



OKACOM

The Permanent Okavango River Basin Water Commission

**Transboundary Diagnostic Analysis of
the Botswana Portion of the Okavango
River Basin**

Land Use Planning

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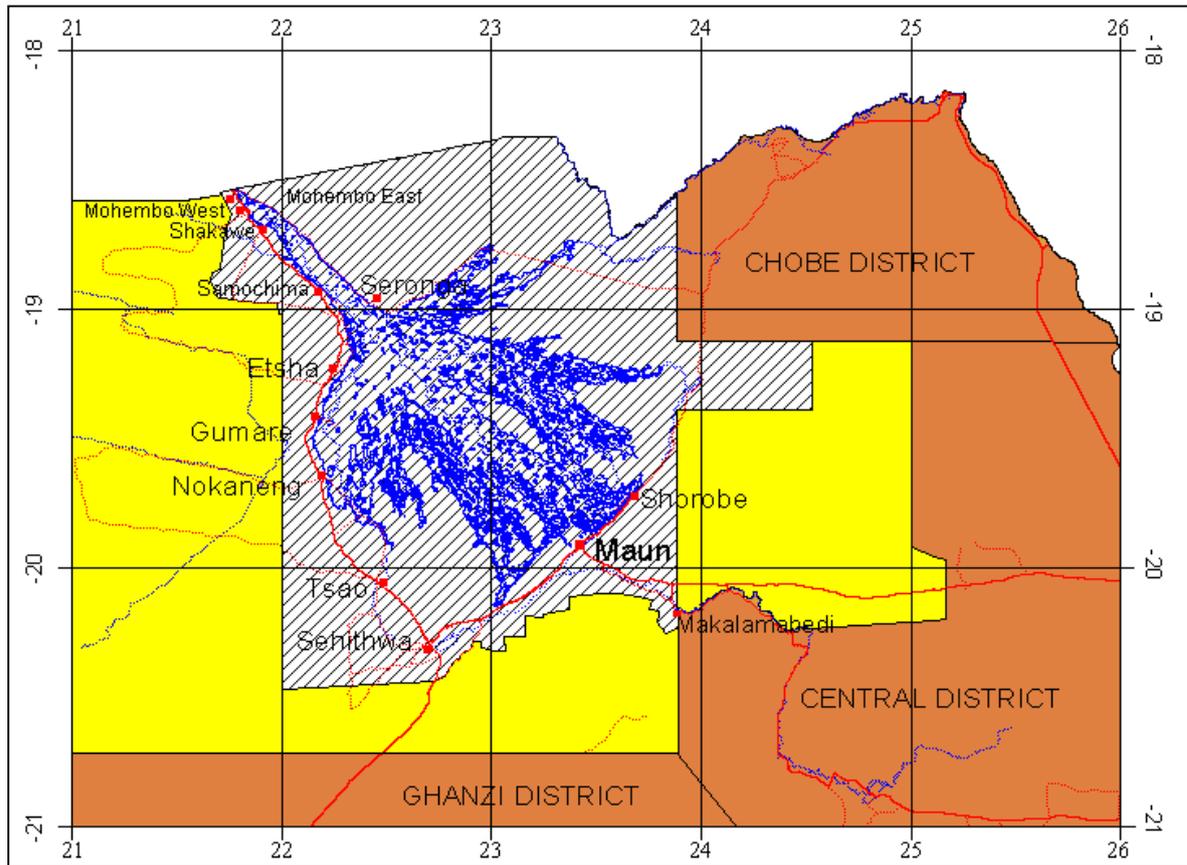
July 2009

*Environmental protection and sustainable management
of the Okavango River Basin*

EPSMO

Transboundary Diagnostic Analysis of the Botswana Portion of the Okavango River Basin.

Land use planning



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Final report

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EXECUTIVE SUMMARY: Major Trans-boundary issues arising from this report.

*“There is an urgent need to carry out an integrated environmental study to obtain data that could be used to form an Okavango Delta master plan. **Such a plan must be sensitive to the socio – economic needs and development of the communities in the Delta whilst exploiting the immense tourism potential.** There are additional risks to the inflow of water in the Okavango Delta **that require joint management with neighbouring states**” Long-term Vision for Botswana (1997)*

As highlighted in the 2016 vision clause above, prudent use of the Okavango delta resources is of national, regional and international importance. The Okavango delta is a complex and sensitive eco-hydrological system which requires wise management and use to ensure its sustainability. Management of the resource is complicated by the fact that it supports multiple stakeholders in a transboundary setting. It is therefore unavoidable and advised that planning and use decisions consider these important variables.

Through local, national and international effort the ODMP process produced a land use plan guided by the following principles:

- 1. Land use capability and land use conflict resolution:** Land use conflicts are a major concern in the Delta. Conflicts exist between wildlife conservation and communal agricultural use and between tourism and other uses. Conflicts therefore require urgent attention as they threaten the conservation of the resources.
- 2. Safeguarding of livelihood strategies and promotion of economic growth:** High poverty levels are an issue in Ngamiland. It is therefore important that the plan and or land use zoning promotes access to resources by the poor while at the same time encouraging investment for economic growth and employment creation.
- 3. Compliance with national and international policies and conventions:** The Okavango Delta is a Ramsar site, hence a wetland of international importance which should be conserved accordingly. It is therefore required that any land use zoning does not jeopardize the conservation of this resource. There are also national ideals for the conservation of the Okavango delta as outlined in the vision 2016 clause quoted above.
- 4. Ecological and environmental considerations:** The complexity of the Okavango delta as an ecological system is known and acknowledged as a planning consideration. It was therefore requested that the land use zoning adopted be environmentally sensitive.

The final decision for land use zoning from the ODMP process is shown by Maps 5 & 6 below. The plans promote sustainable use in the areas of agriculture and tourism.

They recommend that development take advantage of the land suitability and water availability in some areas to enhance agricultural production and rural livelihoods (see Map 5). Map 6 presents an option that maximizes the scenic and wilderness properties of the Okavango delta by increasing tourism activity. The highlight of this land use development is its recommendation for the utilization of Moremi Game Reserve.

While the land use decisions were taken with local resources needs, use and conservation in mind, there is need to also take inventory of regional development needs and reconcile them with local (Ngamiland) ones. This is important because land use decisions made for the development of the Okavango Delta area require that the Delta remain as pristine as it currently is. Needless to say, maintaining the pristine nature of the Delta requires cooperation of other riparian states in the Okavango River basin. There are several ways of fostering such cooperation. Basin wide planning and consultation is one of them. This was embraced to some extent during the ODMP but albeit to a limited consultative extent. It would be useful for stakeholders to be engaged in a process of collective planning and decision making across the basin, perhaps under the leadership and guidance of OKACOM. The second way to foster cooperation for the preservation of the Okavango delta is to deliberately facilitate benefit sharing from development of the basin components. Botswana has a well developed tourism industry which it intends to develop further. If the creativity and attendant benefits from this industry can be scaled up to the rest of the basin that could promote an interest by all the riparian states to preserve the Delta.

TABLE OF CONTENTS

EXECUTIVE SUMMARY: Major Trans-boundary issues arising from this report.	3
1 INTRODUCTION AND GENERAL BACKGROUND.....	6
2 EXISTING LAND USES AND MANAGEMENT PRACTICES.....	7
2.1 Prevailing Land Tenure System	7
2.2 Existing land uses and practices	8
3 FACTORS THAT INFLUENCED THE LAND USE PLANNING PROCESS.....	14
3.1 Socio-economic conditions and population characteristics.....	14
3.1.1 Impacts of population characteristics on sustainable utilisation of land and other natural resources.....	14
3.2 Land Management Practices	15
3.3 Land utilisation potential – suitability	16
4.0 LAND USE ZONING.....	18
4.1 Land use planning and recommendations	18
4.2 Preferred land use options	18
4.3 Conclusion and planning implications.....	20
References.....	21

TABLE OF FIGURES

FIGURE 1 MAP 1: NGAMILAND DISTRICT LAND TENURE	7
FIGURE 2 MAP 2: NGAMILAND DISTRICT CURRENT LAND USE ZONES.....	9
FIGURE 3 MAP 3: SOIL SUITABILITY	17
FIGURE 4 MAP 4: PROPOSED LAND USE ZONING 1	19
FIGURE 5 MAP 5: PROPOSED LAND USE ZONING 2.	20

TABLE OF TABLES

TABLE 1: EXISTING BROAD LAND USE CATEGORIES IN NGAMILAND (2009) ...	8
TABLE 2: LIST AND DETAILS OF CHAS IN THE ODRS	12

1 INTRODUCTION AND GENERAL BACKGROUND

The Okavango Delta covers an area of about 12000 Km² and receives an average of 15 billion cubic meters of water every year. 95% of this water is lost through evaporation (Wolski et.al, 2005). A population of more than 120,000 people, consisting largely of Bayei, Hambukushu, Herero, Batawana, Basarwa and Bakgalagadi ethnic groups are found in villages that lie on the fringes of the Delta (DEA, 2008). The Okavango Delta like other wetlands is a resource rich hub in terms of water, fish, wildlife, forest resources, minerals and other resources. The main land use in the Delta is tourism and wildlife management in the form of Moremi Game Reserve and the Kwando and Okavango Wildlife Management Areas (WMAs) surrounding the Moremi Game reserve. It is estimated that about 100,000 tourists pass through the Okavango Delta every year and both consumptive and non-consumptive tourism activities are the main economic activities in the area. Tourism in the Okavango and Chobe areas makes up most of the 7% that is the contribution of tourism towards the country's GDP.

The Government of Botswana ratified the convention on wetlands–The Ramsar Convention, and thus became a contracting party to the convention on the 4th of April 1997. Consequently the Okavango Delta was listed as a Ramsar site and wetland of international importance. The Department of Environmental Affairs (DEA) was assigned the responsibility of ensuring preparation of a management plan for the site. The Okavango Delta Management Plan (ODMP) project was developed as a means “to integrate natural resource management for the Okavango Delta Ramsar site that will ensure its long term conservation, and will also provide benefits for the present and future well being of the people, through sustainable use of its natural resources” (ODMP Project Proposal, 2002).

The Okavango Delta Management Plan is an integrated plan which draws together various natural resources sector components into an overarching planning framework for the sustainable utilisation, conservation and management of the resources of the Okavango Delta Ramsar Site (ODRS). As a planning strategy twelve sector components were established to contribute in drawing up the plan. Tawana Land Board (TLB) which is the District land authority, in association with the District Land Use Planning Unit (DLUPU) had the institutional responsibility for the land use planning and land management component. TLB worked under the supervision and direction of the component task force (reference group), the Wetlands Management Committee (OWMC); ODMP project steering committee; and the ODMP project secretariat in Maun. The land use and land management plan essentially aims at establishing regulations, guidelines, land use proposals and programmes that will regulate the use of land; guide land management and zone the Ramsar site into distinct land use zones. It is a 24-year comprehensive land use and land management plan. The Okavango Delta Ramsar site covers approximately 60% of Ngamiland District. Planning for the entire District was carried out by the Department of Lands in 2008/2009. This planning exercise endorsed the ODMP land use proposals and carried on the conservation theme by proposing additional wildlife use. The ODMP land use and land management plan for the ODRS was further harmonised with the Ngamiland Tourism Development plan (NTDP). This was so because the two plans were diverging from one another instead of maximising the tourism potential of the ODRS.

2 EXISTING LAND USES AND MANAGEMENT PRACTICES

2.1 Prevailing Land Tenure System

Before the colonial period, the whole of Botswana was made up of communal/tribal land. However, when Botswana became a British protectorate, two additional tenure categories were introduced, namely crown land and freehold land. After the country gained independence, these three land tenure systems were retained. Thus, Botswana now has three land tenure systems, namely, tribal (communal) land; state land (former crown land) and freehold land. Tribal land constitutes 71 percent of all land in the country, while state land covers 23 percent and freehold land makes up 6 percent. According to the Ngamiland integrated land use and land management plan (2009), 79.3 percent of the land fall under tribal land tenure system, while 20.7 percent constitute state land tenure system. There is no freehold land in Ngamiland (see Map 1). The main distinctions in these land tenure systems are in their title holdings and authorities responsible for their administration. Tribal land is communally owned and is held in trust for communities by the Tawana Land Boards. The tribal land Act of 1968 is the principal instrument used to administer land use in the district, whilst the state land Act is used in the last 20% of the district.. The Department of Lands in the Ministry of Lands and Housing holds and administers state land on behalf of the Government using the state land Act.

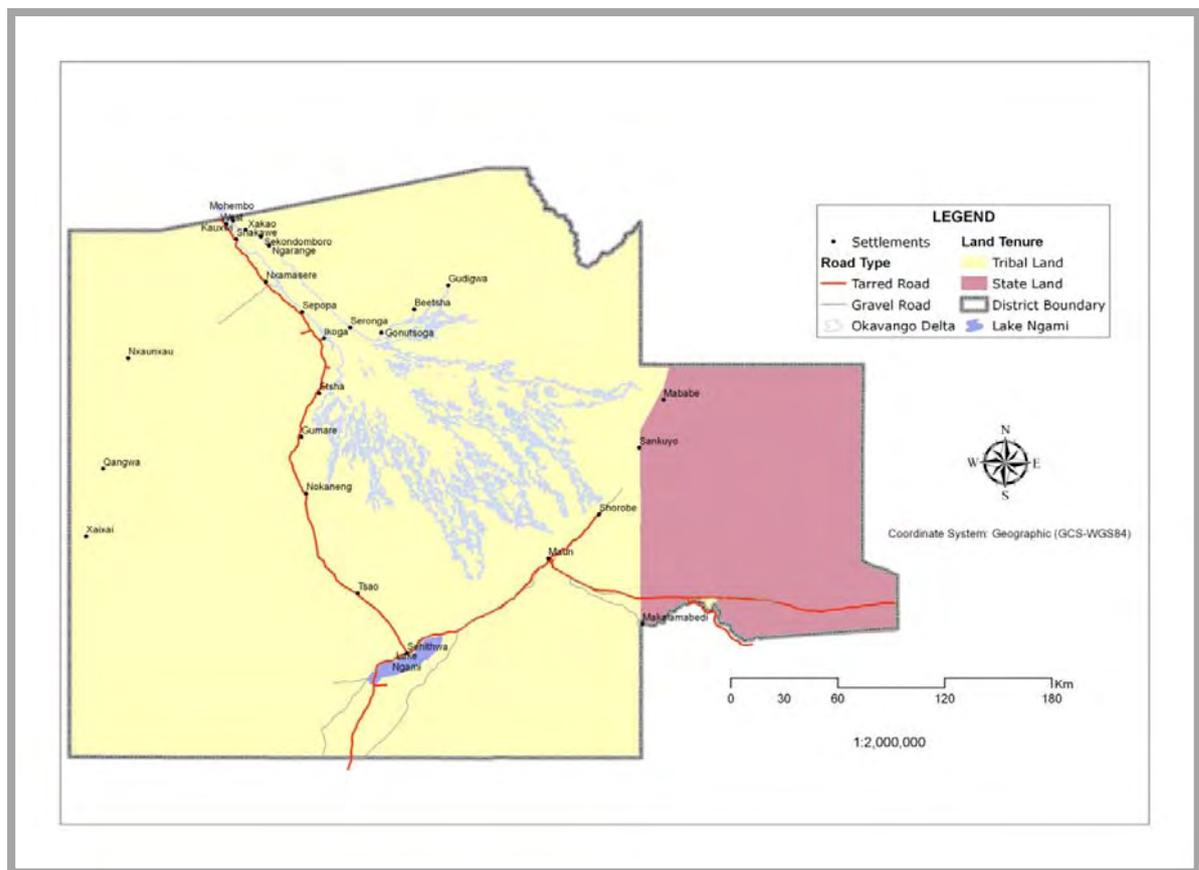


Figure 1 Map 1: Ngamiland District land tenure

2.2 Existing land uses and practices

Existing land uses and land management activities in Ngamiland are largely a reflection of the area's natural resources endowment which gravitates around the attributes of the Okavango Delta and its associated wetlands. The Okavango River or rather water availability, soils, and vegetation have contributed significantly to the distribution of the human population and their related activities. The broad land use zones comprise communal areas, game reserve and national parks, wildlife management areas (WMA) and the wetlands associated with the delta. These broad categories, particularly communal areas are further subdivided into smaller and more specific categories which include settlements, arable lands and grazing areas. The other land use form in WMA is both non-consumptive and consumptive wildlife utilization.

Table1 below shows the land use up-take for the broad land use categories identified above, while Map 2 shows the land use zones in Ngamiland.

Table 1: Existing broad land use categories in Ngamiland (2009)

Land Use Category	Area (km ²)	% of Total Area
Communal Areas, Settlements, Arable and Pastoral Agricultural	54040	49.6
Ranches	9394	8.6
Game Reserves and National Parks	8260	7.5
Wildlife Management Areas	37501	34.3
Total	109195	100

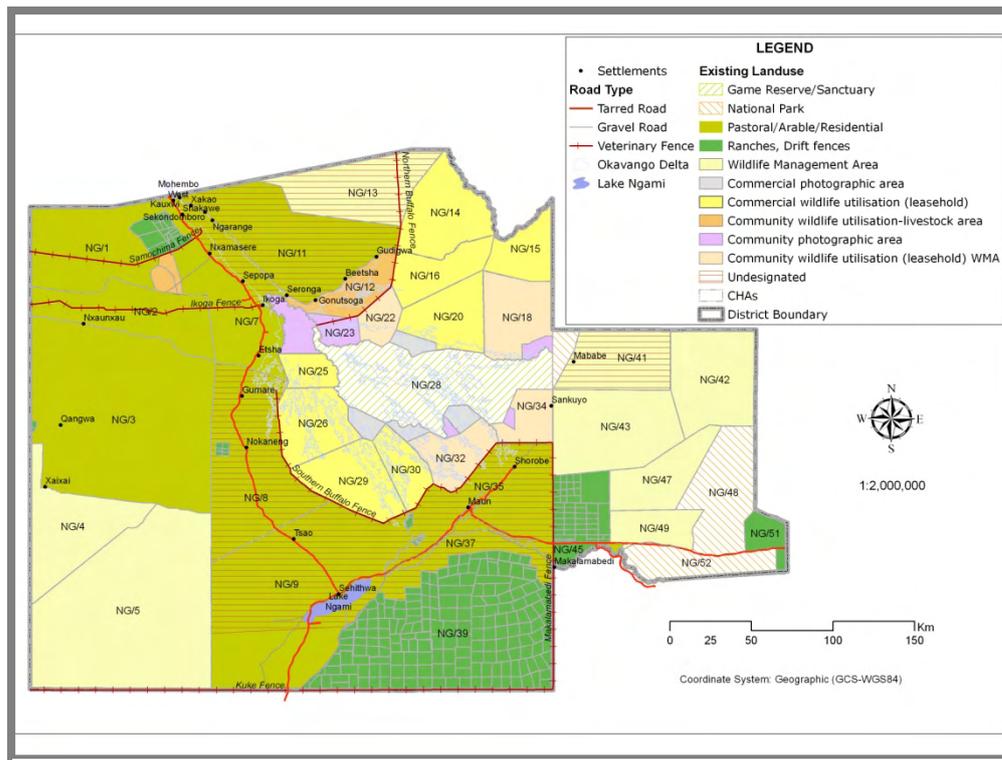


Figure 2 Map 2: Ngamiland District current land use zones

Agriculture

The dominant land uses in communal areas are arable agriculture, pastoral agriculture and settlements. Arable agriculture, including dryland, and molapo farming, is widely practiced by communities living within and in the fringes of the Delta. Settlements around Etsha villages and those on both sides of the Panhandle are well known for dryland farming. Molapo farming is associated with communities around the southern parts of the Okavango delta where both maize and sorghum are cultivated (Bendsen, 2003). There is a perpetual conflict between agriculture and wildlife, particularly elephants raiding crops. This occurs especially in the remote villages in the southeastern Panhandle where communities ploughing fields are located within elephants migratory corridors. Conflict also exists between livestock and predators such as lions, leopards, cheetahs and hyenas. The Botswana Government established a compensation scheme for farmers, whose crops and livestock are destroyed by wildlife. From consultative meetings with communities, the general complaint is that the compensations are not adequate and timely. As a result farmers have not been eager to intensify their arable farming practices and they have not been amicable to conservation measures proposed by government.. Of the total 48 900 hectares of land cleared for cultivation only 10 000 hectares are cultivated annually, of which 75 percent is for dryland farming, and 25 percent for molapo (flood-recession) farming, (Bendsen, 2003).

Pastoral farming is widely practiced in the study area and cattle herds are found at various cattle posts interspersed with villages and arable fields. Despite a major setback in the cattle industry that saw the eradication of the entire cattle population (320, 000) in the district in 1996, there is evidence to suggest that following the restocking exercise, the cattle herd is once again steadily increasing. The

development of the pastoral agriculture is greatly limited by availability of water in areas lying far from the delta. During the ODMP consultative meetings with communities across the Okavango Delta, communities requested for government assistance in borehole drilling in the sandveld areas, so as to allow the relocation of cattle away from the delta. Communities consider such a move vital for the reduction of the widely reported land use conflicts in and around the Okavango Delta.

Management of the continuous foot and mouth outbreaks has proven to be costly. There is also a constant struggle with outbreaks of other less frequently occurring diseases such as the cattle lung disease.

In an effort to minimize the risk and control the spread of livestock diseases, the Department of Veterinary Services in the Ministry of Agriculture erected cordon fences in 'strategic' places. The practical purpose of the fences is to:

- Prevent movement of potentially disease carrying livestock
- Prevent the contact between livestock and buffalo which is a carrier of the foot and mouth virus.
- Prevent the transfer of disease from livestock to wildlife.
- Also as a land use strategy to establish and maintain a foot and mouth free zone.

In Ngamiland there are seven major disease control fences which were erected at different periods marking the expansion of the livestock industry. Before independence the colonial government erected the Makalamabedi cordon fence to the south east and the Kuke fence on the south of the District to separate the disease prone Ngamiland district herd from the Ganzi and Central Districts herds. The southern and northern buffalo fences around the delta were constructed to curtail migratory movements of Buffaloes in the early 1980s and early 1990s respectively. The area inside the buffalo fence is a cattle free zone. The fence is also aimed at preventing contact between buffalo and livestock. This has helped to promote and encourage both consumptive and non-consumptive tourism activities in the areas inside the fence. The final set of fences, Samochima, Ikoga and Setata (see map 2) were erected in 1996 as a control measure for the spread of the cattle lung disease. These measures have had a significant influence on the current distribution of cattle in the entire district. Cattle are concentrated in the south west and southern parts of the district.

Wildlife

The existence of Moremi game reserve, Chobe, Nxai pan and Makgadikgadi national parks and adjacent Kwando and Okavango WMAs in the District continue to promote wildlife use and tourism as a significant land use practice in the Okavango Delta. To this end the WMAs have been divided into smaller segments called controlled hunting areas (CHAs)(see Map 2). Controlled hunting areas have been turned into concession are leased to those with interest in wildlife utilization for both consumptive and non-consumptive

Forestry

Within the ODRS, there are no areas zoned specifically as Forest Reserve, even though there are areas rich in woody species such as Mukwa, used for timber products and carvings. This is one area that should be considered in the preparation of any proposed land use zoning map.

Quarrying and mining

There are no known sites designated for quarrying for gravel and road construction aggregates, as well as for sand excavations. As a result these activities take place indiscriminately in unauthorised locations, particularly in and around major settlements, around river banks and flood plains. This practice leads to despoilation of the landscape and environment, and the creation of unrehabilitated burrow pits. Such areas become undevelopable in the long run. The Tawana Land Board issues the surface rights with the Department of Mines, Minerals and Energy Affairs issuing licences to mine sand and quarry. There is lack of both compliance and enforcement of the licences. Hence most quarrying activities are illegal. Currently there are no mining activities in Ngamiland. However a copper mining project is planned to commence in the near future about 80kilometres from Maun, South of Toteng village. The proposed lifespan of the mine is 19 years .It is not expected that mining will develop into a big industry or a significant land use activity. The EIA of this mine has recommended that the mine plan for and avail its exit strategy at the start of the copper production.

Wildlife management areas and other conservation land uses

Wildlife Management Areas (WMAs) were initially proposed and delineated as corridors and breeding areas of wildlife = under the TGLP of 1975. Their establishment was statutorily supported by the Conservation Policy of 1986 (Government White Paper No 1 of 1986). They further derive legal backing from the Wildlife Conservation and National Parks Act, of 1992. They are located on the margins of National Parks and Game Reserves where they serve as buffer zones between incompatible land uses particularly livestock and wildlife. In some cases, they also serve as migratory corridors for wildlife. Because of their location in wildlife rich areas, WMAs offer some of the most conducive environment for sustainable utilization of wildlife resources under the Community Based Natural Resource Management (CBNRM) program and other commercial natural resources uses. Thus, unlike parks and game reserves where there is total preservation and protection of wildlife resources, sustainable utilization of wildlife resources is encouraged in WMAs.

Land use in Ngamiland is also regulated and defined according to Controlled Hunting Areas (CHAs) which are located within WMAs. The WMAS derive their legal backing from Wildlife Conservation and National Parks Act, 1992. The significance of CHAs is to define wildlife utilization throughout the District. The entire district is divided into fifty-two (52) CHAs (see Table 2).

Table 2: List and details of CHAs in the ODRS

CHA No.	SIZE (KM ²)	LESSEE	LAND TENURE	CHA TYPE	LAND USE	CHA STATUS
NG/6	184.30	Communal & a portion is leased to NMMAG	Tribal	Community managed wildlife in livestock area	Pastoral/ Arable/Res.	Ungazetted
NG/7	2918.93	Communal	Tribal	Un-designated	Pastoral/ Arable/Res.	Ungazetted
NG/8	4837.00	Communal	Tribal	Un-designated	Pastoral/ Arable/Res.	Ungazetted
NG/9	8388.23	Communal	Tribal	Un-designated	Pastoral/ Arable/Res.	Ungazetted
NG/10	1196.28	Communal	Tribal	Un-designated	Pastoral/ Arable/Res.	Ungazetted
NG/11	4562.31	Teemashane Trust	Tribal	Un-designated	Pastoral/ Arable/Res.	Ungazetted
NG/12	1091.93	Bakakwe Cultural Conservation Trust	Tribal	Community managed wildlife in livestock area	Pastoral/ Arable/Res.	Ungazetted
NG/13	2866.83	Tcheku Community Trust	Tribal	Un-designated	WMA	Gazetted
NG/14	2285.70	Linyanti Explorations (Pty) Ltd	Tribal	Commercial Wildlife Utilisation (Leasehold)	WMA	Gazetted
NG/15	1231.72	Linyanti Investments (Pty) Ltd	Tribal	Commercial Wildlife Utilisation (Leasehold)	WMA	Gazetted
NG/16	1343.71	Linyanti Explorations (Pty) Ltd	Tribal	Commercial Wildlife Utilisation (Leasehold)	WMA	Gazetted
NG/17	64.88		Tribal	Community photographic area	WMA	Gazetted
NG/18	1795.36	Khwai Community Trust	Tribal	Community wildlife utilisation (Leasehold)	WMA	Gazetted
NG/19	163.89	Khwai Community Trust	Tribal	Community photographic area	WMA	Gazetted
NG/20	1644.59	Tsum-Tsum Bird Safaris	Tribal	Commercial Wildlife Utilisation	WMA	Gazetted

TDA Botswana Land Use Planning.

				(Leasehold)		
NG/21	230.06	Xagana, Shindi and Camp Okavango	Tribal	Commercial photographic area	WMA	Gazetted
NG/22	610.11	Okavango Community Trust	Tribal	Community wildlife utilisation (Leasehold)	WMA	Gazetted
NG/23A	88.87	Okavango Community Trust	Tribal	Un-designated	WMA	Ungazetted
NG/23B	350.84	Okavango Community Trust	Tribal	Community photographic area	WMA	Gazetted
NG/24	584.12	Okavango Jakotsha Community Trust	Tribal	Community photographic area	WMA	Gazetted
NG/25	617.01	Ngamiland Adventure Safaris	Tribal	Commercial Wildlife Utilisation (Leasehold)	WMA	Gazetted
NG/26	1693.20	Elephant Back Safaris	Tribal	Commercial Wildlife Utilisation (Leasehold)	WMA	Gazetted
NG/27A	250.64	Afro Ventures (Pty) Ltd (CC Africa) & Kanana Ventures (Pty)	Tribal	Commercial photographic area	WMA	Gazetted
NG/27B	153.41	Lodges of Botswana (Pty) Ltd	Tribal	Commercial photographic area	WMA	Gazetted
NG/28	4829.99	Moremi Game Reserve	Tribal	Moremi Game Reserve	Game Reserve	Gazetted

3 FACTORS THAT INFLUENCED THE LAND USE PLANNING PROCESS

3.1 Socio-economic conditions and population characteristics

According to the 2001 Census of Population and Housing, there are a total of 18 277 households in the Ramsar Site, of which 8 278 are male headed, while 9 999 are female headed. This means that in percentage terms, 45.3 percent of the households are headed by males while 54.7 percent are headed by females. The average household size is 6.06 persons per household which is higher than the national average of 4.3 persons in 2001. Ethnic composition of the delta's population is an important consideration in land management and use planning. The Batawana who mainly reside in and around Maun are predominantly livestock and dryland farmers. Livestock farming is the main economic activity of the Herero, and is the major land use activity in the south west from Toteng, around Lake Ngami, and up to Nokaneng. The Bayei and Bahambukushu are active in water related types of activities, like fishing and tourism transportation by mekoro(dugout canoes),. On the other hand, communities in the northern Panhandle, the Hambukushu population on both banks of the Panhandle engage in dryland crop farming. The Bayei form the predominant population in areas of Gumare, Tubu and Shorobe, where flood recession farming is practiced.

3.1.1 Impacts of population characteristics on sustainable utilisation of land and other natural resources

Population characteristics obviously have impacts on land and other natural resources utilization. For the Okavango Delta region whose environment is fragile, and with population concentrations in dryland fringes of the Okavango Delta, impacts on land resources manifest in the following ways:

- A growing and youthful population demands for land use zones to be designated to facilitate investment and employment creation. Such a population also requires that adequate land be zoned for such use activities as schools, clinics and recreational facilities. Hence settlement expansion is a serious issue for land use planning.
- Highest concentration of population in major villages such as Maun will intensify land use problems associated with urban areas, such as illegal occupation of land or squatting; pollution due to mishandling of waste and others.
- With population distributed mainly in the drylands fringes of the delta, and with high levels of tourism facilities and activities, there are obvious impacts on land and other natural resources. These are in the form of land degradation and pollution as a

result of creation of many tracks by safari vehicles, littering and inappropriate disposal of wastes, and tourism activities impinging heavily on land carrying capacities.

- Growing population and urbanization promotes commercialization of natural resources and inevitably the tendency for unsustainable exploitation of these resources.
- With the proliferation and mushrooming of “settlements” which are ungazetted, there are now incessant calls for the provision of services to such “settlements”. This should be a consideration in land use planning.

3.2 Land Management Practices

Land management practices in Ngamiland can be classified according to those implemented at settlement level and those at supra-settlement level. The recommended land use management practices for both levels are usually contained in settlement development plans, and land management plans. Currently, plans prepared at settlement level in the District include the Maun Planning Area Development Plan, the Gumare Development Plan and the Shakawe-Mohembo Development Plan which was produced as part of the ODMP. Fifteen more villages are planned to have layouts prepared and implemented by the end of NDP 10. The provisions of the Town and Country Planning Act (T&CPA) of 1977 and its related documents such as the Development Control Code and the Urban Development Standards inform land use planning and management practices for settlements declared as planning areas. The T&CPA 1977 empowers the minister to declare any area in Botswana a planning area. Once declared a planning area, the Act further requires that a development plan be prepared for such an area. Any development that takes place in such areas requires planning permission and permission is only given for developments that conform to the provisions of the plan and the recommended development, building and design standards. Thus in terms of settlement plans, conformity with the provisions of the development plan is one of the land management strategies. Development plans are also prepared as advisory documents for those settlements that have not yet been declared planning areas. Plans prepared under these conditions are of an advisory nature and can be used as tools to promote sustainable development.

Land management practices at the supra-settlement levels are currently guided by the provisions of plans that cover a specific area within the district, (for example the Okavango River Panhandle Management Plan, 2001) or the entire district (for example, the Ngamiland District Settlement Strategy). These stipulate land management guidelines and regulations which must be adhered to and enforced. Management plans and guidelines have been prepared for the two Ngamiland Wildlife Management Areas (WMAs) as well as Game Reserves- for example the Moremi Game Reserve Management Plan. Furthermore, there are WMA regulations that have been prepared and are yet to be adopted by government. Each one of these plans spells out how land in a particular area is to be used. The preparation and enforcement of the provisions of the different plans is the responsibilities of different institutions operating at district and sub-district levels. Apart from the Tawana Land Board, the responsibility for implementation and enforcement of settlement plans lies with North West District Council and other sectoral government departments. In the

case of plans for WMAs, the Department of Wildlife and National Parks is a key stakeholder for both the preparation of plans and their implementation.

The various plans and local authorities have played an important role in the management of specific areas and specific resources. However as development intensifies, and the need for wise natural resources utilisation becomes eminent, it is useful and prudent to have an overarching development vision for the entire District. That is what the integrated District land use and land management plan is expected to provide. The integrated plan should also present a Delta development direction in the context of the Okavango river basin.

Currently the main challenge in land management in District is the enforcement of the provisions contained in the different plans cited above. Effective implementation of these provisions depends to a large extent on the involvement of local communities and other stakeholders other than the designated authorities. Up until the ODMP, the planning process followed the national planning culture of a top-down approach. Local communities have always played a marginal role in the preparation of plans. Although community consultation is mandatory and was indeed practiced during the ODMP process, the extent to which community views actually influence policy formulation and or implementation of plans remains unclear and debatable.

The fact is that staff capacity within the implementing agencies of the various plans is thin on the ground to facilitate effective inspections, visits and development monitoring, and also to ensure that land management guidelines and regulations are observed. Local communities on the other hand seldom understand these guidelines, and therefore end up not applying best land management practices, or at worst simply ignore these guidelines. Community Based Organisations and Trusts lack the requisite management skills for effective land management in their respective areas. This planning inadequacy has so far not caused serious resources degradation, but has resulted in land use conflicts which need to be addressed by the integrated land use and land management plan.

The Tawana Land Board which is the main land authority, is also faced with the absence of a proper land data base management system, resulting in poor record keeping of land allocated for different uses, to whom, where and when.

3.3 Land utilisation potential – suitability

Soil suitability or potential utilization was another important guiding principle or consideration in developing the Ngamiland integrated development plan. Rating of soils for suitability is based on a number of factors, but mainly soil fertility. The rating of soils that is used in Botswana and therefore applied to Ngamiland has 2 major soil orders that are divided into classes of fertility and these are shown in Map 3 below.

From soil suitability analysis for the District, as depicted on the map, the most fertile soils are found within the peripheries of the Okavango rivers. This is particularly due to the high moisture content, high turnover of biomass, hence the good structured soils that are as a result, very fertile. By default, indigenous knowledge and also as adopted by the Land Board, the drier sandveld areas west of the Okavango area are used for grazing. This is where most of the boreholes used for watering livestock are found.

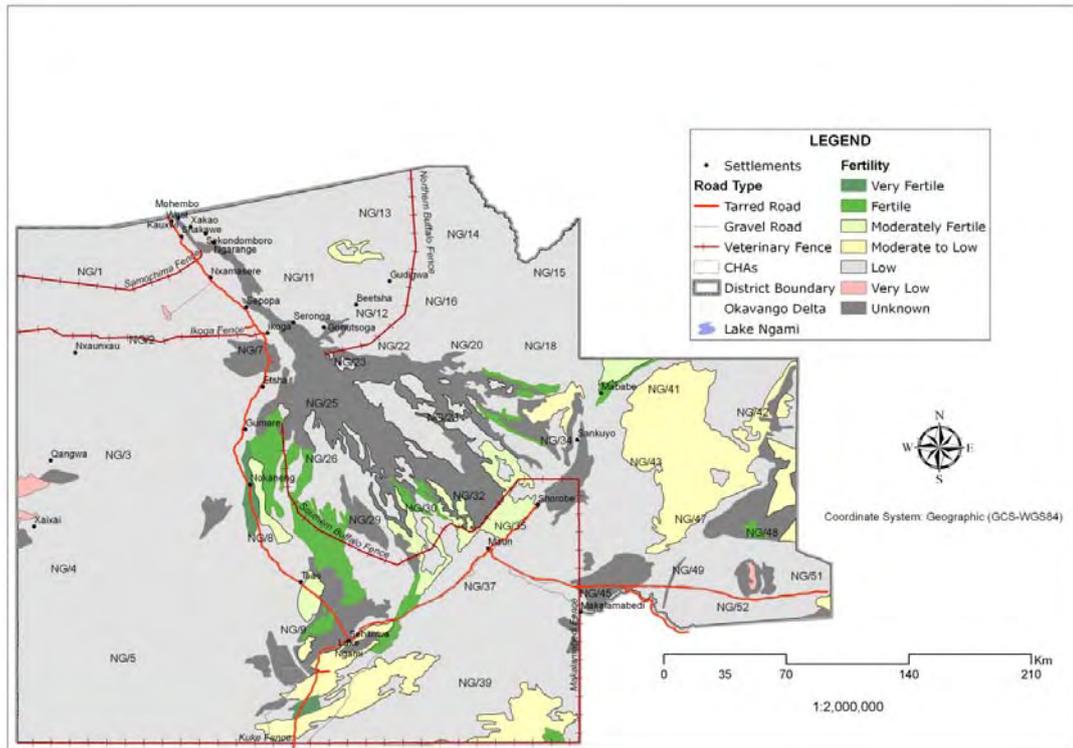


Figure 3 Map 3: Soil Suitability

4.0 LAND USE ZONING

4.1 Land use planning and recommendations

Sustainability was the overarching principle used to decide on the most suitable land use zoning. A favoured land use plan would be one that protects the integrity of the fragile environment of the Okavango delta; one that renders national and local economic benefits; as well as one that fosters equitable distribution and access to natural resources and the benefits of development. The following set of criteria was used to evaluate land use and development option.

5. **Land use capability and land use conflict resolution:** As shown above land use conflicts are a major concern in the Delta. Conflicts exist between wildlife conservation and communal agricultural use and between tourism and other uses. Conflicts therefore require urgent attention as they threaten the conservation of the resources.
6. **Safeguarding of livelihood strategies and promotion of economic growth:** High poverty levels are an issue in Ngamiland. It is therefore important that the plan and or land use zoning promotes access to resources by the poor while at the same time encouraging investment for economic growth and employment creation.
7. **Compliance with national and international policies and conventions:** The Okavango Delta is a Ramsar site, hence a wetland of international importance which should be conserved accordingly. It is therefore required that any land use zoning does not jeopardize the conservation of this resource. There are also national ideals for the conservation of the Okavango delta as outlined in the vision 2016.
8. **Ecological and environmental considerations:** The complexity of the Okavango delta as an ecological system is known and acknowledged as a planning consideration. It was therefore requested that the land use zoning adopted be environmentally sensitive.

4.2 Preferred land use options

During the ODMP planning process several land use zoning options were presented to the land authority, Tawana Land Board. The options shown in Maps 5 & 6 below were chosen to be implemented concurrently as they were viewed to have different strengths as per the above criteria. Map 5 options offer opportunity for the development of the agricultural production hence improving local livelihoods and resource access for the poor. On the other hand, the proposed option shown in Map 6 promotes maximization of the tourism potential of the Okavango Delta. This was seen as providing the opportunity for economic growth and environmental conservation.

It is important to note that the Department of Lands in the Ministry of Lands and Housing, who is the national land authority, is in the process of combining the two options under the principle of sustainability into an integrated District Land Use Plan. It can already be stated that the combined

concept in the options has been accepted as the land use and development concept for the District with the tourism and wildlife uses taking precedence. From consultations carried out during the ODMF process this bias does not have local favor. Local communities remain committed to subsistence agriculture and would like a land use plan which offers development opportunity in that area. However, the tourism and wildlife utilization options are favored by conservationists locally and appeals to the international stakeholders.

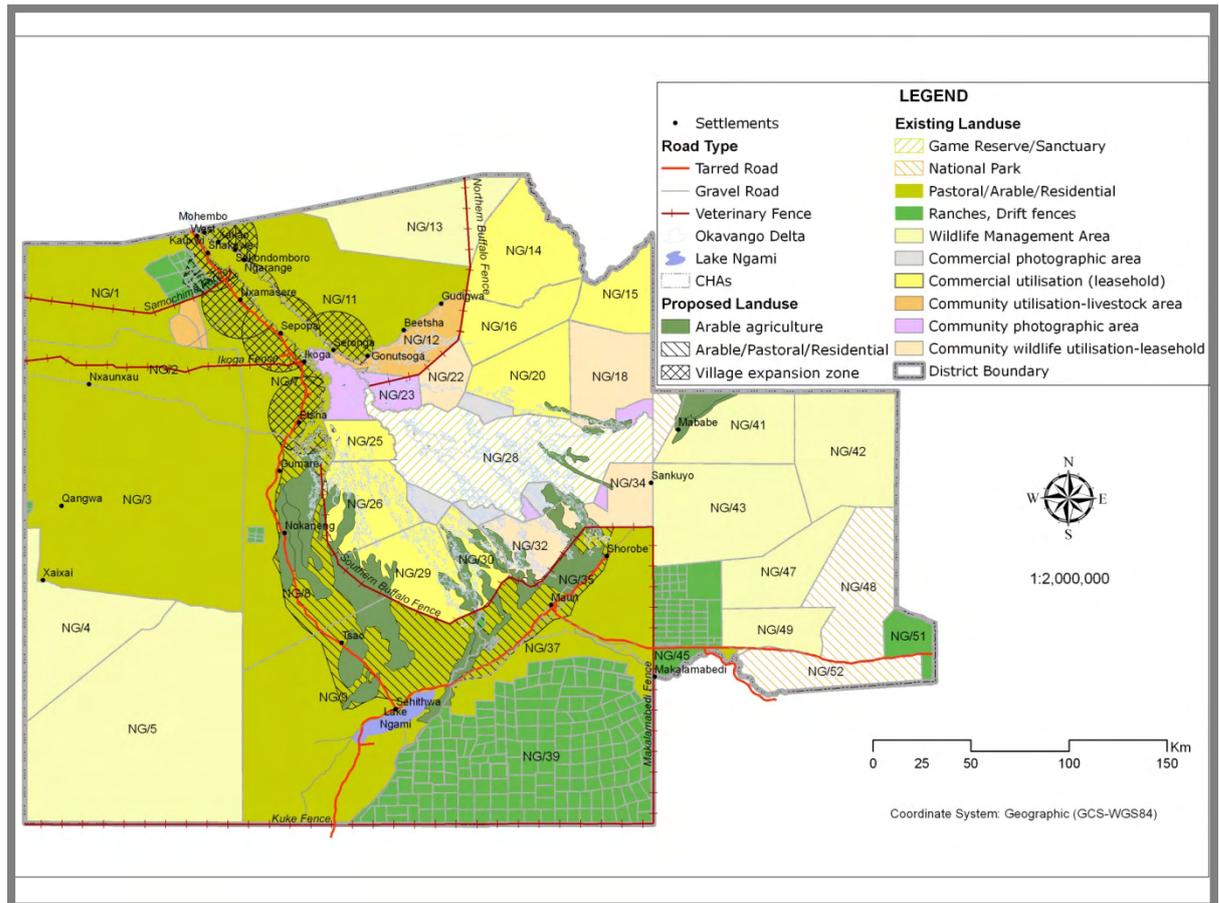


Figure 4 Map 4: Proposed land use zoning 1

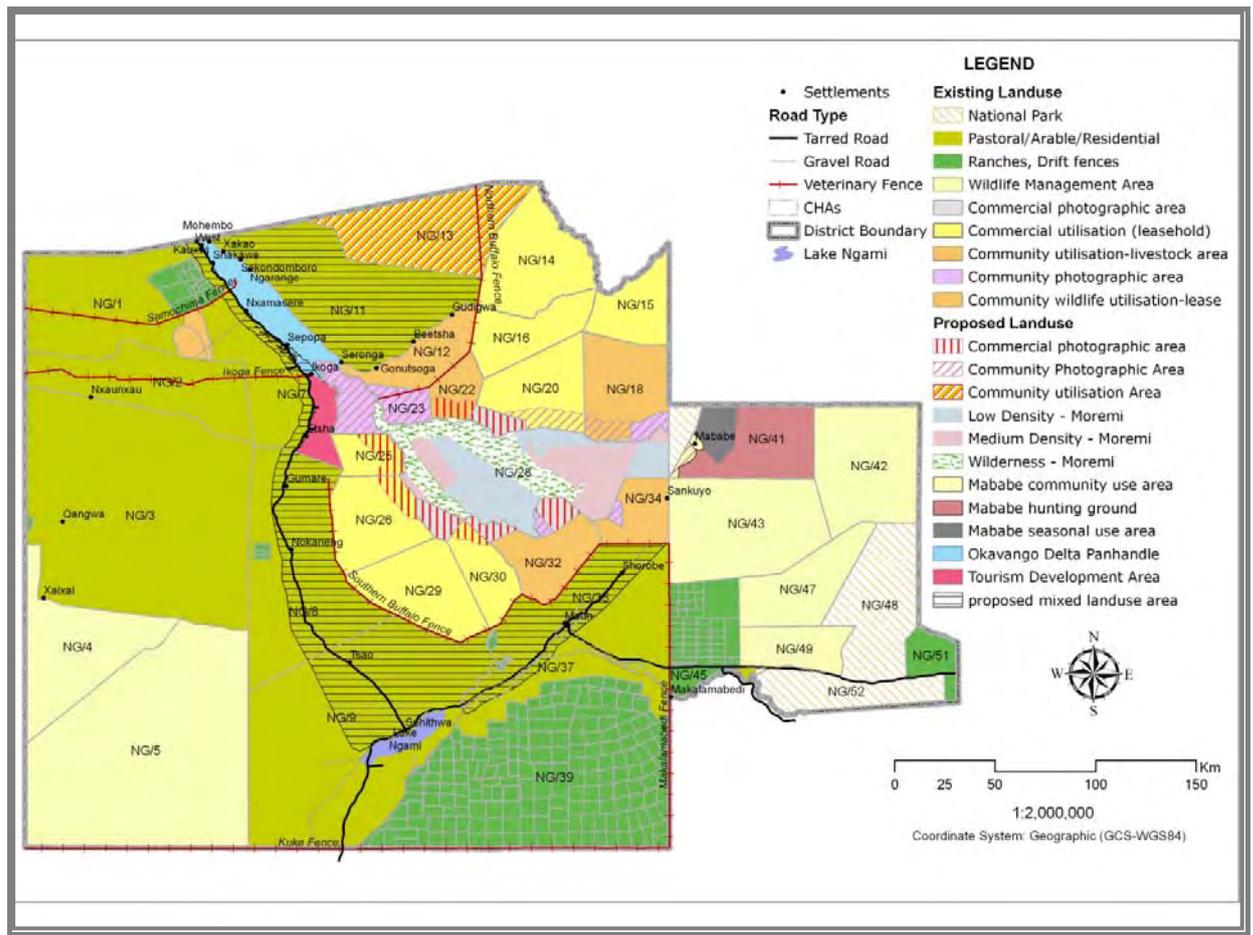


Figure 5 Map 5: Proposed land use zoning 2.

4.3 Conclusion and planning implications

While there remains the need and challenge to reconcile the development and natural resources needs of the Okavango Delta communities and conservation expectations there is also a need to take inventory of and reconcile regional development needs. This is important because land use decisions made for the development of the Okavango Delta area require that the Delta remain in pristine condition. Needless to say maintaining the pristine nature of the Okavango Delta requires cooperation of communities living around the Delta and other riparian states in the Okavango River basin. There are several ways of fostering such cooperation. Basin wide planning and consultation is one of them. This was embraced to some extent during the ODP formulation but albeit to a limited consultative extent. It would be useful to be engaged in a process of collective planning and decision making across the basin, perhaps under the leadership and guidance of OKACOM. The second way to foster cooperation for the preservation of the Okavango delta is to deliberately facilitate benefit sharing from development of the basin components. Botswana has a well developed tourism industry which it intends to develop further. If the creativity and attendant benefits from this industry can be scaled up to the rest of the basin that could promote an interest by all the riparian states to preserve the Delta.

References

1. Bendson H, 2003, *The Dynamics of Land Use Systems In Ngamiland. Changing Livelihood Options And Strategies*. University of Botswana, Harry Oppenheimer Okavango Research Centre, Maun, Botswana.
2. CSO, 2002. *2001 Population and housing census: Population of towns, villages and associated localities*. Government Printer, Gaborone.
3. DEA, 2008. *Okavango Delta Management Plan*. Ministry of Environment, Wildlife and Tourism, Gaborone.
4. Government of Botswana, 1995. *Development Control Code*. Government Printers, Gaborone.
5. Government of Botswana, 1992. *Wildlife Conservation and National Parks Act*. Government Printers, Gaborone.
6. Government of Botswana, 1986. *Wildlife Conservation Policy*. Government Printers, Gaborone.
7. Government of Botswana, 1997. *Vision 2016*, Government Printers, Gaborone.
8. Government of Botswana, 1975. *Tribal Grazing Land Policy*. Government Printers, Gaborone.
9. Government of Botswana, *National Settlement Policy, 1998* Government Printers, Gaborone.
10. Government of Botswana, 1990. *Revised General Soil Legend of Botswana*. Government Printers, Gaborone.
11. Government of Botswana, 1989. *The soils of South East Ngamiland*. Government Printers, Gaborone.
12. Government of Botswana, 1977. *Town and Country Planning Act*. Government Printers, Gaborone.
13. Government of Botswana, 1993. *Tribal Land Act*. Government Printers, Gaborone.
14. Ministry of Lands & Housing, 2003. *Ngamiland District Settlement Strategy: Final Report*. Maun, Botswana.
15. Tawana Land Board, 2008. *Ngamiland integrated land use plan*. Maun, Botswana.
16. Wolski et.al., 2005. Aspects of seasonal dynamics of flooding in the Okavango Delta. *Botswana Notes & records* **Vol 37 179-195**. Botswana Society, Gaborone.

The Okavango River Basin Transboundary Diagnostic Analysis Technical Reports

In 1994, the three riparian countries of the Okavango River Basin – Angola, Botswana and Namibia – agreed to plan for collaborative management of the natural resources of the Okavango, forming the Permanent Okavango River Basin Water Commission (OKACOM). In 2003, with funding from the Global Environment Facility, OKACOM launched the Environmental Protection and Sustainable Management of the Okavango River Basin (EPSMO) Project to coordinate development and to anticipate and address threats to the river and the associated communities and environment. Implemented by the United Nations Development Program and executed by the United Nations Food and Agriculture Organization, the project produced the Transboundary.

Diagnostic Analysis to establish a base of available scientific evidence to guide future decision making. The study, created from inputs from multi-disciplinary teams in each country, with specialists in hydrology, hydraulics, channel form, water quality, vegetation, aquatic invertebrates, fish, birds, river-dependent terrestrial wildlife, resource economics and socio-cultural issues, was coordinated and managed by a group of specialists from the southern African region in 2008 and 2009.

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

Final Study Reports	Reports integrating findings from all country and background reports, and covering the entire basin.		
		Aylward, B.	<i>Economic Valuation of Basin Resources: Final Report to EPSMO Project of the UN Food & Agriculture Organization as an Input to the Okavango River Basin Transboundary Diagnostic Analysis</i>
		Barnes, J. et al.	<i>Okavango River Basin Transboundary Diagnostic Analysis: Socio-Economic Assessment Final Report</i>
		King, J.M. and Brown, C.A.	<i>Okavango River Basin Environmental Flow Assessment Project Initiation Report (Report No: 01/2009)</i>
		King, J.M. and Brown, C.A.	<i>Okavango River Basin Environmental Flow Assessment EFA Process Report (Report No: 02/2009)</i>
		King, J.M. and Brown, C.A.	<i>Okavango River Basin Environmental Flow Assessment Guidelines for Data Collection, Analysis and Scenario Creation (Report No: 03/2009)</i>
		Bethune, S. Mazvimavi, D. and Quintino, M.	<i>Okavango River Basin Environmental Flow Assessment Delineation Report (Report No: 04/2009)</i>
		Beuster, H.	<i>Okavango River Basin Environmental Flow Assessment Hydrology Report: Data And Models (Report No: 05/2009)</i>
		Beuster, H.	<i>Okavango River Basin Environmental Flow Assessment Scenario Report : Hydrology (Report No: 06/2009)</i>
		Jones, M.J.	<i>The Groundwater Hydrology of The Okavango Basin (FAO Internal Report, April 2010)</i>
		King, J.M. and Brown, C.A.	<i>Okavango River Basin Environmental Flow Assessment Scenario Report: Ecological and Social Predictions (Volume 1 of 4) (Report No. 07/2009)</i>
		King, J.M. and Brown, C.A.	<i>Okavango River Basin Environmental Flow Assessment Scenario Report: Ecological and Social Predictions (Volume 2 of 4: Indicator results) (Report No. 07/2009)</i>
		King, J.M. and Brown, C.A.	<i>Okavango River Basin Environmental Flow Assessment Scenario Report: Ecological and Social Predictions: Climate Change Scenarios (Volume 3 of 4) (Report No. 07/2009)</i>
		King, J., Brown, C.A., Joubert, A.R. and Barnes, J.	<i>Okavango River Basin Environmental Flow Assessment Scenario Report: Biophysical Predictions (Volume 4 of 4: Climate Change Indicator Results) (Report No: 07/2009)</i>
		King, J., Brown, C.A. and Barnes, J.	<i>Okavango River Basin Environmental Flow Assessment Project Final Report (Report No: 08/2009)</i>
		Malzbender, D.	<i>Environmental Protection And Sustainable Management Of The Okavango River Basin (EPSMO): Governance Review</i>
		Vanderpost, C. and Dhliwayo, M.	<i>Database and GIS design for an expanded Okavango Basin Information System (OBIS)</i>
		Veríssimo, Luis	<i>GIS Database for the Environment Protection and Sustainable Management of the Okavango River Basin Project</i>
		Wolski, P.	<i>Assessment of hydrological effects of climate change in the Okavango Basin</i>
Country Reports	Angola	Andrade e Sousa,	<i>Análise Diagnóstica Transfronteiriça da Bacia do Rio</i>

Biophysical Series		Helder André de	Okavango: Módulo do Caudal Ambiental: Relatório do Especialista: País: Angola: Disciplina: Sedimentologia & Geomorfologia
		Gomes, Amândio	Análise Diagnóstica Transfronteiriça da Bacia do Rio Okavango: Módulo do Caudal Ambiental: Relatório do Especialista: País: Angola: Disciplina: Vegetação
		Gomes, Amândio	Análise Técnica, Biofísica e Socio-Económica do Lado Angolano da Bacia Hidrográfica do Rio Cubango: Relatório Final: Vegetação da Parte Angolana da Bacia Hidrográfica Do Rio Cubango
		Livramento, Filomena	Análise Diagnóstica Transfronteiriça da Bacia do Rio Okavango: Módulo do Caudal Ambiental: Relatório do Especialista: País: Angola: Disciplina: Macroinvertebrados
		Miguel, Gabriel Luís	Análise Técnica, Biofísica E Sócio-Económica do Lado Angolano da Bacia Hidrográfica do Rio Cubango: Subsídio Para o Conhecimento Hidrogeológico Relatório de Hidrogeologia
		Morais, Miguel	Análise Diagnóstica Transfronteiriça da Bacia do Análise Rio Cubango (Okavango): Módulo da Avaliação do Caudal Ambiental: Relatório do Especialista País: Angola Disciplina: Ictiofauna
		Morais, Miguel	Análise Técnica, Biofísica e Sócio-Económica do Lado Angolano da Bacia Hidrográfica do Rio Cubango: Relatório Final: Peixes e Pesca Fluvial da Bacia do Okavango em Angola
		Pereira, Maria João	Qualidade da Água, no Lado Angolano da Bacia Hidrográfica do Rio Cubango
		Santos, Carmen Ivelize Van-Dúnem S. N.	Análise Diagnóstica Transfronteiriça da Bacia do Rio Okavango: Módulo do Caudal Ambiental: Relatório de Especialidade: Angola: Vida Selvagem
		Santos, Carmen Ivelize Van-Dúnem S.N.	Análise Diagnóstica Transfronteiriça da Bacia do Rio Okavango: Módulo Avaliação do Caudal Ambiental: Relatório de Especialidade: Angola: Aves
	Botswana	Bonyongo, M.C.	Okavango River Basin Technical Diagnostic Analysis: Environmental Flow Module: Specialist Report: Country: Botswana: Discipline: Wildlife
		Hancock, P.	Okavango River Basin Technical Diagnostic Analysis: Environmental Flow Module : Specialist Report: Country: Botswana: Discipline: Birds
		Mosepele, K.	Okavango River Basin Technical Diagnostic Analysis: Environmental Flow Module: Specialist Report: Country: Botswana: Discipline: Fish
		Mosepele, B. and Dallas, Helen	Okavango River Basin Technical Diagnostic Analysis: Environmental Flow Module: Specialist Report: Country: Botswana: Discipline: Aquatic Macro Invertebrates
	Namibia	Collin Christian & Associates CC	Okavango River Basin: Transboundary Diagnostic Analysis Project: Environmental Flow Assessment Module: Geomorphology
		Curtis, B.A.	Okavango River Basin Technical Diagnostic Analysis: Environmental Flow Module: Specialist Report Country: Namibia Discipline: Vegetation
		Bethune, S.	Environmental Protection and Sustainable Management of the Okavango River Basin (EPSMO): Transboundary Diagnostic Analysis: Basin Ecosystems Report
		Nakanwe, S.N.	Okavango River Basin Technical Diagnostic Analysis: Environmental Flow Module: Specialist Report: Country: Namibia: Discipline: Aquatic Macro Invertebrates
		Paxton, M.	Okavango River Basin Transboundary Diagnostic Analysis: Environmental Flow Module: Specialist Report: Country: Namibia: Discipline: Birds (Avifauna)
		Roberts, K.	Okavango River Basin Technical Diagnostic Analysis: Environmental Flow Module: Specialist Report: Country: Namibia: Discipline: Wildlife
		Waal, B.V.	Okavango River Basin Technical Diagnostic Analysis: Environmental Flow Module: Specialist Report: Country: Namibia: Discipline: Fish Life
Country Reports Socioeconomic Series	Angola	Gomes, Joaquim Duarte	Análise Técnica dos Aspectos Relacionados com o Potencial de Irrigação no Lado Angolano da Bacia Hidrográfica do Rio Cubango: Relatório Final
		Mendelsohn, .J.	Land use in Kavango: Past, Present and Future
		Pereira, Maria João	Análise Diagnóstica Transfronteiriça da Bacia do Rio Okavango: Módulo do Caudal Ambiental: Relatório do Especialista: País: Angola: Disciplina: Qualidade da Água
		Saraiva, Rute et al.	Diagnóstico Transfronteiriço Bacia do Okavango: Análise

TDA Botswana Land Use Planning.

			<i>Socioeconómica Angola</i>
	Botswana	<i>Chimbari, M. and Magole, Lapologang</i>	<i>Okavango River Basin Trans-Boundary Diagnostic Assessment (TDA): Botswana Component: Partial Report: Key Public Health Issues in the Okavango Basin, Botswana</i>
		<i>Magole, Lapologang</i>	<i>Transboundary Diagnostic Analysis of the Botswana Portion of the Okavango River Basin: Land Use Planning</i>
		<i>Magole, Lapologang</i>	<i>Transboundary Diagnostic Analysis (TDA) of the Botswana p Portion of the Okavango River Basin: Stakeholder Involvement in the ODMP and its Relevance to the TDA Process</i>
		<i>Masamba, W.R.</i>	<i>Transboundary Diagnostic Analysis of the Botswana Portion of the Okavango River Basin: Output 4: Water Supply and Sanitation</i>
		<i>Masamba, W.R.</i>	<i>Transboundary Diagnostic Analysis of the Botswana Portion of the Okavango River Basin: Irrigation Development</i>
		<i>Mbaiwa.J.E.</i>	<i>Transboundary Diagnostic Analysis of the Okavango River Basin: the Status of Tourism Development in the Okavango Delta: Botswana</i>
		<i>Mbaiwa.J.E. & Mmopelwa, G.</i>	<i>Assessing the Impact of Climate Change on Tourism Activities and their Economic Benefits in the Okavango Delta</i>
		<i>Mmopelwa, G.</i>	<i>Okavango River Basin Trans-boundary Diagnostic Assessment: Botswana Component: Output 5: Socio-Economic Profile</i>
		<i>Ngwenya, B.N.</i>	<i>Final Report: A Socio-Economic Profile of River Resources and HIV and AIDS in the Okavango Basin: Botswana</i>
		<i>Vanderpost, C.</i>	<i>Assessment of Existing Social Services and Projected Growth in the Context of the Transboundary Diagnostic Analysis of the Botswana Portion of the Okavango River Basin</i>
	Namibia	<i>Barnes, J and Wamunyima, D</i>	<i>Okavango River Basin Technical Diagnostic Analysis: Environmental Flow Module: Specialist Report: Country: Namibia: Discipline: Socio-economics</i>
		<i>Collin Christian & Associates CC</i>	<i>Technical Report on Hydro-electric Power Development in the Namibian Section of the Okavango River Basin</i>
		<i>Liebenberg, J.P.</i>	<i>Technical Report on Irrigation Development in the Namibia Section of the Okavango River Basin</i>
		<i>Ortmann, Cynthia L.</i>	<i>Okavango River Basin Technical Diagnostic Analysis: Environmental Flow Module : Specialist Report Country: Namibia: discipline: Water Quality</i>
		<i>Nashipili, Ndinomwaameni</i>	<i>Okavango River Basin Technical Diagnostic Analysis: Specialist Report: Country: Namibia: Discipline: Water Supply and Sanitation</i>
		<i>Paxton, C.</i>	<i>Transboundary Diagnostic Analysis: Specialist Report: Discipline: Water Quality Requirements For Human Health in the Okavango River Basin: Country: Namibia</i>

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