

**ENVIRONMENTAL ISSUES AND  
MANAGEMENT IN BOTSWANA**  
**Have the National Conservation Plans Worked?**

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BEMP	Botswana Energy Plan
CBNRM	Community Based Natural Resource Management
CBO	Community Based Organizations
CCNB	Child to Child Network of Botswana
CITES	Convention on International Trade in Endangered Species
CORDE	Cooperation for Research and Development and Education
CSO	Central Statistics Office
DAHP	Department of Animal Health and Production
DANCED	Danish Cooperation for Environment and Development
DAR	Department of Agricultural Research
DCPF	Department of Crop Production and Forestry
DGS	Department of Geological Studies
DWA	Department of Water Affairs
DWNP	Department of Wildlife and National Parks
EHIA	Environmental Health Impact Assessment
EIA	Environment Impact Assessment
ELMS	Environment and Land Management Sector
ELSO	Environment Liaison Officers
FAB	Forestry Association of Botswana
FORSAG	Forum on Sustainable Agriculture
FPSG	Fixed Period State Grants
GDP	Gross Domestic Product
GEF	Global Environmental Facility
IUCN	International Union for Conservation of Nature
KCS	Kalahari Conservation Society
KRST	Khama Rhino Sanctuary Trust
KTNP	Kgalagadi Trans-frontier National Park
LDC	Least Developed Countries
MCI	Ministry of Commerce and Industry
MFDP	Ministry of Finance and Development Planning

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MLGL&H	Ministry of Local Government, Lands and Housing
MMRWA	Ministry of Mineral Resources and Water Affairs
MoA	Ministry of Agriculture
MoE	Ministry of Education
MoH	Ministry of Health
NCS	National Conservation Strategy
NCSA	National Conservation Strategy Agency
NDP	National Development Plans
NGO	Non-Government Organizations
NWMP	National Water Master Plan
OKACOM	Permanent Okavango River Basin Commission
OUZTFCA	Okavango Upper Zambezi Trans-frontier Conservation Areas
PHC	Primary Health Care
SABSP	Southern Africa Biodiversity Support Programme
SADC	Southern African Development Communities
SHHA	Self-Help Housing Agency
TGLP	Tribal Grazing Land Policy
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
WMA	Wildlife Management Area
WUC	Water Utilities Corporation
ZACPLAN	Zambezi River System Common Action Plan

# ENVIRONMENTAL ISSUES AND MANAGEMENT IN BOTSWANA: HAVE THE NATIONAL CONSERVATION PLANTS WORKED?

## 1. INTRODUCTION

### 1.1 The Natural Environment

Botswana is a landlocked country in the interior of the southern African sub-region. It shares borders in the north with Zambia, in the northeast with Zimbabwe, in the northwest with Namibia, and in the east and south with South Africa.

#### 1.1.1 *Land Area and Population*

The country has a land area of 582,000 km<sup>2</sup> and a population of 1,678,891 in 2001 (CSO 2002). The population density, according to the 1991 census, was 2.3 persons per km<sup>2</sup> and it has risen to 3 persons per km<sup>2</sup> in 2001. This low density, however, conceals regional, district and rural-urban variations. The western part of the country (Chobe, Ngamiland, Kgalagadi and Gantsi), for example, is very sparsely populated with about 14-17 persons per 100 km<sup>2</sup> (CSO 1991). The figures, however, have not changed much for the last 10 years (CSO 2002). Localities with relatively good soils and water resources cover only one third of the country and tend to have a higher density than those with poorer resources. On the other hand, smaller districts such as Barolong and the Southeast have a higher population density of around 31 persons per km<sup>2</sup>. The urban areas have the highest density per km<sup>2</sup>; for instance, Gaborone, Francistown and Selibe-Pikwe have population densities of over 1,000 persons per km<sup>2</sup> (CSO 2002).

Botswana has a fast growing population. As population statistics from three post-independence censuses and preliminary figures from the recently completed 2001 census show, the population in 1971 was 596,944, growing to 941,027 in 1981; 1,326,796 in 1991; and 1,678,891 in 2001 (Gaolathe 2002). The figures imply growth rates of 4.7 percent between 1971 and 1981, 3.5 percent between 1981 and 1991, and 2.4 percent between 1991 and 2001. These growth rates are still relatively high compared to the annual averages of 2.8 percent for Africa, 2.0 percent for the Less Developed Countries (LDCs) and 1.7 percent for the world (MFDP 1993). The 1991 census shows that 60 percent of the population is below 30 years. It is thus a youthful population with demands on education, training, health, housing, and jobs that lead to massive increases in the use of environmental resources.

The country faces a major challenge in HIV/AIDS. In 1998, it was estimated that approximately 17 percent of Botswana's population was infected with HIV. Infant mortality rate, according to the 2000 Multiple Indicators Survey, has now increased to more than 57 per 1000 live births



from around 37 per 1000, while the under-five mortality rate rose to 77 per 1000 live births in 2000, from around 48 per 1000 live births in the previous decade (Gaolathe 2002). The effects are devastating. According to the 2001 Human Development, Botswana's life expectancy is down to 41.9 years (UNDP 2001). World Health Organisation projections show that unless some drastic measures are taken soon to stop this pandemic, the country's life expectancy will continue to drop.

### **1.1.2 Land Ecosystem**

Environmentally, Botswana is a country of contrasts. On the one hand, 80 percent of the country is a vast flatland, covered by Kalahari sand beds, with no surface water, except for ephemeral streams. On the other hand, there is the Okavango Delta, situated in the northwest with an estimated area of between 10,000 km<sup>2</sup> and 18,000 km<sup>2</sup> (Botswana Society 1976). The Okavango River forms the Delta. Because of the deep sand layer, the river's speed and volume are so drastically reduced that the water spills out to form a complex system of channels, ridges, swamps and pools of the Delta. The Delta is home to a wide variety of flora and fauna, and it is a source of surface water for both domestic and agricultural use, food in the form of fish, wild edible plants and wildlife. It is also an important resource for tourism and recreation, a transport medium and a source of building materials.

### **1.1.3 Climate and Resource Base**

Botswana has a highly fragile resource base due to the harsh climate. Botswana is subject to highly variable rainfall. Severe droughts are frequent; population fluctuations prevent plants and herbivores from developing closely coupled interactions, and ecosystems seldom reach a climatically determined equilibrium point (Holling 1973; Ellis 1995).

Average rainfall varies from 200mm in the southwest to about 650mm in the northwest in the Okavango-Chobe system. Day temperatures are normally high, and evapo-transpiration exceeds rainfall especially in the sandveld. Daily rates of open-water evaporation may reach 7.5mm (Darkoh 1997). Drought is endemic and occurs every 10 to 12 years.

The livestock sector is one of the major industries in Botswana. Cattle outnumber people two to one (Ntsabane 2001). Grazing and watering these large herds of cattle are major land-use activities. The consequences of these land-use activities are overgrazing, range degradation, competition with wildlife resources, soil erosion and an overall imbalance in the ecosystem (Cantrel 1992).

Over the years, the government's investment and subsidy policies have been heavily biased towards livestock (Ntsabane 1984). There has been a relative decline in arable agriculture's share of the GDP. The decline is significant as this sector affects a majority of the rural population, who

engages in small subsistence farming and petty commodity production (Molutsi 1988). The results have been persistent poverty, unemployment and migration to urban areas in search of jobs and a better life.

Mining is the dominant sector in Botswana's economy contributing to about 80 percent of the GDP. The key minerals are diamonds, copper, nickel and coal. There are however inherent weaknesses in both the "mineral led" economic growth and the nature of mining in Botswana. Firstly, mining in Botswana is capital intensive, not labour intensive, so its contribution to employment creation is relatively small. Secondly, the phenomenal economic growth based on mining has limits unless new mines can be continually developed. Mineral commodities such as diamonds are also susceptible to changes in the world market.

## **1.2 Significance of the Study**

To many in the developing world, environmental problems were at some point perceived as problems of rich countries and a side effect of industrial wealth. The problem for them was how to become rich or bridge the gap between the rich and poor countries of the world.

Recently, however, there has emerged a consensus that the environment does not exist as a separate sphere from human actions, ambitions and needs. It is now widely known that environmentally sound development policies and projects will lead to sustainable development. The consequence of humanity's inability to take serious note of the environment has resulted in environmental problems such as global warming, depletion of the ozone layer, continued population growth, massive loss of species and biodiversity, land degradation and accelerated rates of deforestation and desertification.

Traditional southern African societies have through history maintained an intimate organic relationship with nature showing a greater sensitivity to the workings of natural ecosystems. Their simple technologies and small population sizes were such that they made limited impact on the environment. Families in these societies have been teaching for decades children and adults the value of conserving, protecting and sustaining their resources. The system was ecologically balanced, as it was not losing products faster than those it could generate were.

There is now overwhelming evidence that all is not well in the relationship between human activities and the environment. Humans now pose the greatest threat to the environment. The unsustainable consumption patterns of natural resources and the ever-increasing population are putting persistent stress on the land, water and ecological systems. Traditional cultural institutions are not substantively and structurally prepared to handle these new challenges. There is now urgent need for assessing the country's environmental conservation/management strategies and for providing answers to why some of these are working or not. The specific objectives of

this study are to: i) review major environmental issues and their management; and ii) find out why the conservation plans have or have not worked.

Given the present resource base, climate, population and size of the country, the Government of Botswana require to urgently diversify its economic resource base and also to identify effective environmental and natural resource management practices. Evidence shows that despite the low population density of the country, pressure on the natural resource utilization has been mounting due to the low land productivity and uneven population distribution. This has created a serious ecological imbalance and it is now more important than ever to find out why or why not the natural resource management or conservation plans are working.

## 2. BACKGROUND: ENVIRONMENTAL ISSUES

### 2.1 Global Overview

The concept of environmental management has evolved overtime from its early concern with a narrow focus on pollution to a broad concern with environmental degradation and conservation to an even wider interest in development policy issues. The world's unsustainable consumption pattern and population increases have put increasing pressure on the use of air, land, water, energy and other resources. Developments such as new capacities and skills to manipulate nature, industrialisation, urbanisation and rapid population increases have disrupted man and nature's harmony of earlier periods. The World Commission on Environment (1987, 1) summarises the current global environmental issues very well:

From space, we see a small and fragile ball dominated not by human activity and edifice but by a pattern of clouds, oceans, greenery and soils. Humanity's inability to fit its doings into that pattern is changing planetary systems, fundamentally. Many such changes are accompanied by life threatening hazards. This new reality, from which there is no escape, must be recognised and managed.

The major divide is between the developing world and the developed. The developed world, comprising only 20 percent of world population, consumes 80 percent of the total resources while the developing world, making 80 percent of world population, consumes only 20 percent (Tedla and Lemma 1998). The result is a massive consumption of both renewable and non-renewable resources from nature, to the point where the global ecological system is losing products faster than could be generated.

For many in the developing world the most decisive challenges confronting governments are the interlinked problems of widespread poverty and environmental degradation. A major cause of both is policy failure. For poverty, it is the failure of national development and external aid agencies and programmes to reach and expand the choices of the poor.<sup>1</sup> For the

environment, it is the failure of economic, agricultural, energy, industrial and other sectoral policies to take fully into account their often-adverse impacts on the environment and natural resource base needed for future development.

There are serious global environmental problems that require attention and action. There is also consensus that these environmental problems are not rich versus poor or north versus south issues but that they are similar to both and global in nature. From erosion through pollution to the depletion of some resources, the evidence is in that many of our activities are reducing the long-term ability of the natural environment to provide goods and services as well as adversely affecting our health and well-being.

The Global 2000 report predicted that if no changes in public policies and technological advances occur, the world in the year 2000 would be more crowded, more polluted, less stable ecologically and more vulnerable than it was then. This indeed is the current situation facing us. Keys to any action, however, are the global perception of the environmental problems, a global political will and tools available to implement strategies. There is also the question of sharing the costs and benefits. Who will pay? Is it the government, consumers on the one hand or local, national, regional or international authorities or organisations, on the other? There have been a number of international conferences and conventions representing international environmental efforts. The following are some of these efforts:

- i) Conference on the Human Environment (1972)
- ii) Law of the Sea Conference (Caracas, 1982)
- iii) Special Session of the General Assembly of the United Nations on Raw Materials
- iv) World Population Conference (Bucharest, 1977)
- v) World Food Conference (Rome, 1980)
- vi) Conference on Human Settlements (Vancouver, 1974)
- vii) World Water Conference (Mar del Plata)
- viii) World Desertification Conference (Nairobi)
- ix) Rio Earth Summit (1992)

Many of these efforts have been more political, economic and social than they are technical. Their success has often depended on the global or national enforcement capacity or tools to implement policy, which were often lacking in terms of both money and work force.

The result has often been selective compliance on the part of the state and industry. Industries in fact have often threatened plant closure or relocation if there was insistence on strict environmental regulation enforcement.

## 2.2 African Environmental Initiatives

For most of colonial Africa, the predominant thinking at some point was that environmental responsibility and development were two competing objectives and that for the continent to catch up with the developed world there must be some intensive exploitation of resources.

There is now increasing evidence that environmental degradation stems from both economic growth and activities induced by an actual lack of development. There is also evidence that many human activities are currently reducing the long-term ability of the natural environment to provide goods and services. Africa is a region characterised by much rural and urban poverty. It is in search of making a livelihood that poverty often becomes responsible for the destruction of ecological resources.

Environmental conservation in Africa is essential to attain sustainable development, which is concerned with improving equity, managing natural resources, eradicating poverty, developing human population and accelerating economic growth. The African agenda on environment and development of 1992 adopted at Abidjan emphasised the need for African countries to make political commitments to ensure that development does not destroy the resource base on which it is based. It also emphasised a need for these countries to redefine national development priorities to alleviate constraints imposed by natural conditions, current international economic conditions and their debt burden.

African countries have responded positively in support of the development and ratification of international environmental conventions. These conventions have provided a framework for discussing issues and have initiated mechanisms for channelling financial resources, new knowledge and ideas. Most of the conventions arose in the early 1990s, reflecting the emerging importance of global and regional environmental issues (table 1).

Table 1. African countries ratifying major environmental conventions

	Environmental conventions	No. of countries that have ratified
1	UN Framework convention on climate change – 1992	36*
2	Convention on drought and desertification – 1995	33*
3	The Basel convention on the control of Tran-boundary movement of hazardous wastes and disposal – 1988	29*
4	Convention on biological diversity – 1992	39*
5	Convention on wetlands of international importance especially as waterfowl habitat – 1971 (RAMSAR)	19
6	Convention concerning the protection of world cultural and natural heritage	33*

Notes: \*Denotes conventions that Botswana has rectified.  
Date = date convention was initiated.

However, there have been limitations and constraints in the implementation of the above Conventions. The African Regional Conference on Environment and Sustainable Development (Kampala, 1989), the African Ministerial Conference on Environment (Cairo, 1995) and the Pan-African Conference on Environment (Bamako, 1991) all recognised that sustainable development can only be achieved if African countries have capacity in terms of technology and human and financial resources. Africa is blessed with abundant natural resources but vast areas of semi-arid areas coupled with frequent droughts and human activities subject many people across the continent to desertification. The results of much of this are widespread poverty, inequality, difficult socio-economic conditions related to fluctuating terms of trade for the continent's raw materials, debt and heavy reliance on natural resources for subsistence livelihood. Africa also suffers from problems such as insufficient legal frameworks, poor governance, a weak infrastructure base, and an insufficient technical and educational capacity. All of which singularly and collectively limit the continent's ability to foster a greater sensitivity to the workings of the natural ecosystem.

### **2.3 Environmental Challenges and Initiatives in Southern Africa**

The report compiled by the Southern African Development Community (SADC) Environment and Land Management Sector (ELMS) on implementation of Agenda 21 recognised that the majority of the people in the SADC countries are poor. The Rio Earth Summit of 1992 through Agenda 21 enhanced the development of choices and opportunities for the majority of poor people, communities and countries where they could meet the needs of the present generation without compromising the ability of future generations to benefit from. It also provides a new integrated policy framework for national and regional action for moving towards sustainable development within and among SADC countries.

After a decade of largely unsustainable development in Southern Africa, the livelihoods and lives of many people and the economic prospects of most countries continue to be threatened by environmental degradation. Most SADC countries are currently faced with a series of critical demographic, social, economic, energy, technological, agricultural, and institutional transitions to move towards development that is economically, socially and environmentally sustainable.

In the SADC region as elsewhere, unsustainable development has been largely driven by economic and sectoral policies that are too narrowly conceived and focused and that neglect in particular the adverse impact on the poor and the environment. Conventional "react-and-cure" responses simply cannot keep up with the escalating pace and scale of environmental degradation. Moreover, none of the national environmental and resource management agencies in the SADC region has enough staff or funds to effectively address all these problems. To break away from unsustainable to

sustainable development in the SADC region, environmental concerns need to be increasingly incorporated as an integral part of the development policies and decision-making of the major economic and sectoral ministries. Agenda 21 contains many recommendations for integrating environment and development in all major sectors, and proposes a broad range and mix of regulatory measures and economic incentives to ensure that national development becomes ecologically and economically sustainable.

A number of initiatives within the Southern African Development Community have been accomplished, and the discussion on such initiatives follows below (SABSP-Southern Africa Biodiversity Support Programme, Water Sharing Commissions, and the Trans-frontier Natural Resources Management).

### **2.3.1 Biodiversity Conservation Initiatives**

The southern Africa region is endowed with varied biological resources and ecosystems of global biodiversity importance including Mediterranean-type ecosystems; coastal, marine and freshwater ecosystems; forest ecosystems; mountain ecosystems; and semi-arid ecosystems. This biological richness supports the livelihood of many people and forms the basis for the economies of some governments. Much of the biological richness exhibits trans-boundary nature or migration patterns. The region therefore shares common problems with respect to physical decline and loss of biodiversity and the underlying factors contributing to such decline and loss. There are common social, institutional and policy problems that affect the region's ability and efforts to manage and conserve biodiversity. The problems are augmented by the limited and scattered information use and the lack of clear national priorities with respect to land use, development and conservation planning.

The SABSP is a regional biodiversity conservation and sustainable use initiative that started in 1996. The programme is supported by the Global Environment Facility with 10 participating countries: Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. The target beneficiaries of the programme are the people, governments, NGOs, CBOs and industries of the countries participating in the collaborative programme.

The overall goal of the SABSP is to improve co-operation, to build capacity both within and among participating nations and to integrate sustainable use into biodiversity conservation and other sectoral programmes. The programme hopes to achieve the following:

- i) Regional biodiversity information system availability and accessibility and its application in conservation, planning and management;
- ii) Regional expert network in various sectors;

- iii) Regional biodiversity strategy, action plan and monitoring system development and incorporation in national and regional policies and plans on agreed implementation process;
- iv) Prioritised regional training needs in biodiversity conservation and management and appropriate training courses developed and implemented;
- v) Pilot schemes and studies in biodiversity conservation and use;
- vi) National and regional strategies for sustainable financing mechanisms for biodiversity conservation and use and information shared among SADC countries for follow up; and
- vii) New and additional funding for potential follow up biodiversity conservation activities to ensure sustainability of the framework.

### **2.3.2** *Water Conservation Initiatives*

Three countries - Angola, Botswana, and Namibia - share the Okavango River Basin. The basin straddles from sub-humid climatic zones in Angola to semi-arid and arid climatic zones in northern Namibia and Botswana, where freshwater sources are scarce. The Okavango River Basin remains one of the least affected basins by human activities in Africa. Mounting socio-economic pressures on the basin in the riparian countries threaten to change its present character. It is anticipated that in the long-term this may result in irreversible environmental breakdown and consequent loss of domestic and global benefits.

The OKACOM (Permanent Okavango River Basin Commission) project required a binding agreement over the sharing of both the benefits and associated liabilities through joint management of the basin's water resources. To accomplish this, OKACOM countries had the political support to work towards joint management of the basin. The 1994 OKACOM Agreement, the 1995 SADC Protocol on Shared Watercourse Systems and the 1997 UN Convention on the law of non-navigational uses of international watercourses provided a framework for such an agreement. Under the OKACOM Agreement, the riparian countries worked toward the implementation of an Integrated Management Plan (IMP) for the basin based on an Environmental Assessment (EA).

Other initiatives in water conservation at the regional level include the following:

- i) Agreement of the Action Plan for the Environmentally Sound Management of the Common Zambezi River System or ZACPLAN, 1987: Botswana signed this regional treaty shared with other nine countries along the Zambezi basin in 1987. The objective is to coordinate the efforts of the parties in managing soundly the water resources and the environment of the Zambezi River Basin.



- ii) Bilateral Water Commission, 1994: This was an agreement between the governments of Botswana and Zimbabwe with the objective of advising on matters related to conservation, development and utilisation of the water resources. River basins covered under this agreement include Ramokgwebana/Shashe and, Nata and Zambezi/Chobe River Systems.
- iii) Limpopo River Basin Commission, 1984: Resources within the Limpopo basin are shared between Botswana, South Africa, Mozambique and Zimbabwe. All of the countries have to agree on each plan for the sustainable utilization of the Limpopo River.
- iv) Southern Africa Development Community (SADC) Protocol on Shared Watercourse Systems, 1995: The protocol aims at promoting measures for the protection of the environment and the prevention of environmental degradation that can arise from the utilisation of the resources of the shared water systems.

### 2.3.3 *Trans-frontier Wildlife Conservation Initiatives*

The Gemsbok National Park found in Botswana and the Kalahari Gemsbok National Park in South Africa were merged into a single ecological unit to form the first trans-frontier park in Africa in 1999, now known as the Kgalagadi Trans-frontier National Park (KTNP). The average rainfall in this area seldom rises above 125mm per annum. The Park is also a home to huge herds of gemsbok and other antelopes, such as the eland, which are capable of living for long periods without water, obtaining moisture from roots and succulent plants. It is also home of the famous black-maned lions, as well as smaller members of the cat family.

The joint venture facilitates the seasonal migration of wildlife in search of water and movement of free-roaming predators. The purpose of the KTNP was to protect the area and the herds of wildlife within it from mounting pressure from cattle and the overgrazing that they caused.

The following are examples of other initiatives that are still at the proposal stages.

- i) Okavango-Upper Zambezi Trans-Frontier Conservation Area (OUZTFCA) has far-reaching implications in socio-economic and regional development. OUZTFCA is also known as Four Corners Trans-boundary natural resource management area, as it spans Angola, Botswana, Namibia, Zambia and Zimbabwe. It includes the major basins of the Okavango and upper Zambezi Rivers. National parks and game reserves within OUZTFCA include Hwange and Zambezi National Parks in Zimbabwe; Mamili, Madumu and Bwabwata National Parks in the Caprivi region of Namibia; Sioma Ngwezi and Kafue National Parks in Zambia; and Chobe, Makgadikgadi-Nxai Pan and Moremi National Parks in Botswana.

- ii) Cross-Border Parks or Trans-frontier Conservation Areas link different countries in SADC under the umbrella of the Peace Parks Foundation, and one of its ambitious component involves the proposal for the merging of Kruger National Park in South Africa and national parks in Mozambique and Zimbabwe and between Botswana, South Africa and Zimbabwe.

## 2.4 Major Environmental Issues in Botswana

Environmental global issues are vast in nature, and successful mitigation strategies will incorporate local, national, regional and global initiatives. This section considers the major environmental problems in Botswana to set a basis for the discussion (in later chapters) as to whether the national conservation plans have worked. Six major environmental issues have been identified in Botswana (NCS 1990).

### 2.4.1 *Wildlife Issues*

Various types of conflicts by the local people characterise the situation in protected areas. This is attributed to the drastic increase in population in African countries (Anderson and Groove 1987), as is the case in Botswana. Most people live in rural areas and they derive their livelihood from, livestock and agriculture, which requires fertile land. As populations increase, fertile land becomes scarce, which puts a lot of pressure on protected land.

Malik (1984) considers poverty, an increasing demand for land and the desire to improve people's standards of living as the three main issues causing many problems of conservation in African countries and in developing countries in general. The rural population of Botswana hardly benefited from the revenue obtained from the protected areas until recently when Community Based Natural Resources Management Organisations were formed. The local population is prevented from hunting in the protected areas, but the wildlife can move out of these areas and damage the little land that remains for the people and their livestock. Predators and elephants terrorise some local communities in Botswana (Totolo and Toteng 1998). Initially, such animals could be shot to reduce damage to local communities (Section 46 of Wildlife Conservation and National Parks Act of 1992), but this has resulted in decrease in wildcat population. In view of the declining population of wildcats, section 46 was recently amended to bar farmers or local communities from shooting such animals, even when damaging their property. This act has further hardened the local people's attitudes towards conservation, and it is likely to force the rural people to engage in illegal activities (e.g., killing of the animals or assisting organised poachers).

Lusigi (1984) and Abel and Blaikie (1986) argue that two other factors strain the relationship between the rural populations and the protected areas. Firstly, entry to the protected areas is beyond the reach of the local people

because of permits and high entrance fees. Secondly, rural communities seldom use protected areas for recreation. Lusigi (1984) further argues that on entry to most African protected areas one must be driving and few people in the rural population own cars. To the local people this is ironical since they have moved for generations on foot among the animals in the jungles of what are now so-called protected areas, but today, you must own a car and have a permit to enjoy the same right.

Rural communities keep cattle and derive more direct benefits from cattle than wildlife. More than half of the country's population owns cattle, although only 5% own over 50% of the national herd. Cattle numbers have been increasing in the wildlife-populated areas of the country since 1935 due to the borehole-drilling technology employed by wealthy farmers. This has resulted in acute competition for land between the two sectors, which is not a positive development towards sustainable development. Disease management strategies have included the erection and separation of the country into zones, using cordon fences. Migration routes of wildebeest, hartebeest and eland from the south-western part of the country to the north have been blocked by these fences (Totolo and Toteng 1998). Conservationists are arguing that such fences were erected without taking into account the migration routes and patterns exhibited by such wildlife species. As a result, many such animals have died from lack of water.

#### **2.4.2 Urban/Industrial Pollution**

Botswana's rapid economic development has led to higher per capita incomes and urbanization that have consequently led to changed lifestyles and increased demand for manufactured goods. As a result, the waste generated has changed in composition from that previously dominated by biodegradable agricultural waste to new forms of mostly non-biodegradable materials such as packaging waste, hazardous waste, food industry and construction wastes. Presently, the country's waste management efficiency has been considered satisfactory because of insufficient data on the waste generated. For efficient waste management, there is need for data on the different types of waste being generated and their quantities so that well informed decisions relating to the best environmentally friendly and economically affordable methods can be used for their disposal. However, available estimates indicate that the waste producers have little knowledge or even concern about the quantities and composition of their waste.

In the country's major cities, local authorities collect most waste. CSO (2000) estimates that the proportions of households that receive a collection service are about 60% in large villages, 7% in smaller villages and none in strictly rural areas (cattle posts and lands). Air pollution occurs but it is not considered significant even in major mining towns.

Even though the government of Botswana regards pollution as an important issue, preventive measures have been limited to a few industrial and other

human activities. However, some government institutions particularly the Ministry of Lands, Housing and Environment and the Department of Water Affairs have taken up serious efforts to address the problem of water pollution through use of various methods. For instance, the NCS 1990 Report provides guidelines for water resources management through "Protection Zones" throughout the country, which is vital in environments with scarce water resources.

### 2.4.3 *Vegetation/Wood Resource Depletion*

Forests provide many products to the inhabitants of Botswana, but the natural forest is finite, especially in the context of Botswana's semi-arid conditions. Past intensive harvesting and other ecological factors have led to some species such as *Pterocarpus angolensis* (Mukwa) being so heavily exploited that their survival is now severely threatened (Moyo et al. 1993). The rapid rise in deforestation has been associated with increases in the human population, which associated with an expansion of cropland and with increasing demands for forest products (Kgathi and Mlotshwa 1994). The effects of population growth on deforestation are also a function of the distribution of the population and tend to be higher around highly populated areas.

Ocaya (2001) discusses the strengths and weaknesses of the strategies that have been implemented/ suggested in Botswana since independence to meet the rising demands placed on forest resources because of population increase. They include natural regeneration, woodlot management and exotic tree planting.

#### *Natural regeneration*

This is a mechanism used by plants to maximise the potential for successful seedling establishment in specific natural environments: it can include vegetative expansion; persistent seed or spore bank or persistent juveniles. The rate of harvesting forests in Botswana and the harsh climatic conditions of the country make regeneration negligible (Tietema et al. 1991).

#### *Exotic tree planting*

In reacting to the deforestation problem, the Botswana Government encouraged planting of woodlands since 1972 (Tietema et al. 1991). The woodlots were mainly eucalyptus species, which were selected because it was believed then that they grew faster and were well adapted to arid conditions. The exotic forest estates or plantations were created to supply future domestic needs for timber; fuel wood and other forest produce in most parts of Botswana (Coe 1992). Problems with these eucalyptus plantations were eventually encountered.

The plantations are not stable as natural ecosystems and the outbreaks of pest diseases have been found to be catastrophic (Tietema 1987). Eucalyptus plantations are very wasteful; i.e., water consumption is very

high and drops in the ground water table have been reported for places with such woodlots. Suppression of other ground vegetation due to eucalyptus' high competitive ability for groundwater has been documented. Eucalyptus plantations are poor in controlling soil erosion because their litter does not decompose fast due to bactericidal substances in the leaves. This results in decreases in the water holding capacity of plantation soils (Tietema 1987). Woodlots also tend to produce fewer products, poorer fuel woods and fodder sources are sometimes inferior in durability compared to indigenous species (Morrison and Bass 1992).

#### *Indigenous woodland management*

Because of problems experienced with the exotic woodlots, performance of the exotic species was compared with that of indigenous ones to assess the possible advantages of using local species instead of the exotic ones. As a result of such studies, forestry programmes now tend to concentrate on management of existing indigenous woodlands rather than on the development of exotic woodlots and tree plantations alone (Coe 1992). Mixed plantations of indigenous and exotic species are being pushed forward as they are much more diverse and as they offer more benefits by producing diversified non-timber products, lower the risk of disease and pest outbreak, protect the soil and improve fertility, provide shade and protection to valuable understorey plants and offer better habitat for wildlife (Ocaya 2001). The local species are often preferred as the species are well known by the local people and the resource may already be partly established (Voysey 1987).

However, managing indigenous species through in situ conservation has proven to be problematic. Firstly, in situ conservation is limited by the large samples required to maintain genetic diversity; for example, 5000-20000 plants are required to maintain variation in a variety (Engelmann 1994). This means that the land requirements will be high especially for forest trees. Furthermore, plants preserved in natural conditions are exposed to pests, pathogens and fires, which are unpredictable and can be quite dangerous. Alternative strategies, taking into account the foregoing problems, have been developed in Botswana by such organisations as the Forestry Association of Botswana (FAB) and the Forestry Unit and the National Tree Seed Centre of the Ministry of Agriculture. One of these strategies involves the development of laboratory based storage systems such as seed stores or *in vitro* cultures (Ocaya 2001).

#### **2.4.4 Depletion of Veld Products**

Broadly, veld products are range resources that include wildlife, plants such as wild fruits and roots, and mineralised and clay soils. For the purposes of the study, fuel wood and wildlife are excluded in this definition, as these components are treated on their own. Wild fruits, herbs, roots and insects

that are used for consumption and for medicinal purposes are of primary concern (Molebatsi and Athlhopeng 1998).

Just like wood resources, veld products are utilised on subsistence and commercial basis. Subsistence harvesting is, however, the more prevalent of the two. It is the threat of over-exploitation of veld products that influenced the government to include them in the list of major environmental issues in Botswana (NCS 1990; Athlhopeng et al 1998). Over-exploitation and depletion are related to the commercialisation of veld products such as phane and grapple plant, poverty, land use competition (e.g., expansion/encroachment of villages, arable lands and grazing pressure), and prolonged droughts that result in environmental degradation. The use of inappropriate harvesting methods for the grapple plant was found by Sekhwela (1994) to be a factor that led to depletion around settlements in western Botswana.

Molebatsi and Athlhopeng (1998) have also argued that access to veld products is a major factor that should be considered as contributing to their depletion. Veld product harvesting is currently not recognised/ considered a distinctive land use activity that deserves to be preserved. This therefore implies that the veld product areas can always lose their status to more recognised land uses such as arable farming, livestock grazing, settlements, etc. Inappropriate use is therefore often worsened by local communities' loss of control over local resource management (Molebatsi and Athlhopeng 1998).

#### **2.4.5 Rangeland Degradation**

Rangeland is grazing land mostly found in the arid and semi-arid areas of the world; however, arable agriculture is usually not a viable option due to aridity and/or dystrophic soils in these environments. It is estimated that 42% of the world's rangelands are used for grazing and browsing purposes (Totolo 1998).

While rangelands are home to more than 10% of the world's population and 42% of them are estimated to be used for grazing and browsing purposes, per capita food production is usually low because of environmental, social and economic constraints. Rangelands were until recently dominated by low usage by pastoral nomads and hunter-gatherers. The rate and intensity of change over the past 40 or 50 years has in fact been striking with the traditional modes of utilisation encroached upon from a variety of sectors, including wildlife conservation, and especially the more intensive forms of livestock and arable production.

In Botswana, two types of rangelands are recognised based on land management (Totolo 1998): communal grazing areas that are utilised on a collective basis and commercial ranches, which are owned privately by individuals or syndicates. Rangelands provide, other than grazing resources, a range of natural resources including wood resources and veld products.

Rangeland degradation, by definition, denotes a permanent change in the quality and potential of a rangeland. However, rangeland degradation in Botswana is a highly contested subject best understood by discussing the classical range succession model, which is solely based on equilibrium principles. The model is based on theories of plant ecological succession developed by Clements (1916) and it is described in detail by Stoddart and Smith (1955) and reviewed by Westoby et al. (1989).

Based on the classical range succession model, rangeland in Botswana is believed to be degraded due to large numbers of livestock.

As a result, the methodologies used to measure the productivity of rangelands in Botswana and consequently condemning them as overstocked are contested as being inappropriate (Perkins 1991; White 1993; Abel 1991, 1997). These works argue that in arid and semi-arid environments, the equilibrium dynamics (classical range succession model) between cattle and plants may never become obvious. The non-equilibrium systems prevail in such environments. Non-equilibrium refers to an ecosystem or community where cattle or herbivore numbers are not in long-term balance with vegetation resources or with other populations or external forces such as climate (Holling 1973), hence the name, disequilibrium rangelands.

Severe droughts are frequent in these systems and population fluctuations prevent plants and herbivores from developing closely coupled interactions, and ecosystems seldom reach a climatically determined equilibrium point (Holling 1973; Ellis 1995). In such climates rainfall, and not forage availability, may ultimately be the variable, which limits herbivore population growth (O'Connor 1991; White 1993) and therefore overrides grazing/ browsing effects (Benkhe and Scoones 1993).

In pursuit of equilibrium status (in an environment where it is unlikely to exist) and to abate rangeland degradation, government schemes such as the Tribal Grazing Land Policy (TGLP) and the National Agricultural Development Policy were introduced in Botswana in 1975 and 1991, respectively. TGLP is a culmination of many previous attempts by both the pre- and post-colonial governments of Botswana to promote the development of the livestock industry and to halt rangeland degradation (Totolo 1998).

However, many unforeseen problems were encountered during the implementation of TGLP, and it was proclaimed a failure. The National Agricultural Development Policy, just like TGLP, promotes de facto privatisation of communal rangeland, as a way to abate/ reduce rangeland degradation. The reasoning behind this thinking lies on the assumption that conferment of property rights to individuals (e.g., water rights and de facto grazing rights) will eventually lead to the adoption of improved range management practices in Botswana.

### **2.4.6 Water Resource Depletion and Degradation**

Except for the Okavango-Chobe area in the north, Botswana suffers from a general absence or paucity of surface water. Rainfall varies considerably and is extremely unpredictable over space and time. Much of it falls in scattered convective showers (Darkoh 1997), and daily rates of open water evaporation are extremely high due to high day temperatures and flat terrain (may reach up to 7.5mm). Drought is endemic and tends to occur with a quasi 10-12 year periodicity. Therefore, the nature of water scarcity is not only seasonal but also varies with periodic droughts.

In view of the frequency of drought and the paucity of surface water in the country, groundwater assumes a special importance. Increasing human and livestock population, development and urbanisation are major factors that place a lot of pressure on water demand. To meet the increasing demand, Botswana has tended to look for more unexploited sources, with emphasis on conservation or re-use initiatives (Athlpheng 1998). Pressure on water resources continues to plague the country as evidenced by the increase in the exploitation of underground water through borehole drilling. There is, however, need to improve the management of the developed water resources so to sustain the supplies (NCS 1990). Groundwater level monitoring has barely taken place, and there is, in fact, fear that groundwater recharge is often insufficient to balance the draw-off.

The National Water Master Plan (NWMP) is a comprehensive document that contains well-thought measures targeted at water conservation in Botswana. The main institutions responsible for the supply of water and related activities include the Department of Water Affairs, Water Utilities Corporation, District Councils, Land Boards, and the Department of Geological Surveys. The Department of Water Affairs has the overall responsibility for water planning, policy-making, protection and development in the country

## **3. BOTSWANA'S NATIONAL CONSERVATION PLANS**

This section discusses the various attempts formulated for managing the major environmental issues summarised in the previous chapter. Some of the strategies have also been identified and discussed in the National Conservation Strategy (1990) and in Athlpheng et al. (1998).

In view of the foregoing, this section considers the evolution of natural resource conservation strategies in Botswana and the legal framework empowering them. It was found befitting to consider the evolution of the country's natural resource conservation strategies in three historical phases: traditional management strategies, management strategies during the colonial period, and management strategies during the post-independence period. Abel and Blaikie (1986) note that to understand the causes of contemporary problems, the historical origins of those problems must be



traced. The past is the key to the present; studying the past shows what worked and what failed, minimising the possibility of repeating similar errors.

### **3.1 Traditional Natural Resource Conservation Strategies in the Pre-Protectorate Period**

People lived in social groups that identified themselves as tribes (e.g., Bangwato, Bakgatla, etc.). The tribal administrative organization of most tribes in Botswana is highlighted in Walker (1994) and Schapera (1943). The chief headed the tribe, and under him were subdivisions led by his designates.

The management strategies of natural resources during this period were embedded into the cultural and administrative organizations of the tribes. The chief effected natural resources management strategies through tribal land divisions. The natural resource base (trees, pastures, water, wildlife, etc.) was under the tribal land. The chief in consultation with the elders and headmen appointed land overseers for different sections of the tribal land (Hitchcock 1980). The role played by the overseer involved monitoring the status of the grazing pastures and general availability of other resources (e.g., wildlife and water) within the tribal land. In the event of a problem, the chief would convene a tribal meeting to discuss and resolve the problem. Solutions included removal of livestock from affected areas for recovery purposes. For instance, cattle posts were moved to the sandveld areas (western part of the country) from the Bangwato cattle posts on the hardveld areas (eastern part of the country) to reduce grazing pressure on natural resources (Walker 1994). The following are detailed accounts of strategies employed by tribes in their natural resource management systems in Botswana (Spinage 1991; Walker 1994).

#### **3.1.1 Conservation Strategies for Plant and Water Resources**

In the traditional systems, tree resources were associated with myths and taboos. Such myths and taboos played a major role in the conservation of rare and unique species (e.g., *Adansonia digitata* - fig tree or *mowana*). Chiefs' decrees/ restrictions also played a major role in the conservation of tree resources. For instance, *Spirosytachies africans* was an important tree species used as timber and goat browsing by the Batswapong people. As a result of the chief's decree, a stand of this species was set aside in Pilikwe and no harvesting was allowed to take place until recently. The Chief's representatives were responsible for seeing that the decrees and restrictions were followed (Walker 1994). The Barolong Chiefs are also known to have regulated the cutting of brushwood through permits and overseers (Walker 1994).

### 3.1.2 *Management Strategies for Wildlife Resources*

Tribesmen could hunt small game wherever they pleased; however, qualifications were required concerning the age group of hunters (Spinage 1991). Big game (e.g., buffalo, giraffe, gemsbok and zebra) was protected by the chief's decree/restriction and could only be killed with the chief's permission. The Kgori bustard (a bird) was only killed and utilized by the chief to avoid mass killing, as the bird bred poorly (Walker 1994).

The oldest form of customary law that emphasized sustainable use of natural resources is reflected in totemic laws of tribes. The tribes in Botswana distinguished themselves from each other (among other things) by their totems, which in many cases, were animal species (Spinage 1991). Tribes could not kill or touch their respective totems, and this placed some protection on a range of animals. Contrary to Walker (1994) who argues that totemic laws played an insignificant role in conservation in Botswana, the present authors believe that during the pre-Protectorate Period (before 1885) such practices were major components of traditional natural resource management.

Methods of killing and storage during this period also attributed to the success of the management strategies employed. The methods of killing were not destructive as compared to today's (Walker 1994). Lack of refrigeration facilities set limits to what could be killed by each family at a time. Moreover, it is well documented in the literature that large game was only killed in the winter through the chief's permission, and meat would be slowly dried for use through the course of the year when hunting was still restricted. This kind of system therefore allowed for breeding to go undisturbed, which is normally between September and February (Spinage 1991). The only people who could hunt throughout the year were the Basarwa (Bushmen) because their lives were so intricately tied to wildlife. Other wildlife management strategies by tribes (locally known as Letsholo-regiment, Moshomo-tribute) are discussed in detail in Spinage (1991) and Walker (1994).

## 3.2 **Natural Resource Conservation Strategies during the Protectorate Period**

In 1885, the British proclaimed a protectorate over Bechuanaland (now Botswana), after three local chiefs went to London to seek protection from the Boers/Afrikaners in South Africa and the Germans in South West Africa (now Namibia). It is therefore important to make an analysis of how the Protectorate administration influenced the traditional natural resources management strategies that were embedded within the cultures of the existing tribes.

Before the protectorate period, Tswana customs and traditions emphasized a communal use and management of resources as discussed in the previous section. The white settlers, however, seemed eager to change the societies

from the traditional communal attitude to the individualist capitalist control of the resources, especially land. Khama (1975) interpreted this attitude as a sound approach, since the traditional organization or attitude to land tenure did not benefit people because it discouraged investments and impeded the rural populace from using the land to the best advantage. The settlers believed that individual control was essential given the range of ecological constraints affecting land use under the existing organization. The sections that follow illustrate how the Protectorate government interfered with the traditional strategies of natural resource management.

### *3.2.1 Early Days of the Protectorate and Conservation*

The first commissioner of Bechuanaland Protectorate in 1885 was advised by the British government not to interfere with the tribal administration of tribes headed by chiefs (Spinage 1991). In 1891, however, the High Commissioner was ordered to ensure the administration of justice, collection of revenue, and general order and good governance of all persons. This was supposed to apply to Europeans only, while Chiefs and their tribes were to be entirely left alone. This system of rule came to be known as indirect rule. Under this system, tribes continued practicing most of the conservation strategies they had before the protectorate days. In 1910, the British government decided to include everyone (both Europeans and tribes) under the administration of the Protectorate under its commissioner. New land institutions were established. To some extent, the institutions diminished the traditional leaders' powers even though the leaders (chiefs) retained autonomous rule in their tribal areas. The institutions were detached from the traditional communal ways of land ownership (Machacha 1981). The institutions that evolved from tribal or communal land management during the early days of the Protectorate included the introduction of different land tenure systems such as the following.

- i) **Freehold land:** This was land taken over by the white settlers when they settled in the country, which initially was communally owned. This became private land owned by the settlers.
- ii) **Crown land:** This was land with few inhabitants or not occupied and there was little done in the way of developing such land during the protectorate period. Crown land was later transferred to government ownership and it was renamed state land at the end of the protectorate period. Most of this land is used for parks, game reserves and forest reserves.

Machacha (1981) records that at the end of the protectorate period 48.9 percent of land in Botswana was tribal or communal land, 46.7 percent crown land and 4.4 percent freehold land. This shows that only a small percentage of land was taken over as private land during the protectorate

period. However, it must be noted that although small in percentage, it was the most productive land in the country.

With time, conflicts of interest related to natural resources management, especially over wildlife, erupted in the early 1890s between the Protectorate Administration and the tribes. For instance, Police Officer Major Grey of the Bechuanaland Protectorate complained through the High Commissioner about the large numbers of animals killed by the Ngwato Tribe (Spinage 1991). Statistics put forward as part of the evidence included more than 600 heads of large game killed by the locals between March 1893 and March 1894. The current study argues that the arrival of the Europeans from South Africa and South West Africa (Namibia) prompted the locals to kill more wildlife for sale in exchange for other valuable goods such as alcohol and jewellery. The Ngwato tribesmen had also seen a lot of game being destroyed by white travellers and Boer trekkers on their way to Damaraland. This brought about a situation where the chiefs were left in a dilemma; on the one hand, they were discouraging the locals from indiscriminate killing of wildlife, whilst the foreigners could just do it and go unpunished.

The Protectorate Administrators viewed the uncontrolled killings as recklessness on the side of the tribesmen. They tried to pursue corrective measures through Chiefs Sebele of the Bakwena, Bathoen of Bangwaketse and Linchwe of Bakgatla in 1894. In general, the chiefs and their people were against any new laws on game killing coming from the Protectorate Administrators.

Although not supportive of some activities of the tribes in relation to natural resources management, the Protectorate Administrators realized the need to work closely with the chiefs. This is evident from the nature of the chief's decrees (*melao*) passed before and during the Protectorate Administration (table 2) as means of natural resources management before and during the Protectorate. Some of the decrees were a direct influence from the white settlers and the missionaries.

Table 2. Decrees passed by chiefs

Year	Decree	Tribe
1815	Ivory is the property of the chief	Bangwaketse
1856	Hunting is prohibited on Sundays	Bakwena
1877	Capture of young ostriches is prohibited	Bangwato
1878	Hunting by European Commercial Hunters is prohibited, but permitted for sport hunters on personal application to the chief	Bangwato
1892	Hunting of giraffes and other big game is prohibited	Bakwena

	without permission from the chief	
1892	Hunting of ostrich is prohibited, but the chief gave permission to hunt cock ostriches	Bangwaketse
1893	Hunting of elephants, giraffes, eland and other big game is prohibited without special permission from the chief	Bangwaketse
1895	Hunting of giraffes, elands and other big game is prohibited without permission from the chief	Bangwato
1898	The use of deadfalls, staked pits and traps on roads is prohibited. Hoofed game is to be caught only with jackal (iron) traps	Bangwaketse
1910	Hunting of elephants is prohibited without permission from the chief. Hunting of giraffes, buffalos, elands, rhinoceroses and hippopotamuses is prohibited	Batawana
1913	Immigrants obliged to obey the Chief's laws concerning the destruction of game. The killing of white storks and secretary birds is prohibited. Hyrax and guinea-fowls are totally protected on Serowe Hill	Bangwato
1920	Elephants are to be hunted only with permission from the Chief, and one tusk is to be given as tribute	Batawana
1926	Hunting of big game east of the railway line is prohibited. Setting traps in other peoples' fields is prohibited	Bakgatla
1936	Sale of lion and leopard skins to traders is prohibited	Bakwena
1937	Hunting of giraffes and other Royal Game is prohibited without permission from the Chief	Batawana

SOURCE: Spinage (1991).

The heightening pressure for change by the whites in the traditional conservation strategies is further reflected in new laws passed by the chiefs. The chiefs began to make special laws about the use of their land and resources, which did not seem necessary before then. For instance, Schapera (1943) reports that among the Ngwato, Khama started prohibiting veld-burning at certain periods of the year, the killing of certain big game animals, the cutting of trees, the making of beer, the watering of cattle at certain places and the sale of sorghum to European traders. Similarly, in addition to all of the above prohibitions, among the Ngwaketse, Bathoen I abolished some "environmentally unsustainable" traditional customs relating to the agricultural cycle; and his successor, in 1912, abolished veld burning. Among the Kwena, in 1937, the Chief ordered fire paths to be made along borders of specific areas to prevent wild fires.

### 3.2.2 *Middle Days of the Protectorate and Conservation*

The middle days of the Protectorate saw a change of policy from “not interfering with the Native Administration” to laws that would regulate natural resources conservation on both freehold and communal lands. The Chiefs, although still very important, had their powers as custodians of all natural resources gradually eroded. For instance, in 1895, the Protectorate Administration, through the British South Africa Company, instructed the Chiefs that they should enjoy hunting rights only on condition that they agreed to observe a “close season” (Spinage 1991). Following this, a series of game laws that had been previously enacted in South Africa were applied to the Protectorate to regulate the hunting and killing of wildlife (table 3.)

Table 3. Game laws passed during the Protectorate and post-Protectorate periods

Year	Game law passed during and after the Protectorate Administration	Summary of major functions
1891	The Game Law Amendment Act of 1886	
1891	The Ostrich Export Duty Act of 1884	Imposed a tax on the export of ostriches and their products;
1893	1893 Proclamation of 19 <sup>th</sup> September	The first Protectorate Proclamation concerning game, but did not repeal the Game Law Amendment Act;
1904	The Large Game Preservation Proclamation No. 22	It repealed the 1893 Proclamation;
1907	1907 Proclamation No. 2	Instituted Section 11 of the Act of 1886 passed in South Africa, empowering the High Commissioner to protect species in specified areas for up to three years at a time;
1907	1907 Proclamation No. 39	Repealed the Ostrich Export Duty Act of 1886 passed in South Africa (making unlawful the export of any ostriches or ostrich eggs);
1911	1911 Proclamation No.42	Instituted a licence to trade in game products; exemption was made for landowners trading in game products derived from their own land and for tribesmen in tribal areas;
1914	1914 Proclamation No.44	Plumage Birds Protection and Preservation, and it made it an offence to trade in or export the plumage of any wild birds;
1924	1924 High Commissioner's Notice	Protected large game for a period of one

	No. 20	year in all Crown Land north of the Molopo River ;
1925	1925 Proclamation No.17, the Bechuanaland Protectorate Game Proclamation	It repealed the Act of 1886 and its eleven subsequent active Proclamations (excluding the Plumage Birds Protection and Preservation Proclamation) and it made some amendments to existing laws on game;
1929	1929 Proclamation No. 48	It placed the burden of proof on the accused to prove that any game in his possession was not hunted in contravention of the law;
1930	1930 Proclamation No. 27	Introduced the forfeiture of firearms and ammunition found in the possession of an accused at the time of commission of an offence of unlawful hunting;
1932	1932 High Commissioner's Notice No. 53	Instituted an important new protected area, protecting both large and small game for a period of 3 years in an estimated 15550km <sup>2</sup> in Chobe District, which is part of the present Chobe National Park;
1934	1934 Proclamation No. 74 Native Administration Proclamation	Empowered the Native Administration to issue through the chiefs any order thought desirable for the protection and preservation of game;
1940	1940 Proclamation No. 19, the Bechuanaland Protectorate Game Proclamation	It repealed Proclamation No. 17 of 1925 and its amendments and introduced new provisions in line with the 1933 London Convention;
1940	1940 High Commissioner's Notice No. 42	Extended the area protected under the 1930 Proclamation No. 27 to include the "whole of the Kgalagadi District" (for the first time native residents could be issued permits to hunt and kill game in reasonable quantities for food in this area);
1940	High Commissioner's Notice No. 107	The first Game Reserve was established under Proclamation 19 of 1940 along the Nossop River;
1950	1950 High Commissioner's Notice No. 228	Brought into force the Laws of Bechuanaland, game becoming Chapter 114; it consolidated the amendments enacted since 1940;
1960	1960 High Commissioner's Notice No. 65	Established the Chobe Game Reserve, protection of the area (under the 1932 High Commissioner's Notice No. 53)

		having lapsed since 1943;
1961	1961 Proclamation No. 22, the Fauna Conservation Proclamation	Further and better provision of the conservation and control of the wild animal life and to give effect to the International Convention of 1933 as amended for the protection of the fauna and flora of African continent;
1967	1967 Act No. 47, the Fauna Conservation (Amendment) Act	Retained most of Proclamation No. 22 and introduced some principal amendments;
1967	1967 Act No. 48, the National Parks Act	Introduced for the establishment of National Parks, for the preservation of wild animal, fish, vegetation and objects of scientific interest and for the control and management of such Parks (Chobe was declared a National Park by Act);
1967	1967 Statutory Instrument No. 64	Promulgated the first Tribal Territory hunting regulations for the Bangwato Tribe hunting on the Tribal Territory;
1968	1968 Statutory Instrument No. 4	Announced the first Controlled Hunting Areas in the Kweneng District;
1968	1968 Statutory Instrument No. 13	Exempted Remote Area Dwellers from the Batawana Tribal Territory Hunting Regulations (S. I. No. 65 of 1967);
1968	Statutory Instrument No. 23	Provided regulations for hunting in Controlled Hunting Areas on Tribal land; these did not apply to members of a tribe hunting in their Tribal Territory;

SOURCE: Summarised from Spinage (1991)

Generally, during the middle days of the protectorate era, contact with Europeans led to greater skill in the use of land and its resources:

- i) Underground water supplies were extensively tapped through boreholes;
- ii) The introduction of new implements and new forms of techniques improved-cultivation methods;
- iii) Better/new methods of combating agricultural pests and stock diseases were introduced;
- iv) Better means of transport and communication, notably the railway line, was built in 1896-7 (Shilling 1981) and it gave the natives greater freedom of movement from the restrictions formerly imposed by their surroundings. Development of the transport facilities brought about a wider range of goods so that the natives



had a choice not to entirely depend on their immediate environment for survival. About this time, the habit of seeking work outside the territory especially in the mining areas of South Africa began and standards of living were improved;

- v) Introduction of horses, guns and iron traps led to extensive destruction of game; and
- vi) Imported goods such as blankets were slowly replacing traditional handicraft products, and metal goods such as sewing machines were becoming very important to the locals.

All these advances were achieved at the cost of overcrowding and over-utilisation of the communal areas. The European influence had made the natives to acquire the skills and tools to more effectively challenge the limitations of their environments.

### 3.2.3 *Last Days of the Protectorate and Conservation*

Because of the limitations imposed by their environment, the pre-Protectorate Tswana were primarily hunters and pastoralists. The products of cultivation were sparse, undependable and seldom marketable. Arable farming therefore became of secondary importance to the economy. The introduction of irrigation techniques and ploughs during the protectorate period formed a potential change in the importance of their traditional ways by making arable farming of primary importance. This could probably be expected because simple traditional ways of hunting could not exploit the resources in the same way as in a system where animal husbandry, agriculture and industrial and mining civilisation were important land use components.

The Tswana unconsciously responded to the outside stimuli brought by the white settlers. Shilling (1981) believes that the driving force behind their response seems to have been their need to overcome the severe productive limitations of their environment. In the long term, this response to the external stimuli of the white settlers eroded the very basis of their economy by upsetting the delicate ecological balance, which they had unconsciously maintained with their environment. Talbot's (1960) vegetation analysis of Botswana shows that the human impact during the protectorate period generally led to a deterioration of the nature of flora and fauna of the region.

Firearms were introduced on a large scale in the country in the 1800s, together with increasing penetration of merchant capital from outside. Initially, this penetration was in search of cattle but soon the interest focused on the region's resources of ivory and ostrich feathers. This had many consequences for the Tswana's natural fauna and a whole relationship with their environment. For instance, the firearms and ammunitions led to a decline in availability of game meat as major source of food. Shilling