

Forestry Outlook Study for Africa (FOSA)



Botswana



Please note that the views expressed in this paper reflect those of the authors and should not be attributed to any of the institutions.

This paper has been minimally edited for clarity and style.

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Preface

This paper for the Forestry Outlook Study attempts to give a broader picture of forestry sub-sector in Botswana. It outlines the current status of forestry sub-sector in Botswana, and the socio-economic, and environmental trends towards the year 2020. It looks at a wide range of issues affecting forestry, makes critical assessment of their implications and how they will shape the future of the sub-sector in the coming years.

It also examines the role of stakeholders and other interested parties (e.g. Government Agencies, NGOs, Donors, Civil Society, Private Sector etc) in forestry sub-sector. The Botswana study will form part of the Southern Africa Outlook Study for Africa for 2020.

The study will feed into the Southern African Outlook Study for Africa, and is a major undertaking that identifies issues and opportunities within and outside forestry sub-sector in Botswana. Hopefully this information will prove to be invaluable to policy decision makers in shaping the future of forestry development in Botswana.

Abbreviations

AP-	AREAL PROPORTION
CSO-	CENTRAL STATISTICS OFFICE
FEC-	FINAL ENERGY CONSUMPTION
FED	FINAL ENERGY DEMAND
GDP-	GROSS DOMESTIC PRODUCT
GS-	GROWING STOCK
LPG-	LIQUIFIED PETROLIUM GAS
MAI-	MEAN ANNUAL INCREMENT
MMEWA-	MINISTRY of MINERALS, ENERGY & WATER AFFAIRS
MOA-	MINISTRY OF AGRICULTURE
NCSA-	NATIONAL CONSERVATION STRAGEY AGENCY
NDP8 -	NATIONAL DEVELOPMENT PLAN 8
NES-	NET ENERGY SUPPLY
NGO	NON-GOVERNMENTAL ORGANISATION
NTPD-	NATIONAL TREE PLANTING DAY
PES-	PRIMARY ENERGY SUPPLY
PGR-	POPULATION GROWTH RATE

Chapter 1

1.1. Objectives

The overall objective of the study is to provide a practical framework to reinforce the national forestry programs of Botswana. This in turn will give useful information to development agencies, development banks, the private sector, Non-Governmental Organizations and others to improve their strategies, programs and investments in forestry sector in the country. The key aspects of the study cover: conservation and management, production and environment, policies, social and economic dimensions.

1.2. General background

1.2.1. Location

Botswana is an arid and semi-arid country with total land area of 582,000 km². It is land-locked and shares borders with South Africa in the south and east, Namibia in the west, and both Zimbabwe and Zambia in the northeast.

1.2.2. Rainfall/Temperature

The annual rainfall ranges from 650mm in the north to 255mm in the extreme southwest. Day temperatures in summer can soar up to 40°C while winter days are invariably sunny and cool to warm. Temperatures in the evenings drop low and can reach freezing point in some areas.

1.2.3. Soils/Vegetation

The Kalahari sands cover 80% of the country. An estimated 6% of the total land area is said to be suitable for arable agriculture, while shrub-like vegetation, sparse savannah, open woodlands and dry deciduous forests cover 60% of the country. The main forested areas are in the north and northeastern parts of the country.

However the climatic and adaphic conditions in Botswana support a varied range of fauna and flora which play a critical role in the social, economic, and ecological well being of the country.

1.2.4. Land tenure

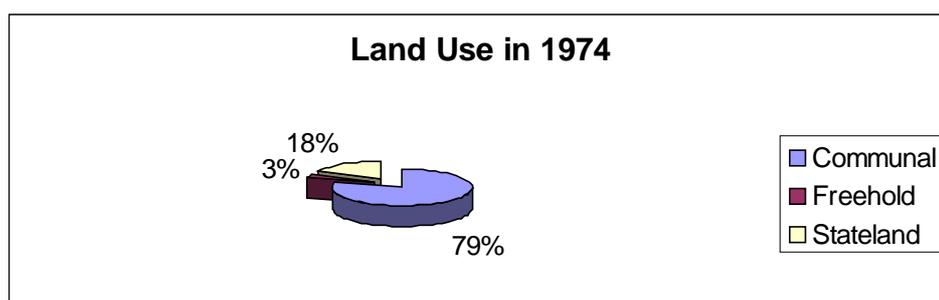
Freehold: The land is owned by an individual or group of people who have exclusive control over its use, and it can be transferred from one owner to another without obtaining permission from government.

Tribal land: This land is owned by the different tribes throughout the country and is administered through Tribal Land Act.

State land: This land is owned by the state and is used in a number of ways; for communal grazing, national needs such as forest reserves, national parks, leasehold rights to individual or groups for different uses. (see table 5 under annexes)

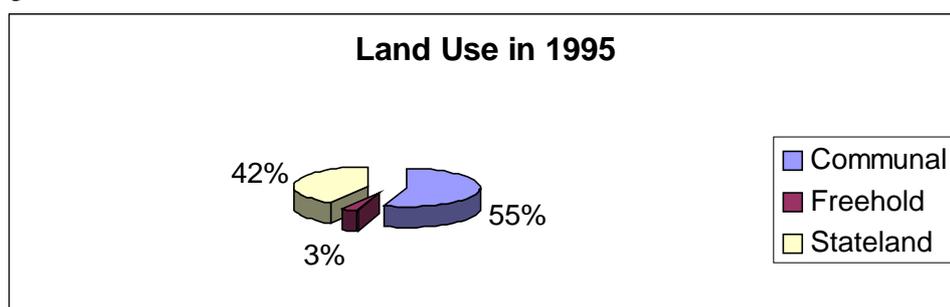
The shares of total land under the three major land uses has changed in the period 1974 to 1995. However the most significant changes took place in communal land and state land major tenure systems as a result of re-allocation of part of the communal land to state land. This was mainly due to the creation of Wildlife Management Areas, which did not exist in 1974, but had a share of 23% of the national land area by 1995, and gazetting of Forest Reserves the same period. Subsequently the share of total land area that fell under the communal land tenure system dropped from 459,601km² (79%) to 318,997 km² (54.8), while state land increased from 103,170 km² (17.7%) to 243,304 km² (41.8%) by the end of the same period. The share of the total land area under freehold increased by only 0.1%. It is important to note that 99.6% of the total re-designated land was a result of the re-allocation of communal land to land reserved for conservation uses. The conversion of communal land into conservation area is in line with the Convention on Biodiversity, which this has ratified. (Environ. Statistic, 2000).

Figure 1.1: Land Use in 1974



Source: Derived from Land Tenure

Figure 1.2: Land Use in 1995



Source: Derived from Land Tenure System

1.3. Forestry status in Botswana

1.3.1. Institutional setup

Unlike other countries in this region, Forestry in Botswana is a sub-sector under the Ministry of Agriculture. The initial functions of the sub-sector were to establish

plantations, control grazing, collect taxes, rents, fees, and royalties etc. However these functions have since expanded to include some technical responsibilities with the view to consolidate the wider objectives of protection, conservation and development of forest resources of Botswana in accordance with the national forest policy and legislation. Today the main broad functions of the sub-sector are:

1. Declaration of lands as forest reserves and the reciprocal power to make grants or dispositions of such lands for the purpose other than forestry i.e. extension of villages and towns.
2. Regulation of the protection and flow of goods and services from the forest to society. This reflects the exercise of sovereignty over the national forest resource vested by legislation in the government.
3. A conservation role expressed through the sustained yield concept in forest management, which stresses the paternalistic attitude towards resources justified on grounds of safeguarding the public interest.(Min. Agric. Paper, 1984).

These functions embrace the following:

- Development of forest resources
- Management of forest estates
- Conservation of forest ecosystems
- Development of forest based industries
- Utilization of wood and non-wood forest products
- Research
- Extension and public education
- Institutional development

1.3.2. Indigenous forests/woodlands

Forests and woodlands cover more than 60% of the country. These woodlands/forests are largely on tribal land. The six gazetted forest reserves make merely 0.8% of the total land area of the country, and are all on state-land save for one. (**see Table 1 under annexes**)

The forests and woodlands of Botswana represent an important resource in terms of providing the majority of rural populations with energy source, in providing materials for fencing, construction, building, crafts and maintaining environmental balance.

However deficits are beginning to occur in areas surrounding major population centers. The situation is not helped by persistent cycles of droughts, wild fires, overgrazing, and the deep rooted cultural belief of “free for all”. The results have been devastating as large areas have been stripped off tree cover through indiscriminate cutting of live trees. The combined effects of deforestation, overgrazing, and perennial wild fires have resulted in conversion of 20,000ha of productive woodland to less productive grasslands and shrub formations leading to serious soil erosion problems, flash flooding and localized fuelwood shortage and construction wood.(Ministry of Agric Report, 1984).

1.3.3. Plantations/woodlots

These have been attempted as far back as the 1930s with the aim to produce building and construction materials, but have frequently met with considerable varying degrees of success (often as low as 25% survival, where as 85% survival of healthy seedlings is usually considered normal. So far less than 2000 ha or so exist (Min. of Agric. Paper, 1996).

The success rate of plantations and woodlots in Botswana has been a modest one. This has often been attributed to a lack of site maintenance or lack of water, but other equally significant factors may have had an effect. For example, there has been a history of planting *Eucalyptus* spp., but sometimes on unsuitable sites, that is; outside their natural range. Planting and growing of such trees as ornamentals may produce quite satisfactory results because they receive individual care and attention, but growing in plantation is quite a different matter. Research and major re-evaluation of plantations and woodlots is underway, together with several associated factors such as re-evaluation of the appropriate choices of species. (see **Table 4 under annexes**)

1.3.4. Environmental services

Botswana, like most of the developing countries is currently experiencing serious depletion of forest resources. The expansion of agricultural activities, forest fires, and high rate of urbanization etc have put considerable stress on the existing forest resources. This is evidenced by deforestation and land degradation around major population centers. The majority of these environmental problems are directly linked to some human activities particularly fuelwood harvesting, overgrazing and arable agriculture.

To date very limited studies have been undertaken to assess the stocking situation and the impact of these activities particularly in tribal land where the bulk of these resources are found. The past studies in tribal land have focused mainly on energy needs and consumption patterns in the eastern part of the country. Thus the countrywide woody biomass situation, and the data on other forestry related activities and associated problems remains inadequate.

The Ministry of Agriculture has over the years undertaken various forest inventory studies in the six gazetted forest reserves. All the studies from 1934 to 1965 focused mainly on assessing merchantable timber with very little regard for other important values/uses.

However a more embracing inventory study sponsored by the Norwegian Forestry Society was undertaken between 1991-1992. The overall objective of the study was to provide fundamental information to develop management plans for sustainable use of both timber and non-timber forest resources in the six gazetted forest reserves. The study recommendations covered important areas such as:

- Research and monitoring,

- Eco-tourism,
- Development of surrounding villages,
- Production of forest products,
- Conservation and protection of the resource base,
- Environmental and cultural education,
- Grazing and range management,
- And wild life utilization.

Very few of these recommendations from the inventory study are currently being implemented, and they include; construction of firebreaks, and grazing. The rest of the recommendations have not yet been fully implemented because of resource and institutional constraints.

1.3.5. Forestry sub-sector contribution to the national economy

The contribution of Forestry Sub-Sector to the national economy is extremely difficult to quantify in economic terms. However what is appreciated at local level is that forests and woodlands contribute to:

The improvement of food security
 Meeting rural subsistence needs
 Generation of income
 Agricultural productivity and protection of the environment

For example, it has been estimated that 53% of domestic energy consumption is generated from wood, while electricity, coal, gas, paraffin, petrol and diesel account for the remainder. The major users are the rural people the majority whom are generally poor. These people also derive benefits such as construction and building materials, food, medicines, game meat, and fodder for their livestock from the forests.

Because of a lack of adequate data on the output and services of forests and woodlands, the real direct and indirect benefits derived from forests have been grossly undervalued and under estimated in both sectoral and national Gross Domestic Product. This has resulted in limited resources allocation, in terms of manpower needs and equipment by both Government and other stakeholders.

Chapter 2 The change drivers

Forests in Botswana, as in most of the developing countries are still a versatile renewable resource, providing simultaneously a wide range of economic, social, and environmental benefits and services. The demand for their numerous functions and outputs will continue to grow in the future. However, the sustainability of the goods and services derived from the forests depends on a number of factors. In the context of Botswana the most critical factors, which may bring about changes in forestry sub-sector during the next two decades, include among others: population growth, socio-economic and political changes, agricultural production, energy needs and consumption patterns, development patterns, institutional frameworks (policies, legislations, land tenure systems), and public education on environmental issues.

Traditionally, Botswana's society is an agrarian society and forestry appears to be secondary to agriculture despite numerous goods and services people enjoy from the forests. More than 50% of Botswana population is still rurally based and wood still forms vital part of their way of living. Wood accounts for over half of Botswana energy consumption and is a vital raw material for construction and building. The depletion of forest resources is likely to become more widespread and serious in view of the anticipated population growth.

2.1. Population growth

The current population estimate of 1.4 million people is projected to increase at the rate of 2.5% per annum. The majority of the people still reside in the rural areas. The population is concentrated along the railway line running south-north along the eastern side of the country. Population and economic growth have over the years increased the demand for food, wood and space for human settlements and hence put pressure on the available natural resources.

The link between population growth resource use and environmental quality are too complex to permit straightforward generalization about direct casual relationships. However, rapid population growth has increased the number of poor people in developing countries, thus contributing to degradation of the environment.(Repetto, 1989). The impact of population growth on the environment will vary in time and space depending on the interaction of several other factors that will mitigate or exacerbate this impact. Such factors include the pattern of distribution of population and the level of economic development of the country.

According to the 1991 National Population and Housing Census, the population of Botswana is put at 1,326,796. The inter-censal (1981-1991) population growth rate (PGR) was 3.5% per annum. The PGR has been estimated at 2.4% and 2.5% for the periods 1991-1996 and 1996-2001 respectively. At that rate the 1999 population is estimated at about 1.6 million. About 80% of the population is concentrated in the eastern part of the country, where both the climate and soils are ideal for agricultural production.(Environ. Statistics, 2000).

The concentration of such a large percentage of the population in such proportionately small part of the country has resulted in exertion of pressure on the resources. For example, biomass resources are abundant in less populated areas, but scarce in the densely settlements.(Environmental Statistics, 2000).

The increase in human population is expected to result in considerable increase in demand for wood products. This factor, coupled with expansion of arable agriculture, rampant bush fires and adverse climatic conditions, as well as the ever increasing populations of both livestock and wildlife will contribute to woodland depletion in Botswana. (see **Table 6, 10&11 under annexes**)

2.2. Agricultural sector

Only about 6% of the country is suitable for arable production. Most arable production activities take place in the eastern part of the country where climatic and soil conditions are more favourable. The contribution of agricultural sector to the Gross Domestic Product (GDP) has shrunk from 40% at independence to mere 4%. Livestock production sub-sector is doing fairly well as compared arable production. Productivity in the arable sub-sector is low. Returns to agricultural labour and capital investment are also low.

The protracted incidence of poor weather conditions characterized by variable, and low rainfall, and poor adherence to proper farming practices have adversely affected productivity in this sub-sector.

Despite this decline the agricultural sector remains the main source of food, income, employment and capital formation for the majority of the population living in rural areas. About 2% of formal employment and significant proportion of informal sector employment comes from the agricultural sector. (National Development Plan 8, 1997/98-2002/03).

However the increase livestock populations currently estimated at 2.9 million and the expansion of arable agriculture, are envisaged to continue to impact negatively on the environment.

While in aggregate terms the role of agricultural sector has declined, the direct and indirect linkages of the sector to both rural and the national economy. The importance of these linkages is evident during drought periods when government provides temporary relief to the rural people, primarily to mitigate precipitous declines in agricultural production, income and employment.(National Development 8, 1997/98-2002/03).

2.3. Socio-economic changes

Since independence in 1966, Botswana has experienced high rate of economic growth. The real GDP has followed an upward trend, increasing from P746 million in 1974/75 to P5,928.9 million in 1997/98, which represents an average annual growth rate of 9.2%.(Environ. Statistics, 2000). The GDP per capita rose from P1,071.0 to P3787.2 in the same period which is an average annual growth rate of 5.5%. The mining sector that took over from agricultural sector as the main contributor to GDP and is largely responsible for the good economic performance.

Although rapid economic growth has led to higher per capita incomes, the wealth is unevenly distributed with respect to urban and rural households. The distribution of both disposable cash income and disposable income is uneven.

While beef production is another important source of GDP, vehicle production has recently overtaken beef as the second largest export earner after diamonds, contributing about 11% of the value of the country's exports in 1997. In the same year the export shares of Diamonds and beef and other beef products were 74.5% and 2.2% respectively. **See Table 8 and 9 under annexes** on GDP and GDP per capita, (1974/75-1997/98), and Income by type of settlements, 1993/94 respectively.

The rate of population growth exceeds the rate of job creation. Results from the 1995/96 Labour Force Survey revealed that out of 528,108 economically active labour force covered by the survey, 94,528(18%) people were unemployed, and an additional 28,789 (8%) were under-employed. Consequently, a significant part of the population is dependent on the land for sustenance, mainly through various agricultural activities. In line with increase in the population, pressure on the land resources has been experienced to the extent that the unsustainable use of resource base is now a major concern.(Environ. Statistics, 2000).

2.4. Overall economic performance

Botswana's economic progress since independence has been one of the success stories of the African continent. Thirty four years ago the country was considered one of the poorest countries in the world, but today it is considered the richest non-oil producing country in Africa.

At independence beef was the main export earner for the country. However by the beginning of the eighties, diamonds had already overtaken beef as the country leading foreign exchange earner. In 1981, diamond exports accounted for 40% of total exports and rose rapidly thereafter to reach approximately 80% of total foreign exchange earnings by 1989. Diamonds continued to dominate the export trade even in the 1990s. However following the establishment of several assembly plants in the country, exports of vehicles surpassed copper/nickel and beef in 1994 to become the second largest export commodity after diamonds. The economy of Botswana has also been boosted by the production of other minerals such soda ash, coal, and gold. Botswana has a number of small to large-scale industries, among the leather game-skin and trophy industries, textiles, beer and soft drinks, soap industry, etc. The country's tourism industry has over the years experienced a substantial growth rate. It has now become one of the main revenue earner for the country.

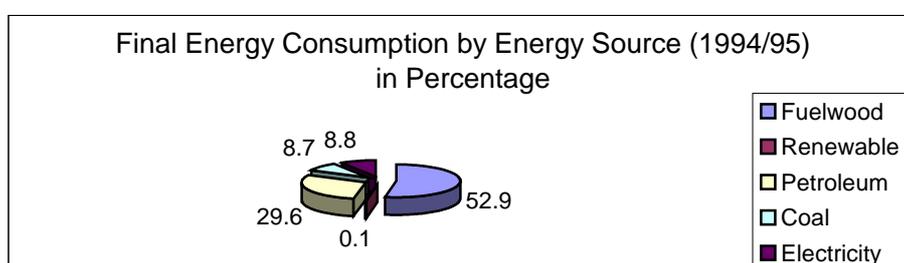
With the increase in resources arising from diamonds during the 1980s Government channeled more resources towards the development program and by 1994/95, the total development budget was P591 million. This enabled government in addition to undertaking investment, to address national disasters such as drought. Road networks have significantly improved throughout the country, and schools and health centers have been built to improve access and hence standards of living of Botswana.

In 1994/95, provisional estimates put the rate of growth at 3.1% compared to 4.1% in the previous year. This Lower rate growth is mainly as result of 1.5% decline in output of the mining sector. Agriculture, financial services and water and electricity fell significantly during the year when compared to previous year. However, growth in manufacturing sector improved remarkably from -2.3% in 1993/94 to 4.3% in 1994/95. The non-mining GDP grew by an impressive 5.5% during the compared to 2.3% in 1992.93, an indication that some reform policies undertaken were beginning to bear fruit. These policies included the progressive trade liberalization, exchange controls, reduction in company tax and the policy of wage restraint. (www.gv.bw)

2.5. Energy sector (Biomass)

Energy in Botswana is characterized by both traditional and commercial energy. Fuelwood is the dominant and most accessible energy source in Botswana. During the period between 1981-1994, the share of fuelwood in annual total of energy supply and demand has been estimated at over 40%. The share ranged from 48% to 63% for Primary Energy Supply (PES), 55% to 77% for Net Energy Supply (NES), and 44% to 58% for Final Energy Consumption (FEC). Throughout the early 1990s fuelwood has accounted for more than 90% of the total annual energy consumption in the household sector, particularly in the rural sub-sector. Studies have shown that other conventional energy source like electricity, petroleum products and coal are not widely used of because they are not affordable and/or accessible. (Environ. Statistics, 2000).

Figure 2.1 Final Energy Consumption by Energy Source(1994/95)



Source: Environ. Statistics, 2000

Fuelwood is mainly used for cooking, heating, and lighting. Generally it is the only energy source used in most of low-income households both in rural and urban areas. The methods, patterns and effects of wood harvesting and collecting depend on location and levels of supply, price and demand for alternative energy sources in specific locations. The regions with low population density and high tree re-growth and woodland density (e.g. north eastern part of Botswana), have abundant fuelwood. On the other, hand in areas of higher population densities and low regeneration rates (e.g. eastern Botswana and around urban and peri-urban centers localized over exploitation is rife. (see **Table 7 under annexes**).

According to the figures compiled by Energy Division of Ministry of Minerals, Energy and Water Affairs (MMEWA), fuelwood consumption is estimated at 0.58 tonnes per capita, and Mean Annual Increment (MAI) is estimated at 1.2 tonnes per annum. The average standing crop in eastern Botswana that is the most populated region is estimated at 15.8 tonnes per hectare (MMEWA Report, 1987). The level of fuelwood is influenced by households size, wealth and availability of substitutes. (see **Table 3 under annexes**)

2.6. Policy and institutional changes

Botswana at independence had no well-defined national forest policy. Only a number of policy statements were inherited from the colonial days and in recent years most of which delineate, in general terms. The major issues addressed by the policy statement are:

- Provide for the protection and conservation and, possible perpetuation of remaining indigenous forests and woodlands in the country.
- Create exotic estates or plantations large enough and sufficiently diverse to supply future domestic needs for timber, fuelwood, and other forest produce.
- Establish large forest nurseries countrywide to ensure provision of disease-free seedlings for plantation establishment.
- Create forest industries dependent on the availability of wood resource and continuity.
- Create employment in the rural areas in order to curb down migration from the rural areas to the urban areas.
- Establish forestry research sector to undertake research in seed collection and propagation of indigenous tree species, woodland and shrub management.

However, these policy statements have found been wanting in some respects. The statements are too general and the relationship and interdependence with other natural resource sectors is lacking.

The Forest Act, promulgated in 1968 formalizes the provisions for the establishment and conservation of forest reserves; prescribes the procedures for utilization of forest products; highlights rights and privileges granted to local communities; and, identifies those species to be granted protected status on State, tribal and private land. The Forest Act was carefully and clearly designed to ensure the protection and administration of Government forest reserves.

However the effectiveness of the Forest Act is limited by the traditional nature of the land tenure system. Government Forests Reserves cover a mere small area of the country (0.8%), but their protection and management is one of the Act's main concern.

One of the most serious problems however lies with the tribal lands and depletion of forest resources outside forest reserves. Over-exploitation of forest resources is prevalent in tribal lands particularly around major population centers. Open access communal ownership is inevitably resulting in each individual trying to extract the maximum benefit from the resource for himself/herself.

All these considerable changes in social and economic condition as well as changing environmental conditions have necessitated the review of both the forest policy and legislation to cover the judicious administration of forest resources of the country as whole.

Countrywide consultation to review the National Forest Policy and the Forest Act was undertaken between 1995/97. All stakeholders were involved and they included, Chiefs, Councilors, Land-board members, NGOs, Government Agencies, and Village Development Committees etc. To date a draft of the National Forest Policy has been

produced, and it's waiting to go to Parliament for consideration. Once its complete, then the review of the legislation will soon follow.

The general goal of the National Forest Policy is protection, conservation, development and sustainable utilization of forest land and forest resources for social, economic, ecological and environmental benefits present and future generations of the of Botswana. The goal is consistent with principles, goals and objectives of national as well as sectoral development policies, international initiatives and conventions related to the forestry sector such as Convention on Biological diversity, Desertification, Climate Change, Agenda 21, and United Nations Forest Principles. The revised forest policy embraces the following objectives:

- Strengthen the role of forestry in alleviating poverty and increasing equity in forest resources and forestland management and utilization.
- Strengthen the role of the forest resources and forestland in promoting economic development, in meeting demand for products, in increasing national revenues and efficiency, creating employment as well as diversification of local, regional and national economy.
- Strengthen the role of forest resources and forestland in enhancing environmental functions including soil and water conservation, biodiversity, recreation, habitats for wildlife, carbon-dioxide (CO₂) fixation and other services
- Encourage, involve and assist local communities in the conservation, management and sustainable utilization of forest resources.
- Create enabling legal and institutional environment so as to effectively implement the policy.

2.7. Development of infrastructure and communications

The works, transport and communications infrastructure is particularly important for the sustainable development of country such as Botswana given its large area, unevenly distributed population and landlocked nature. Partly because of these characteristics, as well as the sandy terrain, semi-arid climate, topographical conditions and shortage of construction materials, the provision of infrastructure is relatively more expensive in terms of per capita expenditure on development and maintenance than most countries.

A balanced and efficient works, transport and communications infrastructure is an important catalyst for economic development. Government has since independence emphasized its facilitative role through the development of infrastructure and has accorded it priority. This is reflected by successive years of major resource allocations to the works, transport and communications sectors.

Works infrastructure consists mainly of buildings for office accommodation of public institutions. Transport infrastructure includes roads, railways and airports. Communications infrastructure includes telecommunications and postal services.

By the end of the National Development Plan 7 (NDP7), all towns and district centers were served by a well developed and integrated road, civil aviation and railways network. Botswana is adequately connected to its neighbours and most the infrastructure is still new. Better communication networks and infrastructure development is contributing significantly towards economic diversification.

Due to low implementation capacity under NDP7, Government has now adopted new strategies under NDP8 which focuses on cost recovery, privatization, market liberalization, commercialization of services and labour-based methods of executing public works where appropriate. (NDP8, 1997/98-2002/03).

Chapter 3 Forestry sector in 2020

3.1 State of forests and plantations

3.1.1 State of forests (indigenous forests/woodlands)

Botswana forests/woodlands are found on state-land, freehold and tribal land. The stocking situation on state-land in particular forest reserves is estimated at 10 million m³ (CFMP,1992). The total growing stock of all woodlands in the country has been estimated at 1,277,400 tonnes and the mean annual increment at 40.8million tones per annum. (CSO Environ. Statistic, 2000).

However, as mentioned earlier forest/woodland depletion particularly around major population centers and settlements has become a common occurrence in recent years in Botswana. Demand for wood products has increased considerably with increase in human populations and has been attributed an increase in demand for fuelwood, building and construction material, and expansion of arable agriculture. These factors coupled with rampant forest fires and adverse climatic conditions as well as the ever-increasing populations of both livestock and wild animals have contributed immensely towards woodland depletion. This trend is expected to continue and as a result, the land under forests/woodlands will also decrease. (CSO Environ. Statistics, 2000)

There has never been any mechanism in the past for bringing this country's indigenous forest/woodland resources particularly those on communal areas under planned, sustainable, management by either communities and/or forest authority. As result there has led to the situation described above of overexploitation and instances of localized environmental degradation.

3.1.2. Plantations/Woodlots

At present the land under plantations and woodlots stands at 1200ha and it is expected to increase due to new afforestation programs funded by both government and donors to offset fuelwood shortages and other wood materials particularly around peri-urban and urban areas.

National Tree Planting program that is an annual event has also raised the level of awareness about the importance of tree planting and is envisaged to continue to play a major role in sensitizing and increasing our woody vegetation.

Despite these projections tree-planting programs will continue to face problems some of which are beyond their scope (e.g. marginal soils, limited species choice, and climatic limitations etc).

3.1.3. Non-wood forest products.

The Botswana woodlands/forests are blessed with a wide range of non-wood forest products ranging from medicinal, food, fodder, household fabrics, to even habitat for wild animals (e.g. *Imbrasia belina*, *Harpagophytum procumbens*, *Lippia javnica*, *Artemesia afra*, *Lippia scaberriama*, baskets, matts, bush meat, honey, silk cocoons etc). These products are the second biggest sources of the livelihood after agriculture to rural communities especially those in marginalized areas, as they generate alternative sources of income and hence improve their standard of living.

There is a great demand for these products both locally and outside. The *Harpagohytum procumens* has good market in Western Europe in particular Germany, while *Imbrasia belina* is widely consumed locally and in SouthAfrica. Coupled with population growth estimated at 2-5%, there is likely to be an increase in both the use and dependency on non-wood forest products due to commercialization. Further scientific investigations on other values are bound to increase the demand for these products.

3.1.4. Trees outside forests

Besides establishment of woodlots and plantations the government and other agencies have lately launched some programs that promote tree planting. These efforts are intended to reduce pressure on the natural woodlands, enhance environmental conservation, and increase food production through the planting of food-yielding and multi-purpose trees. Some of these programs include among others: backyard nurseries, around home tree planting program, schools tree planting program etc. These programs and many others promoting tree planting will inevitably increase trees outside forests.

3.1.5. Conservation of biodiversity

According to (World Conservation Monitoring Centre, 1991) Botswana has at least 2600 species of plants of which at least 17 are endemic, at least 150 species of mammals, over 500 species of birds, over 1000 species of insects and numerous species of reptiles and amphibians. To ensure sustainability of this level of biodiversity, about 39% of Botswana's total land area has been reserved for conservation use. Areas under conservation include: national parks, Forest reserves, Game reserves, Wildlife management areas, wildlife sanctuaries and monuments.(CSO Environ. Statistics, 2000).

However just like in other parts of the world, decline in biodiversity has been observed in Botswana. The main contributing factors of the decline are believed to be rapidly expanding livestock and human populations, forest fires, droughts, diseases and cordon fences.

The government has put in place a number of measures in attempt to reverse this trend. These measures include: provision of water (drilling of boreholes), construction of firebreaks, establishing and anti-poaching unit, protecting wildlife migratory

routes, formulating a National Conservation Strategy, reviewing existing various natural resource conservation laws, and establishment of National Plant Genetic Resources Centre etc. It is likely that the area under conservation will increase in the next 20 years because of improved level of awareness, increasing social, economic, and environmental benefits.

3.1.6. National parks, game reserves and forest reserves

3.1.6.1 National parks, game reserves

In Botswana there are five categories of protected areas namely; national parks, game reserves forest reserves, wildlife managements areas and natural history monuments. There are three national parks covering 45,900km². Acts such as hunting, collections of plants or animals are prohibited. The game reserves covers about 60,550km² and hunting without special permit is forbidden. Other wildlife areas under different managements include sanctuaries, nature reserves, small game parks, and wildlife management areas. The later are natural areas that are meant for multipurpose uses, the predominant one being wildlife utilization.

Wildlife is an important natural resource in Botswana. According to NDP8 theme of “sustainable economic diversification” this sector should present an alternative to the country’s dependence on minerals by way of tourism. Wildlife attracts visitors who view and hunt them for recreational and other purposes.

3.1.6.2 Forest reserves

Gazetted Forest Reserves cover an area of about 0.8% (455,000ha) of the country. They have been established specifically for the conservation and better regulation of use of forest resources.

Since the early 1930s government has been granting concession to companies to exploit timber in the forest reserves and was paid only royalties. The raw timber was exported to neighboring countries particularly South Africa and Zimbabwe. This arrangement was found not to be economically sustainable as the country was loosing revenue by not adding value to its timber resources.

Furthermore, there were also concerns that concessionaires were not observing the contractual agreements especially tree sizes to be harvested. There also were inadequate skilled personnel on the ground to monitor and supervise their activities. As a result of that, harvesting operations have since 1993 been suspended in the country pending inventories and adequate staffing to implement new management plans and supervise any future concessions.

However, it is likely that protected forest areas and land under plantations/woodlots will increase as a result of adoption of new integrated approach towards sustainable management of natural resources.

3.2. State of forest industries

There are very few and small scale forest industries in Botswana, and they include: wood industry, handicraft industry, and seedling production industry.

3.2.1. Wood industry

Notwithstanding the country's limited resources of commercial significance, the potentials offered by the existing vegetation for viable economic utilization have not been fully explored. The wood industries have in the past focused mainly on raw material exploitation and export without achieving value-added benefits through vertical and horizontal integration in processing and industrial development.

The tertiary industries involved in the manufacture of furniture and wood products currently do not have the raw in the material resource base to add value to. Most of them are concentrated on the import of semi-finished wood products from the region at an exorbitant price. The cutting of poles, live-trees for fuelwood on unreserved woodlands has been rampant without sustainable resource management.

Although the policy provided for the creation of forest industries dependent on wood resources, not much have been achieved. Hence in 1992 Government took a decision to suspend all timber operations in Botswana with the view to assess the stocking situation and identify other potential uses of our forests. As a result emphasis will now be placed on the development of value-added products, the economic residues, and the expansion of the utilization base.

3.2.2. Handicraft industry (wood-crafting and weaving)

This is one industry whose potentials have not yet been fully developed. The industry has potential to become alternative source of income for rural communities. Although basket weaving is currently doing well, the same thing cannot be said about wood crafting and other related woodwork. Foreigners dominate the wood crafting industry and local people have not yet realized its potential. To date very limited studies have been done to establish the economic potential of the industry, nevertheless the industry is likely to grow.

3.2.3. Seedling production industry.

This is another industry, which has a lot of potential in Botswana. Currently government dominates the industry. Few NGOs and private sector companies are involved in this industry. However, this is likely to change with more and more people getting involved in the backyard nursery program. The backyard nursery is a new program whereby farmers are encouraged to set up their own backyard nurseries as part of income generating activities. Recently there have been calls from some quarters for the phasing out of government nurseries to give room to the private sector and farmers as they cannot compete with Government subsidized seedlings. The revised forest policy has taken note of the concerns and it's likely the government will revisit its nursery program.

3.2.4. Competitiveness and advantages

Forestry industries in Botswana are relatively small, weak and have difficulty to competing regionally. The wood industry in particular cannot compete because it does not have a strong base in terms of wood resources and technology to process the wood into finished goods. Other industries, though not fully explored, have comparative advantage locally.

Wood demand-supply situation

- Industrial round and other products

The information on roundwood and other products is very scanty and unreliable. It will therefore be unrealistic to make any future projections without baseline information. The bulk of our industrial round wood is imported mainly from South Africa and Zimbabwe. However, it has to be said that as the population increases the demand for wood and wood products will obviously increase, and based on the current situation this would mean an increase in imports.

- Woodfuel and other biomass based energy supply

Fuelwood remains the most dominant and accessible source of energy in Botswana. During the period 1981-1994 the share of fuelwood in the annual total of energy supply and demand has been estimated at 40%. The majority of our rural population still relies on woodfuel as the main source of energy. It is inevitable that the demand for fuelwood will continue to grow as conventional energy sources such as electricity; petroleum products and coal are not widely accessible and /or affordable.

The methods, patterns and effect of wood harvesting and collecting depend on location and the levels of supply, price and demand for alternative energy sources in specific locations. The regions with low population density and high rate re-growth and woodland density (e.g. north-eastern part of the country) have abundant fuelwood. Whilst in areas of higher population density and low regeneration rates (e.g. eastern part of the country especially around major population centers) localized over-exploitation is on the increase. (CSO Environ. Statistic, 2000).

The Government of Botswana has recently embarked on promoting the use of coal as substitute to fuelwood with the aim to reduce pressure on the natural woodland. The success rate of this program has been a modest one due to many factors some of which are cultural. Generally the people of this country are reluctant to switch to coal as because first, they don't have the right technology (stoves) to burn coal, the coal is of poor quality for home use, they have never used coal before, they don't have easy access to it particularly the rural population, they think its expensive although it is heavily subsidized, and they are more comfortable with what they understand best and that is the use of fuelwood. Despite this Government has and continues to make efforts to promote the use of coal as an alternative to woodfuel. The government commitment is evidenced by the subsidy it has extended to the coal program. Perhaps other energy sources should be included in this program.

3.3. Social and economic implications

The contribution of forestry sub-sector towards the national economy has never been quantified in economic terms. This is because forests and woodland resources provide an essential foundation for other important sectors, such as livestock, tourism, and wildlife, and the complexity of these linkages makes quantification difficult. As a result these benefits are often grossly undervalued and under estimated.

However what is appreciated is that the forests and woodlands of this country provide numerous essential social, cultural, economic, ecological and environmental benefits many of which are fundamental to the well-being of the nation, both now and in the future. It is broadly appreciated that trees, forests and woodlands contribute to:

- The improvement of food security and nutrition at household level (honey, fruits, game meat etc);
- Meeting rural subsistence needs; building and construction materials, fuelwood, medicine
- Generating income; handicraft materials, fruits etc
- Agricultural productivity; fodder for livestock, forage and habitat for wild animals
- Eco-tourism;
- And finally protection of the environment; soil erosion control, conservation of watersheds, etc. (Draft National Forest Policy, 2000).

The most dependent on these resources are the poor in both rural and urban areas. This situation is expected to continue for the foreseeable future.

The launching of new forestry projects by both Government and Donors that promote income generations (e.g. eco-tourism, backyard nurseries, handicraft etc) is expected work towards improving the livelihood of the disadvantaged both in urban and rural areas.

3.4. Forestry and environment

3.4.1. Conservation of biodiversity

Conservation of biodiversity is still and will continue to be top of the list of government priorities especially given that the tourism industry is heavily dependent on it. Again as mentioned earlier government has put in place a lot of measures to conserve biodiversity as it recognizes its vitality not only to environmental protection but also its contribution to socio-economic development of Botswana.

3.4.2. Other protective values

All the above-mentioned protective functions are very important and government fully recognizes their role in protecting our fragile environment. It has to be understood that Botswana is a low forest cover country with semi-arid conditions and largely covered by marginal Kalahari sands. As a result the government has over the decade increased its spending on the conservation of biodiversity and promoting anti-desertification program. The combined efforts of the Government and the international donor assistance offer a window of opportunity towards fulfilling these functions.

3.5. Institutional framework for forestry

3.5.1. Forestry and wildlife structures and functions.

The last time there was a departmental restructuring was in 1989 when forestry was elevated from a Unit to a Section. However, there is a widely held belief that the current status of Forestry is still not strong enough to fully and diligently fulfill its broader functions, hence there have lately been calls to upgrade it into a department or even a parastatal. The upgrading of Forestry Section into a much stronger institution than it is now is further supported by the recent consultancy report on the restructuring of the Ministry of Agriculture.

An all-embracing National Forest Policy is now waiting to go to parliament for consideration. The drafting of the National Forestry Action Plan and the review of the existing Forest Act that will support the implementation of the policy will follow this.

Besides there has been suggestions from various consultancies that it would conducive to have all natural resource based sectors under the same Ministry to avoid fragmentation and duplication of responsibilities. The suggestion to pool all natural resources based sectors under one ministry will also ensure optimum utilization of the limited available expertise and resources, and bring closer cooperation between these sectors. To date, it is still not clear as to whether the government will buy this idea or maintain the status quo.

As for the wildlife administration, it is already a Department within Ministry of Commerce and Industry. The Wildlife Department is a high profile department enjoying a lot of support from both Government and Donors. With the growing tourism industry and its contribution towards the national economy, the Department is expected to remain stronger.

3.5.2. New roles of private sector and local communities in forest management

The revised forest policy encourages full participation of local communities in managing their forest resources around their own localities. The government is currently working towards establishing a mechanism that would bring most of our forest and woodland resources under planned, sustainable management by local communities and/or forest authority. This will ensure flow of benefits from these resources continues into the future.

The revised forest policy is also providing an enabling environment aimed at encouraging investment by the private sector in forestry. There are a lot of untapped potentials that the private is encouraged to explore (e.g. eco-tourism, research and marketing of non-wood forest products etc.).

3.5.3. New arrangements for forestry education and research

Although National Development Plan 8 provides for forestry research, no efforts to date have been made to start this program. It is still not clear as to when the program will start and by whom, because the Department of Integrated Agricultural Research has the mandate to coordinate all agricultural research in Botswana. The National Tree Seed Centre has meanwhile started some rudimentary research on seed propagation, selection, storage etc

Chapter 4 Changes facilitation: What needs to be done

4.1. Critical factors for improvement

There are a number of factors that are critical for improvement of the current forestry situation in Botswana. The most critical ones are policies and legislation, institutional setup and operations. As mentioned earlier the National Forest Policy has been reviewed and the legislation review is underway. The administrative setup of the forestry sub-sector is also being considered and may soon be reformed.

4.2. Changes required within and outside forestry sector

4.2.1. Enhancing investment in forestry

There is a need to transform forestry from its current state of low value to a more economically viable sector by:

- Creating an enabling environment for investment in forestry
- Adopting an accounting system that has strong economic component
- Develop economic models for all forest types
- Calculating the total monetary value of all goods and services accrued from forestry and contribution towards the national economy.

4.2.2. Technological Changes

There is an urgent need to improve technology both in forestry and agriculture in order to:

Forestry

- Reduce damage to trees and other plants
- Reduce damage to soils and the terrain
- Reduce waste of products
- Produce products of good quality
- Improve production output
- Improve efficiency and reliability of supply

Agriculture

The physical policy to minimize the adverse effects of the critical sectoral constraints like technology, water shortage etc, requires additional public expenditure so as to improve agricultural productivity and production. This calls for development of alternative but economically viable technologies. The government has now embarked on putting in place additional resources to develop these technologies according to the specific agro-climatic and economic conditions

Instead of expanding the cropping land, crop yields will be increased by adopting high yielding crop varieties, use of complimentary inputs such as pesticides, fertilizers and machinery.

The Government has also strengthened the country's agricultural research system not only to increase productivity effectively, but has re-designed it and developed programs that work closely with farmers and the private sector to fully appreciate and understand their needs and circumstances.

Technology should enhance both the current and future potentials to meet the community needs and aspirations.

4.3. Roles and responsibilities of various agencies (government, NGOs, donor agencies, civil society etc)

There are a lot of changes ongoing within government. The current reforms include: restructuring of Ministries, privatization, decentralization of services, reformation of financial assistance programs, down sizing of public service, reformation of agricultural subsidies, formulation and reviewing of policies and legislations, adoption of new environmental strategies (e.g. recently the government has made major policy changes to attract investment by removing exchange controls, progressive trade liberalization, reduction in company tax, and policy on wage restraint).

The privatization of certain activities by government will be taken as a concrete manifestation of Government's promotion of the private sector, perhaps more than any of the measures undertaken. Privatization should have a solutory effect on the government budget as resources generated and saved can be used for development of infrastructure and provision of services that the private sector would not normally invest in.

4.3.1. Government

Some of the reforms that have taken place and affect forestry sub-sector include the following:

The National Forest Policy is now in a draft form and awaiting to go to parliament for consideration. This Policy is a product of wider consultation with all stakeholders and other interested parties (NGOs, Private Sector, Government Agencies, Farmers, Civic Organs, Traditional Leaders, Politicians etc). This is a very comprehensive policy which places emphasis on integrated conservation, development, management and sustainable utilization of forest resources. Its overall objective is:

“To optimize the contribution of the forest sub-sector to the long-term socio-economic development of Botswana by ensuring an enhanced and sustainable flow of benefits from forestry activities to all sectors of the population of present and future generations”

Government policies on wildlife and tourism are embodied in key policy document and relevant legislation such as National Conservation Strategy of 1990, Tourism Act of 1992, Wildlife Conservation Policy of 1986 and Wildlife and National Parks Act of 1992.

“The Wildlife and National Park Act of 1992 provide for further and better provision for the conservation and management of wildlife of Botswana, giving effect to CITES and any other international convention for the protection of fauna and flora to which Botswana is from time to time a party to provide for the establishment, control and management of national parks and game reserves, and for matters incidental thereto or connected therewith”.

Establishment of Tourism Department responsible for pursuing the primary policy objective of maximizing utilization on a sustainable basis of existing natural resources in order to increase social and economic benefits to the people of this country.

National Conservation Strategy Agency was established in 1992 with the aim to increase the effectiveness with which natural resources are used and managed, so that beneficial results are maximized and harmful environmental effects are minimized; and integrate the work of many sectoral Ministries and interest groups, thereby improving the development of natural resources through environmental conservation. Its broad functions include; environmental education, NCS projects and programs, environmental research and monitoring, and waste management.

Formulation of Natural Resources Conservation Policy which is till awaiting to go to parliament

Agricultural Policy objectives are; improvement of food security at household and national level; diversification of the agricultural production base; increased agricultural output and productivity; increased employment opportunities for the fast growing labour force; provision of secure and productive environment for agricultural

producers; and finally conservation of scarce agricultural and land resources for future generations.

The existing Income Tax Act allows farmers to lay claim against capital costs as well as expenditure items such as prevention of soil erosion, planting of trees, construction of firebreaks etc. Normally these developments require high initial capital investments of which if a provision to claim against such costs was not available the long-term productivity of Botswana's agricultural land would adversely be affected.

In its endeavour to diversify its agricultural production base, and also by so doing broadening the scope for more sources of income and productive employment, the government has introduced assistance programs to enable farmers and other investors to venture into other enterprises such as forestry, horticulture, fisheries etc. These alternative enterprises are intended to encourage agro-processing through the provision of raw materials such as timber etc.

All these reforms are said to be aimed at promoting sustainable socio-economic development without compromising the environment particularly the natural resources that our very livelihood depends on them.

4.3.2 Private sector, NGOs, donors and civil society

The level of participation by the private sector, communities, civil societies, NGOs, and Donor agencies in forestry related activities has increased significantly over the last few years. This is evidenced by a steady increase in: the number of backyard nurseries that are part of income generating activities; increase in funding by both Donor agencies and NGOs; and active involvement in tree planting by communities. This collaborative approach has lately proved to be very effective and sustainable, and is bound to continue along that road in the near future. All these efforts are inline with the revised National Forest Policy, National Development 8, and conform to the International Conventions such as Convention on Biodiversity, which Botswana has ratified

Chapter 5 Summary and conclusions

5.1. Summary

Botswana is expected to continue to experience rapid population growth in the next twenty years. The projections are such that the population will exceed two million in 2011. And the population size is likely to be between 2.4 and 3 million persons in 2021.(National Development Plan 8). However these projections may change due to the AIDS scourge ravaging the country in particular the youth section of our society that makes more than 50% of the population.

The economic growth has been very rapid and is expected to average 4.5% per annum over the period of 1995/96 to 2020/2021. The rate of growth is somewhat higher than the population. (National Development Plan 8).

All these changes in economic performance and population growth are likely to impact on forestry sub-sector.

Increase in population is bound to increase the demand for wood and other forest products. This is likely to result in acceleration of deforestation in some areas. Already their signs of localized deforestation around major population centers.

If the economy continues to grow at the projected rate that is above the population growth rate, it means there will be more job opportunities that eventually will lead to improvement of living standard. It is possible that people will adopt other conventional sources of energy, and this in turn would ease-off pressure on the forests.

Reduction in agricultural subsidies and adoption of new agricultural technologies will also reduce the conversion of forestland into agricultural land.

An integrated approach to forest resource management is the most ideal form of forest management as not only does it focus on wood and other forest products, but also on other non consumptive forest uses such as the environmental functions of forests, including the protection of biodiversity, enhancement of soil and water conservation etc.

The tourism industry is the future engine of economic growth of this country. There is untapped potential for eco-tourism particularly in our forest reserves and on state land.

5.2. Conclusions

For long time forestry has been considered a less important sector in Botswana. The lack of data on the stocking situation and quantification of its economic contribution, public perception of forest resources as a “free goods”, and its low Government priority has over the years undermined the growth of the sub-sector in Botswana. As a result the benefits from the sub-sector have been grossly underestimated in both the sectoral and the national Gross Domestic Products context. It is high time that the Government recognizes and internalizes the full cost and benefits of forest sub-sector development, including productive and environmental values, and impacts; and ensures that forest products and services are properly valued;

Also what is essential is the need for support in terms of resources and commitment from stakeholders and such as the Government, Donor Agencies, NGOs, Private Sector, Civil Society, and the general public. This will help achieve sustainable management, and utilization of forest resource. It will also safeguard the resources productive value, biological diversity, environmental amelioration capabilities and enhance forestry research, education and extension. The Government of Botswana has already taken a step towards fulfilling these obligations by formulating and reviewing existing policies particularly those dealing with the environment. This indeed is a step in the right direction and we expect other stakeholders and interested parties to follow the example of Government and work towards developing forestry sub-sector in Botswana.

Annexes

Tables

Table 1. Areas of woodlands on state land forest reserves

Year of declaration	Name of forest reserve	Area (km ²)
1968	Kasane Forest Reserve	162.2
1980	Kasane Extension For.Res.	475
1980	Kazuma Forest Reserve	237.5
1980	Maikaelelo Forest Reserve	625
1980	Sibuyu Forest Reserve	1175
1980	Chobe Forest Reserve	1880
Total		4555

Source: Miller,C(1986-87)

Table 2. Share of various types in total land area, growing stock and mean annual increment

Biomass class	Area		Growing stock		MAI	
	Km ²	Country (%)	Million tonnes	Total %	Million tonnes	Total %
1 Dense woodland	33.360	5.7	237.6	18.6	3.9	9.5
2 Open woodland	83.437	14.3	274.9	21.5	7.4	18
3 Riparian woodland	6.297	1.1	44.9	3.5	1.4	3.5
Total for classes 1,2,3	123.094	21.1	557.3	43.6	12.6	31
Woodland & bushland	197.665	34	461.8	36.1	17	41.7
Fringing palm woodland	3.115	0.5	2.2	0.2	0.1	0.2
Bushland scrub	106.794	18.3	151.8	11.9	6.4	15.7
Scrubland & bushy scrubland	104.093	17.9	74	5.8	3.2	7.8
Hill woodland & shrubland	26.583	4.6	30.3	2.4	1.5	0
Salt pans	20.583	3.5	0	0	0	0
Total	581.794	100	1277.4	100	40.8	100

MAI: Mean Annual Increment
Source: ETC,1987

Table 3. Estimates of the amount ('000 tonnes) of Woodlands Exploited to Meet the Need of Three Major Uses of Communal Woodland

Year	House poles	Fuelwood	Kraal poles	Total
1981	118.7	1187.19	164.3	1470.21
1982	122.9	1228.75	165	1516.63
1983	127.2	1271.75	165.8	1564.73
1984	131.6	1316.25	163.1	1610.98
1985	136.2	1362.32	151.7	1650.25
1986	141	1410	151.1	1702.10
1987	140	1400	145.6	1685.60
1988	162.2	1622	151.8	1936
1989	166	1660	158.2	1984.2
1990	142.9	1428	159.6	1731.16
1991	143.9	138.69		
1992	127.5	1274		
1993	131.4	1314	152.5	1597.9

Sources: ERL, 1985

Table 4. Number and Size (ha) of Plantations/Woodlots by Region and Ownership at the end of 1996

Region	Agricultural		Ownership				Total	
	Number	Average (ha)	Number	Average (ha)	Number	Average (ha)	Number	Average (ha)
Southern	7	9	7	9.6	5	1.1	19	7.1
Central	2	5	11	4.7	3	109.8	19	24.4
Gaborone	4	12.6	6	2	8	35.7	18	19.3
Maun	4	5.3	3	7.3	2	0.5	9	4.9
Francistown	4	7	0	0	0	0	4	7
Western	14	4.9	11	5.8	0	0	25	5.3
Total	35	6.5	38	5.7	18	34.5	91	11.9

Source: Div. Of Forestry and Range Ecology Report, 1996

Table 5. Land Use in Botswana (km²), 1995

District	State	Tribal	Freehold	Total
Central	20 221	121 893	5616	147 730
Chobe	16 400	4080	320	20 800
Ghanzi	81 431	27 371	9108	117 910
Kgalagadi	70 153	36 787		106 940
Kgatleng		7960		7960
Ngamiland	42 598	66 532		109 850
Kweneng	9614	26 276		35 890
Southern	2887	25 583		28 470
Northeast		1870	3250	5120
Southeast		645	1135	1780
Total	243 304	319 797	19 429	582 530
	41.8%	54.9%	3.3%	100%

Source: Environmental Statistics, 2000

Table 6. Rural/Urban Population Distribution

Year	Percentage distribution		Growth rate		Overall population
	Urban	Rural	Urban	Rural	
1971	9.6	90.4			
1981	18.3	81.7	11.6	3.7	4.7
1991	45.7	54.3	13.4	-0.7	3.5

Source: Environmental Statistics, 2000

Table 7. Energy Consumption in Household Sector, 1992/94

Fuel	1992		1993		1994/95	
	terrajoules	%	terrajoules	%	terrajoules	%
Coal	44	0.2	47	0.2	50	0.2
LGP	437	2.1	466	2.1	496	2.2
Paraffin	440	2.1	462	2.1	485	2.2
Electricity	393	1.9	439	2.0	528	2.3
Wood	19 677	93.6	20 297	93.4	20 940	92.9
Solar	30	0.1	30	0.1	31	0.1
Total	21 021	100	21 741	100	22 530	100

Source: Energy Statistics (1992,1993 and 1994/95), Energy Affairs Division, MMEWA

Table 8. Gross Domestic Product and Gross Domestic Product per Capita, 1974/75-1997/98

Year	GDP (million Pula)		GDP per capita (Pula)	
	GDP	Annual growth rate	GDP per capita	Annual growth rate
1974/75	746.0	86.8	1071.8	78.5
1975/76	887.7	19.0	1219.4	13.8
1976/77	919.2	3.5	1206.3	-1.1
1977/78	1098.2	19.5	3176.2	14.1
1978/79	1207.3	9.9	1445.9	5.1
1979/80	1379.9	14.3	1578.8	9.2
1980/81	1511.1	9.5	1651.5	4.6
1981/82	1623.8	7.5	1702.1	3.1
1982/83	1885.3	16.0	1906.3	11.9
1983/84	2101.6	11.5	2048.4	7.5
1984/85	2246.1	6.9	2113.0	3.2
1985/86	2414.8	7.5	2189.3	3.6
1986/87	2617.6	8.4	2290.1	4.6
1987/88	3001.6	14.7	2533.0	10.6
1988/89	3680.4	22.6	2992.9	18.2
1989/90	3882.7	5.5	3047.7	1.8
1990/91	4219.4	8.7	3196.7	4.9
1991/92	4484.2	6.3	3313.6	3.7
1992/93	4480.6	-0.1	3233.3	-2.4
1993/94	4667.5	4.2	3289.3	1.7
1994/95	4792.9	2.7	3298.5	0.3
1995/96	5108.3	6.6	3428.2	3.9
1996/97	5474.0	7.2	3584.0	4.5
1997/98	5928.9	8.3	3787.2	5.7

Source: Environmental Statistics, 2000

Table 9. Income by Type of Settlement, 1993/94

Type of settlement	Population	Households	Disposable cash income			Disposable income		
			Mean	Median	GINI	Mean	Median	GINI
Urban	316,139	87,419	1,524.5	734.3	0.548	1,710.1	808.6	0.539
Urban villages	330,443	67,218	731.3	430.4	0.552	876.4	545.0	0.451
Rural	704,319	136,973	441.4	200.0	0.599	641.2	416.5	0.414
National	1,350,899	291,610	833.1	372.5	0.638	1,015.9	531.1	0.537

* Mean and median of disposable cash income and disposable income are in ' Pula'

Source: Environmental Statistics, 2000

Table 10. Demographic Indicators

Indicators	1971	1981	1991	2001	2011	2021
Population	596,944	941,027	1,326,796	1,693,970	2,149,833	2,648,195
Infant mortality rate	97.1	71.0	48.0	36.0	27.0	3.1
Total fertility rate	6.5	6.6	4.2	3.8	3.4	3.1
Crude birth rate	45.3	48.7	49.3			
Crude death rate	13.7	13.4	11.5			
Life expectancy	55.5	56.5	65.3	68	70.7	73.5
Dependency ratio	113.3	110.3	81.5	66.2	61.9	54
Population growth rate	3.1	4.1	3.5	2.5		

Source: Environmental Statistics, 2000

Table 11. Demographic Density/Distribution (Projections)

Indicators	1991-1996	1996-2000	2000-2006	2006-2011	2011-2016	2016-2021
Crude birth rate (/1000)	32.4	32.1	30.9	12.8	26.8	25.3
Crude death rate (/1000)	7.7	6.6	5.7	5.1	4.7	4.5
Population growth rate	2.4	2.5	2.5	2.3	2.2	2.0

Source: Environmental Statistics, 2000

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