EVALUATION OF CONSERVATION STATUS AND MANAGEMENT OF ELEPHANT POPULATION

(Loxodonta africana) IN SOUTHERN OF MOZAMBIQUE

(CASE STUDY OF LIMPOPO NATIONAL PARK)

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MANAGEMENT, ACCESS AND CONSERVATION OF SPECIES IN TRADE: THE INTERNATIONAL FRAMEWORK

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ABSTARACT

Elephant and their habitats in Southern African is necessary because both species are environmental engineers and can have enormous impact on their habitats. Placing their potential impacts in an evolutionary context is relevant to the present debate on managing elephants and their impacts on biodiversity and ecosystem process in protected areas.

It is also important because present day human elephant interactions almost certainly differ from those that existed where a fraction of their current levels and elephant range was not restricted.

The civil war in Mozambique also resulted in major social disruption with large scale movement of people out of the area where the Limpopo National Park is presently situated.
With peace again prevailing, people have been moving back into the area.

One of the main goals in the establishment of a TFCA is that the local communities will benefit from the increased eco-tourism to the area. This, in turn, is dependant on the communities' involvement in the development of the park. The development of the Limpopo National Park therefore started with community consultations and with the dissemination of information about the envisaged transfrontier park.

Conservation is increasingly in conflict with other human activities although such conflicts can positively influence changes they are often destructive , costly, and not only undermine effective conservation, but also prevent economic development, social equality, and resource sustainability hence, conflicts are arguably on of the most intractable problems facing conservation,

The study intends also to address how tourism can generate revenue in areas of high biodiversity such as Transfrontier Conservation Areas (TFCA's), and help to make them economically viable both use- and non-use values.
The exploitation of certain resources within a LNP on a sustainable basis could contribute to higher living standards, of rural people

A sustainable protection of elephant must be taken into consideration for the impact of elephant on biodiversity or people living in proximity to elephants through their natural migration routes.

LIST OF ABREVIATION AND ACRONOMY

LNP:	Limpopo National Park
GLTP:	Great Limpopo Transfrontier Park
KNP:	Kruger National Park
GNP:	Gonarezhou National Park
TFCA's:	Tran frontier Conservation Areas
GMZ:	The Government of Mozambique
INE:	National Institute of Statistic
WWF:	World Wide Fund for Nature
AFD:	Agency Françoise de Development
CEAP:	Community Environmental Awareness Program
CDP:	Community Development program
WPC:	World Park Congress
IUCN:	World Conservation Union
MICOA:	Ministry for the Coordination of Environmental affairs
MADR:	Ministry of Agriculture and Rural development
DNFFB:	National Directorate of Forest and Wildlife
DNTF:	National Directorate of Land and Forest
MITUR:	Ministry of Tourism
EU:	European Union
KWS:	Kenya Wildlife Serve
HWC:	Human/wildlife Conflict.
MIKE:	Monitoring the Illegal Killing of Elephants

COP:	Conference of the Parties
ETIS:	Elephant Trade Information System
CBD:	Convention on Biodiversity
PAC:	Problem Animal Control
APU:	Anti –Poaching Unit
AESG:	African Elephant Specialist Group
WPCW:	World Park Congress
MUZ:	Multiple use Zone
CBNRM:	Community Based Natural Resource Management
CITES:	Convention on the International Trade in Endangered Species Of Wild Fauna and Flora
WMP:	Wildlife Management Program

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INDICE

1.INTRODUCTION

Wildlife has always been a distinctive component of the day to day life of Africans. Animals and plants play important roles in African culture. Such fauna and flora should not be endangered, many local and indigenous communities depend on sustainable use of wildlife for their livelihoods and survival.

Utilization of wildlife is an old form of land use and is practiced throughout the world, but perhaps nowhere more than in Africa. Its people have used wildlife in the past and continue to do so today, despite attempts by colonial administrations and postcolonial independent governments to stop them.

It has been very correctly said that no natural resource is more sensitive to conservation than wild life and no natural resource has suffered more from lack of conservation.

The human race has a long record of over-exploitation of the earth's natural resources and of wildlife in particular and it was not until a large number of species had been made extinct and the danger signals could no longer be ignored that the nations of the world woke up to the necessity for husbanding nature. (Shadab, 2009)

It is believed that elephants once lived in most parts of Africa outside of the Sahara desert. They were exterminated from North Africa in the Roman era, probably as a result of capturing large numbers for domestication and the circus, although climate change may also have played a role (Scullard 1974).

Expanding human demands on land, sea and fresh water, along with the impacts of climate change, have made the conservation and management of wild areas and wild animals a top priority.

Wildlife management poses a particular challenge to the global community, these challenges sometimes are negative to the survival of many species and habitats and consequently for wildlife population.

But there are many different reasons for thinking that such conservation is important, and these reasons can shape conservation policies in different ways.

From paradigms of conservation in the 1960s and 1970s to the community based conservation paradigm of the 1980s and 1990s, the ideological linkage of people and conservation of natural resources in Africa seemed to have progressed towards local ownership and local management.

According to the Conservation Approaches Conservation paradigm, practices, and policies which have shifted over time and have been variably successful. in recent decades, traditional approaches to conservation—such as the creation of national parks—have involved to encompass awareness of the diverse benefits provided by protected areas, the importance of local conservation initiatives and interests in protected area management, and the need to address the opportunity costs of conservation among the rural poor motivated ecological restoration, both within and outside protected areas which has been increasingly applied in the world.

The conservation and management of Africa's elephants is of considerable importance to the long term sustainability of many of Africa's habitats and subsequently the species that occupy them.

They are important for the function and structure of many ecosystems, there is also a need to conserve ecosystem including other plant and animals species (kerley et al. 1995).

The conservation of African elephants is at times highly politically and emotionally charged, however, it is important to note that from a management perspective some key conservation challenges and opportunities have emerged across the continent. Importantly, these challenges and opportunities are dynamic, requiring reaction and innovation rather than blueprints.

The management of Africa's elephants is complex – they are vulnerable to extinction in some regions but appear overabundant in others (Blacke and Hedges, 2004, Stephenson,9 2004). Overall, southern Africa's populations grew significantly from 1994 to 2002 (Blanc et al., 2005) and this trend probably continues, across the sub-region across the globe.

The elephant is believed to be a crucial "key stone" species for African Savannah and forest ecosystem (Western 1989)" key stone" species play a major role in a food web, and the extermination of these species is expected to cause a dramatic changes or extinction in ecosystems.

However, their populations have declined in many regions due to drought, excessive anthropogenic pressures resulting in habitat loss, desertification, and poaching for their ivory. The African elephant is not in immediate danger of extinction as a species in many regions of Africa and in serious decline in Asia.

However, in the context of this study, the conservation of African elephants is important because of their unique role in African ecosystems and their value to communities in Africa. Conserving the elephant requires careful consideration of biological, social, political and economic factors.

There is need to manage systems for the conservation of elephants as a key stone species. There are three main reasons: First, elephants are the largest of the extant land mammals. They are known, along with rhiniceros, hippopotamus and giraffe, as'megaherbivores' (plant-eaters weighing more than 1000kg) elephants are capable of transforming the ecosystems in which they occur in dramatic way, for instance by debarking or pushing over large trees.

Along with large size come the attributes of longevity (up to 60 years) and relatively slow population growth rate (a long-term rate of up 7 per cent per annum), which make elephant populations slow to respond to management or changes in resource availability.

Because of they large size, lower relative metabolic rate and hindgut digestive system, elephants consume a wide range of plant parts, including grass, herbs, tree and shrub foliage, fruit, woody stems, bark, and roots, further consequences of a large body size are that elephants have a few natural predators and a large home range, now substancially constrained.

Second, have alarge and a complex brain. They are capable of learning and remembering. They experience fear, pain, and (apparently) a sense of loss. They are infered to among the more intelligent animals.

Third, elephant exhibit complex social behaviour that includes the lifetime persistance of extended family linkages, While none of this atributes are completely unique to elephants, they exihibit them in combination, and to such a degree, that people of many different cultures and backgrounds agree that elephants must be managed with a degree of respect greater than afforded to most other species of wild animals.

Elephant conservation in southern Africa has been remarkably successful over the last century. In the early years of this century, there were low human densities in many parts of Africa as a result of the slave trade, wars and introduced diseases, and the limits on cattle husbandry imposed by the tsetse fly (Ford 1971).

As elephant and other species declined in certain areas in Southern Africa, (Shillington, 1989). There were still large areas where they lived relatively undisturbed by humans. As human populations rose throughout Africa and land-use patterns changed, there was a general contraction of elephant range.
As elsewhere in Africa South African elephants were exploited for their ivory for more than 10.000 years
The unsustainable killing of elephants, primarily for the ivory trade, is considered to be one of the major threats to the survival of the elephant in Africa (Milner-Gulland & Beddington 1993; Parker & Graham 1989).

It is noted the efforts by Parties to the Convention on International Trade in Endangered Species of Fauna and Flora (CITES) to conserve the elephant in Africa and in Asia, including the adoption of Resolutions and Decisions by various Conference of the Parties1, the Monitoring of Illegal Killing of Elephants (MIKE) funded by the European Union, the African Elephant Action Plan and African Elephant Fund and efforts to combat the poaching of elephants for the ivory.

In addition to poaching, habitat fragmentation is also considered a serious threat to elephant populations. The major types of habitat loss are conversion of natural vegetation to farmland, exclusion of elephants from pastoralist areas through conflict over resources, logging of forests, and inundation from dam construction.

Conservation is increasingly in conflict with other human activities although such conflicts can positively influence changes they are often destructive , costly, and not only undermine effective conservation, but also prevent economic development, social equality, and resource sustainability hence, conflicts are arguably on of the most intractable problems facing conservation,

Elephants were also hunted to extinction in much of Southern Africa in the 18th and 19th century (Campbell 1991; Hall-Martin 1992). During the latter part of the present century their range has been fragmented as a result of increasing agricultural development, but they are still widespread in sub-Saharan Africa, occurring in 37 countries (Said et al. 1995).

1 For example, see: Resolution Conf. 16.9: African Elephant Action Plan and African Elephant Fund; Resolution Conf. 10.9: Consideration of proposals for the transfer of African elephant populations from Appendix I to Appendix II; Resolution Conf. 10.9: Consideration of proposals for the transfer of African elephant populations from Appendix I to Appendix II

African elephants are being slaughtered for their ivory as a surprising consequences of the rise of Asian economies.

The region's elephant populations collapsed in the late 1880s through over-hunting, but their numbers have since increased more than 20-fold; from less than a few thousand to 250,000 – 300,000 today. The overall biomass of elephants in southern Africa is now higher than that of any other large mammal in the region.

Human populations have also increased 20-fold over the last century resulting in a rapid expansion of human settlement and agriculture. Human and elephant population growth has led to compressed and fragmented elephant ranges, increasing human-elephant conflict and an escalating elephant overpopulation problem.

According to the 2003 International Union of nature (IUCN) World Parks Congress, human- wildlife conflict occur when wildlife residents encroach on those of human populations with costs both to residents and wild animals (IUCN,2005). Human- wildlife conflict has been in existence for as long as humans and wild animals have shared the same landscapes and resources where human elephant conflict is particularly prevalent, even in countries with higher average annual income. (Human wild life conflict in Africa)

Though laws against exterminating wildlife were introduced in South Africa beginning in the 1650s, by 1890 the population had nearly been wiped out. In the 20th century, however, establishment of national reserves (Including Kruger National Parks in 1926), facing of conservation areas, and more aggressive anti-poaching efforts allowed South African elephant populations to grow even as they continued to dwindle elsewhere.

Elephant over population has been a major issue in Southern Africa since the mid-Twentieth century, and the continual debate in south Africa over a solution to- the elephant problem has been prominent enough.

Human wildlife conflict does not occur only in Africa, now a days human wildlife conflict exists in one form or another all over the world.

This view also focuses on Mozambique where elephants still kill people. In terms of the scale of their impact on humans it is the smaller elephants occurring in vast numbers that have the greatest impact.

There have been reports of human-animal conflicts in many parts of the country, especially in those communities living inside or around conservation areas (AGREGO, National Census of Wildlife, 2008).

2. OBJECTIVE OF THE STUDY

Within the context of CITES, this study will assist to identify the strength and weaknesses of the current elephant conservation management strategies in order to improve the conservation of the specie in Limpopo National Park in Mozambique, describing the available management options and drawing attention to gaps in knowledge.

The study intends also to address how tourism can generate revenue in areas of high biodiversity such as Transfrontier Conservation Areas (TFCA's), and help to make them economically viable both use- and non-use values.

2.1 CITES

CITES is an international agreement, also called a multi-lateral environmental agreement, between governments. Its aim is to ensure that international trade in specimens of wild fauna and flora does not threaten their survival in the wild.

It currently counts on the support of 180 countries, or Parties. The origins of CITES is the result of a resolution adopted in 1963 during a meeting of IUCN (The World Conservation Union). The text of the Convention was agreed at a meeting of representatives of 80 countries in Washington, D.C., the United States of America, on 3 March 1973. It entered into force on 1 July 1975.

CITES is an international agreement to which nation states adhere to voluntarily. States that have agreed to join the Convention ('joined' CITES) are called Parties. CITES is legally binding on the but it does not replace national laws. Rather it provides a framework to be respected by each Party (states that have joined), which has to adopt its own domestic legislation to ensure that CITES is implemented at the national level.

Mozambique joined the Convention as a result of Resolution No.20/81 OF 30 de December. Its accession was on 25 March 1981 and it came into force on 23 June 1981. The Ministry for the Co-ordination of Environmental Affairs (MICOA) acts as its Management Authority and the University Eduardo Mondlane (UEM) acts as its Scientific Authority.

CITES works by subjecting international trade in specimens of CITES-listed species to certain regulatory controls. All import, export, re-export and introduction from the sea of species covered by CITES needs to be authorized through a permit or certificate system. In addition, each Party must designate one or more Management Authorities in charge of administering that permitting system and one or more Scientific Authorities to advise them if trade in a certain species will not be detrimental to its survival in the wild.

The species covered by CITES are listed in three Appendices, according to the degree of protection they need. Appendix I is the most restrictive. Appendix II lists the majority of species. In Appendix II, trade is permitted but must be regulated so as to not threaten the survival of the species. Appendix III lists species that are protected in at least one country, which has asked other, CITES Parties for assistance in controlling the trade.

It is one of the oldest biodiversity global biodiversity conventions and the first to come into force. CITES has been recognized by governments at Rio+20 as *an international agreement that stands at the intersection between trade, the environment and development, promotes the conservation and sustainable use of biodiversity2*. The President of the Swiss Confederation similarly stated that The *CITES – in conjunction with other international instruments – strikes a balance between the three dimensions of sustainable development and thus has the potential to make a difference to people's livelihoods*.

2.2 The Specific Objectives of this Study includes:

- To evaluate the trends of elephants population in Limpopo National Park
- To identify the main threats to elephant population in Limpopo National Park.
- To understand the main reason of human and elephant conflict in Limpopo National Park
- To identify the different stakeholders and their roles in the conservation of Elephant population in Limpopo National Park.
- To develop sustainable and responsible tourism in Limpopo National park
- To ensure that tourism and the environment are mutually supportive

3.LITERATURE REVIEW

3.1 Overview About Elephant (Loxodonta africana africana)

2 A/RES/66/288 - The Future We Want

Linnaeus placed African and Asian elephants together in a single genus, *Elephas* but they were separated in 1797 by Johann Blumenbach into the Asian *Elephas* and the African *Loxodonta* (Skinner & Chimimba, 2005). There is evidence from DNA-based studies that two species of African elephant exist, namely, *L. africana* (savanna elephant) and *L. cyclotis* (forest elephant) (e.g. Roca *et al.*, 2001).

The elephant is described as a 'Pachyderm' because of its very thick skin which may reach thickness of 3-4cm. Although both species of African elephant have five well-formed digits on both fore and hind feet, *Loxodonta africana* displays 4 nails on the fore feet and 3 on the hind, whereas *L. cyclotis* has 5 and 4 respectively.

3.2 Elephant Distribution

Long-term trends in the distribution of elephant in Mozambique were determined by comparing the current distributions of the wildlife with their distributions prior to the 1970s (Smithers & Lobão Tello, 1976). Apart from Protected Areas and Coutadas, where people now also live at varying human densities, outside of these areas elephants are dispersed in a matrix of human dominated landscapes, with some isolated ranges in central and southern Mozambique.

The periods of drought can have significant effects on the population density, structure and distribution of elephant, this is an example of Namibia and Gonarezhouh National Park where the Drought of 1991-1992 have an influence.

An important challenge will be to maintain present range and develop mechanisms for connectivity for contiguous sub-populations.

Evidence of elephant presence was concentrated around Niassa NR, in Magoe, south of Cahora Bassa, in Marromeu Reserve, and adjacent Coutadas as well as in border regions adjacent to Gonarezhou National Park in Zimbabwe, Kruger NP in South Africa, as well as in Limpopo National Park.

There is also an isolated presence of elephants west of Inhambane (Banhine), in Gile NR, Mecuburi FR and the Chimanimani-Moribane Transfrontier Conservation Area on the Mozambique-Zimbabwe border. Ntumi et al. (2009) provide a contemporary reduced and fragmented range compared to that of 1940-1960 as does AGRECO (2008), comparing changes in elephant distribution in Mozambique since the pre-1970s.

In southern Mozambique and northern KwaZulu-Natal, the Maputo Elephant Reserve, Futi Corridor and Tembe Elephant Park presently have elephant populations separated from each other either by electric fences or man-made barriers. These sub-populations represent the remaining fragments of the coastal plain population that, until 1855, roamed as far south as the White Umfolozi River (Klingelhoeffer, 1987).

African elephant occur in 37 range states in Sub-Saharan Africa. Savanna elephants (*loxodonta Africana Africana*) are predominantly found in Eastern and Southern Africa while Forest elephants (*Loxodonta africana Cyclotis*) occur primarily in the Congo Basin of Central Africa.

The main southern African elephant populations are in a belt extending across the northern part of the region through Angola, Namibia, Botswana, Zambia, Zimbabwe and Mozambique. The potential exists, through the development of trans-frontier conservation areas, for these subpopulations to form a single contiguous population across the continent, between elephant, people, and people's livelihoods (Van Aarde & Jackson,20020).Elephants come into greater contact with people where their ranges increase.

Over the past 40 years in Mozambique there has been an overall contraction of both numbers and range of the African elephant (*Loxodonta Africana)* population.(MADR-DNFFB 1991, Agrco,2008, Ntumi et al.2009), formerly abundant but hunting, poaching and agricultural development reduced the populations of elephant during colonial times, estimated at approximately 50,000 in 1974 together with habitat and range.

Most of the elephant range in Africa occurs outside protected Areas (Blanc et al. 2007) human and elephant ranges overlap in many places inevitably, plantations and agricultural development reduced and fragmented habitats and this may have further reduced elephant numbers (Manghezi, 2003).

Poaching continues, as does legal consumptive use through small-scale trophy hunting of elephants (Milliken, 2002; SRN, 2006). The illegal trade in bush meat represents a severe conservation threat in several African countries, the elephant population experienced heavy poaching during the 1970s and 1980s but are now beginning to recover, but in Mozambique elephant range covers 52% or 334,786 km^2 of the country (Blanc et al. 2007) of which 15% is in protected areas (PAs cover 25 % of the country). Elephant sightings, carcasses, tracks and other sign during the 2008 survey all indicate regions of Mozambique that are within the elephant distributional range on a year-round basis.

3.3 Trends of elephant Population in Mozambique

The elephant *Loxodonta africana* population of Mozambique has declined rapidly over the last 4 decades. Historical census data are incomplete but suggest that the impact of human activity on the elephant population increased after the onset of the colonial era including other Wildlife declined drastically during the 25 years prior to the establishment of Limpopo National Park, primarily because of uncontrolled hunting during the civil war where local people invaded these areas for housing or cultivation and were heavily affected by illegal and excessive use of natural resources, particularly bush meat to feed soldiers and to supply the market.

These observations suggest that human activities reduced elephant numbers in Mozambique. Two decades of civil war following independence contributed to further declines, reducing numbers to approximately 13,000 by 1991 (MADR-DNFFB 1991) at which time the first plan for elephant conservation in Mozambique was drawn up.

The national strategy for elephant management drawn up in 1999 viewed elephant as a valuable natural resource and a key component of Mozambique's development options for sustainably utilizing forest and wildlife resources.

Over the past 10 years the country's elephant population has increased by approximately 20% by 2010 The Mozambique National Directorate of Land and Forests (DNTF) within the Ministry of Agriculture (MINAG), in 2008 commissioned AGRECO to carry out a national census of wildlife in Mozambique. (The estimated number of elephant in 1999 was then thouht to be about 18,000.

The latest information on elephant numbers (Blanc et al.2003) gives and estimate of 21,502 elephant for the country. To its present estimate of 22,114 elephants (AGRECO 2008), this number has exceeded compared with the estimated of 20,084 elephants (Blanc et al. 2007) and compared to the 1999 baseline of approximately 18,000 (MADR-DNFFB 1999),

3.4 Protected areas and conservation Approaches in Mozambique

From about 1500, Portuguese trading posts became regular ports of call on the new route to the east. Later, traders and prospectors penetrated the hinterland. The discovery of gold in the latter half of the 19th century attracted large numbers of Europeans closer to the area. This contributed to sustained and increasing hunting pressure on wildlife, leading to the establishment of protected areas in South Africa and then Mozambique.

Mozambique come across in a process of protected area restoration which started in 1995 with the re-establishment of management bodies and preparation of management plans; creation of new parks, reserves and hunting areas; shifting of protected area boundaries; formulation of policies and laws such as the Environmental Law, Forest and Wildlife Law, and Land Law.

After the creation of the ministry of tourism in 2000, designated conservation areas came under its jurisdiction for tourism purposes, which includes all present and future national parks and reserves and enclosures in the country. The aim was to give more emphasis to the exploitation of these areas for tourism and the development of ecotourism.

Protected Areas in Mozambique are the cornerstone of Biodiversity conservation, they maintain key habitats provide refuges, allow for species migration and movement and ensure the maintenance of natural process across the landscape not only do protected areas secure biodiversity conservation, they also secure the wellbeing of humanity itself.

But In Mozambique to ensure environmental protection and the sustainable use of forests and wildlife, the Government has approved various instruments such as the Forestry and Wildlife Development Policy and Strategy (in 1997); the Forestry and WildLife Law (in 1999); The Ministry of Agriculture, National Directorate of Forests and Lands is responsible for the management of forest reserves.

Most protected areas in Mozambique were established in the 1960 and 1970, under the Decree no 40040, of 20th January 1955. During the civil war (1977 – 1992) no protected areas were established and the existing ones were mostly abandoned due to lack of security

The responsible authority for the management of all national parks, national reserves, coutadas and community wildlife management programs is the Ministry of Tourism through the former National Directorate of Conservation Areas Currently designated by (ANAC)

Mozambique has a total protected and conservation Areas network of approximately 136,000 Km2 corresponding to 25% of Mozambique's land surface, and comprising a six national parks, eight national reserves, 13 forest reserves, two integral reserves and 14 hunting concessions, called "*coutadas*." These hunting concessions are public lands designated for sport hunting and the protection of species, with hunting rights contracted to hunting operators by the State.

The wildlife conservation areas - parks, reserves, hunting areas, and game farms - cover 25% of the national territory. Mozambique's protected area system is designed to conserve its ecosystems and species. Protected areas include landscapes and seascapes falling in one of the following categories:

National Parks are defined by the Forest and Wildlife Law as zones of total protection for the propagation, protection, conservation and management of vegetation and wildlife, and for the protection of local landscape and geological formations of particular scientific, cultural and aesthetic value representative of the national heritage, for public recreation.

National Reserves are defined as zones of total protection for protecting rare, endemic and/or endangered species of flora and fauna, and fragile ecosystems (e.g. wetlands, dunes, mangroves and coral reefs).

A third category provides for zones of use, historical and/or cultural value according to norms and customary practice of local communities.

Communities have rights over such areas and declaration is merely a formality. MITUR is responsible for national parks and reserves while local communities are directly responsible for zones of use and cultural value.

3.5 IUCN and New Definition of Protected areas

IUCN agreed a new definition of a protected area, which made significant changes to the Union's understanding of the nature of protection defining a protected area as: "A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values" (Dudley, 2008).

Protected areas are the basis of most national biodiversity conservation strategies, with growing evidence of their success in conserving biodiversity (Pimm et al, 2001; Butchart et al, 2012).

More recently, they have also been recognized as playing a critical role in delivering a range of ecosystem services, cultural benefits and economic values (Stolton and Dudley,2010). Importantly, the process of protected area creation is still underway: since the tenth Conference of Parties of the Convention on Biological Diversity.

This consensus was not an insignificant accomplishment because many individuals argued that Parks had to be engines for National development. Still others argued for exercising human activities completely from Parks. Resolving strong opinions was often a challenge.

The past three decades have seen a 500% increase in land designated as protected areas (PAs) for nature conservation. Many see this explosion of land protection as negatively impacting the livelihoods of local communities through a loss of rights, exclusion from natural resources, and displacement from traditional lands.

As a result, emigration from protected lands may be expected to reduce human population growth at PA edges over time relative to neighboring unprotected lands.

However, PA creation may benefit rural inhabitants by providing access to road networks, employment, foreign aid, increasingly scarce ecosystem services (e.g., firewood, bush meat, and clean water), and areas of safety during strife.

According to the Durban Accord (World conservation union [IUCN] 2003 a), the fifth World Park Congress (WPC), held in 2003 in Durban South Africa , brought together " resource managers, Scientists civil servants, and industry leaders" to celebrate, voice concern and call for urgent action on protected areas.

The Durban accord (IUCN 2003a) an affirmation of the value of Parks and Protected Areas for both biodiversity conservation and human livelihoods, was one of the major products of the 2003 congres.

Participants in the congress recognized that many natural systems and species depend for their existence on Parks and that the contribution of Parks to human well-being is pervasive, poorly qualified, and underappreciated, especially for many indigenous peoples and the rural poor.

3.6 Tab 1. National Parks and Reserves in Mozambique

PROTECTED AREA	AREA/ (km2)	TYPE AND ELEPHANT PRESENCE
National Parks	**37,476 4.7%**	
Gorongosa	5,370	Terrestrial
Quirimbas	7,506	Marine and terrestrial
Zinave	6,000	Terrestrial
Limpopo	10,000	Terrestrial
Bazaruto	1,600	Marine
Banhine	7,000	Terrestrial
National Reserve	**48,440 6.1%**	
Chimanimani	1,740	Terrestrial
Pomene	200	Coastal
Niassa	42,200	Coastal
Marromeu	1,500	Coastal
Maputo	700	Coastal
Gile	2,100	Terrestrial

…

3.7 Transfrontier Conservation Areas in Mozambique

Mozambique has also been subject to pressure from regional and international organization that favors transboundary approaches to conservation and is involved in the establishment of a number of transfrontier conservation areas (TFCAs).

One of the main goals in the establishment of TFCA is that the local communities will benefit from the increase eco-tourism to the area. This, in turn, is dependent on the community consultations and with the dissemination of information about the envisaged transfrontier park.

In November 2000, it was declared Limpopo National Park was before formally used as a hunting Concession (Coutada Oficial 16).As early as 1938, the linking of the Kruger National Park. Coutada 16 and Gonarezhou National Park in Zimbabwe was after Mozambique peace accord of 1992.

The LNP is a part of the Great Limpopo Transfrontier Park, which also includes the Kruger National Park (KNP) and Gonarezhou National Park (GNP). However, the original vision for the area and the Transfrontier Conservation Areas Pilot and Institutional Strengthening Project also includes Banhine National Park and Zinave National Park in Mozambique as well as the interstitial land between the parks.

The great Limpopo Transfrontier Park (GLTP) aims to link the kruger national park in south Africa, the Gonarezhouh National park in Zimbabwe and the newly proclaimed Limpopo national Park in Mozambique. Initial plans for the GLTP, promoted strongly by organizations such as the peace Parks foundation appear to have been developed with little consideration for the presence of about 20.000 people in the area which has become the Limpopo National Park.

Trans-Frontier Conservation Areas (TFCAs), have been established: Limpopo TFCA between Mozambique, South Africa and Zimbabwe; Lebombo TFCA between Mozambique, South Africa, and Swaziland; and Chimanimani TFCA between Mozambique and Zimbabwe.

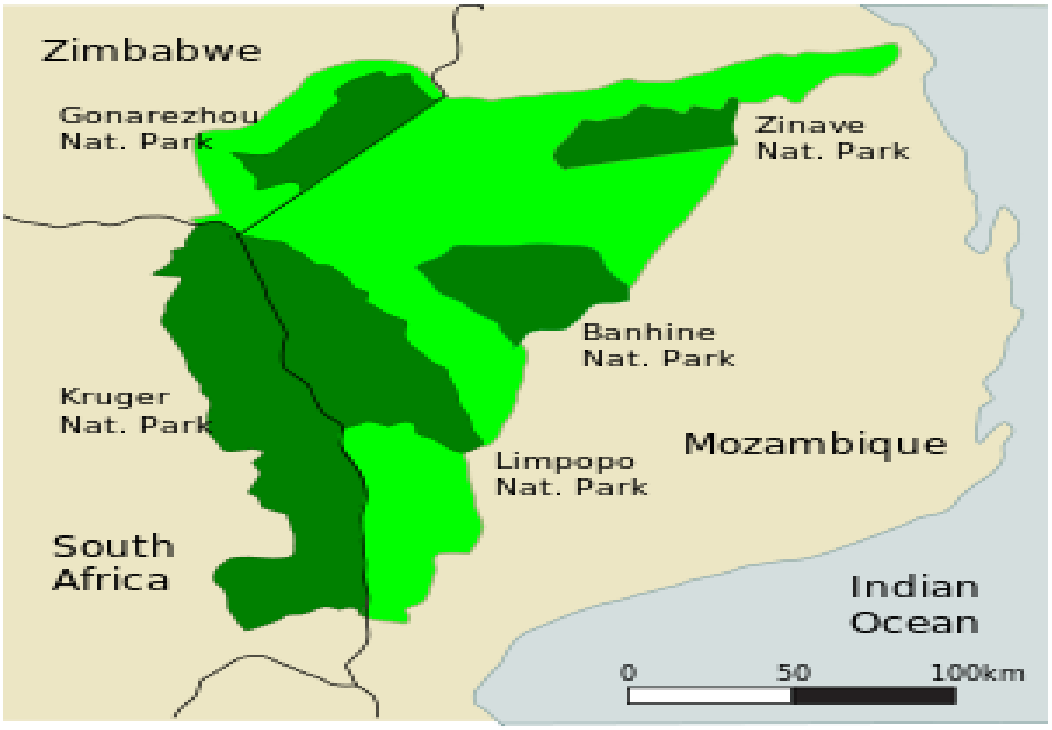
In developing the Lebombo TFCA, the Futi Corridor (about 240km^2) was proclaimed as a formal conservation area in 2011, to strengthen the connectivity between the Maputo NR in Mozambique and the Tembe Elephant Park in South Africa.

The Government of Mozambique, South Africa and Swaziland signed five protocols on the establishment of the Lubombo Transfrontier conservation Resource area.

In June 2001, the Government of Mozambique and Zimbabwe signed the Chimanimani Transfrontier Conservation area in the Chimanimani Mountains

On 9 December 2002 the Great Limpopo Transfrontier park, to make this instrument more operational, the government set up the Environmental Education, Communication and Dissemination Programme which seeks, among other aspects, to create community forests. Within this initiative, protected areas such as national parks and reserves have also been expanded.

3.8 ACTF(Transfrontier Conservation Area)



3.9 Establishment of the GLTP

The Great Limpopo Transfrontier Park (GLTP) was established in December 2002, when the Head of the States of Mozambique, South Africa and Zimbabwe signed a Treaty in Xai- Xai

city in Mozambique. The Treaty that establishes the Great Limpopo Transfrontier Park has the following objectives:

(i) Foster transnational collaboration and co-operation among the Parties which will facilitate effective ecosystem management in the area;

(ii) Promote alliances in the management of biological natural resources by encouraging social, economic and other partnerships among Parties, including private sector, local communities and non-governmental organizations;

(iii) Enhance ecosystem integrity and natural ecological process by harmonizing environmental management procedures across international boundaries and striving to remove artificial barriers impeding the natural movement of wildlife;

(iv) Facilitate the establishment and maintenance of a sustainable sub-regional economic base through appropriate development frameworks, strategies and work plans;

(v) Develop transborder eco-tourism as a means of fostering regional socio-economic development; and

(vi) Establish mechanism to facilitate the exchange of technical, scientific and legal information for the joint management of the ecosystem. Transfrontier Conservation Areas (TFCAs)

3.10 Advantages of TFCAs

In comparison to national parks, TFCAs have the potential to conserve a greater diversity of species within larger geographical areas and to promote co-operative wildlife management between nations (BSP, 1999).

TFCAs may also improve opportunities for tourism, by allowing visitors to disperse over greater areas and obtain better quality experiences (Singh, 1999), and by offering more diverse attractions (van derLinde et al., 2001).

The World Wide Fund for Nature (WWF) suggests that TFCAs have the capacity to strategically develop sustainable tourism that may support the costs of conservation management, while also providing employment and entrepreneurial opportunities for poor people in developing countries (BSP, 1999).

The TFCA has generated interest amongst conservationists because of its potential to become one of the largest conservation areas in the world. The area could conserve the widest variety of wildlife on Earth, with areas of great cultural and historical value, making it an area of global conservation significance (Hanks, 1998).

Arising out of this, Mozambique has legislated and designed several interventions in this area. Among others, there stand out the National Tourism Strategy and Policy of 2003; the 2004-2013 Tourism Development Strategic Plan of 2004 and the Code of Conduct for Tourism produced in 2007.

The common goal of all these legal provisions is to make the tourism sector a pole of development for the country, without neglecting nature which is the main sources of tourism.

3.11 Mozambique Geographical Location

Mozambique covers c. 800,000 km2 is located in South-eastern Africa, between 10° 27',26° 52' South and 40° 51',30° 12' East. It borders with Malawi (1569 Km border length), Zambia (419 km), Zimbabwe (1231Km), Swaziland (105 Km), South Africa (491 Km) and Tanzania (756 Km).

On the east there is Indian Ocean with a coastline of about 2,700 km length. Most of the population lives within a 40Km wide. Mozambique has a tropical climate with two seasons (rainy and dry). More temperate climate prevails above 800 m asl. With an inter-tropical climate, rainfall varies from 1,000 - 1,200 mm per annum and temperatures are generally high.

Mozambique is very rich in both land, sea and flora. The type of land and climate has created three different varieties of vegetation: dense forestland in the high parts of the North and Centre of the country, woodland and savannah in the South and mangroves a long the coastline.

In terms of wildlife, the main species to be found in these ecosystems are elephants, lion, leopards, cheetahs, hippopotamus antelopes, tortoises and monkeys and varied species of bird life.

Elephants are major agents of change and are often indicated as those large herbivores possessing the ability of changing entire ecosystems in terms of vegetation structure and composition.

The country has good agricultural, agro-industrial, water, mineral and tourism potential, as well as Wildlife forestry and marine resources, much of the country is made up of approximately 300 km wide coastal and often swampy strip below the continental escarpment and plateau.

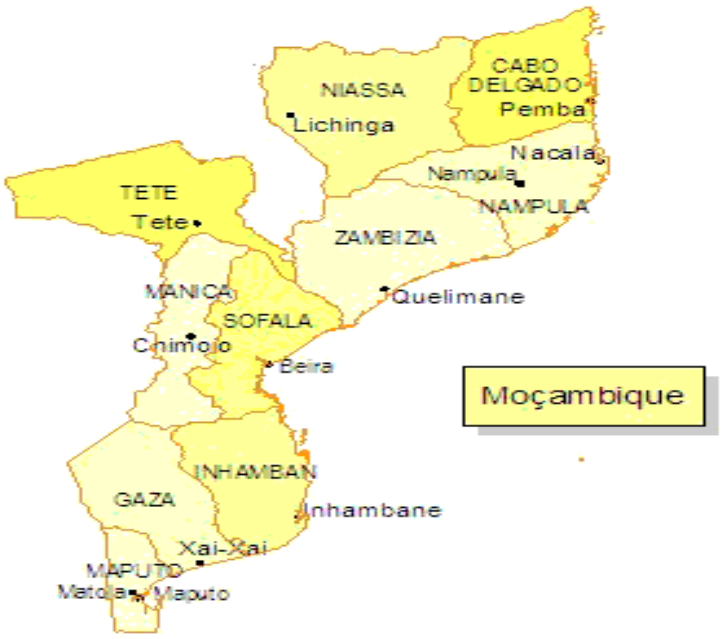


Fig. 1.

Centrally, the country extends inland up the Zambezi valley, and further south along the Limpopo-Save river systems. In both, mopane (*Colophospermum mopane*) woodlands dominate while dry and moist miombo (*Brachystegia* spp.) woodlands are common in the north and central areas above the Zambezi where the southern tip of the Rift Valley drives a wedge into the country.

In Mozambique, the most common environmental problems are related to soil degradation, erosion, deforestation, fauna reduction, air and water pollution and destruction of mangroves and unchecked burning land. Because of environmental problems, the rural population inadequately exploits resources in order to satisfy its basic needs.

In particular, soil degradation is caused by the following factors: the inequality in the distribution of productive and cultivable land, and the resulting increase in the cultivation of less fertile or sloped land; inadequate practices, such as the burning of the vegetation to clear the land plot; inadequate utilization of agrochemical inputs; inadequate management and maintenance of irrigation and drainage systems that can cause in sanitization alcalinisation and erosion of the soil; indiscriminate cutting of the forest for the production of vegetal charcoal.

3.12 Major Land Use in Mozambique (MADER 2007)

Land use	Area (ha)	Area (km2)	%
Protected Areas	13,563,100	135,631	17
Forest and Natural Vegetation	47,200,000	472,000	59
Agriculture	18,000,000	472,000	22.5
Urban development	2,000,000	20,000	2.5
TOTALS	80,000,000	800,000	100

3.13 Demographic population of Mozambique

In 1979, the United Nations estimate in Mozambique was of about 10 million people and 12,000,000 by 1980 (INE 1980). The human population in Mozambique was 20.2 million people in 2007 (INE 2007), increasing at approximately .2% per annum.

Currently a population of about 24,096669 (July 2013 est) million. Administratively, it is divided into 11 provinces subdivided into 128(INE,2007)

Estimates for this country explicitly take into account the effects of excess mortality due to Aids, this can result in lower life expectancy, higher infant mortality, higher death rates, lower population growth rates, and changes in the distribution of population by age and sex than would otherwise be expected

Mozambique is still one of the world's poorest countries ranked 175th out of 179 countries on the UN's human Development Index in 2008 over half the population lives in absolute poverty and over a third of house holds are highly food insecure.

The rural population in Mozambique numbers 14.8 million people or 72% of the total population, this population is distributed over 780,000 km2 among the country's 11 Provinces.

3.14 Language

Various suggestions have been put forward as to the number of languages spoken in Mozambique (Marinis 1981).

There are of course various problems with such an approach, one being that languages differ notably within families, another that several languages are omitted in this classification, Mozambique is home to a variety of groups, who speak around 40 different languages and dialects belonging to the Bantu family.

Groups include the Makua, Thonga, Shona/Ndau, Sena, Nyungwe and Yao eg. Shimakonde, Ciyao, Kimwani, Cicop, and Guitonga. Nelimo (1989) lists 20 languages in their linguistic Map of Mozambique.

Following Portugal's colonial rule until 1975, Portuguese remains the official language of Mozambique and is used by government, law and business.

However, Mozambicans grow up speaking a local mother-tongue. They must therefore learn Portuguese at school. Since school attendance rates are poor, less than half the population speaks and writes Portuguese with fluency.

3.15 Religion

Mozambique has a mixture of religions. Around a third of Mozambicans are Christian, with Roman Catholicism the major denomination. Around a quarter are Muslims, mainly in the northern regions.

Nearly half the population practises traditional animist beliefs, where the spirits of ancestors can affect the lives of the living. Many groups also believe in an all-powerful God, as well as spirits. Therefore, it is not unusual for traditional beliefs to be incorporated into Christianity

3.16 Culture

A set of values and beliefs norms and customs, and rules and codes that socially defines a group of peoples behinds them to one another, and gives a sense of commonality (trenholm & Jenson,2000).Sacred and cultural sites such as sacred forests sacred pools and streams and mountain areas play a central role in the lives of rural communities. The conservation and management of these sites falls usually under the responsibility of traditional leaders

3.17 Cultural identity

Mozambique was ruled by Portugal and they share in common, main language and second main religion (roman Catholicism). But since most of the people are Bantus, most of the culture is native and for Bantus living in urban areas with some Portuguese influence.

Mozambican culture influences the Portuguese culture. The music, movies, food, and traditions are now part of everyday lifestyle of Portugal

3.18 Economic activities

In rural Mozambique, the small-scale farming system comprising cultivated, fallow and grazing subsistence, but one component of the overall natural resource base contributed to livelihood of the local communities, natural habitats such as forests adapitic grassland, mangroves, freshwater lakes and rivers-inter tidal zone and litoral waters provides many additional services and good.

Farming activities are dependant on improved varieties of plants and animals.

The small scale farmers have for generations selected the material that were most suited to local conditions as their basis for agriculture

Despite the growing economy, Mozambique remains one of the world's poorest countries. This is partly because of its continuing trade imbalance, where more is spent on imports such as food, oil, machinery and manufactured goods, than the country earns from its exports.

Growing at around 7% each year, the country's economy is one of Africa's strongest performers. Foreign companies have increasingly chosen to invest here, particularly in mining ventures.

Half of Mozambique's revenue therefore comes from foreign donors for the support of development projects. The country has also benefitted from the significant reduction of foreign debts.

The Government of Mozambique (GMz) has defined as its main objectives, poverty reduction, primarily through agriculture, rural development and development of human capacity, so as to ensure the social and economic integration of the most vulnerable population group.

The primary land use is subsistence agriculture with cassava, millets, maze and sorghum the staple foods. Small stock (chickens, pigs, goats) are widespread while cattle occur mostly in the centre and south of the country.

Principal cash crops include sugar, coconut, sisal, cotton, tobacco and cashew nut production with limited intensive irrigation in river valleys. Forests and other natural vegetation, covers nearly 60% of Mozambique, although across much of the country, and especially along the coastal hinterland, this is a mosaic of settled cultivated land interspersed with natural vegetation (AGRECO 2008).

Mozambique has a wealth of natural resources, including deposits of iron ore, gold, bauxite, graphite, marble and limestone. There are also rare and important minerals such as tantalite and limonite (a source

of titanium). And the Tete highlands have large reserves of coal, which is exported to places like India and China.

But the most important earner for Mozambique is aluminum. Since the opening of a large smelter near Maputo in 2000 (the country's largest foreign investment project to date), aluminum became the most valuable export. Low global prices for this commodity can seriously affect the economy.

3.19 Study area

Limpopo National Park is situated between latitudes 22º25'S –24º10'S and longitude 31º18'E–32º39'E in the Gaza Province of Moçambique

3.20 Location of the Study

3.21 Criteria for selection of the study area

The study area was selected based on the improvement of the current development system of Limpopo National Park and motivated by the ecological objective of re-establishing traditional migratory wildlife routes once fences between the three countries are dismantled. Besides biodiversity conservation benefits, the park may also provide a basis to generate revenue for conservation and local economic through development of cross-border tourism linkages.

3.22 Boundaries

The Limpopo River forms the northern and eastern border to the LNP, whereas the Olifants River forms the southern boundary. The Limpopo National Park spans ten Thousand square Kilometers of arid Land

in Mozambique's Southern Gaza Province .In the district of Chicualacuala to the North west Mabalane to the east and south Massingir to the South west (Holden 2001) . International boundaries between South Africa, Mozambique and Zimbabwe divide the tribe and its families

3.23 Limpopo National Park Biophysical Parameters

3.23.1 Topography

The terrain of LNP is mostly flat and dry, with the main relief feature being the Lebombo mountains which rise to about 500m above sea level along the border with South Africa.

3.23.2 Climate

The entirety of Mozambique is subject to cyclical drought, and the land comprising the Limpopo National Park is reported to receive the country's lowest levels of rainfall (Holden 2001: 10). and is characterized throughout.

The area has a warm arid climate with a dry winter and a mean annual temperature exceeding 18 ºC (Van Rooyen *et al.* 1981). Rainfall decreases from 500 mm annually near Massingir Dam in the south to less than 450 mm at Pafuri in the north. The climate of the LNP my be described as subtropical, with hot, wet summers and dry winter

3.23.3 Temperature

The average, maximum day temperatures increase from south to north, with absolute maximum temperatures of above 40°c being common for the months November to February. Although the minimum temperature is above freezing point, frost is periodically recorded in the lower lying areas a long the rivers in the Shingwedzi area.

3.23.4 Rainfall

Mean annual rainfall decrease from south to north. Precise rainfall figures not available for the LNP area. Based on adjacent KNP long-term figures, mean annual rainfall varies from the order of 360 mm in the far northern part to over 500mm a long the Lebombo Range in the south west of the Park.

Effective rain occurs September o April with a short dry of four months. Analysis of the rainfall pattern of adjacent KNP over the past 100 years also indicates a cyclical nature with approximately 10 years of generally above average rainfall, followed by a period of similar duration with generally below average rainfall.

3.23.5 Geology and Soils

The dominant geological feature of the LNP is the extensive sandy cover along the northwest/southeast spine of the park. Calcaric sedimentary rocks have been exposed where this sand mantle has been eroded closer to the main drainage lines.

Alluvial deposits are found along the main drainage lines (Limpopo, Olifants and Shingwedzi).A narrow tongue of rhyolite rock of volcanic origin straddles the western border with the KNP.

Soils derived from the sand mantle range from shallow to deep and are mostly infertile. Deep, structured clay soils are derived from calcaric sedimentary rocks. The alluvial soils are clayey and fertile. Soils derived from the rhyolite are shallow and clayey.

The escarpment zone of the southern region (plateau area) is underlain by rhyolite volcanic rock. The eastern part of this region consists of sandy substrates.

Geologically, the southern region has a relatively high proportion of rhyolite volcanic rock forming an escarpment zone along its western boundary and comprising Glenrosa and/or Mispah soil forms.

Deep structured clay soils derived from calcaric sedimentary rocks are broadly associated with the drainage systems of these rivers, each with its narrow strip of alluvial sediments. Sandy soils, including dunes, are characteristic of the higher lying stepped slopes and crests away from the drainage lines.

Geologically, the northern region forms part of a greater sedimentary basin that is contained within the alluvial systems of the Limpopo River to the east and the Olifants River to the west. It also includes a narrow tongue of rhyolite volcanic rock, which extends northwards part of the way along its western boundary.

Immediately up-slope of the narrow strip of alluvial sediments that follow the course of the Limpopo River, sandy soils derived from calcaric sedimentary rocks are evident. Deep sandy soils are in the form of a red sand mantle and include dunes, which are characteristic of crests away from the rivers.

Shallower, grey sandy soils are found on the periphery of the red sands, where pebble-beds are exposed to the surface.

Alluvium and clay sediments and calcaric sedimentary rocks are characteristic of the Limpopo flood plains, but a relatively small section of sand dunes are found in the south.

Geologically, the Eastern Region forms part of a greater sedimentary basin that is contained within the alluvial systems of the Limpopo River to the east and the Lebombo Mountains to the west, with the Socco River intersecting the region.

3.23.6 Hydrology

The Limpopo River forms the eastern boundary, whilst the Olifants (Elefantes) River forms the southern boundary. The course of the Limpopo River is of fundamental importance in determining the physical position of the north-eastern boundary and a number of related factors needs to be considered.

These include the hydrological regime of the river, which experienced great flooding in early 2000 and which periodically flows at a very high level. The extent of the 2000 floods was so great that the valley was submerged and the floodplain boundaries were exceeded

The hydrology of the region is dominated by three river systems, the Limpopo and the Olifants and to a lesser degree the Shingwedzi.
The Limpopo is the largest, and its catchments are derived from the interior plateau of South Africa, the interior plains of eastern Botswana and the northern part of the eastern escarpment of South Africa.

The varying landscape and rainfall patterns have widely differing effects on the hydrologic regime of the Limpopo. The highveld produces most of the runoff and floods, but is controlled by the various dams in the Crocodile, Marico and Pienaars Rivers.

These dams reduce runoff and control the moderate floods. The Botswana catchments of the Shashi, and others produce little runoff but can dramatically influence flooding. The escarpments catchment of the Pafuri can influence flooding as well as runoff to a lesser degree.

The Limpopo, once perennial, currently dries up at the end of winter during dry cycles and only pools remain in the riverbed. The Olifants River is derived from the eastern interior plateau of South Africa and high runoff and flooding is produced by the catchments of the Olifants, the Wilge and Steelpoort Rivers.

Dams in these catchments also influence runoff and flooding. The eastern escarpment rivers such as the Letaba and Blyde have a large effect on the flooding and runoff regime of the Olifants River.
The Massingir Dam in Mozambique controls these escarpment rivers but as the dam is not complete, it releases water in a controlled manner to the lower Olifants River. This river remains perennial throughout the season.

The Shingwedzi is a much smaller river system with only a small part of its catchment reaching the escarpment and its high rainfall regions. The river is therefore not perennial and dries up in its lower reaches.

As it drains the central portion of the LNP, it has a large effect on the wildlife distribution through the Lebombo rhyolite mountain drainage. These smaller streams retain water for long periods and attract wildlife from the dry waterless sandveld interior.

The sandveld interior is waterless except for the many small pans, which retain water during the summer and for periods during the winter. Most dry up at the end of winter.

These river systems have an overwhelming impact on the land use of the region, which influences the population distribution as well as wildlife distribution. It also impacts on tourism zoning and utilization. It must be seen as the prime factor in determining land use.

3.23.7 Flora

The PNL falls within the mopane vegetation of the Sudano- Zambezian Region as described by Werger & Coetzee (1978). Mopaneveld has been described for the hot, dry valley bottom of the Limpopo River and are distinctive with a very diverse range of plant species associated with them, making them important areas for biodiversity conservation.
The landscape is described as Limbombos Woodland and Shrubland and Mopane Woodland (Hatton *et al.* 2001: 24) and is characterized throughout by wide-open stretches of acacia

Typical trees found here include *Bapphia massaiensis, Afzelia quanzensis, Strychnos spp., Terminalia sericea, Albizia spp.*, and others.

Tall woodland exists along most river courses in Kruger Park and Gonarezhou and to some extent in parts of the Mozambican portion of the Great Limpopo Transfrontier Park. Notable species in this vegetation

community include *Trichilia emetica, Ficus sycomorus, Xanthocercis zambesiaca, Diospyros mespiliformis, Acacia robusta, Acacia xanthophloea, Kigelia africana and the palms Phoenix reclinata and Hyphaene natalensis*.

Although only a narrow band rarely exceeding 150 metres in width on each bank, these riverine forests represent a diverse and specialised habitat offering refuge for many mammal species (e.g. elephant shrews, nyala, bushbuck, and hippo) and birds which are strongly associated with such habitats

A total of fifteen, distinct plant communities can be identified in the field:

- Community 1: *Androstachys johnsonii* (Lebombo ironwood) – *Guibourtia conjugata* (small copalwood) short forest,
- Community 2: *Baphia massaiensis* (sand camwood) – *Guibourtia conjugata* (small copalwood) low thickets,
- Community 3: *Terminalia sericea* (silver clusterleaf) – *Eragrostis pallens* (broom love grass) low woodland,
- Community 4: *Combretum apiculatum* (red bushwillow) – *Pogonarthria squarrosa* (herringbone grass) low woodland,
- Community 5: *Combretum apiculatum* (red bushwillow) – *Andropogon gayanus* (blue grass) low woodland,
- Community 6: *Colophospermum mopane* (mopane) – *Panicum maximum* (Guinea grass) short woodland,
- Community 7: *Colophospermum mopane* (mopane) – *Combretum imberbe* (lead wood) tall shrubland,
- Community 8: *Kirkia acuminata* (white seringa) – *Combretum apiculatum* (red bushwillow) tall woodland,
- Community 9: *Terminalia prunioides* (Lowveld clusterleaf) – *Grewia bicolor* (white raisin) thicket,
- Community 10: *Acacia tortilis* (umbrella thorn) – *Salvadora persica* (mustard tree) short woodland,
- Community 11: *Acacia xanthophloeia* (fever tree) – *Phragmites sp*. woodland,
- Community 12: *Acacia xanthophloeia* (fever tree) – *Faidherbia albida* (ana tree) tall forest,
- Community 13: *Plugia dioscurus – Setaria incrassata* (vlei bristle grass) short grassland,
- Community 14: *Sporobolus consimilis – Setaria incrassata* (vlei bristle grass) tall

grassland, and

 Community 15: *Stenotaphrum secundatum* (coastal buffalo grass) – *Cynodon dactylon* (couch grass) short grassland.

Different combinations of these plant communities can be grouped in10 landscapes that belong to five landscape alliances.

Landscapes strongly reflect the underlying geology. The landscapes of the LNP have strong affinities to a number of landscapes found in the adjoining KNP. The main difference is the much greater importance of sandveld landscapes in the LNP that constitute 44% of its surface area

Moçambique (Wild & Barbosa 1967). Within the KNP this corresponds to veld type 15, Mopani veld (Acocks 1988). This veld type has been divided into Mopane Shrubveld, Mopane Bushveld and Lebombo Arid Mountain Bushveld by Low & Rebelo (1996)

3.23.8 Fauna

Cape buffalo *(Syncerus caffer),*

plains zebra (*Burchell's zebra*),

giraffe (*Camelo pardalis*),

greaterkudo(*Tragelaphusstrepsiceros*),

hippopotamus(*Hippopotamus anphibius*),

waterbuck (Kobus ellipsiprymnus),

Blue wildebeest*(Connochates taurinus*).

and Impala (*Aepyceros melampus),*

Park also harbours high predators densities, including an estimated,

spotted hyena, (Crocuta crocuta)

Lion (Panthera leo),

Leopard Panthera pardus

and cheetah (Acinonyx jubatus), . the Kruger population of

African wild dogs (*Lycaon pictus*), estimated at 350,15 probably the largest outside of the Selous-Niassa ecosystem

Most of the diverse and numerous large herbivore component that would be expected to occur in this area has been lost over the last decades, mostly through indiscriminate and illegal hunting.

3.33.9 Overview about LNP

Mozambique's proclaimed Limpopo National Park. Due to conflicting conservation practices and security issues. Conservationists have hailed the move as a pragmatic solution to the management of South Africa's elephant population.

Almost 5 000 animals were translocated from Kruger to Limpopo National Park. This, combined with 50 km of fencing being dropped, has encouraged more animals, including over 1 000 elephants and over 1 000 buffalo, to cross the border of their own accord. South

Africa dismantled a portion of the fence and began process of relocating 1,000 elephants from Kruger across the border into Mozambique's Limpopo National Park.

The 1,000 elephants formed the nucleus of reestablishing the herds that once roamed along the natural migration routes among the three countries. However, before this wildlife movement can take place the Mozambique authorities reconciled the national interests with those of the communities in and living adjacent to the Park.

AWF worked closely with these authorities to ensure a balance of interests between wildlife and people, central and local governance.

In Zimbabwe the Gonarezhou Game Reserve, meaning "the home of the elephant", was proclaimed in 1934, and later upgraded as the Gonarezhou National Park in 1975. As the name implies, it provided habitat to large herds of elephants, which were decimated during Zimbabwe's war of liberation, civil strife in bordering Mozambique, and drought during the 1980's.

In later years community-based natural resource management in the form of the CAMPFIRE initiative was established with varying degrees of success in communal areas around this Park. The outcome

nevertheless has been that large areas in south-eastern Zimbabwe are still successfully managed as wildlife conservancies with tourism and game-farming as the main sources of income.

Before the erection of a fence along the South African-Moçambique border (1974- 1976) elephants could move freely between the two territories. In 1994, the western boundary fence dividing the Kruger Park from the private nature reserves between the Sabie and Olifants rivers, was removed in order to allow the free movement of elephants and other wildlife (Whyte, 2001).

Elephant numbers increased from 7 806 in 1994 to 10 459 in 2002. An additional development was the incorporation of the Kruger National Park into the Greater Limpopo Transfrontier Conservation Area, which opened up new areas of habitat to elephants and other species in Mozambique, where animal numbers are currently very low.

By dropping fences' and other barriers, an opportunity exists to reduce some of the pressures on Kruger national Park (GNP), especially elephant populations, and at the same time create new value for the other countries, social and economic changes have profoundly affected the habitat for elephants and other wildlife in this region.

On the one hand, large areas outside of parks have been closed off to most species through intensified settlement and agricultural activity. In addition, access to water, migration routes and vegetation has diminished since the eighteenth century.

Limpopo National Park has been poorly studied relative to the Kruger and it. Probably supports are more limited habitat diversity. Furthermore, wildlife populations have been compromised by decades of hunting and encroachment, between the two Parks deteriorate furthermore are removed altogether in essence, most large mammals associated with the kruger might be seen in Limpopo and a quick overview of this diversity makes for tantalizing reading indeed.

In total, 147 mammals species have been recommended in Kruger, more than any other African National parks with some of the more abundant species being African elephant estimated 2009 population.11,600.

Since the park implementation in 2001, local community conflict with wildlife has increase significantly, and the community have generally not been permitted to defend themselves, they have been particularly

concerned with elephant whose numbers have increased twenty-fold and who have severely diminished residents areas to cultural and environmental resources.

3.23.10 Human Population in LNP

The Limpopo national Park current population is estimated at 27,000 (Grossman 10/29/2003) Approximately 6,5 00 live along the shingwedzi watershed in the villages divided in seven zones of Mavodze, Massingir velho, Bingo,Machamba, Chimangue and Makandezulu A and B (Holden 2001: 45). The predominant tribe in the LNP today is the Shangaan / Tsonga

3.23.11 Use of natural resources

In the heart of the protection of resources is total, wildlife cant be exploited at all. A buffer zone has been created around this central area, a zone in which one the exploitation of natural resources is allowed but controlled.

3.23.12 Conservation and management IN LNP

The elephant debate deals largely with population size, how elephant numbers change over time, how they may affect other species (e.g. Owen-Smith, *et al.*, 2006; van Aarde *et al.*, 2006) and how elephants should be managed (e.g. Whyte, *et al.*, 2003; van Aarde & Jackson, 2007). Changes in elephant numbers are the basis of many management plans and policies

The conservation of wildlife in Mozambique is Governed by the Forestry and Wildlife act(10/99) and subsequent regulations (Act: 12/2002). The elephants may not be killed without the permission of the Government.

The maximum fine for illegal killing an elephant is 100 million Mt the law provide that attempts must first be made to chase away problem elephant, but if this fails then the local district Administrator has the authority to permit the destruction of an elephant.

There is the need to ensure that elephant management objectives meet political, social, technical, economic, ecological and institutional requirements. These elements were partially captured in the 1999 elephant management strategy, especially in relation to social and economic development goals, the sustainable use of natural resources and biodiversity maintenance. However, they have not all been adequately met, and need to be broadened in this strategy.

The park's management plan provides for the participation of local communities in the development and management of the park and ensures the equitable flow of benefits to the communities. In 2010

3.23.13 Local community lively wood in LNP

About 30.000 people inhabit the so called Multiple use zone (MUZ) relying on rain fed agriculture for their livelihoods.

People distributed in 44 villages a long Limpopo and elephants rivers (Ministry of Tourism, 2003)

The MUZ policy for LNP tolerates natural resource exploitation for subsistence purposes, except hunting which is prohibited under any circumstances (Ministry of Tourism 2003)

In the late 1990s significant changes to national land and wildlife laws sought to emphasized and secure the rights of local communities to manage resources (Anstey 2001; Tanner 2002; Lunstrum 2008).

Two focal areas for resolving community concerns have been identified namely realignment of the Limpopo National Park boundary a long the Limpopo river and the development of a voluntary resettlement and compensation plans. strategies and action plans have put in place to address these issues.

The civil war in Mozambique resulted in major, social disruption, with large-scale movement of people out of the LNP. During this time, numbers of people moved into the apartheid homeland of Gazankulu in South Africa and traditional tribal structures have been disrupted.

Residents from the Park, Men in particular have engaged in migrant Labour to the south African mines with peace prevailing people moved back into the rural area and were accepted into the community.

Many people have started to return to their former homes and are re-establishing a means of ensuring their basic survival, especially difficult in areas with low potential and high risk for agriculture and livestock rearing, and the hunting concession that preceded the LNP, More recently some Limpopo residents have been employed by the LNP they worked as game rangers, poaching guards, cooks, and mechanic, among other jobs.

In the district of Massingir, the population almost doubled between 1980 and 1996. Most people together with their livestock are concentrated in areas of arable alluvial soils along the Limpopo and Shingwedzi rivers.

Participation by local communities in management is widely considered a means of sustaining protected areas. The practice of forbidding exploitation of natural resources within LNP is being debated and participation of rural people is now recognized in management plans for such areas (MacKinnon *et al.* 1986; Kiss 1990; Happold 1995; Rihoy 1995; Heinen 1996).

Resources should be seen in the light of three key factors, namely availability, production and off take (e.g. de Bie *et al.* 1987; Bodmer *et al.* 1994; McGregor 1994). Household socio-economic background also plays a role in resource utilization; poorer families depend more on natural products (Infield 1988; Newmark *et al.* 1993; McGregor 1995)

3.23.14 Economic activities of the local Community

With limited access to markets the majority of people in the Limpopo national Park depend on agriculture and sometimes livestock for subsistence (Holden 2001: 46)

The main economic activity in the region is rain-fed agriculture (e.g growing maize, pumpkins and beans) complemented by the raising of livestock, particularly cattle, gouts and chickens and depend on wild plants and tree products.

When there is a rain, families farm close to home or begin gardens in their yard.
Agricultural plots exist a long the road near each village in the schingwedzi watershed. Active farms located at distance from residents homes these farms are particularly important driving the winter months when there is little rainfall.

The implementation of a nursery in the buffer zone appears like one of the solution identified by the program to reduce the conflict between human being and nature.

There is an implementation of nursery in several villages of the buffer zone around 400 families have been involved in the project.

The benches coming from the nursery are include in the cultivated areas of the villages.

3.23.15 Farming System

Cropping and animal husbandry are the two main livelihood means in the Macaringue community. Croppinghas an important role in food supply while cattle are the safety net of the household, and also an important determinant of the cropping system. The size of cropping area and the household's capacity for resilience depend partially on cattl possession and size of the herd. Smaller species of farm animals such as goats, sheep and chicken play the saving and trade coin role, especially for immediate needs such as seeds, schools materials and other domestic needs.

That's how populations will be able to produce their own resources fruits, charcoal. And wood for buildings, which will reduce the extractions of arboricultural species in the park.

The resources will be directly consumed by the families or sold on local markets.

This action will impact on poverty and on the vulnerability of the populations assuring them a sustainable production while creating income generating activities.

In an other hand, the benches can in an other hand, these benches can be used to reforest the damage areas of the park

Rural communities thus value elephants in protected areas as part of their cultural heritage. However, although communities living adjacent to South African protected areas allude to the cultural value of elephants and the historical relationships between them and people (see SANParks, 2005),
Conservation, tourism and recreational hunting create secondary benefits from elephants for local rural communities, such as employment and training. This, in turn, has a positive influence on local attitudes towards protected areas (Anthony, in press). However, since parks employ a relatively small proportion of the neighbouring population, rural communities have expectations of greater access to other economic benefits from parks

3.23.16 Human Ressetlement in LNP

Since at least 2003, conservation managers have been attempting to implement a voluntarily resettlement program (Milgroom and Spierenburg 2008) most of the local community prefared to continue living within the LNP, An additional important step towards achieving national and transfrontier goals was the nation's development of a resettlement programme for approximately 6,500 of the 27,000 people residing in the LNP.

Mozambican law does not allow economic activity, resource use, or occupation within total protection zones like the LNP (Tanner 2002). As a result, and as is well-recognised by some project authorities, the resettlement programme has progressed in a context of legal ambiguity regarding the tenure rights of the people living in areas that are subsequently declared total protection zones (MITUR 2007).

While all land belongs to the state in Mozambique, Nonetheless, the first village resettlement, involving the residents of Nanguene, occurred in 2008.

A significant number of people presently live within the PNL's borders. They are mostly concentrated on the alluvial plains of the Limpopo and Shingwedzi rivers where they practice subsistence cultivation. Livestock comprises cattle and goats. Their numbers are generally low.

Experiences, and institutional mandates influence protected area conservation to ensure free and safe wildlife movement within the Parks' core zone the resettlement programme is managing the relocation of families to the Parks 5+km wide Buffer Zone which runs along the Limpopo and Elefantes rivers.

Corridors were established along the Limpopo river to provide a link for wildlife between the Park's Core zone and the Limpopo River. The benefits of these corridors include:

- A safe corridor to enable migration of wildlife (Elephant, Buffalo etc) throughout the GLTP and to link up with Banhine and Gonarezhou National Park.
- Protect riverine forest vegetation along the Limpopo river
- Provide water access for wildlife from the dry Sandveld
- Provide a tourism product along the Limpopo River which may include Community run lodges.

3.23.17 Community Based Natural Resource Management (CBNRM)

The Communal Areas Management Programme for Indigenous Resources is about the sustainable use of natural resources by rural communities. The community users maybe a village, a ward or a group of wards depending on the type of natural resource being managed and the way in which it is distributed in a given geographical area.

Eg in Zimbabwe some experiences are taking place like CAMPFIRE is a programme that is currently based on devolution of power from central government to district councils

LNP established for conservation and wildlife protection purposes. Nevertheless, nearly all the LNP have people living in them, with varying densities and settlement patterns.

The exploitation of certain resources within a LNP on a sustainable basis could contribute to higher living standards, of rural people

4. MATERIAL AND METHODS

The study consisted of the survey of available literature from the national reports, existing documents and information available through the Mozambique government system and information available within PA's. A literature review was carried out to obtain information

on elephant conservation status in Limpopo National Park, focusing the most on elephant trends data Which was sourced from the Park database and analysed to develop profile of historical elephant range dynamics for the Park.

A literature review was also conducted to obtain information on social issues associated with elephant harvest and wildlife conservation related legislation and policy.

Information was also sourced on current and future initiatives that could potentially support the implementation of elephant conservation to contribute in the improvement of conservation and management of elephant population in Mozambique.

The study consisted also face- to- face questionnaire household of 2 villages within 10 Km from one village to onother village in Limpopo National Park in Gaza Province. Namely Machaule Village and Chibotane Village

Data on socio-demographic variables including age, sex, Household income, Household size, education level and years

5. RESULTS AND DISCUTIONS

5.1.Trends of elephant in LNP

The elephant in Limpopo National Park suffered massive decline during the civil war period, when many herds fled to neighborhood countries. Other elephant were killed during the conflict, since hunting was uncontrolled and many conservation areas were not fully operating of the war in 1992 the national

government has been directing efforts on the recovering of lost populations, especially within conservation areas.

But according to the observation of the local community the current trends of elephant population in LNP indicates great changes in number and distribution, when compared to the 1992's The elephant population has undergone a major change in the last 10 years due to population increase, development and the past political instability that confined most of the large mammals to existing conservation areas.
New polices have been drawn aiming to re-populate the conservation areas and this includes more financial support as well as new partnerships with neighborhood countries;

The community says that this positive trend is associated with a good conservation measures which usually include habitat management and protection through law enforcement, successful management at the site level is always resulting in the build-up of high elephant densities.

Elephant densities are monitored regularly during aerial censuses. Elephant movements are subject to various degrees of legal protection in all range.

The species range is believed to lie in unprotected land, most large populations occur within protected areas.

The new elephant management policy looks different from the old one in that the elephant population will be managed according to measured impacts on biodiversity rather than on absolute numbers of elephants.

Different management options is being practiced in the area this includes the entire biodiversity and the monitoring system.

The communities ensure that the management option will continue until there is clear evidence that the prevailing density of elephants is having a negative impact on some aspect of biodiversity which warrants concern.

Mozambique has made significant progress in implementing measures that will contribute not only to the fulfillment of the Convention, but also to encourage different stakeholders to apply the National Strategy and Action Plan (NBSAP) and the Environmental Strategy on Sustainable Development. In terms of Article and several community programs for natural resources management are being implemented

5.2 Major Threats

There is disturbance of elephants by people living inside protected areas which most of the time cause a lot of threat to wildlife, currently the most important perceived threat is the loss and fragmentation of habitat caused by ongoing human population expansion and rapid land conversion.

Factors that cause locally high numbers are induced principally by people and include water supplementation, fencing and the reduction and fragmentation of landscape that detract from more natural movements of elephants.

Crop damage is the most prevalent form of human wildlife conflict across LNP. According to the information caught from the villagers elephant killed a human this year in one of the community visited Machaule community.

5.3 Community based natural resource management

As the majority of the population resides far kilometers a way from the chingwedzi river , artisanal fisheries are also a major economic and subsistence activity, with fisheries products providing much needed protein to local diets and an alternative source of income.

As in most traditional rural societies as a local communities in LNP have strong bonds with their traditional land and fishing zones and are deeply dependent on their access and use of the natural resources available in these areas, for a variety of cultural, spiritual and subsistence reasons. A major part of the traditional staple diet of the population is based on cassava, mushrooms, game meat and edible fruit.

In addition to food, one of the main forms of dependency on forest products is the use of woody biomass which provides about 85% of the total energy consumption, through the production of charcoal and collection of firewood, and is an indispensable part of not only rural but semi-urban and urban everyday life.

Furthermore, traditional medicine, which is widely practiced throughout the area and which, in the majority of remote areas, is the only medical service familiar and available to the population, is purely based on the use of wild products such as medicinal plants. As the picture below in annex 1, 3 and 4 are showing the member of the community preparing the medicinal plants as he said during the interview their collect it in sustainable manner so that the generation of tomorrow can still use those plants.

In Mozambique the management of endangered species of flora and fauna are in place,
The council of minister approves by decree the list of protected species and the list of species whose utilization is permitted, including their hunting.

The state promotes investigations and research concerning the status of biological diversity of the country in order to provide information for decision-making with respect to the management of the species.
Mozambique is a signatory to CITES, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the country agreed to be bound by CITES 1981 and was the 66th state (Country) to join. And as such has certain compliance procedures and obligations which are detailed I n the context of elephants it has two additional major responsibilities, namely support for ETIS, the Elephant Trade Information System, and implementation of MIKE, the Monitoring of Illegal Killing of Elephants.
MIKE is a field-based monitoring programme whilst ETIS is to do with monitoring ivory seizures relating to trade in elephant products, both domestic and international.

The University of Eduardo Mondlane in Mozambique is the Scientific Authority and the Ministry of Environment, MICOA coordinating role as a management Authority.

The CITES Scientific Authority must ensure that exportation does not impact on the survival of the species and it can demonstrate that the specimen obtained did not infringe any legal conservation requirement.

Wildlife conservation in Mozambique is guided by the Forest and Wildlife Law and Act No 10 of 1999 and accompanying Regulations, and builds on the Policy for Forests and Wildlife (DNFFB 1996).

There are two monitoring the Illegal Killing of Elephants (MIKE)3 sites in Mozambique, one in the Tchuma- Tchato community conservation area in Tete Province, and the other in Niassa NR. Data

3 MIKE stands for Monitoring the Illegal Killing of Elephants. It emerged after the 10th meeting of the Conference of the Parties as a system for tracking illegal activities involving elephants. At its 11th meeting (Gigiri, 2000), the Conference of the Parties approved MIKE for implementation. It confirmed this decision at its 12th meeting (Santiago, 2002) with a few refinements [see Resolution Conf. 10.10 (Rev. CoP16)].

collection has been sporadic with centralised collation and reporting not always efficiently executed, partly because of split responsibilities between DNAC and DNTF.

5.4 Human elephant conflict

Increasing elephant numbers may threaten other species and their habitats, community in LNP believe that the number of human/elephant conflicts is increasing and this is also an indicator of increasing elephant numbers (community leader.). Elephants usually destroy crops, eat food being stored by villagers and have killed people.

A set of global trends relating to human populations, habitat evolution and animal distribution and behavior has contributed to the escalation of human-wildlife conflict in this area.

The main causes of human wildlife conflict is the competition between growing human populations and wildlife for the same declining living space and resources.

The transformation of forests, savannah and other ecosystems into agrarian areas or urban agglomerates as a consequence of the increasing demand for land, food production, energy and raw materials has led to dramatic decrease in wildlife habitats hence most of the people in the area rely in natural resources.

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Another consequence of the opening a new lands and villages into areas that were once private wildlife refuges is the creation of new bush paths between these settlements. This generates a greater traffic of pedestrians, increasing the risk of contact with wild animals. Other activity organized around new settlements such as the day collection of wild fruits, barriers and fuel wood, fishing and poaching further expose the inhabitants, to encounter with wildlife.

The villager said that human-elephant problem is a rapidly growing one in this area, during the dry season, elephant are beginning to move down into the Chingwedzi river., particularly in Chibotane Village being one of the community visited and interviewed, they have found green crops under irrigation and raided these both bulls and breeding herds of elephant have already begun to cross the Chingwedzi River , which in the dry season is no barrier to them.

Crops being raided included those growing outside the Limpopo National Park and beyond the support zone.

In the case of the *machaul Village illustrated*, this farmer had installed a diesel pump and fenced the field to exclude cattle. He produces two crops a year and cultivates approximately 5 ha. An estimate of half a hectare was destroyed and in one night at a conservative estimate this was a loss of at least 15 bags of maize. Usually Government does not compensate villagers for crop damage. The occurrence and frequency of crop-raiding is dependent upon a multitude of conditions such as the availability, variability and the type of food sources in the area, the level of human activity on farm, and the type and maturation time of crops as compared to natural foods sources.

In most cases the adult male elephants carry out crop-raiding, while the female herds prefer to keep a way from areas inhabited by humans. It is worth noting that during dry seasons elephants can also break into storage bins and steal grain. When they do so the consequences for food security are even more serious.

Livestock and humans compete for water with a herd of about 50 elephants. Aside from the fatal incidence which could due the due to the close and often dangerous encounters with the elephants at the ponds, this competition always lead to loss of cattle, particularly at the end of the dry season or in times of drought.

Access to water is another essential human requirement. Permanent settlements are developed close to source of water, but this prevents access to wildlife.

Despite effort to develop alternative water supplies in rural areas in Mozambique water is still most frequently drawn from natural or man made surface water ie. Rivers, lakes, and dams. People are dependent on access to these water bodies for their daily needs: collection of water for domestic use, washing clothes and utensils and bathing

5.5 Poaching

Poaching for ivory has traditionally been the major cause of the species' decline. Although illegal hunting remains a significant factor in some areas, most of these illegal activities are being practiced by national citizens influenced by people from abroad.

Illegal hunting is most commonly practiced with the use of gin traps, dogs, and muzzle-loaders. Illegal hunters are typically local poor, food-insecure men in their 30s and 40s.

This problem is associated with the harvest of wildlife of a small dimension for human consumption which provides an essential source of meat for hundreds of millions of rural people living in poverty. Increasing land use pressures on elephant range, declining of law enforcement budgets and continuing poaching pressure for bush meat as well as ivory, have kept illegal killing of elephant.

Hunting shall be allowed only for the protection of life and property, against actual or impending attacks by wild animals when chasing away or capturing is not possible,

Hunting shall be exercised promptly after knowledge of the facts, by specialized brigades of the state or the private sector and bye duly authorized local communities.

5.6 Anti-Poaching

South Africa and Mozambique signed a Memorandum of Understanding in the field of Biodiversity, Conservation and Management, Several training have been undertaken in LNP, recruitment of new field ranger and training was supported by the Southern African Wildlife College which has extensive field ranger training experience across southern Africa.

The training programme was adopted by the Game Rangers Training Coordination Group as the standard adopted across Southern Africa, thereby ensuring that the park's field rangers are at the fore front of the best regional anti-poaching techniques. The training was also supported by selected senior park field rangers and the Mozambican police who were commissioned to conduct the rifle skills training.

These rangers were deployed along the border adjacent with Kruger National Park to focus on the increasing elephant poaching threats facing the Great Limpopo Transfrontier Park. The unit is supported by three newly procured land cruiser vehicles, rifles, radios and patrol equipment.

- Ensure the reinstatement and implementation of cross border joint operations protocol
- Collaboration on the development of an effective management and protection force and setting up a GLTP management committee and a joint operation committee
- Ensure the strengthening of the judicial system for protected wildlife species, and specially elephant related crimes;
- Improve and strengthen the reward and incentive systems,
- Share information and joint cross-border communication system implement a monitoring and evaluation system to mesure effectiveness, investigate all fencing options as a means of improving the protection of wildlife and support the development of legal wildlife based economies as a means to diversify local community livelihoods options.

5.7 Law enforcement

There is a appropriate capacity to enforce the law for which MITUR is responsible and often willing to meet enforcement needs within PAs. Field documentation of ivory collections from PAC and illegal seizures is also in place e.g. recording, marking and weighing of ivory at field offices. These activities are in collaboration with obligations under the Convention on International Trade in Endangered Species of

Wild Fauna and Flora (CITES). There is effective measures regulations regarding law enforcement and/or is being enforced, with a high substantial penalties for illegal wildlife activity.

Subsequent actions following the apprehension of poachers are weak in terms of successful prosecutions and convictions. Compensation values are either not used or bear little relation to the severity of the crime. The responses of the local (district) administration, police and judiciary to wildlife infractions are not well coordinated or harmonized

In relation to the payment of fines and hunting taxes, MITUR has been investigating the best approach for payment of fines at provincial or district level. This includes payments into the bank nearest to the conservation area. The approval of an instrument to solve coordination problems between different law enforcement agencies and the payments of fines arising from infringements in conservation areas is due shortly.

Good progress has been made in the implementation of a draft cooperation agreement on the joint protection and management of the elephant population in the GLTP and conservation area, which was endorsed as an implementation strategy to combat wildlife crime.

The draft cooperation agreement has resulted in increased joint collaboration efforts on elephant anti-poaching intervention on Park management level.

The development of joint operations cross border protocol by the park managements will, once approved by the safety and security clusters of the two countries provide joint cross-border operation.

Additional steps being taken by South Africa and Mozambique following the bilateral include:

- Immediate maintenance and erection of fencing a long the eastern boundary of Kruger National Park with Mozambique

- Strengthening of the buffer zone in Mozambique through the establishment of the greater Lubombo conservancy

- Creation of an intensive protection zone in the LNP

- Deploying a well- trained and armed anti-poaching UNIT for Joint collaboration with Kruger National Park team and the Syncronization of operational plans between the Limpopo and Kruger National Park.

Mozambique is also discussing with the CITES Secretariat the possible role that the International Consortium on Combating Wildlife Crime (ICCWC) could play in assisting Mozambique to more effectively combat wildlife crime. ICCWC is the collaborative effort of five inter-governmental organizations working to bring coordinated support to the national wildlife law enforcement agencies and to the sub-regional and regional networks that, on a daily basis, act in defense of natural resources. The ICCWC partners are the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Secretariat, INTERPOL, the United Nations Office on Drugs and Crime, the World Bank and the World Customs Organization (CITES website, http://cites.org/eng/prog/iccwc.php)

Such assistance could include the operationalization of the *Wildlife and Forest Crime Analytic Toolkit* published by ICCWC and which "provide a comprehensive overview for understanding the main issues related to environmental offences and for analysing preventive and criminal justice responses to wildlife and forest offences in a given country" (ICCWC, 2012).

5.8 Stakeholders and their roles in the Conservation in LNP.

The development of the conservation and tourism sector results from the participation and interaction between a broad range of direct and indirect stakeholders. These stakeholders include the State, the Government at national, provincial and district level, municipalities (autarquias), private sector, local communities, international, regional and domestic tourists, non governmental organizations, financial institutions, international development organizations, the media and the general public.

Approximately 25% of Mozambique's land area is comprised of State owned National Parks and Reserves. Developing sustainable tourism concession models in and around Mozambique's key protected areas , the Government of Mozambique (GoM) get the private sector engaged, to enable communities to benefit from tourism development, to create jobs, and to help the Mozambique's tourism industry grow.

There is a good design and implementation of tourism concessions which benefit a wide range of stakeholders, while ensuring the environmental protection of critical assets.

Ministry of Tourism -MITUR- is legally responsible for managing PA for conservation purposes, including representing GoM on granting contractual concessions, and approving management plans.

National Directorate of Conservation Areas -DNAC is responsible for the technical establishment and management of National Parks, National Reserves and Coutadas, and also to issue special licenses for tourism projects and activities in PA.

DINATUR is competent for generally licensing tourism projects and activities.

Ministry of Fisheries- MPescas is responsible for the management of fisheries resources and marine protection areas, including for the proposal for the establishment of marine reserves25 and for issuing temporary fisheries licenses and launching of bots permits.

Ministry for the Coordination of Environmental Affairs- MICOA has the overall responsibility for coordinating all environmentally related issues in Mozambique and reports on the national implementation of the CBD. Once created, it will oversee the National Conservation Areas Agency (ANAC).

National directorate of Environmental Management -DNGA is responsible for coordinating the conservation planning, management and monitoring of biodiversity throughout the country.

National Directorate of Evaluation of Environmental Impact -DNAIA is responsible for approving EIAs and issuing environemntal licenses to tourism projects in PA.

Ministry of Agriculture -MINAG is legally responsible for granting use and development rights (DUAT) outside PA (such as buffer zones), for all purposes, including for tourism or living/ressetlement

National Administration of Conservation Areas (ANAC)

the PA Agency has been created (Decree 11/2011) as the agency in charge of managing all conservation areas, PA included, and with tourism concessioning powers. It is expected to become functional still in 2012.

5.9 Community awareness

Consultation with villager said that there is awareness raising carried out in the community at different levels, for instance in the schools or in adult education arenas such as farmers field school.

Educating children, coupled with awareness raising among adults through the traditional authority of chiefs and headmen is certainly highly cost effective means of managing conflict.

Education and training activities are directed towards disseminating innovative techniques, building local capacity for conflict prevention and resolution and increasing public understanding of human wildlife conflict.

The rural Community is also educated in the villages in pratical skills to help them deal with dangerous wild animals species and acquire and develop new tool for defending their crops and livestock.

Overtime, it results in a change of behavior among local livelihoods and a reduction in their vulnerability.

In an optimizing scenario, education and training is promoting commitment towards conservation, raise awareness of the essential role of wildlife in ecosystem functioning and its ethical and economic value, as well as the recreational and aesthetical importance.

The Park has adopted a lot of mechanism to mitigate elephant poaching and another illegal activic

ties through a method of cultural tourism organization, like theaters groups.

The group of theaters shows, communicate the threat of global warming an understandable concept in this hot part of the world , the importance of the park to the community within the perspective of regional development revenue sharing and employment benefits but most importantly the threat that elephant poaching poses to the future of both the park and to community well being.

5.10 Tourism in L N P

LNP has competitive advantages in tourism, which makes this sector very important in increasing of the income generation of the Park for the benefit of the local community sorounding the Park in order to fight against poverty.

In LNP tourists can anjoy tourism, ecotourism, cultural tourism, adventure tourism, and game watching and thematic tourism.

A large charismatic wildlife, such as elephants plays an important role as flagship species which attract tourists to LNP large number of foreign and domestic tourists.

There is increasing emphasis on the need to promote and enact sustainable tourism through community participation around LNP.

An overview of community participation in the tourism project development was provided – from participatory rural appraisal and the establishment of a community committee with a bank account – through to local employment and the distribution of profits.

The need to develop a culture of tourism was raised, as was the time required to learn about tourism, constraints faced where few were literate or spoke Portuguese. Regular communication between Park

management and the community was raised as very important, and they have discussions with the whole community every six month

5.11 Tourism and Environment

Villagers said that there is a active participation in development of tourism sector and active role of the government regarding sustainable locals tourism towards the environmental responsibilities.

Ecotourism focuses on preserving and sustaining the diversity of the natural and cultural environments. In addition to evaluating environmental and cultural factors, initiatives by hospitality providers to promote recycling, , and the creation of economic opportunities for local communities are an integral part of Ecotourism.

Tourism can be less environmentally damaging than other revenue generating industries based on natural resource use, including forestry, slash and burn agriculture, pastoral farming and wood collection

Tourism is one of the few economic activities suited to take place within conservation areas located on marginal land and Tourism and economics in LNP based on natural resources can theoretically be sustainable if its impacts are managed and mitigated.

5.12 Waste management

Every stage of waste handling is addressed, from collection and transportation to disposal. Waste deposit systems that restrict wildlife access to garbage and good standards of waste management are important to avoid attracting wild animals to human settlements and to prevent wild populations from proliferating and becoming artificially sustainability of human food.

5.13 Benefit of Tourism in LNP

A lot of benefits throughout the parks revenues and from economic linkages from the implementation of tourism projects are in place. Communities residing in PAs, or dependant on their natural resources, have customary access, occupation, use and benefit rights.

Sustainable tourism is one of the aspects mentioned in LNP Implementation Plan seeks to ensure that all tourist activity are taking place in such a way that the Environment is well protected taking into consideration that tourism have fundamental impacts on biodiversity conservation for a number of reasons, including the following.

Both use- and non-use values are potentially recoverable from PAs tourism can raise public support for conservation since it can provide environmental education to visitors and local people.

Tourism in LNP also generates direct employment and catalyse economic opportunities for local people. Beneficiaries may consequently perceive a direct value from biodiversity, which provide incentives to conserve natural areas.

The community is responsible for all tourism activities in its portion of the park. The agreement has been described as a unique attempt to harmonize the protection of biological diversity with the interests of rural people. The agreement has important implications for the mobilization of indigenous culture in support of conservation. The community is willing to participate in ecotourism and conservation. Agreement was only reached after two years of negotiations, and the people expect benefits from ecotourism that have yet to materialize.

5.14 Income generation

Community based natural resource management (CBNRM) initiatives provide opportunities for communities to benefit from revenues and employment from tourism.

Positive direct interactions between rural communities and elephants are limited. Communities get access to meat when problem animals are destroyed and some local residents visit neighbouring parks as tourists. Found that rural residents adjacent to the Kruger value elephants for meat and recreation, as well as for ornaments.

In 2010 the government approved the National Strategy to Promote Integrated Community Management of Natural Resources, which seeks greater involvement and appropriation of natural resources by the communities which come across with the development and implementation of conservation projects in LNP.

For communities to share in the benefits of the Park 20% of the Park revenues are given to Communities decisions on the allocation of these revenues to identified projects (eg Community Hall, Improved water supply, Community operated Tourism camps etc) is undertaken in each region through appointed community committees.

This is distributed throughout several organizations that attempt to link village, district provincial, and national levels of government with the international and multilateral organizations that also shape the national conservation agenda.

5.15 Community Development Program in LNP

This is the case of Limpopo National Park where there is an engagement of communities development programs between the parks and communities itself to ensure healthy and mutually beneficial relationship and sustainable conservation in place.

The Community Development program is funded by Agencia Francesa de Desenvolvimento (AFD) who have donated huge amount and funds over a 5 year period. Implemented community activities include:

- Development of a Support Zone Management Plan which will guide the Park management of the Buffer or Support Zone.
- Support Zone Land Use and Carrying Capacity Study
- Implementation of 18 Irrigation schemes along the Limpopo and Elefantes rivers which will reduce land demand and riverine forest destruction and improve community livelihoods.
- Implementation of a community nursery to provide trees for land rehabilitation as well as for the resettlement programme.
- Repair of water systems for 5 villages
- Construction of a Community Information Centre constructed at Mahawane on the Limpopo River.
- Park Core and Support zone road design and alignment study to plan the Parks' Tourism and Community road network. The upgrade of the 350km community Support Zone road running along the Limpopo and Elefantes rivers.
- Barrier Fence Environmental Impact Assessment study and construction of the 56km south eastern barrier fence as a Human Wildlife conflict mitigation measure
- Human Wildlife conflict training and support
- Implementation of a community Environmental Awareness programm

5.16 Challenges

The main challenge now lies in the promotion and development of conservation as an engine for economic growth and in the engagement of public and private sector as well as communities in making the delivery of services in the conservation sector a reality.

The growth of tourism depends on the long-term vision, on the capacity to evaluate opportunities and understand realities and in the recognition that tourism is a highly competitive international industry that requires planning, investment, strategic alliances and strategic management.

6. CONCLUSON AND RECOMMENDATION

The African elephant is subject to various degrees of legal protection in all range state, good management plan, law enforcement and compliance with obligations under CITES will enhance the conservation of Elephant population in Mozambique. Successful management can result in the build up of high elephant density.

The reduction and minimizing the human-elephant conflict will help to sustain the elephant population in future. Conservation measures usually include habitat management and protection through law enforcement.

A sustainable protection of elephant must be taken into consideration for the impact of elephant on biodiversity or people living in proximity to elephants through their natural migration routes. Has been disrupted by the activities of people over the last two centuries, carefully conservation and management has led to the significant growth of elephant populations and human intervention is necessary to ensure that any future growth occurs in a manner that not result in the loss of biodiversity or human life.

Measures to manage elephants must be informed by the best available scientific information and, where the available scientific information is insufficient, adaptive management forms the cornerstone of the management of elephants and adaptive decision making tools must be adopted.

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ANEX

QUESTIONARE

Interview About Conservation Status and Management of Elephant Population in Southern of Mozambique (Limpopo National Park)

Interview , This interview was used for data collection for Research . the Interview answered the following question ,Their did not need to write their names. We were kindly like their collaboration.

a) Age

20-35		36-50		51-70	X

b) Sex

F	X	M	

c) Education level

Basic Level		Medium level		Degree		MSc.		Doctorate .	

Illiterate X		Law Level	

Occupation	Farmer

1. How long have you been living here 30 Years

2. Do you know elephant, Yes_____No_____
3. Have you ever seen elephant in your area, Yes_____No_____
4. Which area elephants use frequently _____

5. Does it bring a benefit for you, Yes_____, No_____
6. Which kind of benefit brings for you

7. Which season do you use to see elephant

Summer (November-February)		J	F	M	A	M	J	J	A	S	O	N	D
Winter (May-August)													

8. How many elephants do you see in :

Rain season	Males		Females		Youngs	
winter						
Summer						

9. .do you think elephants are increasing or are decreasing.: increasing _____Decreasing_____

10. Elephants are coming in your fields, Yes _____No_____

11. They damage crops, Yes _____No_____
12. Which action do you under take to solve this problem_____

13. What is the main course of elephant death in you area
14.Poaching_____poisening _____Natural death _____ Other causes _____

15.have you ever seen an elephant carcasses in your area , yes _____No____, Where did you see _____

16 .What is the cause of death _____

17.have you reported somewhere Yes ____No____

18.What kind of management tool do you use to improve you production

Fire _____ fertilizers _____logging_____Others_____

19.In which year do you use to fire _____

20 .How often

_____

21. Burned area_____

22.Which method do you use to protect fire _____

23. Which species of trees do you log in _____

24. Do you know the rivers where elephants drink water, yes___, No_____, Which one____

25.What kind of activities do you practices _____

Item	**Activictie**		**Intruments**					
01	Fishing		Fishing material		Net		Boat	
02	Hunting		spires		Firearm		Sneares	
03	Medicinal plant colection		Hoe		Moto saw		tractor	
04	Loging for chacol production		Saw		Moto saw		tractor	
05	Agriculture		Hoe		Tração		tractor	
06	Grow of livestock							
07	Tach colection for construction							
08	Logging for arts crafts		Saw		Motosaw		tractor	

	2002-2003	2004-2005	2006-2007	2008-2009	2010-2011	2012-2013
Number of poachers captured						
Weapon captured						
Species captured						
Ivory seizure						
Skin captured						
Meat captured						
Weigh of ivory						
Number of carcasses seen						
Number of camp seen						
Active camp						

.26. What kind of equipment do you use for patrol_____

52.Does it cover the demand of the patrol_____
27.is n the number of Rangers is enough to cover the needs_____

28.Have you ever had a training_____

29.Is there any good relationship between the Park and the Community _____

30.I s there any support of investors or other stakeholders financial involvement _____

31.What kind of benefits the Park brings for the Community _____

32 Is the good policy and legislation are well applied for better sustainable conservation_____

33.What is still missing _____

34.How to improve _____

35.Final comments _____

Thank you very much for your cooperation

Photo1. Interview about Medicinal Plants in LNP

Photo 2. Interview with Local Community about Human elephant conflict

Photo 3. Field rangers of LNP

Photo 4.Community member explaining the harvest methods

Photo 5. Dog helping during the activities/LNP

6. Rhino Hons and Ivory Seizures in LNP