OKACOM

*The Permanent Okavango River Basin Water Commission*

# Okavango - Cubango River Basin

# Botswana National Action Plan 2011-2016

April 2011

**The National Action Plans for the Cubango-Okavango River Basin**

The Cubango-Okavango Strategic Action Programme (SAP) is supported at national level by the respective National Action Plan (NAP) of each basin state, making the NAP a critical tool for the implementation of SAP priority actions at national level and the integration of transboundary and basin concerns into national legislative, policy and budget decision making processes.

National Action Plans (NAPs) for Angola, Botswana and Namibia identify priority problems and interventions based on the Cubango-Okavango Transboundary Diagnostic Analysis. The NAPs are strategic implementation plans for the national part of the river basin, endorsed at political level.

The National Action Plans (NAPs) represent an awareness of and commitment to enhanced sustainable management of water resources by the basin states. It is critical that all states continue to make further steps towards improved stewardship of all natural resources at the national level, with the confidence that even the smallest action can lead to large improvements when taken collectively.

While the NAPs feed into the SAP, they are also cohesive, independent documents which detail national objectives, targets and interventions to be achieved. They have common guidelines and, like the SAP, will be implemented in two separate five-year periods and will be reviewed every five years. Implementation of the NAPs moves forward independently of the SAP process but their updating shall be undertaken concurrently with the SAP.

The basin states have ensured and will continue to ensure that the NAP and SAP content, policy and measures, are coordinated and consistent with those developed across the sectoral ministries. The NAP consultation process leading to endorsement was designed to ensure all key government stakeholders are consulted fully and in a timely way to ensure integration. In preparing the NAPs the basin states referred to existing development and environment plans and it has been stressed that each riparian state should ensure that its body of laws and regulations is fully coordinated and supportive of environmental policies developed through the SAP.

OKACOM

*The Permanent Okavango River Basin Water Commission*
*Comissão Permanente das Águas da Bacia Hidrográfica do Rio Okavango*

# OKAVANGO/CUBANGO RIVER BASIN

## Botswana National Action Plan

## 2011-2016

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**Acronyms**

| | |
|---|---|
| ADP | Agriculture Development Policy |
| CBD | Convention of Biological Diversity |
| CBPP | Contagious Bovine Pleuropneumonia |
| CSO | Central Statistics Office |
| DAHP | Department of Animal Health and Production |
| DEA | Department of Environmental Affairs |
| DFRR | Department of Forestry and Range Resources |
| DWA | Department of Water Affairs |
| DWNP | Department of Wildlife and National Parks |
| EA | Ecosystem Approach |
| FAO | Food and Agriculture Organization |
| GEF | Global Environment Facility |
| GWP | Global Water Partnership |
| HIV/AIDS | Human Immunodeficiency Syndrome |
| IWRM | Integrated Water Resources Management |
| IWU | International Waters Unit |
| MDGs | Millennium Development Goals |
| MEWT | Ministry of Environment, Wildlife and Tourism |
| MMEWR | Ministry of Minerals, Energy and Water Resources |
| NAP | National Action Plan |
| NBSAP | National Biodiversity and Action Plan |
| NFT | National Formulation Team |
| NGO | Non-Governmental Organisation |
| NWMP | National Water Master Plan |
| NWPWWA | National Master Plan for Wastewater and Sanitation |
| OBSC | Okavango Basin Steering Committee |

| | |
|---|---|
| ODMP | Okavango Delta Management Plan |
| ODRS | Okavango Delta Ramsar Site |
| OKACOM | Permanent Okavango River Basin Water Commission |
| ORI | Okavango Research Institute |
| ORPMP | Okavango River Panhandle Management Plan |
| SAP | Strategic Action Programme |
| SEA | Strategic Environmental Assessment |
| SLF | Sustainable Livelihood Framework |
| TDA | Transboundary Diagnostic Analysis |
| UNDP | United Nations Development Programme |
| VDC | Village Development Committee |
| WMAs | Wildlife Management Areas |
| WRC | Water Resource Council |
| WRC | Water Resources Council |
| WUC | Water Utilities Corporation |

# 1 BACKGROUND

The Okavango/Cubango River Basin is a transboundary river, which rises from the headwaters of the Cuito and Cubango in Angola, flowing through Namibia and entering Botswana at Mohembo to form the Okavango Delta. The river basin is one of the least developed basins in Africa and presently near pristine status. The river basin remains a source of important water resource for all the three riparian states. Socio-economic needs of a growing population in the three countries are likely to result in greater development of the water resources. Socio-economic pressure on the basin could potentially have negative environmental and social consequences, affecting the functioning of the Okavango River Basin ecosystem. Within Botswana, an important issue is associated with the functioning of the Okavango Delta, an extremely important source of tourism revenue which plays an important role in sustaining the livelihoods of many communities living in and around the Okavango Delta.

The three riparian countries recognize that economic and social development within the basin is essential; however, it needs to be balanced against the conservation priorities of the three states and needs to continue supporting the myriad of livelihood activities of the riparian communities. In recognizing this imperative, the three riparian countries established the Permanent Okavango River Basin Water Commission (OKACOM) in 1994 with an objective of promoting the coordinated and environmentally sustainable regional water resources development, while addressing the social and economic needs of the riparian states. Under the OKACOM agreement, the three countries have committed to the joint management of the basin and the implementation of activities that address this imperative.

In support of this commitment, the Global Environment Facility (GEF) and the United Nations Development Programme (UNDP) provided assistance to OKACOM to undertake a basin wide exercise that will deepen their understanding of the basin and its potential threats and problems. This project was executed by the Food and Agriculture Organization (FAO). A preliminary Transboundary Diagnostic Analysis (TDA) was completed in 1998 and in 2004, the GEF funded the project, Environmental Protection and Sustainable Management of the Cubango/ Okavango/Cubango River Basin to develop a full TDA. The objective of the TDA was to identify the potential problems and threats to the Okavango River system, largely from the socio-economic pressure exerted by the three riparian countries. The TDA identified those elements that may induce impacts beyond national boundaries and those that are common to the riparian states. Collectively, the TDA presented a 'tool' intended to inform the riparian states about the problems, priorities and opportunities within the

context of immediate and long term sustainable management of the Okavango/Cubango River Basin.

The TDA provides the technical transboundary information for the development of a basin wide planning document, the Strategic Action Programme (SAP) and a national implementation document, the National Action Plans (NAP). While the SAP is a basin-wide joint strategy that lays down the principles and strategic direction for the development of the basin, the NAP is a national document that defines the specific, time-bound interventions, in response to the SAP priorities. This report presents the National Action Plan for Botswana that was informed by the TDA and SAP process. The NAP is a planning document, designed to be reviewed every 5 years, along with the SAP and the TDA.

### 1.1 Need and purpose of the NAP

The National Action Plan is central in the implementation of SAP priorities at a national level. In the Botswana context, the purpose of the NAP is therefore twofold; 1) it serves as an implementing vehicle for the SAP and 2) it defines the specific national development priorities in the Botswana part of the Okavango/Cubango River Basin that will be integrated and aligned with national planning instruments.

The specific objective of the NAP is therefore:

> ***To promote the sustainable management, development and use of natural resources in the Okavango Delta in order to improve livelihoods, conserve biodiversity and protect the ecosystem.***

Several planning documents for the Botswana part of the Okavango basin have been developed in the past. The Okavango Delta Management Plan (ODMP), the Okavango River Panhandle Management Plan (ORPMP) and the Okavango Delta Ramsar Site Land use and Land Management Development Plan are perhaps the most relevant ones. However, for varying reasons, little to no implementation has taken place. Additionally, the National Wetlands Policy and Strategy, which provides for the contextual and institutional framework for appropriate management plans for the country's key wetlands, is still in a draft form and therefore not enforceable. While all the plans and policy documents mentioned above have the broader objective of promoting the sustainable management and utilisation of the Okavango resources, the activities in the plans are managed and implemented by different departments and ministries. This presents a great challenge in the coordination of activities in the Okavango Delta.

One of the main objectives of the NAP is therefore to strengthen and improve the coordination of all the relevant plans and strategies in the Okavango Delta. In addition to the NAP being an implementation vehicle of the SAP, it also contains priority actions that were identified through the various planning documents and instruments mentioned above. It is a mechanism of integrating the SAP into national planning framework. The NAP highlights priority interventions, including policy reforms, programms and areas that require technical assistance. Just like the SAP, the NAP is a negotiated document. Priorities that are set need to be made an integral part of national and budgetary planning framework. The NAP outlines the country specific commitments of the prioritised actions, the implementation mechanism, institutional requirements and the endorsement process.

### 1.2 NAP development process

The development of the NAP was both consultative and collaborative, with inputs from national level authorities, including government departments, Non-Governmental Organisations (NGOs), academic and research institutions, private sector and local communities. This process was carried out in two phases: 1) stocktaking, information gathering and consultation of key stakeholders, completed in August 2010 and 2) drafting of the NAP which commenced in November 2010 and completed in May 2011.

The first phase identified a wide range of current and anticipated environmental and social problems in the Okavango Delta using a participatory process mostly, but also reviewed the current planning documents. Phase II, focuses on the prioritisation of the issues identified in Phase I, and ensures that they are reflective of the national situation. This second phase was achieved through a series of activities; including literature review, national and district level consultative workshop.

The literature review involved extensive review and analysis of research and studies conducted in the Okavango Delta, key policy and planning documents, strategies and action plans for the area. National and District level development plans, such as NDP10, Ngamiland Development Plan and the Okavango Delta Management Plan were reviewed with an objective of identifying problems, issues and priorities for the Okavango Delta that warrants immediate and long term action. Other documents and journal papers from research institutions such as the Okavango Research Institute (ORI) were used where available.

Consultations were done at various levels using various approaches. Under the auspices of the Botswana Okavango Basin Steering Committee (OBSC), at least two consultative meetings were held to identify issues from the Okavango/Cubango River Basin of national concern. Additionally, key stakeholders in both Maun and Gaborone were identified and

consulted individually. The outcome of this consultation process was a comprehensive list of issues of concern in the Botswana part of the Okavango/Cubango River Basin.

Key issues that were identified through literature review and broader consultation processes were compiled and presented at a one day prioritisation workshop held in Maun. The main objective was to prioritise the problems/interventions at national level based on the SAP and national concerns. The implementation mechanism at national level was also discussed at this workshop. The outcome of the prioritization workshop culminated in a validation workshop that took place in February 2011, in Gaborone Botswana. A multi-disciplinary National Formulation Team (NFT) was created as the core team in the development of the NAP. The NFT worked closely with the national consultant to ensure that the content of the report is technically sound, accurate and in line with national priorities. See Annex II for membership of the NFT.

### 1.3 Geographical scope of the NAP

The geographical scope of the NAP is the hydrologically active part of the Botswana part of the Okavango/Cubango River Basin, the Okavango Delta.

**TO INSERT MAP**

## 2 DESCRIPTION OF THE BOTSWANA PART OF THE OKAVANGO/CUBANGO RIVER BASIN

The Okavango is a transboundary river basin, shared by Botswana, Namibia and Angola. The river rises in the headwaters of the Cubango and Cuito Rivers in the highland plateau of Angola. It flows through Namibia, before entering Botswana at Mohembo through the panhandle. The river flows in a NW-SE direction in a well defined channel, however, at the end of the panhandle in Botswana, the waters of the river break into many channels, due to blockages caused by alluvial deposits. Consequently, the river fans out over a large area forming the Okavango Delta.

The Okavango Delta, is the most significant feature of the basin, and is located in the North Western part of Botswana, in the Ngamiland District. The Okavango Delta was selected as a wetland of international importance, and declared a Ramsar site, making it the largest Ramsar site in the world. In 2004, the boundary of the Okavango Delta Ramsar Site (ODRS) were rationalised based on ecological, hydrological and land use features (ODMP, 2008). The main features that characterise the Okavango Delta Ramsar Site are: the panhandle, the Okavango Delta (entire seasonal and permanent swamps), Lake Ngami and part of the Kwando-Linyanti river system.

The Okavango Delta, which is the main focus of the NAP, experiences large variations of flooding, creating permanent, seasonal and intermittently flooded areas. It is the annual flooding of the Okavango River that maintains this unique wetland ecosystem, creating the world's second largest inland wetland region: a unique, dynamic mosaic of habitats with exceptionally high biodiversity (Hughes et. al., 2010). The Okavango Delta contrasts sharply with the surrounding land where rainfall is low and erratic, evaporation rates are high and surface water is lacking for most of the year (Wolski and Savenije, 2006). It is an inland delta wetland system, found in what is otherwise a semi-arid region. This, combined with the seasonal flooding and drying of the Okavango Delta have led to its rich diversity in flora and fauna making it a unique and precious resource.

### 2.1 Physical features

The climate of the Okavango Delta region is described as semi-arid with very high summer temperatures and a pronounced dry winter season. The monthly mean temperature ranges from 16 to 26 $^{o}$C in June and October respectively, with summer temperatures reaching an average high of 37 $^{o}$C. The rainfall occurs between the months of October and March and is highly variable, ranging from 455mm in Maun to about 480mm over the Delta area (ODMP, 2008).

In terms of its geology, the Okavango Delta region overlies solid basement bedrock, known as the Kalahari group sediments. Research shows that there are three active fault lines in the Okavango Delta area; namely, Gumare, Kunyere and Thamalakane faults. These play a role in controlling the flow and sedimentation in the Okavango system. Earthquakes have been reported in the past, particularly in Maun around the 1950s. The occurrence of faults in the Okavango Delta region presents a planning challenge in the area, which needs to be factored into district planning processes.

The soils of the Okavango Delta are predominantly arenosols and a small percentage is luvisols. Typically, the arenosols have a very low water holding capacity and have extremely low essential nutrient content, such as phosphorous and nitrogen. As a result, the drylands are characterised by white sandy soils, commonly known as Kalahari sands, with very low inherent fertility. The outer areas of the Delta floodplains demonstrate high levels of fertility as evidenced by the rich biodiversity (Omari et. al., 2004). This is a result of the accumulation of organic matter and less frequent flooding. This relatively fertile area becomes particularly important for local communities in the Okavango Delta, as they practise flood recession farming (locally known as *Molapo* farming).

The Okavango river does not discharge into the ocean or lake, but spills into the Okavango Delta. This feature makes the Okavango unique. The Okavango in Botswana has three main rivers (tributaries): Thaoge towards the south west, Jao-Boro to the south and Maunachira-Khwai to the east. Further downstream, the channels splits further into a large number of smaller flow paths which form a complex flow system of flood plains (ODMP, 2008).

Three major aquifer formations exist in the Botswana part of the Okavango/Cubango River Basin; the basement rocks, Karoo and Kalahari Group sediments (ODMP, 2008). The Kalahari aquifers, which are the shallower aquifers, are the most important local aquifers and they are usually hydraulically connected. Groundwater recharge in the Okavango Delta is dominated by floodwater infiltration, whilst the role of rainfall recharge is rather limited. It should be noted, however, that understanding of the groundwater resources in the basin is limited, and Botswana is no exception.

## 2.2 Ecology

Ecologically, the Okavango Delta is a complex and dynamic system. An ever changing mosaic of perennial and seasonal swamps, grasslands, intermittently flooded areas, and dry land, this oasis within the Kalahari Desert serves as magnet for many kinds of wildlife, especially when the rest of Botswana is dry.

Vegetation in the delta plays an important role in the drying and flooding cycle, perhaps more closely interlinked with the flood regimes. The availability of water affects the vegetation distribution and, due to blockages formed by dense wetland vegetation such as papyrus, the actual distribution of flood water depends on the vegetation. That link is important and has large implications for the Okavango Delta ecology.

The size of the Delta varies dramatically from year to year, depending primarily on rainfall in Angola (Kgomotso and Swatuk, 2006). The flooding and drying pattern of the Delta creates large variations in habitat patterns, ranging from permanent rivers and lagoons, to permanent swamps with reeds and papyrus, seasonally flooded grasslands, occasionally flooded grasslands, riverine woodlands and dry woodlands (ODMP, 2008). Each of these habitats has its own distinct composition of plants, reptiles, birds, mammals, which also supports the livelihoods of many inhabitants residing in the Okavango Delta. It's worth noting that the Okavango Delta is home to approximately 3,000 plant species, over 162 arachnid species, more than 20 species of large herbivores, over 450 bird species and over 70 fish species (Kgathi et. al, 2005).

## 2.3 Land use

Botswana has three land tenure systems, namely, Tribal (communal) land, State land and Freehold land. Tribal land constitutes 71 percent of total land area in the country, state land covers 23 percent and freehold land makes up 6 percent. In the Okavango Delta Ramsar Site however, almost 96 percent of the land falls under Tribal land tenure system, while only 4.6 percent constitute State land tenure system, mostly in the form of national parks and game reserves (ODMP, 2008).

The dominant land uses in communal areas include arable agriculture, livestock farming and settlements (Table 1). The majority of Ngamiland households are engaged in arable farming, despite the risk associated with it. After the culling of all cattle in the district due to Contagious Bovine Pleuropneumonia (CBPP) in 1995/96, arable farming became one of the main land use activities. Although the total area under cultivation has declined over the years (Meyer and Bendsen, 2003), agriculture still remains an important livelihood activity for many households in the area. Land cleared for cultivation *(dryland and floodplain)* amounts to 48,900ha, out of that, almost 75 percent is used for dryland farming, while the remaining 25 percent is used by households that have access to the floodplains, practising floodplain (*molapo,* plural *melapo*) farming. *Molapo* farming is a traditional farming system commonly practised on flood plains on the fringes of the Okavango Delta. It is an important livelihood activity that depends almost entirely on natural waters (flooding) or along river channels where soils are moistened by seasonal flooding. The main crops planted in the *molapo* farming system are maize, intercropped with beans, water melons and pumpkins.

Several literature suggest that there is no scarcity of land for dryland arable farming in Ngamiland, however, access to land for *molapo* farming is limited and perhaps restricted, with women and young farmers most affected. Currently, government only allocates land for dryland farming and does not allocate land for *molapo* farming. Titleholders of *molapo* farms tend to have either inherited the land or 'bought' temporary rights to cultivate the land from the titleholder (Kgathi et al., 2005).

**Table 1: Existing land uses in the Okavango Delta Ramsar Site**

| Land use category | Area (km2) | Percentage of total area |
|---|---|---|
| Communal areas, settlements, arable and livestock agriculture | 27119.923 | 48.8 |
| Game reserves and national parks | 5221.334 | 9.4 |
| Wildlife Management Areas | 23257.923 | 41.8 |
| **Total** | **55599.000** | **100** |

Source: ODMP Integrated Land Use Plan (2009)

## 2.4 Socio-economic

The Ngamiland District has a population of about 124,712 (2001 national population census). Out of that, 48.8 percent are males while 52.2 percent females. In terms of households, 52.1 percent are female headed households, while 47.9 percent are male headed households. This predominance of females in the area is also reflective of national situation and has implications on planning.

Some general statistics of the Ngamiland area are provided in Table 2.

**Table 2: General statistical data for Ngamiland District**

| | |
|---|---|
| Total population | 124 712 |
| Proportion of national population | 8% |
| Annual population growth rate (1991-2001) | 2.8% |
| Male population | 59 661 (48.8 percent) |

| | |
|---|---|
| Female population | 65 051 (52.2%) |
| Number of households | 26 313 |
| Average household size | 4.7 persons |
| Number of male headed households | 12 603 (47.9%) |
| Number of female headed households | 13 710 (52.1 %) |
| Percentage of unemployed population | 64% |
| Illiteracy rate | 36% |

Source: CSO, 2001 Census of population and Housing

The main economic activities in the Ngamiland District are rainfed and flood recession agriculture, livestock management, fishing, hunting, gathering of veld products, small scale commercial enterprises such as production and sale of crafts and local food beverages, wage labour in the tourism industry and formal employment in government and private sector. These activities will vary at individual, household and community level, depending on various factors such as rainfall, access to resources, level of education, capital, labour, cultural and other influencing factors (Meyer and Bendsen, 2003). . Most of these activities are centred on the Okavango River and floodplains which offer a variety of ecosystem services that support these livelihood activities.

Seasonality caused by the flooding and drying of the Okavango Delta, requires adaptation and diversification of local livelihood strategies in order to continue benefiting from the resource. As a way of reducing risks associated with an unstable environment, most locals in Ngamiland area maintain a diversified income generation system. Activities that are often combined include arable farming, livestock farming, fishing, basket making and community based tourism. However, activities such as fishing and flood recession agriculture can be adversely affected by changes in flood regime. Assets such as cattle are affected by drought and disease outbreaks, such as Foot and Mouth and Lung disease. Tourism is also vulnerable and can be affected by political instability, market changes, local and international policies.

Like other rural places in Botswana, the HIV/AIDS pandemic has presented a shock to the livelihoods of people in the Okavango Delta. HIV and AIDS prevalence in the Okavango was estimated at about 15% in 2004. This epidemic usually affects the most productive cohorts of the population. The HIV/AIDS pandemic presents a number of challenges and differs from other shocks in that it 1) has long-term impacts, 2) attacks the most productive cohorts 3) puts heavy pressure on women as they play a leading role in caring for the sick and orphans, 4) significantly reduces the gross national product (Kgathi et al., 2007). The pandemic will increase financial costs, pressure on agricultural labour and loss of employment.

# 3 NAP PRINCIPLES

The development of the NAP was informed and guided by global and national principles of environmental management, water resources management and governance. By signing and ratifying international agreements and conventions, Botswana has committed itself to aligning its national policies and strategies in line with the global principles. In addition to the well known global principles of environmental and water resources management, various national planning documents and policies were reviewed in order to align the NAP with national principles. The following principles and values were considered when developing the Botswana NAP.

## 3.1 Global principles

**Polluter pays principle**

The polluter pays principle requires that the polluter bears the cost of mitigating and eliminating pollution, including cleaning up. This principle encourages potential polluters to comply with environmental standards and requirements enforceable by the Ministry of Environment, Wildlife and Tourism, through the Department of Waste Management and Pollution Control (DWMPC). This principle becomes extremely important in the context of the Okavango Delta, where the ecosystem is exceptionally sensitive to chemical and physical agents that have the potential to cause detrimental and irreversible damage. Some key planning and policy documents, such as the Botswana Waste Management Policy and the Environmental Impact Assessment Act have also embraced this principle, making it necessary in the NAP implementation.

**Precautionary principle**

This principle implies that when there are threats of serious or irreversible damage to a particular environment, lack of scientific uncertainty should not be used to prevent taking cost effective measures in order to avoid environmental damage. This principle is relevant for the Okavango Delta, and it is therefore essential that the NAP embraces this principle.

**Integrated Water Resources Management**

The Global Water Partnership (GWP) defines Integrated Water Resources Management (IWRM) as a process which promotes the coordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. In other words, IWRM can be divided into three components of integrated land, water and ecosystem management. This requires the following:

- An understanding of water related needs for the ecosystem within a specific catchment
- Identification of human activities that have important water use implications for the ecosystems
- Balancing human activities and ecosystem needs

Human development will inevitably lead to changes in aquatic ecosystems, however, living organisms including humans, have over time developed mechanisms to cope with some level of disturbance. The IWRM concept implies that the change introduced in an ecosystem, as a result of development, should not exceed the elasticity or resilience of both the social and the ecological systems.

Botswana has applied the IWRM principle in many planning instruments, including the current National Water Master Plan. Botswana is also in the process of developing an IWRM plan for the country. These principles shall also be recognized in the implementation of the NAP.

**The Ecosystem Approach**

The Ecosystem Approach (EA) is a strategy for the integrated management of the land, water and living resources that promotes conservation and sustainable use in an equitable way. The EA has been applied in the development of the Okavango Delta Management Plan, the development of the Draft Water Policy and now in the development of the NAP. A key component of the EA is how to meet the human requirements for the use of the natural resources, while maintaining the biological richness and ecological processes necessary to sustain the composition, structure and function of the habitats or ecosystem services (Pirot et. al., 2000). This approach will ensure that the Okavango Delta is managed in a sustainable manner and that there is due consideration of the ecosystem in its entirety, before development is proposed. The table below provides the 12 guiding principles of the EA.

**Table 3: Guiding principles of the Ecosystem Approach**

| |
|---|
| **Principle 1**: The objectives of management of land, water and living resources are a matter of societal choices. |
| **Principle 2:** Management should be decentralized to the lowest appropriate level. |
| **Principle 3:** Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems. |
| **Principle 4:** Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem- |

management programme should reduce those market distortions that adversely affect biological diversity; align incentives to promote biodiversity conservation and sustainable use; and internalize costs and benefits in the given ecosystem to the extent feasible

**Principle 5:** Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.

**Principle 6**: Ecosystem must be managed within the limits of their functioning.

**Principle 7:** The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.

**Principle 8:** Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term..

**Principle 9:** Management must recognize that change is inevitable.

**Principle 10:** The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.

**Principle 11:** The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices

**Principle 12:** The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

### 3.2 National principles

**Participation**

Participation is a key principle in governance, and has been adopted by the Botswana government in national development planning for many years. Participation by the public will improve conflict resolution and encourage active support in the implementation of the NAP. This principle is largely derived from the national principle of democracy and good governance, as well as from the reality that implementation of the NAP will only be effective when receiving full public support. Broad participation of various stakeholders, either through consultation (*therisanyo) or* other forms of meaningful participation, within and across sectors has improved the quality, effectiveness and sustainability of the NAP.

**Development, democracy, self reliance, unity and *Botho***

Development planning in Botswana is based on four main national principles; development, democracy, self reliance and unity. These principles are derived from Botswana's cultural

heritage, and are designed to promote social harmony. Governance is described as the interactions among structures, processes and traditions that determine how power and responsibilities are exercised, how decisions are taken and how citizens participate in that decision making process. The role of citizens in a democracy is participation. That means participation in politics, debating issues of national concern, community meetings and development planning. The fifth principle, also referred to in many planning instruments, is *Botho*. Translated to English, *Botho* means "humane behaviour" All these principles will guide the implementation of the NAP.

### 3.3 Integration of the Millennium Development Goals into the NAP

Millennium Development Goals (MDGs) are quantitative, time bound and specific development goals that aim to address extreme poverty, its causes and manifestations. The MDGs were agreed at the Millennium Summit in 2000 and they specifically target extreme poverty, education, gender inequality, child mortality, diseases, environmental degradation and global partnership for development.

The MDGs provide guidance for the integration of the NAP into the national planning process. Of particular relevance to the NAP is MDG 1- Eradicate extreme poverty; MDG 3- Promote gender equality and empower women; MDG 4- Reduce child mortality; MDG 5- Improve maternal health; MDG 6- Combat HIV/AIDS, Malaria and other diseases and MDG 7- Ensure environmental sustainability.

Botswana has committed itself to meeting the MDGs and to this end, Botswana formulates its population and development policies and programmes in line with these goals, and periodically monitors the achievement of their goals and targets. For example, the MDGs were fully integrated into the National Development Plan 10 (2009-2016) and the long term vision for Botswana, Vision 2016. Vision 2016 (developed in 1997) provides a blue print for the country's development path until 2016. This long term vision outlines the country's aspirations and where the citizens of Botswana would like to be, 50 years after independence. Vision 2016 has fully embraced the Millennium Development Goals and the principle of participation and *therisanyo*. Development of the NAP was informed and fully integrates the MDGs in its development and implementation. Through Thematic Area 1 on livelihoods and socio-economic development, the NAP contributes to MDGs 1,3,4,5 and 6. MDG 7 is addresses in Thematic Area 2 on Water Resources Management, Thematic Area 3 on Land Management, Thematic Area 4 on Biodiversity and Environment, Thematic Area 5 on Policies and Institutions and Thematic Area 6 on Research, Information and Communication.

# 4 GOVERNANCE FRAMEWORK

This section gives an overview of the institutional, policy and legislative environment that governs the management of the Botswana part of the Okavango/Cubango River Basin. A closer look at the institutional arrangement in the Okavango Delta is central to the implementation of the NAP. The policies and strategies are presented at the international, regional and national context.

## 4.1 Institutional arrangements

The management of the Botswana part of the Okavango/Cubango River Basin and its resources is multi-sectoral and involves central government departments, parastatals, local authorities and the private sector.

In Central government, several ministries are involved. The Ministry of Environment, Wildlife and Tourism (MEWT) is responsible for the overall coordination of environmental activities through the Department of Environmental Affairs. The management of forestry and range resources as well as wildlife is also carried out under this ministry through the Department of Forestry and Range Resources (DFRR) and the Department of Wildlife and National Parks (DWNP) respectively. The Department of Tourism has a specific mandate of regulating the tourism industry, such as setting out procedures and licensing of tourism establishments.

Managing of the country's water resources is the responsibility of the Ministry of Minerals, Energy and Water Resources (MMEWR). The Department of Water Affairs (DWA), in particular, has the responsibility of planning, developing and maintaining of water resources for domestic, agricultural, commercial, industrial and other uses in Botswana. They provide leadership and direction in water resources management and they liaise with other related sectors to ensure that decisions made on water resources are equitable and sustainable. The water sector in Botswana is currently undergoing a major water sector reform, which aims to promote a coordinated approach, moving away from the multiplicity of institutions involved in the management of water resources. The responsibility of water supply, which used to lie with the DWA for rural areas, has now been taken up by the Water Utilities Corporation (WUC). The Water Utilities Corporation is a parastatal that has recently (2010) expanded its mandate from strictly urban and bulk water supply, to supplying water to urban, rural areas, towns and cities.

Other ministries also involved in the management of the Okavango Delta include the Ministry of Lands and Housing, which through the Tawana Land Board, has the responsibility of administrating, coordinating, allocating and managing tribal land. The Ministry of Agriculture, through the Department of Animal Health and Production (DAHP) and the Department of Crop Production are responsible for veterinary services and arable agriculture respectively.

At the local level, there are four main institutions operating as local authorities, these are; District Administration, Tribal Administration, Land boards and District and Town Councils. Land is managed and allocated by the Tawana Land Board. The District Land Use Planning Unit (DLUPU) is the advisory organ to Tawana Land Board on land use planning and land management related matters. This is a multi-sectoral committee comprising of representatives from central and local government. At a more local level, each village in Botswana has a Village Development Committee (VDC) that coordinates and implements development priorities in the village. The VDC is a grassroots development structure comprising of elected local communities and village leadership. The VDC and the Village Chief make up the Tribal Administration.

District councils, in this case, the North West District Council are the local political body that provides development leadership at the district level. District Administration on the other hand provides an advisory role to the councils and tend to me more technical. State organs represent all the involved interests, resulting in a more centralised approach to planning and management of water resources. Prior to the water sector reform, the District Council used to manage rural water supply as one of the many functions it has been given as a local government. Since the reform, the District Councils are not responsible for water resources management directly, they are however involved in development planning for the district as a whole.

It is clear from the analysis above that there are several institutions that are involved in the management of natural resource in the Okavango Delta. The challenge still remains that there is fragmentation of management responsibilities across central government, local government and more recently, the involvement of a parastatal. There is also very little involvement, particularly regarding water resources management, at the local level. For such a fragile and highly contested ecosystem, planning requires an implementing authority with powers and resources that can execute the implementation of the NAP in an integrated manner.

## 4.2 Policy and legislation

### 4.2.1 International context

Botswana has signed and ratified several Multilateral Environmental Agreements. Of most relevance to the Okavango Delta is the Convention on Wetlands of International Importance (Ramsar Convention) which binds Botswana to formulate and implement a plan promoting the conservation of the listed wetland, in this case, the Okavango Delta. Botswana is also expected to promote the wise use of the wetland and the conservation of wetlands and waterfowl by establishing nature reserves. To this end, the Okavango Delta Management Plan (ODMP) was developed to fulfill this obligation.

Another obligation of the convention is for Parties to consult with each other about implementing the convention's obligations, especially in the case of a wetland extending over the territories of more than one Party or where a water system is shared by Parties.

Also at an international level, Botswana is bound by the Revised SADC Protocol on Shared Water Courses. The protocol is highly important as a means of developing sustainable water resources management for the region's watercourses and for reducing conflict over those resources. The objective of this Protocol is "closer cooperation for the judicious, sustainable and coordinated management, protection and utilisation of shared watercourses." The Protocol is a regional framework agreement for the management of shared watercourses and closely follows the Convention on the Law of Non-navigational Uses of International Watercourses

The Permanent Okavango River Basin Water Commission (OKACOM) agreement commits Botswana, Angola and Namibia to promote the coordinated and environmentally sustainable development of the transboundary resource, Cubango/Okavango River Basin.

Botswana therefore has an obligation to consider the bio-physical, socio-economic and livelihoods factors in management of its shared watercourses. This implies that the 'stakeholders' in the watercourse have their interests protected by this Agreement. In addition Botswana must take into consideration other users of the watercourses both upstream and downstream and factor in all alternative uses of the water resources.

### 4.2.2 National Policy and strategies

There is a clear paradigm shift in development planning in Botswana, from sectoral water resources planning to a more integrated approach of water resources planning. The NDP10 has a strong component of integrated and result based planning at a national and district

level. The Integrated Water Resources Management (IWRM) project that is currently underway will result in the development and implementation of a dynamic IWRM/Water Efficiency Plan for Botswana. Once completed, the IWRM plan will address both national and transboundary water management priorities and engage the national and regional stakeholders in IWRM processes and planning. This therefore presents an opportunity to integrate the NAP into development planning and the IWRM process.

The following sections provide an analysis of some of the national policies governing the use of the Okavango Delta. It should be noted that this is not an exhaustive list.

**National Water Master Plan**

In terms of national water planning instruments, the National Water Master Plan (NWMP) is the current document guiding all water resources management in Botswana. The reviewed NWMP (2007) calls for water resources stewardship, water demand management and to apply the principles of Integrated Water Resources Management (IWRM) in water planning. The NWMP review also recommends that all future development plans, whether at district or national level, be subjected to a Strategic Environmental Assessment (SEA) in order to determine the impact of the plan on water demand. In addition, assessment of the impact of projects on water demand in their localities is made a standard requirement of all future project EIAs.

**National water policy**

The National Water Policy, currently in a draft stage, provides a national framework that will facilitate access to water of suitable quality and standards for the people of Botswana and provide the foundations for sustainable development of water resources in support of economic growth, diversification and poverty reduction. It supports the formation of a new water authority, the proposed Water Resources Council (WRC). The technical functions of this body will be carried out by a division of DWA which will act as the executive arm of the WRC. This entails the relinquishing by DWA of any water delivery service functions it currently provides so as to avoid conflicts with its regulatory, policy formulation and resource management functions.

According to the policy, water resources will be managed in an integrated manner to meet the needs of present and future generations. Management will be through participatory approaches, involving users, planners and policy makers at all levels. Access to water will be given in the following order of priority: (i) the basic requirements required for human consumption; (ii) the environment to ensure sustainable foundations for supporting the national interests; followed by (iii) agricultural and livestock, commercial and industrial applications. National water planning will be supported by formal mechanisms for ensuring cross sectoral consultation and inputs from all sectors whose interests must be taken into account and this function will be discharged by the proposed Water Resources Council.

**The Draft Wetland Policy**

The wetlands policy seeks to conserve Botswana's wetlands in order to sustain their ecological and socio-economic functions. Specifically, the policy aims to rehabilitate and conserve national and trans-boundary wetland ecosystems by providing linkages between existing policies and legislation. The policy incorporates the international commitments arising from multilateral agreements such as Convention of Biological Diversity (CBD_ and the Ramsar Convention. The specific objectives of the policy are to:

- Promote coordinated wetland management at local, district and national levels through appropriate institutions;
- Promote planning and implementation of ecologically sustainable wetland conservation including management plans for wetlands of national and international importance.

The Department of Environmental Affairs (DEA) is the lead institution for the implementation of this policy and is expected to draw up an implementation plan, which will include timeframe, activities and defining institutional responsibilities. The policy is still in draft form and therefore cannot be implemented.

**The National Biodiversity Strategy and Action Plan**

Botswana produced a National Biodiversity Strategy and Action Plan (NBSAP) in December 2004 in response to its obligations to the United Nations Convention on Biological Diversity. This plan remains largely unimplemented.

**The National Master Plan for Wastewater and Sanitation**

The Botswana National Master Plan for Wastewater and Sanitation (NMPWWS) provides for the management of water and sanitation in accordance with Agenda 21 and the principles providing for pollution prevention, polluter pays, public consultation and economic participation.

**The Tourism Policy**

The policy provides guidelines for planning, developing and managing tourism in Botswana. It is designed to ensure that tourism activities are carried out on an ecologically sustainable basis. It also provides local communities with direct and indirect benefits from tourism activities. The policy encourages communities to appreciate the value of wildlife and its conservation. It avails opportunities for the rural areas to participate in wildlife-based activities including tourism.

## 4.3 Legislative context

Botswana has enacted several pieces of legislation that address water resources management and environmental management. The most noteworthy Acts that have provisions for the development and implementation of the NAP are described below.

**The Water Act**

This Act governs the administration of water resources, defines ownership of rights to the use of water and provides for the granting of water rights. The Act provides for the establishment of a Water Apportionment Board (WAB). The functions of the WAB include the granting of water rights to use, divert, store, abstract or discharge any effluent into public water. Under the water reform project however, these functions will be undertaken by the proposed Water Resources Council, which will replace the current WAB.

**The Fisheries Act**

The Fisheries Act was enacted in 1975 and provides for regulation, control and protection of fish and fishing in Botswana. The Act gives the Minister the power to make regulations to control and protect fish resources. The implementing regulations, developed in 2008, are still contested by locals, mainly on the categorization of commercial vs subsistence fishers.

**The Environmental Impact Assessment Act**

The Act is a regulatory tool for a systematic procedure for the examination or consideration of the environmental consequences of projects, policies or programmes. It combines with it global principles such as the precautionary principle and emphasizes the need for public participation in decision-making processes. The Act also makes reference to trans-boundary environmental impacts, which is may have an effect on the environment of another country.

**The Tribal Land Act**

This Act assigns all the rights to tribal land to the land boards which are said to hold the lands in trust for the citizens of Botswana. The act assigns functions to the land boards which were previously under the powers of chiefs. These include the granting and cancellation of land rights, control and imposition of restrictions on the use of tribal land. .

**The Wildlife Conservation and National Parks Act**

The Act provides for the conservation and management of the wildlife in Botswana

**Tourism Act**

The Act makes provision for regulating the tourism industry with regard to promoting its development and well being.

# 5 DRIVERS AND PRIORITY AREAS OF CONCERN

The Cubango/Okavango Basin is currently in a remarkably good ecological condition, compared to most river basins around the world. Current trends by the riparian countries, however, threaten this near pristine status of the river basin. The following sections provide an analysis of the drivers that potentially can affect change in the basin and in particular the Botswana part of the basin, what impact does the driving factors have in the basin and what are the areas of concern for Botswana and the basin as a whole.

## 5.1 Driving factors

The Transboundary Diagnostic Analysis has identified four key factors that will drive change in the Okavango/Cubango River Basin, namely population dynamics, poverty, climate change and change in land use. These factors are equally important in the Botswana part of the Okavango/Cubango River Basin. *Population growth* will increase the demand for resources and put pressure on the ecosystem, but for poverty to be tackled; more resources need to be utilised. Where poverty is high, population growth is undesirable, but where income levels are high, and livelihood options more diverse and not too dependent on the environment, population growth is not always a problem, and may in fact facilitate economic activity and generate growth. *Poverty* therefore, needs to be understood in historical and socio-political contexts, and its multiple dimensions appropriately addressed.

As noted by the SAP and substantiated by the TDA, high-use developments on the basin will not necessarily lead to reduction in poverty. As the main reason for high levels of poverty is the unequal distribution of wealth, access to development benefits will be crucial for reducing poverty. In the Okavango Delta, like the rest of the basin, direct access to wetland resources is critical for households' livelihoods; accessing natural resources for food, fibre and fuel, while important for meeting basic household needs, is also important for income generation. *Climate change* will exacerbate poverty by reducing the coping abilities of households and individuals and increasing their vulnerability to its impacts. As a way of reducing risks associated with climate and an unstable environment, most locals in Ngamiland area maintain a diversified income generation system. However, activities such as fishing and flood recession agriculture can be adversely affected by changes in flood regime. *Land use change* is a driving force for change and will have an impact on water quality and biodiversity in the Okavango Delta. There is an increased demand for arable land along the river and tourism establishments within the Okavango Delta, if not well managed, can have significant impacts on the quality of water and the ecosystem as a whole.

All the drivers mentioned above are interrelated and they impact on the priority concerns for the Okavango Delta. Changes in flow regimes will lead to changes in land use and

livelihood options. Equally, the impacts of policies and institutions could result in land use and flow regime changes. It is therefore important to recognise and understand the interconnectedness of the issues and come up with integrated solutions for potential problems. For the Okavango Delta, these issues are enhanced by the fact that it is located downstream, as well as the sensitive nature of the ecosystem.

## 5.2 Priority areas of concern

The drivers mentioned above will have an impact on the integrity and functioning of the Cubango/Okavango River Basin, causing several areas of concern for the riparian countries. The Transboundary Diagnostic Analysis identified four areas of concern in the entire basin and these will be discussed below.

Priority areas of concerns for the basin:

- Variation and reduction of hydrological flow
- Changes in sediment dynamics
- Changes in water quality
- Changes in the abundance and distribution of biota

For Botswana, the priority concerns are related to those of the basin. However, being a downstream riparian country with an extremely sensitive wetland ecosystem, some concerns are more relevant and more significant than others. The priority concerns for Botswana are listed and discussed in detail below.

1. Changes in flow regimes
2. Changes in water quality
3. Changes in land use
4. Changes in abundance and distribution of biota
5. Changes in livelihood options
6. Inadequate policies and institutions
7. Inadequate research, information and communication

## 5.3 Changes in flow regimes

The Cubango/Okavango River Basin is referred to as a ‘losing’ system in that nearly all the water in the basin is generated upstream of the basin, particularly in Angola. Downstream of the river basin, such as the catchments of the lower Cubango/Okavango and the Cuito River, contribute very little flow to the system. The river system also loses water through evapo-transpiration and groundwater recharge, particularly in the upper catchment. This leaves very little flow to the lower part of the system, making the Okavango Delta extremely vulnerable and sensitive to hydrological changes and reduced flow.

Although hydrological change is inherent in the Okavango Delta ecosystem, it is also not always permanent. Flood dynamics in a channel-floodplain system can change due to *exogenic* processes such as climate change, *endogenic* processes such as geomorphological evolution of river channels and floodplains, and anthropogenic processes such as channelization, regulation and water diversion (Wolski and Murray-Hudson 2006). Understanding the causes of change and the impacts on the system dynamics (e.g. vegetation species composition and distribution) (Ringrose et al 2007) is therefore critical for determining whether that change is desirable or not and how to address its negative impacts and indeed reduce or manage the negative causes. Historical analysis shows that major changes in water distribution in the Delta have occurred in the past (Wolski and Murray-Hudson 2008). Wolski and Murray-Hudson note that change in flooding in the Okavango Delta results from either variation in hydrological inputs (inflow from the feeding Okavango River and local rainfall), which vary strongly, or by change in distribution of water within the system. In the long term, they argue, variation is dominated by cyclicity (characterised by recurrence in cycles). They state that the important difference between change in flooding resulting from variation in inputs and that resulting from endogenic processes, is in permanency. Reduction in flooding caused by decrease in inputs is reversible – larger floods will come in years of higher rainfall and inflow. Reduction in flooding caused by endogenic processes is rather irreversible – increase in flooding cannot be expected within the geomorphological cycle of aggradation or dessication, typically 150 and more years. They therefore point out, that it is important to distinguish between these two types of change in order to inform management decisions.

According to the Integrated Flow Assessment of the Okavango/Cubango River Basin, under the high water use scenario, large parts of the system would be unable to sustain present beneficial uses and causing significant drying of the Okavango Delta (TDA, 2011). The impacts of change in flow regimes will affect many of the human activities that depend on flooded plains and flowing rivers and the ecosystem services they provide. These range from subsistence uses such as fishing, harvesting reeds and grass, to water supply and tourism. Too little water in the system will inevitably lead to reduced flows and desiccation of floodplains and channels, resulting in a myriad of socio-ecological impacts such as lack of water for domestic and agricultural use, reduced area for floodplain agriculture and reduced fishing effort, among others. Equally, too much water in the system could result in floods not receding and therefore decrease in arable land, rotting crops, water-related health concerns and disastrous floods that can cause damage to life and property.

## 5.4 Changes in water quality

As noted by the TDA, at present the water quality of the whole basin is considered to be very good, characterised by very low suspended solids and turbidity, with very clear water, low nutrients and low organic content for most of the time. The quality of water in the Okavango Delta is also exceptionally good and for purposes of human consumption, generally safe. This is particularly so for surface water which many communities in remote parts of the Delta already use for drinking and other household uses. According to Wolski (2005) the clean quality of the water is due to the vegetation and the low-nutrient sands which act as a natural filter. Human activities can however introduce waste and other chemicals into the water that could render it unsafe. Water in stagnant pools close to settlements and livestock grazing areas may therefore be contaminated. The colour of the water is however not always clear due to dissolved organic matter. This is usually because of decaying vegetation, and gives the water a red/brown or murky colour. Despite this, the quality of surface water in the river and floodplains is generally good, compared to other river systems around the world.

The situation is however different for groundwater. Although the surface waters are pure enough to drink, the groundwater of the Delta is typically very saline, with traces of Arsenic in the deeper aquifers (Wolski, 2005; Huntsman-Mapila et al. 2006:1376). Minerals accumulate in the groundwater giving the Okavango waters its salty taste. The most saline ground waters are found towards an island's interior. This explains the dominance of salt tolerant vegetation, such as grasses and wild sage, near the centre of islands, and less salt-tolerant vegetation, such as woodland trees and Phoenix palms, near the outer margins of islands.

The TDA and SAP highlights the limitations of available data in giving a comprehensive picture of the current status of water quality in the whole basin, including the Okavango Delta. As is noted only a few parameters are well known and even though pollution is often acknowledged, the exact nature, source and location of the pollution are not always defined. The SAP highlights this as one of the most critical gaps within the TDA.

Many factors locally and outside the Delta can contribute to changes in water quality. These include current and future development activities in Angola and Namibia; agricultural and other activities in Namibia - settlements/ camps/ lodges/ fishing/ houseboats activities in Botswana (Biokavango Project, www.orc.ub.bw ). Some research has alluded to inappropriate handling of waste and potential water pollution in the Delta originating from tourism facilities (Mbaiwa 2003). Understanding the quality of the water in the system is crucial not only for determining the health implications for humans, livestock, vegetation

and wildlife but also for identifying the cause and managing the changes in the quality of the water. It is also important because the rapid growth in Maun, estimated at 3.5% annually, has necessitated exploration of groundwater resources. These groundwater resources have to be appropriate for human consumption..

## 5.5 Changes in land use

Changes in land use are triggered by a variety of factors, some environmental and others socio-political (e.g. policies or economic status of the population). In the Okavango Delta, the distribution of land use types largely depends on factors such as distribution of water, soil and range land quality, and the presence of vector-borne diseases, but also strongly related to the traditional preferences of different ethnic groups for particular economic activities (Bendsen 2002; Meyer and Bendsen 2003). As noted by Scudder et al. (2003) the importance of the individual economic activities varies from household to household; community to community; from season to season; and from year to year in response to variations in rainfall and flooding, access to resources, labour and capital and cultural and other factors influencing preferences.

Many households, especially in areas where conflict with other uses is high (e.g. the eastern-side of the Panhandle where wildlife (elephant) populations are high), households have reduced the area cultivated, or do not cultivate their fields at all. Many more households do not cultivate land, or cultivate less area due to lack of draught power (cattle), farm labour and other implements. Many female-headed households, who often use hoes to cultivate their fields, cultivate even less area due to this challenge.

Livestock rearing has always been an important aspect of rural Botswana and has formed the backbone of the household economy for generations. In communal areas, livestock is mainly concentrated along the fringes of the *melapo* during the dry season and during the rainy season, livestock graze in the dryland pastures. Many poorer households in Ngamiland consider farming (both arable and livestock rearing) as risky due to periodic outbreaks of livestock diseases (e.g. Foot-and-Mouth), reduced grazing potential in areas close to protected areas (e.g. Moremi Game Reserve) and lack of labour and draught power.

Government policy, zoning and land-use planning decisions have primarily influenced land use changes. The growth of tourism and conservation in the last few decades has also facilitated a significant change in land use. Research by Magole and Magole (2009) shows that since the declaration of Moremi Game Reserve in 1963, more and more land has been allocated to conservation, which has increasingly benefitted tourism development.

Additionally the Tribal Grazing Land Policy has dramatically changed the land tenure in Botswana since the late 1970s by creating private cattle ranches, and fencing of grazing areas through the Agricultural Development Policy (ADP) of 1991. The creation of Wildlife Management Areas (WMAs) through the ADP meant even less land became available for communal use.

The table below gives a summary of the changes in availability of communal land over time, and the population growth-land use dynamics.

| **Year** | **Ngamiland district population** | **Land available for communal use** | **% of total district land** | **Actions responsible for reducing communal land** |
|---|---|---|---|---|
| 1964 | 42,500 | 111,650 | 100 | All land communal |
| 1981 | 68,000 | 102,423 | 92 | Establishment of protected areas, parks and game reserves |
| 1991 | 94,500 | 58,508 | 52 | Establishment of commercial ranches and WMAs |
| 2001 | 124,700 | 58,508 | 52 | – |

Source: Magole and Magole (2009)

Understanding how land-use is changing is important not only for determining appropriate policies to manage and regulate activities, but also to understand the economic status of households and the reasons for that change. Environmental factors (rainfall, flood distributions, state of range resources) and political decisions (policies) as well as household income status and cultural preferences influence land-use decisions. As noted, in the Okavango Delta, fewer households own cattle, and less land is being cultivated. It is therefore important to know what alternative activities these households engage in, and if they are better or worse off as a result. Also important is to understand the environmental sustainability of the current land-use practices. What are the impacts of land-use changes on the physical environment? How are the negative environmental and social impacts of increasing tourism managed? These questions will become increasingly important as the decisions to balance sustainable use of resources and economic development become more pertinent.

Another concern in the Okavango area is the practise of indiscriminate quarrying. There are no known sites that are designated for quarrying for gravel and road construction

aggregates, as well as sand excavations. As a result, these activities are often practised without the required authorisation. This leads to degradation of the landscape and the environment, and the creation of rehabilitated burrow pits.

### 5.6 Changes in abundance and distribution of biota

The Cubango/Okavango River Basin is still regarded as highly impressive in terms of abundance and diversity of flora and fauna, with the Delta being exceptionally endowed with rich biodiversity. However, changes discussed above (water quality, land use and flow regime) and many others, will have a direct impact on the abundance and distribution of biota. Abstraction of water, harvesting of reeds, fish, grass, and conversion of land for farming will inevitably change the ecosystem of the river basin and the Delta in particular.

The ecological diversity of the Okavango Delta is generally understood. Species diversity in the Okavango Delta is a consequence of the unique environment with dynamic shifts in flooding patterns that in turn force constant changes in patterns of plant succession and dependent animals. Temporal variations in flooding also cause accumulation and sudden mobilisation of nutrients which are readily used by well adapted plant species. As a consequence, locally high biological productivity occurs, which in turn results in high number of grazing mammals. Households reported that resources such as water lillies, medicinal plants, palm trees and papyrus have declines, while fish, birds and wildlife were reported to be increasing (Kgathi et. al. 2005). Mosepele (2003) also notes that the total number of fisheries in the Okavango Delta has increased from mid 1970s to the late 1990s. There are many reasons for this, including the efficiency of the artisanal fishing gear (fishing baskets, traditional hook and line etc..), resulting in relatively low fishing pressure on the system.

Changes in abundance and distribution of biota may be driven by changes in flow regimes, abstraction or harvesting levels, introduction of alien invasive species which may results in declining populations of other species due to predation. Many other threats to biodiversity are anthropogenic, and may result because of limited human activities and well as large developments. Ramberg et al. (2006) argue that the highest habitat diversity is found in the fringes of the Delta, implying that the total species diversity is also highest here. It can be concluded therefore that the highest losses of species are likely to be caused by water development schemes, and already face human pressure from subsistence uses close to settlements.

## 5.7 Changes in livelihood options

The Okavango Delta has enjoyed a diversified rural economy for many generations (Campbell 1976) as people pursued different activities to reduce risk in an unstable environment. The main economic activities are rainfed and flood recession *(molapo)* agriculture, livestock rearing and management, fishing, hunting, gathering and harvesting of non-timber wild resources (e.g. fruits, grass, reeds), small-scale commercial enterprises such as production and sale of crafts, food and beverages, wage labour in the tourism industry and formal employment in the government and private sectors (Bendsen 2002).

The Okavango Delta is however an unpredictable environment, with variable rainfall and flooding patterns (Meyer and Bendson 2003; Ramberg et al. 2006). This has direct implications on people's ability to not only access resources but also to build sustainable livelihoods. As noted under 'Land-use changes', a significant amount of households in the Okavango Delta no longer engage in livelihood activities that they previously did as a result of socio-political and environmental factors such as human-wildlife conflicts, reduction in available communal land, and unpredictable rainfall patterns. There is a trend towards dependence on the cash economy through seeking formal employment, wage labour and small-scale enterprises such as fisheries and food and beverage sales (Kgathi et al. 2004; Mosepele and Ngwenya 2010). Factors such as human well-being, labour availability and access to income and credits also determine the types of livelihood activities that households and individuals engage.

The HIV/AIDS situation in the Okavango Delta is significant, and has been shown to affect households' ability to fish (Ngwenya and Mosepele 2007) and harvest reeds and grass (Wilk and Kgathi 2007). The Okavango Delta is characterised by increasing migration from rural to urban areas in search of employment in the tourism industry, especially among youth and adult males (Vanderpost 2007). This leaves behind women to carry out rural livelihood activities and raise younger children, often HIV/AIDS orphans. Traditional household activities such as farming and collecting wild resources therefore decline and dependence on remittances and cash income increases as households are no longer able to meet their household food requirements through farming.

Most of the changes in livelihood options arise from reduced access to productive resources (e.g. land, wetland resources such as fish, grass, reeds). As most land in the Okavango Delta has been allocated to conservation and tourism, fences have reduced amount of grazing land available, and livestock and human diseases increased in incidences, households have had to change the way they construct their lives. Conflicts over resources result from this situation. Even though jobs have been created through the growth of the tourism industry, they have fallen short of the requirements of the growing number of people who need jobs

precisely because they lost access to some subsistence resources (Vanderpost 2006). The formal job market also has its problems, particularly in the tourism industry, where it is significantly controlled by an expatriate community of a different background to the local Okavango Delta population. The local population is also often unable to meet the skills requirements of the tourism industry, resulting in some (usually high-paying) posts being reserved for expatriates causing resentment among locals, many of whom remain unemployed (Vanderpost 2006).

Animal diseases have always been an issue of concern in the Okavango Delta. They have influenced settlement patterns, livelihood strategies and choices of communities and households for many generations (Tlou 1972; Campbell 1976). In the past tsetse-fly and sleeping sickness decimated herds of cattle and resulted in declines in human populations. In the mid-1990s it was the CBPP and currently the Okavango Delta region is struggling with the control of periodic outbreaks of Foot-and-Mouth disease. This is an issue of concern as it has direct implications on the livelihoods of communities who depend on keeping livestock and is also costly to governments that have to invest in controlling the spread of diseases to uninfected areas.

### 5.8 Inadequate policies and institutions

The Okavango Delta is typical of many environmental resources of global significance in that three competing types of proprietorial claim can be identified: different stakeholders may assert that it is a local common belonging to local peoples, a national resource to be used for national development, or part of the global heritage of mankind, i.e. global common (Thomas 2003). For this reason, policies for the Okavango Delta, perhaps more so than other parts of the basin, have to respond to these three competing claims: international conservation obligations as required by the Ramsar Convention and other international obligations, local economic and social demands to tackle poverty, and national sovereign rights and aspirations to utilise its resources. But as is the case, the Okavango Delta is also part of a wider system, so decision-making about the use of the resource needs to be negotiated also at the regional, basin-wide level.

The conservation status of the Okavango Delta is generally high as a result of the gradual adoption of strict conservation policies over the years. At the international level, the Ramsar Convention has an overarching role over 'wetlands of international importance' through which Ramsar principles have to be followed in the management of Ramsar sites. CITES, UNCBD and other international and regional (SADC) policies and agreements also shape Botswana's national policy towards the Okavango Delta. Nationally, many policies have been adopted that regulate the use of and conservation of wildlife, forests, fisheries, water

and other resources. A key question in this regard is to what extent national policies have taken into consideration international obligations?

As noted by the SAP, the problem of conflicting policies is common among all Okavango countries. In the Okavango Delta, the main conflicts can be observed between traditional subsistence activities such as farming, fishing, gathering of veld products, and hunting which are often considered incompatible with wildlife-tourism and conservation (Vanderpost 2006, Darkoh and Mbaiwa 2009). Land-use policies often do not integrate these issues in the planning process as often they are sectoral (Magole 2008). The SAP raises the importance of stakeholder participation in the planning processes for the basin. In the Okavango Delta, it has been demonstrated through the ODMP planning process that this is achievable.

Modern policies have tended to displace traditional practices based on traditional knowledge and discrediting the knowledge of local people in informing policy, and favoured modern scientific knowledge instead. As a result, often policies reflect the interests of modern (scientific) institutions such as international conservation organisations, and business (e.g. tourism industry) and undermine those of traditional subsistence users (e.g. fishers). Strengthening existing local institutions and organisations to participate in decision-making and management processes is also a decision that has to be made at the OKACOM policy-making level.

### 5.8.1 Inadequate research, Information and Communication

Research and communication are important aspects of governance. Several studies have been conducted in the past on social, economic, ecological and management topics related to the Okavango Delta. These studies are useful as they enhance and deepen the collective understanding of the functioning, structure and composition of the ecosystem and how communities in the Okavango Delta area derive livelihoods from the Okavango ecosystem goods and services.

The ODMP (2008) process facilitated the development of the Okavango Research Strategy. This strategy has outlined the following areas where research is limited:

- Understanding of the different ways in which the Okavango/Cubango River Basin responds to change (climatic and hydrological) and how these affect the ecological and social processes
- A thorough understanding of the physical, chemical, ecological, socio-economic and political factors that influence the interactions within and between society and ecosystem components

- Directed management oriented research that answers focused ‘cause and effect’ questions.

These areas are crucial for enhancing the understanding of the Okavango Delta and for the formulation of appropriate management interventions. In the past, individual research agendas were pursued, rather than coordinated research programmes that are more focussed and comprehensive. The added value in having a coordinated approach to research in the area needs to be realised. Environment and development research also needs to be locally-relevant and located in the socio-political and cultural realities of the people and environment it studies (see Magole and DeMotts 2007).

## 6 MANAGEMENT INTERVENTIONS- THEMATIC AREAS

In response to the problems identified at a transboundary level and the priority areas of concern identified at a national level, six thematic areas were developed for the Botswana part of the Cubango/Okavango River Basin. Table 4 below shows the driving force, their impact on the Okavango delta (priority concern) and management intervention to mitigate against the impact (thematic area).

**Table 4: Thematic areas, identified priority concerns and the driving forces**

| Thematic area | Priority concern | Driving force |
|---|---|---|
| 1. Livelihoods and socio-economic development | Changes in livelihood options; Indigenous Knowledge; Animal diseases | Poverty, climate change, land use change, population dynamics. |
| 2. Water resources management | Changing flow regimes; Changes in water quality; | Climate change, population dynamics |
| 3. Land management | Changes of land use | Land use change, population dynamics |
| 4. Biodiversity and environment | Changes in abundance and distribution of biota; | Land use change, population dynamics, poverty |
| 5. Policies and institutions | Policies and institutions | Land use change, poverty |
| 6. Research, information and communication | Research information and communication; | Climate change, poverty |

Each thematic area relates to one or more outcomes that it aims to achieve. These outcomes are identified and described in the logical framework (Annex I) together with the supporting intervention, timeframe and the institutions responsible for its implementation. For each of the outputs in a thematic area, interventions that realize the output. interventions are actions undertaken to realize a deliverable, the output and include indicators that allow measuring the progress of each activity in the implementation of the NAP are described. .The sections below provide a brief description of each thematic area proposed above.

## 6.1 Thematic Area 1: Livelihoods and Socio-economic Development

Poverty, climate change, land use change and population dynamics are among the key driving forces in the Okavango Delta that can potentially have an impact on livelihood options for many people in the area. Most of the changes in livelihood options arise from reduced access to productive resources, either through climate change, land use change or population dynamics.

In order to address this challenge, a comprehensive and detailed understanding of the social dynamics around changing livelihoods, their impacts on household economies, and social relations deserves attention. The dynamics of social impacts of tourism and conservation in particular deserve attention if socio-environmental goals are also to be achieved. Benefit-sharing mechanisms need to be put in place to ensure that communities that lose their livelihoods due to conservation and tourism can also benefit from the growth derived from these tourism activities. Many studies have been conducted and needs to be incorporated into decision-making processes at the policy level. This will also facilitate the institutionalisation of processes and programmes that can effectively address poverty. If the negative impacts of power relations and the wider political economy of conservation and tourism are not fully addressed, they will inevitably contribute to reduced household capacity to build sustainable livelihoods and cope with environmental change, which will subsequently reverse the goals and benefits gained from conservation of the Okavango Delta.

Climate change affect everyone, but more to those individuals and communities that are totally dependent on climate sensitive sectors. Climate proofing and building the resilience of households and livelihoods will be important in the medium to long term. In the short term, creating awareness about the impacts of climate change and putting in place mitigation and adaptation plans suitable for the sub-basin will be crucial.

Disease outbreaks are a key concern for the people of the Okavango Delta and perhaps a threat to their livelihood. In the Delta where wildlife and livestock are in close proximity and interactions are high, FMD outbreaks are a constant reality. Rapid responses to outbreaks are therefore crucial for containing diseases. Periodic monitoring of livestock movements and their health status, a costly exercise, therefore needs to be institutionalised.

The Sustainable Livelihood (SL) approach will be used in developing these management interventions. This will ensure that interventions go beyond the conventional definitions and approaches to poverty eradication. There are three basic features to the SL approach. The first is that its focus is on the livelihoods of the poor. The second is that the approach rejects the standard procedure of conventional approaches of taking as an entry point a specific sector such as agriculture, water, or health. And finally, the SL approach places great

emphasis on involving people in both the identification and the implementation of activities where appropriate.

### 6.2 Thematic Area 2--Water resources management

Two key driving forces for the water resources management thematic area are climate change and population dynamics. While some work on the assessment of causes and impacts of changing flow regimes on the Okavango Delta has already been done, more work needs to be carried out to develop baseline. Tools for monitoring and managing flooding and drying, and the extreme events that occur due to these processes are therefore required to enable early warning systems to be put in place. It should be noted that the quantification and analysis of baseline information on Okavango Delta Flow regimes has been done from a research perspective, however, this information has not translated into policy and informing government decisions. Management responses to change in flow regimes will therefore have to be informed by comprehensive and up-to-date understanding of the causes of the changes (exogenic or edogenic) in the flow regimes. This would require understanding the system as a whole, and being aware of what changes have occurred upstream (within and outside the Delta) and their causes.

The exact situation of water quality needs to be understood so that appropriate solutions can be put in place. Cost effective monitoring programmes that can be integrated into community programmes and undertaken by semi-skilled personnel can contribute towards a comprehensive, up-to-date understanding of the water quality situation in the Delta. Environmental awareness programmes would also play an important role in sensitizing communities and businesses about the impact of certain human activities on the quality and health of water resources and the environment in general. Most importantly, capacity to identify changes when they occur, and the reasons and scale and frequency of their occurrence will be critical in the medium- to long-term.

### 6.3 Thematic Area- Land Management

Under the ODMP and Tawana Land Board, an integrated land use and land management plan was developed for the years 2005-2029. This plan however is largely unimplemented. One of the main challenges is the absence of a proper land data base management system, resulting from poor record keeping of land allocated for different uses. Development of a comprehensive land information management system or the expansion of the existing Tribal Land Information Management System will become a key activity under the NAP.

Perhaps the greatest challenge to land management is the enforcement of the provisions contained in a land use plan. Effective implementation of these provisions depends to a large extent on the involvement and participation of local communities.

Community participation becomes important for the long term success of programmes in the Okavango Delta. Such approaches tend to be more effective because it incorporates traditional knowledge and the relevant experience of those affected by land decision. In this way, help to mitigate potential and existing conflicts arising from land use.

### 6.4 Thematic Area 3:- Biodiversity and environment

Land use change, population dynamics and poverty are the three key drivers of change in abundance and distribution of biodiversity in the Okavango Delta. This change is not only contributing to biodiversity loss, but also threatens to impact on the lives that are dependent on these resources. Some changes are caused by natural processes such as shifting direction of river flows, drying floodplains, and climate-driven change. A comprehensive knowledge and understanding of the status of the basin and the spatio-temporal dynamics of change is required within the ecosystem. Understanding and being able to distinguish the cause of change is also an important step to managing that change. Natural changes in the system also have the potential to disrupt entire frameworks of resource access and expose livelihoods to vulnerability. These activities are of course necessary for human development. Therefore, establishing limits (development space) in line with international best practice, based on the ecosystem approach and development needs of the population is an important step.

### 6.5 Thematic Area 5- Policies and institutions

A key concern for the Cubango/Okavango River Basin is conflicting policies among all Okavango countries. In the Okavango Delta, the main conflicts can be observed between different resource users, such as traditional subsistence activities (farming, fishing, gathering of veld products), and hunting A key activity for the NAP then becomes to review these policies with the aim of identifying policy gaps.

As a downstream member of the basin, it is in Botswana's interests to facilitate a harmonisation of policies and programmes throughout the basin. The downstream impacts of a lack of harmony between policies can result in uncoordinated efforts that may in the end nullify the gains achieved from cooperation.

Engaging local communities in decision-making would also strengthen support and ownership of decisions, policies, and programs and benefit from the indigenous knowledge that local resource-users possess. While science has a role to play in policy and resource management, so does indigenous knowledge. Local institutions and the indigenous knowledge held by communities have been shown to contribute towards sustainable resource management and conservation for generations.

### 6.6 Thematic Area 6- Research, Information and Communication

Several research programs have been developed in the Okavango Delta, however, they remain uncoordinated and not translated into policy. Communication of research results is perhaps the most important part of the research process. Where research is conducted to inform decision-making, it needs to be packaged and presented in an accessible and simplified manner. This not only helps inform people but also provides them with space to participate in research and decision-making. Collaborative research between research institutions and government institutions would also go a long way in institutionalising decision-making based on properly-conducted science and build the capacity of government institutions to conduct research and also utilise research findings in management decision-making.

The storing of information in a systematic manner and the accessibility of that information is crucial at institutional level. Establishing appropriate data sharing mechanisms such that they are accessible to decision-makers, managers and local community members is a critical part of the governance process. Often information exists but does not inform decision-making, management and practice because it is not processed, packaged and accessible to potential users. Harmonisation of data collection, analysis, processing and sharing protocols will be important for informed and sustainable management of the Okavango River resources. Mechanisms therefore need to be put in place to coordinate these efforts at OKACOM level. There is also a need for common databases for the three riparian states, for planning and for deeper understanding of the system. There is even a greater need for long term research and monitoring programmes in the Okavango Delta and the basin as a whole.

# 7 NAP IMPLEMENTATION

This section outlines the implementation of the activities identified in the NAP as prioritized activities for the next 5 years. The development of the NAP was done with active participation of all stakeholders at district and national level. Similarly, for the NAP to be successfully implemented, it requires the active participation and collaboration of all the relevant stakeholders. It should be noted that the structure for Botswana NAP implementation is strongly informed by the successes, failures and experiences of the implementation of the Okavango Delta Management Plan (ODMP). While the ODMP has remained largely unimplemented, valuable lessons can be drawn from its implementation that will inform the NAP implementation and coordination. The structure and bodies that will be involved for facilitating and ensuring smooth and effective implementation of the NAP activities are discussed below.

## *7.1 Institutional set up for NAP coordination*

The Department of Environmental Affairs in the Ministry of Environment, Wildlife and Tourism will be the coordinating unit of NAP implementation. Building on the experience and trust established through the ODMP process, DEA being the lead institution in the coordination of NAP activities will ensure the connection and therefore continuity of the ODMP and the NAP. DEA is also the national coordinating unit for the National Wetlands Policy and Strategy and the focal point for the Ramsar Convention, making it an appropriate institution to coordinate activities in the Okavango Delta. To empower DEA and give it mandate to coordinate NAP implementation, a cabinet directive will be issued. A Project Management Unit (PMU) will be established and hosted in DEA Maun office to run the day to day activities of NAP implementation. The PMU will work closely with the International Waters Unit (IWU) and the Okavango Wetland Management Committee (OWMC). Overall guidance and strategic direction will be provided by the proposed Water Resources Council (WRC). To avoid the creation of new institutions, the NAP will largely be implemented from existing institutions with the required mandate, save for the PMU which is a new unit to be established for coordination purposes. Figure 1 shows the NAP implementation structure.

### *7.1.1 The Project Management Unit*

The PMU will be the coordinating unit for NAP implementation and will be hosted by DEA in the Maun office. This unit will be responsible for overseeing the effective and efficient implementation of the NAP, resource management and the monitoring and evaluation aspects of all the NAP activities. Headed by the NAP Coordinator, the PMU will be staffed by two other senior officers; a chief technical advisor and a communication officer. It is proposed that the three senior personnel should be recruited at government salary scale

equivalent to D1. The specific qualifications of the persons to be employed will be defined at the time of recruitment; however, the persons should be highly experienced with demonstrated knowledge in water resources management in Botswana. The NAP Coordinator will report to the DEA North West District Coordinator and the Water Resources Council and work closely with the International Waters Unit. DEA will have the responsibility of reporting all NAP activities and progress to OKACOM.

### *7.1.2 International Waters Unit*

It is important for the PMU to ensure strong linkages with the International Waters Unit (IWU) during NAP implementation for three reasons- 1) IWU's experience with the TDA, SAP and NAP process and 2) as the institution responsible for transboundary water resources activities and 3) its strategic position and strength in levering funds for transboundary activities from ICPs and other organisations. The IWU will therefore have a coordination role of NAP activities in Botswana with those of Angola and Namibia. The IWU will also be responsible for leveraging funds for national level and transboundary water resources activities. It is proposed that a dedicated office/focal point be established for NAP implementation in the IWU. This could either be through the deployment of a staff member within the ministry to IWU or establishing a focal point within the IWU with existing staff.

### *7.1.3 Water Resources Council*

The proposed Water Resources Council (WRC) will provide strategic and policy guidance, oversight and monitoring of NAP implementation. Given the multi-sectoral composition and the functions of the proposed WRC, they are well positioned to provide monitoring and oversight functions to NAP implementation. The current proposed membership of the WRC will be high level officials, predominantly from government, with private sector and NGO representation. The WRC will have a functional secretariat based at the DWA, a government budget and full time employees that will be responsible for the day-to-day functions of the secretariat. The WRC will meet twice a year to discuss NAP progress, additional meetings will be organized as and when required.

### *7.1.4 The Okavango Wetlands Management Committee*

The Okavango Wetlands Management Committee (OWMC) is a district level institution with supervisory and cross sectoral mandate. Its role in NAP implementation will be to provide institutional linkages of Okavango Delta related activities to ensure implementation. The OWMC is chaired by the district land authority, the Tawana Land Board, and it is composed of representatives from all government departments, civil society organisations and community organisation. This composition is important for NAP implementation and monitoring at the local and district level.

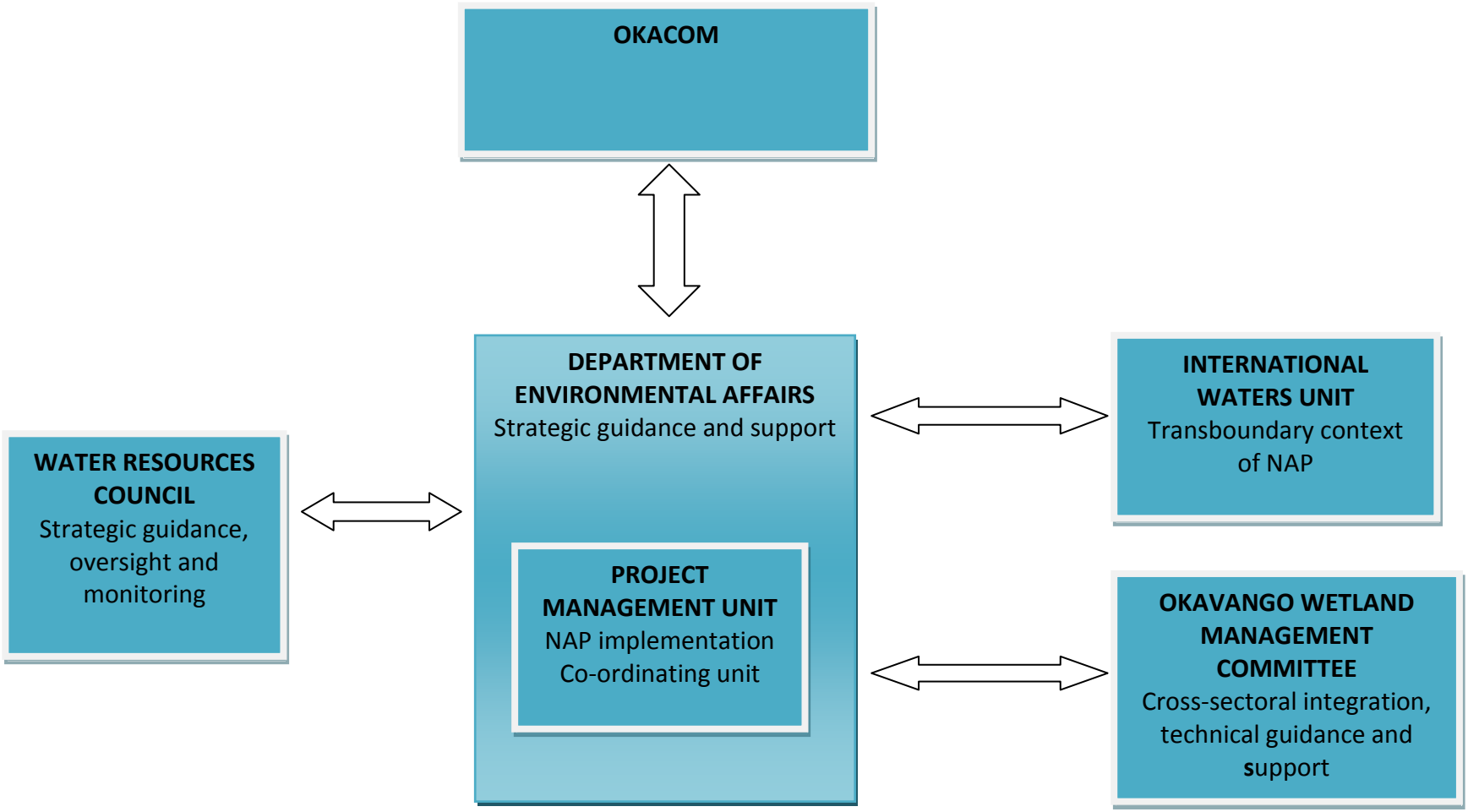


**Figure 1**: NAP implementation structure

### *7.2 Monitoring and Evaluation Mechanisms*

Monitoring and evaluation (M&E) can aid the successful implementation of the NAP, ensure that targets and goals set out in the NAP are achieved and problems regarding implementation are detected early and addressed. Two types of monitoring activities will be carried out under the NAP implementation:

- Monitoring of the actual NAP, its performance and achievements. This will be done on the basis of the Logical Framework Analysis and Objectively Verifiable Indicators, using the NAP Log Frame developed.
- Monitoring of the implementation of the NAP and its impact on the Okavango wetland and its ecological character as a whole.

Monitoring and evaluation will be guided by the specific result based indicators described in the Log Frame attached (Annex I). The reporting system would have to be designed in such a way that progress tracked for the individual activities of the NAP, problems encountered and the measures taken to address the problems are reported on a quarterly and annual basis. In addition, systematic periodic evaluation and objective assessment of the progress made towards the achievement of the NAP overall goal will be done.

Therefore, the main monitoring and evaluation activities for the Botswana NAP are as follows:

- Development of a comprehensive M&E plan is an integral part of successful implementation of any action plan. It is recommended that at the inception phase of NAP implementation, the PMU should facilitate the development of an M&E plan for NAP implementation. The structure and elements of the M&E plan will be defined during the inception phase, however, the M&E will include SMART indicators, outline means of verification, develop budget for all thematic areas and outline the reporting and reviewing schedules. All indicators must be accompanied by baselines and targets. Without baselines and targets, measurement of change over time is not possible.
- The OWMC which has the main task of coordinating and ensuring cross sectoral planning, integration and implementation, will take the lead in monitoring at the district level. The OWMC will work closely with the PMU and report to the District Development Committees. This OWMC will utilise the existing reporting structures at a district level to ensure implementation.

- The proposed Water Resources Council will have an oversight and monitoring role for the NAP implementation. It is proposed that the WRC meets twice a year to discuss general progress of NAP implementation and problems encountered.
- It is recommended that in addition to the interim quarterly progress reporting that will be carried out by the PMU during NAP implementation, mid-term evaluation and post-implementation reviews after 5 years should be undertaken. This will provide early feedback to DEA on progress towards success, and also a means of meeting accountability and transparency requirements.

### *7.3 Required resources and possible funding*

Developing a detailed funding strategy for NAP implementation will be the responsibility of the PMU, working closely with the implementing institutions. This strategy will outline

1) A detailed budget for each thematic area of the NAP and the corresponding intervention and;
2) The various sources of funding that exist for NAP implementation through national budgets, International Cooperating Partners (ICPs) and the funded projects currently underway.

## 8 NAP ENDORSEMENT PROCESS

The endorsement of NAP in Botswana has been a process, carried out in parallel with the NAP development process. The list below outlines some of the steps that the Botswana endorsement process has followed; and concludes with a roadmap for the approval and endorsement of NAP:

- Stakeholder consultation workshops at district and national level were held. The approach to the development of the NAP emphasised wide consultation and enhanced collaboration. To this end, two national consultative meetings were carried out in Maun and Gaborone. The objectives of the meetings were to identify, agree and prioritise the areas of concern that will be included in the NAP.
- The NAP formulation team constituted the core team in the NAP development (see composition in Annex II). Approval of NAP was done by this core group of experts representing various sectors and institutions. The OBSC and OKACOM is represented in this team.
- At the district level, the NAP will be presented to the OWMC and other district structures involved in development planning, such as the District Development Committee (DDC) and the Planning Management Committee (PMC), comprising of Tawana Land Board Secretary, North West District Council Secretary, Tawana Tribal Secretary and the District Commissioners. DEA office in Maun will lead this activity and OBSC members will be invited to make presentations on NAP. District development forums such as full council meetings and the monthly Tawana Land Board meetings will be utilised to make presentations at a local level.
- Presentation of the NAP to a meeting of Ministers (Ministry of Minerals, Energy and Water Resources and Ministry of Environment, Wildlife and Tourism). Other relevant Ministers and Directors will be invited for the endorsement of the NAP.
- Cabinet briefing and Cabinet directive will be issued to give DEA the mandate to host the PMU for NAP implementation and coordination.
- Endorsement at the level of OKACOM will be done during the next OBSC meeting.

**ANNEX I- NAP LOGICAL FRAMEWORK**

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| **Thematic Area 1- Livelihoods and Socio-Economic Development** | | | | | |
| ***Sustainable tourism development with enhanced benefits for local communities*** | Tourism information system developed (includes capturing of baseline data) | Electronic tourism information system in place at BTO | Improve and implement tourism information system (Data and monitoring)<br>Missing form the info system- community initiatives.<br>Packaging and access the information for different audiences. | 1-5 years | Lead- BTO, Department of Tourism, Tour operators and DEA. |
| | Economic benefits derived from tourim for locals | Socio-economic Impact of tourism survey Report | Carry out periodic socio-economic impact surveys of tourism in the Okavango Delta (5 years) | 1-5 years | Lead- BTO, Department of Tourism, Tour operators and DEA. |
| ***Capacity and participation of locals in the tourism sector strengthened*** | Community Based Organisations (CBOs) trained in tourism development | Increased benefits derived from tourism development due to increased knowledge in the sector. | Identify capacity building needs and develop the capacity of Community Based Organisations in the tourism sector | 1-5 years | Lead- BTO, Department of Tourism, Tour operators, ORI, CBOs and DEA. |
| | Local participation and ownership in the tourism industry quantified | Increased participation and ownership by locals in the tourism industry. | Assess the level of participation and ownership of tourism operations by locals. Issues to include: access to markets, information and funding | 1-5 years | Lead- BTO, Department of Tourism, Tour operators, ORI, CBOs and DEA |

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| | Biannual stakeholder workshops on tourism | Regular stakeholder forums on tourism | Strengthen collaboration between local, national and international stakeholders in the tourism sector | 1-5 years | Lead- BTO, Department of Tourism, Tour operators, ORI, CBOs and DEA |
| ***Gendered and pro-poor development in the Okavango Delta supported.*** | Household income of local communities increased by the year 2016 relative to 2008. | Socio-economic survey showing livelihoods have improved | Develop gender-sensitive pro-poor programmes that will improve livelihood opportunities for local communities | 1-5 years | Lead- NWDC, Support- ORI, NGOs, TLB, NWDC, BTO, MoA, DWNP, DFRR, MTI |
| | Implementation mechanism for benefit sharing developed | Benefit sharing guidelines for natural resource use developed for Botswana | Develop options and implementation mechanisms for benefit sharing (eg CBOs, opprotuniy lost due to zoning) | 1-5 years | Lead- DEA<br>Support- NGOs, CBNRM Forum, ORI, TLB, NWDC, MoA, DWNP, DFRR |
| ***Human-wildlife conflicts reduced*** | Reduced reported incidents of human-wildlife conflicts by 50% by 2016<br><br>Reduce the extent of damage of the conflict- measure the losses eg changes in harvests | Mitigation strategies for human-wildlife conflict developed and implemented using participatory approaches | Develop integrated mitigation strategies for human-wildlife conflict<br><br>Review the policy and compensation structure governing human wildlife conflict | 1-5 years | Lead- DWNP<br><br>Support – MoA, ORI |
| ***The impacts of climate change (differentiated by socio-economic class and gender) understood and appropriate adaptation strategies*** | Impacts, and pro-poor coping and adaptation strategies for men and women documented by 2013 | Gendered pro-poor adaptation strategies for climate changeimplemented | Develop pro-poor and gendered climate change adaptation strategies and awareness raising | 1-5 years | Lead- DMS, DEA. Support: Health, MoA, DWNP, Dept of Womens Affairs, ORI |

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| ***developed*** | | | | | |
| ***Cross cutting issues (human health, gender and poverty) mainstreamed into development planning processes.*** | Gender, human health and Poverty reflected in planning documents | Gender, human health and poverty mainstreaming in all planning documents | Develop a tool for mainstreaming human health, gender and poverty in planning processes (health issues lagging behind- involve the authorities that deal with heath) | 1-5 years | ALL |
| ***Animal disease control programmes reviewed with the aim of improving livelihoods in the Okavango Delta*** | Animal disease control programmes respond to poverty challenge in the Okavango Delta | Animal disease control programmes reviewed | Evaluate the impact of animal diseases and animal disease control programmes on livelihoods | 1-5 years | Lead- MoA. Support: TLB, MEWT, MLG |
| ***Thematic Area 2- Water Resources Management*** | | | | | |
| ***Improved understanding of the current and historic flow regimes in the Okavango Delta*** | Spatial and temporal distribution patterns of water in the Okavango Delta quantified | Hydro-Ecological Models that factor flow regimes. | Gather and analyse all available baseline information on Okavango Delta Flow regimes | 1-5 years | Lead DWA. Support- ORI |
| | | | Package the information and make accesible to decision makers | 1-5 years | Lead DWA, ORI Support- DEA, OP, Tourism |
| ***Causes and impacts of changing flow regimes on the Okavango Delta*** | Baseline information on the causes and impacts of changing flow regimes in the | A Hydro-Ecological models that factor flow regimes | Gather and analyse the required information on the exogenic and endogenic causes and impacts | 1-5 years | Lead-DWA. Support- ORI, Meteorology, |

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| ***identified and understood*** | Okavango Delta quantified and validated | comprehensive understanding of flow change impacts on ecosystem and livelihoods | (climate change and upstream development) of flow change regimes on the Okavango Delta. | | |
| ***Management mechanisms for responding to changing flow regimes developed*** | Long term monitoring plan for changing flow regimes developed | Long term monitoring plan for changing flow regimes developed and implemented | Identify and improve existing or develop where required management responses to changing flow regimes | 1-5 years | Lead DWA. Support- ORI |
| | | Continuously updated database of flow regimes available for use by stakeholders | | | |
| | | A decision support system that relies upon real time hydrological data and provides future forecasting of changes in flow regimes | | | |
| | | Early warning system for floods and drought | | | |
| ***Water quality that meets national and international standards is maintained in the Okavango Delta*** | National standards for water quality for both Surface and Ground water developed | Systematic water quality monitoring in the Okavango Delta | Develop national surface and ground water quality standards | 1-5 years | OKACOM,DWA, DWMPC. Support- ORI, BOBS, NWDC, DoT |

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| | | Dissemination of water quality monitoring data for use by ecosystem managers | | | |
| ***Future water quality trends in the Okavango Delta Determined*** | Okavango Basin water quality standards/guidelines developed | Coordinated water quality monitoring in the Okavango/Cubango River Basin | Synchronise water quality standards across the three riparian states of the Okavango/Cubango River Basin | 1-5 years | DWA, DWMPC. Support- ORI, BOBS, NWDC, DoT |
| | Water Quality database developed | Water quality surveillance programme implemented. | Develop water quality surveillance programme | 1-5 years | OKACOM,DWA, DWMPC,<br>Support ORI, BOBS, DoT |
| | Water quality threats in the upper catchment assessed | Threats to water quality in the upper catchment defined | Review of development scenarios to determine future threats to water quality | 1-5 years | ,DWA, DWMPC, |
| | | | Develop water quality decision support system and water quality thresholds | 1-5 years | Lead- DWA, DWMPC. Support- ORI, BOBS, NWDC, DoT |
| ***Pollution in the Okavango Delta prevented, controlled and managed.*** | Guidelines for solid and liquid waste management developed and enforced | Guidelines for solid and liquid waste management developed | Develop guidelines and implementing mechanisms for solid and liquid waste management in the Okavango Delta | 1-5 years | Lead-DWMPC, DWA, NWDC, TLB. Support- KCS |

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| | Persistent Organic Pollutants (POPs) levels for fish and crocodiles determined | POPs levels known and communicated to stakeholders | Carry out baseline survey to determine the levels of POPs in plants and animals. | 1-5 years | Lead-DWMPC, DWA, Dept of public health, Ministry of Agriculture. Support- ORI, DEA |
| | Targeted annual training programmes on water quality issues developed | Different target groups (eg Tourism establishment management, local communities) knowledgeable of water quality impacts | Develop and implement targeted training and awareness programmes on water quality | 1-5 years | Lead- DWMPC, and DWA. Support- NWDC |
| | Guidelines for acceptable farming practises piloted in 3 sites in the Okavango Delta | Guidelines developed and implemented across the Okavango Delta | Develop and implement guidelines for acceptable farming practises | 1-5 years | Lead- MoA, NWDC, DAR, ORI |
| | Water quality database and monitoring programme developed | Collaborative pollution monitoring programme developed and implemented | Develop a water quality database for the Okavango Delta | 1-5 years | Lead DWA, DWMPC, Agriculture. Support- DoT, NWDC |
| | | | Conduct pollution monitoring in the Okavango Delta through collaboration with main stakeholders (Tourism, Agriculture, Wildlife, Environment and communities etc) | 1-5 years | Lead DWA, DWMPC, Agriculture. Support- DoT, NWDC |
| **Thematic Area 3 - Land Management** | | | | | |

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| ***Land use planning that promotes the development of local livelihoods, access to resources for the poor, maximises tourism potential and reduces land use conflicts.*** | Land allocation and management is guided by the integrated land use plan from 2011 | Land allocated and managed as per the integrated Land use plan | Review implementing strategyfor the Ngamiland integrated land use plan- Roles, responsibilities, timelines and budgets | 1-5 years | Lead- TLB, NWDC ORI and DoL. Suppoting- DEA, DFRR |
| | Land authorities trained in sustainable land management | Annual training of land authorities using existing training manual (Developed under Biokavango) | | | |
| | sand mining and quarrying activities guided by environmental principles and guidelines | Guidelines to monitor and control sand and gravel mining and quarrying. | | | |
| | A Strategic Environmental Assessment (SEA) for the Okavango Delta developed | A comprehensive SEA for the Okavango Delta | Develop a SEA as a tool that will inform development planning | | |
| ***Land data collected, managed and analysed to inform decision making and land management*** | TLIMS reviewed and institutionalised | Land information system that is updated regularly | Expand, institutionalise and network the Tribal Land Information Management System | 1-5 years | Lead- MLG, TLB, NWDC and DoL[8] Supporting- DEA, DFRR |
| | LAPCAS implemented | Area coding system developed and updated regularly | Implement LAPCAS (MLH, Postal services)- find the exact meaning of LAPCAS. | | |
| | Physical planner's portal implemented | Physical planning information system that is updated regularly | Implement Physical planner's portal | | |

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| | Number of land officers trained in land management | Land management Officers equipped with relevant skills to develop and implement land use plans | Strengthen skills of Land management Officers | | |
| | Database developed for natural resource use (selected key resources) | Long term resource monitoring plan | Monitor natural resource use of the Okavango Delta (selected key resources) | 6-10 years | Lead- DFRR, DWNP<br>Supporting- TLB, DEA |
| ***The negative impact of flooding is effectively reduced*** | Effective flood management | The impact of flooding on local livelihoods is understood and mitigated. | Develop a flood management strategy | 1-5 years | Lead- OP, DA, NWDC, disaster management and TLB |
| ***Increased levels of community participation and use of indigenous knowledge systems in land use and sustainable management processes.*** | Enhance participatory planning in the Okavango Delta | Lessons learnt documented and participatory planning upscaled to the Okavango Delta | Participatory land planning piloted in 3 sites in the Okavango Delta | 6-10 years | Lead- TLB, ORI and Local communities |
| | IK documented and used to ensure the sustainable use of natural resources in the Okavango Delta | Natural resource management plans developed through documented IK | Document the IK for the management of the Okavango Delta resources (traditional land use, cultural /heritage initiatives, biological, etc) | 1-5 years | Lead- DEA, Support: TLB, DFRR, DWNP, ORI, MoA |
| **Thematic Area 4- Environment and Biodiversity** | | | | | |

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| ***Threatened and endangered species protected.*** | Evidence of the populations of endangered species decreasing, stabilizing or increasing | Biodiversity field surveys undertaken with research needs defined for threatened species (population dynamics, genetic viability and susceptibility to climate change) | Develop a programme for the management of threatened and endangered species in the Okavango Delta, and develop monitoring plans | 1-5 years | Lead- DFRR, DWNP, DEA and TLB |
| | Monitoring plans for endangered species developed and implemented with communities (MOMS), Private sector (concessionaires), public sector, NGOs | Endangered species inventory | | | |
| | | Species-specific management plans (status and threats) | | | |
| ***Zero introduction of alien and invasive species*** | No new introduction of invasive species | Species inventory of current and potential invasive species | Develop a programme to control the introduction and spread of alien species | 1-5 years | Lead- DFRR, DWNP, DEA and TLB |
| | Decline of the spatial distribution of invasive species within the Okavango Delta | Species specific management plans developed for existing invasive species | | | |
| | Implementation of alien and invasive monitoring plans by different stakeholders | Alien and invasive species monitoring plans developed | | | |

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| | | Mapping the distribution and spread / retreat of the invasive species in the Okavango Delta | | | |
| ***Existing biodiversity related plans implemented*** | Biodiversity related plans reviewed and approved by relevant authorities (NBSAP by 2012, ODMP by 2014, NAP by 2014) | Reviewed biodiversity related plans | Review and implement biodiversity related plans, such as the NBSAP, ODMP and ensure linkages with approved SAP and NAPS. | 1-5 years | Lead- DFRR, DWNP, DEA and TLB |
| | | Implementable actions from the biodiversity plans prioritized with reference to SAP and NAP | | | |
| ***Effective fire management in the Okavango Delta*** | Fire maps developed | Fire management strategy for Botswana and ODMP's fire management strategy for the ODRS implemented | Develop fire maps for the Okavango Delta | 1-5 years | Lead- DFRR, DWNP, DEA, TLB and Disaster management |
| | Decrease in economic value of damages by fires | | Assess the socio-economic and biodiversity impact of fires in the Okavango Delta | | |
| | Number of communities /stakeholders employing fire as a management tool (annual) | | Assess the potential change of current fire risks and threats relating to future climate change, flood dynamics, land use etc. | | |
| | | | Improve early warning system for fires through GIS / Modis | | |

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| ***Land use management threats to biodiversity reduced*** | | Biodiversity threats identified | Isolate and implement the biodiversity aspects of the land use management plans such as Ngamiland Integrated Land Use Management Plan / Pan handle Management Plan etc.- | 1-5 years | Lead-DWNP and DFRR, Museum Support: DEA, TLB |
| | Area of established and recognizedwildlife corridors | Trans-boundary wildlife corridors established | Assess the transboundary wildlife movement corridors around the Okavango Delta | | |
| ***Biodiversity monitoring strategies established*** | Indicator species trends used as part of decision supporting system | Annual land use cover maps for three indicator habitats (e.g. riparian woodlands, seasonal floodplains and permanent swamps), established | Establish and implement biodiversity monitoring surveys for key indicator species. | 1-5 years | Lead- DFRR, DEA and DWNP |
| | | Annual monitoring reports for key indicator species | Establish and implement a landscape monitoring program | | |
| **Thematic Area 5- Policy and Institutions** | | | | | |
| **National policies and legislation aligned with appropriate international obligations.** | National policies and legislation not in conflict with international obligations | National policies and legislation aligned with international obligations | Harmonise national legislation and policies (e.g. water quality, waste management) and align with international obligations and agreements. | 1-10 years | Lead- DEA |

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| | National policies and legislation reviewed and aligned with sustainable development priorities | Policies and legislation on sustainable development and natural resources management reviewed | Review and analyse all policies and legislation on natural resources management and sustainable management (, and identify policy gaps including issues relating to poverty, gender and health. | 1-5 years | Lead- DEA |
| **Policies that regulate the introduction and control of alien and invasive species are developed.** | Legislation that regulates alien and invasive species developed | Alien and invasive species regulated | Review and align legislation related to alien invasive species (Aquatic Weeds Control Act, Herbage Preservation Act, Agricultural Conservation resources Act, District Councils Act) | 1-5 years | Lead- DFRR, MoA, DEA, DWNP, DWA |
| | Reduction in the spread of alien invasive species | | Develop water traffic regulation for the Okavango Delta | 1-5 years | Lead- DFRR, MoA, DEA, DWNP, DWA |
| **Policies and institutions that respond to the environmental and social challenges of the Okavango Delta reviewed.** | The sustainable livelihoods framework and SEA used to review policies, regulations and guidelines | Policies, regulations and guidelines that support sustainable livelihoods | Review policies, regulations and guidelines (e.g. fishing, veld products, aquaculture) to ensure that they support sustainable livelihoods. | 1-5 years | Lead- DEA, Support: ORI, DWNP, DFRR, DWA |
| | | | Institutional review- capacity, constraints,- for NAP implementation. Gap analysis of implemetation of plans | 1-10 years | Lead- DEA, ORI Support- NWDC, |

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| | Wetland policy tabled in parliament | An approved wetland policy | Facilitate the approval of wetland policy and develop implementation plan, together with time frame, activities and institutuional responsibilities. | 1-5 years | Lead- DEA, DWA |
| **Approaches and guidelines for sustainable natural resources management in the Okavango Delta developed** | Guidelines for SEA developed for projects and policies by 2012 | SEA Guidelines developed | Develop guidelines for all policies and projects to be subjected to a Strategic Environmental Assessment and the Sustainable Rural Livelihoods Framework. | 1-5 years | Lead- DEA<br>Support: NGOs, OP, NWDC, |
| **Thematic Area 6- Research and Communication** | | | | | |
| **Enhanced understanding of the physical, chemical and biological processes in the Okavango Delta and the interaction with social and economic processes** | Research programmes developed to address knowledge gaps | New research that integrates social and physical data | Develop research programmes that will address information gaps to enhance the understanding of dynamics within the Okavango Delta | 1-5 years | Lead- ORI<br>Support- Meteorology Dept, Department of Research, Science and Technology, DEA, DWA. |
| | Development of climate change research programmes by 2012 | Research programmes that address climate change | | | |

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| | Local problems solved through uptake by policy makers of research findings | Innovative solutions to livelihood and natural resources | Develop an innovative programme to integrate and apply research findings on the interaction of biodiversity, livelihoods and ecosystems in the Okavango Delta, including issues such as ethics, culture, economics and governance. | 1-5 years | Lead- ORIDepartment of Research, Science and Technology |
| | | Research council established to integrate the public / private and research sectors to develop innovative thinking | | | |
| | Long term research programme in place | Research and monitoring programme developed | Develop long term research and monitoring programmes for the entire basin | 1-10 years | ORI |
| **Participatory planning in the Okavango Delta enhanced. Research findings processed, packaged and disseminated to decision makers and the broader public.** | Annual stakeholder conference held to share practical research findings and policy issues | Research findings and policy solutions communicated and appreciated by decision makers. | Enhancement of participatory planning in the Okavango Delta<br><br>Package of information and research findings | 1-5 years | ORI |
| | Research findings communicated to stakeholders, brochures printed and biannual seminars to decision makers | | | | |

| Outcome | Outcome indicator | Output | Intervention | Time frame | Lead/ support institution |
|---|---|---|---|---|---|
| **Comprehensive information system on the Okavango Delta developed.** | ODIS expanded | Information on the Okavango Delta accessible | Expansion of the Okavango Delta Information System and improve accessible of ODIS. | 1-10 years | ORI, OKASEC. |

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## ANNEX II: National Formulation Team

The National Formulation Team (NFT) had the responsibility of providing technical oversight in the NAP development process. The office of the International Waters Unit, under the Ministry of Minerals, Energy and Water Resources (MMEWR), served as the national coordinator providing overall strategic direction in the NAP development. The NFT was constituted of representatives from the following organisations and departments:

- Botswana Tourism Organization (BTO)
- Department of Environmental Affairs (DEA)
- Department of Water Affairs (DWA)
- Department of Wildlife and National Parks (DWNP)
- Hospitality and Tourism Association of Botswana (HATAB)
- Tawana Land Board
- Ministry of Agriculture
- North West District Council (NWDC)
- Okavango Basin Steering Committee (OBSC)
- Okavango Research Institute (ORI)
- Southern Africa Regional Environment Programme (SAREP).