange" River joining the Molopo near Makopong (Nash, 1992).

Lying at an altitude of about 1000m, this area is covered by Kalahari Sands which form poorly structured and infertile soils of low moisture retaining capacity. The vegetation of this portion of the Kalahari is of Karoo-Namib affinity (Werger, 1973), with marked variation in species composition occurring along pans, dunes and river valleys. Rainfall is highly variable both within and between years and also spatially. The annual average for the extreme south-west of the basin in Botswana is 167mm, increasing to 300mm to the north and 350mm to the east. Drought is endemic due to the interior's peripheral and topographically isolated location in respect to the region's northern and eastern rain bearing air masses (Bhalotra, 1987). In the summer temperatures range typically between 20 and 37°C, but may rise to well over 40°C, with winter temperatures ranging from -2 to 12°C, and often falling to below freezing at night.

Water availability in the southern Kalahari is very limited, with perennial surface water and springs entirely absent. In good rainfall years clay depressions or pans can hold water for extended periods, with hand dug wells within their basins, traditionally providing the all essential water supply which



enabled people to settle there permanently. Today these wells are either dry or too saline for use with recharge rates are negligible.

## 2.2 Social context

Kgalagadi District has changed rapidly over the last two decades and is today relatively well connected with country's major highways, including the Trans Kalahari Highway and the recently completed Tsabong to Bokspits road. Due to its ethnic composition (San, Bakgalagadi and Coloureds), livelihood strategies in Kgalagadi District traditionally combined pastoralism and hunting and gathering. Most settlements in the district are situated near pans or fossil river valleys, or on rock outcrops that serve as sources of water through ground water supplies. The settlements in the southern Kalahari are in general characterised by high unemployment and severe poverty resulting in out migration.

The sizes of the some of the key settlements in Kgalagadi District are shown in the Table 1 below, where a broad contrast can be made between settlements such as Ncaang, Ukhwi, Ngwatle, Zutshwa and Khawa which are characterised by former hunter gatherer populations (also known as Remote Area Dwellers, RAD) and those of Tshane, Tsabong and Hukuntsi, which are much larger service centres and increasingly dominated by livestock-keeping economies. Along the Molopo River valley the settlements of Bokspits, Vaalhoek, Struizendam and Rappelspan are mostly engaged in pastoral farming for both commercial and subsistence purposes. Fenced private farms stretch down to the Molopo River and characterise the area outside of the village communal land, with many private ranches successfully engaged in Karakul sheep farming in the 1960s, until the market collapsed. Private ranches, cattleposts and village areas alike, are all afflicted by a chronic shortage of groundwater.

Settlement	Population in 2001	Number of households	Distance from Kgalagadi Transfrontier Park in km
Ncaang	175	43	250
Ukhwi	453	114	90
Ngwatle	120	20	85
Zutshwa	469	118	75
Khawa	517	128	21
Struizendam	313	76	23
Bokspits	499	122	53

Table 1: Characteristics of key settlements in Kgalagadi District

HIV/AIDS are as elsewhere negatively impacting upon livelihoods, due to the loss of the breadwinner who was remitting money (with implications on livestock purchases, payment of school fees), the loss of labour (through death, time needed to care for the ill, attendance at day-long

funerals) and the financial burden placed on families (cash diverted to health care and funeral expenses, and for the increased slaughtering of livestock for funeral rituals).

### **Land use**

Apart from the private ranches along the Molopo, fenced private ranches allocated under the Tribal Grazing Land Policy by the Ministry of Agriculture, communal village land and unfenced cattleposts, extensive areas of both the northern and southern parts of the Kgalagadi District fall within the so-called Wildlife Management Areas (WMAs). These were formulated in the early 1970s, with the idea that such areas should serve local communities primarily through sustainable wildlife utilisation, and act as a buffer zone between the protected areas and ranches and cattleposts. Twenty one per cent of Botswana's land area is made up of WMAs, which are further sub-divided into Controlled Hunting Areas (CHAs).

Owing to disputes and disagreements over land use, namely livestock versus wildlife, the gazettelement of the WMAs that lie between the protected areas of the Central Kalahari Game Reserve (CKGR) and the Kgalagadi Transfrontier Park (KTP), has yet to occur. As a result livestock continue to encroach into the WMAs and threaten key wildlife refuge areas and migratory corridors within them. A four year study 'the Western Kgalagadi Conservation Corridor' undertaken by Conservation International is attempting to establish formally conserved wildlife corridors between the CKGR and the KTP and ends in April 2011.

### **Livelihoods**

Murray (1979) analysed wildlife utilisation in Western Botswana and estimated that 39% of the population used game extensively for food and utilities, and that for 16% of the people, game is the principle source of their subsistence. As White (1994) explains for the Kgalagadi WMAs most of the inhabitants are primarily hunters and gatherers until recent times. A small minority own sufficient livestock to be able to sustain a reasonable standard of living. Another small minority are in paid employment, most of whom work for the District Councils in various capacities.

*'The vast majority of the population do not have a secure livelihood and are extremely poor. Full-time hunting and gathering is no longer a viable or acceptable lifestyle for most people. The majority of people survive on a combination of opportunistic and seasonal food gathering, drought relief food rations and drought relief employment, some craftwork and occasional 'piece-jobs' often at very low wages. A minority of individuals still hunt but success rates are low due to the scarcity of game....'* (White, 1994).

Contemporary livelihood strategies combine Government drought relief projects, social welfare programmes, livestock rearing and collection of veld products especially in the case of female-headed households (IUCN, 2007). Plant resources tend to contribute to the livelihoods of the local communities on a seasonal basis and also in times of good rains. Access to wildlife resources is now at a collective community level through the quota. The community auctions this quota to private safari operators and uses only part of it for subsistence (IUCN, 2007).

## Livestock keeping

The southern Kalahari is ill-suited to livestock production due to the lack of surface water, high rainfall variability and fragility of the ecosystem. The pastures are of very low nutritive value with high crude fibre, low calcium and phosphorus and low dry matter digestibility characteristic, and low crude protein the major limiting factor. However, the advent of deep borehole drilling technology in the region in the mid twentieth century made it possible to pump up fossil water from deep aquifers and effectively broke down the age-old protection of the Kalahari (Cooke, 1985). Permanent livestock grazing around boreholes has resulted in distinct zones of bare soil, ephemeral plants, woody shrubs and grasses outwards from the water point to the outer edge of the intensively used area (the 'piosphere'). These zones migrate progressively outwards over time and appear particularly resistant to changing back to their original condition. While shrub establishment in xeric regions such as the southern Kalahari is directly limited by moisture, it is strikingly evident on pans and fossil river valleys and is believed to last from 60 to 100 years.

The bare ground or 'scarifice zone' (Stoddart *et al.*, 1975) within several hundred metres of the water point is characterised by entirely bare and active sand dunes, with sand movement on the crests of the linear dunes discernible over many kilometres from the borehole – especially during drought. The grazing and trampling effect of livestock on the upper dune slopes and dune crests removes the primary limiting factor to aeolian sediment transport, vegetation. Some climate simulation models have predicted dramatic increases in dune "activity" – as they start to erode and move as precipitation falls and wind speeds increase, under global warming (Thomas *et al.*, 2009). Indeed, the latter authors emphasise that under livestock production the southern dunefields of Botswana and Namibia will become activated by 2040 with drastic social consequences.

The recommended carrying capacity of the southern Kalahari has been consistently stated as the lowest in the country at 25 ha/livestock unit (LSU), and even lower during droughts (>50ha/LSU) (Field, 1975; DHV, 1980). The low moisture and nutrient content of the forage makes it unsuited to cattle, and while small stock such as Karakul sheep are better adapted to the arid conditions, the need for borehole water, the remoteness of markets and markedly fluctuating prices for their products, means that karakul sheep are no panacea to the structural poverty faced in the area today.

The one factor the livestock sector cannot overcome is a lack of groundwater and this has effectively halted the Ministry of Agriculture's ranching plans for the region. Significantly, both the fenced ranches and open 'cattleposts' that do exist in the southern Kalahari are typically owned by people from outside of the area, often with salaried jobs in the civil service or private sector in the larger centres such as Gakhibane, Tsabong, Tshane, Hukuntsi or even Gaborone. The notion that livestock keeping can form a meaningful part of development efforts in the region prevails in some Government sectors, even though the area is ideally suited to mobile populations of wild ungulates.

### Southern Kalahari wildlife

The earliest comprehensive study of large mammal populations in the Kalahari, the Country-wide Animal and Range Assessment Project (CWARAP) (DHV, 1980) highlighted the importance of comparatively slight and stochastic events, such as isolated rainfall showers, as causing dramatic, short-lived changes in animal distributions. The flushing of green shoots on recently burnt ground is another well-known example, which is known to attract both domestic and wild herbivores in large numbers (Pratt, 1967) and is verified by both the Department of Wildlife and National Parks (DWNP) (Verlinden, pers.comm.) and CWARAP (DHV, 1980) surveys. The latter point to the green flush associated with an isolated rainfall event in July 1979 in the southern Kalahari region which led to the concentration of some 40,000 wildebeest (*Connochaetes taurinus*) and 25,000 eland (*Taurotragus oryx*). By contrast the three previous flights over a broader southern Kalahari area had returned an average of 4,500 wildebeest and 6,000 eland (from DHV, 1980; Vol.IV).

The southern Kalahari, like the Kalahari System in general, has experienced dramatic declines in the populations of some of its key wildlife populations, particularly during the severe drought of the 1980s (Table 2).

Species	1978	1994	2003
Wildebeest	315,058	17,934	16,698
Hartebeest	293,462	44,737	44,629
Gemsbok	71,423	85,368	91,130
Eland	18,832	11,757	24,024
Springbok	101,408	67,777	24,795

Table 2: Wildlife populations in Kgalagadi District

In drier than average years the need for wildebeest and hartebeest to seek access to water, by moving either southwards to the Molopo-Nossob River, or north-eastwards to Lake Xau, from the southern and western Kalahari (Figure 1), resulted in mass-die offs along the fences they encountered on their way.

*'In 1980 and again in 1985 and 1986 large numbers of hartebeest, wildebeest and eland moved south from northern Kgalagadi to the Molopo where they either died on the border fence or were allowed by South African farmers to cross and were then captured. At the end of 1986 virtually every large tree south of the line between Swart Pan and Dekbos had the carcass of a wildebeest or hartebeest lying in its shade.'* (White, 1995. p.31).

Springbok numbers have also declined drastically (approximately 70%), probably due to poaching and competition with livestock, while gemsbok populations due to their independence of surface water supplies, even in a drought, have increased over the last fifty years.

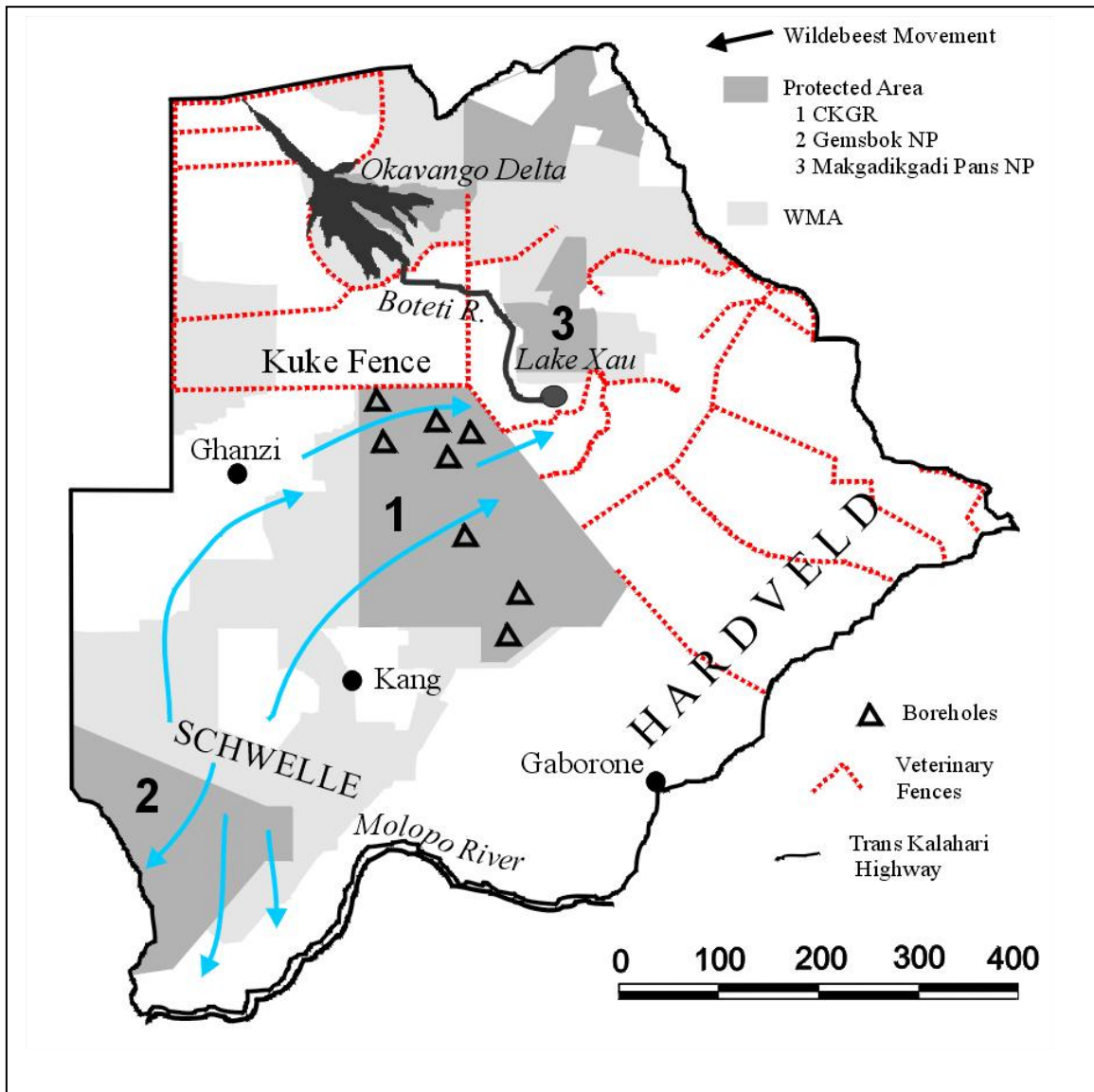


Figure 1: Wildebeest movement in Kgalagadi District

### Veld products

Apart from wildlife, veld products, largely harvested as common pool resources, are frequently used to supplement destitute relief packages, often serving as “safety nets” to support livelihoods, especially in times of drought. They include a great diversity of plants used for food, water, medicinal and spiritual purposes, with Arnold *et al.* (1984) listing 333 food plants in the Kalahari alone. The distribution and abundance of many of these plants has been adversely affected by livestock keeping (Kgabung, 1999), such that together with a decline of the key wildlife populations has come the loss of some of the more valuable veld products.

Local name	Part used	Scientific name	Use
Sengaparile	tuber	Harpagophytum procumbens	medicine
Moretlwa	berries	Grewia flava	Food/beer
Mokwa	tuber	Coccinia rehmanni	Food/water
Motshia	tuber	Cucumis kalahariensis	Food/water
Mahupu	fungi	Terfezia sp	Food
Motlopi	berries	Boscia albitrunca	Tea
Kgengwe	melon	Citrullus lanatus	Water/food
Wild Ghap	Herbal extract	Hoodia gordonii	Drug
Elephants root	Root	Elephantorrhiza elephantine	Medicine
Gemsbok cucumber	tuber	Cucumis africanus	Food

Table 3: Veld products, adapted from BORAVAST, 2006

The majority of veld products in the Kalahari have a subsistence value only, with the few that have a commercial potential tending to be rapidly over-exploited. The tubers of the perennial creeper *Harpagophytum procumbens* (Sengaparile) is a good example. Sengaparile remains one of the world's most effective remedies for arthritis, diabetes, gall bladder, liver and kidney complaints (Taylor, 1985), with processing taking place in Germany. The plant is now severely depleted around most villages despite conservation efforts of an NGO, and the need for harvesting permits from the Agricultural Resources Board within the Ministry of Agriculture.

The discovery of the anti-obesity value of *Hoodia gordonii*, a leafless spiny succulent plant has led to it being actively harvested in the wild and was heralded by many as the path to great riches. However, efforts to grow *Hoodia* in small enclosures within some of the villages in Kgalagadi has been overtaken by widespread intensive commercial cultivation in South Africa, with doubts over whether the marketed product contains the 'real' active ingredient, clouding its exploitation.

### Ecosystem goods and services

IUCN (2007) put an economic value of the ecosystem goods and services provided by the southern Kalahari under various land and resource uses. They used the 'asset value' of the area which represents the present value of the expected future contribution of the dryland ecosystem in terms of economic rent. To calculate the asset value, the likely scenario in terms of future growth in different land and resource uses was determined. Models were then developed for each of the land and resource uses and were used to calculate the annual contribution made in terms of resource rent. This is the output, less the production costs and a reasonable return to capital. The results are shown below and it can be seen that the asset value of livestock production is zero when compared with CBNRM that utilises both wildlife and veld product utilisation. (IUCN, 2007). The latter study also emphasised the importance of the cultural values and norms that exist in local communities in Kgalagadi as valuable assets that are worth protecting.

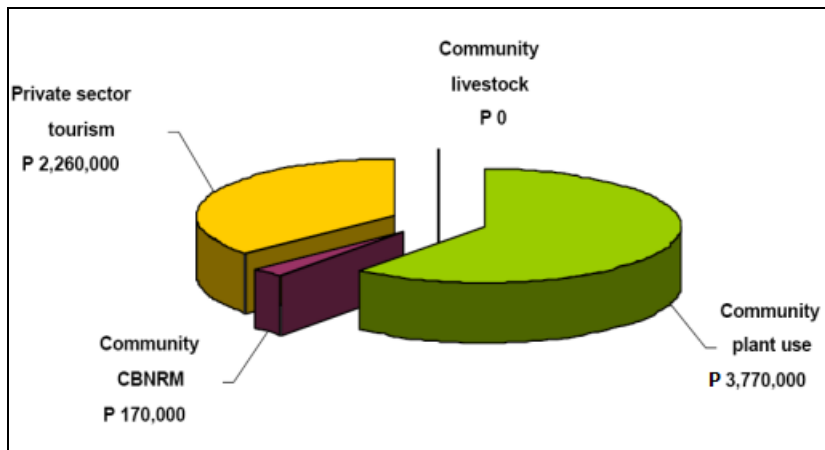


Figure 2: Assets values of the Kgalagadi study area (in Pula), from IUCN, 2007.

## 2.3 Institutional context

### Land tenure and management

There are three main categories of land tenure in Botswana. Tribal land is allocated and managed by Land Boards and all Batswana irrespective of their gender are entitled to land for their own use but do not have exclusive and perpetual rights to it. Freehold entitles the owner with perpetual and exclusive rights to the land. Freehold land is found mainly along the eastern and southern boundaries of the country (Tuli, Ghanzi, Molopo and Bokspits). State land covers mainly national parks and game reserves, forest reserves and some wildlife management areas. Almost two thirds of Kgalagadi District is tribal land.

Botswana has a good framework of legislation governing conservation, sustainable use of natural resources and tourism. The principal legislation referring to wildlife conservation and protected areas is the Wildlife Conservation and National Park Act of 1992. The Act provides for the establishment of national parks, game reserves, private game reserves, Wildlife Management Areas (WMAs) and Controlled Hunting Areas (CHAs) and also for the conservation and utilisation of wildlife outside protected areas.

In practical terms, Wildlife Management Areas were subdivided into Controlled Hunting Areas, which became the 'units of natural-resources production'. CHAs are administrative blocks used by the Department of Wildlife and National Parks to allocate hunting-quotas. The entire land area of Botswana is divided into 163 hunting areas, which are zoned for various types of wildlife utilisation (including non-consumptive use), under commercial or community management. Wherever possible, especially on tribal land, the hunting areas are zoned around existing settlements and those under community management are designed to benefit the local people (Rozemeijer, 2003).

The wildlife and tourism-related policies give part of the responsibility for managing and administering wildlife to communities. This process might take five years and it includes a number of steps:

- A community or communities in or adjacent to a Controlled Hunting Area (CHA) zoned for community management can apply for a wildlife quota provided it has organised itself in a participatory and representative manner that is sanctioned by the district authorities and the Department of Wildlife and National Parks.
- If the community wants more secure access to the wildlife quota and considers joint ventures with the private sector, it may decide to lease the CHA from the land authority. In that case the community has to organise itself into a representative, accountable and legally registered entity with adopted regulations and procedures (constitution and bylaws) with a Land-use and Management Plan that explains how the community intends to utilise the natural resources.
- A registered Community Based Organisation (CBO) may, if it so wishes, enter into subleases and/or joint-venture agreements with private companies for the use of the acquired resource rights. 'Joint Venture Guidelines' have been issued by the Government of Botswana to provide a framework for such an activity in accordance with the principles of Community Based Natural Resources Management (CBNRM).

### **Community Based Natural Resources Management**

CBNRM in Botswana has gradually taken shape since the mid eighties but became firmly established as a rural development strategy during the implementation of the Natural Resources Management Project (NRMP) that ran for ten years (1989 to 1999). The procedure for wildlife-based CBNRM projects in Botswana is as follows. First, landuse planning and DWNP determine best uses for WMAs and CHAs: hunting, photo safaris or multiple purpose areas (CAR, 2003). Communities are mobilised and workshops held, typically leading to the establishment of a representative, accountable and legal entity, such as a 'trust', which also needs to be approved by District Authorities. Subsequently, land and resource use and management plans are prepared for these areas and a community wildlife off-take quota from DWNP and a resource use lease (that includes a tourism concession) from the Land Board obtained. Several such Trusts have been established within the Kgalagadi WMAs.

In order to get the wildlife quota and resource use rights, communities need to accommodate the interests of RAD, who previously held special game licenses, and to adhere to joint venture guidelines. The community auctions this quota to private safari operators and uses only part of it for subsistence. If communities fail to adhere to guidelines and plans, the quota may be withheld by DWNP, as happened for the first time in 2003 (CAR, 2003).

Veld product-based CBNRM projects may operate without any special permission as long as the project does not harvest grapple (sengaparile) and other veld products governed by the 1974 Agricultural Resources Conservation Act. Because of the lack of knowledge about the commercial



potential of most veld products, the incentives to start such projects have been low historically (CAR, 2003).

Community use rights over wildlife, natural resources and tourism are provided through a number of laws and policy documents. The most important document setting out the government's approach to giving rights over wildlife utilisation and tourism is the Community Based Natural Resources Management Policy adopted by Parliament in 2007. It sets out minimum conditions that communities need to meet before they can be awarded a use right for any tourism or hunting development activity.

Significantly during and immediately after the ten years of the NRMP (1989) there was considerable support for CBNRM in terms of financial and technical assistance for the establishment and management of trusts, for training programmes and for the NGOs facilitating the growth of the programme (Rozemeijer, 2009). Since Botswana has now become a middle-income country, international donors and support organizations have phased out their interventions or are in the process of doing so.

### **Kgalagadi Transfrontier Park**

The Kgalagadi Transfrontier Park (KTP) is the oldest among the transfrontier parks. De facto it exists since 1948 by an agreement between the conservation authorities of Botswana and South Africa, which in 1999 was cast into a bilateral agreement to manage the KTP as a single ecological unit.

Formally opened in 2000 KTP offers free movement of tourists who enter as a single facility to visit the entire park spanning the border between Botswana and South Africa. The Park is 37,991 km<sup>2</sup> in extent, with 73% in Botswana (Gemsbok National Park) and the remainder of 27% in South Africa (Kalahari Gemsbok National Park). Economic benefits from the Park, however, are shared on an equal basis (50:50) between Botswana and South Africa. This is defended by the fact that Botswana has more land in the KTP but South Africa contributes more tourism infrastructure assets.

The Park's vastness and absence of human-made barriers allows a natural balance of different antelope species and their large predators i.e. leopard, lion, cheetah and hyena. In addition, the Kalahari landscape has a special aesthetic appeal and the harsh, semi-arid environment has produced special adaptation mechanisms of fauna and flora that are of scientific interest.

A joint management plan was elaborated in 2007 and it was agreed that each country will be responsible for implementation within its own national territory, based on the following management goals:

- To guarantee essential long term conservation of the wildlife resources in the southern Kalahari, which will help maintain the integrity of the entire Kalahari ecosystem;
- To improve regional ecological management;
- To share management of the park;

- To allow free roaming of wildlife between the two countries;
- To increase the international profile of KTP as a conservation area, thereby greatly enhancing its potential as a tourist destination;
- To realise fully the economic potential of the KTP and the surrounding areas in order to bring economic benefits to both countries, especially to the local communities adjacent to the park;
- To provide facilities and opportunities for research and monitoring of activities for a better understanding of the physical and biological processes of the Kgalagadi ecosystem;
- To mitigate the undesirable impacts of existing and potential land-use conflicts between the Park and neighboring local communities.

Nonetheless, a major grievance of communities within the southern Kalahari is that they do not benefit greatly from the Park at the individual household level, but instead incur losses from problem animals which kill their stock.

## 2.4 Resource conflicts and challenges

### Range degradation

Watering livestock around communal stand pipes in the villages has caused range degradation with the communal rangelands in the southern Kalahari under increasing stocking pressure from borehole allocations made to individuals/syndicates who often do not reside in the area. The impact of livestock grazing around point water sources leads to the opening up of distinct zones of range degradation, via the piosphere effect, and is a feature of both cattleposts and private ranches. The southern Kalahari ecosystem is not suited to grazing by cattle, with technological fixes to spread the grazing pressure more evenly over the rangeland, such as more boreholes, or more waterpoints through water reticulation, simply leading to more piospheres. Although work in Bokspits and Struizendam has shown that the dunes can be stabilised by fencing, planting and watering exotics (Ministry of Agriculture, 1980), it is clearly an unsustainable development, particularly given the southern Kalahari's scarce water supplies.

Karakul sheep are better acclimatised to desert conditions, and produces a diverse range of products – such as meat, milk, fur/pelt and wool. Animal rights protests in the northern hemisphere destroyed the Karakul pelts market in the 1960s, while the major constraints to production today are lack of feeds, lack of market of pelts in Botswana, lack of capital, lack of skilled labour and diseases (Nsoso and Madimabe, 2003).

In general, livestock prices in South Africa are higher than those in Botswana (especially once transport costs are included into the equation), such that the smuggling of stock from Botswana into South Africa has become a relatively lucrative, but not spoken of, activity.

## Tourism

As Jones and Weaver (2003) put it, *'In both Namibia and in Botswana and in other southern African countries, a certain combination of circumstances creates one of the a major constraints facing CBNRM: financial benefits from wildlife and tourism to individual households remain low, cost of living with wildlife remain high and community proprietorship over wildlife continues to be weak. The current enthusiasm of rural communities could wane if household benefits do not increase and proprietorship over wildlife is not strengthened (from CAR, 2003; p.44)'*.

Similarly DHV (1980) emphasised that, *'...the game resource is outstanding for the frequency with which observers have suggested its commercial exploitation, and the virtual absence of efforts to do so, except by safari operators, and further that 'Enhanced game use is seen as the best way to raise the standard of living of the greatest number of people in the Kalahari, particularly those who are the poorest.'*

The opportunities to harvest significant game populations have today disappeared for most Kalahari wild ungulates, except perhaps gemsbok. Nonetheless, it is clearly unsatisfactory for the only benefits forthcoming from wildlife populations to be the fee that is received from auctioning off the annual quota from DWNP to safari hunting companies and/or the meat that is from hunted animals. This effectively amounts to paying the local communities off for 'not poaching' and effectively isolates them from the management of the key natural resources in their area.

If CBNRM and the WMAs are to survive in any meaningful form the financial benefits from tourism and wildlife needs to increase significantly. It is though not a new argument, *'Every effort must be made to develop the tourist industry, so that the financial returns can be obtained similar to those reaped by many other countries which have developed natural attractions. Botswana cannot afford to neglect this opportunity.'* (Blair Rains and McKay, 1968).

## Depredation

Most protected areas are too small to host viable populations of large mammals, especially large predators such as lions, whose tendency to move over large areas brings them into direct conflict with people. The expansion of livestock keeping in particular has caused declines in predator population levels and a contraction of their geographic ranges, and has put carnivores in general, but lions in particular, in direct conflict with humans. Depredation by lion (*Panthera leo*), leopard (*Panthera pardus*), brown hyaena (*Hyaena brunnea*), cheetah (*Acinonyx jubatus*) and caracal (*Felis caracal*) occurs to an unknown extent in the region. In some Kgalagadi settlements poison is used to exterminate jackals that take smallstock, with unknown ecological consequences – in addition to the economic loss incurred by fact that the pelts of such poisoned animals cannot be used to make traditional blankets or hats, as they deteriorate rapidly (J. Thomas, pers comm.).

There is a predator proof fence along the southern most portion of the south eastern boundary of the KTP which was erected to stop lions from reaching the cattleposts in the communal area south of KD/15 (Figure 3). It commences at the Park Entrance gate at Two Rivers and extends along the KTP boundary for 100kms. Thusano Lefatsheng (2005) point out that it has been proposed by

DWNP to remove the 16kms section of fence between the KTP- KD/15 boundary and re-align it to run along the entire southern boundary of KD/15 up to the northern point of the Middelpits farms.

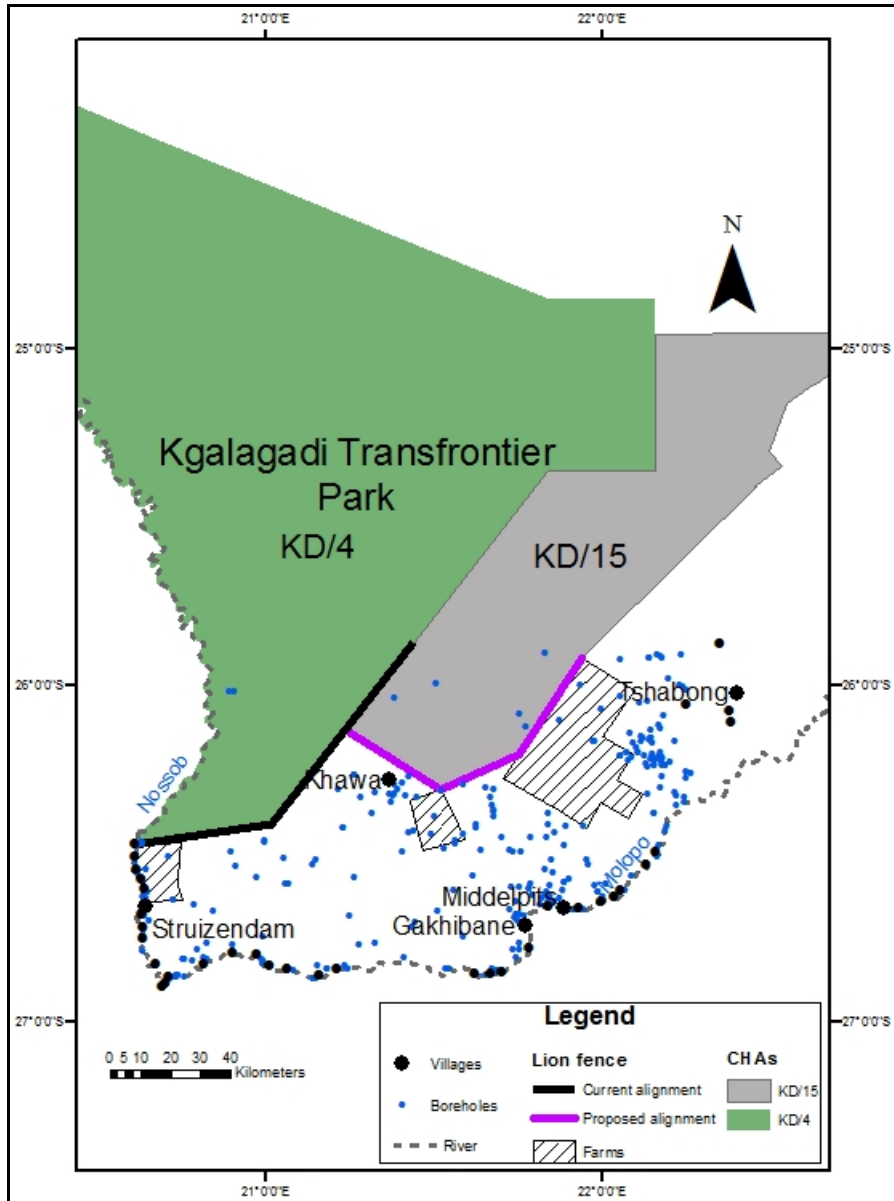


Figure 3: Predator proof fence along the south eastern boundary the Kgalagadi Transfrontier Park

The fence is of questionable and unknown effectiveness, due to the lack of monitoring, and has undoubtedly prevented wild ungulates utilising the extensive grazing areas that lie to the east of it. This biomass cannot be utilised by cattle either, due to the remoteness of the cattleposts and so is prone to veld fires.

When carnivores attack humans and livestock, campaigns to eradicate them are inevitable (Patterson, 2004). Understanding the circumstances surrounding carnivore attacks and mitigating them is a crucial issue for conserving and managing many top predators (Frank, 1998). By stressing the potential for revenues generated from wildlife to contribute to local economies conservationists hope that economic incentives will create or increase willingness to manage local wildlife sustainably (Hemson *et al.*, 2009). The latter studying lion depredation around Makgadikgadi emphasised that,

*‘The Makgadikgadi community were generally hostile towards lions and unaware of, or unimpressed by tourism’s contribution to their livelihoods. They did not appear willing to take preventative action to address the problem of livestock loss. Rather they viewed the government as responsible for the costs of wildlife incurred by the community and were otherwise most interested in killing problem lions’.*

Increasing the resilience of carnivore populations by increasing the area in which people can coexist with large carnivores is a logical direction for large carnivore conservation. The decline of lions in the southern Kalahari is of national concern with profound ecological and economic ramifications for both the protected areas and the surrounding CHAs. Significantly, the safari hunting value of CHAs is greatly reduced when key trophy species such as lions are removed from the quota – as has happened since 2003. This translates into a significant loss of revenue for the trust as the quota for wild ungulates ends up being taken largely for its subsistence, rather than its trophy, value.

### **Veld products, crafts and other activities**

Veld product markets are not formalised and remain underdeveloped and invisible in formal land use and investment plans at national and district levels (IUCN, 2007). Cultural values are not adequately rewarded; for example, no formal benefits are derived by local residents for local knowledge and innovations through patents and royalties from the use of herbal teas or medicinal plants (IUCN, 2007). There is a general lack of economic diversification at the local level i.e. livestock production concentrates only on beef production and not on the development of other by-products and small stock farming. Wool spinning and weaving, small garden plots, sewing and bee keeping have all been tried in Kgalagadi District under various projects, but have never been sustained.

### **Fire**

For much of Botswana it is generally assumed that naturally occurring fires burn between ten and twenty per cent of the land surface each year. The nature and extent of fires is clearly linked to rainfall and herbivory patterns, with the tendency for the wildlife areas of the Kalahari (protected areas and WMAs) to burn extensively in good rainfall years quite striking. In this respect, fire patterns have changed drastically over the last century with hotter and spatially more extensive fires occurring in good rainfall years. Due to a ban on burning, fuel loads tend to build up leading to intense fires, in contrast to the pre-independence era when hunter-gatherers used frequent fires to manage the veld.

## Exotics

The Molopo River fossil valley is today heavily encroached with the exotic *Prosopis*. A native of north eastern Mexico and the southwestern USA, *Prosopis glandulosa* (Honey Mesquite) and hybrids *Prosopis velutina* (Velvet Mesquite) were first introduced in 1897 in the Okahandja Experimental Garden in the then South West Africa (Bromilow, 2001). German settlers in the area planted it for shade and fodder and by 1912 it was recorded as having established itself in the wild. It was also recorded as being cultivated around Upington in 1900.

It is now widespread in the Karoo and Kalahari thornveld. The plant is extremely tolerant of drought, high temperatures and overgrazing. It forms dense thickets, thereby excluding natural vegetation. Although it provides fodder it has transformed the landscape. Along the Molopo villagers relate the declining groundwater supplies to the invasion by *Prosopis*, such that it is now widely regarded as a pest species. In South Africa a destructive eradication programme has been implemented, but has been effectively compromised by Botswana's ongoing research into a control programme that has meant that extensive areas of the Molopo, just across the border fence with South Africa, remain encroached. Control is difficult because plants damaged by inadequate removal resprout from dormant buds just below ground level, resulting in a dense multi-stemmed shrub. *Prosopis* is however confined to the Molopo and the villages along the rocky escarpments, where there is relatively shallower groundwater, and is not found deeper within the southern Kalahari.

## Community based monitoring system

The development and implementation of a Community based monitoring system of rangeland resources that can guide ongoing management decisions is an important component of empowering local communities, or Trusts, to sustainably manage their natural resources. Namibia has been at the forefront of this work, with the 'Event Book System', also known as 'MOMS' – 'management oriented monitoring systems' for use in conservancies, now proving popular throughout southern Africa (Stuart-Hill *et al.*, 2005).

As Stuart-Hill *et al.* (2005) point out the "Event Book System" differs from the conventional way of monitoring in that:

- The community decides on what they want to monitor;
- The technicians only provide support upon request from the community and facilitate the design process; and
- All data collection and analysis is undertaken locally by community members.

Once the community has selected what it wants to monitor, the technical support team then provides a complete kit for each monitoring topic. Each kit contains 'tools' for: (i) data collection, (ii) monthly/quarterly reporting and (iii) reporting and analysing long-term trends.

MOMS has proven popular in Botswana with its use in CBNRM supported by the Department of Wildlife and National Parks (DWNP). In 2007 it was implemented in central Botswana (Kedia) and

the southern Kalahari (Struizendam) (Biotrack Botswana, 2007) and was well received by the respective communities.

## 2.5 Lessons

The recent history of the southern Kalahari area also provides some important lessons in terms of the way forward. They include:

- The absolute shortage of potable groundwater in the region, coupled with increasingly saline and diminishing supplies.
- The fragility of the southern Kalahari dunefields to livestock grazing, as evidenced by the re-activation of dunes around livestock boreholes and the dune stabilisation programme.
- The susceptibility of the system to invasives, particularly *Prosopis* which has proven tenacious in its domination of large tracts of land.
- Repeated die-offs of Kalahari wildlife due to drought induced movements to the Molopo River, which seem likely to occur again once drought conditions return.
- Sector led initiatives leading to conflict with other development goals. The Kgalagadi District Development Plan 6 (DDP 6) makes specific reference to the fact that all the settlements in Kgalagadi District are within, or close to, the Wildlife Management Areas, with the Government's Policy of providing cattle and small-stock to Remote Area Dwellers (RAD) to boost livelihoods, also having the twin undesirable effects of increasing competition with wildlife and promoting land degradation. During DDP 5 (1996-2002) a total of 156 RAD received 780 cattle and 65 RAD received 650 smallstock. In order to minimise the conflicts with land use in the WMAs the idea of ranches for RAD has been proposed, although the lack of water has again often proved crippling.
- The tendency of donor driven development initiatives to focus on a single product or sector, that subsequently becomes abandoned at the end of the project, when the (often unrealistic short term) expectations are not met.
- An almost continuous cycle of donor funded projects, which are short term in their outlook. These initiatives prove unsustainable once funding is withdrawn. As Rozemeijer (2009) puts it, "*Methodologies for community capacity building need to be long term and more appropriate to suit specific local conditions, and the roles of facilitating organizations playing the honest broker in complicated change processes at community level need to be secured on a long-term basis*".

The below SWOT analysis (Table 4) shows that the structural constraints encountered require a holistic and balanced approach, based on CBNRM principles:

<p><b>Strength</b></p> <p>Wildlife potential and wilderness value</p> <p>Connectivity with protected area</p> <p>Rich socio-cultural heritage</p> <p>Valuable veld products</p>	<p><b>Weakness</b></p> <p>Over-emphasis on technical measures/solutions</p> <p>Aid dependence, donor driven initiatives</p> <p>Subsistence livestock economy</p> <p>Remote location</p>
<p><b>Opportunities</b></p> <p>Tourism/wildlife related economic activities</p> <p>Unique socio/cultural context and landscape</p> <p>Indigenous technical knowledge on hunting and gathering</p>	<p><b>Threats</b></p> <p>Harsh climate, climate change</p> <p>Lack of surface water and suitable groundwater</p> <p>Disenfranchisement of control over the community CHAs</p> <p>Poverty, socio-political issues</p>

Table 4: SWOT analysis

## Conclusion

Given the direct dependence on natural resources of most poor rural people, more effective local management of these resources has long been considered key to tackling poverty. In addition to local constraints on livelihoods, top-down projects, despite considerable investment and effort, have generally failed to lift people out of poverty and have proven inherently unsustainable once the donor money dries up. A fatal flaw too many such efforts has been the notion that the southern Kalahari can be developed along the lines of traditional dryland agriculture (cattle), when it is in fact clear that there are insurmountable natural resource constraints preventing the achievement of this goal (climate, soils and groundwater).

For this reason past development projects that have attempted to address a diversity of constraints on local livelihoods have all failed to uncover practical ways of significantly reducing poverty. Even an integrated approach to catchment management seems doomed to fail if it overlooks the fact that the southern Kalahari is a unique environment, with a unique socio-cultural context. Many current development efforts seem to target interventions to fix something specific (e.g. increasing water availability, stabilising dunes or providing micro loans or credit), all of which are operating within basically dysfunctional natural resource management systems.

Providing water through reticulation and/or the drilling of new boreholes will simply open up new piospheres, and while the dunes can be stabilised through fencing and tree planting (and irrigation), the process does not reduce poverty or improve the management of natural resources in semi-arid regions. On the contrary, by promoting environmentally unsustainable and economically failing modes of production within a system traditionally dominated by influential relationships benefitting



those from outside of the area, local people and local institutions actually become poorer, as the environment becomes more degraded.

Effective resource management must genuinely encompass the aspirations and needs of the people using sustainable natural resources. Success hinges on their active involvement and participation in turn depends on motivation and incentives. The social, political, and environmental features of the southern Kalahari are dominantly wildlife based, and today there are institutions ‘trusts’ established to enable benefits to be derived within a CBNRM framework. Promoting such development through sectorally based national programs with minimal community involvement in either planning or implementation simply will not be successful. Development initiatives have to be formulated to accommodate this uniqueness. District Government and neighbouring CBNRM areas will undoubtedly also have to be engaged if the framework for local-level natural resource management is to be improved and tangible benefits are to be realised by the community.

### 3. Demonstration project in Botswana

The proposed rangeland demonstration project in Botswana shall be located in the Orange-Senqu Basin and because of the relatively short implementation period should have realistic and attainable objectives. These include the intention to:

- Target communal or tribal land, rather than private farms, so as to raise livelihoods across as wide a spatial area, and for as many people, as possible.
- Target the most impoverished and marginalised of society, particularly women.
- Rely upon indigenous knowledge to understand the importance of rangelands in traditional culture.
- Expand economic opportunities for local communities away from a livestock focus.
- Reduce the cost of living with wildlife.
- Strengthen monitoring and management systems to bolster governance at the local level and help develop adaptive management strategies.

The typical focus of rangeland demonstration projects within river basins is to try and reduce range degradation and the loss of soil and nutrients into rivers and out of the ecosystem. The context in Botswana is clearly a little different as the Molopo River has not flowed along its entire length for thousands of years and the Kalahari ecosystem does not experience anything but localised surface runoff when it rains. However, wind erosion is a concern and within the Orange-Senqu River Basin there are a number of sustainable development challenges, that whilst specific to Botswana, affect large tracts of rangelands and the livelihoods of several thousand people, who happen to be amongst the most impoverished in the country.

Based on extensive research and recent past discussions with Government agencies, ongoing projects in the sector and targeted field visits four sites were identified. Each site has its own community trust, often representing the interests of more than one village. In such cases, past experience has shown that it is important to try and spread the benefits of any development project across all the villages within a trust, rather than to target one village, to the exclusion of others.

The prospective sites and their associated trusts are as follows (Figure 4):

- Ukhwi, Ncaang and Ngwatle villages, KD/1: Nqwaa Khobee Xeya Trust (NKXT),
- Bokspits, Rappelspan, Vaalhoek and Struizendam villages: BORAVAST Trust;
- Khawa, KD/15: Khawa Kopanelo Development Trust (KKDT),
- Zutshwa, KD/2: Qhaa Qhing Development Trust (QQDT).

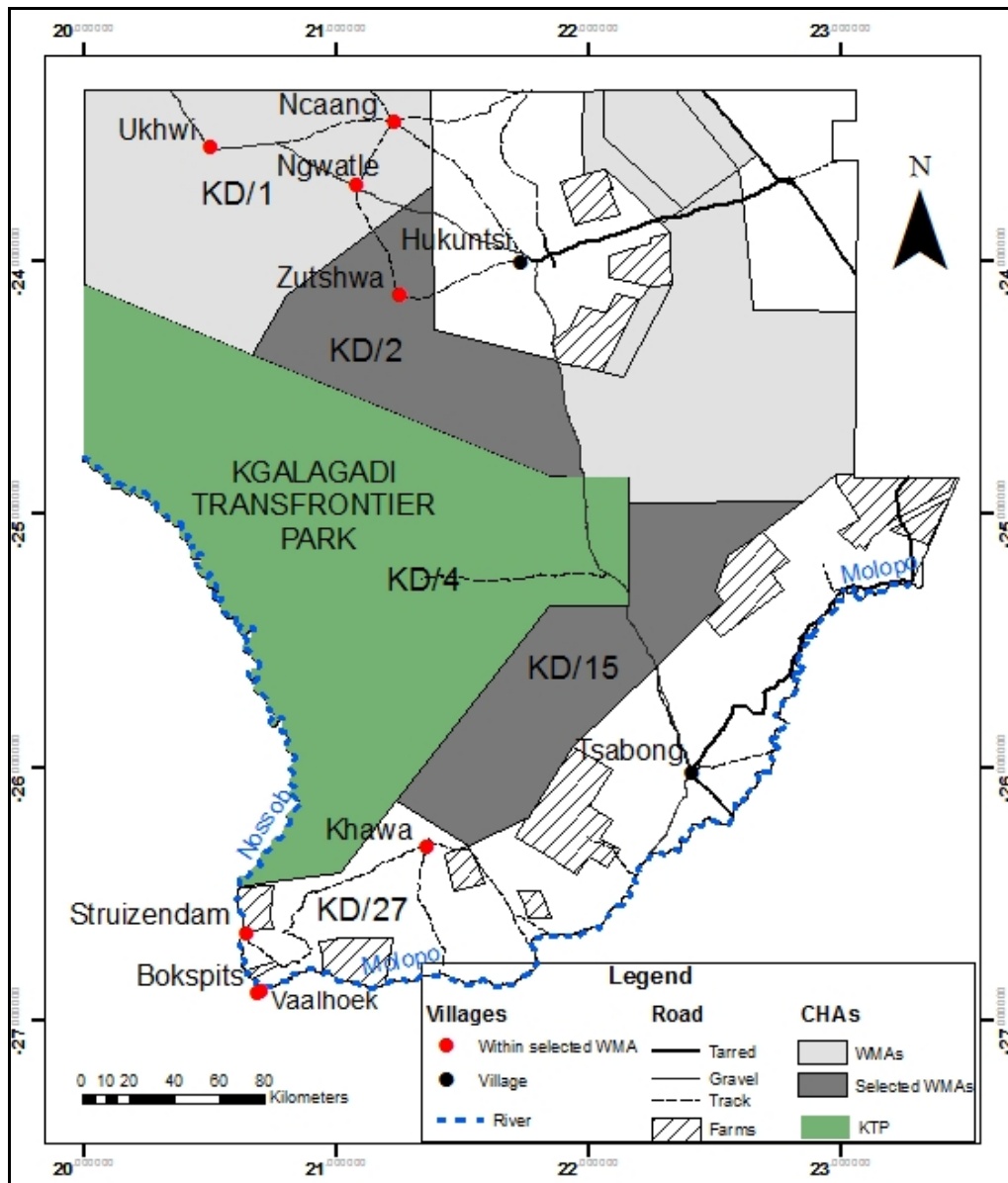


Figure 4: Selected WMAs in Kgalagadi District

All sites fall within Kgalagadi District and within the Kalahari ecosystem and share many common socio-economic characteristics and development challenges. The following section attempts to briefly outline the key features of each area.

### 3.1 Ukhwi, Ncaang and Ngwatle villages: Nqwaa Khobee Xeya Trust

The Nqwaa Khobee Xeya Trust (NKXT) was established in 1996 for the communities Ukhwi, Ncaang and Ngwatle in the Kgalagadi WMA in the management area KD/1 of Kgalagadi District.

#### Physical geography and environment

The annual average rainfall for KD/1 is about 300mm, although drought is endemic. In the summer months temperatures range between 20 to 34°C, but may rise to well over 40°C, with winter temperatures ranging from 5 to 21°C, and sometimes falling to below freezing at night (Van der Jagt, 1998). Groundwater is scarce and salty, such that all three villages are supplied by Council bowzers.

The dominant vegetation association in KD/1 is classified as Kgalagadi plains microphyllous savanna, with open mixed thorn trees (*Acacia erioloba*, *Acacia luederitzii*, *Acacia mellifera*, *Boscia albitrunca* and *Terminalia sericea*), and broad leafed shrubs (*Grewia flava*, *Grewia retinervis* and *Rhus tenuinervis*). Dominant grasses include *Schmidtia kalahariensis*, *Stipagrostis uniplumis*, *Schmidtia pappophoroides*, *Eriogrostis lehmanniana*, *Eriogrostis pallens* and *Anthephora pubescens*. Most of the key Kalahari ungulates are found in KD/1. These include springbok, gemsbok, hartebeest, kudu, ostrich, steenbok, duiker, warthog, wildebeest and eland. Following the large die-off of wildebeest in the Kalahari in the 1980s drought, their numbers are still very low. Eland are also rarely seen. Large predators are lion, leopard, brown hyena, jackal and rarely cheetah and wild dogs. The concentration of mineral rich pans, together with open woodlands, means that KD/1 constitute a 'core area' in the wet season, when calving takes place, with the wildebeest dispersing, often along dry river valleys, as the dry season progresses (Lindsay, 1992).

#### Socio-economic background

The three main settlements in KD/1 comprise two main ethnic groups in the area the !Xoo Bushmen, also known as Basarwa (70% of the population) and the Bakgalagadi (30%). The total population fluctuates between 750 and 850 inhabitants (see Table 1), with the people mainly subsisting on hunting and gathering. There is limited animal husbandry, which is mostly in the hands of a few affluent Bakgalagadi (Flyman, 2003). Bushmen and Bakgalagadi reside together in the settlements, although there are very real fears on the part of land use planners that their desires to expand their livestock herds in KD/1, will jeopardise those of the non-livestock owning majority to develop wildlife-based tourism (IFAD, 1997). In all three settlements adult literacy levels are very low. At Ukhwi and Ncaang livestock are watered from the public standpipes and generally graze within a 20km radius of the settlements, with a RAD ranch north of Ukhwi planned, but as yet, undeveloped. There has been tremendous pressure from livestock expansion within the region for several decades, with illegal drilling and occupation of boreholes being a recurring problem. Livestock from Ncojane frequently graze inside KD/1 to the north and north-west of Ukhwi, and may even reach the settlement in the wet season (van der Jagt, 1998). IFAD (1997) emphasised that many residents of the neighbouring Matsheng villages (Hukuntsi, Lehututu, Tshane and Lokgwabe) felt strongly that they should not be excluded from the management

of KD/1, as they claim traditional use of the area for hunting, gathering and transhumant livestock grazing.

The Trust has been granted resource-user rights over the controlled hunting area KD/1 by the Kgalagadi Land Board through a lease arrangement. Assistance was initially provided by SNV with wildlife and veld products utilisation and handicrafts production the key activities (IFAD, 1997) – later moving into catering for self-drive tourists and providing cultural activities such as guided bush-walks, traditional dancing, story-telling, amongst others. Additional institutional support was secured from the USAID funded Private Agencies Collaborating Together (PACT) and Institutional Reinforcement for Community Empowerment (IRCE) projects.

Apart from heavy sand access and hunting tracks there is no tourism infrastructure in KD/1. Basic services and supplies are available from the Matsheng villages and at Ncojane in western Ghanzi District. The Nqwaa Khobee Xeya Trust signed a one year sublease agreement that gives a private company called Safaris Botswana Bound (Pty) the exclusive rights to conduct both hunting and photographic-safaris in KD/1 (Flyman, 2003).

The Trust established three camp sites, a craft shop and a tannery – the latter two now being defunct, landing the Trust in debt. It is clear that the Trust's income is largely dependent upon the revenue generated from the sale of the wildlife quota, through a joint venture agreement. As the value of the quota has declined over the years the Trust's finances have steadily deteriorated.

### **3.2 Bokspits, Rappelspan, Vaalhoek and Struizendam villages: BORAVAST Trust**

The BORAVAST Trust covers approximately 182,700ha of communal grazing land running along the Molopo River. The trust was established within the UNDP-funded Indigenous Vegetation Project (IVP) in 2002 and initially involved an *ad hoc* committee which was replaced by a new committee in 2010.

#### **Biophysical background**

The annual average rainfall for Struizendam was 155mm and that for Bokspits 167mm, in the period 1982 to 2006. In the summer months temperatures range typically between 20 to 37°C, but may rise to well over 40°C, with winter temperatures ranging from -2 to 12°C, and often falling to below freezing at night.

The vegetation of the sandy habitats consists of an open shrub or tree savanna, whereas the other substrates are characterised by an open dwarf shrub or grassland formation. The coarse sand of dune tops and slightly undulating sand plains are characterised by three differential species, the large shrubby *Stipagrostis amabilis*, together with *Eragrostis trichophora* and *Crotalaria spartoides*. *Stipagrostis*

*amabilis* is a tall perennial grass endemic to the region that colonises loose sand by means of extensive systems of rhizomes and roots (Leistner, 1967; Werger, 1978). It is a role that is compromised by livestock grazing and trampling leading to the re-activation of the otherwise inert dunes. The tree and shrub layer of this vegetation association is mostly formed by *Acacia haematoxylon*, *Acacia erioloba* and *Boscia albitrunca* (Werger, 1978). The dune streets are often dominated by the bluish-grey dwarf shrub *Monechma incanum* and the widespread perennial grass *Stipagrostis ciliata*, while the low shrub *Rhigozum trichotum* is also abundant.

Four distinctive habitat types occur within the southern Kalahari, sand, calcrete, pans and fossil river beds and correspond with variations in three major factors, soil clay content, sand depth and permeability and water table depth (Werger, 1978). The dry river valleys of the Kalahari are considered to have formed during periods of former wetter climate in the Late Tertiary and Quaternary and to have incised their courses into the relatively subdued Kalahari landscape. It seems likely that the Molopo Valley preceded some or all of the South Western Kalahari dune system.

### **Socio-economic background**

Population sizes of the four BORAVAST communities are provided in Table 1, with the management plan pointing out that 90% of the population resides permanently on settlements with the remainder scattered on cattleposts within the communal area. High unemployment and severe poverty (affecting 59% of the population in 1997 – according to BIDPA; from BORAVAST, 2006) have resulted in out migration.

Livestock ownership is relatively important in the BORAVAST area, with one-third to a quarter of all household owning smallstock or cattle. The use of village water points for the watering of stock is a problem and has led to domestic stock occurring throughout the village areas, together with large numbers of ‘feral’ donkeys. A sand dune stabilisation scheme started by the Ministry of Agriculture in Bokspits (Timberlake, 1980) was extended by to also include Vaalhoek and Rappelspan in 2004. Indigenous as well as exotic tree species were planted to rehabilitate the areas. The vegetation regenerates undisturbed because of the fence, thus creating ground cover and stabilising the soil. The BORAVAST now waters and monitors the three sites.

Veld products continue to be important especially at a subsistence level with attempts to commercialise the more valuable products such as *Sengaparile* and *Hoodia* failing.

The BORAVAST management plan identifies the following issues within their communal area:

- The lack of resource utilisation rights – that would enable the Trust to implement by laws and regulations guarding against the mismanagement of natural resources by its members.
- Indiscriminate harvesting of firewood and veld products.
- Unplanned allocation of boreholes in unproductive areas.
- Conflict between predators and livestock.

A number of environmental issues are identified in the BORAVAST management plan, including:

- Heavy stocking and the associated land degradation due to the concentration of water points along the dry river valley.
- Sand dune movement related to heavy grazing.
- Invasion of exotic species – *Prosopis* and *Eucalyptus*.
- Over harvesting of timber, thatching grass and firewood.

The management options proposed in the BORAVAST management plan include:

- Communal Land Use Zone – based upon two water reticulation schemes 40kms long and running due east from Tshane Tshane Cattlepost, and due south from the Goodhope Cattlepost. Regulations will be developed governing the utilisation of water and veld health teams will serve as environmental ‘watch dogs’ for the Trust.
- Community Multiple Use Zones – comprising approximately 30% of the proposed area including small temporary cattleposts and veld product collection areas. It is proposed that this area be turned into a Conservancy.
- Tourism Development Zone – Focusing upon the area around Tshane Tshane – scenic and 4WD tourism will be developed.
- Conservancies/buffer zones – areas greatly degraded will be so demarcated along the existing park boundary.

### 3.3 Khawa: Khawa Kopanelo Development Trust

The Khawa Kopanelo Development Trust (KKDT) was registered in 2001. It represents residents of the village of Khawa, and has the sole rights of managing the controlled hunting area that makes up management area KD/15. In 2005 the trust commissioned Thusano Lefatsheng, a rural development NGO in Botswana, to produce a land use and management plan for the area.

#### Biophysical background

Rainfall is highly variable both within and between years as well as spatially ranging, for example, from 225mm at Khawa to 250mm at Tsabong. Average daily minimum and maximum summer temperatures are 20°C and 34°C respectively, although maximum temperature can at times reach at 43°C. Winter temperature can fall as low as -8°C, with dry frosts being a common occurrence, especially in areas around KD/15.

The biophysical description for the southern Kalahari, as detailed for the BORAVAST area, applies equally to Khawa, and so is not re-iterated here. The re-activated linear dunes are a striking feature of Khawa and in this respect it is worth emphasising that the southwest Kalahari is a desert of great antiquity (Bullard and Nash, 1998). The dune sands were emplaced during a period of enhanced aeolian activity at around 23 to 28Ka, although it is not clear if this period of aeolian activity represents the initial deposition of dune sand in this region or full reworking of sediment deposited at

an earlier date. Consequently the dune pattern observed at the present day may not reflect the contemporary wind regime or sediment budget, particularly if it has been windier and/or drier in the past as has been suggested.

The Kalahari Desert as a whole is influenced by the anti-cyclonic circulation prevalent over central southern Africa (Tyson, 1986). The strongest and most persistent winds in the southwest Kalahari are usually described as north and north-westerly in the central and southern parts, but are highly variable in terms of direction and velocity, both within and between years. Over 90% of the dunes in the region are linear, varying in height between 2m to greater than 30m above the inter-dunes. During drought years sand movement is accentuated with there being real fears that under global climate change widespread re-activation of the sand dunes will occur if livestock keeping continues.

Wildlife population estimates for KD/15 (Table 6) reflect the drastic declines in the key ungulates that occurred in the 1980s drought. Before the Trust was established approximately 25 people per year were issued with Special Game Licenses (SGLs), which entitled them to hunt a limited number of animals all year round. Only traditional hunting methods were to be used, and the sale of game meat was strictly prohibited. In 1999 Khawa residents adopted the community hunting quota system; initially for subsistence hunting purposes only. Following the formation of the KKDT the Trust makes money by entering into a joint venture with a safari company and auctioning off its wildlife quota.

Species	1999	2001	2002	2003	2004
Duiker	62	54	145	387	n/a
Eland	902	2,207	145	2,954	1,314
Gemsbock	13,525	12,784	11,177	11,699	12,757
Hartebeest	1,928	3,418	7,113	5,568	2,546
Kudu	466	54	203	412	192
Springbok	373	81	552	557	767
Steenbok	1,492	1,588	1,597	2,489	1,314
Warthog	n/a	54	348	n/a	n/a
Wildebeest	1,244	1,346	n/a	1,646	356
Ostrich	1,679	511	2,148	2,106	1,643
Jackal	31	54	116	73	27
Lion	n/a	n/a	n/a	24	n/a
Bee-eating Fox	n/a	n/a	n/a	n/a	55

Table 5: Population estimates of wildlife in the Khawa Wildlife Management Area (KD/15)

### Socio-economic background

Khawa is situated approximately 10 km south of KD/15 and 80 km north of the nearest village, Gakhibane. Tsabong, the district headquarters, is approximately 190 km from Khawa. Khawa was a hunting post for Khuis and Gakhibane residents from 1970 until 1973, then the drilling of an (albeit



brackish) borehole attracting more people to Khawa, from neighbouring cattleposts and from along the Molopo River. In 1984, the District Council negotiated with the original families to turn Khawa into a Remote Area Dweller (RAD) settlement, with services such as a primary school and clinic provided. For junior secondary education, Khawa pupils need to go to Middlepits, while the nearest senior secondary school is in Kang. In 1989, the Khawa residents elected a Kgosi (chief) for the first time and four years later the Kgotla (traditional, shaded meeting place in the village) was finished.

In 2001, it was estimated that a little over a third of all households owned a total of 312 cattle, with at least half of all households owning goats (total 885). Many of these animals were received under the Government of Botswana's Remote Area Development Programme (RADP). Sheep (148), donkeys (208) and horses (40) also occur at Khawa, with livestock numbers mainly affected by lion predation.

Besides the formal employment opportunities mentioned above, households in Khawa rely heavily on drought relief projects for income. In addition, livestock sales, remittances, piece jobs within Khawa or at nearby cattleposts and ranches, sale of game meat, beer sales, sale of honey, sale of wood and leather crafts, and sale of moretwa and sengaparile (velt products: wild berries and medical plants) supplements household income, albeit on a seasonal or erratic basis.

Several projects have been initiated under RADP in the past, such as bakery, sewing, and carpentry. Unfortunately, almost all of those projects were characterised by collapse and failure, and none of them progressed beyond the first year of operation, when inputs provided by RADP as start-up ran out.

The RADP and Social and Community Development provides assistance across a wide range of basic needs, including the provision of food, clothing, blankets, transport and assistance with HIV/AIDS related health care. A number of infrastructure projects have been carried out under government Drought Relief including road construction, dune stabilisation, guesthouses, a community hall and other houses. The Lutheran World Federation built the cooperative shop in the village and has assisted with the provision of borehole water and its reticulation. Water provision at Khawa has always been problematic with the water too salty for human consumption and used only for livestock watering and for limited domestic use. The District Council bowsers in potable from a Council borehole at Tsikamas (40 km south of Khawa).

Cattle posts belonging to Khawa residents are mainly found within ten kilometres from the settlement, towards the east and west. No cattle posts are situated inside KD/15. A large number of cattleposts around Khawa belong to residents from Khuis, Gakhibane, Bokspits, and Struizendam, and some of these cattleposts are older than Khawa. For instance, Matlalo and Kotswane cattleposts, both to the south of Khawa, were established in 1964 and 1968, respectively.

Cattleposts to the east of Khawa include Tumi, Matshapo, Metsimantsi, and Sikamatso. Some of these are as far as 50km from Khawa. Most of them were established during the 1980s and belong to Khuis and Gakhibane residents. Livestock at these cattleposts, and those on the unfenced Middlepits ranch area, encroach into KD/15 from the southeast and move into the CHA as far as Konka pan. Cattle encroachment into KD/15 also occurs along the eastern boundary of the CHA. These cattle originate from the numerous cattleposts and ranches belonging to residents of Tsabong and Makopong.

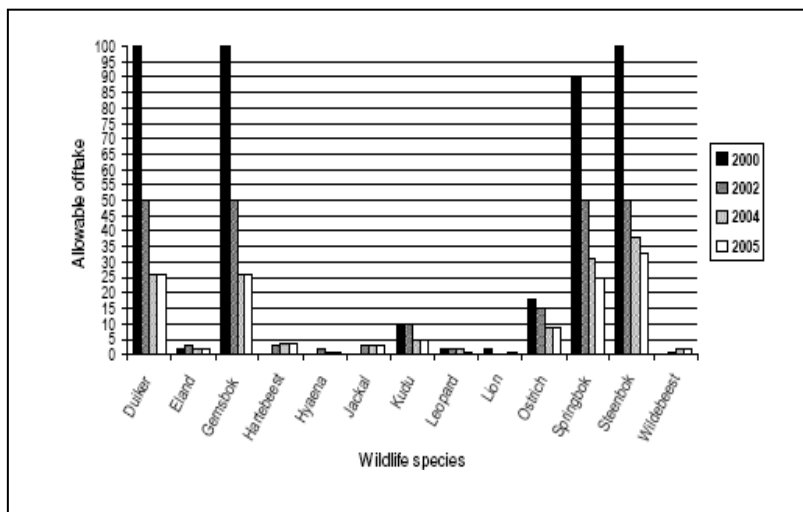


Figure 5: Annual allowable off-takes (hunting quota) for Khawa 2000 - 2004

Livelihoods in Khawa are to a large extent based on livestock keeping and wildlife/veld product utilisation. As in KD/1 and KD/2, the KKDT is overly dependent upon the value of the wildlife quota and as this has declined, so has revenue that can be gained from the Joint Venture Partner (Figure 5).

The main income generating activity has been the hunting joint venture partnership, however since 2007 the quota has dramatically dropped to zero (0) in 2011. This will force the Trust to revisit their plan to re-designate the area that has been used for hunting.

### 3.4 Zutshwa: Qhaa Qhing Development Trust

Zutshwa is found in Northern Kgalagadi in the controlled hunting area KD/2. The Qhaa Qhing Development Trust (QQDT) was registered in 2001.

## **Biophysical background**

The annual rainfall in the area is about 350mm, with potential evapotranspiration ( $ET_0$ ) of over 1800mm/yr. Maximum summer temperatures can reach as high as 40°C and minimum winter temperatures at -8°C.

The biophysical of KD/2 is similar to that of KD/1 and so is not re-iterated here. Zhutshwa is a Remote Area Dwellers settlement and is in the case of Ukhwi, Ngwatle and Ncaang is dominated by former hunter gatherers who co-exist with livestock owners. As for KD/1 there is an ongoing conflict over land use with livestock from the nearby village of Tshane encroaching into the grazing pastures of KD/2. In 2002 Zhutshwa had an estimated population of 469 people, comprising 118 households.

Hunting dominated traditional land uses and Zutshwa has struggled in the face of wildlife declines and reduced hunting quotas – as the large number of poaching cases against members of the village indicates. Species found in the area include wildebeest, hartebeest, gemsbok, eland, kudu, springbok, steenbok, duiker, lion, leopard, hyena, fox, ostrich and rabbits (Mantswe, 2006). Wildlife numbers in the area are also declining as in the rest of Kgalagadi due to drought and possibly over harvesting. Zhutshwa lies on an existing, but nonetheless low volume tourism route through the KTP.

## **Socio-economic background**

Zutshwa benefits from the Remote Area Development Programme (RADP). Population in 2001 was estimated at 469 (225 males and 244 females), excluding that of associated localities. Ethnic composition consists of 51% Ba !Xo, 39% Bangologa and 10% Balala (Molamu, 1995). The community practices limited arable and livestock farming. Livestock kept in is mainly, goats, sheep, donkeys, horses and cattle that have been acquired through RADP. Previously cattle found in the area belonged to Hukuntsi community.

Employment opportunities are very limited, with central and local government department offering formal employment and drought relief programmes offering informal employment. According to the 2006 management plan the following employment opportunities had been available in Zutshwa:

- The community trust joint-venture agreement with the Safari Botswana Bound.
- The Salt Project (Project not operating in 2006)
- Arts and craft workshop (Project not operating in 2006)

The trust has not been running well since 2006, but is currently being revived through Ministry of Environment, Wildlife and Tourism (MEWT) assistance. Once this process is completed the Trust can be engaged with revisiting the LUMPs.

### 3.5 Site evaluation

The needs of all four potential sites are very similar not least because three of them (i) Ukhwi, Ngwatle and Ncaang, (ii) Zutshwa and (iii) Khawa, are Remote Area Dwellers settlements. The location of the BORAVAST along the Molopo River is quite distinct, with livestock keeping more important to their communities, than wildlife. By definition the Remote Area Dwellers settlements all comprise significant numbers of former hunter gatherers, and are in desperate need of poverty alleviation/livelihood development. As such there is little to separate these settlements in terms of a needs assessment as both the socio-cultural and ecological context surrounding their development is very similar.

Significantly the structural constraints on livestock keeping in the BORAVAST (lack of groundwater, low rainfall and fragile ecosystem) means that the majority of people are also poor – and due to the scarcity of wildlife do not benefit from a hunting quota.

All considered sites are to some degree remote but could potentially benefit from their proximity to the Kgalagadi Transfrontier Park. Indeed, the diverse and to some extent still abundant wildlife resources of the area, coupled with its wilderness and unique cultural setting, means that it is important not to constrain the demonstration site to a strictly communal livestock grazing project, but rather to a broader sustainable livelihood approach.

<i>Evaluation criteria</i>	<i>NKXT</i>	<i>BORAVAST</i>	<i>KKDT</i>	<i>QQDT</i>
1 - An effective community level structure already exists.	✓	✓	✓	✓
2 - The site includes a variety of habitats, areas are at different stages of degradation. This would allow meaningful replication in similar environmental settings.	✓	✓	✓	✓
3 - Baseline data is available – time and budgetary constraints require this, although some targeted data could be collected.	✓	✓	✓	✓
4 – Potential for alternate income generating activities, related to tourism and veld products.	✗	✓	✓	✓
5 – Land use competition between wildlife and livestock	✗	✓	✓	✓
<i>Comments and recommendations</i>	Remote location with functioning trust. Main source of income for trust is wildlife hunting quota. Income through rangeland management only marginal. Previous income generating initiatives were only marginally successful.	Existing community trust. BORAVAST will soon receive substantive support through UNEP-GEF funded Kalahari-Namib Project which may exhaust absorption capacity of trust.	Well established trust; high community awareness on rangeland degradation issues; the sharp decline of the hunting quota will require the trust to explore alternate economic activities. <b>Site recommended by TAC.</b>	Remote location, established trust currently revived with MEWT support. Relatively low stocking densities would allow improving rangeland management practices. Previous alternate income generating initiatives confirmed potential and were fairly successful, but are not yet sustainable. <b>Site recommended by TAC.</b>

✓ Compliant, available.

✗ Not compliant or available

### 3.6 Proposed scope of the demonstration project

#### Key issues

The key components of the proposed rangeland demonstration project area already in place, the main challenge is to connect them up, and effect management and monitoring activities that meaningfully contribute to the lasting improvement of rural livelihoods.

The key issues to be tackled are as follows:

- Strengthen monitoring and management systems to bolster governance at the local level and help develop adaptive management strategies.
- Reduce human wildlife conflicts.
- Expand economic opportunities for local communities beyond the livestock focus.
- Target the most impoverished and marginalised of society, particularly women and utilise indigenous knowledge to improve livelihoods by increasing financial benefits to households.

#### Strengthen monitoring and management systems

Under a UNDP funded project through Department of Forestry and Range Resources (DFRR) a Management Orientated Monitoring System (MOMS) based approach was piloted in the BORA-VAST area (Biotrack Botswana, 2007) and was received with considerable enthusiasm (Figure 6).

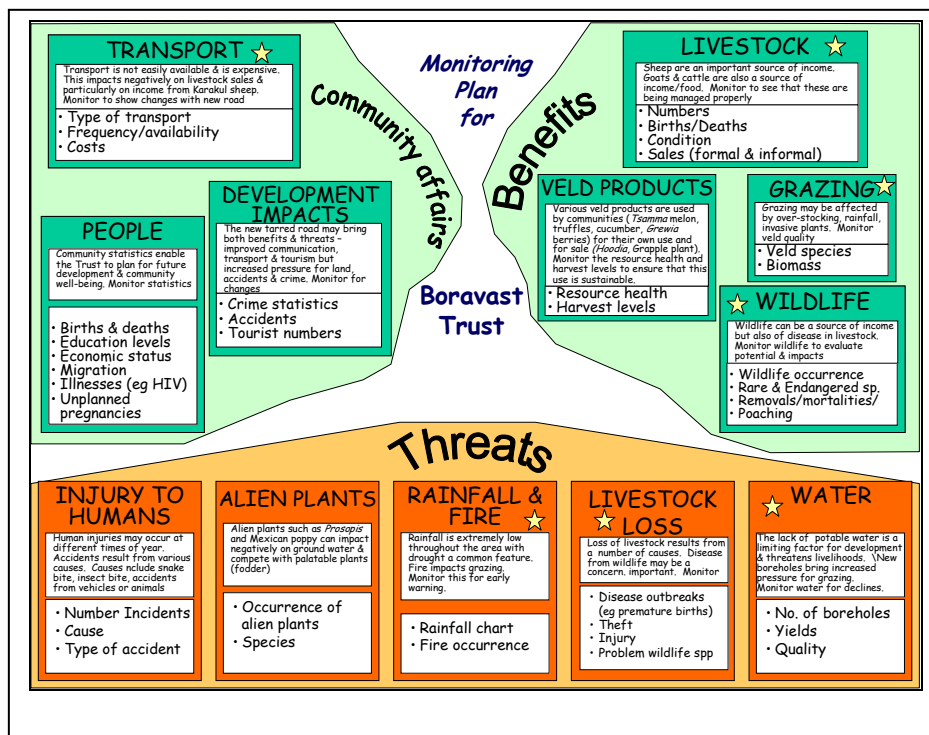


Figure 6: BORAVAST Monitoring Plan (Biotrack Botswana, 2007)

### **Reduce human wildlife conflicts**

Apart from the human tragedy they may inflict, lions, which raid the livestock herds and occasionally also attack herders, may also cause environmental degradation – where the rangelands that support countless wild ungulates become isolated from them due to fencing, or where predators make livestock keeping unprofitable, or whereby herders may resort to the snaring or poisoning of predators (Patterson, 2004). A more detailed assessment of this issue is included in the Western Kgalagadi Conservation Corridor (WKCC) human wildlife conflict survey (CI 2008).

Land use appears to affect conflict with most of incidents in farms close to the KTP. Findings from the study suggested livestock management as possible method for reducing conflict. This involves kraaling, herding and using livestock guarding dogs. A manual was also produce to assist farmers with implementation of the methods.

### **Expand economic opportunities**

The KKDT and QQCT developed a management plans in 2005 (Thusano Lefatsheng, 2005) and 2006 ( Mantswe Natural Resources Consultants, 2006), which suggest the promotion of tourism and wildlife based economic activities within the boundaries of the Trusts. Ferrar (1995) profiled the typical visitor, to the Makgadikgadi Pans National Park, who is. *'... around 40 years old, English speaking, a professional, earning about US\$40,000 per annum. Half come from the United Kingdom or North America and a quarter from South Africa. They travel with family or friends averaging four per group and spend around US\$2,700 on the holiday, US\$1000 of which is spent in Botswana. Their opinions are that the wildlife, scenery and lack of people are great but in the Parks, the facilities, staff service, roads and lack of interpretative material could be improved. Their very clear advice is to 'keep it wild', resist civilising and developing the Park, make visitor facilities adequate and functional but keep them basic. Scenic wilderness, peace and quiet, and learning something to improve their understanding is what they expect from their visit.'* (IUCN visitor survey, Ferrar, 1995).

### **Targeting the most impoverished and marginalised**

There are other clear potential boosts to the KKDT and QQCT and individual households which occur as a result of an influx of visitors through the area. This includes activities such as cultural dances, story-telling, tracking, guiding, hunting and survival related activities, sales of handicrafts, medicines, veld products etc. The latter on their own will not improve rural livelihoods, but when linked to markets and a throughput of visitors, can clearly make a difference to poverty alleviation.

### **Expected outcomes and related indicators**

Expected outcomes and related indicators are clustered under three thematic headings:

- Environmental integrity: Rangeland conditions are improved through the decline of un-sustainable grazing practices and the rehabilitation of degraded areas. (Stress reduction indicator: % reduction in degraded areas, baseline and end-of-project.)

- Social empowerment and equity: Community based institutions are empowered to manage their rangelands in a sustainable way. Female headed and other vulnerable households are adequately represented in these community based institutions. (Indicator: focus group discussions, structured interviews, end-of-project.)
- Poverty alleviation and economic development: Alternate income sources, in particular those based on natural resources commodities as well as tourism and wildlife related activities, decrease the overall dependency on grazing for economic subsistence. (Indicator: % contribution of alternate income sources to average household income, baseline and end-of-project.)

### **Workflow with outputs and associated activities**

#### Baseline:

- Conduct a Participatory Rural Assessment (PRA). Following on from this scoping exercise a participatory assessment carried out with the respective communities shall include the following issues: land cover and land use; criteria for land degradation; current management practices; land tenure and land access; carrying capacity of rangelands; traditional institutions in natural resources management; potential for alternative income sources.
- Supplement PRA by community-specific socio-economic evaluation, covering: the social role of herds within the traditional culture and impacts on existing herding behaviours and beliefs regarding rangeland management; the economic importance of herding; the role of environment and environmental stewardship within communities; the economic impact of current overgrazing practices; the shifts in gender roles, if any, as a result of demographic changes in the region; and the potential for alternate income sources within the community.
- Conduct other targeted short studies, e.g. on dune stabilisation, alien invasive vegetation, as required.
- Discuss land management issues, major challenges and potential solutions with community leaders and selected community members. Construct a causal chain analysis, identifying priority issues, and possible intervention areas.
- Concise technical report, establishing baseline for monitoring change, by mid 2011.

#### Strengthening of community based institutions:

- Forming rangeland management committees in Khawa and Zutshwa, by building on the existing community trusts. Ensure appropriate community representation and solicit community inputs to project design and implementation through regular meetings at community level. Solicit support of governmental line agencies through TAC, as appropriate.
- Provide training to the committees/trusts on all aspects related to the demonstration project, including aspects of rangeland management; land degradation; flora and fauna identification; basic ecology; rudimentary climatology with climate change and adaptation issues; concepts of environmental stewardship, as well as monitoring and adaptive management principles and basic project management skills.



- Support community based management of rangelands with advice on technical and institutional aspects, as required.
- Gender mainstreaming; cooperate with UNDP Gender Mainstreaming in Transboundary Water Resources Governance Project (under preparation), as appropriate
- Institutions formed and trained, by end of 2011.

#### Management plan:

- Verify and update the existing management plans for Khawa and Zutshwa using a participatory approach. The plans shall be based on traditional knowledge and institutional structures, as well as best practice and governance principles in CBNRM. It shall define rangeland management criteria, set objectives and annual targets to restore the land and manage an appropriate grazing regime, stocking density and wildlife management. The Plan will need to conform to local traditional systems, as well as national laws and regulations and will need formal support of governmental agencies responsible for oversight of range land management.
- Explore options for alternate income generating activities for communities. Analyse business opportunities for natural products, and tourism and wildlife related activities, including value chain analysis, provide economic valuations and estimate potential, analyse marketing.
- Consolidated management plan, adopted by the community and agreed upon by respective governmental authorities, by end of 2011.

#### Implementation:

- Physical implementation of measures related to environmental conservation and restoration, biodiversity conservation: These may include dune stabilisation (re-seeding of denuded areas; planting of fodder trees); eradication of alien vegetation.
- Conduct targeted research on technical/scientific issues as well as aspects of community based management, as required.
- Implement of selected measures, 2011 through to 2013.

#### Monitoring, adaptive management and learning:

- Develop and implement a community based monitoring system. Incorporate innovative community based approaches (i.e. MOMS) and mapping technologies (i.e. cyber tracker) to cover land cover and degradation issues, grazing patterns and stocking densities, human wildlife conflicts, etc.
- Track implications of alternate income source developments.
- Document traditional knowledge and best practice in relevant areas; document lessons learnt and their replicability.
- Educate youth on sustainability issues and traditional knowledge, i.e. through a field school approach.

### 3.7 Implementation arrangements and tentative budget

#### Implementation arrangements

The proposed Demonstration Project would work within the existing institutional framework and follow existing policy objectives and guidelines. At the two project sites in Khawa and Zutshwa the existing community trusts shall provide the main focus for interventions and support, but shall in turn be guided by Technical Advisory Committees (TAC) in Tsabong and Hukuntsi respectively. Chaired by the District Development Officer these inter-sectoral committees include the Departments of Wildlife and National Parks (DWNP), Environmental Affairs (DEA), Water Affairs (DWA), Veterinary Services (DVS), Forestry and Range Resources (DFRR) and Tourism (DOT). The TAC provide support to trusts and ensures that ICP funded projects cooperating with the trusts are harmonised with district and national level natural resource management policies, strategies and objectives.

Implementation in the field shall be supported by a Field Officer, based in Khawa or in Zutshwa but visiting both sites on a regular schedule, providing the following services:

- Implement all Demonstration Project activities at both sites.
- Conduct applied scientific research related to the rangeland management and community based natural resources management issues; draft respective scientific reports, papers, etc.
- Administrative management of the Demonstration Project, including management and disbursement of funds, monitoring and reporting, etc.
- Undertake other specific assignments relating to the demonstration project, as requested.

## Tentative budget

An estimated budget of some USD 300,000.- will be required for the demonstration project's duration of 30 months. The below table provides a tentative breakdown of the allocated budget:

<i>No</i>	<i>Description</i>	<i>Unit</i>	<i>Unit costs (USD)</i>	<i>Quantity</i>	<i>Costs (USD)</i>	<i>Comments</i>
<b>1</b>	<b>Staff costs</b>					
	Technical advisor	Person day	400.-	150	60,000.-	International/regional TA; based in Botswana; part-time 20%
	Field officer	Person month	2,600.-	30	78,000.-	Local FO; based at communities; full-time; based on UN SB4/Q2
<b>2</b>	<b>Field office expenses</b>					
	Utilities and communication	Lump sum per month	75.-	60	4,500.-	2 sites, in Khawa and Zutshwa
	Transport	km	0.50	60,000	30,000.-	4WD, 2,000km per month
	Subsistence	day	30.-	150	4,500.-	For TA , 5 days per month
	Field offices and accommodation	month	100.-	60	6,000.-	2, in Khawa and Zutshwa
<b>3</b>	<b>Implementation</b>					
	Materials	year	40,000.-	2.5	100,000.-	E.g. seedlings, as per requirements
<b>Total for Demonstration Project duration</b>					<b>283,000.-</b>	

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