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COUNTRY ENVIRONMENTAL PROFILE OF THE REPUBLIC OF BOTSWANA

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SUMMARY

State of the Environment

Botswana's key environmental issues are influenced by, or relate to, (1) climate, (2) water resources, (3) the management of land, (4) forests, vegetation and ecosystems, (5) conditions in human settlements, (6) mineral resources and geology and (6) archaeological and cultural resources.

Climate.

Botswana is largely arid or semi-arid because of geographic location. Rainfall, which is unreliable and unevenly distributed, varies widely from about 250 mm in the south-west to about 650 mm in the north-east of the country. Variations in temperatures are similarly high. Average daily maximum temperature ranges from 22 ℃ in July to 33 ℃ in January, with an average daily minimum of 5 ℃ in July and 19 ℃ in January. Extreme temperatures can reach 43 ℃ in January, resulting in very high evaporation rates.

The country is susceptible to seasonal variations in climate which are influenced by the *La Nina* and *El Nino* events. The latter contributes to drought conditions which, in turn, reduce water supply as well as agricultural production. Drought, therefore, affects the livelihoods of the large population which is dependent on agriculture and the rural communities that depend on individual water sources that cannot withstand prolonged drought. The severity and extent of drought is difficult to predict due to the absence of a fully established monitoring system and scarcity of long-term data sets.

Botswana is highly vulnerable to climate change, even though the country is estimated to be a net sink of greenhouse gases. Although a wet scenario is possible, most climate change models for the region indicate generally drier conditions in future, which would reduce agricultural production, and result in more severe drought and desertification.

Water

Water demand in all the sectors is expected to increase from 120 million cubic metres in 1990 to 335 Million cubic metres in 2020 due to population growth, improvements in living conditions, and economic development. The major water users are human settlements, livestock, mining and energy and irrigation.

The provision of reliable water supply is costly because Botswana has few surface water sources. This is due to low rainfall, high seepage because of generally sandy soils, and high evaporation rates. All rivers, apart from the Okavango and Chobe, are ephemeral. Consequently, dams have been constructed to improve water supply mainly for urban areas. The uneven spatial distribution of surface water has required costly transfers of the resource, within the country and from outside.

Ground water is important, especially for rural communities, because of the limited supply of surface water. The high reliance on ground water (estimated to be 80% in 2005) poses several challenges. These include the protection of aquifers from pollution, the high cost of provision due to the depth at which it is available, high levels of salinity in some places and the absence of precise knowledge on the rate at which it is being recharged, which makes the determination of future availability difficult.

The augmentation of domestic water supply for Gaborone area through the reuse of effluent is being investigated. There is currently little reuse but substantial quantities (up to 16% of total demand) could be made available through a programme of treatment and re-use of domestic effluent.

Despite the above challenges, Botswana has achieved high levels of potable water provision, although there are occasional problems of lack of reliability of supply in some villages. All residents of urban areas either have reticulated potable water in their houses or can obtain it from a nearby stand pipe. Overall, 97 percent of the population has access to potable water within a distance of 2.5 kilometres. A cross-subsidy mechanism reduces the cost of water to low-income households.

Botswana shares four transboundary river basins and this has made cooperation with other riparian countries with regard to their management imperative. In that regard, several river basin agreements have been concluded with the purpose of achieving coordinated and judicious use. The scarcity of water has resulted in an integrated approach to management, both in Botswana and in other SADC countries.

Land

Botswana's three categories of land tenure are state (24.9%), freehold (4.2%) and tribal land (70.0%). State land is allocated primarily to national parks, but is used also for forest reserves and urban settlements. Tribal land is used mainly for grazing, crop production, settlement, game reserves and as wildlife management areas. Freehold land is used mainly for livestock farming, but also on a small scale for housing in urban areas. High priority has been given to the conservation of natural resources in the allocation of land and this is reflected in the high proportion allocated to protected areas.

Land that is suitable for arable farming is small due to generally poor soils which, together with climate and other factors relating to management, result in low productivity of crops. Consequently, the country imports most of its food.

Pastoral farming (mainly cattle) dominates the agriculture sector. Apart from its benefits in terms of employment and incomes, there has also been negative environmental impacts of the sector. Rangelands, especially in eastern Botswana, are being degraded due to a high livestock population, the tendency of farmers to keep cattle in excess of sustainable stocking levels, a low offtake rate, as well as incidents of bush fire which reduce available forage.

Land is becoming increasingly scarce and unaffordable in some areas. In peri-urban areas around Gaborone, self-allocation of land, which is a manifestation of the scarcity and unaffordability of land in Gaborone, has occurred. Land use conflicts have also occurred in Boteti subdistrict where grazing of cattle in national parks has been reported and livestock has been killed by wildlife. There is also increasing conversion of arable and grazing land to residential use around Gaborone.

Forests, vegetation, ecosystems

Botswana's ecosytems fall into two broad biogeographical zones: the Zambezian zone and the Kalahari–Highveld. The Zambezian zone contains a greater species diversity than the Kalahari-Hardveld. Within these broad zones exists areas of relatively undisturbed land of national and global ecological importance that support the tourism industry. These include wetland ecosytems such as the Makgadikgadi pans, the Okavango–Kwando, and the Linyanti–Chobe systems, as well as the surrounding terrestrial ecosystems. The Okavango Delta has already been declared a Ramsar site which enhances its conservation profile and tourism value.

Botswana possesses a wide diversity of wild fauna and flora including populations of globally endangered and rare species. Despite this diversity, wildlife numbers have been declining over several decades due to illegal hunting, drought, and habitat destruction. Some species, such as the Black (*Diceros bicornis*) and White (*Ceratotherium simum*) Rhino appear to have been poached to

extinction. However, a small population of White Rhino has been re-established in a secure sanctuary. A notable exception to the general decline in wildlife populations has been with regard to elephants.

Biodiversity still contributes to livelihoods although the extent of direct dependence is declining. There is concern regarding its further depletion due to some harvesting practices.

A recent potential threat to biodiversity is biotechnology. Botswana imports agricultural produce, including from countries that apply modern biotechnology, but there is no requirement for disclosure on whether such products have been genetically modified or not.

Human Settlements

Botswana's human population was estimated to be 1,680,863 in 2001. The rate of population increase between 1991 and 2001 was 2.4 percent, representing a decline from the 3.4 percent recorded in the previous decade. The population is predominantly youthful, and has a higher proportion of males than females.

The rate of urbanisation has been high. In 2002, 52 percent of the population lived in urban areas compared with 18 percent in 1981. The development and management of human settlements has largely been orderly due to physical planning. Over crowding is not a widespread phenomenon but high plot occupancy rates have been reported in some Self Help Housing Areas in Gaborone. The recent emergence of the informal sector has, however, created additional pressure on urban planning as many entrepreneurs conduct their business from unsuitable places such as pedestrian walkways, road reserves or locate next to busy roads.

The country has achieved high levels of access to sanitation despite a high rate of urbanisation. It is estimated that 77 percent of households in the country had access to adequate sanitation in 2001.

The management of waste varies between urban and rural areas. In the former, it is regularly and frequently collected while in the latter this is often not the case. Further, even where waste is collected, disposal does not always occur in properly managed sites. Littering is widespread in settlements despite efforts to manage it through education campaigns.

Chemicals containing persistent organic pollutants have previously been used for pest and disease control as well as in electricity transmission. The use of chemicals containing these substances is reported to have stopped but there is no national inventory of unused stocks (if any) or information on the impacts that may have occurred as a result of previous use.

Energy

The energy sector comprises both conventional and non-conventional energy sources. The former is dominated by electricity, petroleum products and coal, while the latter comprises biomas, primarily in the form of fuelwood. The very high reliance of fuel wood for cooking in rural areas (77% of rural population) and a significant level of use in urban areas (23% of urban population) has resulted in cutting of trees on a large scale around towns and large villages.

Access to electricity is improving. In 2004, 34 percent of the population was connected to the electricity grid compared to 12 percent in 1998. Access to electricity, however, varied between rural and urban areas with 25 percent and 61 percent of the respective populations connected to the grid in 2004. Most of the electricity is imported.

There is little use of renewable energy technologies although initiatives have been made to introduce them. In particular, solar technologies have not been widely adopted despite the existence of a good solar regime.

Minerals and geology

Mineral resources have been largely responsible for the transformation of the Botswana economy and for improvements in living standards over the last four decades. Despite the existence of environmental management programmes, some operations have had negative impacts. The impacts of mining have included high levels of sulphur oxide emissions; high levels of pH, total dissolved solids, sulphates and nickel in discharged effluent at Selebi Phikwe Mine, as well as several abandoned mines around Francistown which pose safety risks. A programme to rehabilitate abandoned mines has been started.

Botswana experiences low seismic activity because part of the country is located on the southwesterly extension of the East African Rift Valley. Most of the cases have been reported in the Okavango Delta area, but small tremors have been felt or recorded in other parts of the country.

Archaeological and Cultural Heritage

Botswana has a wealth of archaeological and cultural resources, including some of global importance such as the Tsodilo World Heritage Site. There are also sites of national importance such as rock engravings and monuments. Despite its potential, this sector has not contributed significantly to tourism. This requires redress as part of efforts to diversify the economy and develop a better understanding of history and culture.

Environmental Disasters

Botswana has experienced few environmental disasters. Occasional floods are experienced despite generally arid conditions; the invasion of crop pests also occurs, and; there has been minimal damage to property due to rare incidents of significant seismic activity.

Environmental Policy, Legislative and Institutional Framework

Environmental Policies, Strategies and Legislation

Several policies and strategies guide Government intervention in environmental management. These policies and strategies address agriculture, energy, tourism, wildlife, waste management, housing, settlement, water as well as the integrated management of all aspects of the environment. The themes that are common to most of them, and which represent various aspects of sustainable development, include improvement of the quality of life, conservation of the environment, diversification of the economy, value addition to natural resources, and job creation. The policies and strategies contribute to the attainment of the Vision 2016 goal of creating a prosperous, productive and innovative nation. One of the challenges to the attainment of the country's sustainable development objectives is poverty. The linkages between living standards and environment are complex with both poverty and affluence associated with environmental degradation.

Several statutes, most of which are directed at specific sectors such as water, wildlife conservation, the management of waste, tourism, forestry, pollution and the management of land, regulate environmental management. Three statutes deal with the assessment of environmental impacts and create a potential overlap which should be clarified or resolved. These are the Environmental Impact Assessment Act, 2005, Mines and Minerals Act, (No. 17 of 1999) under which the impacts of mining are considered, and Monuments and Relics Act, (No. 12 of 2001) which deals with impacts on archaeological sites, relics and monuments. There is no specific legislation to regulate persistent organic pollutants and genetically modified organisms.

Regulations, Guidelines and Standards

Regulations, guidelines and standards have been developed, or are in the process of being developed, for environmental assessment, drinking water quality, waste water, water reticulation and urban development. Guidelines for preparing EIAs for mining projects, an outline of the environmental impact report for mining projects, guidelines for pre-development archaeological

impact assessment, draft waste water standards as well as draft regulations for the Monuments and Relics Act, have been developed. Regulations and guidelines for environmental impact assessment under the Environmental Impact Assessment Act, 2005 are currently being developed.

Non-legislative instruments for environmental management are not widely applied in Botswana. An exception is in the water sector where urban water tariffs are structured in a way that penalises high consumers in an effort to reduce overall consumption.

Multi-lateral Environment Agreements

Botswana has ratified several environmental agreements that have been developed under the auspices of the United Nations as well as through the Southern African Development Community. These are aimed at ensuring coordinated responses to environmental issues in order to realise greater impact. The principles contained in MEAs are reflected in policies and legislation.

Action plans aimed at building human and institutional capacity and National Reports that document progress towards achieving certain goals have been prepared with the support of development partners. These include the Drought and Desertification Action Plan, the Biological Diversity Strategy and Action Plan, and reports to the Conference of Parties of the UNFCCC and CBD, as well as on progress in implementing millennium development goals. The progress achieved with regard to the environmental goal is reflected in the integration of principles of sustainable development into policy and legislation; protection of biodiversity; management of GHGs; access to energy, water and sanitation; as well asng in livconditions in settlements

Institutional Framework

Environmental management is largely the function of the Ministry of Wildlife Environment and Tourism. Within the ministry, the following core departments have been established: Environmental Affairs, Waste Management and Pollution Control, Forestry and Range Resources, Meteorological Services, Tourism and Wildlife and National Parks. Other Government departments, international development partners, NGOs and the private sector provide support, including through research, advocacy as well as the funding of activities. The impact of NGOs and CBOs has in particular been limited because of inadequate management skills and financial resources which has, in turn, resulted in the lack of sustainability of many of their initiatives.

The elevation of the former NCSA into a full Department of Environmental Affairs as well as the consolidation of some of the functions of the Agricultural Resources Board should improve environmental coordination.

Integration of Environmental Concerns in the Main Sectors

Environmental issues are integrated into the main sectors through the National Development Plan and other cross cutting policies and initiatives such as the Poverty Reduction Strategy, the National Research, Science and Technology Plan, the education curriculum, the district planning process, as well as through the adoption of strategic approaches to environmental assessment, particularly in the water sector. The documents and processes identify issues relating to environmental management and suggest how they should be addressed.

Capacity

Capacity in the public service, the private sector and among NGOs influences the effectiveness of environmental management. Botswana has undertaken activities to build capacity in areas such as the implementation of the UNFCCC and the CBD and environmental impact assessment. Despite these efforts, individual, institutional and systemic capacity constraints relating to the lack of some specialised technical skills (e.g. climate change modelling; monitoring GMO content of imported food), specific competencies (e.g. environmental law; review of EIA reports), prioritisation of work, coordination, staff numbers and leadership are still perceived. The overall capacity situation is complicated further by the erosion of skills due to HIV and AIDS. However,

some institutions with responsibility for the management of water resources, such as the Department of Water Affairs and the Water Utilities Corporation, have developed organisational policy to respond to the pandemic.

EU and other Donor Cooperation from and Environmental Perspective

Projects aimed at improving the management of natural resources have been implemented with the support of development partners. Ongoing projects which are supported by the European Union, UNDP and USAID, are in the areas of wildlife conservation and management, capacity assessment, energy, climate change, rangeland and biodiversity management, environmental law and water resource management. Although these interventions are related and are often complimentary, they have not been developed as part of a single coherent programme. This sometimes creates overlaps and the absence of synergy between them.

In implementing these projects, technical assistance is procured to complement capacity available in the implementing institutions. The sustainability of these projects may be affected by the difficulty of transferring skills from short term project staff and the difficulty of fully integrating projects in institutional programmes.

Conclusions and Recommendations

Conclusions

Botswana faces several challenges in effectively managing the environment. The key issues that relate to climate are frequent drought which is a consequence of seasonal variations, and possible future global warming. These have adverse consequences for water supply, agricultural production and maintenance of biodiversity.

With regard to water, despite increasing demand, scarcity, cost and the technical difficulty with which it is obtained, important progress has been made in improving supply. The major challenges regarding continued provision of a reliable water supply service include protecting aquifers from pollution, developing a better understanding of ground water recharge, making domestic effluent available and accepted for reuse, and applying a comprehensive demand management programme to improve the efficiency of use.

High priority has been given to the conservation of natural resources and this is reflected in the proportion of land allocated to protected areas. The key issues on land are rangeland degradation due to a high livestock population; the tendency of farmers to keep cattle in excess of sustainable stocking levels; a low offtake rate; incidents of bush fire which reduce available forage; self allocation of land in peri-urban areas; competition for land between livestock and wildlife; and reduction is grazing and arable land due to conversion to residential use.

The priority given to the conservation of natural resources is also reflected in the existence of several ecosystems of regional and global importance, including the Okavango Delta as well as the existence of global threatened animal species. These successes are, however, dampened by the decline in the numbers of most animal species. Other threats to biodiversity include rangeland degradation, inappropriate harvesting methods, habitat destruction, climate change and the potential introduction of genetically modified organisms.

Settlements have been developed in a largely orderly manner. There are, however, new challenges for their management. These include pressure on urban services and infrastructure due to a high rate of urbanisation; littering; inadequate management of waste in rural areas; as well as lack of adequate information on hazardous waste in general.

The energy sector is characterised by the high use of wood for cooking and increasing coverage of electricity, both of which vary between urban and rural areas. There are three main environmental issues relating to energy: land degradation around towns and major settlements due to the high use of fuel wood; high level of dependence on imported electricity; and the low use of renewable energy.

Mineral resources have been largely responsible for the transformation of the Botswana economy and for improvements in living standards. Some mining operations have, however, had negative impacts which include high levels of emissions, high concentrations of various metals in discharged effluent, and mines which have not been rehabilitated.

Botswana has a wealth of cultural and archaeological resources but their contribution to tourism is currently small. This requires redress as part of efforts to diversify the economy and to develop a better appreciation of culture and history.

Apart from earth tremors which have caused minimal damage, the few environmental disasters that have been experienced include floods, and crop pests.

A comprehensive set of policies and strategies on environmental management generally reflect concerns with issues of sustainable development and contribute to the goals of Vision 2016. However, there is no specific legislation to regulate genetically modified organisms or the use of persistent organic pollutants. There is also a possible overlap between the three laws that govern aspects of environmental impact assessment.

Regulations, guidelines and standards that provide specific environmental requirements and processes have been developed, or are in the process of being developed. These cover environmental assessment, drinking water quality, waste water, water reticulation and urban development.

Botswana has ratified several environmental agreements that have been developed under the auspices of the United Nations as well as through the Southern African Development Community, and which aim at achieving coordinated responses to environmental issues in order to obtain greater impact.

Action plans have been developed to build human and institutional capacity especially with regard to the implementation of the conventions, but also in other areas such as environmental impact assessment. National reports have been prepared to show progress towards achieving agreed targets.

The Government, NGOs, parastatal institutions and private sector organisations support environmental management. There has been a concerted effort to rationalise environmental institutions. This should reduce overlaps, clarify roles and improve their effectiveness.

Significant achievements have been made in integrating environmental issues into other sectors through policies, plans, the education curriculum, as well as through a strategic approach to environmental assessment.

Despite past and ongoing efforts to improve capacity, individual, institutional and systemic capacity constraints are still perceived. Some specialised skills and competencies are lacking, as is the ability to prioritise, manage and direct environmental work so that it can have a clearly profound impact. The capacity constraints are made more acute by the impact of HIV and AIDS.

Projects aimed at improving the management of natural resources have been implemented with the support of development partners. This approach is not sustainable and should be addressed by resolving the capacity issues identified in Section 3.

Recommendations

It is envisaged that Human Development, mostly through formal and informal education and training, will be the focal area for EDF 10 with funds channelled through sector budget. By mainstreaming environmental concerns, human development can support environmental protection in the following ways:

i. Enabling managers and policy makers to appreciate the economic value of natural resources and the impact of current patterns of use through formal academic training, short courses and targeted workshops. The target for this support would be staff in central government departments and district offices responsible for economic matters and the management of natural resources. The understanding gained will allow the issues to be incorporated in development plans and other sector plans.
ii. Developing capacity to improve data management and environmental monitoring and reporting in the districts. This will help to integrate environmental issues into the district planning process and also provide reliable information for the State of the Environment reporting.
iii. Improving the understanding of environmental legislation and the capacity to enforce such laws, through workshops. The target would be district and central government officials, including those involved in the administration of justice.
iv. Supporting opportunities to strengthen the school curriculum in order to infuse new concepts of environmental management.

The proposed responses with regard to non-focal sectors relate to institutional development and capacity building, studies to provide additional information, as well as review of legislation:

Institutional Development and Capacity Building

i. In order to improve the impact of projects, and reduce *ad hoc* and uncoordinated interventions, the Department of Environmental Affairs must coordinate the development of a comprehensive environmental programme which the Government and donors can support.
ii. Assistance is required to develop specific competencies and skills including climate change modeling, monitoring the GMO content of imported food, environmental law, review of EIA reports. A more comprehensive and prioritised list should be developed by the Department of Environmental Affairs.
iii. There is need to improve capacity to implement the action plans on biodiversity and drought and desertification.
iv. Assistance in the form of staff experienced in EIA is required to improve the capacity of the Department of Environmental affairs to effectively manage the environmental impact assessment process.
v. There is need to support communities and NGOs on capacity building and organisational development in order improve basic capacities and skills that can help them to access and manage funding and to sustain activities beyond project completion.

Studies

vi. The possible overlap of processes which results from the existence of three statutes which require EIA - Environmental Impact assessment Act, 2005, Monuments and Relics Act (No. 17 of 1999) and the Mines and Minerals Act (No. 12 of 2001) should be clarified with a view to having one common approach for undertaking environmental impact assessment.
vii. Investigations on water recharge should be undertaken in order to assure its sustainable supply.
viii. A way of communicating the impact of environmental interventions should be developed

in order to demonstrate the relevance of the sector and improve its profile.

ix. Support ongoing initiatives on the development and adoption of renewable energy in order to reduce over-reliance on foreign sources and improve sustainability.

Legislation

x. Legislation to regulate the use of persistent organic pollutants should be developed to manage them in a comprehensive manner.

xi. Legislation to regulate genetically modified organisms should be developed to deal with the potential hazards that they pose.

Use of the EC Horizontal Budget Lines and EU Facilities

The activities recommended above can be supported under the following themes and facilities:

i. Non-State Actors and Local authorities development, specifically interventions and activities in partner countries through grants to NSAs and local authorities.

ii. Environment and Natural Resources, specifically Working upstream on MDG7; and Promoting implementation of EU initiatives and internationally agreed commitments.

iii. Water Facility to support investigations on ground water recharge.

iv. Energy Facility to support ongoing initiatives on the wider adoption of renewable energy.

ACRONYMS

BCL	Bamangwato Concessions Limited
BOD	Biological Oxygen Demand
CBD	Convention on Biological Diversity
CBO	Community Based Organisation
CITES	Convention on International Trade in Endangered Species
CSO	Central Statistics Office
DEA	Department of Environmental Affairs
DWNP	Department of Wildlife and National Parks
EC	European Commission
EDF	European Development Fund
EIA	Environmental Impact Assessment
GDP	Gross Domestic Product
GEF	Global Environment Facility
GMO	Genetically Modified Organism
LPG	Liquified Petroleum Gas
MEA	Multi-lateral Environment Agreement
MEWT	Ministry of Environment, Wildlife and Tourism
NCSA	National Conservation Strategy Agency
NGO	Non Governmental Organisation
NWMP	National Water Master Plan
PCB	Polychlorinated Biphenyls
POP	Persistent Organic Pollutants
SACIM	Southern African Centre for Ivory Marketing
SADC	Southern African Development Community
SEA	Strategic Environmental Assessment
SHHA	Self Help Housing Agency
UNDP	United Nations Development Programme
UNFCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
WHO	World Health Organisation
WMA	Wildlife Management Area

CONTENTS

APPENDICES

1. INTRODUCTION

This document identifies and assesses the key environmental issues that should be considered during the preparation of the Country Strategy Paper which will outline European Community (EC) co-operation activities in Botswana from 2008 to 2013. The information contained will ensure that environmental considerations are systematically integrated into the EC focal sectors and co-operation objectives and strategies, and also help to establish environment safeguards for all co-operation activities undertaken in Botswana.

The issues are presented in five sections. This first section provides the purpose and approach to the report. Section 2 describes the state of the environment, pressures as well as the key trends. The environmental policy, legislative and institutional framework is described in Section 3. Section 4 outlines cooperation on environmental matters between the Botswana Government and other donors, including the European Union. The conclusions and recommendations are contained in Section 5.

2. STATE OF THE ENVIRONMENT

2.1 Climate

Botswana is located close to the subtropical high-pressure belt of the southern hemisphere and, as a result, is largely arid or semi-arid. Mean annual rainfall ranges from about 250 mm in the south-west to about 650 mm in the north-east. Almost all of the rainfall, which is unreliable and unevenly distributed, occurs during the summer months (October to April) while the period from May to September is generally dry. The average daily maximum temperature ranges from 22 ℃ in July to 33 ℃ in January, with an average daily minimum of 5 ℃ in July and 19 ℃ in January. Extreme temperatures can reach 32 ℃ in July and 43 ℃ in January, resulting in very high evaporation rates.

The country is susceptible to seasonal variations in climate which are influenced by the *La Nina* and *El Nino* events. The latter phenomenon contributes to drought and reduces agricultural production. Drought, therefore, affects the livelihoods of the large population which is dependent on agriculture and the many rural communities that depend on individual water sources which can not withstand prolonged drought. The severity and extent of drought is difficult to predict due to the absence of a fully established monitoring system and scarcity of long-term data sets.

Climate change projections and impact studies suggest that Botswana is highly vulnerable to climate change. Temperatures are predicted to rise by between 1 and 3 degrees during the next hundred years. Scenarios for rainfall include a possible 10 percent increase and a 25 percent decline in precipitation. Generally drier conditions, which are more likely, would reduce agricultural production, result in more severe drought, increase desertification and exacerbate the invasion of thorn and shrub savanna onto grasslands and woodlands. A wetter climate, if it is also warmer, could lead to greater exposure to malaria.

Botswana's ecosystems absorb more greenhouse gases than the country produces (i.e. net sink). The main greenhouse gases that are generated include carbon dioxide, methane and nitrous oxide. Carbon dioxide is generated by agriculture (57%), electrical power generation (17 %), mining and industry (10 %), transport (8 %), domestic cooking and heating (3 %) and government (1 %).

About 50% of methane emissions come from the livestock sector. The remainder comes from coal mining, combustion of wood and power generation. Emissions of nitrous oxide are small and are generated by savanna burning and the explosives in the mining industry.

2.2 Water

There is increasing demand for water as a result of population growth, improvements in living conditions, and economic development. Total water demand is expected to increase from over 120 million cubic metres in 1990 to 335 million cubic metres in 2020. Average daily per capita water consumption in 1990 was estimated to be 40 litres in small villages, between 60 and 120 litres in the large villages, and 170 litres in urban areas. The recent review of the National Water Master Plan estimates daily water consumption per capita during 2006 in towns and large villages to range from 47 litres in Serowe to 131 litres in Gaborone. The major water users are human settlements, livestock, mining and energy and irrigation.

The provision of reliable water supply is costly because Botswana has few surface water sources. This is due to low rainfall, high seepage because of sandy soils, and high evaporation rates. Apart from the Okavango and Chobe, all rivers are ephemeral. Consequently, six dams[1], with a capacity of 497 million cubic metres, have been constructed to improve the reliability of water supply.

The uneven spatial distribution of water has required costly transfers, within the country and from outside, in order to meet demand. (e.g. North-South Water Project). An agreement with the Republic of South Africa provides for the importation of up to 5.6 million cubic metres of water per year from 1992 to 2009 from Molatedi Dam on the Marico River to augment supplies to the south east part of the country.

Because of limited surface water resources, ground water has assumed great importance, especially for rural communities. In 2005, ground water accounted for about 80 percent of total water consumption. The high reliance on ground water poses several challenges. These include the high cost of provision due to the depth at which it is available, high salinity in some places and the absence of precise knowledge on the rate at which it is being recharged, which makes the determination of future availability difficult. Generally, abstraction rates for ground water are thought to exceed recharge. The revised National Water Master Plan identifies several wellfields, such as Dukwi, Ghanzi, Kanye and Serowe in which abstraction is not sustainable.

Another major challenge is to ensure the protection of ground water from pollution. Previous investigations have shown that some of the aquifers, such as Ramotswa wellfield, are contaminated with nitrates due to faecal matter from septic tanks and pit latrines.

Botswana has achieved high levels of water provision although there are occasional problems of lack of reliability of supply in some villages. It is estimated that 97 percent of the population has access to potable water within a distance of 2.5 kilometres. All urban residents have access to safe water either within their homes or within the neighbourhood. Water provided through communal standpipes is free for consumers. A cross-subsidy mechanism which charges large consumers a higher amount per cubic metre has been adopted, in order to help pay for the cost of providing free water to low-income consumers, promote equity and encourage more efficient use of water.

[1] Gaborone, Nnywane, Bokaa, Shashe, Letsibogo, Ntimbale.

Despite being a water scarce country, previous attempts to promote water harvesting by the Botswana Technology Centre and the Rural Industries Innovation Centre have not been widely adopted.

Currently, there is little reuse of water for domestic consumption but substantial quantities (up to 16% of total demand) could be made available through a concerted programme of treatment and re-use of domestic effluent. The augmentation of water supply to the Gaborone area through the reuse of domestic effluent is being considered. It is estimated that 20 million cubic metres of potable water per year could be produced from waste water in Gaborone alone.

Botswana shares four transboundary river basins - Limpopo, Okavango, Orange, Zambezi - which makes cooperation with other riparian countries with regard to their management imperative. This has resulted in formal agreements[2] on the use and management of water resources. Cooperation is aimed at achieving judicious use, environmentally sound development of water resources and equitable access. This approach requires coordination and harmonised approaches for various activities including awareness building and training, as well as data collection and information management.

The scarcity of water has led to an integrated approach to management in Botswana as well as within the SADC region. This requires the consideration of the most environmentally appropriate sources of supply, a balance between the use of ground, surface and recycled resources, consideration of ecological water requirements, as well as the institution of demand management programmes, including through economic instruments.

2.3 Land

Botswana has three categories of land tenure – state land, freehold land and tribal land. State land, which comprises 24.9 percent of the country is made up of national parks, forest reserves and urban settlements. Freehold land comprises 4.2 percent and is used mainly for livestock farming but also on a small scale for housing in urban areas. Tribal land constitutes 70.9 percent and is used mainly for grazing, crop production, settlement, game reserves and wildlife management areas. High priority has been given to the conservation of natural resources in the allocation of land. Currently, 17% of Botswana is set aside as national parks and game reserves, while wildlife utilisation has been earmarked as the main land use on a further 22% (i.e. WMAs).

About two-thirds of the country is covered with Kgalagadi desert sands, which have poor water retention capacity, low nutrient levels, low organic matter content, and are marginally productive. The eastern part of the country has relatively more fertile soils than the west and is where most arable farming occurs. It is estimated that five percent of the country is suitable for arable production.

Crop yields are low due to a combination of poor soils, climatic factors as well as inadequate management practices. In 2003 42,044 metric tons of crops were produced which was markedly less than the national annual requirement.

Pastoral farming (mainly cattle) dominates the agriculture sector. Apart from its benefits in the form of employment and incomes, the sector has resulted in widespread land degradation. Land degradation is a serious environmental problem, especially in eastern Botswana. The main factors that contribute to this problem include a high livestock population, the tendency farmers to

[2] These include Okavango Permanent River Basin Commission (Signed 15 September 1994), Senqu- Orange River Commission (Signed 3 November 2000), Zambezi River Basin Commission (Ratified 24 June 2005), Limpopo Basin Commission (Ratified 24 June 2005).

keep cattle in excess of sustainable stocking levels, the low offtake rate of 12.2% in the communal areas, as well as incidents of bush fire which reduces available forage. The agriculture sector as a whole, however, contributes substantially to employment as it employs 20 percent of the workforce.

Land degradation reduces the productivity of soils, reduces ground water recharge because of increased run-off, results in the replacement of perennial grasses with annual grasses and bush of low nutritional value and ultimately contributes to high livestock mortality in periods of drought. Historically, drought and disease have reduced the size of the cattle herd which has never significantly exceeded 3 million animals. In 2003 the cattle population was 2,028,000 reflecting a decline from the previous year's population of 3,060,000.

Land is becoming increasingly scarce and unaffordable in some places. Self-allocation of land, which is a manifestation of the scarcity and unaffordability of land in Gaborone, has occurred in the nearby villages of Tlokweng and Mogoditshane. In Boteti subdistrict, grazing of cattle in protected areas has been reported and wildlife from the Makgadikgadi Pans National Park has killed livestock from nearby settlements. In Kgatleng District, in the vicinity of Gaborone, fields have been replacing grazing areas. There is also increasing conversion of arable and grazing land to residential use around Gaborone.

2.4 Forest, vegetation, ecosystems

The ecosystems of Botswana can be classified into two main biogeographical zones: the Zambezian zone in the north and the Kalahari–Highveld zone in the drier central-to-southern part of the country. The Zambezian zone contains a greater species diversity than the drier south including the dry deciduous woodlands, dominated by *Baikiaea* and *Colophospermum mopane*; the aquatic and swamp vegetation of the Okavango Delta; and the halophytic vegetation of Makgadikgadi salt pans surrounded by treeless grass savanna. The Kalahari–Highveld zone is characterised by acacia bush, wooded grassland and arid shrub savanna.

Within these broad zones, large areas of land have had little disturbance from human activities and are consequently of national and global ecological importance. These include wetland ecosytems such as the Makgadikgadi pans, the Okavango–Kwando, and the Linyanti–Chobe systems, as well as the surrounding terrestrial ecosystems. The Okavango Delta has already been declared a Ramsar site, elevating its conservation profile and increasing its tourism value

Botswana possesses a wide diversity of wild fauna and flora, with at least 150 species of mammals, over 570 species of birds, 131 species of reptiles, over 82 species of fish, 10 livestock species and 28 crop species. Very few of the species that have been identified are endemic to Botswana. The country supports healthy populations of globally endangered species such as Wild Dog (*Lycaon pictus)*, cheetah (*Acinonyx jubatus*), Wattled Crane *(Grus carunculatus)* and Cape Vulture *(Gyps coprotheres)*. There are also rare species such as sable (*Hippotragus niger)*, roan *(Hippotragus equinus)*, puku *(Kobus vardonii*), Chobe Bushbuck *(Tragelaphus scriptus)*, Red Lechwe (*Kobus leche*), sitatunga (*Tragelaphus spekei*) and reedbuck *(Redunca arundinum)* which occur in localised habitats.

Despite this diversity, wildlife numbers have been declining over several decades due to illegal hunting, drought and the degradation of habitat. The causes of habitat destruction include the construction of infrastructure, unsustainable rangeland management and excessive water abstraction. The Black (*Diceros bicornis*) and White (*Ceratotherium simum*) Rhino appear to have been poached to extinction. However, a small population of White Rhino has been re-established in

a secure sanctuary. A notable exception to the overall decline has been with regard to elephants and which has created pressure on its habitat.

Biodiversity contributes to livelihoods through cash incomes as well as through the use of products derived from it for building, food and medicines. The overharvesting of some veld products, e.g. devil's claw *(Harpagophytum procumbens*), damages their regenerative capacity, thus jeopardising their ability to provide future subsistence and commercial needs.

Despite its advantages, for example in reducing the application of pesticides in agricultural production and increasing the life of produce, modern biotechnology presents risks to people and to biodiversity. These risks include the introduction of potential allergens in otherwise safe food, as well as the creation of superweeds by transferring herbicide tolerance to weeds. Botswana imports agricultural produce, including from countries that apply modern biotechnology, but there is no requirement for disclosure on whether such products have been genetically modified or not.

2.5 Human settlements

The 2001 Population and Housing census estimated Botswana's population at 1,680,863. The rate of population increase between 1991 and 2001 was 2.4 percent representing a decline from the 3.4 percent recorded in the previous decade. The population is predominantly youthful with children under 15 constituting 38.4 percent of the population in 2001. The proportion of females has consistently been higher than that of males and was 51.6 percent in 2001.

Botswana has experienced a high rate of urbanisation. In 2002, an estimated 52 percent of the population was living in urban areas compared with 46 percent in 1991 and 18 percent in 1981.[3] The number of urban areas has increased from two before independence to 24 in 1991, largely as a result of the transformation and reclassification of traditional villages as urban areas.

The development and management of human settlements has largely been influenced through physical planning. Land use plans have been prepared for districts, urban areas and some villages and this has contributed to a largely orderly spatial development. Over crowding is not a widespread phenomenon. However, in the Self Help Housing Areas (SHHA) of Gaborone, occupancy rates are reported to be high because many plot owners accommodate many tenants; with cases of 15 people per plot reported. The recent emergence of the informal sector has created additional pressure on urban planning as many entrepreneurs occupy unsuitable places such as pedestrian walkways, road reserves or locate next to busy roads.

There has also been a high demand to change industrial land to commercial use and civic and community use in Gaborone, possibly because commercial land is not in locations preferred by developers.

The 2001 Census indicates that 77 percent of households in the country had access to adequate sanitation, according to WHO standards. However, on the basis of the more stringent Botswana Government standards as adopted in the Policy for Wastewater and Sanitation Management, only 39 percent of the country has access to adequate sanitation – 53 percent in urban areas, and 18 percent in rural areas.

Littering is a major problem despite ongoing education aimed at reducing it. Botswana imports more than 200 million cans of beverages every year, of which about 55% are recycled. The

[3] The rapid increase is also attributable to the re-classification of some large villages as towns by the time of the 1991 census.

management of waste varies between rural and urban areas. Local authorities collect household and commercial waste in urban areas on a frequent and regular basis and dispose of it in designated areas. In the large villages, 60 percent of residents have their waste collected by the local authority. It is estimated that only 38 percent of all waste generated is delivered to disposal sites. Within most disposal sites, uncontrolled access and scavenging are common. Waste disposal sites often fill up earlier than planned due to limited reduction of waste through recycling and reuse.

Chemicals containing persistent organic pollutants, such as DDT and PCBs, have previously been used in Botswana for tsetse fly and malaria control and in the energy sectors in electricity transformers. The use of such chemicals in the agriculture, health and power sector is reported to have stopped. Overall, there is little information on the quantity of hazardous waste, including on stocks of persistent organic pollutants, contaminated sites, releases into the environment and impacts on human health, but the amounts are thought to be small. Due to the relatively small quantities it is not feasible to operate a hazardous waste disposal facility.

2.6 Energy

The energy sector comprises both conventional and non-conventional energy sources. The former is dominated by electricity, petroleum products and coal, while the latter comprises biomas, primarily in the form of fuelwood. In 2003, petroleum products contributed the largest share of the primary energy supply with 38 percent followed by fuelwood (29 %) and coal (27%). Electricity contributed 6% in the form of imports while LPG contributed 0.98%. Renewable energy sources contributed only 0.03%.For the same year, the net energy supply was dominated by petroleum products (45%) followed by wood (34%), electricity (12%) and coal (9.0%). Electricity generated in the country meets 30 percent of the requirement. The rest is imported, mainly from South Africa.

In 2001, about 23 percent and 77 percent of the urban and rural population respectively relied on fuel wood for cooking. The high reliance on wood for fuel has resulted in significant depletion around towns and major settlements. In 2004, 34 percent of the population was connected to the electricity grid compared to 12 percent in 1998. Access to electricity, however, varied between rural and urban areas with 25 percent and 61 percent respectively connected to the grid in 2004.

2.7 Mineral resources and geology

Botswana is underlain by basement granites which are covered by Karroo sedimentary deposits. These sediments host coal deposits. Diamond-bearing ores are found in volcanic intrusions known as kimberlite dykes.

Diamonds are currently mined at Orapa, Lethakane, Jwaneng and Damtshaa; copper, nickel and cobalt at Selebi–Phikwe and Selkirk; coal at Morupule; and soda ash and salt at Sowa Pan while gold is mined in the Francistown. Due to increased activity in the construction industry, there has been increased quarrying of stones and extraction of clay, gravel and sand with production rising from 2.545 million m^3 in 2003 to over 3.55 million m^3 in 2004. Mineral resources have been largely responsible for the transformation of the Botswana economy and for improvements in living standards over the last four decades. The contribution of minerals to gross domestic product (GDP) has grown from a few percent in 1967/68 to about 37 percent in 2004/5.

Despite the existence of environmental management processes as required by legislation (See Section 3), some mining operations have had negative impacts. For example, between 1986 and

1993, sulphur dioxide emissions at the Selebi Phikwe Mine exceeded the international threshold limit of 13 000 µg m^{-}

With regard to liquid effluent, on average, in 2004, the level of pH, total dissolved solids, sulphates and nickel at the point of discharge of BCL effluent exceeded WHO and Department of Water Affairs allowable concentrations for discharge into ephemeral streams. The average level of contaminants fell within acceptable levels at the furthest point of monitoring, except for nitrates and sulphates. Several old and abandoned mines exist around Francistown and represent a safety risk. A rehabilitation programme was started and in 2004, 33 shafts were rehabilitated.

Botswana experiences low seismic activity. Most of the cases have been reported in the Okavango Delta area. The Kunyere and Thamalakane faults on the southeastern edge of the delta mark the southwesterly extension of the East African Rift system and the tectonic activity of these faults leads to the relatively high micro-seismicity (magnitude < 1). On October 11, 1952 an earthquake of 6.7 magnitude reportedly damaged buildings in Maun.

Seismicity of the rest of Botswana is not as well documented as that of the Okavango region. However, tremors have either been felt or recorded in other areas although these have been relatively small in magnitude and number. On May 18, 2001, an earthquake with a magnitude of 4.1 on the Richter scale was felt in places like Good Hope, Pitsane, Lobatse and Gaborone. Other earthquakes occurred on October 22, 1995, and June 29 1997 in south east and north east Botswana respecively. The former was felt in Gaborone, Mochudi, Morwa, Bokaa, Kopong, Ditshukudu, Lentsweletau, and Ramankung while the latter (magnitude 4.4) was felt in Tutume, Nswazwi, Maitengwe, Nkange, Makaleng, Masunga, and Zwenshambe.

2.8 Archaeological and Cultural Resources

Botswana has a wealth of historical and cultural resources some of which have religious significance. These include areas of global importance, such as the Tsodilo World Heritage site, as well as sites of national and regional importance such as Moremi Gorge in the Tswapong Hills, Lekhubu Island in Sua Pan and Mamuno Rock Engravings. Five sites, including the Gchwihaba Caves which contain archae-palentological deposits, are being considered for inclusion on the World Heritage List. Historical and cultural sites currently do not contribute significantly to tourism since they attract only a small number of visitors.

2.9 Environmental Disasters

Despite generally arid conditions, occasional floods are experienced. In 1995 heavy rainfall over most of the country resulted in floods which affected parts of Kweneng and Central districts. These floods caused 23 human deaths, displaced about 20,000 people temporarily, killed 1,139 goat deaths, and caused damage to property. Floods in early 2000 caused damage worth P1.1 billion.

Crop pests including the African Migratory Locust, the Brown Locust and Quelea at times invade Botswana causing considerable damage to crops and increasing the risk of crop failure and famine. The predominant method of control has been the use of pesticides.

There have been incidents of slight damage to property as a result of seismic activity including in Maun and Good Hope.

3. ENVIRONMENTAL POLICY, LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

3.1 Environmental Policies, Strategies and Legislation

Environmental Policies and Strategies

Several policies and strategies have been developed, typically with public input, to direct Government intervention in environmental management. These policies address agriculture, energy, tourism, wildlife, housing, settlement, water as well as the integrated management of all aspects of the environment. The themes that are common to most of these policies include the improvement of the quality of life, the conservation of the environment, diversification of the economy, value addition to natural resources and job creation. These themes represent various aspects of sustainable development.

The National Conservation Strategy was published in 1990 (Government Paper No.1 of 1990). The policy identifies several priority areas for conservation and development, namely wildlife, land degradation water and pollution, and wood depletion, and proposes the development of a State of the Nation Report as well as the need for environmental impact assessment to support sustainable development.

The Ministry of Agriculture commissioned a review of the agricultural sector in 1988 in the context of declining contribution of the sector to GDP and employment relative to other sectors. The purpose of the review was to:

- Evaluate the performance of the agricultural sector and its contribution to socio-economic goals such as household food security, employment creation, economic diversification and the provision of raw materials for agro-industries;
- identify sectoral policy issues and constraints; and,
- provide policy recommendations to improve the sector's contribution to the economy in general and to the rural population in particular.

The recommendations which the Government accepted are contained in the National Policy on Agricultural Development (Government Paper No.1 of 1991).

The National Master Plan for Arable Agriculture and Dairy Development was published in 2002 to improve and ensure sustainable performance of the agriculture sector. The Master Plan is guided by the objectives of the National Policy on Agricultural Development.

Challenges facing the energy sector in Botswana include: the need to increase access to modern energy services in rural areas, improving energy service delivery, affordability of energy services, especially to low income groups, high imports of electricity, potential supply disruptions of petroleum products, promoting the use of locally available energy sources, and environmental protection. In response to these issues, the draft national energy policy was published in 2006.

The Game Ranching Policy for Botswana is aimed at developing a game ranching industry that will provide a viable and sustainable alternative for livestock enterprises either on its own or in mixed livestock/game ranches.

To accommodate the increasing population and increased levels of urbanisation, the Government developed a National Housing Policy. The goal of this policy is to facilitate the provision of decent and affordable housing for all within a safe and sanitary environment. The key elements that are covered by the policy include institutional capacity building, land, finance, subsidies, rentals, housing standards, building materials and private sector participation.

The National Settlement Policy aims to provide a comprehensive set of guidelines for national physical planning and to provide a framework for guiding the distribution of investment in a way that reflects the settlements' population size, economic potential, level of infrastructure and settlements' role as service centres.

The Tourism Policy was developed because the sector had not been given due prominence, had the potential to create more economic benefits, and because Batswana were not likely to benefit from the sector in the absence of an enabling policy.

Wildlife is no longer available in areas where it used to exist and this has reduced the contribution of wildlife to people's livelihoods despite its importance for tourism. The goal of the Wildlife Conservation Policy is to protect wildlife and encourage the development of a commercial wildlife industry that can be viable over the long term, thereby helping to create economic opportunities, jobs and incomes for the rural population in particular and for the national economy in general.

The principal objectives of the 1992 Water Master Plan were to estimate national water demand until 2020; determine the availability and development potential of resources to meet the identified demand; determine the optimum water resources development programmes and policies, and identify the associated financial, institutional, and legal requirements, as well as the likely social and environmental impacts. The NWMP was recently revised. In addition to the aspects covered in the 1992 plan, the revision considered ecological water demand, country-wide resources and demand, sanitation and re-use options for treated effluent, water demand management, shared water sources management and the impact of HIV/AIDS.

The Strategy for Waste Management was published in 1998. The fundamental principles of the strategy are to minimise pollution by introducing appropriate management measures, ensure that polluters pay for the full costs of their actions and ensure cooperation between stakeholders in the resolution of waste management problems.

The National Master Plan for Waste Water and Sanitation was prepared in 2003 with the aim of assessing the status of sanitation and wastewater and to propose improved management. The assessment has resulted in the development of strategic plans for all primary, secondary and tertiary centres.

The Community-based Natural Resources Management Policy (draft) has formalised an approach to natural resources management which has been pioneered in Botswana since the 1980's. The concept assumes that effective conservation requires the full participation of all stakeholders, and that communities can participate effectively only if they derive benefits from conservation.

The Wetlands Policy aims at ensuring the sustainable use of Botswana's wetlands. One of the key initiatives that support the policy is the ongoing development of a management plan for the Okavango Delta. It will provide a long term vision, a framework and contextual guidelines for all other specific strategies and plans; a determination of levels of use in order to ensure sustainability and protection of the natural resources; and proposition of development options for the management of the entire basin.

A National Biosafety Framework, which should address biotechnology and biosafety issues, is being developed.

Botswana's environmental policies contribute to the attainment of the Vision 2016 goals of creating a prosperous, productive and innovative nation. It is expected that this will be reflected through sustainable economic growth and diversification, the protection of the environment, improvements in per capita incomes, increase in employment, and access to decent housing and shelter. Table 1 summarises the main objectives of the relevant environment policies and strategies.

One of the challenges to the achievement of the country's sustainable development objectives is poverty. Key issues in this regard are the high levels of unemployment which is estimated at 23.8% by the 2002/03 Household Income and Expenditure Survey (especially among young people), higher levels of poverty among women than men[4], and a declining but still high proportion of people living in poverty. A 1997 BIDPA study indicates distinct geographic variations which appear to be influenced by natural resource endowment and climate with Ghanzi, Kgalagadi and parts of Kweneng and Southern Districts particularly less well off than other parts of the country.

The linkages between living standards and environment are, however, complex. Although some environmental impacts, such as illegal hunting and depletion of firewood are typically associated with poverty, it is also apparent that improved livelihoods (e.g. in urban areas) can result in high levels of pollution and unsustainable consumption of resources such as fossil energy and water. The challenge for the country is to improve livelihoods while sustainably using renewable natural resources and improving the efficiency of use of the non-renewable ones as advocated in several policies.

[4] In 1993/94, half of female-headed households, compared to 46 percent of male-headed households, were considered to be poor. The 2002/03 HIES also established that across all strata, male headed households have higher mean disposable incomes than female headed households.

Table 1: Policies on environmental management

POLICY	*POLICY OBJECTIVES*
National Policy on Resource Conservation and Development, 1990	▪ Increase the effectiveness with which natural resources are used and managed and to reduce harmful impacts; and integrate the work of stakeholders in order to improve the development of natural resources through conservation.
National Policy on Agricultural Development, 1991	▪ Improve food security through sustainable methods of production, and increase employment and incomes in the sector through diversification.
National Master Plan for Arable Agriculture and Dairy Development, 2002	▪ Improve and ensure sustainable performance of the agriculture sector.
National Settlement Policy, 1998	▪ Rationalise the distribution and development of settlements thereby achieve spatially balanced development across the country.
Housing Policy, 1999	▪ Facilitate the provision of decent and affordable housing for all within a safe and sanitary environment.
Draft National Energy Policy, 2006	▪ Facilitate economic efficiency; improve access and affordability of energy services; ensure environmental sustainability; ensure security of supply and diversified supply sources; facilitate gender equity; and, improve governance in the energy sector.
Game Ranching Policy for Botswana, 2002	▪ Support economic diversification in rural areas and increase economic returns from wildlife resources outside protected areas including by increasing the participation of Batswana.
Revised National Policy for Rural Development, 2002	▪ Reduce poverty; provide opportunities for income generation and involvement in economic activities; create employment; and, enhance popular participation in the development planning and implementation processes, as a basis for broad-based, balanced and sustainable development.
The Tourism Policy, 1990	▪ Promotes low-volume, high value tourism that benefits rural areas and involves a larger number of citizens.
National Water Master Plan,1992	▪ Guide the development of the water sector by estimating water until 2020; determining the availability and development potential of resources to meet the identified demand; determining the optimum water resources development programmes and policies, and identify the associated financial, institutional, and legal requirements, as well as the likely social and environmental impacts.
Wildlife Conservation Policy, 1986	▪ Provide a framework for the conservation and sustainable utilisation of wildlife by realising the full potential of the wildlife resource, developing a commercial wildlife industry in order to create economic opportunities, jobs and incomes, and increasing the supply of game meat for commercial, subsistence and nutritional purposes.
Strategy for Waste Management, 1998	▪ Minimise and reduce wastes in industry, commerce and households; maximise environmentally-sound waste reuse and recycling, and promote environmentally sound waste collection, treatment and disposal.
Wastewater and Sanitation Management Policy, 2003	▪ Assess the status of sanitation and wastewater in Botswana and propose improved mananagement.

Environmental Legislation

Botswana has several statutes that regulate environmental management. The statutes address issues relating to water, wildlife conservation, the management of waste, tourism, forestry, pollution, the management of land and environmental impacts of development. The key provisions of these laws are summarised in Table 2.

Table 2: Legislation on environmental management

LAW	*RELEVANT PROVISIONS*
Water Act, 1968	▪ Defines water use rights and servitude.
Wildlife Conservation and National Parks Act, 1992	▪ Conservation and management of wildlife and implementation of international conventions for the protection of fauna, management of national parks and game reserves to which Botswana subscribes.
Agricultural Resources Conservation Act, 1974	▪ Makes provision for the conservation and improvement of agricultural resources and establishes the Agricultural Resources Board whose functions include to issue conservation orders and stock control orders.
Herbage Preservation (Prevention of Fires) Act, 1978	▪ Prevention and control of bush fires and other fires.
Tourism Act, 992	▪ Regulates the tourism industry to promote its sustainable development.
Forest Act, 1968	▪ Provides for the protection of forests and forest produce and the establishment of forest reserves.
Environmental Impact Assessment Act, 2005	▪ Provides for environmental assessment to be done for projects and policies.
Monuments and Relics Act, 2001	▪ Enables the protection, preservation and declaration of artefacts, monuments and heritage areas and provides for archaeological impact assessment.
Mines and Minerals Act, 1999	▪ Provides for environmental impact assessment of mining projects.
Waste Management Act, 1998	▪ Provides for the efficient management of waste, as well as the implementation of the Basel Convention.
Town and Country Planning Act, 1980	▪ Provides for the orderly development of land.
Atmospheric Pollution Prevention Act,	▪ Governs air pollution and provides for the declaration of “controlled areas”.
Agrochemicals Act, 1999	▪ Regulates the registration and licensing of agrochemicals, controls their importation, manufacture, distribution, use and disposal and limits pollution of the environment.
Tribal Land Act, 1970	▪ Defines Tribal Land and establishes Land Boards to administer it.
State Land Act, 1966	▪ Defines State land and provides for its disposal

The statutes are comprehensive and cover most aspects of the environment. There is, however, no specific legislation on persistent organic pollutants and genetically-modified organisms (GMOs) to deal with the potential hazards that they pose. Currently, none of the polychlorinated biphenyls (POPs) such as DDT, aldrin and PCBs are banned, or restricted in and there is no effective mechanism for controlling the importation of GMO foods.

A potential overlap arises from the existence of three statutes that deal with the assessment of environmental impacts. These are the Environmental Impact Assessment Act, 2005, Mines and Minerals Act, (No. 17 of 1999) under which the impacts of mining are considered, and Monuments and Relics Act, (No. 12 of 2001) which deals with impacts on archaeological sites, relics and monuments. An Environmental Management Act is being prepared to coordinate and harmonise all the pieces of legislation relating to the environment but it is not apparent how the above issue will be addressed.

There is a good level of compliance with environmental legislation despite some of the challenges referred to in Sections 2.3 and 2.4. Non-legislative instruments for environmental management are not widely applied in Botswana. An exception is in the water sector where urban water tariffs are structured in a way that penalises high consumers in an effort to reduce overall consumption.

3.2 Regulations, Guidelines and Standards

Regulations, guidelines and standards have been developed, or are in the process of being developed, for environmental assessment, drinking water quality, waste water, water reticulation, and urban development.

The Department of Mines has developed guidelines for preparing environmental impact assessment reports for mining projects as well as an outline of the environmental impact report and management plan. The outline provides a list of issues to be considered in preparing an EIA. The National Museum and Art Gallery has developed draft Regulations for the Monuments and Relics Act as well as guidelines for pre-development archaeological impact assessment. Regulations and guidelines for environmental impact assessment are currently being developed for the Environmental Impact Assessment Act, 2005. It is expected that these will identify activities for which an EIA should be done and address the structure and content of several documents that are necessary for the preparation, review, authorisation and effective monitoring of the decisions on EIA, as well as how to undertake strategic environmental assessment.

National guidelines for drinking water quality have been developed by the Department of Water Affairs and are used in conjunction with WHO guidelines. The parameters which are measured include Total Dissolved Solids, Hardness, the concentration of nitrates and fluorides, as well as pH.

Wastewater draft standards which cover pH, various metals, oils and fats, colour, faecal coliforms, temperature, suspended solids as well as BOD have also been developed.

Minimum standards for the reticulation of domestic water supplies have been established by the Department of Water Affairs. The maximum distance between a homestead and a standpipe in urban and peri-urban areas is 200 metres. However, because of financial constraints, or the absence of reliable water supplies, it is not always possible to conform to this standard.

Urban development standards that have been developed by the Department of Town and Regional Planning stipulate minimum plot sizes. For low income housing in urban areas this is 200 square metres.

3.3 Multi-Lateral Environment Agreements

United Nations Environmental Conventions

Botswana has ratified several environmental agreements that have been developed under the auspices of the United Nations. The agreements have informed Botswana's thinking on environmental management. Several of the principles advocated in the MEAs relating to public participation and community management, the precautionary approach to development, integrated management of resources, transboundary impacts and the need for polluters to pay for the full cost of their actions are reflected in policies and legislation. Despite significant achievement in incorporating them into policies and legislation, these principles need to be more consistently applied, to address some of the negative trends affecting natural resources (See Section 2).

The objectives of the UN environmental conventions which Botswana has ratified, as well as date of ratification, are shown in Table 3.

Table 3. UN Environment Conventions and Protocols Ratified by Botswana

NAME OF CONVENTION	*DATE OF SIGNATURE / RATIFICATION / ACCESSION*	*OVERALL OBJECTIVES*
UN Convention on Biological Diversity	Ratified 12 October 1995	▪ Conservation of biological diversity, sustainable use of its components; and fair and equitable sharing of benefits arising from genetic resources.
UN Convention to Combat Desertification and Drought, 1994	Ratified 11 September 1996	▪ To combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973	Accession 14 November 1977	▪ The protection of endangered species prominent in international trade through appropriate control measures and monitoring the status of such species.
Convention on Wetlands of International Importance especially and Waterfowl Habitat (Ramsar Convention), 1971	Accession 12 November 1997	▪ To stem the loss and to promote wise use of wetlands.
Montreal Protocol on substances that Deplete the Ozone Layer, 1987	Ratified 4 December 1991	▪ Ensuring measures to protect the ozone layer.
Basel Convention on the Trans-boundary Movement of Hazardous Wastes and their Disposal, 1989	Accession 20 May 1998	▪ Reduce transboundary movements of wastes; minimise the amount and toxicity of wastes generated and ensure their environmentally sound management; and assist least developed countries in environmentally sound management of the hazardous and other wastes.
UN Framework Convention on Climate Change	27 January 1994	▪ To stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous interference with the climate system.
Kyoto Protocol	Accession 8 August 2003	▪ Countries that ratify this protocol commit to reduce their emissions of carbon dioxide and five other greenhouse gases, or engage in emissions trading if they maintain or increase emissions of these gases.
Vienna Convention for the Protection of the Ozone Layer, 1985	Accession 4 December 1991	▪ Protect human health and the environment against adverse effects from activities which modify the ozone layer.
Cartagena protocol on Biosafety to the Convention on Biological Diversity, 2000	Ratified 11 June 2002	▪ Ensure an adequate level of protection in the safe transfer, handling and use of living modified organisms that may have an adverse effect on the conservation and sustainable use of biodiversity.
Convention on Persistent Organic Pollutants, 2001	Accession 28 October 2002	▪ Protect human health and the environment from persistent organic pollutants.
Convention for the Protection of World Cultural and Natural Heritage, 1972	Acceptance 23 February 1999	▪ Establish an effective system of collective protection of the cultural and natural heritage of outstanding universal value.

Regional Environment Protocols

Botswana is a founding member of the Southern African Development Community and its policies on the environment are consistent with the 1995 SADC Strategy on sustainable development which promotes the integration of regional policies and programmes into a single agenda in order to improve the impact of development. With regard to the environment, several protocols which advocate common and coordinated approaches to natural resource management have been agreed. These are on energy, tourism, wildlife conservation, shared watercourses, fisheries and forestry. The overall objectives and dates of ratification of the conventions are in Table 4.

Initial steps aimed at achieving these goals include the establishment of trans-boundary conservation areas (e.g. Kalahari-Gemsbok Trans-frontier Park),[5] as well as initiatives to jointly manage trans-boundary river basins through river basin commissions (See Section 2). These initiatives should help to ensure that the benefits of these resources are increased and shared more equitably among the relevant countries.

Together with Malawi, Namibia, South Africa and Zimbabwe, Botswana has established the Southern Africa Centre for Ivory Marketing in order to facilitate the harvesting of elephants under a controlled programme which has been sanctioned by CITES.

[5] There are ongoing initiatives to establish two other trans-boundary conservation areas: one in northern Botswana which would include parts of Namibia, Zambia and Zimbabwe and a second in the north-east of the country to include parts of South Africa and Zimbabwe.

Table 4. Environment-related SADC Protocols Ratified by Botswana

NAME OF CONVENTION	*DATE OF SIGNATURE / RATIFICATION / ACCESSION*	*OVERALL OBJECTIVES*
Protocol of Energy, 1996	Ratified 16 July 1997	▪ Harmonise national and regional energy policies, strategies, programmes and standards on matters of common interest based on equity, balance and mutual benefit and cooperate in to ensure security and reliability of energy supply and the minimisation of costs. ▪
Protocol on the Development of Tourism in the Southern African Development Community Region, 1998	Ratified 18 June 1999	▪ Increase the contribution of tourism in the region to sustainable development and job creation by optimising resource usage and increasing competitiveness through collective efforts and ensuring the involvement of all stakeholders.
Protocol on Mining, 1997	Ratified 4 November 1997	▪ Harmonise national and regional policies, strategies and programmes on the development and exploitation of mineral resources through the participation of relevant stakeholders and jointly develop and observe internationally accepted standards of health, mining safety and environmental protection.
Protocol on Wildlife Conservation and Law Enforcement in the Southern African Development Community Region, 1999	Ratified 27 January 2000	▪ To establish within the Region and within the framework of the respective national laws of each State Party, common approaches to the conservation and sustainable use of wildlife resources and to assist with the effective enforcement of laws governing those resources.
Revised Protocol on Shared Watercourses, 2000	Ratified 21 February 2001	▪ Foster closer cooperation for judicious, sustainable and coordinated management, protection and utilisation of shared watercourse and advance the SADC agenda for regional integration and poverty alleviation.
Protocol on Fisheries in the Southern African Development Community Region, 2001	Ratified 14 August 2001	▪ To promote responsible and sustainable use of the living aquatic resources and aquatic ecosystems of interest to State
Southern African Development Community Protocol on Forestry, 2004	Ratified 28 September 2004	▪ Promote the sustainable development, conservation, management and utilisation of all types of forests and trees; promote trade in forest in order to alleviate poverty and generate economic opportunities; and achieve effective protection of the environment, and safeguard the interests of all generations.

Action Plans and National Reports

In support of global obligations and national priorities, several action plans have been developed to build human and institutional capacity with the support of development partners. These include the National Biodiversity Strategy and Action Plan which has been funded by the Global Environment Facility and the United Nations Convention to Combat Desertification and Drought (UNCCD) Action Plan which has been funded by UNDP. The development and implementation of some of the plans has been very slow, partly due to their lack of full integration in departmental work programmes.

Botswana is also collaborating with the focal points of some Conventions to produce National Communication Reports and Capacity Assessments. These include the UNFCCC Second National Communication and the CBD Third National Communication. The reports define the priorities for Botswana in the context of these conventions and guide responses for coordinated and effective environmental management.

Botswana subscribes to the Millennium Development Goals and has reported progress on their achievement. The principal environmental goal is to ensure environmental sustainability by integrating the principles of sustainable development into policies and programmes; reversing loss of environmental resources; reducing by half the proportion of people without sustainable access to safe drinking water; and achieving significant improvement in lives of slum dwellers. The progress achieved with regard to the environmental goal is reflected in the integration of principles of sustainable development into policy and legislation; protection of biodiversity; management of GHGs; access to energy, water and sanitation; as well as in living conditions in settlements (See Section 2 and Section 3.1).

In support of the Revised SADC Protocol on Shared Watercourse which advocates the sustainable, equitable and reasonable utilisation of shared watercourses, as well as coordinated and integrated environmentally sound development and management, the riparian countries have embarked on processes to prepare management plans for the Okavango and Zambezi River Basins.

3.4 Institutional Framework

The management of environmental issues has, over several decades, been the responsibility of several ministries. A new Ministry of Environment, Wildlife and Tourism was created in 2002 and brought together departments, from various existing ministries, with responsibilities for environmental management and natural resources conservation. The need for this new ministry emanated mainly from the absence of an independent ministry to effectively coordinate all issues pertaining to environment conservation and protection. The absence of a coordinating ministry resulted in fragmented and narrow approaches, as well as absence of concrete actions toward addressing environment concerns. Further institutional restructuring occurred in 2005 and resulted in the ministry being constituted by the following core departments: Environmental Affairs, Waste Management and Pollution Control, Forestry and Range Resources, Meteorological Services, Tourism and Wildlife and National Parks.[6]

[6] Other departments in the ministry that are not directly involved in environmental management are Department of Ministry Management and Department of Planning, Statistics and Research.

The elevation of the National Conservation Strategy Agency (NCSA) to a full Department of Environmental Affairs during this process should ensure its improved effectiveness. The DEA will serve as a coordinating body with statutory authority to coordinate strategies and policies that relate to environmental management and sustainable development.

It is envisaged that as part of the restructuring process, an Environmental Affairs Council will be constituted to assume the functions of the former NCSA Board, as well as those functions of the Agricultural Resources Board relating to coordination and compliance, and oversee an Environmental Appeals Board. The DEA will also serve as the secretariat to the Environmental Affairs Council, a function that was previously undertaken by the NCSA.

Other government institutions involved in aspects of environmental management, which are located outside the Ministry of Environment, Wildlife and Tourism, include the National Herbarium, the Department of Energy Affairs, and the Department of Water Affairs, the National Museum and Art Gallery which administers archaeological impact assessment, and the Department of Mines which administers EIA for mining.

The Town and Country Planning Board as well as Land Boards which are based in the districts consider and give planning permission for development in urban and rural areas respectively. In doing so they consider environmental implications.

Several parastatal organisations are involved in activities relating to environmental management. These include Water Utilities Corporation which provides water to urban areas, Rural Industries Promotions Company (solar energy and water harvesting), Botswana Technology Centre (solar energy), as well as various institutes and departments of the University of Botswana which conduct research in hydrology and water management, ecology, tourism management, natural resources management, and indigenous plants and animals.

Non-Governmental organisations (NGOs) and community-based organisations (CBOs) have played an increasingly important role in supporting or implementing community projects, disseminating information and advocating alternative points of view, thereby making some issues prominent on the environment agenda. These organisations include Thusano Lefatsheng, Veld Products Research and Development, Permaculture Trust of Botswana (commercialisation of some natural resources) and Kalahari Conservation Society (advocacy and research). Although there are exceptions, the impact of NGOs and CBOs has been limited because of inadequate management skills and financial resources which have in turn resulted in the lack of sustainability of many of their initiatives.

Private sector organisations such as Shell Oil Botswana, Cresta Hospitality Botswana, Kgalagadi Management Trust, and Debswana, have provided funding to natural resource conservation activities.

Several mechanisms have been established to assist the coordination of environmental issues. The National Climate Change Committee which is an advisory body chaired by the Director of Meteorological Services guides the climate change secretariat in planning and executing projects. It has representation from NGOs, the Government, and parastatal organisations.

The Rural Development Council, which is chaired by the Minister of Finance and Development Planning, was established in 1972. The Membership comprises heads of Ministries and representatives from the Non-Governmental Organisations and the Private Sector. The responsibilities of the Council include the coordination of policies and programmes for rural development, monitoring of the implementation of cross cutting policies that affect rural

development, and advocacy on rural development issues. The Council is supported by the Rural Extension Coordinating Committee, the Natural Resources Technical Committee, which also serves as the secretariat, the Inter-Ministerial Drought Committee, and the National Food Strategy Monitoring Group.

Responses to environmental disasters are coordinated by the Office of the President.

3.5 Integration of environmental concerns into the main sectors

Environmental issues are integrated into the main sectors through the National Development Plan, cross-cutting policies, strategies and plans, the environmental assessment process as well as through the education system.

Like previous national development plans, National Development Plan 9 – which covers the period 2003/04 to 2008/09 - identifies issues relating to the environment and sustainable development, including the introduction of EIA legislation, the development of management plans for some ecosystems[7] as some of the priority areas. The plan also includes a chapter on the environment. Other sector chapters indicate how the individual sectors will incorporate environmental issues. NDP 9 also advocates the inclusion of environmental considerations in the preparation of national accounts which will reflect that natural resources are assets, like capital stocks. A consultancy is being commissioned by the DEA to review some environmental economic instruments and initiate a regular assessment of the state of natural capital.

The poverty reduction strategy, which was published in 2003, seeks to guide and coordinate the various poverty-related initiatives across the various sectors. It contains a situational analysis of the problem, including policy gaps, strengths and weaknesses in the design, planning and implementation of programmes, including issues of coordination, institutional arrangements, and stakeholder participation. The strategy recognises that environmental conditions contribute to poverty.

Environmental issues have also been integrated into development projects through environmental impact assessment (EIA). The EIAs which have been conducted since the 1980s have primarily been on the water sector, but have also included agriculture and the road sector. The private sector has also commissioned several EIAs especially for mining projects.

Botswana has also adopted SEA-type approaches to the development of plans in the water sector. These include the development of the National Water Master Plan as well as management plans for the Okavango basin and delta. The Department of Town and Regional Planning intends to incorporate SEA into development planning to conform with the Environmental Impact Assessment Act. SEA takes account of both cumulative and long-term environmental impacts of plans, policies and programmes, thereby more effectively enhancing their outcomes, and addressing root causes rather than the symptoms of development problems.

Environmental issues have also been integrated into the National Research, Science and Technology Plan. The areas of research proposed in the plan cover several sectors including eco and cultural tourism, mining, water, energy and agriculture.

Efforts have also been made to integrate environmental issues in district planning. The revised Planning Officer's Manual (1997 draft), among other things, sets out the need to address environmental issues in the early stages of development planning. The principles contained in

[7] Okavango, Makgadikgadi, and Linyanti-Chobe.

the manual have been applied in preparing development plans and have helped to address environmental implications more explicitly.

A draft Environmental Planning Manual, which provides a detailed process for integrating environmental issues in district planning as well as a revised version of the District Planning Handbook, which summarises the key aspects informed local authority plans.

The ongoing development of an Environmental Framework for District Development, which includes the development of indicators for different sectors, should improve the incorporation of environmental issues into the planning cycle.

The trends and relationships between various aspects of the environment have also been discussed in the State of the Environment report which was published in 2002. The report and outlines the different attributes of Botswana's environment, as well as the different types of human activities that have an impact on the environment. The information provided is largely adequate to guide policy direction but general problems include (i) the absence of consistent and long term, (ii) absence of data at district level to enable more informed decisions at that level, and (iii) varying methodologies for collection. A district environment framework has been commissioned to enable the districts to provide consistent data which can be used for both district and national planning and support future state of the environment reports.

The Department of Environmental Affairs initiated an environmental education programme in the 1990s and has also been instrumental in infusing environmental issues into the primary and secondary school curriculum in collaboration with the Ministry of Education.

3.6 Capacity

Capacity in the public service, the private sector and among NGOs affects effective environmental management. Botswana has undertaken activities to build capacity for the implementation of the UNFCCC and CBD, but also in other areas such as environmental impact assessment. Despite these efforts as well as the institutional mechanisms that have been established, individual, institutional and systemic capacity constraints are still perceived. These constraints include:

i. Lack of technical skills in specialised areas (eg. Operating climate change models and interpreting results; monitoring the GMO content of imported agricultural produce
ii. Lack of specific competencies, such as environmental law, or reviewing EIA reports.
iii. The absence or inadequacy of holistic thinking within the different disciplines involved in environmental management, which is increased by limited team work.
iv. Lack of prioritisation of issues that should be addressed.
v. Fragmented responsibilities across institutions (E.g for biodiversity management).
vi. Insufficient coordination between Government institutions.
vii. Inadequate financial and technical capacity within community organisations.
viii. Absence of measures of the impact of environmental interventions, and
ix. Absence of clear leadership on environmental issues at the national level.

Some documents suggest that current staff establishments do not allow some environmental institutions to effectively implement their mandates. Within the DEA, the management of the EIA process in accordance with the Environmental Impact Assessment Act, 2005 requires a larger number of experienced staff. Capacity limitations in some technical areas also exist within the private sector. Many EIA consultants lack experience because of the relatively few EIAs that have been carried out.

The overall capacity situation is complicated further by the likely erosion of skills due to HIV and AIDS. Botswana is one of the countries most affected by HIV and AIDS in the world. Like other sectors, the impact of HIV and AIDS on the environment and natural resources sector could be manifested through (i) reduced productivity, high staff turnover, and shortage of skills leading to a poorer service, (ii) higher training costs for institutions to replace or re-skill staff, and (iii) delays in the implementation of key environment projects due to loss or morbidity of specialist staff.

Strategies for managing HIV/AIDS exist in some of the institutions that are responsible for environmental management, such as the Department of water Affairs and the Water Utilities Corporation. The key features of the responses include the prevention of infection, support to individuals who are affected or infected, the provision of information to improve understanding to the pandemic and to reduce the stigma associated with it, as well as the mainstreaming of HIV and AIDS in the business process.

4. EU AND OTHER DONOR CO-OPERATION WITH THE COUNTRY FROM AN EVIRONMENTAL PERSPECTIVE

4.1 Donor-Supported Environmental Activities

Projects to improve the management of natural resources have been implemented with the support of development partners. Ongoing projects which are supported by the European Union, UNDP and USAID, are in the areas of wildlife conservation and management, capacity assessment, energy, climate change, rangeland and biodiversity management, environmental law and water resource management. Although these interventions are related and are often complimentary, they have not been developed as part of a single coherent programme. This sometimes creates overlaps and the absence of synergy between them.

In implementing these projects, technical assistance is procured to complement capacity available in the implementing institutions. The transfer of skills from project staff does not always occur thereby affecting the sustainability of these projects as well as their integration in institutional programmes.

European Union

The European Development Fund (6^{th}, 7^{th} and 8^{th}) support focused in the past on conservation, management and sustainable utilisation of rangelands, forests and wildlife, and maximisation of benefits accruing to the rural communities in areas of the country with limited alternative sources of employment and income. In particular EDF has financed since the 1990's three consecutive wildlife programmes and projects for a total of 27.2 Million Euro: *Wildlife Conservation and Utilisation in Central & Southern Botswana Project, Wildlife Conservation in Northern Botswana and the Wildlife Conservation and Management Programme*, which is ongoing. The interventions are aimed at conserving Botswana's wildlife resources and enhancing the sector's contribution to economic diversification through:

- Support to the management of protected areas and their surroundings;
- Institutional strengthening of the Department of Wildlife and National Parks;
- Accruing benefits to the local communities through the sustainable use of natural resources.

The protected areas targeted by the programmes are Moremi Game Reserve, Chobe National Park, Makgadikgadi and Nxai Pans National Parks, Central Kalahari and Khutse Game Reserves, Kgalagadi National Park. Further interventions have concerned the tourism and forestry sector, through the *Community Forestry Development Project* and the *Botswana Tourism Development Programme.* The latter assisted in the development of the Botswana Tourism Master Plan and the Eco-Tourism Strategy, both of which aimed at diversifying tourism activities and promoting community participation.

The ongoing Wildlife Conservation and Management Programme in particular aims at strengthening the capacities of the Department of Wildlife and National Parks and to improve its efficiency and effectiveness in managing wildlife resources. Special attention is paid to institutional strengthening, training and capacity building. The programme also aims at supporting community-led projects enabling them to benefit from the sustainable use of wildlife and natural resources within the targeted areas.

United Nations Development Programme

The UNDP Country Programme for Botswana (2003 - 2007) addresses several development challenges, one of which is environmental protection. The support in the areas of environmental management is provided through several projects and programmes including (i) Environment Programme Support Document, (ii) National Capacity Self Assessment Project, (iii) Biodiversity Enabling Activities Add On Programme, (iv) Enabling Activities Project for the Preparation of Botswana's Second National Communication to the United Nations Framework Convention on Climate Change, (v) Identifying and Overcoming Barriers to the Widespread adoption of Photovoltaic Rural Electrification, (vi) Enabling Activities Programme to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants in Botswana, (vii) Partnership for the Development of Environmental Law in Africa, (viii) Incorporating Non-motorised Transport Facilities in the City of Gaborone, (ix) Management of Indigenous Vegetation for the Rehabilitation of Degraded Rangelands and (x) Southern Africa Biodiversity Support Programme. Most of the projects are financed by the GEF to which the EU is a major contributor. The objectives of the projects and programme are summarised in Table 6.

There is some overlap between the activities of some of these projects in relation to capacity development and assessment (E.g. Environment Support Programme, National Capacity Self Assessment, and Biodiversity Enabling Activities Add On Programme). This is being resolved. It, however, highlights the need for the development of a single environment programme. This will reduce *add hoc* interventions that are not consistent with the programme, thereby improving focus.

Table 6: Current UNDP Environmental Projects

PROGRAMME/ PROJECT	*OBJECTIVES*
Environment Programme Support Document	▪ Support MEWT and other organisations so they are better able to satisfy their mandates for environmental protection and management. ▪ Strengthen the systems for conservation and sustainable use of natural resources. ▪ Establish a national environmental information management system, which can be applied to national development planning, environmental protection and management, research and other applications, within and outside Government. ▪
National Capacity Self Assessment project	▪ Support the current Botswana Government/UNDP Environment Programme for 2003-2007 by taking stock of Botswana's existing capacities, identifying capacity gaps at the individual, institutional, and systemic levels, and proposing ways of creating greater synergy cross cutting issues and addressing in implementing the conventions.
Biodiversity Enabling Activities Add On Programme	▪ Prepare Botswana's Third National Report to the Conference of Parties of the CBD. ▪ Assess National Capacity for the implementation of general measures for *in-situ* and *ex-situ* conservation and sustainable use, including national plans, strategies and legislation. ▪ Assess national capacity to implement initial assessments and monitoring programmes, including taxonomy. ▪ Implement the Clearing House Mechanism.
Enabling Activities Project for the Preparation of Botswana's Second National Communication to the United Nations Framework Convention on Climate Change	▪ Develop and enhance national capacities and facilitate the process of mainstreaming climate change issues into national planning and policy, thus enabling the country to deal with climate change as an issue of sustainable development.
Identifying and Overcoming Barriers to Widespread adoption of Photovoltaic Rural Electrification	▪ Improve people's livelihoods by improving their access to and affordability of modern energy services and assist the Government of Botswana with the initiation of a renewable energy programme for the rural areas, thus reducing the dependency on imported fossil fuel.
Enabling activities to facilitate early action on the implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in Botswana	▪ Strengthen national capacity and capability to prepare a National Implementation Plan for the management of POPs.
Partnership for the Development of Environmental Law in Africa (PADELIA)	▪ Review existing laws and comparative analysis for the development/strengthening and harmonization of EIA laws, regulations and guidelines. ▪ Develop/strengthen and harmonise Bio-safety laws, regulations and guidelines. ▪ Undertake a review and comparative analysis for the development/strengthening and harmonisation of hazardous wastes

PROGRAMME/ PROJECT	*OBJECTIVES*
	management law and regulations.
Incorporating Non-motorised Transport Facilities in the City of Gaborone	▪ Promote the significant use of substantially cheaper non-motorised modes of transport particularly walking and cycling in Gaborone. ▪ Encourage and facilitate a modal shift from motorised transport to non-motorised transport modes for relatively short distances that can be covered by such modes.
Management of Indigenous Vegetation for the Rehabilitation of Degraded Rangelands	▪ Develop indigenous management systems for the rehabilitation of degraded land.
Southern Africa Biodiversity Support Programme	▪ Promote conservation and sustainable use of biological diversity in Southern Africa by strengthening regional biodiversity planning, interstate co-operation, and information exchange.

United States Agency for International Development

The USAID-Southern Africa Mission in Botswana is supporting the Okavango Integrated River Basin Management project. The project aims to support the OKACOM mandate of promoting coordinated, regional water resources development objectives for the Okavango river basin, while addressing the legitimate social and economic needs of these three riparian states - Namibia, Botswana and Angola. The project has three components: enhance organisations' ability to manage river basin resources; improve information systems for biodiversity and natural resource management, and improve community management and local governance of natural resources. Incorporated in these three components are three cross-cutting themes – highlighting HIV/AIDS within the basin, ensuring the participation of women and disadvantaged groups, and promoting the participation of the private-sector.

4.2 Donor Coordination

Donor coordination in Botswana is limited and this is largely attributable to the relatively small scale of official development assistance to the country. Coordination among donors takes place at the International Partners Forum, which serves as an avenue for sharing information and exchanging views about development cooperation programmes. All foreign missions with representation in Botswana, as well as UN agencies, are invited to the meetings. Some donors perceive the Forum only as an opportunity to exchange information, rather than initiate programme coordination.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

State of the Environment

Botswana faces several challenges in effectively managing the environment. With regard to climate, aridity together with seasonal variations which are influenced by the *La Nina* and *El Nino* events makes the country vulnerable to drought. These conditions affect water supply as well as agricultural production on which a large proportion of the population is dependent. Although wetter conditions are possible, drought conditions are likely to increase over the long term because of climate change.

Water demand has increased due to population growth, improvements in living conditions, and economic development. The major challenges with regard to water supply include ensuring the protection of ground water from pollution; developing a better understanding of ground water recharge, its quality, distribution, and available quantities; making domestic effluent available and accepted for reuse; and applying a comprehensive demand management programme to improve the efficiency of water use.

The provision of reliable water supply is costly because Botswana has few surface water sources due to low rainfall, high seepage due to sandy soils, and high evaporation rates. The uneven spatial distribution of water has required costly transfers, within the country and from outside. Despite the above challenges, Botswana has achieved high levels of potable water provision.

High priority has been given to the conservation of natural resources and this is reflected in the proportion of land allocated to protected areas. There are, however, several problems that relate to land management. The amount of land that is suitable for arable farming is small due to generally poor soils which, together with climate and other factors relating to management, result in low productivity of crops. Consequently, the country imports most of its food.

Land degradation - due to a high livestock population, the tendency farmers to keep cattle in excess of sustainable stocking levels, the low offtake rate, as well as incidents of bush fire which reduce available forage - is widespread.

Self-allocation of land, which is a manifestation of the scarcity and unaffordability, has occurred. Land use conflicts have also occurred and relate to grazing in protected areas and the killing of livestock by wildlife. There is also increasing conversion of arable and grazing land to residential use.

The priority given to the conservation of natural resources is also reflected in the existence of several ecosystems of regional and global importance, including the Okavango Delta as well as the existence of global threatened animal species. These successes are, however, dampened by the decline in the numbers of most animal species. Apart from its importance for tourism, biodiversity supports subsistence livelihoods. Biodiversity is, however, being threatened by rangeland degradation, inappropriate harvesting methods, habitat destruction, climate change and the potential introduction of genetically modified organisms.

The development and management of human settlements has largely been orderly due to physical planning. However, new pressures in urban areas are reflected through increasing occupancy rates because of a high rate of urbanisation and disregard for regulations that govern land use.

The country has achieved high levels of access to sanitation with better provision in urban than rural areas. Littering is still widespread despite efforts to control it. The management of waste

varies between rural and urban areas with the latter receiving a more reliable and predictable service.

There is little information on the quantity of hazardous waste but chemicals containing persistent organic pollutants have previously been used to control disease and pests and in power transmission.

The energy sector is dominated by electricity, petroleum products, coal and biomas. The high reliance on fuel wood especially in rural areas has resulted in land degradation around large villages and towns. There is little use of renewable energy despite ongoing efforts to introduce it.

Mineral resources have been largely responsible for the transformation of the Botswana economy and for improvements in living standards. Some mining operations have, however, had negative impacts including high levels of emissions, high concentrations of various metals in discharged effluent, and unrehabilitated mines.

Botswana has a wealth of cultural and archaeological resources but their contribution to tourism is currently small. This requires redress as part of efforts to diversify the economy and to develop a better appreciation of culture and history.

Apart from earth tremors which have caused minimal damage, the few environmental disasters that have been experienced include floods, and crop pests.

Environmental Policy, Legislation and Institutional Framework

A comprehensive set of policies and strategies on environmental management generally reflect concerns with issues of sustainable development and contribute to the goals of Vision 2016. There is, however, no specific legislation to regulate genetically modified organisms or the use of persistent organic pollutants. There is also possible overlap between the three laws that govern environmental impact assessment - Environmental Impact Assessment Act, Mines and Minerals Act, and Monuments and Relics Act and it is not yet apparent how the proposed Environmental Management Act will address this. Non-legislative instruments for environmental management are not widely applied in Botswana, but overall there is a good level of compliance with environmental legislation. One of the major challenges to the achievement of the country's sustainable development objectives is poverty. Non-legislative instruments for environmental management are not widely applied in Botswana.

Regulations, guidelines and standards have been developed, or are in the process of being developed, for environmental assessment, drinking water quality, waste water, water reticulation and urban development. These stipulate specific environmental requirements and process that should be followed to improve environmental management.

Botswana has ratified several environmental agreements that have been developed under the auspices of the United Nations as well as through the Southern African Development Community, and which aim at achieving coordinated responses to environmental issues in order to obtain greater impact.

Action plans have been developed to build human and institutional capacity especially with regard to the implementation of the conventions but also in other areas such as environmental impact assessment. National reports that show progress towards achieving agreed targets have also been prepared.

The Government, NGOs, parastatal institutions and private sector organisations support environmental management. In particular, the impact of NGOs and CBOs has been limited because of inadequate management skills and financial resources which have resulted in lack of sustainability of many initiatives. There has been a concerted effort to rationalise environmental institutions. This should reduce overlaps, clarify roles and improve their effectiveness.

Significant achievements have been made in integrating environmental issues into other sectors through policies, plans, the education curriculum, as well as through a strategic approach to environmental assessment.

Despite past and ongoing efforts, individual, institutional and systemic capacity constraints are still perceived. Some specialised skills and competencies are lacking as well as the ability to prioritise, manage and direct work so that it can have a more profound impact. The capacity constraints are made more acute by the impact of HIV and AIDS.

Donor Cooperation
Botswana has implemented natural resources projects with donor support. The current project are in several areas such as wildlife conservation, capacity assessment, energy, climate change, rangeland and biodiversity management, environmental law and water resource management. The long term impact of these projects may be affected by the dependence on short term project staff and the difficulty with fully integrating projects in institutional programmes.

5.2 Recommendations

The following recommendations respond to the issues identified in the preceding sections:

Focal Sectors and Response Strategies
It is envisaged that Human Development, mostly through formal and informal education and training, will be the focal area for EDF 10 with funds channelled through sector budget. By mainstreaming environmental concerns, human development can support environmental protection in the following ways:

i. Enabling managers and policy makers to appreciate the economic value of natural resources and the impact of current patterns of use through formal academic training, short courses and targeted workshops. The target for this support would be staff in central government departments and district offices responsible for economic matters and the management of natural resources. The understanding gained will allow the issues to be incorporated in development plans and other sector plans.
ii. Developing capacity to improve data management and environmental monitoring and reporting in the districts. This will help to integrate environmental issues into the district planning process and also provide reliable information for the State of the Environment reporting.
iii. Improving the understanding of environmental legislation and the capacity to enforce such laws, through workshops. The target would be district and central government officials, including those involved in the administration of justice.
iv. Supporting opportunities to strengthen the school curriculum in order to infuse new concepts of environmental management.

Non-Focal Sectors

The proposed responses relate to institutional development and capacity building, studies to provide additional information, as well as review of legislation:

Institutional Development and Capacity Building

i. In order to improve the impact of projects, and reduce *ad hoc* and uncoordinated interventions, the Department of Environmental Affairs must coordinate the development of a comprehensive environmental programme which the Government and donors can support.

ii. Assistance is required to develop specific competencies and skills including climate change modeling, monitoring the GMO content of imported food, environmental law, review of EIA reports. A more comprehensive and prioritised list should be developed by the Department of Environmental Affairs.
iii. There is need to improve capacity to implement the action plans on biodiversity and drought and desertification.
iv. Assistance in the form of staff experienced in EIA is required to improve the capacity of the Department of Environmental affairs to effectively manage the environmental impact assessment process.
v. There is need to support communities and NGOs on capacity building and organisational development in order improve basic capacities and skills that can help them to access and manage funding and to sustain activities beyond project completion.
vi. Studies
vii. The possible overlap of processes which results from the existence of three statutes which require EIA - Environmental Impact assessment Act, 2005, Monuments and Relics Act (No. 17 of 1999) and the Mines and Minerals Act (No. 12 of 2001) should be clarified with a view to having one common approach for undertaking environmental impact assessment.
viii. Investigations on water recharge should be undertaken in order to assure its sustainable supply.
ix. A way of communicating the impact of environmental interventions should be developed in order to demonstrate the relevance of the sector and improve its profile.
x. Support ongoing initiatives on the development and adoption of renewable energy in order to reduce over-reliance on foreign sources and improve sustainability.

Legislation
xi. Legislation to regulate the use of persistent organic pollutants should be developed to manage them in a comprehensive manner.
xii. Legislation to regulate genetically modified organisms should be developed to deal with the potential hazards that they pose.

Use of the EC Horizontal Budget Lines and EU Facilities

The EU budget line 21 02 05 “Environment in Developing Countries and Tropical Forests” provides financial resources for activities to (1) promote the full integration of the environmental dimension in the development process of developing countries, and (2) promote the conservation and sustainable management of tropical forests and other forests in developing countries.

The overall purpose of support though this budget line is to encourage measures carried out in the developing countries in the field of the environment and contribute to the integration of environment concerns in all EC development cooperation programmes.

The activities recommended above can be supported under the following themes and facilities:

i. Non-State Actors and Local authorities development, specifically interventions and activities in partner countries through grants to NSAs and local authorities.
ii. Environment and Natural Resources, specifically Working upstream on MDG7; and Promoting implementation of EU initiatives and internationally agreed commitments.
iii. Water Facility to support investigations on ground water recharge.
iv. Energy Facility to support ongoing initiatives on the wider adoption of renewable energy.

Opportunities for Coordination on Environmental Issues with Donors

The development of an environmental programme with related and complementary components, which can be supported by individual donors is a possible way of ensuring coordinated donor activity in relation to environmental management. This would complement the current information sharing sessions between the Government and donors.

Environmentally-relevant Indicators (to be used in the NIP)

SECTOR	***INDICATOR***
Water	▪ Proportion of the Population with Sustainable Access to potable water according to Botswana Government Standards ▪ Percentage of waste water recycled for potable use
Land	▪ Degraded land as a percentage of national territory
Forests, vegetation, ecosystems	▪ Protected land as a percentage of national territory
Human settlements	▪ Proportion of the Population with Access to Improved Sanitation ▪ Number of residents per dwelling
Energy	▪ Percentage of population with access to electricity ▪ Percentage of population using renewable energy ▪ Carbon Dioxide Emissions (per capita)

APPENDIX 1: COUNTRY STRATEGY PAPER ENVIRONMENTAL ANNEX SUMMARY

State of the Environment

SECTION	*ISSUES*
Climate	▪ Frequent drought due to seasonal variations in climate. ▪ The likelihood of drier future conditions due to predicted global warming with impact on water supply and agricultural production.
Water	▪ Increasing water demand due to population growth, improvements in living conditions, and economic development. ▪ High cost of reliable water supply because of few surface water sources due to low rainfall, high seepage due to sandy soils, and high evaporation rates. ▪ Inadequate knowledge on the rate of ground water recharge. ▪ Protecting ground water from pollution.
Land	▪ Rangeland degradation due to a high livestock population, the tendency farmers to keep cattle in excess of sustainable stocking levels, a low offtake rate, as well as incidents of bush fire. ▪ Self allocation of land in peri-urban areas which is a manifestation of the scarcity and unaffordability of land. ▪ Competition for land between livestock and wildlife. ▪ Reduction is grazing and arable land due to consersion to residential use.
Forest, vegetation, ecosystems	▪ Decline in populations of most wildlife species due illegal hunting, drought, and habitat destruction. ▪ Threats to biodiversity due to climate change, land degradation and potential introduction of GMOs.
Human settlements	▪ Pressure on urban services and infrastructure due to a high rate of urbanisation. ▪ Littering, and inadequate management of waste in rural areas. ▪ Lack of adequate information about chemicals containing persistent organic pollutants and hazardous waste in general.
Energy	▪ Land degradation around towns and major settlements due to the high use of fuel wood. ▪ High level of dependence on imported electricity. ▪ The low use of renewable energy.
Minerals and geology	▪ Environmental impacts, such as emissions and waste discharges as well as abandoned mines.
Archaeological and cultural heritage	▪ Small contribution of archaeological and cultural heritage to tourism.
Environmental disasters	▪ Occasional seismic activity, floods and the invasion of crop pests.

Environmental Policy, Legislative and Institutional Framework

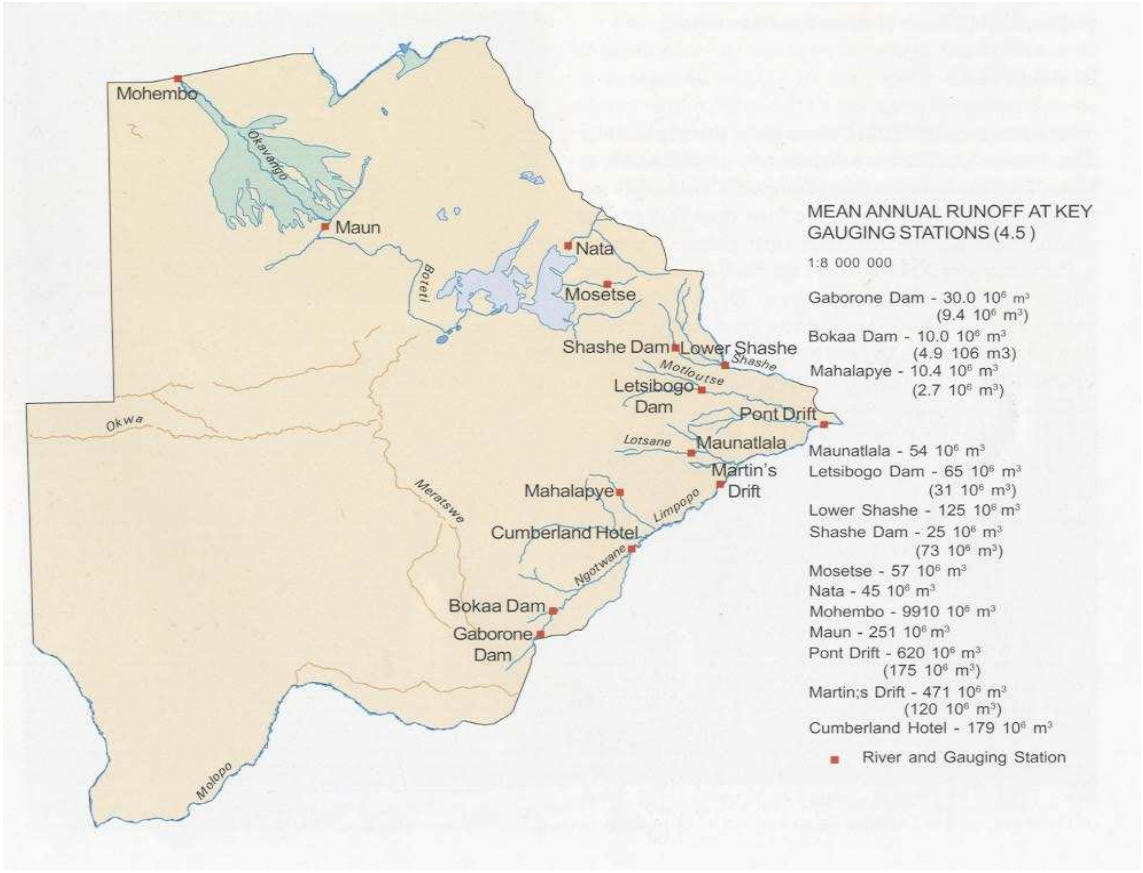
SECTION	*ISSUES*
Environmental, Policies, Strategies and Legislation	▪ Lack of specific legislation to regulate persistent organic pollutants and genetically modifieds organisms. ▪ Possible overlap between the EIA provisions of the Monuments and Relics Act, Mines and Minerals Act, and Environmental Impact Assessment Act. ▪ Impact of living standards on natural resource degradation. ▪ There is need to further improve compliance with environmental laws.
Regulations, Guidelines and Standards	▪ -
Multi-lateral Environmental Agreements	▪ Slow development and implementation of action plans.
Institutional Framework	▪ Limited effectiveness of NGOs and CBOs.
Integration of Environmental Concerns	▪ Absence of detailed and consistent long term data for monitoring.
Capacity	▪ Lack of experience in reviewing EIA reports within the Department of Environmental Affairs. ▪ Lack of technical skills in specialised areas, e.g. climate change modelling, monitoring GMO content of imported agricultural produce. ▪ Lack of specific competencies, e.g. Environmental law. ▪ The absence or inadequacy of holistic thinking within the different disciplines involved in environmental management, which is increased by limited team work. ▪ Lack of prioritisation of issues that should be addressed. ▪ Fragmented responsibilities across institutions (E.g for biodiversity management). ▪ Insufficient coordination between Government institutions. ▪ Inadequate financial and technical capacity within community organisations. ▪ Absence of measures of the impact of environmental interventions. ▪ Absence of clear leadership on environmental issues at the national level. ▪ Likely impact of HIV and AIDS on staff capacity.

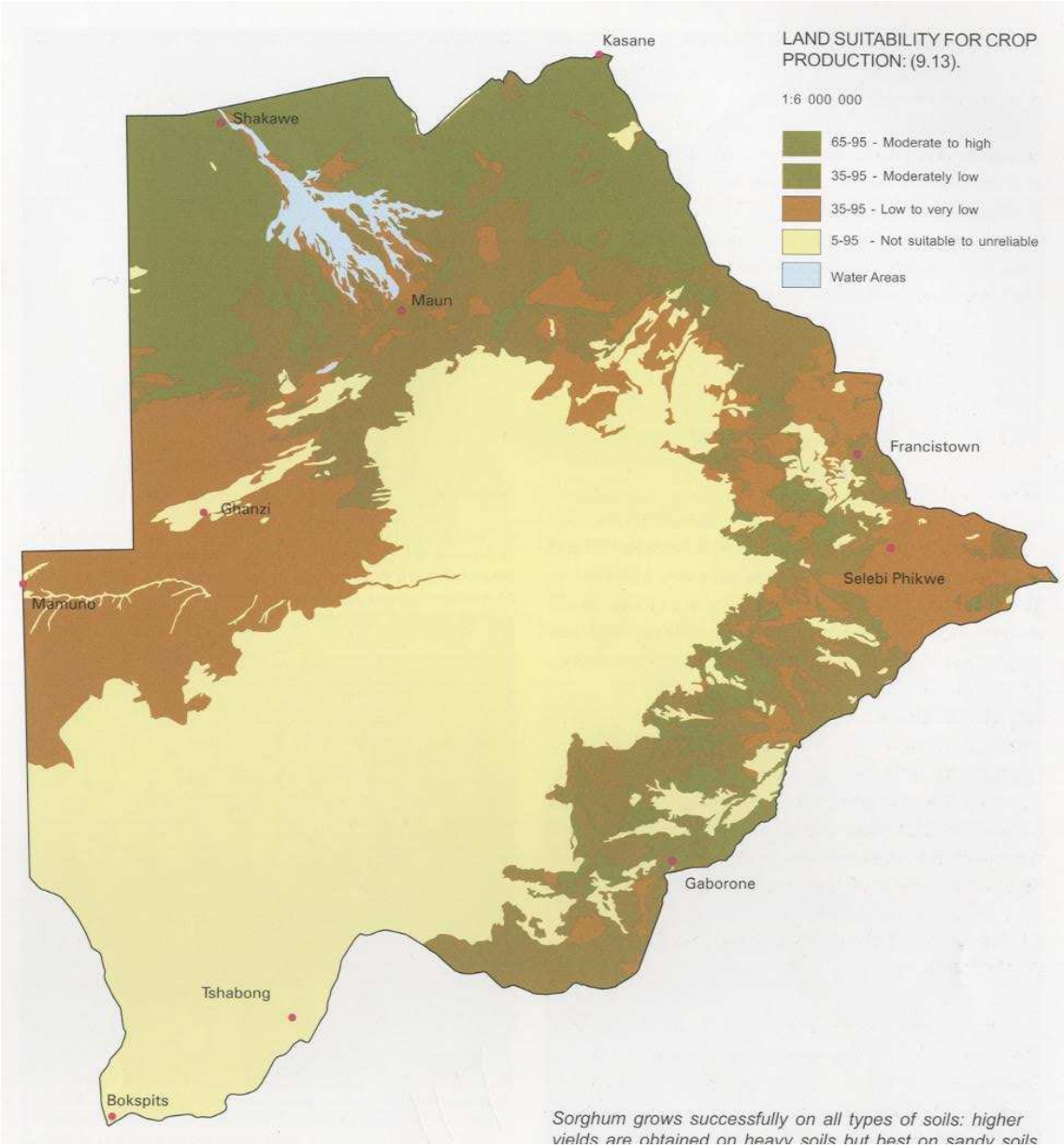
EU and Other Donor Cooperation from an Environmental Perspective

SECTION	*ISSUES*
Donor-Supported Environmental Activities	▪ Overlap between the objectives of some projects. ▪ Lack of sustainability of some projects due to difficulty of transferring skills and absence of full integration of some projects into institutional work programmes.
Donor Coordination	▪ Absence of structured donor coordination.

APPENDIX 2: TECHNICAL APPENDICES

I. Environmental maps of the Country




LAND SUITABILITY FOR CROP PRODUCTION: (9.13).
1:6 000 000
65-95 - Moderate to high
35-95 - Moderately low
35-95 - Low to very low
5-95 - Not suitable to unreliable
Water Areas
Kasane
Shakawe
Maun
Francistown
Ghanzi
Selebi Phikwe
Mamuno
Gaborone
Tshabong
Bokspits
Sorghum grows successfully on all types of soils: higher yields are obtained on heavy soils but best on sandy soils

II. Reference list of environmental policy documents, statements and action plans, and other relevant technical information.

Department of Water Affairs (2006). *National Water Master Plan Review Final Report*, Ministry of Minerals, Energy and Water Resources, Gaborone.

Department of Water Affairs (2006). *National Water Master Plan Review Executive Summary,* Ministry of Minerals, Energy and Water Resources, Gaborone.

Ministry of Environment, Wildlife and Tourism (2004). *Botswana Biodiversity Strategy and Action Plan,* Gaborone.

Ministry of Works, Transport and Communications (2001). *Botswana Initial national Communication to the United nations Framework Convention on Climate Change*, Gaborone.

National Museum and Art Gallery (undated). *Pre-Development Archaeological Impact Assessment : Guidelines for Archaeological/Architectural History Consultants,* Gaborone.

Republic of Botswana (1986). *Wildlife Conservation Policy*: Government Paper No 1 of 1986, Government Printer, Gaborone.

Republic of Botswana (1990a). *Tourism Policy*: Government paper No. 2 of 1990, Government Printer, Gaborone.

Republic of Botswana (1990b). *National Policy on Natural Resources Conservation and Development*: Government Paper No. 1 of 1990, Government Printer, Gaborone.

Republic of Botswana (1991). *National Policy on Agricultural development*: Government paper No. 1 of 1991, Government Printer, Gaborone.

Republic of Botswana (2002a). *Revised National Policy for Rural Development*: Government Paper No 3 of 2002, Government Printer, Gaborone.

Republic of Botswana (2002b). *The National Master Plan for Arable Agriculture and Dairy Development.* Government Printer, Gaborone.

Republic of Botswana, (2004). Botswana: Millennium Development Goals Status Report 2004, UNDP, Gaborone.

Republic of Botswana (2003). *National Development Plan 9*, Ministry of Finance and Development Planning, Gaborone.

Republic of Botswana (2006). *Draft National Energy Policy*: Unpubl. Department of Energy Affairs, Gaborone.

Republic of Botswana (1986). *Wildlife Conservation Policy*: Government paper No. 1 of 1986, Government Printer, Gaborone.

Republic of Botswana (1998). *Botswana's Strategy for Waste Management*, Ministry of Local Government and Lands, Gaborone.

Republic of Botswana (2003). *Guidelines for Preparing Environmental Impact Assessment Reports for Mining Projects*, Volume 1, Department of Mines, Gaborone.

Republic of Botswana, (2005). *The Environmental Impact Assessment Act*, 2005, Government Printer, Gaborone.

Republic of Botswana (1990). *National Policy on Natural Resources Conservation and Development: Government Paper No. 1 of 1990*, Government Printer, Gaborone.

Republic of Botswana, (1999). *Mines and Minerals Act, Act No.17 of 1999*, Government Printer, Gaborone.

Republic of Botswana, *The Monuments and Relics Act, No12 of 2001*, Gaborone.

Snowy Mountains Engineering Corporation (1991). *National Water Plan Summary,* Ministry of Water Affairs, Gaborone.

APPENDIX 3: ADMINISTRATIVE APPENDICES

I. Persons/organisations consulted or who provided information

ORGANISATION	REPRESENTATIVES	CONTACT DETAILS
Ministry of Finance and Development Planning	▪ Tuelo Benito Rabaloi, Planning Officer	Private Bag 008, Gaborone.
Department of Environmental Affairs	▪ Mr Steve Monna, Director. ▪ Tuelo Nkwane, Principal Natural Resources Officer. ▪ David Aniku, Senior Natural Resources Officer.	Private Bag 0068, Gaborone.
Department of Town and Regional Planning	▪ Mr Ralph Chepete, Director. ▪ Doreen Simon, Senior Planner	Private Bag 0042, Gaborone.
Department of Sanitation and Waste Management	▪ Enoch Naane, Director.	Private Bag BO 323, Gaborone.
Department of Wildlife and National Parks	▪ Steve Atkins ▪ Ms Lorraine Nyoni	P O Box 131, Gaborone.
Department of Water Affairs	▪ Kalaote Kalote	Private Bag 0018, Gaborone
Department of Energy Affairs	▪ Buti Mogotsi, Deputy Director. ▪ Masego Kealotswe, Energy Officer.	Private Bag 0018, Gaborone.
Department Meteorological Services	▪ Ntiki Masisi	P O Box 10100, Gaborone.
Department of Geological Survey	▪ Tiyapo Ngwisanyi, Geophysicist.	Private Bag 14 Lobatse
National Museum and Art Gallery	▪ Matlhodi Segokgo, Senior Curator.	Private Bag 00114 Gaborone
Tshole Trust	▪ Phatshimo Motlhabatau	Private Bag 00254 Gaborone
Somarelang Tikologo	▪ B. Setume ▪ K. Moseki	bsetume@somatiko.co.bw kmoseki@somatiko.org.bw
Delegation of the European Communities	▪ Monica Pambianco	Tel: + 267 391 44 55 ext 113
United Nations Development Programme	▪ Leonard Dikobe, Programme Specialist.	22 Khama Cresent, Gaborone

II. List of documentation consulted (Non-Policy Documents)

Botswana National Agenda 21 Coordinating Committee (Undated). *Botswana National Report on the Implementation of Agenda 21 and other Rio Earth Summit Decisions*, Ministry of Lands, Housing and Environment, Gaborone.

Department of Mines (2004). *2004 Annual Report,* Gaborone.

Department of Water Affairs (undated). Terms of Reference for Botswana National Water Master Plan Review, Gaborone.

Keatimilwe, K. and Kgabung, B. (2005). *SEA Experience in Developing Countries – Botswana*, in Strategic Environmental Assessment: A sourcebook and Reference Guide to International Experience, (Ed: B. Dalal-Clayton and B. Sadler), pp 247- 250. Earthscan, London.

Mpotokwane, M.A., and Keatimilwe, K. (2003). *Botswana Country Report*. In: Environmental Impact Assessment in Southern African. Southern African Institute for Environmental Assessment, Windhoek, pp.45-61.

Natural Resource Services and Landflow Solutions (2003). Review of Botswana National Land Policy: Final Report, Volume 1 Main Report, Ministry of Lands and Housing, Gaborone.

Southern Africa Development Community (2004). *Southern Africa Development Community Protocol on Forestry*, SADC, Gaborone.

Southern Africa Development Community (2001). *Protocol on Fisheries in the Southern African Development Community Region,* SADC, Gaborone.

Southern Africa Development Community (2000). *Revised Protocol on Shared Watercourses,* SADC, Gaborone.

Southern Africa Development Community (1999). *Protocol on Wildlife Conservation and Law Enforcement in the Southern African Development Community Region,* SADC, Gaborone.

Southern Africa Development Community (1997). *Protocol on Mining,* SADC, Gaborone.

Southern Africa Development Community (1996). *Protocol of Energy,* SADC, Gaborone.

Southern Africa Development Community(1998). *Protocol on the Development of Tourism in the Southern African Development Community Region*, SADC, Gaborone.

United Nations (2001). *Botswana: Towards National Prosperity – Common Country Assessment 2001,* Gaborone.

III. Curricula vitae of the consultant

CURRICULUM VITAE: KAGISO KEATIMILWE

Profession	:	Town Planner, Natural Resources Planner
Specialisation	:	Environmental Policy
Position in Firm	:	Manager, Strategic Research Alliances
Year appointed	:	July 2001
Nationality	:	Botswana
Year of Birth	:	1961
Language Proficiency	:	English, Setswana, French (Basic)
Email	:	Kkeati@csir.co.za

KEY QUALIFICATIONS AND COMPETENCIES

Technical knowledge of environmental management issues. This has been gained through formal training as well as experience in the public service (Botswana Government), international development organisation (UNDP) and a research organization (CSIR South Africa).

Design and implementation of environment projects, programmes and policies. This has been acquired through activities funded by the Botswana Government and United Nations Development Programme. These addressed current issues of global importance such as energy, drought and desertification, global warming, and management of ecologically sensitive ecosystems, as well as overall sustainable development concerns.

Management of project teams which has been gained through implementing projects with many contributors and stakeholders. Responsibilities have included managing consultants and other staff, designing their terms of reference, and coordinating arranging and consultations with key stakeholders.

Integration of information provided by various experts and stakeholders and the ability to present it in a concise and accurate manner.

Experience in training through teaching short training courses, undergraduate and postgraduate university courses, as well as briefing civil servants and NGOs on various aspects of Botswana environmental policy.

EDUCATION AND PROFESSIONAL STATUS

Qualification	**Institution**	**Year**
M.Sc. Planning (Natural Resources)	University of British Columbia, Vancouver	1990
B.Sc. (Hons) Town Planning	Heriot-Watt University, Edinburgh	1985
A Levels	Maru A Pula School, Gaborone	1981
O Levels	Maru A Pula School, Gaborone	1978

EMPLOYMENT AND EXPERIENCE RECORD

Period **Organisation details and responsibilities/roles**

July 2006-Present ***CSIR, Pretoria, South Africa***

Strategic Research Alliances Manager

- Forging relationships with national and international tertiary education institutions; research institutions; and, R&D units in private organisations.

Supporting the CSIR human capacity development programme.

July 2001- ***CSIR Environment and Natural Resources, Stellenbosch, South Africa***

June 2006 *Senior Environmental Specialist*

- Undertook research and consultancy work on EIA practice in Southern Africa, integration of HIV/AIDS issues into environmental assessment, and also developed a research, science and technology policy.
- Authored published reports on EIA practice in Botswana, Lesotho and Swaziland.
- Developed and managed projects on environmental auditing, environmental impact assessment, integration of HIV and AIDS issues into environmental assessment, environmental capacity assessment, as well as research, science and technology policy.

1996-1998 ***University of Botswana, Gaborone, Botswana***

Part-time Lecturer

- Post-graduate course in Population and Sustainable Development (Two months each year).

1994-2001 ***United Nations Development Programme, Gaborone, Botswana***

Sustainable Development Advisor

- Participated in the development of, and subsequently managed Environment Programme covering wetlands, environmental conventions, institution building, community natural resource management, environmental monitoring, and regional natural resource issues. Also responsible for FAO activities and management of projects on climate change, drought and desertification, Global Environment Facility Small Grants, Okavango Delta.
- Supervised consultancies, liaised with Government, and other UN agencies.
- Participation in annual external management audit of the Environment Programme.
- Supervisory and oversight responsibility for ten staff.

1993-1994 ***National Conservation Strategy Agency, Gaborone, Botswana***

Senior Natural Resources Officer

- Drafting of documents, including Cabinet Memoranda on ratification of Ramsar Convention, Convention on Biological Diversity, and World Heritage Convention, speeches, briefing documents on EIA legislation and 1993 EEC/ACP Conference.
- Member of committee reviewing EIAs for Letsibogo dam, North- South Water Carrier, Botswana Energy Master Plan.

1990-1993 ***Department of Town and Regional Planning, Gaborone, Botswana***

Town and Regional Planner

- Assisted in establishing National Conservation Strategy Agency
- Management of short consultancies.
- Workshops on National Conservation Strategy implementation.

1987-1988 ***Department of Town and Regional Planning, Gaborone, Botswana***

Acting Town and Regional Planner

- Drafting National Conservation Strategy background documents.
- Undertaking consultations with stakeholders.

Briefing local authorities on NCSA plans and progress.

1985-1987 ***Department of Town and Regional Planning, Gaborone, Botswana***

Assistant Town and Regional Planner

- Contribution to development of National Settlement Policy.
- Participation in development of village plans.

RECENT PROJECT EXPERIENCE:

Year	Description, client, role
2005	Project Manager, Botswana National Science, Research and Technology Plan.
2003-2005	Project Manager, Integrating HIV and AIDS Issues into Water Resources Management, Southern African Development Community.
2003	Project Manager, Environmental Assessment of the Seismic Survey in Block PH-77 Offshore, Cameroon, Phillips Petroleum Company Cameroon.
2002	Project Manager, Environmental Audit of the Trans-Kgalagadi Road, Botswana Government.
2002	Project Manager, Environmental Assessment in southern Africa, Southern Africa institute for Environmental Assessment.

MAJOR CONSULTANCY REPORTS:

2004 (Dec)	**Keatimilwe, K.** and Setswe, G. (2004) Impact of HIV and AIDS on Water Resources Management in Botswana, Lesotho, South Africa and Swaziland – Integrated Report. CSIR Environmentek, Stellenbosch. Report No. ENV-S-C 2004-104. vii and 83 pp
2005 (June)	**Keatimilwe, K**. and Ashton, P.J. Guideline for the Review of Specialist Input in EIA Processes. Prepared for Western Cape Department of Environmental Affairs and Development Planning
2005 (Oct)	Boko, D. and **Keatimilwe, K.** Review of Existing Laws, Regulations and Guidelines on Environmental Impact Assessment in Botswana. Prepared for Botswana Department of Environmental Affairs.
2005 (Dec)	**Keatimilwe, K.** and Setswe, G. Guideline for Integrating HIV and AIDS Issues into the Environmental Assessment of Water Projects and Policies. Prepared for the Southern Africa Development Community Health Sector Coordinating Unit.
2005 (Dec)	**Keatimilwe, K.,** Weaver, A., Walwyn, D., Maphanyane, E., Chiepe, G., Eksteen, J., and Pefile, S. Botswana National Research Science and Technology Plan. Prepared for Botswana Ministry of Communications, Science and Technology.

CHAPTERS IN BOOKS :

2002	Weaver, A. **Keatimilwe, K**. and Tarr, P. (2002). *Regional Perspectives and Considerations – Southern Africa*, in (Eds. L. Billing, C. Jones, B. Sadler, J. Walmsley and C. Wood), Environmental Assessment Year Book 2002, Institute of Environmental Assessment and Management, Manchester. pp 86-89.
2003	Mpotokwane, M and **Keatimilwe, K** (2003). Botswana country report. In: Environmental Impact Assessment in Southern Africa, (Ed: P. Tarr), pp 45 – 61. Southern African Institute for Environmental Assessment, Windhoek.
2003	Motsamai, B, **Keatimilwe, K,** and Pomela, M (2003). Lesotho country report. In: Environmental Impact Assessment in Southern Africa, (Ed: P.Tarr), pp 63 – 80. Southern Africa Institute for Environmental Assessment, Windhoek.
2003	Mlangeni, J and **Keatimilwe,** K (2003). Swaziland country report. In: Environmental Impact Assessment in Southern Africa, (Ed: P.Tarr), pp 227 – 242. Southern Africa Institute for Environmental Assessment, Windhoek.

2005	**Keatimilwe, K**. and Kgabung, B. (2005). *SEA Experience in Developing Countries – Botswana*, in Strategic Environmental Assessment: A sourcebook and Reference Guide to International Experience, (Ed: B. Dalal-Clayton and B. Sadler), pp 247- 250. Earthscan, London.

PAPERS IN PRESS:

2006 (May)	**Keatimilwe, K.**, Davies, S. and Weaver, A. (2006). *The Trans-Kgalagadi Road Project in Botswana: An Analysis of The Effectiveness of The Environmental Post-Implementation Audit*. African Journal of Environmental Assessment and Management

PAPERS :

1997 (May)	*Environmental Impact Assessment in the Context of Sustainable Development,* University of Botswana, Gaborone.
1994 (June)	*Population, Environment, and Sustainable Development, National Conservation Strategy Agency*, Gaborone.
1994 (March)	*Botswana in Relation to Post-Apartheid South Africa: Regional Environmental Problems and Opportunities,* National Institute of Research, Gaborone.
1994	*State of the Environment in Southern Africa,* Southern Africa Research and Documentation Centre, Harare (Chapter Reviewer).
1993 (Nov)	*Natural Resource Utilisation and Management for Sustainable Rural Development,* National District Development Conference, Gaborone.
1993 (Oct)	*Natural Resource Utilisation and Conservation in the Basarwa Settlements*, Second Regional San Conference, Gaborone.
1993 (Aug)	*Reflections on the Issues Raised at the Environmental Impact Assessment Workshop,* presented at EIA Literacy Training Course, University of Botswana.
1993 (March)	*Environment and Development* – Briefing document for delegates to the EEC/ACP Conference, Gaborone (Co-author).
1992	*Overview of Global and National Environmental Issues,* in Proceedings of the National Planning Conference, Gaborone.
1992 (April)	*Current Use of Natural Resources in Rural Areas and Needs for Rehabilitation,* in Proceedings of the Conference on Sustainable Rural Development, Botswana Society, Gaborone.

ACADEMIC PUBLICATIONS :

1990 (Aug)	Consequences of Modernisation in Botswana: Lessons from the Livestock Sector, (M.Sc. Thesis) University of British Columbia, Vancouver.
1985 (June)	Rural Development and Public Policy in Botswana, B.Sc. (Hons) Thesis, Heriot-Watt University, Edinburgh.

NEWSPAPER ARTICLES:

1996 (Sept)	Evolution of Environmental Issues Since Independence, Mmegi Newspaper, Gaborone.
1996 (March)	Botswana Ratifies the Desertification Convention, Mmegi Newspaper, Gaborone.

COMPUTER SKILLS :

- MS Word, Excel, Powerpoint, MS Project

INTERNATIONAL MEETINGS/CONFERENCES :

1998 (June)	▪ Training on the Global Environment Facility, New York
1998 (March)	▪ Meeting on the SADC Water Round Table, Livingstone, Zambia.
1997 (Aug)	▪ National Forum on the Implementation of the Drought and Desertification Convention, Goma, Zimbabwe.
1996 (April)	▪ Workshop on the Global Environment Facility, Lusaka
1995 (Dec)	▪ Workshop on Sustainable Energy, New York
1994 (May)	▪ National Conference on the Implementation of Agenda 21, Maseru.
1994 (April)	▪ Workshop on Environmental Impact Assessment, Mauritius
1993 (May)	▪ Global Environment Facility Participants Assembly, Beijing.
1993 (May)	▪ United Nations Environment Programme Governing Council, Nairobi.
1993 (April)	▪ Meeting on the United Nations Drought and Desertification Convention Case Studies, Abidjan.
1993 (April)	▪ Workshop on Biodiversity Conservation, Bulawayo.
1992 (Dec)	▪ African Sub-Regional Environment Groups Meeting, Nairobi.
1992 (Dec)	▪ African Ministerial Conference on Environment Bureau Meeting, Nairobi.
1992 (Nov)	▪ Seminar on Environment and Economic Development, Bombay
1992 (Aug)	▪ Southern Africa Sub-Regional Environment Group, Arusha.
1991 (Aug)	▪ Training for Environmental Managers and Engineers, Moscow, St. Petersburg, Tampere.
1991 (March)	▪ Seminar on Institutional Development in the Field of Environment, New Delhi.
1990 (Feb)	▪ Canadian Association of Planning Students Conference, Halifax.
1989 (Oct)	▪ American Association of Collegiate Schools of Planning Conference, Portland, Oregon.
1987 (May)	▪ Food Aid for Natural Resource projects Workshop, Mombasa

1986 (Sept)	▪ Royal Town Planning Institute Summer School, Nottingham.
1984(Jan-March)	▪ Student Exchange Programme, Aarhus, Denmark

SCHOLARSHIPS AND AWARDS:

2005	CSIR Environmentek Team award for outstanding service to client
1996	UNDP Merit Award for Services to the UN 5othth Anniversary Celebrations
1988-1990	United nations Development Programme Fellowship (post-graduate studies)
1988 (May-June)	Rotary International Exchange Programme to Canada and the United States
1981-1985	United Nations Centre for Human Settlements Fellowship (undergraduate studies)

MEDIA INTERVIEWS :

- "A o itse Gore", Radio Botswana, 1993.
- Development Forum, Radio Botswana, 1993-1996 (Several).
- Environmental Issues in Botswana, Radio South Africa, 1992.
- Around the World Today, Radio Botswana, 1991.

PRESENTATIONS:

- SADC Regional Training Workshop on Mainstreaming HIV and AIDS in Development, Johannesburg, May 2005
- Conference on Wetlands, on UNDP Environment Programme, Francistown, 1998.
- Conference on Wetlands, on UNDP Environment Programme, Maun, 1997.
- University of Botswana Final Year Environmental Science Students, 1992,1993, 1997, 2000.
- University of Botswana Department of Biology on Implementation and Coordination of Policies Relating to Biodiversity Conservation, June 1993.
- Regional Planners Workshop on Regional Planning and the Environment, June 1993.
- Environmental Health Officers on Agenda 21 and Environmental Health Issues in Botswana, Francistown, July 1993.
- World Environment Day, Sowa, Botswana. 1993.
- Environmental Health Officers on Environment and Development, Gaborone, July 1992.
- Environmental Impact Assessment Training Course, University of Botswana, April 1992.
- Peace Corps Volunteers on the Botswana National Conservation Strategy and Wildlife-Related Issues, Gaborone, March, 1990.
- Local Authorities (Councillors) on National Conservation Strategy, several.
- Public Officers on National Conservation Strategy, several.

SERVICE :

- Maru A Pula School Council, Member, 1993 - present.
- Maru a Pula School Bursary Committee, Member, 1991- present and current Chair.
- Mmegi Publishing Trust Board, Member 1993 – 2001.
- Botswana Cultural Activities Support Trust, Trustee, 1996-1999.
- KTM Choir, Chairman 1993-1995.
- Forestry Association of Botswana Board, Member 1993-1994

REFEREEES :

- Professor Geoffrey Setswe, Chief Research Officer, Human Sciences Research Council, South Africa. Cell no. 0720259875
- Dr Peter Tarr, Executive Director, Southern Africa Institute for Environmental Assessment, Windhoek. Phone (264) 61 220 579
- Dr Alex Weaver, CSIR Fellow, CSIR Environmentek, Stellenbosch, South Africa. Phone: (27)21 888 2504

CURRICULUM VITAE: MASEGO AYO MPOTOKWANE

Date of Birth	:	14th January 1957
Sex	:	Male
Place of Birth	:	Tonota
Nationality	:	Botswana
Marital Status	:	Married with three children
Contact Details	:	Department of Environmental Sciences University of Botswana Private Bag 0022 Gaborone Tel 3552509; Fax 585097; Cellular 7171 1818 Email: mpotokma@mopipi.ub.bw

ACADEMIC QUALIFICATIONS

- Ph.D. (Environmental Science), University of Stirling, UK (1999) Ph.D. Thesis Title **"Variation in Cattle Numbers, Rainfall Amount and Land Availability in Tlokweng Sub- District, Botswana. A Modelling Approach to Livestock Management"** (1999)
- MSc (Rural Surveys), ITC (International Institute for Aerial Survey and Earth Sciences), Enschede, The Netherlands (1986) MSc Dissertation Title **"Changes in Settlement and Landuse in Kgatleng District, Botswana, 1950 to 1982"**(1986)
- Post Graduate Diploma in Rural Survey Using Aerial Photography and other Remote Sensing Techniques, ITC (International Institute for Aerial Survey and Earth Sciences), Enschede, The Netherlands (1984)
- BA (Geography/Sociology) University of Botswana (1979)

EMPLOYMENT RECORD:

1986 to present	*Lecturer* Department of Environmental Science,University of Botswana
1982 – 1986	*Staff Development Fellow* Department of Environmental Science, University of Botswana
1979 – 1982	*Geography teacher* Swaneng Hill School, Serowe, Botswana

TEACHING RESPONSIBILITIES (UNIVERSITY OF BOTSWANA:

- Teaching, marking and dissertation supervision
- Taught over 10 different undergraduate courses from 1982 to date.
- Supervised over 20 undergraduate dissertations, twelve MSc dissertations and been a committee member for 5 PhD theses.
- Internal examiner for 3 MSc dissertations at University of Botswana

PUBLICATIONS AND PAPERS PRESENTED:

Publications

"Changes in Land use, Kgatleng District 1950 - 1982", 1985 in **NIR Research Notes 13**, Gaborone, (40 pages)

Mpotokwane M A 1988 Advisor (acknowledged) **Atlas for Botswana,** Longman Botswana, Gaborone,. ISBN 0 582 03103 6

"Rural Land use and Ecological Issues in Botswana", 1989 in **Pula** Vol. 6 No. 2, Gaborone, (p 48-57)
Mpotokwane M A 1990 Editorial Advisor **Longman Secondary School Atlas** Collins Longman Atlases, Essex, , ISBN 0 582 05972 0

"Tourism and Environmental Issues in Botswana", 1991 **Tourism in Botswana,** Botswana Society, Gaborone, (p 146-157).

"Environmental Impact Assessment - What is it?" 1992 **Report of the Workshop on Environmental Impact Assessment Legislation**, Government Printer, Gaborone, (p 8-13)

Co-edited, with Ms N.L. Ngcongco, 1992 **Report of the Workshop on Environmental Impact Assessment Legislation** held under the auspices of the Botswana National Conservation Strategy Coordinating Agency, Government Printer, Gaborone, (148 pages).

Mpotokwane, M.A 1992 "Pollution Risks in Botswana" **Which Way Botswana's Environment?** Proceedings of a Symposium Organised by the Kalahari Conservation Society (p109 – 117)

Mpotokwane M A 1993 Book Review Erbynn G.K. **Comprehensive Map work for Southern Africa** Heinemann, Gaborone

Mpotokwane, M.A., Shaw S. and Segodi R., 1993 "Botswana", Chapter 2 Moyo S., O'Keefe P. and Sill M. **The Southern African Environment: Profiles of the SADC Countries**, Earthscan Publications, London, (p 32-64)

Kgathi D.L., Maya R.S., Sekhwela M.B.M., Tietema T.T. Mpotokwane M.A. 1994 "Biomass in Botswana" Hall, D.O. and Mao, Y.S. (eds.), **Energy and Coal in Africa**, Zed Press, London (p.17 – 67)

Mpotokwane M A, 2002, **"**The Concept of Sustainable Development" In: Chilisa B., Mafela, L., Preece, J., eds. 2002 **Educational Research for Sustainable Development** Botswana Educational Research Association and Light Publications, Gaborone (p 105 – 121)

Mpotokwane M A and Keatimilwe K 2003 "Botswana: Country Report" In: **Environmental Impact Assessment in Southern Africa** Southern African Institute for Environmental Assessment, Windhoek (17 pages) also available on website (http://www.logical.com.na/saiea)

Papers Presented:
1987 February **"Small scale irrigation in Botswana"** A consultancy report for the ILO Southern African Team on Employment Promotion.

1987 March **"Land Resources of Botswana"** A paper presented at the National Training Course on Reclamation and Management of Deteriorated Soils, Gaborone.

1987 August **"An approach to rural land use studies in Botswana."** A paper presented at a Geography Teachers' Workshop, Ramotswa.

1987 November **"The National Conservation Strategy Household Opinion Survey"** (Co-authored with K.M. Mogalakwe) A consultancy report for the Department of Town and Regional Planning, Gaborone

Papers Presented (Continued)

1987 December **"Range Management and Soil Erosion Applications using Aerial Photographs"** and **"Theoretical Background of Remote Sensing"** Papers presented at the 2nd Course on Rangeland and Soil Conservation in SADC.

1989 February **"Proposed Land use Plan for Makgadikgadi Region"** (Co-authored). A consultancy report for the Central District Council Land use Planning Unit (DLUPU)

1989 February **"Public Consultation and Views on Environmental Issues"** (Co-authored with Segodi R) Paper prepared for National Conservation Strategy Report on behalf of the Department of Town and Regional Planning, Gaborone.

1991 June **"Public Awareness of Environment Issues in Botswana."** Paper presented to the Workshop on Environment and the Media, Maun, Botswana.

1991 August **"The Southern Integrated Water Development Project" Paper** presented to the Development Studies Workshop for Secondary School Teachers, Selebi Phikwe, Botswana

1992 November **"Pollution Risks in Botswana**" Paper presented to the Kalahari Conservation Society Symposium, Gaborone.

1992 November **"Public Participation in Conservation in Botswana" Media briefing** to international journalists organized by National Conservation Strategy Agency through Hill and Knowlton (U.K.) Ltd., Gaborone.

1993 September **"Food Security in Botswana: Question of Sustainability."** Paper presented at a panel discussion for Public Education Advisory Committee at Serowe, Botswana.

1996 August **"The Terms of Reference for Environmental Impact Assessment of the Maun Groundwater Development Project Phase 1"** –for Department of Water Affairs – through Water Resources Consultants, Gaborone

2000 September **"The Ghanzi Farm Workers Mid Term Review" Netherlands Development Organisation (SNV),** Gaborone, Consultancy Report

2001 April **"The Terms of Reference for Environmental Impact Assessment of the Maun Groundwater Development Project Phase 2**" –for Department of Water Affairs – through Water Resources Consultants, Gaborone

2001 August **The Meaning and Implication of Sustainable Development** Paper presented at the 9th Botswana, Lesotho and Swaziland International Education Research Symposium, Gaborone, Botswana

Attended the UNDP Launch of the **Human Development Report 2001,** May 2001, Gaborone

2002 January **"Current Environmental Issues"** Paper presented at the Social Studies Workshop to the College of Education Lectures, Molepolole

2002 August "**Rural Urban Fringe Livelihoods in Distress Around Gaborone City: The Case of Tlokweng Village"** Paper presented at the Workshop on Livelihoods in Distress organised by the Department of Rural and Urban Planning – Belgian VLIR, Communal Lands Development Project, University of Zimbabwe, Harare

Papers Presented (Continued)

2002 October **Environment and Sustainable Human Development** Paper presented at the International Day for the Eradication of Poverty Commemorations 2002, Boipuso Hall, Gaborone

2002 November, **The Development of the Broadcasting Policy in Botswana** Paper presented at MISA/SABA/FEF Workshop on *the State of Broadcasting in Southern Africa* Orokopo Lodge, Namibia

2004 February **The Development and Challenges of Regulating Broadcasting in Botswana Since 2000** Paper presented at the Commonwealth Broadcasting Association Biennial Conference, Sheraton Fiji Resort, Fiji. 16th to 19th February 2004

Setswe G and Mpotokwane M A 2005 **Lectures for the Course on Integrating HIV/AIDS Issues through the Use of Environmental Assessment and Management Tools in the Water Sector in Southern Africa, Modules 1, 2 and 3,** University of Botswana and CSIR

Member, **University of Botswana Senate, Faculty of Science Representative**, September 1991 to September 1993 and 2002 to present

Chairman of **Board of Trustees**, Thusano Lefatsheng - August 1989 to December 1993.

Chairman, **Geography Panel**, Department of Secondary Education, January 1988 to December 1993.

Member, **Workshop Organizing Committee**: "Developing Our Environmental Strategy", 1987. Botswana Society workshop Organising Committee

Member, **National Conservation Strategy Editorial Board**, August 1987 to June 1988

OTHER SERVICES:

Member, **Environmental Impact Assessment Reference Group** at National Conservation Strategy Agency, September to December 1992.

Member, Organizing Committee for the **Environmental Impact Assessment Legislation Workshop,** December 1992

Workshop Evaluator, **"National Settlement Policy Workshop,"** Gaborone, March 1990.

Reviewer sections of Southern African Research and Documentation Centre's Regional **"State of the Environment"** Draft Report, June to December 1993.

Evaluator (with B. Prophet) of the **UK Government Overseas Development Administration (ODA) and Government of Botswana Secondary Schools Inservice Project,** 1992 to 1993.

National Marker, **Geography Essay Competition for Senior Secondary Schools**, 1992 and 1993

Secretary, **Botswana Bus Truck and Taxi Association, BOBTTA** October 1992 to December 1993

Member and Researcher, **African Energy Policy Research Network (AFREPREN),** 1989 to 1992

Member, **Environmental Impact Assessment Trainers Networ**k, EIA Centre, University of Manchester, UK. (1993 to 1996)

Member, **Register of Environmental and Sustainable Development Expertise**, International Institute of Environment and Development (IIED), London, UK (March 1994 to August 1997)

Member, **Kalahari Conservation Society**, Botswana 1990 to 1995

Secretary, **University of Botswana Academic Reorganisation Task Force**, 1993 to 2000

Member, **Tender Assessment Panel for the Environmental Impact Assessment of the Maun Groundwater Development Project Phase 1"** –at Department of Water Affairs – Gaborone – June 1996

Chairman, **National Broadcasting Board** of Botswana, 1st August 2000 to date

Discussant UNDP workshop on **"Developing the United Nations Common Country Assessment for Botswana",** May 2001

Facilitator, IUCN and National Conservation Strategy Agency workshop **"The National Development IX Environmental Key Note Paper",** June 2001 and October 2001

Member, UNDP **Interview Panel for the Sustainable Development Advisor Post, UNDP Office**, Gaborone July 2001

OTHER SERVICES (CONTINUED):

Motivational Talk to Form 3, 4 and 5 YWCA Students on **Career Opportunities in Environmental Science,** Gaborone, 24th September 2001

Member, **Faculty of Science Organisation Committee for the Linked Universities Consortium on Environment and Development, (LUCED),** to prepare a declaration on universities role in Sustainable Development for the World Summit on Sustainable Development (WSSD), March – Aug 2001

Chairman, University of Botswana, **Faculty of Science Committee** Evaluation of the Use of Laboratory Facilities, March 2001 to present

Member of IUCN Coordinated **National Environmental Fund Feasibility Study Working Group (2002 – 2003)**

Coordinator **Environmental Science Departmental Seminars** 2001 to present

Member, University of Botswana Tender Evaluation Committee 2002 – to present

Attended**, Commonwealth Broadcasting Association 25th General Conference**, Fiji, February 2004

Facilitator, IUCN and National Conservation Strategy Agency workshop **"The National Development IX Environmental Key Note Paper", June 2001 and October 2001**

Conducted a one day **workshop** at BOTEC HALL for EIA practitioners in Botswana **on EIA Practice in Botswana**, for the CSIR paper

Country Researcher for CSIR /UB Research **The Effect of HIV/AIDS on Water Sector** (2003 to 2005)

Member Department of Environmental Science **Monographs Committee**

IV. Terms of Reference for the Country Environmental Profile

1. Background

Botswana, which at independence in 1966 was one of the 10 least developed countries with a per capita income of about USD 360, has recorded remarkable social and economic transformation, becoming a middle-income country with an estimated income in 2004 of USD 3,451 per capita. Whilst minerals (diamonds in particular) remain the dominant source of revenue (over 50% of all Government revenue), there has been growth in such sectors as financial services, tourism and manufacturing, although economic diversification and global competitiveness remain a major challenge. In spite of the positive trends in poverty decline, income disparities remain a concern, which affect in particular people living in remote areas and female-headed households. The HIV/AIDS epidemic has a negative impact on household incomes, and places a strain on the health, education and other sectors of the economy. Unemployment is also a major challenge which affects especially youth. The 9th National Development Plan (NDP 9), which sets out the Government of Botswana (GoB)'s development agenda for 2003/4-2008/9, stresses the Government's determination to safeguard the natural capital and the quality resource base as necessary conditions to achieve sustainable development. GoB is aware of the need to use natural resources efficiently, equitably and sustainably and to mainstream the environment into Government's policies, strategies and programmes.

The areas of cooperation between the EU and the Government of Botswana (GoB) are identified in a strategic programming document called Country Strategy Paper (CSP). The ongoing CSP covers the period 2002-2007. In February 2006, the EU and the National Authorising Officer of the EDF (in Botswana the Ministry of Finance and Development Planning) have launched the start of the programming for the period 2008-2013, which will identify the future areas of EU-GoB cooperation to be financed under the 10th EDF. The first draft CSP is to be completed by July 2006. To this end both parties intend to prepare the CEP in order to integrate environmental issue in the CSP.

2. Objective

The main objective of the CEP is to identify and assess environmental issues to be considered during the preparation of a CSP, which will directly or indirectly influence EC co-operation activities. The CEP will provide decision-makers in the partner country and in the European Commission with clear information on the key environmental challenges, the current policy, legislative and institutional framework and the strategies and programmes (including those of the EC and other donors) designed to address them. This information will ensure that the EC co-operation strategies systematically integrate environmental considerations into the selection of focal sectors and co-operation objectives/strategies, and also establish the necessary environment safeguards for all co-operation activities undertaken in the Country. The Profile will establish the key linkages between the environment and poverty reduction. It will constitute an important source of baseline information and contribute to focusing political dialogue and co-operation with the Country on key areas of concern including sustainable development as well as raising awareness among policy-makers.

3. Results

The profile will deliver the following results:

- An assessment of the state of the environment and key environmental factors and trends influencing the Country's development and stability.
- An assessment of national environmental policy and legislation, institutional structures and capacity, and the involvement of civil society in environmental issues.
- An assessment of the integration of environmental concerns in development policy and sectors with key linkages with environmental issues.
- An overview of past and ongoing international (including EC) co-operation in the environment sector.
- Recommendations and, as far as possible, guidelines or criteria for mainstreaming environmental concerns in co-operation areas. These recommendations should support the preparation of the CSP/NIP (National Indicative Programme) and include guidelines or criteria to be used for environmental mainstreaming in subsequent phases of the cycle of operations.

4. Issues to be assessed

The following issues should be assessed:
(The sub-headings below are the same as the recommended profile format)

4.1. The state of the environment

This Chapter should identify the state and trends of key environmental resources or components in the country, including (as relevant), but not limited to:

Themes	Aspects
Mineral resources and geology	Mineral resources Geological risks (seismic, volcanic and related risks)
Land	Soil erosion and degradation Desertification Land use, arable land, losses due to urbanisation or infrastructure building
Water	Water regime, Ground water, Water quality
Air and climate	Air quality Potential climate changes and vulnerability
Forest, vegetation, ecosystems	Forest cover and volume Pastureland State of particular ecosystems (savannahs, mangroves, coral reefs…)
Biodiversity, wildlife	Local status of globally threatened species/habitats Alien invasive species Fish stocks Species with special value
Landscape	Aesthetic and cultural value of landscape
Living conditions in human settlements	Air and water quality Sanitation Slums Health Vulnerability to disasters (including identification of needs and preparedness measures)

Pressures explaining the main negative trends should be identified, as well as pressures contributing to global environmental problems, using the following Table as a guiding checklist.

Themes	Possible aspects to consider
Mining, extraction of hydrocarbons	Extraction, treatment and transport of minerals and hydrocarbons
Water use and management	Water extraction (surface- and ground-water) Waste water discharges Water use
Land management	Land use planning
Forest exploitation, hunting, fisheries, biodiversity	Forest extraction Forest and fisheries management practices Hunting and fishing activities, poaching Use of NTFP (non-timber forest products) Fires Introduction of alien species
Livestock raising	Overgrazing Rangeland management, use of fire, water management
Agriculture	Extension of agricultural land Shifting cultivation Intensification Irrigation and water use Pest control Agricultural practices
Energy production and use	Sources of energy Energy consumption Energy efficiency
Urbanisation, infrastructure and industry	Urban growth and sprawl, urban planning, dams, roads, major infrastructure, polluting industries, tourism
Waste disposal and management	Waste production Waste management Public behaviour and practices, existing systems, hazardous waste management
Atmospheric emissions	Emissions of greenhouse gases and ozone-depleting substances Air pollutants affecting local or regional air quality (point-source and non-point source emissions)

As far as possible the driving forces influencing these pressures should be identified, such as economic incentives, demographic pressure, access rights to natural resources and land tenure systems.

Environmental trends should be assessed with regard to their social and economic impact, including:

- Declines in economic production or productivity (e.g. agriculture, forestry, fisheries);
- Threats to human health;
- Human exposure to environmental disasters (e.g. floods, drought);
- Conflicts and security;
- Impact on poverty and on vulnerable groups (including women, children and indigenous peoples);
- Sustainability of resource use;
- Cultural values.

This Chapter should lead to the identification of problems, described in terms of situations or trends that are undesirable due to their current socioeconomic consequences (e.g. falling productivity, health problems, natural risks, social crises, conflicts), their future consequences (e.g. decline in natural resources, cumulative pollution) or their contribution to global environmental problems.

If appropriate the consultant could refer to appropriate environmental indicators in order to establish a consistent basis both for comparisons among countries and for monitoring changes in the studied country. Attention should be paid to the MDG 7[8] indicators, and specific indicators related to the particular environmental issues of the country.

If appropriate, the information could be organised according to eco-geographical subdivisions with the scale (regional, national, local) of the issues indicated.

4.2. Environmental policy, legislation and institutions

A brief description and review should be provided of the strengths and weaknesses of the following aspects, with their associated evaluation criteria given for guidance:

Aspect	Evaluation criteria
Policies	Existence of national policies, strategies and action plans for the environment; including NDP 9 and the National Policy on Natural Resources Conservation and Development of 1990, (known as the National Conservation Strategy). Policy response to global issues, sustainability issues (depletion of natural resources), and specific environmental issues identified above. Consistency between policies. Environmental integration in sectoral and macro-economic policies and existence of SEA of policies or strategies. Important measures taken by the Government to solve environmental concerns. Effectiveness in achieving targets.
Regulatory framework, including EIA and SEA legislation	Ratification status and implementation of MEAs (Multilateral Environment Agreements) such as those concerning climate change, biodiversity and desertification. Adequacy of (current and in preparation) environmental legislation (including land tenure and land reform, access rights to natural resources, management of natural resources, requirements for environmental assessment such as for EIA and SEA, pollution control, development control). Provision and procedures for public participation in environmental issues. Effectiveness of legislation enforcement. Use of other (non legislative) instruments, e.g. “green budgeting” (or Environmental Fiscal Reform) and market-based mechanisms, voluntary schemes (environmental management systems, environmental labelling, industry-government agreements). Potential impact of non-environmental legislation.
Institutions with environmental responsibilities	Identity, number and quality of institutions (involved in policy making, legislation, planning, environmental protection, monitoring and enforcement). Level of co-ordination and decentralisation. Strength and capacity of individual institutions. Influence on other institutions. Good governance practices. Capabilities, means, functioning of environmental services. Major NGOs, institutes or other organisations involved in environmental management or policy.
Public participation	Transparency and access to environmental information. Role of NGOs and civil society in environmental decision-making. Effective participation. Access to justice in environmental matters.

[8] See http://www.undp.org/mdg/

Environmental services and infrastructures	Protected Areas: number, areas, relevance, and effectiveness. Sanitation and waste treatment infrastructure. Disaster prevention systems. Emergency response mechanisms.
Environmental monitoring system	Relevance of selected indicators (with reference to MDG7). Measurement of the indicators: periodicity, liability. Integration in the general development indicators.

The analysis should both identify potential institutional/policy/regulatory causes of environmental pressures and the response by the government to solve the environmental problems.

4.3. Integration of environmental concerns into the main policies and sectors

The assessment should examine the integration of environmental concerns in the overall development policy and in sectors/areas that have key linkages with environmental issues and which might be identified for EC support, taking into account the focal areas of the current CSP (Human Resource Development/Education). This section should examine whether there is a Strategic Environmental Assessment (or similar assessment) for the national development strategy or the Poverty Reduction Strategy and for the sectors. If an SEA exists, it should provide a brief description of it, including its main recommendations. The main legislation and institutional arrangements and measures of the sector which address environmental issues, especially those identified in section 4.1 should be examined.

4.4. EU co-operation with the Country from an environmental perspective

This section should review the past and current experience relating to development co-operation interventions with specific environmental objectives as well as the integration of environment into other co-operation areas, including the application of environmental integration procedures (preparation of SEA or EIA in EC funded programmes/projects). Where information is available the environmental impacts or potential risks of EU co-operation should be identified for the benefit of future programmes. The results of existing evaluations/reviews should be incorporated and lessons drawn for the future. The implications for the environment of budgetary support or sector wide approaches should be reviewed if these have been applied. The review should cover both geographical and thematic programmes.

4.5. Co-operation funded by other donors from an environmental perspective

This section should review the past and current involvement of other donors and their experience in the Country, and include a list of recent and planned projects/programmes with an environmental focus or anticipated impact. Co-ordination mechanisms between donors and the EC with respect to the environment should be assessed, as well as opportunities to collaborate in pursuing common goals and seeking complementarities.

5. Conclusions and recommendations

The key aspects of the state and trends of the environment in the Country, including policy/regulatory and institutional constraints and challenges, should be clearly stated. These may be presented in a matrix, crossing environmental concerns and the main sectors or policies.

Based on a comprehensive assessment of the available information and on consultations with stakeholders, recommendations should be made on how the EC and GoB can better mainstream the environment into the next Country Strategy Paper, taking into account current CSP and any pre-identified options for the next one, including the anticipated focal sectors.

Recommendations should address (but not necessarily be limited to) the following:

(1) Recommendations concerning the selection of the focal sectors and response strategies, based on environmental considerations. These recommendations should show how best to address the main environmental challenges identified by the CEP. For potential focal sectors other than the environmental sector this might be done by integrating the environment as a cross cutting issue (indicating the opportunities for environmental mainstreaming) and through environmental safeguards which may include, for example, proposals for institutional strengthening and capacity building (including the enhancement of the regulatory framework and enforcement capacities), or recommendations for additional studies (like initiating an appropriate Strategic Environmental Assessment process) and potential indicators to be used in the NIP (reflecting the main environmental and sustainability concerns which can be influenced by the EC support).

(2) Recommendations on the use of EC horizontal budget lines (such as Environment and Forests) and facilities (EU Water Facility - EUWF and the EU Energy Facility - EUEF).

(3) Opportunities for co-ordination on environmental issues with other donors, seeking to achieve complementarities and synergies in order to more effectively deliver development objectives.

(4) Proposals for environmentally-relevant indicators to be used in the NIP (National Indicative Programme) or to be considered during the formulation of a General Budget Support or Sector Policy Support Programme (as relevant).

Individual recommendations should be clearly articulated and linked to the problems to be solved and grouped according to the sector concerned or institutional stakeholder. The relative priority of the recommendations and an indication of the challenges to their implementation should be given.

Any constraints to preparing the profile resulting from limited information should be described.

6. Work plan

The work plan should include but not necessarily be limited to the following activities:

- Consultations with, EC Delegation, the Ministry of Environment, Wildlife (MEWT) and Tourism (and in particular the Department of Environmental Affairs), relevant line ministries, key international donors, plus key national and international civil society actors operating in the environmental field.
- Review of key documents and reports, including the *NDP 9*, *The Mid Term Review of NDP 9 of 2006* and *The State of Environment Report of 2002,* previous Country Environmental Profiles (EC and others); the current EC Country Strategy Paper (including the Joint Annual Report 2005); evaluation reports, existing Strategic Environmental Assessments (particularly those concerning potential focal sectors), EIA of EC funded projects; environmental literature, environmental policy and regulatory framework, legislation, relevant strategic/actions plans, regulations and enforcement relating to environmental issues, information on monitoring and environmental performance indicators.

7. Time schedule and Reporting

The proposed mission will require 30 person/days and is expected to be undertaken over a 2 months period. The proposed start date is 15th May 2006.

The results of the study should be presented in the CEP in the format given in appendix to these ToR. The draft profile, in 5 hard copies and electronic version (Microsoft Word), should be presented to the Ministry of Finance and Development Planning (Contracting Authority), the MEWT and the EC Delegation by 16th of June at the latest. The three authorities will make comments within 3 weeks. The consultant will take account of these comments in preparing the

final report (maximum 40 pages excluding appendices). The final report (5 copies, in English) is to be submitted by the 14th July 2006.

8. Expertise required

The proposed mission shall be conducted by an expert who should have the following profile:

- at least 10 years wide experience in environmental issues, including institutional aspects; international environmental policies and management; environmental assessment techniques and experience in rapidly assessing information and developing recommendations.
- Previous working experience in the Country or the region;
- The Expert should have an understanding of the EU environment and development policies;
- Experience in undertaking environmental analyses and preparation of development programmes would be an asset;
- Familiarity with Commission guidance on programming, country strategies, PCM, policy mix and integration of environmental issues into other policy areas is desirable;
- Experience of participatory planning processes would be an advantage.

The expert should have excellent skills in English.