CHAPTER 1

INTRODUCTION

This chapter gives the background of the study in terms of the world-wide problems that wetlands, including Botswana's Okavango Delta wetland, face today. The chapter also gives the motivations of the study, objectives of the study and a short overview of the methodology. The structure of the thesis is presented at the end of the chapter.

1.1 Background

Botswana is well endowed with a variety of natural resources that include the Okavango Delta wetland, the world's largest known Ramsar site in the north, which supports a rich biodiversity of wild biota. Despite the importance of wetland ecosystems in the social and economic development in the countries in which they occur, they are among the most threatened of all environmental resources (Brouwer et al., 2001). Their loss and degradation may be considered at two levels, which are the direct loss and degradation of the wetland itself, and the indirect loss and degradation, which occur outside the wetland (Brouwer et al., 2001). The loss and degradation of wetlands reduces their future capacity to provide the goods and services to mankind and life on earth. The major causes of wetland loss and degradation include conversion to agriculture, commercial and residential or settlement development, resource extraction, dredging and channelization, diking and damming and discharge of waste material (Stuip et al., 2002).

According to Winpeny (1991), the reason that wetland ecosystems are prone to loss and degradation is that their values (especially functional values) are not understood, or where these values are understood, are simply not appreciated. Wetland ecosystems are often considered wastelands, unproductive and without value (Turner et al., 2000; Silvius, 2000). Their products are also not marketed. This makes them appear to have a low economic value which in turn leads to inefficient resource allocation. Wetlands also have characteristics of public goods, which means that the services they provide are not paid for by the users (Barbier et al., 1997). Further, wetlands are in many cases open access resources where no rules apply to their use, hence are often subjected to over-exploitation. This market failure is considered one of the most important causes of wetland conversion and loss (Turner et al., 2000; Barbier et al., 1997).

1.2 Motivation

While international conventions such as the UN Non-Navigational Uses of International Watercourses and Protocol on Shared Watercourse Systems advocate equitable sharing of water and sufficient conservation of scarce resources, any development in the form of wetland utilization such as water abstraction or hydropower generation, is bound to have an opportunity cost associated with such impacts. The Botswana's Okavango Delta provides an example of a continually threatened wetland. Firstly, in 1985 the government of Botswana issued terms of reference for the Southern Okavango Water Development Project to undertake feasibility studies on possible uses of the delta water with minimal environmental impacts. The aim of the project was to improve the utilization of land and

water resources, increase food production and increase employment opportunities and raise the standard of living of people in the southern part of the peripheries of Okavango (Scudder et al., 1993). Some of the proposed development structures in this project included construction of river control structures: construction of dams and bunding of river channels (Scudder et al., 1993). The project met a lot of criticism from among local and international communities due to its perceived negative impacts on the environment. As a result, the government engaged the World Conservation Union (IUCN) to carry out an independent assessment of the project, the recommendations of which led to the abandonment of the project (Schudder et al., 1993).

Secondly, in 1996 the government of Namibia proposed to construct a 240 km pipeline for abstracting 17 million cubic metres annually from the Okavango River, which is the source of the Okavango Delta in Botswana (Ashton et al., 2003; Rothert, 1999). The abstracted water was to be distributed to central Namibia through this pipeline. While Namibia, Botswana and Angola had formed the Permanent Okavango River Basin Water Commission (OKACOM) in 1994 to co-ordinate and collaborate the sharing of the basin's water resources, Namibia's proposal to abstract water from the Okavango Rivers was developed outside the framework of OKACOM (Hitchcock, 2001). The government of Botswana protested to the Namibian government for failing to consult other stakeholder countries about the project (Hitchcock, 2001). The government of Namibia had also recommended the undertaking of environmental impacts of the project within Namibia only. Due to lack of consideration of the impact of the project on neighbouring states, the government of Botswana and other environmental organizations called for an

investigation of the downstream impacts of the project within Botswana as well. The water abstraction scheme was temporarily suspended due to good rains in Namibia (Gumbricht et al., 2004). While the Government of Namibia's studies on environmental impact assessment revealed that the anticipated impacts were more likely to be seen in the Okavango Delta than in the Okavango River and the information available was insufficient to provide the extent of and significance of these impacts there were not any significant negative impacts that would prevent the proposed water abstraction scheme from proceeding as the anticipated ecological impacts were within the natural variability of the Okavango Delta system (Republic of Namibia, 1997).

1.3 Statement of the problem

While water development projects (for example, water extraction) in the Okavango Delta may be pursued for social and economic benefits, there may be negative impacts on the ecological integrity of the ecosystem that result in the impairment of the Delta's ability to provide ecosystem goods and services. Although the fraction of the total economic value that may be lost or reduced due to the implementation of such projects cannot be estimated precisely, there is need to generate basic information about the economic values that are provided by the Okavango Delta to allow for more informed decision-making by all stakeholders in the context of total economic value.

Past research in the Okavango Delta has concentrated on many aspects of natural resources including socio-economic and environmental impact of tourism development, (e.g. Mbaiwa, 2002), and the economic, social and environmental sustainability of enclave tourism and its economic impact on the Okavango Delta (e.g. Mbaiwa, 2005). Attempts have also been made to estimate direct economic values of some utilised resources. These studies include economic analysis of craft based resources (e.g. Terry, 1999); financial and economic viability of commercial fishing in Shakawe, Okavango

Delta (e.g. Mmopelwa et al., 2005a); the economic contribution of safari hunting to rural livelihoods (e.g. Thakadu et al., 2005); and the willingness of households to pay for improved water supply and quality in the village of Maun (e.g. Mmopelwa et al., 2005b). Economic analysis of some land uses (including commercial wildlife viewing) has been undertaken by Barnes et al. (2001). Barnes (1998) applied the contingent valuation method (CVM) as part of a larger study on determining direct use values in the wildlife sector in Botswana. In this study the CVM was used to determine the proportion of tourists' expenditures consisting of the consumer surplus, the willingness of tourists to contribute to a conservation fund and the willingness of tourists to pay increased park entry. The study revealed that visitors had a consumer surplus ranging between 17 and 20 percent of the total trip costs, and were willing to donate money for the conservation of wildlife resource of Botswana.

Much of the existing research on valuation of resources has focussed on particular sites within the Okavango Delta, and did not give indications of aggregate estimates of economic value for the whole area. It appears also that none of the past studies used a natural resource accounting framework in their valuation. In addition, the national accounts of Botswana have missing values. These include wildlife and livestock values, the inclusion of which have been hampered by lack of data (Lange and Wright, 2004), subsistence resources harvested by communities from the wild (e.g. forest and fishery resources, traditional medicinal plants, wild fruits, fuelwood, basket making resources) and indirect goods and services (e.g. livestock grazing, honey production carbon sequestration) which do not normally enter the trade and market sphere.

The motivation of natural resources accounting is about proper measurement of income derived from resources (El Serafy, 1989). There has been a preoccupation with links between measures of income and measure of human well-being or welfare (Hamilton et al., 1994). The standard measures of income such as Gross National Product (GNP) provide a comprehensive view of a nation's economy in terms of total income and output (Sêve, 2002). However, it is common knowledge that GNP or GDP are fairly poor indicators of welfare because they were designed to measure the level of economic

activity and not welfare (Hamilton and Lutz, 1996; Hamilton et al., 1994). According to Hamilton et al. (1994), the inability of these indicators to measure welfare stems mainly from their lack of consideration of non-market activities because the system of national accounts measures the performance of the economy based on market transactions, ignoring the value of non-market goods provided by the environment. Another important shortfall of the conventional accounting is that important considerations such as the degradation and depletion of resources are not accounted for in spite of the fact that resource degradation and depletion result in reduction in social welfare (Seregeldin, 1996; Hartwick, 1990).

Environmental concerns about degradation and depletion of resources and sustainability of economic activities have contributed to the development of natural resource accounting (Hamilton et al., 1994). The concept of sustainable income forms the foundations of natural resource accounting (El Serafy, 1989). A proper measurement of sustainable income will guide a person or a nation on how much to spend on consumption for any particular period in order to maintain a constant level of income (Santos and Zaratan, 1997). A proper estimate of sustainable income requires capital, including natural capital, to be kept constant, which means that a reduction in one form of capital must be offset by the acquisition of any other form of capital so that the society does not suffer deterioration in the future (El Serafy, 1997; Santos and Zaratan, 1997).

Since conventional measures of macroeconomic performance disregard depletion of natural assets, and are inappropriate for evaluating long-term welfare aspects, natural resource accounting generates accurate indicators of well-being and macroeconomic performance which gives correct signal about the environment impacts of economic activities (Hassan et al., 1998; Hamilton and Lutz, 1996). Thus, in as far as produced and natural capital are concerned, the primary motive of natural resource accounting is to correct or adjust existing conventional measures of income, wealth and social welfare so that a more accurate overall picture of a nation's income and wealth is obtained (Hassan et al., 1998; Hamilton and Lutz, 1996). Such adjustments are therefore important for

policy- making decisions tradeoff between economic activities and environmental degradation (Hassan et al., 1998).

This thesis therefore aims at estimating the value of selected ecosystem goods and services of the Okavango Delta using a resource accounting framework.

1.4 Research objectives

The general objectives of the study are:

(i) To compile physical resource accounts for Okavango Delta Region for 2003

(ii) To construct a monetary valuation of the physical assets where possible and to estimate the per hectare values.

(iii) To formulate policy scenarios resulting from an understanding of the value of ecosystem goods and services derived from the Okavango Delta.

The specific objectives are:

(i) To determine compositional and functional resource accounts of wild herbivores, vegetation and water use

(ii) To determine the direct non-consumptive use value of tourism in Moremi game reserve.

(iii) To determine indirect use value for livestock grazing, milk production, honey production and carbon sequestration.

(iv) To determine the non-use or existence value of the Okavango Delta from households and tourists.

The Okavango Delta wetland in Botswana has been chosen for the case study. The choice of the Okavango Delta was based on two reasons. Firstly, although the Okavango Delta can be considered to be a relatively undisturbed ecosystem, it has been threatened from time to time because of its great water utilization potential as has been shown by threats from Namibia and Botswana. The second reason why the Okavango Delta wetland was chosen for the case study is that it is a unique ecosystem, which contributes to the economy of Botswana, particularly through tourism. For instance, tourists spend roughly about US$5000.00 to US$6000.00 in a 6-10 days visit to the Okavango Delta (Mbaiwa, 2002). The Okavango Delta also supports thousands of communities through provision of many direct and indirect services such as water supply and collection of various veld products.

1.5 Overview of methodology

The total economic value of the ecosystem goods and services provided by the Okavango Delta during 2003 was estimated and presented in a natural resource accounting framework. The following accounts have been constructed using data from secondary information sources and surveys of households and tourists: composition of and ecological functions provided by wildlife; the composition of and ecological services provided by vegetation; direct consumptive use of tourism; indirect consumptive use value of livestock grazing, milk production, honey production, carbon sequestration,

water supply and use and non-use values (preservation values). The physical accounts were valued using market prices where possible.

1.6 Structure of the thesis

The first chapter gives the motivation of the study, defines the research problem and spells out the objectives and hypothesis. Chapter Two presents the background on Botswana and a description of the Okavango Delta including its hydrology, threats, economic significance and conservation and management in the overall context of the Botswana government policies on natural resources management and utilization. A review of the relevant literature about capital theory and natural resource accounting and valuation in general is presented in Chapter Three 3. Theoretical framework, sources of the data, study areas and sampling are discussed in Chapter Four. Chapter Five presents an analysis of physical and monetary accounts of different resources. Discussions of results, policy implications and conclusions are presented in Chapter Six.

CHAPTER 2

BOTSWANA AND THE OKAVANGO DELTA

2.1 Introduction

This chapter gives background on the general physical, demographic and socio economic characteristics of Botswana and the Okavango Delta. The chapter also discusses the significance of the Okavango Delta to the general economy of Botswana in relation to other natural resources. The chapter concludes with a brief review of natural resources management policies as they relate to the management of resources in the Okavango Delta.

2.2 General characteristics of the country

2.2.1 Physical characteristics

Botswana is a land locked country found in the southern part of Africa with an area of 582 000 square kilometers between latitudes $17^0$30 north-west and 28^0 south of Equator and longitudes 20^0 and 29^0 East of Greenwich Meridian (Government of Botswana, 2001). The country is boardered by Namibia to the west and north, South Africa to the south and south-east, and Zimbabwe to the north east (Figure 1). Botswana's topography is mostly flat, with gentle undulations and occasional rock outcrops. There are no major mountain features. However, in the eastern and south-eastern parts elevations vary between 1491 metres for Otse Hill to less than 800 metres in the Limpopo basin (Government of Botswana, 2001).

The country is characterized by four drainage basins, which are the Okavango-Makgadikgadi, Zambezi, Limpopo and Orange basins. The Okavango-Makgadikgadi basin in the west of the country occupies 60% of the total basin area.

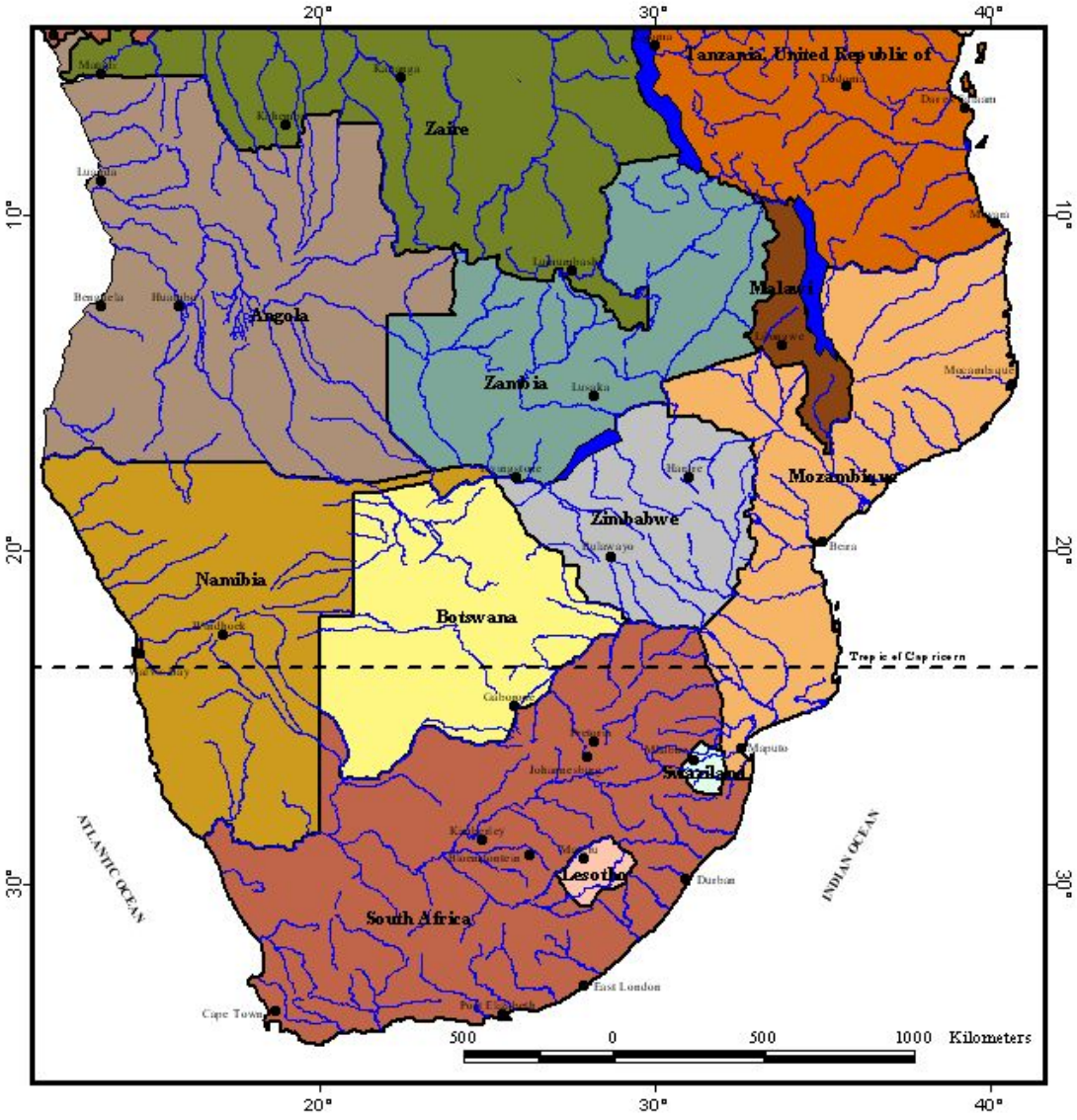

Figure 1: **Location of Botswana**

The Okavango River drains inland from the country of Angola forming the Okavango Delta and the Chobe/Linyanti rivers. The two river systems form the major perennial

surface water and constitute 95% of the country's water (Government of Botswana, 2001). The Limpopo basin in the eastern fringe of the country covers 20% of the total basin area. The head waters of the Limpopo basin are in South Africa. All ephemeral sources found in the east drain towards this basin and the Marco River in South Africa. The Orange basin in the southern fringe of the country covers about 20% of the total basin area. The Orange River basin has a minor tributary, the Molopo River, at the South African and Botswana border and receives its water flows from northern part of South Africa. The Zambezi basin in the northern extremity of the country covers less than 5% of the total basin area. The Zambezi River originates in Zambia and forms the border between Botswana and Zambia.

Approximately two thirds of the country is covered by aelion Kalahari sands known as the sandveld, which are generally known to be infertile, while the remainder of the country has a more diverse and harder geological base, known as the hardveld (Government of Botswana, 2001). The major soil group of the sandveld is the Arenosols, which are generally deep, fine textured soils with a low nutrient and water holding capacity. The hardveld is characterized by more than one soil grouping.

Botswana's annual rainfall is low, and has a high spatial and temporal variability, with the mean annual rainfall ranging from about 650 mm in the north to less than 250 mm in the south-western part of the country (Government of Botswana, 2001). The rainfall occurs in the summer months of October to April and usually falls as localized showers and thunderstorms. The dominant features of Botswana's climate are its dryness and high temperatures which cause annual evaporation to be three to four times the annual amounts of rainfall in most parts of the country (Government of Botswana, 2001). The mean annual temperatures vary from 20^0 C in the south west to 23^0 C in the north. The average daily maximum temperature ranges from 18^0C in July in the north and east to 21^0 C in west and south-west, while the average daily minimum temperature in January ranges from 12^0 C in the north and east to 15^0 C in the west and south west (Government of Botswana, 2001).

Most of Botswana's natural vegetation can be classified as savanna grassland with a more or less developed tree layer. The major specific vegetation types are bush savanna, which cover most of the northern part of the country, tree and bush savanna, which cover a broad area trending north west to south east in the centre of the country, mopane woodland, which is found in the belt to the north of tree and bush savanna, arid shrub savanna in the extreme south west, dry deciduous forest in the extreme north and small area of grassland around the Okavango Delta and the Makgadikgadi pans (Government of Botswana, 2001).

2.2.2 The economy of Botswana

At independence in 1966, agriculture was the dominant economic activity, contributing 40% of the Gross Domestic Product (Government of Botswana, 2001). However, since the discovery of minerals in 1967 and in the subsequent years, the composition of GDP changed significantly (Table 1). The other contributing sectors to total GDP are manufacturing, water and electricity, construction, trade hotels and restaurants, transport and communication, banks, insurance and business services, social, personal services and general government.

Agricultural contribution to GDP has been declining. For instance, in 2001/2002, the agricultural contribution to GDP declined to 2.5 % (Republic of Botswana, 2003a). Much of the decline has been attributed to low and erratic rainfall, recurrent droughts and uneven distribution of land resources. Despite the poor economic performance of agricultural sector lately, it still remains an important source of food, income, employment and capital formation for the majority of the rural population. For instance, agriculture provides about 20% of employment generated within the country, and about half of the population depends on arable farming for its income (Republic of Botswana, 2000a).

Table 1 Sectoral shares of GDP (%) (Current prices)

Sector	1992 / 1993	1993 / 1994	1994/ 1995	1995/ 1996	1996/ 1997	1997/ 1998	1998 / 1999	1999/ 2000	2000 / 2001	2001/ 2002	2002/ 2003	2003/ 2004
Agriculture	4.9	5.1	3.9	4.1	3.4	3.4	3.0	2.7	2.6	2.5	2.4	2.6
Mining	33.8	43.4	33.8	33.8	38.9	38.0	31.1	33.6	35.2	35.1	34.8	30.7
Manufacturing	4.8	4.7	5.0	5.1	5.0	5.0	5.2	5.0	4.7	4.4	4.3	4.2
Water & Electricity	2.3	2.6	2.2	1.9	1.8	1.8	2.1	2.3	2.4	2.3	2.6	2.5
Construction	6.5	7.8	6.3	6.2	5.7	5.7	6.3	5.7	5.5	5.4	5.4	5.8
Trade, Hotels & restaurant	5.3	9.7	9.6	10.1	10.1	10.0	10.9	11.0	11.1	11.4	11.5	11.4
Transport	3.7	4.5	3.8	3.6	3.2	3.3	3.8	3.8	3.8	3.8	3.5	3.4
Banks, Ins &Buss. Servs.	9.7	12.5	11.0	11.4	10	10.3	11.2	11.1	11.2	11.4	11.3	11.6
General Government	15.7	18.7	15.4	14.9	14.0	14.5	17.4	16.5	15.9	16.5	16.6	17.5
Social & Pers. Services	4.4	5.2	4.4	4.3	3.8	3.7	4.0	4.0	3.9	3.9	3.8	3.9
Total value added	91.0	94.3	95.4	95.5	96.0	95.8	95.1	95.5	96.3	96.7	95.6	93.4

Source: Republic of Botswana (2004a)

The mining sector has for a long time been the largest contributor to total GDP **(**Republic of Botswana, 2004a; Table 1). During 1991 to 1997, the mining sector contributed over 30% of the GDP. In 1993/94 prices, GDP grew marginally from P16.254 billion in 2000/2001 to P16.911 billion in 2001/2002 (Central Statistics Office, 2001).

The growth rate of the non-mining sector output increased from 4.0% during 2000/2001 to 5.5% in 2001/2002 with the manufacturing sector registering a very low output growth of –0.4% in 2000/2001 and 0.2% in 2001/2002 (Central Statistics Office, 2001). Trade, hotels, and restaurant sector registered a growth rate of 8.2% during 200/2001 as compared to 6.5% recorded in 2001/2002, while Social and Personal Services sector registered a growth rate of 6.2% during 2001/2001 as compared to 2.8% recorded in 2000/2001 (Republic of Botswana, 2003a).

In terms of trade, diamond exports reached P10 billion in 1999, compared to P6 billion in 1998 (Republic of Botswana, 2000b). This represented more than 70% of the total exports (Table 2). Other principal commodities are meat and meat products, live animals, hides and skins, copper nickel matte, textiles, soda ash, vehicle parts and other goods. Botswana remains an importer of a number of export commodities. The principal import commodities include food, beverages and tobacco, fuels, chemicals and rubber products, wood and paper products, textiles and footwear, metals and metal products, machinery and electrical equipment and vehicles and transport equipment. The share of manufacturing and electrical equipment to total imports was highest (22.2%) during 2000, followed by food beverages and tobacco (14.1%) during the same year (Table 2). During 2002, the shares of these import commodities were 14% and 21.6%, respectively.

Table 2: **Percentage contribution to total export and import by most important items (1994-2002).**

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002
Exports									
Meat & meat products	3.7	3.0	2.5	2.2	3.4	1.8	1.9	2.6	0.83
Diamonds	74.9	67.0	70.4	73.8	69.5	79.4	82.3	84.5	87.1
Vehicle and parts	6.1	16.1	14.1	11.4	11.1	5.5	2.0	2.01	2.6
Imports									
Food beverages & tobacco	17.7	15.9	16.9	13.1	13.1	13.9	14.1	14	14
Machinery & electrical equipment	17.6	15.7	16.1	17.6	21.2	21.1	22.2	19.7	21.6
Vehicle and transport equipment	12.0	18.6	14.1	20.0	16.3	13.5	12.4	12.2	13.3

Source: Republic of Botswana (2004a)

The tourism sector is one of the most important activities in Botswana's economy and is currently the fastest growing sector in the economy (Government of Botswana, 2001). The contribution of tourism to GDP has increased from 2.5% in 1996/97 to 3.6% in 2000/2001 and to 3.8% in 2001/2002 (Republic of Botswana, 2003a). In view of government policy on economic diversification, the tourism industry is regarded as having the greatest potential of all other sectors in the economy. For the year 2003, tourism expenditures was estimated at 1.8 million Pula (US$356 million) which represents an average annual growth rate of 15.3% over the past five years (Tourism

Statistics, 2003). Tourism revenues are due to a high number of tourists visiting the country (Table 3).

Table 3: **Tourist arrivals from the top 10 countries**

Country/Year	**1999**	**2000**	**2001**	**2002**	**2003**
RSA	393 528	507 610	478 044	407 247	438 605
Zimbabwe	245 630	311 452	319 174	401 424	432 334
Zambia	28 888	40 343	36 681	44 644	48 082
Namibia	39 952	40 429	36 681	34 814	37 495
USA	9 871	23 967	21 971	15 238	16 411
UK	15 519	22 868	19 283	18 077	19 464
Germany	8 209	13 317	8 875	8 640	9 305
Netherlands	4 460	7 038	6 030	5 161	5 558
Australia	5 577	8 217	5 756	5 488	5 911
France	3 219	4 562	4 358	3 679	3 962
Other countries	88 461	123 993	11 992	92 146	99 241
Totals	***843314***	***1103796***	***1048845***	***1036558***	***1116373***

Source: Tourism Statistics, 2003

Tourism is predominantly wildlife based. The wildlife resources of Botswana are concentrated in national parks and game reserves, which cover over 17% of Botswana's land area. Payments of various taxes and fees related to the use of tourism resources are among the most important income earners for government (Table 4). Some of these payments include corporate taxes, airport tax, social tax, personal/individual tax, sales tax, park fees, entry fees, vehicle license fees, lease rentals, trophy fees and resources royalties (Mothoagae,1997).

Table 4 Revenue by type of fee from national parks (1999- 2001) (Botswana Pula)

Type of fee	1999	2000	2001	2003
Entry	7 856 191	12 927 576	15 687 296	1 3693 546
Camping	1 697 323	1211535	1 589 556	988 432
Vehicle	540 622	1 238 267	1 550 044	1 072 555
Boat	5 700	2 620	5 490	5 860
Aircraft	10 690	26 994	80 252	46 900
PARRO[1]	11 67 731	864956	1 173 152	66 500
Other	5 226	552	1 000	835 215.5
Total	**11 283 483**	**16 272 500**	**20 086 790**	**1 670 9008.5**

1 PARRO: Parks and Reserve Reservation Office

Source: Annual Reports for Parks and Reserve Reservation Office 1999-2003

Although Botswana has maintained one of the world's highest economic growth rates since independence, the distribution of income in the country remains highly unequal and poverty affects a wide spectrum of people. According to Republic of Botswana (2000b), income inequalities are mainly due to uneven availability of income-generating activities and gender differences. The 1993/1994 Household and Income Survey estimated that the richest 20% of the households received 61.2% of the total national income, while the poorest 40% of households received only 9.4% (Republic of Botswana, 2000b). In 1995/96, the Household and Income Expenditure Survey estimated the Gini Coefficient to be 0.556 for all income and 0.703 for cash income. The extent of the income inequality is still very high when evaluated by world standards (Central Statistics Office, 2001). The government of Botswana has therefore adopted a National Strategy for Poverty Reduction of 2003 (Republic of Botswana, 2004b).The strategy is to guide all initiatives which are aimed at eradiating poverty.

While the problem of unemployment is still widespread, Republic of Botswana (2004b) indicates that about 15000 formal sector jobs have been created from 2001 to 2003, and this represents 2.7% of employment growth per annum. When compared to growth of 5%, of formal employment between September 1998 and September 1999, this shows

some growth improvement (Central Statistics Office, 2001). Through the Citizen Entrepreneurial Development Agency (CEDA) which was incepted in 2001, the government expects to create more jobs throughout the country (Republic of Botswana, 2004b).

The Population and Housing Census of 1991 estimated the population of Botswana at 1 327 million, with a growth rate of 3.5%. The 2001 Population and Housing Census estimated the population of Botswana at 1,680 863. The annual growth between 1991 and 2001 is 2.38% compared with 3.5% between 1981 and 1991 (Central Statistics Office, 2001). The main features of the Botswana's population are that it is small in relation to the size of the country, it grows very rapidly as a result of high fertility rates and its age structure is youthful (Republic of Botswana, 2004b) and is characterized by a high rate of urbanization. HIV/AIDS has had a significant impact on the population growth**.** During 2000, the national prevalence rate of HIV/AIDS was estimated at 38.5% (UNDP, 2002).

2.2.3 The relevance of the study to the economy of Botswana

Although not reflected in the GDP, the economic values of some goods and services provided by the Okavango Delta are important for the well-being of the society. As indicated in chapter 1, if the Okavango Delta is adversely affected by human use, it may no longer be an important destination for a large number of tourists who are a source of foreign earnings. At the local level, the Okavango Delta is important for the creation and realization of employment benefits and local business opportunities through tourism (Hitchcock, 2002; Schudder, et al., 1993; Republic of Botswana, 2001). Due to a likely reduction of income generated from tourism activities as a result of external impacts, there will be concomitant reductions in employment opportunities for the local population which in turn will result resulting in increased unemployment and poverty. Thus, there will be reduction in the standard of living of the people.

2.3 The Okavango Delta

The Okavango Delta is a relatively undisturbed ecosystem that supports both terrestrial and aquatic forms of lives. The delta occupies a significant place in the economy of Botswana as it supports the tourism industry and subsistence activities of the communities living around it (Rothert, 1997).

2.3.1 Location and resources

The Okavango Delta is found in the North West District of Botswana, with coordinates: $18^0\ 29^1 – 20^0\ 12^1 S$ and $22^0\ 12^1 - 23^0\ 45^1\ E$ (Government of Botswana, 2001; Figure 2). It is the largest inland wetland known in Africa for its large quantities of fresh water spreading over lagoons and channels (Ashton et al., 2003) and not flowing to the sea. The delta's maximum extent is approximately 22 000 square kilometres (Monna, 1999).

Based on flooding frequencies, the delta can be partitioned into five main regions, which are perennially flooded swamps (4887 sq. km), seasonally flooded swamps (3855 sq. km), seasonally flooded grassland (2760 sq. km), intermittently flooded areas (2502 sq. km) and dry land (1842 sq. km) (Ashton et al., 2003). The Okavango Delta fluctuates in area from 6000-8000 sq. km during the dry season to over 15000 sq. km during the flood season (Ashton et al., 2003) (Figure 3 and 4).

The source of the Okavango Delta waters is the Okavango River, whose headwaters are in the highlands of Angola, where it is called Cubango River. The Cubango River enters Botswana as the Okavango River at a place called Mohembo (Ashton et al., 2003). After entering Botswana, the Okavango River flows through a narrow swamp called the Panhandle, and disperses its water into the delta shaped systems of swamps and distributary channel consisting of three major channels of Thaoge, Jao/Boro and Nqogha/Maunachira (McCarthy et al., 1998; Ashton et al., 2003; Republic of Namibia, 1997).

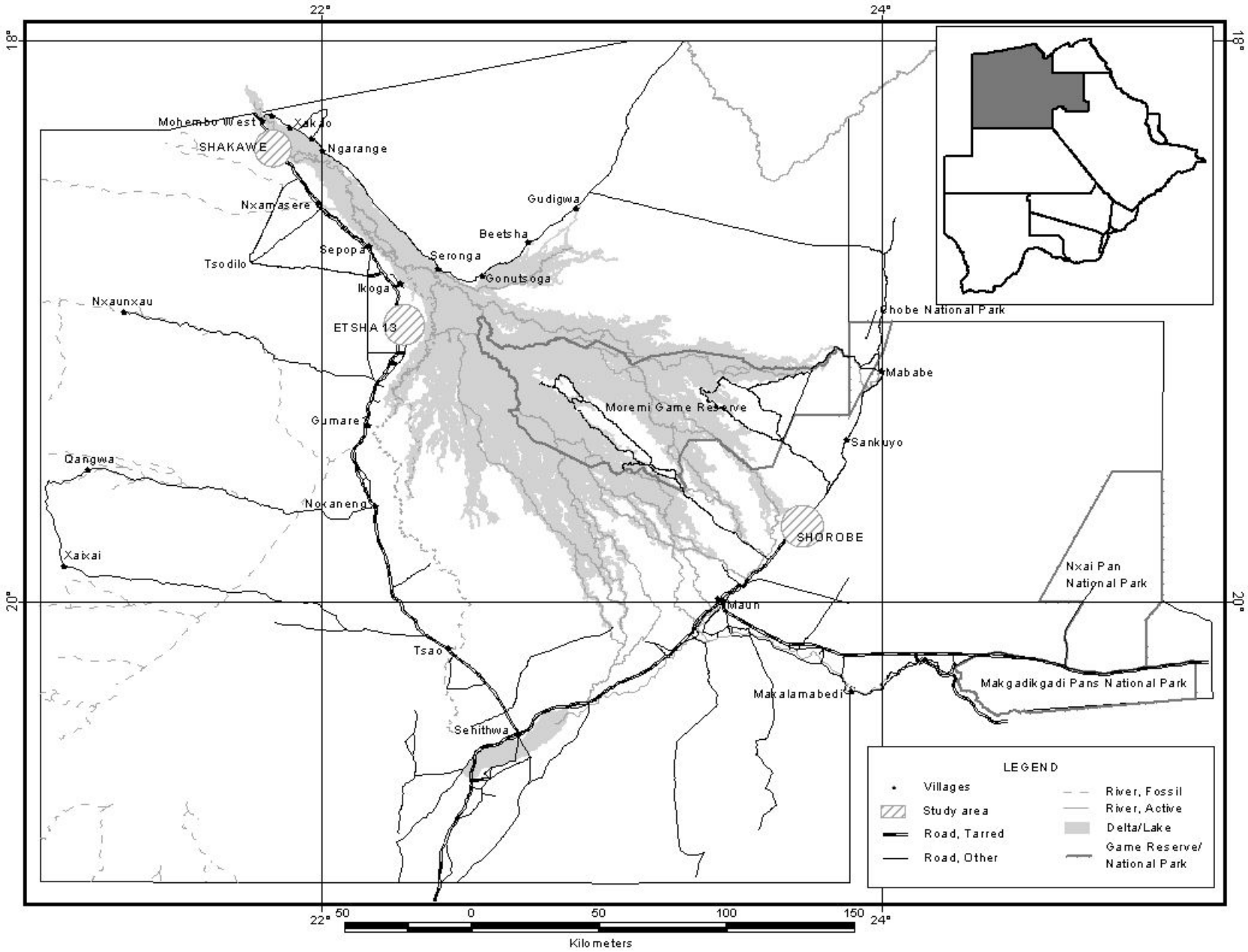

Figure 2: **Map of the Okavango Delta**

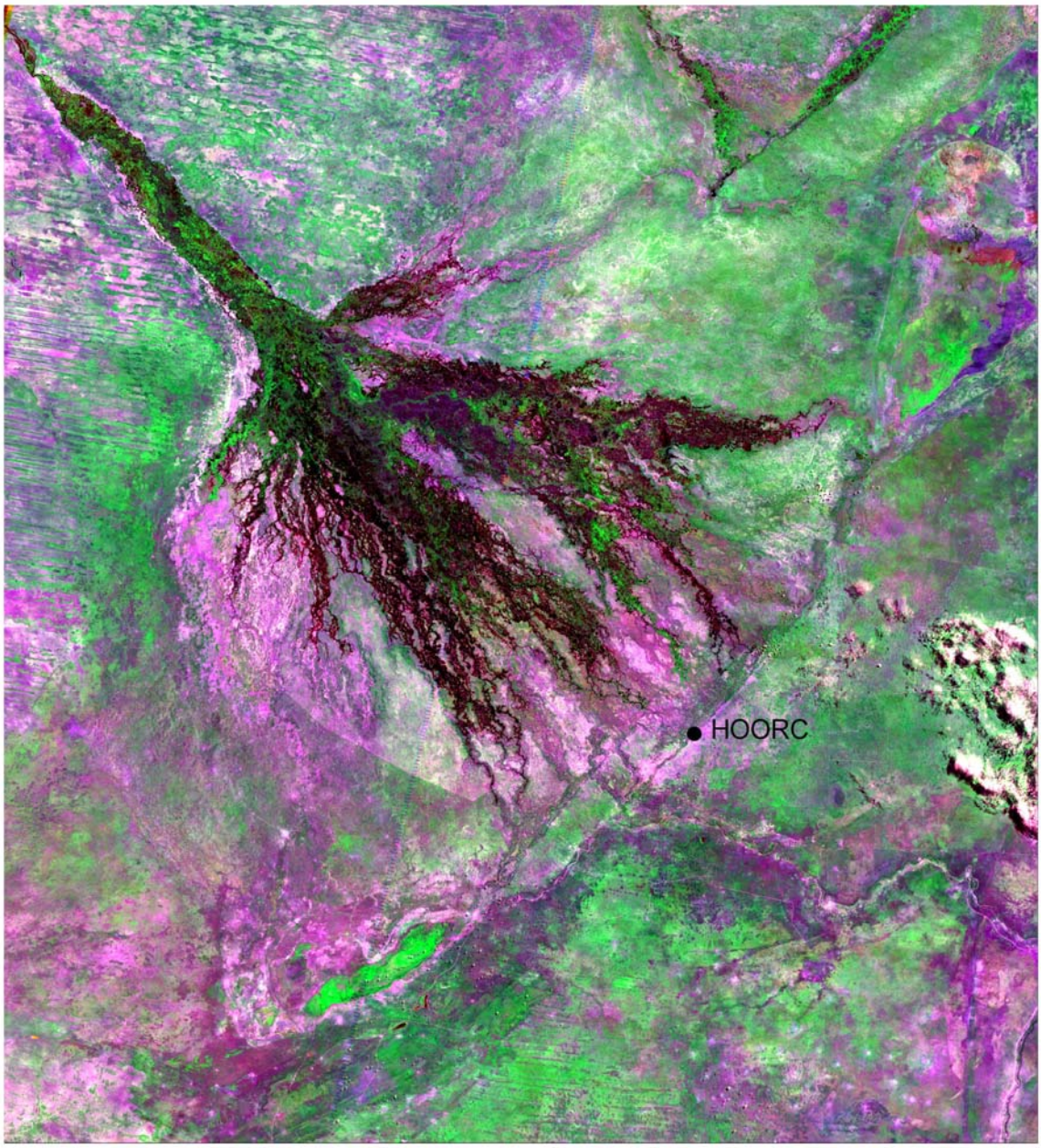

Figure 3: **A Satellite image of the of the Okavango Delta during the wet season.**

The Thaoge channel carries water to the western delta; Jao/Boro to the central delta and Nqoga to the eastern delta (Republic of Namibia, 1997). Of the water entering the Panhandle, the Thaoge, Jao/Boro and Nqoga/Maunachira account for 60% of the discharge, the remaining 40% is lost by leakage channel margins (Republic of Namibia, 1997). The annual inflow at Mohembo varies from 6 000 million cubic metres to 16 000 million cubic metres with an average of 10 000 million cubic metres (Republic of Namibia, 1997). The annual flow is very seasonal. Rainfall contributes 2000 million cubic metres to 8000 million cubic metres per year. The peak flow is normally recorded in April and has an average of 650 m^3/s, and the lowest flow is recorded in November with an average of 150m^3/s (Republic of Namibia, 1997). The majority (97%) or 2172 mm of this inflow is lost mainly by evaporation while groundwater seepage contributes a very small amount to this total loss (McCarthy et al., 1998; Gumbricht et al., 2004).

The climate of the Okavango Delta region may be described as dry, semi-arid with very high temperatures and a pronounced dry winter season (Masundire et al., 1998). Minimum temperatures occasionally fall to around zero during winter. The mean annual rainfall over the Okavango Delta is 513 mm. The rainfall is very variable and ranges from a low of 288.3 mm to a high of about 800 mm (Republic of Namibia, 1997). Rainfall is usually in the form of thunderstorms of short duration, and occurs during the months of October to March (Masundire et al., 1998). The rate of evapotranspiration is high due to high temperatures. The winters are dry and mild. The driest months are June and July, and the mean monthly temperature during these months is about 16^0 C (Government of Botswana, 2001). The summers are hot, and the hottest month is October.

The vegetation types found in the Okavango Delta region are determined by the flood water regimes of the perennially flooded area, seasonally flooded areas and intermittently flooded areas and the dryland area (Hudson-Murray and Parry, 1997)**.** The vegetation in the region can be described as dry savanna. In the perennial swamps, the dominant vegetation (tall emergents) is papyrus species, *Miscanthus junceus and Phragmites australis* while the emergent communities are dominated by a variety of grasses and sedges (Government of Botswana, 2001). The dryland is characterized by mixed stands

of trees, grasses, shrubs and forbs. In the small islands the vegetation includes *Ficus verruculosa, Syzygium cordatum*, tall broad leaved evergreen trees such as *Ficus natalensis, Diospyros mespiliformis, Garcinia livingstonei and Phoenix reclinata,* while the vegetation in the large islands and the sandveld tongues can be described as open shrublands and woodlands (Ellery and Ellery, 1997).

2.3.2 Social and Economic Significance of the Okavango Delta

The Okavango River, which is the source of the Okavango Delta, holds the largest wetland and freshwater reserves of the country and supports the livelihood of many communities (Gumbricht et al., 2004; Ashton et al., 2003; Silvius et al., 2000; Rothert, 1997; Neme, 1997). According to Rothert (1997) 'over 70 percent of the riparian community households collect water directly from the Delta in the dry season; 75 percent of the households collect fish, edible or medicinal plants from the Delta, and nearly 20 percent of households conduct farming in the Delta flood plains.'

The Okavango Delta is particularly important as one of the largest remaining inland wetland ecosystems in the world today because it is a habitat for a variety of species of plants and animals. It is believed that the Okavango Delta is a habitat for between 2000 and 3000 species of plants, more than 65 species of fish, over 162 arachid species, more than 20 species of large herbivores and over 450 species of birds (Monna, 1999).

The Delta also supports a large tourism industry as is evident from the build-up of more lodges and increasing tourist visitors from all over the world (Table 5). The Delta's main tourism attractions relate to its complex mosaic of dryland, island frindge and wetland habitat and associated wildlife including big game, birds, fishes, reptiles and amphibians (Masundire et al., 1998; Ashton et al., 2003). Over 400 species of birds have been recorded and the opportunity to observe rare species and/or large numbers of particular birds is an integral part of the Delta's visitor's experience (Masundire et al., 1998). One of the game reserves, Moremi (3880 sq. km), located in the northern eastern part of the Okavango Delta, is an area of considerable ecological diversity and scenic beauty

particularly with its wilderness combinations of water, riverine woodland and wildlife (Barnes, 1998). Thus, the principal attraction is the opportunity to view animals in their natural environment.

The Okavango Delta has become a major attraction for recreation, (Gumbricht et al., 2004). It provides appealing scenery and novel recreational activities that include canoe rides, site-seeing, motor boat cruises, and game fishing (Rothert, 1997; Mbaiwa, 2002). The river system provides a medium for traditional transport and communication, primarily through the use of boats. The dug–out canoe has been adopted by the tourist industry as a way for tourist to experience the Delta (Cassidy, 1997). Opportunities exist for short duration of two to four day-camping trips by boats.

Although tourism contributes significantly to the country's GDP, it is reported that tourism links with other economic sectors are not clearly defined in the traditional categorization of economic activity shown in the national accounts (Republic of Botswana, 1999). As a result, services such as inland water transport by boat operators are not included in the national accounts. Notwithstanding this situation, it has been shown by Republic of Botswana (1999) that tourism has strong links with certain sectors of the economy as shown in Table 5.

Table 5: Tourism related share of GDP at market prices 1996/1997

Economic Activity	Tourism related output	
	P million	**Percentage of total**
Agriculture	3.1	0.5
Mining	0.5	-
Manufacturing	17.1	3.0
Water and electricity	1.6	0.3
Construction	4.9	0.8
Trade, Hotels and Restaurants	331.1	57.3
Hotels and Restaurants	248.5	43.0
Wholesale trade	52.6	9.1
Retail and other trade	30.0	5.2
Transport	51.7	8.9
Banks, Insurance and Business services	49.5	8.6
General Government	48.5	8.4
Social and Personal services	70.4	12.2
Tourism related GDP	578.4	100

Source: Republic of Botswana (1999)

The Okavango Delta is also economically important as a source of water for north central Botswana (Government of Botswana, 2001) and water availability has greatly influenced settlement patterns in the region. However, the open access use of water in the Okavango Delta makes it difficult to record water consumption by economic sectors such as agriculture, tourism or mining (Zambo, personal communication, 2003).

Direct use of the water from the delta depends on whether or not there is a water reticulation system in a village community and the extent to which such reticulation functions (Applied Research Development Consultants, 2001). Riparian communities are more likely to use more water directly from the river than non-riparian communities. Based on North West District Council's manual on estimations of daily water needs of

the population in the area, 787m^3 of treated surface water is extracted daily from the Okavango Delta to meet the needs of 18 villages in the area. A total of 1229m^3/day is supplied through 36 boreholes to meet the needs of some other 26 villages. It is assumed that since all boreholes are situated along the Delta, they are recharged by the Delta.

Much of the surface water from the Okavango Delta is not priced, and as such, the GDP fails to account for the non-marketed value of surface water. Only water that is supplied by the Water Utilities Corporation by metering and that which is provided through private connections by the Department of Water Affairs is reflected in national accounts. The latter is very common in major villages such as Maun, which is currently the largest village in the country, and capital of the North West district. Maun village water supply is dependent on the flood outflows from the Delta to recharge the aquifer.

The Delta also indirectly supports arable and livestock agricultural activities. Two systems of arable farming are practiced: dryland and floodplain agriculture. In dryland agriculture, the source of moisture is rainfall. In floodplain agriculture, crops are planted on the fringes of the Delta to make use of residual moisture in the soil and then sustained by summer rains (Bendsen, 2002). According to Kgathi (2002), there were a total of 11 200 dryland cultivated farms and 2118 floodplain agricultural farms in the region in 1998. The average size of these farms is 2.2 hectares, while the national average is 4.4 hectares. Irrigated agriculture in the area is limited to two commercial farms that are located near the Panhandle area, and the size of the land under cultivation is approximated at 137 hectares. The amount of water used for irrigation purposes is, however, unknown (Tawana Land Board, 2001).

The primary means by which the Delta supports livestock is through provision of grazing grounds and water. Most of the aquatic habitats have vegetation which comprise grass and herb species which are highly palatable to livestock (Kwerepe, 1995). Before the outbreak of cattle lung disease in 1995/96 that led to the killing of all livestock (cattle mainly) in the region, the Delta waters supported an estimated head of 318 000 cattle. Restocking by an estimated 100 000 cattle was done after complete eradication of the

disease (Alberton, 1997). In 1998, there was a total of 192 540 cattle, 1487 sheep, 5869 goats and 5122 donkeys in the area (Central Statistics Office, 2001). Using the North West District Council's water consumption estimates of 50 litres per head of cattle, 5 litres per sheep per day, 5 litres per goat per day and 20 litres per donkey per day), the estimated livestock's consumption of water converts to a rough estimate of 4 746 920 litres per day. Considering the average annual discharge of $1.64x10^{10}m^3$ (Gumbricht et al., 2004), the percentage of livestock water use to total water supply would be about 10.6. When considering that 97% of surface water is lost through evapotranspiration (Hichcock, 2002; Gumbricht et al., 2004), the percentage of livestock water use to total water usage is expected to be higher.

The Okavango Delta also supports the well-being of many people through the provision of various veld products, fish and wildlife hunting. Veld products collected include craft products, such as palm leaves (*Hyphaene petersian)* grapple plant (*Harpagophytum procumbens),* thatching grass (*Eragrostis pallens, Aristida stipitata, Cymbopogon excavatus* and *Eragrostis pallens),* reeds, floristic materials, various fruits and firewood. In 1999, P22 million (US$4.75 million) worth of crafts from Botswana was sold (Terry, 2000).

Fish is exploited at three levels: subsistence fishing, commercial and sport fishing. According to Mosepele (2001), 65% of Ngamiland north population depends on fishing and that the total annual economic turnover in the Okavango fishery is approximately P1.5 million. There are several safari camps and mobile operators offering fishing as part of their tourist package in many areas of the Delta. According to Merron (1995), the value of recreational fishing generated through tourist fishing activities is in excess of P750 000.00.

2.3.3 Property right regimes in the Delta

The use of resources by different entities such as government or communities, results in different management regimes for those resources. Four property rights regimes are

recognised in Botswana: open access, common property, state property and private property (Kgathi, 2002). State property regime refers to situations where resource use is controlled by the state. Wildlife resources in national parks and game reserves, which are abundant in the Okavango Delta region, are owned and controlled by the state government through the Department of Wildlife and National Parks (DWNP). The Department's responsibility is to ensure the conservation of indigenous wildlife and habitat in national parks and game reserves through minimal interference, ensure conservation of biodiversity throughout Botswana in the interest of present and future generations, promote research in all areas related to management of wildlife resources in Botswana, raise public awareness and appreciation of Botswana's unique wildlife resource, and involve communities, NGOs, and the private sector in the realization of the full economic potential of wildlife resources outside the protected areas through sustainable utilization.

Open access resource regime refers to a situation where there are no restrictions or regulations on resource use as the resource is not owned by any person or institution (Pearce and Turner, 1990; Prato, 1998). It is generally argued that under open access regime, there is a market failure that ensues from the inability to adopt the right measures to conserve and sustain resources (e.g. Perman et al., 2003). As a result of this inability, the negative effect of greater harvesting pressure on the resource results in a falling population of the harvested biological species which eventually leads to lower levels of the supply of the resource (Barbier et al., 1997). The use of resources such as grazing on flood plains, fishing, surface water for domestic and livestock purposes, and veld products (thatching grass, reeds, basket weaving resources) is theoretically controlled by the state, but it is in practice on an open access basis (Hasler, 2001; Rozemeijer and van der jagta, 2000). Contrary to open access use of water resources, the rights to use boreholes are essentially determined by de facto rights as boreholes are owned by individuals or organizations that have invested substantial amount of labour and capital resources in having them (Hitchcock, 2001).

Common property resource regimes are those regimes whereby resources are owned and controlled by a defined group of people such as a community for the benefit of that group (Pearce and Turner, 1990). The management regime under common property is often considered to be a sustainable system of resource management in the sense that group members have secure expectation that they can gain access to future use, which is ensured by the existing guidelines for resource use and enforcement mechanisms for punishing deviant behaviour (Tietenberg, 2000).

The Botswana Government's recent efforts to implement community based natural resources management programs has resulted in some changes in the previous resources management regimes, particularly in the management of wildlife resources in controlled hunting areas. The management responsibilities of wildlife resources in these areas has been decentralised to the communities who have organized themselves into legally registered entities such as trusts so that they can better realize the benefits from such resources (Rozemeijer and van der jagta, 2000). Communities wanting to have access to wildlife resources in controlled hunting areas are bound to have a constitution and bylaws that define the natural resources management functions and accountability and responsibility towards the community members as well as land-use management plans that conform to Wildlife Management Areas regulations as approved by the land authority (Rozemeijer and van der jagta, 2000). Community Based Organisations (CBO) assist the communities in the drafting of these documents. Following the approval of a community application by the Department of Wildlife and National Parks, a community is given a 15 year lease for the area, which is reviewed after every five years. The lease essentially entitles the community to exclusive access to wildlife resources in the area. However, the lease is not for the land but for governing the use of natural resources in that area. The community will now be in a position to invite private companies to tender for the area. The company that wins the tender will then sign a sublease with the community that outlines the responsibilities of each party. The company that has won the tender and signed a sub-lease agreement with community will then have exclusive rights to operate in the designated controlled area. While the company has exclusive right of use during the sublease period, it pays annual fees, such as hunting fees to the community as

agreed in the lease arrangements (Rozemeijer and van der jagta, 2000). At the end of the sublease period, the community may opt to tender the area again or renew the sub lease agreement with the previous partner.

2.4 Overview of Natural Resources Management Policies, Programs and Acts

The Government of Botswana recognizes that its natural resources need to be used in a sustainable manner in order to meet some of its social, economic and environmental goals. Motivated by this concern, the government has formulated a number of policies and programs to achieve these goals. This section gives a review of these programs and policies, particularly as they pertain to the management of natural resources in the Okavango Delta.

2.4.1 Water Resources

Water is an important development constraint in Botswana. According to the Water Act of 1968 (Cap. 34:01), no person has a right of ownership of public water, including groundwater, water in any natural streams, rivers, lakes, pans or swamps. The use of water, including that of pumping from a river and building a dam near a river, requires application and approval from the Water Appointment Board. The Act also controls pollution of public water and requires the permission of the Water Registrar for the introduction of any poison in public water to which a member of the public may have access. Okavango Delta waters are open access resources, and any person using the water for domestic and livestock watering purposes does not have the right to exclude other people from using the water **(**Hitchcock, 2002). However, in the case of using water for irrigation purposes, the user is required to make an application to a Water Appointment Board for approval

2.4.2 Tribal Land

The Tribal Land Act (Cap. 32:02) was established with a view to effectively control the use of land resources in the country (Republic of Botswana, 1968). Under this act, the Land Boards, which are the land custodians, can grant land under customary law and common law. User rights can only be given under customary law. These rights pertain to arable agriculture, residential, business, and to a small extent, grazing (Hitchcock, 2002). Under common law, grants can only be given in the form of written agreement between the Land Board and the applicant (Cassidy, 2000). The Panhandle area is an important but little known component of the Okavango Delta, with unique flora and fauna. In an effort to maintain the ecological integrity of the panhandle area, the Land Board has taken an important step of not allocating land for any purposes within 100 metres of the water mark. Further, a study aimed at developing a management plan for the Okavango Delta and developing management recommendations for areas within and on the periphery of the panhandle, has been commissioned (Tawana Land Board, 2001).

2.4.3 Agricultural Resources

The Agricultural Resources Board (ARB), the custodian of agricultural resources in the country, was established by the Agricultural Resource Conservation Act of 1972 (Cap. 35:06). The aim of the act is to achieve sustainable utilisation of natural resources, most of which are veld and agricultural resources. In some areas, the ARB is working closely with Village Conservation Committees, who act as law enforcing agents. However, not all villages have conservation committees. In the village of Etsha, in the Okavango Delta, the Village Conservation Committee is actively involved in regulating the exploitation of palm tree, *Hyphaene ventricosa*, which is used for basket making (Hitchcock, 2001).

2.4.4 Fish resources

Fish protection is under the control of the Ministry of Agriculture. The Fish Protection Act of 1975 (Cap. 38:05) empowers the Minister of Agriculture to regulate the species

and quantities of fish harvested and the methods of harvesting of fish. The act also prohibits the use of explosives, poisonous or noxious substances as a means of catching fish easily. Fishing activities in the Okavango Delta are controlled by the Fisheries Division of the Ministry of Agriculture. The government provides support for fishing activities in the form of fishing equipment such as gillnets, boats and assisting in fish marketing (Hitchcock, 2001). By virtue of its position, the Fisheries Division controls the sizes of fishing nets in order to avoid over-exploitation of fish resources of the Okavango Delta.

2.4.5 Conservation and utilization of wildlife

According to Republic of Botswana (1986), the government position is that wildlife resources must be seen in terms of their potential contribution to the economic well-being of the nation and in terms of their heritage and aesthetic value. Accordingly, the government formulated the Wildlife Conservation Policy of 1986 with the objectives of realising the full potential of the wildlife resources; developing commercial wildlife industries (such as ostrich farming) in order to create economic opportunities, jobs and incomes for rural populations and to enable more rural dwellers to enter the modern economy; and increasing the supply of game meat as a consequence of the further development of wildlife commercial utilization.

As a practical strategy towards the implementation of the Wildlife Conservation Policy, the Ministry of Local Government and the Department of Wildlife and National Parks re-zoned controlled hunting areas, which are administrative blocks for allocating hunting quotas, in order to establish areas in which better management of wildlife resources would be undertaken. (Rozemeijer, 2001). Most of these areas are found in the Okavango Delta region, and include commercial multipurpose areas, commercial photographic areas, community managed wildlife utilization areas, community photographic areas and community managed wildlife utilization in livestock areas (Republic of Botswana, 1997; Rozermeijer, 2000). The Government of Botswana assumes that communities living in the vicinity of areas with wildlife will manage these

resources better when they are given security of tenure and can realise the benefits of management. According to Republic of Botswana (2003b), the Wildlife Policy of 1986 is being reviewed to keep pace with other national development policies and other international agreements.

2.4.6 Tourism

Wildlife and wilderness represent the principal tourist attractions (Republic of Botswana, 1990). The Government of Botswana has established a national tourism policy in 1990 to guide the operationalisation of tourism in the country (Hachileka, 2003). The objectives of the policy are: to increase foreign exchange earnings and government revenues; to generate employment, particularly in rural areas; to raise incomes in rural areas in order to reduce urban drift; to promote rural development and to stimulate the provision of other services in remote areas of the country; to improve the quality of national life by providing educational and recreational opportunities and to project a favorable national image to the outside world. Hotel business has been increasing in the Okavango Delta. Tourism in Botswana is 'described under the policy as 'low volume-high value' which means that to protect the fragility of the ecosystem from high number of tourists, higher entry fees have been introduced (Rozemeijer, 2000). According to Republic of Botswana (2003b), tourism policy is being reviewed to bring it in line with the latest international development on tourism. This entails improvements such as development of infrastructure in wildlife protected areas to enable Botswana's tourist destinations to compete with other international destinations.

2.4.7 The conservation and management of elephants

Botswana has one of the highest elephant populations in the world. The central government has committed itself to ensuring that elephants are used in manner that also benefits communities. One of the greatest threats to elephants is poaching, which is driven by the lucrative ivory trade. The government is committed to conserving elephant population and ensuring that there is a legal and clean trade in elephant products. The

Republic of Botswana (1991) established an act on the Conservation and Management of Elephants in Botswana. The objectives of the acts are: to manage elephants on a sustainable multiple use basis in accordance with the Wildlife Conservation Policy and the Tourism policy; to maintain elephant populations at a level that is not beyond the carrying capacity of the land resources; to maintain elephant populations through research and monitoring; to maintain biodiversity and essential life support systems in the national parks and game reserves; to reduce conflict between elephants and humans and to support and undertake elephant population habitat research and monitoring programs.

In 1989, the Convention on International Trade on Endangered Species (CITES) banned the ivory trade and decided to place elephants in Appendix 1 of the convention (Barnes, 1998). Botswana was among the list of countries that were protesting against this ban because of the huge population of elephants which was threatening to destroy the environment on which they depended. The high population of elephants was also causing land use conflicts in the communities, and government felt that allowing international trade in elephant products would redeem the Okavango Delta and other areas, particularly Chobe, from degradation.

2.4.8 National parks and wildlife conservation

The Wildlife Conservation and National Parks Act of 1992 replaced two previous acts: the Fauna Conservation Act and the National Parks Act. The act describes how wild animals can be used in all areas of Botswana. A number of controlled hunting areas (CHA) have been established. For these areas, permitted activities are listed in the act. Management of CHA depends on certain conditions, such as whether the area is a commercial or a private operator area, or a community area, whether the area is a multi-purpose area or photographic area, whether the area is inside or outside a Wildlife Management Area and whether the area is within state land or tribal land. In Moremi Game Reserve, in the north eastern part of the Okavango Delta, certain areas are designated as community use zones for communities living in or adjacent to the game

reserve. Communities are allowed to conduct only commercial tourism activities and to make sustainable use of veld products in the game reserve.

2.4.9 Ramsar Convention on Wetlands

Recognising the Delta's importance and threats, the Government of Botswana ratified the Ramsar Convention and officially registered the Okavango Delta as a Ramsar Wetland of International Importance on 4th April 1997 (Monna, 1999; Rothert, 1997). The Okavango Delta is currently the largest wetland in the Ramsar List of Wetlands of International Importance. The mission of the Ramsar Convention is the conservation and wise use of wetlands by national action and international cooperation as a means of achieving sustainable development throughout the world (Barbier et al., 1997). The benefit of the Okavango Delta being a Ramsar site is that the Government of Botswana is committed to developing management plans and policies guiding its use (Hachileka, 2003; Barbier et al., 1997).

2.4.10 Community Based Natural Resource Management (CBNRM)

The Government of Botswana Community Based Natural Resource Management Policy of 1998 was formulated as an extension of other existing policies and acts such as the Wildlife Conservation Policy of 1986, the Tourism Policy of 1990, Wildlife Conservation and National Parks Act of 1992 and the Agricultural Resources Conservation Act of 1972 (Republic of Botswana, 1997). The aim of Community Based Natural Resource Management (CBNRM) is to provide a means of combining natural resource conservation with social and economic development. CBNRM involves initiatives that are owned by one or more defined communities, or run as a joint venture partnership with the private sector with equitable community participation, as a means of using the natural resources in a sustainable manner to improve their standard of living in an economically viable way (Rozemeijer, 2001). Communities apply to the Department of Wildlife and National Parks (DWNP) to be granted rights over control of wildlife with the aim of

deriving benefits from them (Hitchcock, 2002; Republic of Botswana, 1997). The government expects that the benefits derived from the use of natural resources such as wildlife will prompt the community to use the resources in a sustainable way (Rozemeijer, 2001). Several communities in the Okavango Delta such as the Sankuyo community have formed community trusts and undertaken to participate in joint venture projects in the management of wildlife resources after the DWNP has allocated land to the communities.

2.4.11 Conservation and utilization of wetlands

The Government of Botswana has already undertaken some steps towards the development of a wetland policy (Monna, 1999). These include execution and completion of a national wetland inventory, the formulation of issues pertaining to wetlands, stakeholder consultations and consultation with policy bodies of government and drafting of the policy and the strategy. The main goal of the Draft Policy of 2000 is to promote the conservation of Botswana's wetlands in order to sustain their ecological and socio-economic functions as well as providing benefits for the present and future wellbeing of the people living in and near wetlands. The draft policy recognizes the following threats to the wetland of Botswana: changes in land use, invasive plant species, sedimentation due to upstream habitat loss and destruction, uncontrolled exploitation of water resources through commercial exploitation of communal resources such as river sand, alienation of communities living in or near wetlands due to reduced rights of access of resources, and international threats such as global worming and trans-boundary activities (Government of Botswana, 2001).

On-going policy work in the Okavango Delta region includes development of an Okavango Delta management plan under the auspices of the Tawana Land Board. Since the Delta is also a trans-boundary natural resource, the Permanent Okavango Commission (OKACOM) has been formed with membership from Botswana, Namibia and Angola, whose responsibilities include facilitating cooperation in the development and implementation of an integrated management plan of the Okavango Delta.

2.5 Chapter Conclusion

This chapter has given the general physical characteristics of Botswana and those of the Okavango Delta, the large alluvial fan that lies in the northern part of the country (Government of Botswana, 2001). The general physical characteristics are, to a large extent, determinants of the functioning of any natural system and the consequent goods and services that are a product of that ecosystem (Novitzki et al., 1997). As has been shown in the chapter, the sources of the Okavango Delta waters are the Okavango River whose tributaries are in Angola. Together, the Okavango River and the Chobe/Linyanti river systems form the major perennial surface and constitute 95% of Botswana's surface water.

The chapter has also given an overall picture of the economy of Botswana, and the economic and social role played by the Okavango Delta in the total economy of the country. As Rothert (1999) and Gumbricht et al. (2004) have shown, the Okavango Delta contributes significantly through tourism to the economy of Botswana, as well as sustaining the livelihood of riparian communities through the harvesting of water, veld products and other resources such as fish. The Okavango Delta is also source of moisture for flood plain agriculture.

The chapter has also presented a general policy framework and property regime within which resources of the Okavango Delta are utilized and regulated. Some of these policies include Wildlife Conservation Policy of 1986, Tourism Policy of 1990, and Ramsar Convention of Wetlands and Community Based Natural Resources Management Policy of 1998.