

Conflicting Land Use in and Around Lake
Mburo National Park Sanga Sub-County
Mbarara District



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Yours sincerely,

Dr. Hannington Sengendo,
Ag. Head, Geography Department.



**CONFLICTING LAND USE IN AND AROUND LAKE
MBURO NATIONAL PARK, SANGA SUB-
COUNTY, MBARARA DISTRICT.**

AYOREKIRE JIM

IFRA



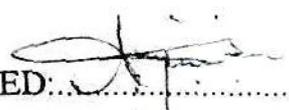
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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF
ARTS (LAND USE AND REGIONAL DEVELOPMENT
PLANNING) OF MAKERERE UNIVERSITY.**

MAY, 1999

DECLARATION

I, AYOREKIRE JIM, declare that this work has not been submitted for the award of a degree in any university or for publication.

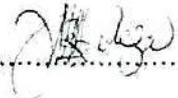
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SUPERVISOR'S APPROVAL

This dissertation which is a result of research carried out by Ayorekire Jim in Sanga sub-county - Mbarara District under my supervision is now, with my final approval, ready for submission for the award of a degree to the Higher Degrees Committee of the Faculty of Arts, Makerere University.

SIGNED: .....

BOB NAKILEZA

DATE: 01/07/1999.....

DEDICATION

TO

DAD AND MUM, MR. AND MRS . AYOREKIRE

AND

THE AYOREKIRES

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I hope this dissertation will greatly contribute to discussions aimed at improving the park community relationship, sustainable resource use and development of Sanga sub-county and possibly for all the areas surrounding Lake Mbuo National Park.

AYOREKIRE JIM

ABSTRACT

The long term success of the conservation of the protected areas depends heavily on the co-operation of the local people. Their attitudes need to be incorporated into the planning and management of the protected areas especially if the land use conflicts which tend to characterise conservation areas are to be resolved.

This study is an effort to address the landuse conflict between pastoralism and wildlife conservation in Lake Mburo area, its effect on the environment and attitude formation. A survey was mainly carried out in the parishes which border with the park in order to clearly examine the land use conflict. Data was obtained from 105 randomly selected general users of the land from four parishes in Sanga sub-county. Elders, opinion leaders, local council officials (LCs), government and park management officials also provided some information. Data was collected using rural appraisal techniques, questionnaire, interviews, consultations and secondary data sources.

Survey results indicate that the land tenure uncertainty, low levels of education, overstocking, overgrazing, traditional grazing methods, lack of sound conservation policies and increasing population have resulted in an environmental crisis. All the above were found to have great

implications on the sustainable use of resources and development of Sanga sub-county.

This study makes recommendations covering land use, the environment, the park, water resource, rural development, legal frame work and further research required.

The study concludes by giving goals and strategies for sustainable development of Sanga sub-county.

CHAPTER ONE

1.0 INTRODUCTION

1.1 GENERAL BACKGROUND OF THE PROBLEM

The government of Uganda has gazetted a number of large areas as national parks mainly in an effort to preserve its unique eco-systems and related bio-diversity. However, this has created land use conflicts especially where these areas contain valuable natural resources which for a long time have been utilised by the local communities. This conflict has intensified with increase in population, which coupled with land shortage, has resulted in persistent encroachment on protected areas.

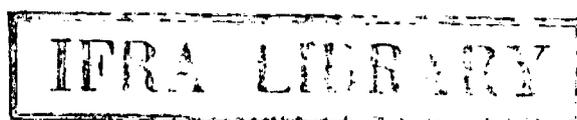
Wildlife conservation often clashes with traditional land uses such as grazing and cultivation. Peasants farmers and pastoralists look at protected areas as the last remaining frontier for cultivation and grazing. Faced with production constraints, pastoralists have little understanding of the value of conservation, particularly when portions of the reserved areas formed part of their traditional grazing area (GAF Consult, 1993). In Uganda, during the 1980's period of political turbulence, the local communities took this opportunity to encroach on protected areas with a view of firmly establishing themselves there (Kamugisha and Stahl , 1993).

In Lake Mburo National Park (LMNP) the landuse conflict became prominent in 1983, when the entire game reserve was declared a National park and the people were evicted from the gazetted area. The local people

believed that if the wildlife in the Park valued by the government was destroyed, the authorities would lose interest in the area and leave it to them (Kamugisha and Stahl , 1993). This attitude further complicated the landuse conflict.

Furthermore the conflict is compounded by conservation authorities who seek to protect the park, disregarding the efforts, interest and influence of the local communities. This sharpens local resentment of wildlife and encourages local people to draw the conclusion that government places a higher value to animals and plants than on their well being. The conflict becomes much more serious when people begin to suffer in favour of wildlife, presumably being preserved for the good of the same people (Kafureka,1992).

Protectionism which seeks to protect the park or game reserve, from the surrounding society cannot always ensure the sustainable conservation of natural resources. The logical alternative is to transform the local communities into protectors of parks and game reserves. To achieve this objective any development effort should consider the people of the place where it is to be located as beneficiaries and not victims. It should also seek to utilise their wealth of experience accumulated over years seeking to know what they do, why they do it and in the way they do it, if it is to avoid surprise failures (Kafureka, 1992).



This research is therefore an important step in understanding the peoples relationship to the land and natural resource use and their attitudes towards conservation. The focus is on the land use conflict between pastoralism and wildlife conservation with emphasis on its effects on the environment.

1.2 STATEMENT OF THE PROBLEM

This study analyses the conflict between pastoralism and wildlife conservation and its effects on the environment and on attitude formation.

The Bahima pastoralists residing in and around the park regard the savanna grasslands of Lake Mbuoro area as their traditional grazing lands. They therefore argue that the national park is depriving them of their right to graze in the Park area. The park authorities on the other hand feel they are duty bound to protect and conserve wildlife. This has resulted into a land use conflict especially over pasture and water.

Pastoralism forms the major part of the landuse conflict. The restriction of the pastoralists from grazing in the park, resulted in limited grazing land in the areas surrounding the park. This has contributed to overstocking and overgrazing. It has also led to the encroachment on the park in search of water and pasture especially in the dry season. This forms the basis for the landuse conflict, which this research mainly investigates with particular reference to sanga subcounty.

Research carried out so far on land use conflict in Lake Mbuoro area has focused mainly on other areas other than Sanga Sub-county and moreover with little regard to its impact on the ecosystem. This study therefore focuses on how pastoralism has led to environmental degradation in the study area and what steps have been taken to resolve the resource use conflict especially through the efforts of the Lake Mbuoro Community Conservation Project (LMCCP). The study also analyses the measures which can be taken to ensure that pastoralists benefit from wildlife conservation without contravening conservation laws and enable them have positive attitude towards conservation of wildlife.

1.3 SCOPE AND PURPOSE OF THE STUDY

The study mainly covers the areas bordering the northern part of Lake Mbuoro National Park in the parishes of Akaku, Kanyaryeru, Rwamuranda and Rwabarata (Map 2.3) These parishes are mainly occupied by pastoralists who utilise resources in and outside the national park. The principle objective of this study is to analyse the landuse conflict between pastoralism and wildlife conservation, its effects on the environment and how the conflict can be resolved.

The relationships examined in this study are between, the number

of cattle and the density of soil erosion gullies, between the level of education, the distance from the boundary of the park and their influence on peoples attitude towards wildlife conservation.

1.4 SPECIFIC OBJECTIVES

1. Find out the nature of the land use conflict between pastoralists and wildlife conservation.
2. Analyse the effect of pastoralism on the environment in the park and the surrounding areas.
3. Examine the effects of the landuse conflict on the community and their attitudes towards conservation.
4. Identify the strength and weakness of the efforts to resolve the landuse conflict from 1990-1997 and formulate appropriate recommendations.

1.5 HYPOTHESES

1. No relationship exists between the number of cattle and the density of erosion gullies.
2. The level of education influences the peoples attitude towards wildlife conservation and soil conservation.
3. The increase in distance from the park boundary has no

effect on the positive attitude of the local people towards wildlife conservation.

1.5 SIGNIFICANCE OF THE STUDY

Most of the research carried out in the lake Mbuoro area and the surroundings has mainly revolved around ranching and wildlife conservation. Little research has been carried out on the communities around the park with regard to their landuse practices and patterns.

There has been no specific research addressing the landuse conflict between pastoralism and wildlife conservation and its effect on the environment in Sanga Sub-county. More so, no specific evaluation has been done in the area about the success of the conservation projects, which were set up to resolve the resource use conflict between the park authorities and the local community.

Therefore there is need for this research because the eco-system is at stake; especially with increasing human and livestock population in the areas bordering the national park. Wildlife has to be protected but also the interests of the landless pastoralists in and around the park need to be considered since the park covers a large portion of their traditional grazing land. This called for a detailed research geared towards formulating appropriate recommendations on how to resolve the landuse use conflict,

conserve the eco-system and develop community support for wildlife conservation.

The data collected will help improve management systems for resource use and allocation, assist in the formulation of appropriate park and government policies concerning resource utilisation and management in protected areas.

CHAPTER TWO

2.0 AREA OF STUDY AND REVIEW OF RELATED LITERATURE

2.1 BIOPHYSICAL BACKGROUND

2.1.1 Geographical Location

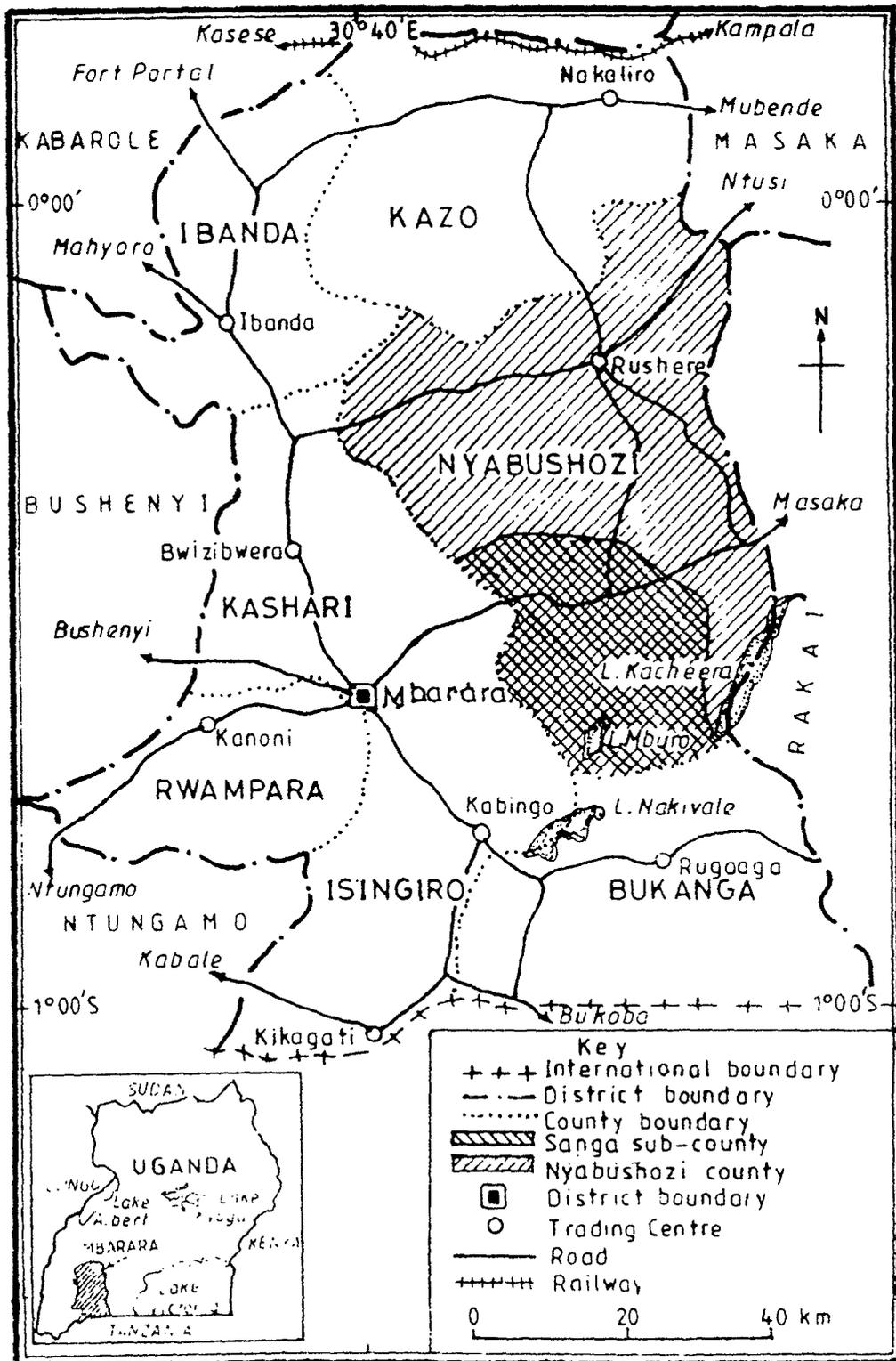
The study area, Sanga sub-county, is situated on the northern boundary of Lake Mburo National Park in south central Uganda, along the Mbarara-Masaka high way, 40 kms east of Mbarara town in Nyabushozi county, Mbarara district. Sanga Sub-county covers an area of 878.90 km² and it lies between latitudes 0°38' South and 0°41' South, longitudes 30° 55' East and 31° 57' East (see map 2.1 and 2.2).

2.1.2 Geology and Soils

The geology of the area is part of the Karagwe - Ankolean rock system; consisting of wholly granitized undifferentiated gneisses and elements of pre-Cambrian partly granites rocks (Uganda Atlas, 1967).

The soils have been derived from weathered materials of pre-Cambrian rocks derived from pre-Karagwe Ankolean age basement complex. They are mainly ferrallitic soils of sandy type and occasionally sandy loam soils can be found in valleys. The steep slopes are mainly dominated by laterite soils.

Map 2.1 LOCATION OF NYABUSHOZI COUNTY AND SANGA SUB-COUNTY IN MBARARA DISTRICT

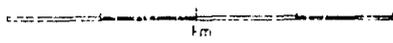


Map 2.2 LOCATION OF LAKE MBURO NATIONAL PARK IN NYABUSHUZI COUNTY.



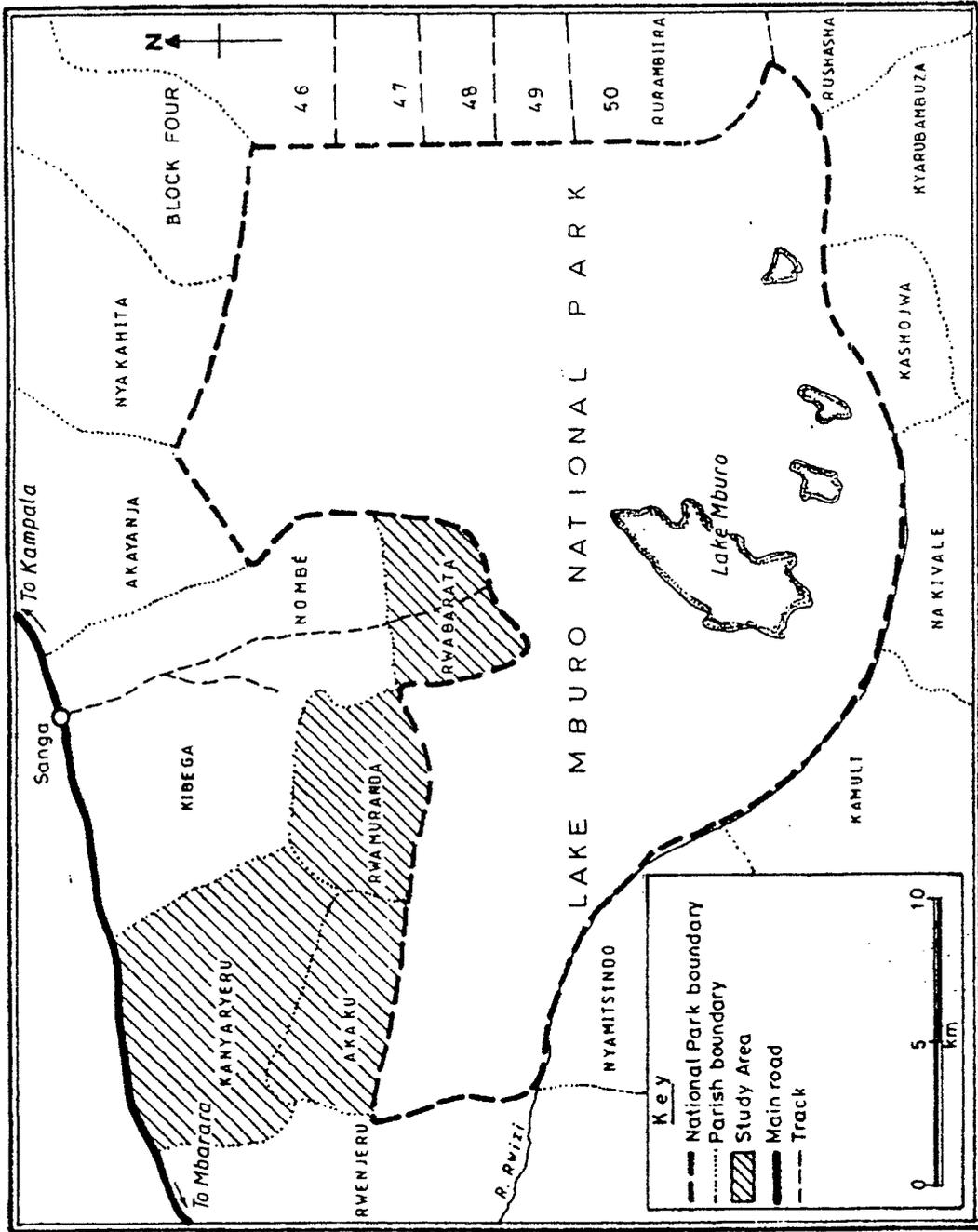
Legend

- District boundary
- - - County boundary
- Sub-County boundary
- Parish boundary
- National Park boundary
- District Headquarters
- Trading Centres
- Tarmac road
- Murram road



Source: ...

Map 2.3: LOCATION OF STUDY AREA AND LAKE MBURO NATIONAL PARK.



Source: Adapted from Sanga Sub-county map of 1991 Population and Housing Census. Also from L. Mbuoro National Park records.

Hydromorphic soils exist mainly in areas covered with swamps. The development and characteristics of these soils are influenced by permanent or seasonal water logging. Peat and organic hydromorphic soils including clay are rather scattered in seasonally water logged areas.

These soils have been leached and eroded for many years hence soil nutrient levels are low. Fertility depends greatly on reserves of plant nutrients in humic organic top soil, which also depends on continued renewal by vegetation. Hence the soils need to be protected from erosion (Kamugisha and Stahl, 1993 and Uganda Atlas, 1967).

2.1.3 Topography

The northern side of the national park and the Sanga sub-county areas lie between 1219 and 1828 metres above sea level (Monday, 1991). The relief consists of undulating to dissected plateaus. The southern part of the sub-county is dominated by hilly and upland areas. The uplands are interrupted by a series of areas which have low lying terrains and usually these consist of a granite floor and a resistant phyllite and quartzite. The rest of the study area consists of undulating low rolling hills with fairly wide valley bottoms (Kamugisha and Stahl, 1993).

2.1.4 Climate

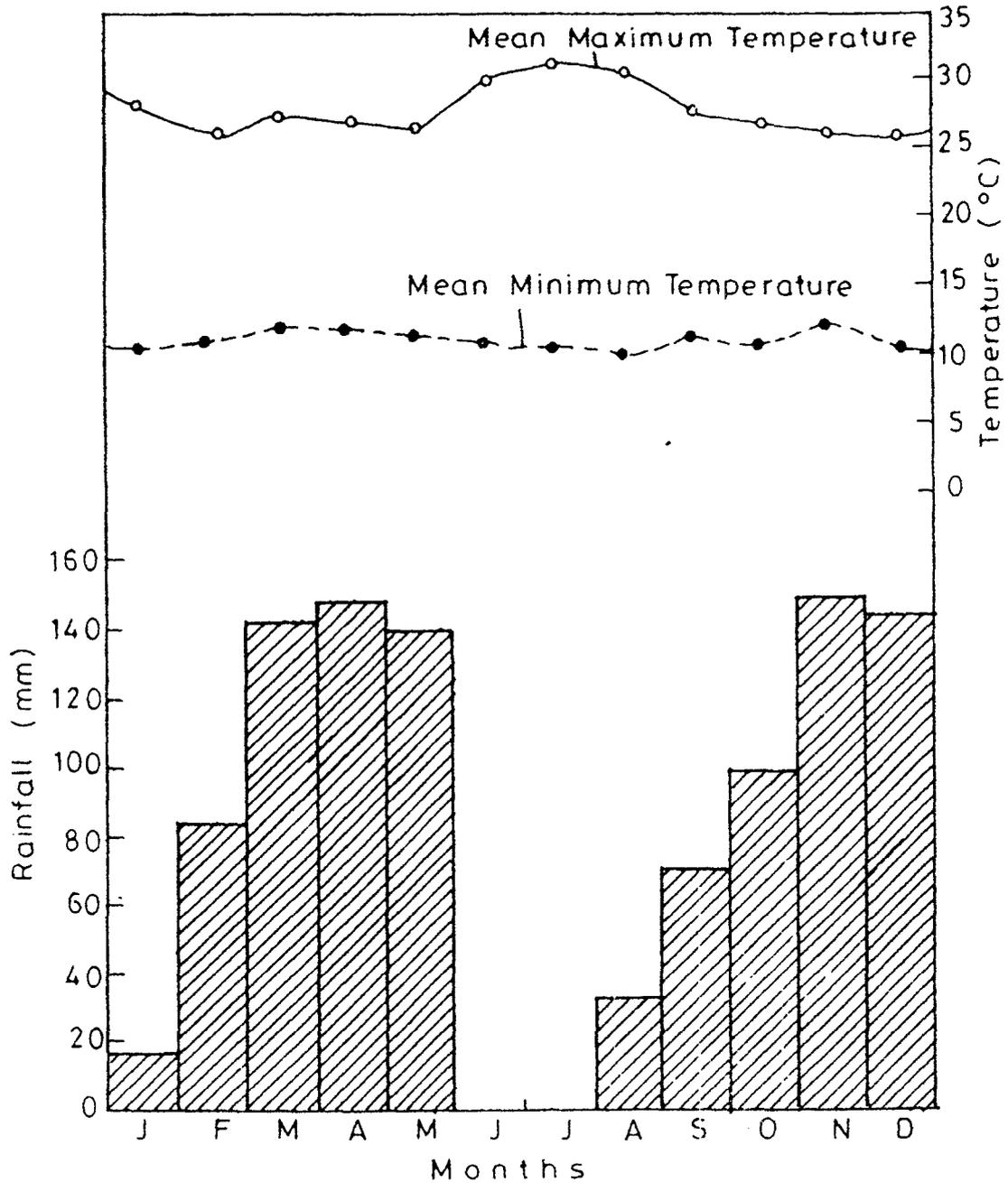
The climate of Lake Mburo National Park and the surroundings can be described as hot and dry for most parts of the year. The area is located

in the Ankole - Masaka dry corridor. Climatic data was obtained from Lake Mbuho National Park weather station records and the Meteorological Department in Kampala. The mean monthly rainfall and mean maximum and minimum temperatures for the period 1960-1964 and 1996 for Mbarara are given (Appendix VI). The 30 year mean annual rainfall is 945.5 mm.

The rainfall is bimodal in nature, with two rainfall peaks occurring from April to May and from September to November. Pronounced dry season occurs in June/July to August and December to February as indicated in Appendix VI and as recorded at the weather station in the park (Fig.2.1). According to the residents of the area the dry seasons can be quite severe, sometimes leading to drought. Rainfall tends to be erratic lasting for a short period of 30-60 minutes and it is unreliable (Kasoma, 1993) hence affecting the behavior of pastoralists and wildlife.

Temperatures are generally high throughout the whole year, ranging from 20°C to 28°C in the wet season and 28°C to 30°C in the dry season. However, with difference in altitude, there are bound to be variations in temperature at different altitudes within the study area.

Fig. 2.1 Mean Annual Climatic Characteristics Recorded at Rwonyo Headquarters, Lake Mbuho National Park 1996.



Source : Adapted from Park climatic records of January to December, 1996.

2.1.5 Drainage

The Lake Mbuoro National Park area and the surroundings lie in the Lake Victoria catchment area. Most of the permanent water sources are found in the southern part of the park, which is associated with a chain of Lakes like Mbuoro, Kazuma, Kigambira, Mutukwa and Bwara. (Busulwa, 1993)

Associated with these lakes are extensive swamps which exist in valley bottoms, though they are becoming less frequent because of changing climate and human influence. Rwizi is the major river in this area and it flows into Lake Mbuoro. Seasonal streams do occur during the wet seasons especially after heavy down pours but they disappear during the dry season due to high evapo-transpiration rates. Most of the water sources tend to dry up especially in the northern areas of the park, where the study area is also located. This leaves the southern parts of the park, the only area with permanent water sources.

2.1.6 Vegetation

The dominant vegetation type in this region is savanna grassland which forms a continuous community of grass cover with scattered trees; the main tree species being Acacia hockii

However, this vegetation has been significantly modified as a result of grazing, cultivation, burning, settlement, construction of cattle kraals and cutting trees

for fire wood. Acacia hockii (orugando) is invading many areas such as the well drained hill sides and low lying hill tops which were formerly much more open and provided good grazing areas for cattle and wildlife. Cymbopogon nardus (omutete) which is unpalatable both to wildlife and livestock is abundant and is invading rapidly from the north. The invasion is attributed to overgrazing and frequent burning.

Generally the vegetation in Nyabushozi county can be regarded as a fire sub-climax. This emphasizes man's predominant role in influencing the formation of vegetation cover. Frequent burning, cultivation, cutting trees for fire wood and for charcoal and heavy grazing, have been found to reduce plant species diversity which eventually leads to bare ground and soil erosion.

Areas currently under cultivation support many introduced plant species; several exotic plant species have been introduced like sisal (Agave sisalina) eucalyptus and mango trees.

2.1.7 Animals

Lake Mburo National Park and the surroundings have a rich faunal diversity. However, it has been reduced over the past years as a result of

increased human activity like hunting, Tsetse fly control and habitat destruction through cultivation, grazing and settlement (Appendix V)

According to the 1990 park records a total of 68 species were recorded in the park. To note is that Lake Mburo National Park supports Uganda's only population of Impala (*Aepyceros melampus*). In 1990 count, they numbered up to 10,000 and their numbers are increasing (Appendix V). The most common animals are zebra, warthog, oribi, bushduiker and eland. These species have also been increasing in numbers due to improved protection.

However, there are species which have been declining in numbers, for instance, topi, reedbuck, velvet monkey, baboon and buffalo. Some species which were known to exist in the park, but are now locally extinct include lions, elephant, giant forest hog, black rhinoceros and wild dog. Few numbers of predators like leopards, hyenas and jackals still live in the park (Appendix IV). The predators are threatened with extinction due to poisoning from the local community especially the pastoralists because they prey on their livestock. The lakes in the park support, crocodiles and some hippos. The surrounding papyrus swamps also support various animals like the sitatunga (information from Park records).

Areas surrounding the park, including Sanga sub-county are mainly dominated by domestic animals like cattle, goats and sheep. Some wild animals like impala also graze from outside the park. It is also common to

find livestock grazing inside the park, sometimes side by side with the wild animals.

2.2 SOCIO -ECONOMIC BACKGROUND

2.2.1 Land use and socio-economic status

The communities around Lake Mbuoro National Park are made up of a high proportion of households of recent or relatively recent arrivals. Approximately 66% of the communities are immigrants (Marguardt, et.al 1994) From the highly populated parts of Isingiro, Kashari, Rwampara in Mbarara district, from Rukungiri and the war torn Luwero triangle. Those who had been settled in the area before 1983 were given land in the Kanyaryeru resettlement scheme. The recent immigrants are not only landless and subsistence farmers, but also economically marginalised. Social structures are therefore weak hence making community mobilisation activities and assistance in the development of permanent community institutions difficult.

The majority of the community in the study area are pastoralists, although pastoralism appears to be declining. Most households are shifting away from strict dependence on cattle keeping towards a more sedentary form of mixed farming; they rear cattle and also grow some crops. However, in the study area there are also arable farmers who only depend on cultivation for survival. The pastoralists, often enter the park to graze

and water their animals, especially in the dry season. This often brings them into conflict with the park authorities.

Land ownership is strongly related to the socio-economic activity. The pastoralists who do not have land live unsettled life than the cultivators who have land.

However, the pastoralists in the Kanyaryeru Resettlement Scheme (KRS) live a more settled life because they were allocated about 40 acres of land per household. Most of them have even started growing crops, along side rearing cattle.

The pastoralists outside the resettlement scheme, for instance, in Rwabarata parish face the problem of landlessness. They were evicted from the national park and they were not considered by the government for resettlement. With this marginalisation, most of them have ended up as squatters on the ranches. Those who have not shifted to the ranches live near the park from where they make daily incursions in the park to graze and water their animals. They are therefore in constant conflict with the park authorities.

In the study area, there is lack of basic infrastructure such as schools, health centres, roads and permanent houses. This is because government which should have provided these facilities, has not yet done so. The people on the other hand, not sure of their legal tenure positions have been discouraged from investing in the construction of infrastructure

and even from carrying out any form of land conservation practices like tree planting. However, community participation in providing infrastructure is increasing, for instance some primary schools have been built by the community, with assistance from the Lake Mbuho community conservation project (LMCCP).

2.2.2 Human population

The area is mainly occupied by Bahima who are traditionally cattle keepers. Most of them were resettled in this area in 1986 from the war torn area of Luwero triangle. Other ethnic groups are mainly cultivators; they include Bakiga, ethnic Banyankole from Mbarara and Mpororo in Rukungiri and some Baganda.

The population figures used in this study are drawn from the last four national population censuses - 1959, 1969, 1980 and 1991. Table 2.1 below shows the population figures for Nyabushozi county, where the study area lies.

Table 2.1: Human Population of Nyabushozi County

Year(s)	Population
1959	12,665
1969	37,224
1980	77,838
1991	76,200

Source: Statistics Department, Ministry of Finance and Economic Planning, Entebbe.

The table shows steady increase in population between 1959 and 1980, with a slight decline in 1991. The study however could not ascertain the cause of this trend. Marquardt, et. al (1994) also indicate that there is no apparent explanation for this decline.

The steadily increasing population implies a steady growth in the need for natural resources in the area. Given the predominantly subsistence production of the communities in the study area and the low levels of household income, it is evident that local community demands on the areas' natural resources including water, soil, pasture and trees will constitute a major and sustained threat to the conservation of Lake Mbuoro National Park (Muhwezi, 1993).

The population distribution and density of Sanga sub-county for the different parishes, is revealed in table 2.2.

Table 2.2: Population distribution and density of Sanga sub-county parishes

Parish	Population	Land Area (km ²)	Density Persons per sq. km.
Rwabarata *	2,899	197.6	15
Kanyaryeru Res. Scheme *	3,541	138.3	26
Nombe	4,826	276.1	17
Embaare	1,833	89.6	20
Kayonza	2,010	134.1	15

Source: Statistics Department, Ministry of Finance and Economic Planning, Entebbe, 1992.

* Parishes which contain the sampled areas of study.

As revealed by the table above, the population density in the study area is relatively low. However, this should not be interpreted to mean availability of enough land and other resources. This is mainly because of the fact that these areas are mostly occupied by pastoralists who own large herds of cattle ranging from 50-600 herds of cattle per household. Thus though the area is sparsely populated in terms of people, it is actually overstocked with cattle, resulting in environmental degradation, as discussed in Section 4.4.1.

2.3 REVIEW OF LITERATURE

Wildlife conservation has increasingly received attention in Africa and it is increasingly becoming not only a biological challenge but also a social one. Various countries have tried to protect their bio-diversity by setting up protection areas which restrict human activity. This has resulted into conflict between the authorities and the local communities who want to utilise some of the resources in the protected areas like water, pasture, fire wood, game meat and gathering of food especially from forests. This conflict has intensified as the human and livestock numbers increase.

Several studies have shown different aspects of land use conflict in conservation areas. The following literature review is an attempt to further crystallise the existence of conflicting land use with particular emphasis

on pastoralism-wildlife conservation conflict. It will be reviewed under the sub-headings depicting the aspects of wildlife conservation and community participation, conflict between wildlife and livestock over resource use.

2.3.1 Wildlife Conservation and Community Participation

In analysing conservation and management of African wildlife, Riney (1967) observed that wildlife conservation and development are new sciences of which some of the general principles are known and yet these lead only to general solutions. He therefore argues that what is needed are specific answers to specific problems, whose urgency lies in avoiding the disappearance or extinction of the animal(s) concerned and the destruction of valuable resources.

He further observes that specific problems concern the most basic relations between habitats, animals and man. Animals and their habitat exist in a relatively stable, fluctuating equilibrium and it is unlikely that primitive hunting had much influence. But man using advanced technology of an industrial society, has had no time to fit into the ecosystem, except as a destructive force.

Curry (1981) argues that wildlife management is a complicated activity because of its impact on a wide variety of human activities. He observes that wildlife management should emphasize restoring, protecting,

conserving and maintaining animals population in relation to the environment. It requires a long term ecological based policy which takes into account land use practices and management. He stresses that management polices must also always plan ahead taking into account population pressure on the habitats and wild animals. He finally comments that important lessons must be learnt from numerous human mistakes and misuse of land in past centuries in order to reduce, as much as possible, man's detrimental impact on wildlife and the environment.

Analysing conservation and community participation Drijver (1994) noted that the relationship between protected areas and local communities is a key factor in the long term conservation of nature and resources in and around these areas. He observed that in remote areas of developing countries it is difficult to maintain effective control without the support of local communities. He however comments that in many cases this relationship is more of conflict than support. Conflict typically arises when local communities perceive the protected area as a burden on their land use and self reliance, while on the other hand conservationists perceive the growing numbers and aspirations of local people as a major threat to the sustainability of the protected area.

Related to the above, Anderson and Grove (1987) observes that a number of conservation and development projects around the world have taken up the challenge to transform such conflicts into cooperation. They

observe that in order for this to be possible, the projects should aim at the participation of local communities in the protection and management of conservation areas as well as in the potential sustainable benefits from conservation.

Newmark (1993) and Infield (1986) point out that historically law enforcement has been the primary means used by protected area managers to resolve conflicts with local people, but further argues that the techniques have proved to be inadequate and often inappropriate in Africa.

The local communities surrounding protected areas have generally been left out of conservation planning. They have been alienated by conservationists denying them access to resources which have been traditionally harvested for food shelter and medicine (Infield, 1986).

Hough (1988) reviewed several obstacles to cooperation between the parks and surrounding human communities in developing countries today; these include:

- (i) institutional environment of national parks.
- ii) lack of trust between national park authorities and local people
- (iii) difficulties in communication between park management and surrounding communities.
- (iv) the number of actors involved
- (v) difference in power between the interested parties.

(vi) difficulty of enforcement of protected area - local agreements.

Newmark (1993) points out that strategies to involve local people in the planning process, provides them tangible benefits and empowers them to manage their own natural resources. McNeely (1989) observes that while tourism is an important function of natural parks, it is a weak justification for people living around the park if they are not benefiting in any way other than preservation of a resource.

Olivier (1992) basing on findings in Murchison falls National Park argues that one of the basic platforms for the effectiveness of a park's management plan, is the recognition and encouragement of real appreciation of the park at both local and national level. He further notes that in the final analysis Murchison Falls National Park will not survive intact unless careful selected target groups are successfully inculcated with a genuine understanding of the parks value to the nation.

Furthermore, Parkipuny (1991) with reference to Serengeti national Park, observes that there is a growing awareness of the disastrous consequences of a reckless approach to development and the limitation of conventional wildlife preservation. He notes that, it is increasingly realised that the solution to the problem of conservation is not to strengthen the power of the authorities against local communities. On the contrary the solution lies in planned integrated management geared to

harmonise the conservation of biological resources with the need to overcome poverty and backwardness among the local inhabitants. He further comments that such an approach will not only help to restore vital community support for the existing areas, but will help to mobilise support for the reaction of new integrated management areas, along the lines of biosphere reserves.

In Lake Mbuoro National Park, the need for community participation was realised in 1989 and the Lake Mbuoro Community Conservation Project (LMCCP) was therefore set up to create more positive attitudes towards the park amongst the local communities and involve them in the conservation of protected areas.

Marquardt, et.al (1994) reveals that LMCCP was set up in response to what was perceived as a crisis in the conservation status of the park. They also note the need to work with local communities to alter the apparently negative attitudes held by local people towards the park.

Infield (1992) observes that Lake Mbuoro National Park is a classic example of what can go wrong when the authorities think only about protecting wildlife and ignore the needs and feelings of the local people. Several hundred people were driven from their homes to establish Lake Mbuoro National Park. The people were not consulted about the creation of the park or compensated for the loss of their homes and land. Nor was any real attempt made to explain to them what conservation was or what

the intention of the government was. He finally observes that the relationship between the park authorities and the people remains one of conflict and suspicion and there are grave fears that the entire area could still be lost to conservation. Tindigarukayo and Turyatunga (1993) point out that in order to harmonise the wildlife conservation with the communities around the park, the government and the park management in particular needs to adopt an approach that seeks to popularise conservation as a productive alternative land use method. This can best be achieved through community education, mobilisation and involvement of the values attached to wildlife and its conservation. The local mans position of tangible benefits should be clearly defined.

2.3.2 Resource Use Conflict between Wildlife and Livestock

Riney (1967) comments that the conflict between wildlife and cattle includes some of the most explosive land use situations in Africa today. Wildlife competes with cattle for food and they bring diseases into valuable domestic herds. In order to keep wild animals away from domestic animals programmes for shooting out wildlife or fencing off huge areas have taken place in many parts of Africa. Fences in particular are very expensive to erect, they decimate animal populations whose migration routes they cross and are fairly quickly damaged. He cites an example of Botswana, where

£60,000 in fencing is said to be destroyed annually by game and large numbers of wild animals have been killed by fences.

In Lake Mburu National Park, Monday (1991) mentions that the greatest threat to animal diversity in the park is the existence of very high numbers of cattle within the park. He observes that although cattle and wildlife can co-exist up to a certain point, if cattle densities rise above a certain threshold, wildlife is negatively affected. He also notes that over significant parts of the park, especially in the western hills, large mammal populations appear to be much reduced probably due to the presence of high cattle densities and high levels of human activity including cultivation. He also observed that some of the parks species like roan antelope are more sensitive to disturbance than others and these are the populations that seem to be currently in decline.

Furthermore he notes that for the majority of the pastoralists who are living a largely traditional life, subsisting on milk and occasionally selling their cattle to meet specific cash requirements, the park is perceived as a considerable problem. In almost all cases the negative attitudes arise from real conflicts between the demands of the cattle and the demands of the park. The pastoralists are denied access to the grazing resource contained within the park. Lack of access to water is probably the single most important cause of conflict and resentment against the park

authorities. The park contains much of the areas where there is permanent water and pastoralists would like unrestricted access to this resource especially during the dry season. The silting up of many valley dams around the park has aggravated this problem and it is a fact that these sources are not adequate to supply the demand for water throughout the year.

On the effect of pastoralists to the park, Monday still notes that the concentration of pastoralists and their herds in the areas has resulted in extreme pressure on the grazing land which in turn results in more pressure on the park and thus increased conflicts.

Muhwezi (1994) comments that grazing as a method of rangeland management in Lake Mbuoro National Park is considered unsuitable in the short term because current park management priorities include eliminating livestock from the park. He observes that employing grazing as a management tool might cause confusion amongst local pastoralists and lead to increased incursions of livestock.

In the report by GAF Consult (1993), According to the GAF Consult report (1993), it is stated that wild game depends on rangeland as much as livestock. The two types of animals co-exist freely even in a pastoral situation without any party being the loser. It is only when the balance in the land use equation is tipped in favour of man that the wild game is

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branded the culprit.

The report further notes that, the soils are under serious threat of sheet and gully erosion especially along cattle tracks, hill slopes and around water sources. The report states that in reality the national park is still a contested area and as a result of this the park and its environs are experiencing unprecedented high rates of range deterioration and environmental instability due to the pressure from overgrazing and the accompanying soil erosion. More so, soil degradation has been aggravated by burning the already overgrazed areas. Burning results in soils losing nutrients through volatilization (process by which soils lose nutrients by heat and evaporation), fire also leads to biological degradation; organic matter and living organisms die off, hence the rate of decomposition and soil fertility reduces. At stake, therefore is the very unique and rich biodiversity in the area, the immense tourism potential and the survival of the communities in and around the park.

However, Tindigarukayo and Turyatunga (1993) argue that the nomadic pastoral people in the Mburo area have a traditional landuse right to as much level as do the wildlife with which they have co-existed since time immemorial. On a similar note, Heady and Heady (1982) argue that domestic livestock and wildlife animals have co-existed on rangelands in Africa and the Arabian peninsular over many years. They note that these

ranges have survived mixed grazing and it is now becoming recognised that this practice does not damage the land under careful controlled management. They further add that in order to avoid over use, any common use of rangeland must be carefully evaluated and the numbers of all species closely controlled. With increased research they argue, it is possible that other wild animals could be domesticated and game ranching made possible and profitable. Wild species can be tamed and managed the same way as domestic livestock, as exemplified by a successful pilot scheme which has been carried out in Zimbabwe with the eland (*Taurotragus oryx*). In Kenya, Laikipia district, ranches have successfully reared wildlife like ostriches, guinea, fowls, crocodiles and frogs whose meat and skins are sold (Elliot and Muthoni, 1997). However, it should be noted that the choice of particular species is also affected by family or community tradition.

Kamugisha and Stahl (1993) observed that the cattle keepers currently perceive a need for the water resources of Lake Mbuoro for survival of their livestock. As long as this continues to be the case, the surrounding park is bound to be invaded. The pastoralists argue that the area was formally their traditional grazing land hence they have a right to graze in the area (Kalekyezi, 1982). This creates a source of constant conflict between the park and the people.

Kasoma and Kamugisha (1993) note that in Lake Mburo area overgrazing has resulted in reduced productivity and land degradation. The extensive soil erosion associated with overgrazing has contributed to the silting up of most valley tanks and dams which had been constructed in the area. All this has created a scenario in which the rangeland outside the park has declined in productivity and water for livestock has become scarce, particularly in dry seasons. This has made Lake Mburo National Park contrast sharply with the surrounding land and extremely attractive to pastoralists for both pasture and water.

On the issue of wildlife-cattle co-existence, they note that an appropriate mix of cattle and variety of other large herbivores could ensure an optimum utilisation of the primary productivity. Locally it would be necessary to identify those species that are compatible with the type of land use around the park, study their life histories and develop strategies for ensuring the survival of their habitats as well as a mechanism of managing and utilising them sustainably .

Conservation and development interests have appeared incompatible if not in direct conflict (Schonewald-Cox, 1991; Wells, et.al, 1990; Hough, 1988; Weber 1989). This problem has been especially acute over years, as developers view natural resources (like forests, wetlands) in terms of their potential economic value, while conservationists attach a whole set

of different values to natural resources in their attempts to preserve resources. As a result Weber (1989) states that the two activities, use or protection, have often been perceived as mutually exclusive.

However, more recent literature indicates potential compatibility between conservation and development, Repetto and Gillis (1988), Wells, et.al (1990) observe that biodiversity will be impoverished without shaping land use in a form that preserves it, and that economic development will be hindered and eventually reversed if it omits the kind of environmental policy which seeks to conserve the biodiversity. Conservation is inseparably linked to future of economic development by a form of mutualistic symbiosis, (Wilson, 1989).

Weber (1981) described two central tenets comprising this emergent paradigm of mutual complementarity. He first acknowledged that before local people can be expected to support conservation activities, they must first attain a certain level of development (that is satisfy basic socio-economic needs). The second stated that without a reliable base of natural resource on which the local people are dependent, development or standard of living improvements will not occur.

However, while conservation and development have begun to be perceived as compatible, the implementation of successful programme remains extremely difficult and the effective integration of

these two efforts virtually impossible. Meshing conservation and development has proved especially difficult when trying to secure widely distributed benefits for people living in or near areas, who may have made a livelihood from park resources in the past (Healy, Pers.Comm.)

With this background, it is noted that wildlife conservation and its appreciation by the local community, is faced by various problems which make the whole process a complex one. This reveals the need for more landuse studies and landuse planning for specific rural areas. It is out of this need that the researcher examines the landuse conflict between pastoralism and wildlife conservation in Sanga Sub-county. The study analyses the relationship between pastoralism, the environment and wildlife conservation in a fragile range land eco-system in order to reduce environmental degradation and at the same time achieve sustainable economic development of the area.

CHAPTER THREE

3.0 METHODOLOGY

3.1 INTRODUCTION

This study was done by reviewing and evaluating the existing studies, on the history of land use and land use conflicts, especially between pastoralism and wildlife conservation. A historical survey carried out by the researcher led to an in-depth analysis and understanding of the nature of the conflict; its causes and effect on the environment.

During the study, information and data was collected on various subjects using both primary and secondary sources.

Secondary data sources were used to collect information on:

- Trends in land use
- Evolution of land use conflict
- Demographic data

The primary data source was used to collect information on the peoples attitude and perception towards conservation.

While both primary and secondary data sources were used to collect information on:

- Environmental issues
- Conservation issues
- Grazing patterns
- Governments (park authority) policy towards pastoralism

3.2 RESEARCH DESIGN

Considering the purpose, objectives and hypotheses, the design for this study is multi-faceted in nature. The plan and structure of the investigation was a combination of different research designs.

The multi-faceted design of this study was both quantitative and to some extent qualitative, and both empirical and perceptual. The research mainly presents the data empirically, while some of the data was generated from peoples perceptions. It should, however, be noted that in this report, the findings are presented generally therefore it might be difficult to differentiate where the quantitative or qualitative, empirical or perceptual presentations begin and end.

3.2.1 Survey

The basic design for this study was a survey, in which self reported data was collected from a sample to describe environmental issues, pastoralism as a land use form, its conflict with wildlife conservation and development issues. It involved asking 105 general land users questions which were related to the research problem; the main aim being to relate the problem to the peoples attitudes and perceptions.

The survey that was used in this study is a cross sectional survey. This survey collected information from a random sample that has been drawn from a pre-determined population (Opolot, 1993). The information

collected from the sample was therefore from a cross-section of people as indicated in Section 3.3.

3.2.2 Correlational Design

This study examines the relationships between various dependent and independent variables. Correlation statistical research methods (for example, Spearman rank correlation co-efficient method) were used to determine the degree of relationship existing between different variables such as land use, resource use, environmental conservation and peoples attitude and perceptions towards conservation.

3.3 THE SAMPLE AND SAMPLING METHOD

In this study the target population were pastoralists in the northern parishes which border with the national park. A member of this target population had to be a person with a household under his jurisdiction, independent of others.

Due to limited time and resources available, the survey was based on a sample from four (4) parishes (see map 2.3) which were in a 10 kilometre radius from the park boundary. These parishes were chosen for various reasons including, land use patterns, extent of pastoral activity, road accessibility and their marked differences in pastoral population density.

In this study the sample or the research subjects consisted of three categories. The first category consisted of 120 randomly selected people (with cattle and carrying out open grazing). Each parish was stratified into two sample areas, one bordering the park in a distance of 0 - 5 kms and the other in a distance of 5 - 10 kms from the park. A stratified random sampling method was then used to obtain at least 10 respondents from each sample area as shown in table 4.8. Members of this category responded to a questionnaire directly administered by the researcher.

The second category consisted of 10 pastoralists of above 50 years of age (elders chosen for their historical views and perspectives) who were not covered in the first category. They were selected from the population by use of non-probability sampling method or non-random method. They mainly responded to interview schedule questions administered by the researcher in a face-to face interview.

The third category consisted of village council officials (LCs), religious leaders, park management personnel like the community conservation warden and members of the park management advisory committees, who did not fall in the two categories above. These were located for consultation purposes.

The stratified random sampling procedure was used to select the sample for the first category of respondents. This method was used because it was considered to be systematic and an acceptable scientific

process. The subjects for the second and third categories were located using non-probability sampling methods. This is because these categories of the study population were more or less needed for consultative purposes.

In almost all surveys, some members of the selected sample fail to respond to the research instruments. This may be due to lack of interest in the topic, unwillingness and refusal, absence at home or illness.

Therefore, the researcher had to make a decision about the minimum acceptable sample size before the process of data collection began. For this study the minimum acceptable sample size was fixed at 100 households out of the intended 120.

After the completion of data collection respondent and non respondent members of the sample in each parish were noted as indicated in the table below.

Respondents and non-respondents of the sample

Parish	Respondents	Non-Respondents
Akaku	30	0
Kanyaryeru	26	4
Rwamuranda	28	2
Rwabarata	21	9
TOTAL	105	15

Therefore out of the targeted 120, 105 households contributed. The other 15 were not located mainly because of absence at home and others refused to respond probably because of suspicion that the researcher was 'spying' for the park authorities.

3.4 RESEARCH INSTRUMENTS

The following research instruments were used in this study:

1. Rapid Rural Appraisal (RRA)

Rapid Rural Appraisal was conducted in the communities living around the northern border of the park. This was used to collect information from the local community rather than relying exclusively on pre-established questionnaires.

The RRA technique included among others sketch maps, diagrams, ranking activities and semi-structured interviews with both the community groups and key informants.

Rapid Rural Appraisal was used to obtain information on the community's land use practices, awareness of all conservation and perceptions towards the park relationship with the community. RRA was also important to enable familiarisation with the study area, the local population and their perception about developmental issues and priorities. This method offered a valuable tool in developing a good working relationship that is very important in such an area of conflict over natural

resources, where the local community is very sensitive and suspicious of any stranger carrying out research.

In order to ensure good quality, the data obtained from the various group interviews conducted, was checked and corroborated with information from key informants.

2. A comprehensive land use survey was used in order to assess real biophysical situation in the study area. A wide range of tools and techniques were used to collect information. They included self taken low oblique ground photographs, on ground field survey, mapping and general recording of the existing land use positions.

3. Questionnaire

A questionnaire (Appendix I) was given to the respondents by the researcher to tick the answers chosen or fill in the space provided. Those who could do not read or write were assisted by the researcher. The questionnaire was designed to collect four types of data.

- biographical data including social and geographical background of the household, education level, socio -economic data like main economic activity.
- Pastoral activities, including, grazing areas, objectives of rearing cattle and land acquisition.

- Respondents knowledge of environmental degradation and soil conservation practices.
- The communities attitude towards conservation, resource use and perception of the purpose and benefits of the park.

The formal questionnaire interview was administered by the researcher to heads of randomly selected households to fill in their responses. This method was an effective way to enlist the cooperation of respondents. It enabled the researcher ask direct, easily understood questions and made follow up easy.

The questionnaire was translated from English into Runyankore (the local language) by a linguist. The responses were then translated back into English ensuring that they still carried the same meaning.

A check list of statements (Appendix II) was also used to determine the respondents perception of the park and conservation in general. The respondents were requested to state whether they agreed or disagreed with or did not know the statement. Those who remained neutral were indicated by the 'No response'.

4. Interview Schedule (appendix III) was a set of questions used to enlist oral responses concerning the inner dynamics of landuse, environment and conservation issues. The questions verbally were asked on a face to face basis and the responses were recorded by the researcher. This was especially administered to the elders, local council officials,

opinion leaders and park authorities.

5. Consultations and check list of questions were carried out among people knowledgeable about the park, like elders, members of the Park Management and Advisory Committee (PMAC), Community Conservation Project (CCP) and with academicians especially those who have done research in the Lake Mbuoro National Park.

3.5 RESEARCH PROCEDURE

This section briefly discusses the what, when, where and how this study came to what it is.

The idea of the researcher was to have a study that could be conducted in a marginal fragile environment. It is from this that the research problem was identified, conflicting land use in and around Lake Mbuoro National Park Sanga Sub-county, Mbarara district.

After identifying the research problem, review of related literature was carried out on the general land use conflict in Nyabushozi county in particular. A research proposal was then compiled and presented for approval. An introductory letter was secured from the Head of Geography Department Makerere University (Appendix VII). It explained the purpose of the research and requesting for every assistance needed for the success of the research study.

Field research work started in December 1996. The first task in the field was to prepare the sample frame and carry out a general landuse survey. The second task was carrying out a sample survey using a questionnaire which was administered to 105 people. Consultations were also carried out with elders and other people knowledgeable about the area of study.

Compilation of the data collected from the field and its analysis began in February 1997. During this time, the expansion of the literature related to the research problem was also done. The process of data compilation and analysis was done manually. This was dictated by the financial position of the researcher. As a result, compilation and analysis of the data took a lot of time. The writing of the report began in April 1997.

CHAPTER FOUR

4.0 RESEARCH FINDINGS

The research findings are mainly organised in six sections; land issues, land use, resource use, effect of pastoralism on the environment, attitudes and perceptions of the people towards community conservation. This was in line with the objectives and hypotheses of the study.

4.2 LAND ISSUES

The land issues covered in this study includes land crisis, land acquisition and land tenure.

4.1.1 Land Crisis

The land crisis in the Lake Mburo area can be well explained from the general land crisis in Mbarara district as a whole. In pre-colonial Uganda, most land was held under customary ownership. Population was still low, and there was enough land especially for an activity like pastoralism. The Ankole - Masaka dry corridor (where the study area lies) formed the major traditional grazing ground reserved for the kings of Ankole in 1800's (Kalekyezi, 1982).

However, during the colonial and post colonial period there were changes in land ownership and land use. These changes greatly affected

the pastoralists . During colonial times land ownership began to be individualised especially since the 1900 Buganda agreement. However, in Ankole , where Mbarara is located, land alienation was a result of 1901 Ankole Agreement. Part of the land was alienated as mailo land to the chiefs of Ankole and the rest was termed as crown land.

In the 1960's private land ownership was becoming common and the communal lands were grabbed by the influential and rich people, leaving the poor who could not afford land, especially the pastoralists with less land (Kafureka, 1992). More so in 1960 a big area was alienated for ranching and this pushed mainly pastoralists on to the margins of the ranches. They were not the kind of people to be considered to run ranches; therefore the pastoralists resorted to occupying the Lake Mbuoro area. In accordance with the Uganda Game Act of 1964, 650 km² of the Lake Mbuoro area was declared a game reserve. Some cultivators and cattle herders living in the area at the time were allowed to remain under agreed conditions and they were given game department permits.

After the 1975 land reform Decree, because of further grabbing of whatever remained of the communal lands, many people were further pushed into these reserves. Due to increased encroachment on Lake Mbuoro game reserve and the need to preserve the biodiversity, in 1983 the government declared the entire game reserve a National park. All the people, including the pastoralists were evicted from the park and all forms

of previous land tenure, whether traditional or not were effectively terminated. The pastoralists were therefore marginalised that is forced to occupy the margins of the park and quite a number ended up as squatters on ranches.

In 1985, following the National Resistance Army (NRA) takeover of Mbarara district, the evicted people were allowed to go back into the area. They moved back along with hundreds of newcomers and cattle numbers in the park increased rapidly (Appendix V) between 1986 and 1992. The government again attempted to evict the people though this did not work out successively. In order to resolve the land crisis, the Uganda National Parks in conjunction with the Lake Mburo task force degazeted 390km² of the park (approximately 60%) leaving only 260 km² with no buffer zone for the park. Some pastoralists were resettled in the newly formed Kanyaryeru Resettlement Scheme as an option for ending the land use conflict. However most of them were not considered and therefore remained landless at the margins of the park.

With limited grazing land outside the park, the pastoralists have had no alternative other than to encroach on the park. Most of them have resorted to grazing on private land (not fenced) which they view as 'free land' if it is not fenced. Due to reduced grazing land and lack of adequate land, areas surrounding the park have suffered environmental degradation, leaving the park as an island of relative green amidst degraded rangeland.

4.1.2 Land Acquisition and Land Tenure

(i) Land acquisition

In the Parishes of Kanyaryeru, Akaku and Rwamuranda, land was mainly acquired during the setting up of the Kanyaryeru Resettlement Scheme. As revealed in table 4.1 the majority of the people reported that land was acquired from government which allocated each family about 40 acres of land on the scheme.

In the area outside the resettlement scheme, land was generally owned communally. From generation to generation land was utilised by all the people with equal claims over the land and therefore inheritance is the major mode of land acquisition (Table 4.1). However, with individualisation of land and with increasing population, customary system of land ownership has decreased. Purchasing of land is another way in which land is acquired.

Table 4.1: Mode of acquisition of Land

Category	Parish in Resettlement Scheme (%)	Outside Resettlement Scheme (%)
Hired	0	6
Inherited	10	48
Acquired from Government	89	16
Borrowed	1	2
Rented/leased	0	0
Purchased	0	28
	100	100

Source: Fieldwork Research, 1997.

It should be noted that some methods of land acquisition are partly overlapping and partly exclusive.

(ii) Land Tenure

FAO (1971) defines a land tenure system as a systematization of the rules which function by specifying what different classes of persons may or may not, must or must not do, with reference to the occupancy, acquisition, use, abuse or disposition of land.

In the study area land acquisition is highly related to land tenure. Approximately more than 70% of the land is held under customary private ownership of land. The basic ownership of land is vested in an individual - normally a family or household head. The right of occupancy and use is mainly passed on by inheritance.

The rest of the land is under communal tenure and it is mostly associated with grazing land including swamps. However, due to population pressure and increased cattle numbers communal land has reduced and become more less defined.

The field survey revealed that no individual person or household owned land under leasehold (title deed) tenure system. This is mainly because the surveying process is expensive and therefore cannot be afforded by the majority of the local population. In the study area it is only institutions like Lake Mbuo Secondary school which has afforded leasehold titles.

(iii) Land Tenure Insecurity

In this study, Land tenure insecurity refers to a situation where the people are occupying land but they are not certain that it belongs to them in perpetuity.

There is rampant land tenure insecurity in the study area. The resettlement scheme has never been surveyed to acquire a land title. Therefore, individual households can not have titles of their own pieces of land. They only know the boundaries of their land but they have no security of tenure. Therefore, they consider the land as belonging to government not to them. The community attributes the delay in acquiring a Land title for the scheme to poor administration and due to the land surveying process being expensive for individuals who want to have titles for their land.

Outside the resettlement scheme in Rwabarata parish, land tenure insecurity is more rampant. People mainly hold land under the customary land tenure system. After the removal of some of their land during the degazetting of the national park, they no longer feel secure and have lost confidence in the customary land tenure. They wish to get land titles and fence their land. In Rwabarata, six respondents revealed that they had endeavored to apply for land titles but the surveying procedure was too long and expensive. During group interviews, the respondents expressed the fear that since they did not have legal protection over their land, rich foreigners could easily grab it from them. This clearly revealed how the people were not aware of their constitutional rights over the land they were occupying.

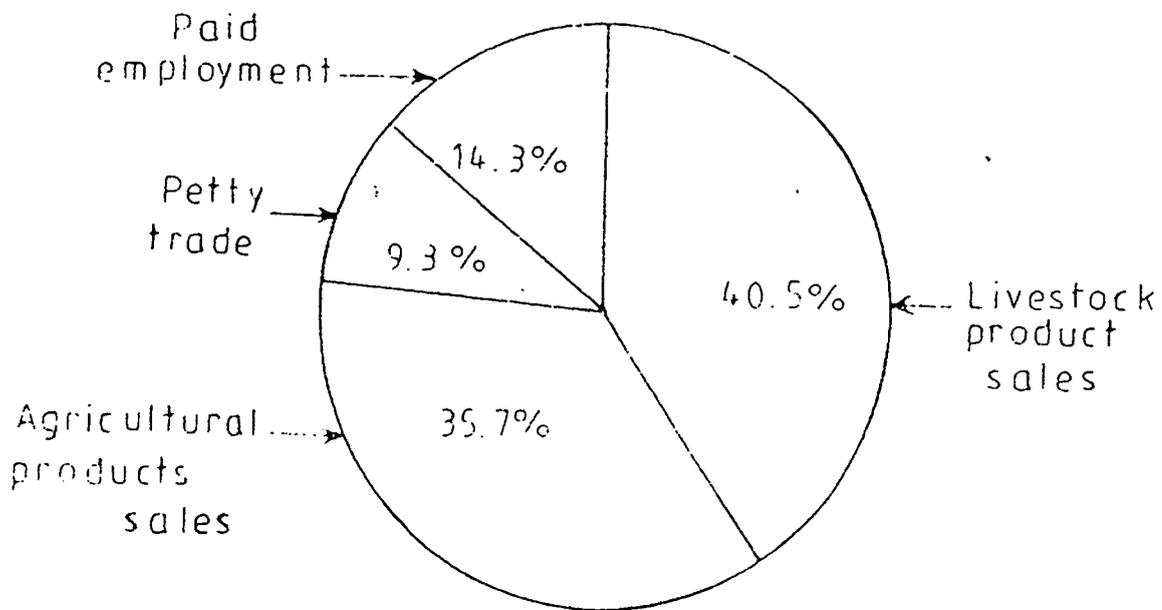
The community in Rwabarata parish blame the government for demarcating land in 1986 without consulting them. They claim that in the process of land demarcation they lost part of their land to the park and to the resettlement scheme, which received more land leaving the community with less land. They also blame the local leadership which has not taken any steps to help solve this problem.

4.2 LAND USE IN AREA OF STUDY

In this study, land use is perceived as the form of land utilisation, that is, man's activities carried out on land directly or as an expression of man's management of the ecosystem in order to meet his needs.

The major types of land use identified are livestock rearing, crop farming, forestry, and settlement. Livestock rearing and crop farming are the major land uses and it is from these activities that most of the local people earn a living as indicated in Figure 4.1.

Fig.4.1 Major Sources of Income



Source : Field Work Research, 1997

The major type of livestock reared are cattle (especially the Ankole long horned), other animals like sheep and goats are reared together with cattle in varying numbers.

Most of the pastoralists are becoming sedentary and they have started growing some crops. Approximately 65% of the households in the study area both own livestock and carry out cultivation. A survey by the researcher revealed that various crops are grown like beans, maize, bananas, millet, sweet potatoes and cow peas, mainly around homesteads

However, crop cultivation is greatly hampered by rampant damage by wildlife, especially wild pigs. This problem is most prevalent in communities bordering the park, where wild animals easily move into the gardens in the surrounding areas.

Forestry is becoming common in this area, though it is still at a small scale level. Eucalyptus trees are being planted with the main aim of getting fire wood for fuel. The trees also provide poles for construction of houses and for construction of cattle kraals. Those with large numbers of trees can sell them to generate income.

4.3 RESOURCE USE

The natural resources considered in this study include vegetation (trees and grass), soils, water and to some extent wildlife animals. Some of these resources are located within the area occupied by the communities, while others are in the park.

The resources utilised by the communities in and outside their areas of occupation include farming land, pasture, water, building wood, firewood, game meat, medicinal plants, fish, thatching grass, papyrus and

weaving material.

The resource needs and their utilisation by the people was examined and the findings are shown in table 4.2 below.

**Table 4.2: Current Resource Use and Desired Resources from Park
(in Percentage)**

Resource	Current Use (%)	Source utilised from the Park (%)	Use if Permitted (%)
Pasture	91	12	32
Water	100	12	30
Building wood	89	2	16
Firewood	99	3	10
Game meat	6	<1	13
Medicine plants	80	4	21
Fish	32	5	12
farming land	87	0	19
Thatching grass	76	<1	6
Papyrus	20	<1	10
Weaving material	48	2	5

Source: Fieldwork Research, 1997.

The percentages of households currently using various natural resources conform to the expectations drawn from general knowledge of the communities surveyed. According to the response the most utilised resources are water (100%), pasture (91%) and farming land (87%) table 4.3. This implies that increased uncontrolled use of these resources will result in environmental degradation as discussed in Section 4.4.

The very low percentages of respondents indicating use of resources from inside the park, seem to indicate the occurrence and availability of most of these resources outside the park. However, from the researcher's survey, it was realised that the sensitivity of this issue may have resulted into under-reporting of the use of resources from the park since the law prohibits them. It therefore suggests that even the percentages of use of water (12%) and pasture (12%) are probably much higher than this. Therefore if the park management authorities are to prevent incursions into the park, the causes behind this issue need to be resolved.

The highest percentages of respondents indicating interest in access to resources from within the park if permitted, were 32% (for pasture) followed by 30% (for water). The above percentages are relatively low and do not tally with the information collected from group interviews where the participants expressed strong desire of having access to resources. The reasons given were that these resources outside the park are either limited or they have been over utilised. The respondents therefore might have under reported in fear of being suspected as enemies to the park. This forms the basis of the conflict over these resources between the pastoralists and the park authorities.

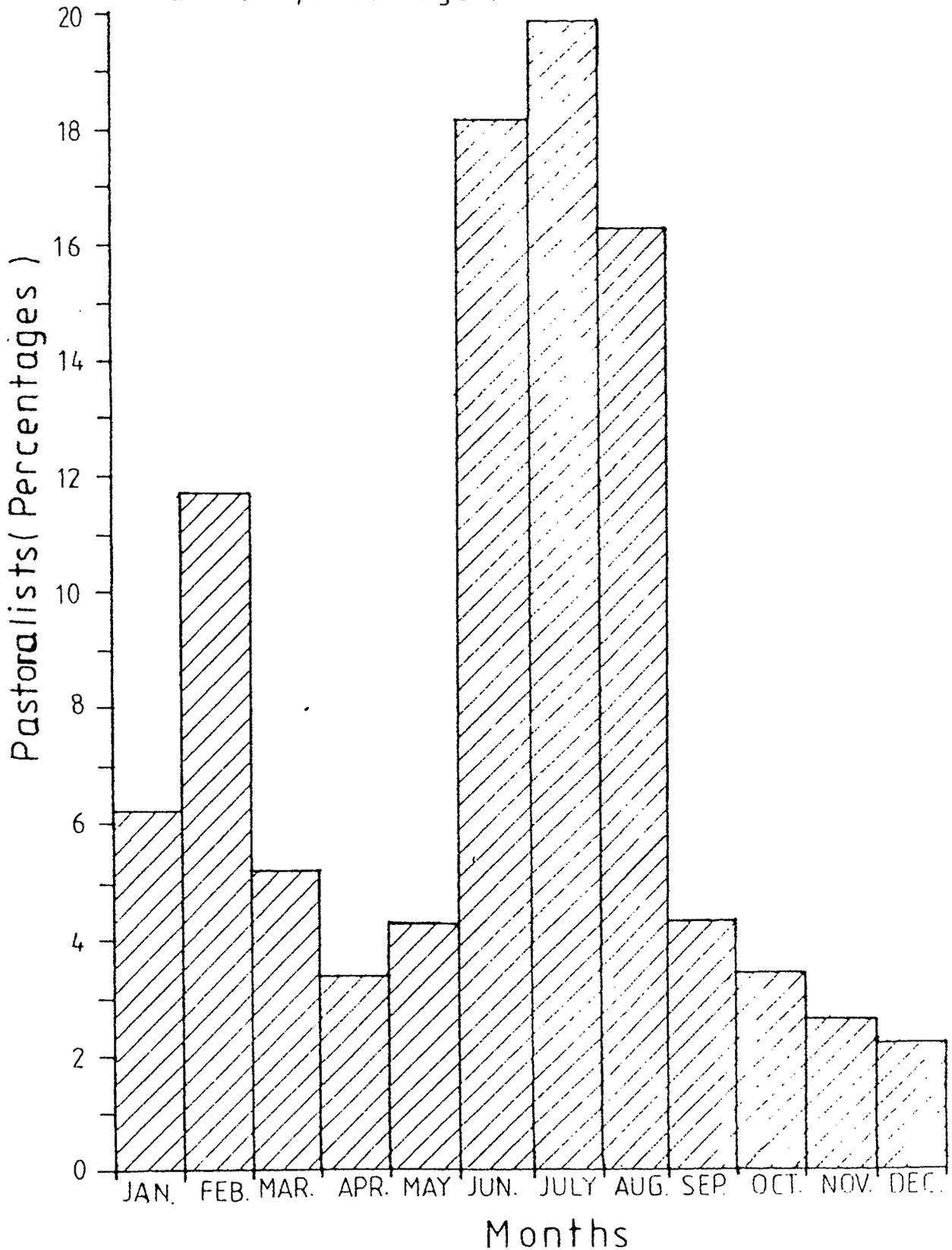
The pastoralists were specifically asked if they grazed from the park and in what months of the year. However, the sensitivity of this issue may

have resulted in under-reporting. The responses are shown in (Fig.(4.2).

As revealed by Fig.4.3 the peaks of grazing in the park are mainly in the dry season that is during the months of June (18.1%), July (19.0%), August (16.2%) and in February (13.7%).

This seasonal incursion in the park is mainly due to the fact that all the permanent water sources are located in the park for instance River Rwizi , Lakes like Mbuho and Bwara, and permanent swamps like Kizimbi. In the dry season, water sources in Sanga sub-county dry up. Therefore, the pastoralists are forced to shift southwards into the park where there are more permanent water sources. This results into conflict for the cattle not only consume water but also other resources like pasture. An estimated 50,000 herds of cattle invade the park every dry season (GAF, Consult 1993). This exerts alot of pressure on the resources leading to environmental degradation as discussed in section 4.4.1.3.

Fig. 4.1 Months of the year when pastoralists graze in the Park (in percentages).



Source: Field Work Research, 1997

More so, the prolonged dry season (which often results in drought) leads to the deterioration of the quality and quantity of the pasture in the areas bordering the park. The situation is further compounded by destruction of the pasture by fire set alight by the people. This leaves the national park as the only area to graze from since it is usually not under intensive grazing, and pasture can still be found around the permanent water sources.

The park authorities have tried out means of giving the local people access to the water sources in the park. For instance in Akaku parish, the community was given an access corridor to River Rwizi in March 1996 for a period of one year ending in March 1997. This was a short term measure put in place, so that the people could find their own solution to the water problem.

The community lobbied for assistance from government for construction of water dams in their area, but they got a negative response. Some people using personal initiative dug wells but these dried up in the dry season. The community later got assistance of Uganda shillings 300,000 to construct a dam, from a non-government organisation called Food for the Hungry International. However, the dam never held any water most probably because of poor site location. Other areas too, like Rwahongera, Katooma and Kyandara do not have suitable sites for dams. This leaves river Rwizi inside the park as the only reliable water source.

During the time of this research the people of Akaku had not found an alternative water source. So they were planning to plead with the park authorities to extend the period for the provision of the water access corridor. However, according to the park authorities, they were not willing to do so. They argued that the pastoralists abused this system. For instance the pastoralists were to only drive their cattle to the river, water them and then use the same route back. Instead, the pastoralists after watering their cattle would start grazing in the park contrary to the agreement. The park's efforts to stop this was perceived by the pastoralists as an excuse for the rangers to harass them and extort money from them. More so the park authorities argue that the environment along the access corridor has been degraded, especially the vegetative cover and the soil. The vegetation has been over grazed, trampled upon, leaving bare ground which has developed gullies as a result of accelerated soil erosion. The park authorities argue that they cannot allow continued access for the local community.

Therefore, left with no alternative, the local community have to illegally enter the park in search of water. This reveals the intensity and gravity of the resource use conflict in the study area.

4.4 THE EFFECT OF PASTORALISM ON THE ENVIRONMENT

There is evidence of environmental deterioration in most parts of the study area. A major cause for this deterioration is the system of livestock keeping which has proved rather conservative. It has tended to preserve conservative traditions and has been reluctant to change to new methods of farming. Pastoralists have tended to look at cattle numbers as a measure of economic and social status. This has resulted into overstocking, overgrazing and eventually rampant soil erosion.

4.4.1 Environmental Degradation

Environmental degradation is a state in which the sustaining capacity of the natural resources like vegetation, soil and water in a given area begins to deteriorate or, it is a state of imbalance between the carrying capacity of the land resources and the consumers.

In Sanga sub-county, environmental degradation is evidenced by the deterioration of vegetation (pasture) and water resources. This is as a result of the high rate of resource utilisation. Pastoralism which is the major land use practice has greatly contributed to environmental degradation. The quantity and quality of the pasture and water resources have been adversely affected by high cattle stocking rates (Table 4.3) which has resulted in overgrazing and eventually bare ground and soil erosion. However, apart from pastoralism other practices like crop cultivation, deforestation

and bush burning (discussed in Section 4.4.1.2) have contributed to environmental degradation. The changing climatic patterns are also responsible for changing and deteriorating state of the natural resources. Prolonged dry season usually creates stress to the marginalised people who cannot cope with the climatic change. Hence this results in over use of the limited resources like pastures and water.

Table 4.3: Expected Cattle Stocking Rates

Parish	No.of Cattle	Land Area in hectares	Stocking Rate Hec /cattle
Akaku	9752	2989.12	0.3
Kanyaryeru	5373	6228.38	1.2
Rwamuranda	12410	4598.80	0.4
Rwabarata	7015	19758.86	2.8

Source: Computed from Veterinary Department records, Mbarara District, 1997.

As shown by the stocking rates in the table above, it is realised that there is less land available for each head of cattle. Therefore the chances are higher for these areas to be overgrazed. The recommended stocking rate by Ministry of Agriculture in 1991 is one cow per two hectares. In the study area it is only Rwabarata parish which is above the recommended stocking rate.

However, it should be noted that this data is very approximate. Because, use of total land area presupposes that all the land is available for livestock grazing, which is not true, given the fact that other forms of land use like crop cultivation occupy part of the land. Therefore the land

actually available for livestock is far less than what has been used in these calculations, hence the actual stocking density is higher. This also means that the environmental implications like overgrazing and soil erosion are much higher.

Poor land management in such a fragile ecosystem has aggravated the situation. It was observed by the researcher that the soils found in overgrazed lands are hard and compact, possibly due to the compaction of soil by the hooves of cattle. This has reduced the infiltration rate hence increasing surface run off which has accelerated soil erosion (Plate 4.1).

The mismanagement of land resources in the study area, is as a result of the failure of the existing socio-economic systems to adequately manage the resources in such a fragile semi-arid eco-system. This has been due to lack of land use planning at district and village level to address local problems on the ground. The broad National planning imposed on the people using the top-down planning approach has failed to involve the people in solving the problem of land mismanagement. This may be explained by the apparent lack of alternative land use methods, lack of modern scientific methods of livestock rearing and low standards of living.

Therefore the area is experiencing unprecedented increasing rates of range deterioration mainly as a result of over grazing, erosion and bush burning.

4.4.1.1 Soil Erosion

Soil erosion is widespread in the study area. The soils are under

serious threat of sheet and gully erosion, especially along cattle tracks, hill slopes (Plates 4.1 and 4.3) and around water sources where large numbers of cattle concentrate especially in the dry season. The high stocking density of cattle in these areas is largely responsible for the deteriorating conditions of the environment.

When the respondents were asked about the awareness of soil erosion in their area, the majority (68%) recognised that the area had a soil erosion problem, 42% said they had been aware of the problem for more than four years, 26% stated that soil erosion has existed for one to four years period while 32% pointed out that they were unaware of the soil erosion problem in their area.

Those who were aware of soil erosion mentioned various causes as summarised in Table 4.4.

Table 4.4: Primary Causes of Soil Erosion

Primary Cause	Frequency	Percentage
Overgrazing	28	19.2
Overstocking	24	16.5
Erosive rains	30	21.0
Bush burning	17	12.0
Slope gradient	27	18.6
Improper cultivation on steep land	15	10.2
Do not know	4	2.5
Total	145	100%

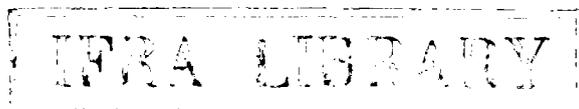
The largest number of respondents (21.0%) attributed the primary cause of soil erosion to erosive rains, followed by overgrazing (19.2%) and over stocking (16.5%). 18.6% cited slope gradient, 12.0% cited bush burning and 10.2% improper cultivation on steep land as the causes of soil erosion, 2.5% responded that they did not know the cause. However the respondents argued that the factors beyond their control like erosive rains and slope gradient were the root causes of soil erosion.

The majority of the respondents (50%) observed that for the last five years soil erosion has been increasing, while 23.7% observed that it has remained constant and 26.3% observed that it was decreasing. The reasons given by the respondents for the increase in soil erosion were: increasing number of cattle, overgrazing and reduced land for grazing as a result of increased crop cultivation.

In order to analyse the effect of pastoral activities on the environment, an investigation was carried out to find out if there was no relationship between gullies and cattle numbers.

It was hypothesized that NO RELATIONSHIP EXISTS BETWEEN THE NUMBER OF CATTLE AND THE NUMBER OF EROSION GULLIES.

In order to test the above null hypothesis physical counting and measuring of the gullies was done with the help of a base map of Sanga sub-county and the data on the number of cattle were collected. In order



to determine the depth and width of the gullies, the researcher measured all the gullies in each Parish, then computed the average. This is what was recorded and used in determining the findings are indicated in Table 4.5.

Table 4.5: Approximate number of cattle, gullies, average depth and width of gullies

Parish	Number of Cattle	Number of Gullies	Average width and depth of gullies in cm	
			Width (cms)	Depth (cms)
Akaku	9754	12	90.7	92.6
Kanyaryeru	5273	8	50.4	50.3
Rwabalata	7015	11	125.4	21.7
Rwamuranda	12410	14	130.8	75.0

Source: Veterinary Department, Mbarara District and Field Research, 1997.

The Spearman rank correlation co-efficient (r_s) was used to test the above null hypothesis at 0.05 level of significance. The two variables to be correlated were the number of cattle and the number of gullies.

$$r_s = 1 - \frac{6 \sum d^2}{n^3 - n}$$

Where r_s = Spearman's Correlation Coefficient

d^2 = Square of deviations

n = Number of pairs

Hammond et.al ('970), p.224

The Spearman correlation coefficient was then calculated.

Table 4.5(i)

Parish	No. of Cattle (x)	No. of Gullies (Y)	X	y	d x-y	d (x-y)
Akaku	9754	12	2	3	-1	1
Kanyaryeru	5273	8	4	4	0	0
Rwamuranda	12410	21	1	1	0	0
Rwabarata	7015	14	3	2	1	1

$$\Sigma d^2 = 2$$

$$\Sigma d^2 = 2$$

$$n = 4$$

$$\text{Therefore } r_s = 1 - \frac{6 \times 2}{4^3 - 4}$$

$$r_s = 1 - \frac{12}{64 - 4}$$

$$r_s = 1 - \frac{12}{60}$$

$$r_s = 1 - 0.2$$

$$r_s = +0.8$$

The value above indicates that there is a positive correlation between the number of cattle and the number of gullies. This means that the more the number of cattle the higher the number of gullies. At 0.05 level of significance, the critical value of r_s for 4 sample pairs is 1.000. With $r_s = 0.8$, the null hypothesis is rejected because it is less than the critical value of 1.000. This confirms that there is a significant positive correlation between the number of cattle and the number of gullies.

The above finding is in agreement with the view of the respondents when they were asked if the increase in the number of livestock lead to increase in soil erosion. 21% strongly agreed, 45% agreed, 8% were undecided, 21.1% disagreed and only 5.3% strongly disagreed. Thus the majority (66%) agreed that increased numbers of cattle led to increased soil erosion.

The coefficient of determination was then calculated to show the percentage contribution of cattle to formation of erosion gullies.

$$\begin{aligned}
 &= (r_s)^2 \times 100 \\
 &= (0.8)^2 \times 100 \\
 &= 0.64 \times 100 \\
 &= 64\%
 \end{aligned}$$

This means that the number of cattle accounts for 64% of the number of gullies found in the study area. This is why most gully erosion was localised along cattle tracks as revealed from the field observations in plate 4.1. The number of cattle therefore is to a large extent a good index to measure soil erosion severity in the area. This is confirmed by fact that the Parishes of Akaku and Rwamuranda, with high cattle stocking rates, are also the ones with a high density of gullies. The rest of the percentage (36%) is accounted for by other factors like erodibility of the soil, slope gradient and poor crop cultivation methods.

In order to fully understand the correlation between the number of cattle and the erosion gullies, the study went further to investigate the correlation between the number of cattle and the depth and width of gullies.

The spearman rank correlation coefficient (r_s) was used to determine the relationship between the number of cattle and the width of the gullies at 0.05 level of significance.

Table 4.5(ii)

Parish	No of Cattle (X)	Average width of gullies (Y)	X	Y	d X - Y	d ² X - Y
Akaku	97554	90.7	2	3	-1	1
Kanyaryeru	5273	50.4	4	4	0	0
Rwamuranda	12410	130.0	1	1	0	0
Rwabarata	7015	125.4	3	2	1	1

$$\sum d^2 = 2$$

$$\sum d^2 = 2$$

$$n = 4$$

$$r_s = 1 - \frac{6 \sum d^2}{n^3 - n}$$

Therefore

$$r_s = 1 - \frac{6 \times 2}{4^3 - 4}$$

$$r_s = 1 - \frac{12}{64 - 4}$$

$$r_s = 1 - \frac{12}{60}$$

$$r_s = 1 - 0.2$$

$$r_s = +0.8$$

At 0.05 significance level the r_s value obtained above indicates that there exists a significant positive correlation between the number of cattle and width of the gullies. This implies that "the higher the number of cattle, the wider the gullies will be in a given area". Relating to the field data, it is indeed parishes with large number of cattle that have wider erosion gullies like in Rwamuranda.

The co-efficient of determination was then calculated to determine the percentage contribution of cattle towards the width of the gullies.

$$= (r_s)^2 \times 100$$

$$= (0.8)^2 \times 100$$

$$= 0.64 \times 100$$

$$= 64\%$$

This reveals that the numbers of cattle account for 64% of the width of the gullies. The remaining percentage (36%) can be attributed to factors like the amount of surface runoff, mode of movement of cattle and density of the vegetation cover. This explains why a parish like Rwabarata which has fewer cattle than Akaku has wider gullies.

The study also examined the correlation between the number of cattle and the depth of the gullies. The spearman rank Correlation coefficient was used.

Table 4.5(iii)

Parish	No. of Cattle (X)	Average depth of gullies (Y)	X	Y	d X-Y	d X-Y
Akaku	9754	92.6	2	1	1	1
Kanyaryeru	5273	50.3	4	3	1	1
Rwamuranda	12410	75.0	1	2	-1	1
Rwabarata	7015	21.7	3	4	-1	1

$$\sum d^2=4$$

$$\sum d^2=4$$

$$n = 4$$

$$r_s = 1 - \frac{6 \sum d^2}{64 - 4}$$

$$\text{Therefore, } r_s = 1 - \frac{6 \times 4}{64 - 4}$$

$$r_s = 1 - \frac{24}{60}$$

$$r_s = 1 - 0.4$$

$$r_s = +0.6$$

The value above reveals that there is a positive correlation between the number of cattle and the depth of the gullies. However, it is less significant. This is revealed when the coefficient of determination is calculated.

$$\begin{aligned} & (r_s)^2 \times 100 \\ &= (0.6)^2 \times 100 \\ &= 0.36 \times 100 \\ &= 36\% \end{aligned}$$

This indicates that the number of cattle accounts for only 36% of the depth of the gullies. It therefore means that the other factors (apart from the number of cattle) are largely responsible for the depth of the gullies. These factors include concentrated surface runoff which accelerates vertical erosion hence deepening of gullies. Another factor is slope gradient. It was noticed by the researcher that gullies develop more on steep slopes (Plates 4.4 and 4.5) than in the lowlands. This partly explains why Akaku Parish (which is hilly) with relatively low number of cattle has deeper gullies than Rwamuranda with high number of cattle. Other factors responsible for depth of gullies include mode of movement of cattle, soil erodability and vegetation cover.

The presence of wide and deep gullies in the study area indicate the intensity of the soil erosion problem. The high intensity of soil erosion especially on hill slopes has resulted in huge amounts of sediment yield on

the valley floor. Brown coloured over land flow is a common phenomenon in the area especially after a rain storm (Field research observation). This indicates that there is a lot of soil sediment carried in the over land flow as a result of soil erosion. This sediment has led to silting of water bodies, hence affecting their water holding capacity, especially the shallow ones, like wells.

4.4.1.2 Effect of Burning on the Environment

Burning as a traditional method of pasture management is commonly used in the study area. Generally the vegetation in the whole of Nyabushozi county can be regarded as a fire sub climax. The majority of the respondents (66%) accepted having noticed burning in their area and in the park. However, a high percentage (81.1%) denied practising burning, may be because of the fear of the law which prohibits burning. Asked on how the fires started, most of them suggested that fires were mostly accidental.

In reality, most of the fires are set by pastoralists and sometimes by hunters who poach in the park. This practice is carried out every dry season, at least twice a year. Burning is intended to elicit fresh grass for grazing, at the beginning of the wet season. More so, this practice releases nutrients for immediate uptake by plants and it may also control encroachment of bush and pasture weeds in a rangeland. However, the

above advantages can only be achieved through controlled burning which has been tried. In Murchison Falls National Park, Queen Elizabeth National Park and Kidepo National Park, with varying degrees of success.

In the study area, there being no local fire management policy, fires are set haphazardly and large areas burn except those which are now so degraded that they cannot support any fire. Therefore burning has adversely affected the environment, especially the vegetative cover and the soils. The respondents were aware of both the advantages and disadvantages of burning as indicated in Table 4.6.

Table 4.6: Effects of Burning on the Environment

Effect	Percentage
Leads to growth of fresh grass	10.7
Controls ticks	20.0
Leads to soil erosion	28.3
Spoils the soil and leads to loss of fertility	38.0
No Effect	3

Source: Fieldwork Research, 1997

After repeated burning the community in Sanga sub-county has realised that it has negative effects in the long run. The majority of the respondents indicated that burning spoils the soil and leads to loss of fertility (38.0%). 28.3% indicated that it leads to soil erosion. This view was also revealed by respondents in table 4.4.

Burning mainly affects the quality and quantity of the pastures. Fire affects the plant biomass structure, nutrient content, plant palatability and availability. In Sanga sub-county *cymbopogon nardus* (omutete) which is fire resistant grass, is rapidly spreading in the grazing land because of frequent burning which has less effect on it but has reduced the rest of the other plant species diversity. This grass is unpalatable both to wildlife and livestock, therefore the grazing land is under threat of being covered by this pasture weed as burning becomes more frequent.

As a result of burning, soil erosion has been accelerated in Sanga sub-county. Towards the end of the dry season all the vegetative cover is set alight, leaving the ground bare. When the rains begin the soils are subjected to direct rain drop impact and heavy overland flow, leading to increased soil erosion. It was observed that areas subjected to frequent burning have short scattered grass (Plate 4.2) and therefore highly affected by soil erosion.

Therefore with increased human and cattle population the study area is in rapid transition, and the environment is being degraded. The grass height has become shorter, fires more frequent, number of trees have reduced, unpalatable thorny thicket of acacia species are spreading and the amount of bare ground is increasing. The soils are becoming more compact and less permeable, leading to increased soil erosion.

4.4.1.3 Effects of Pastoralism on the Park's Ecosystem

Most of the pastoralists in the study area, especially those living near the park, graze and water their cattle in the park. This has formed the basis for the resource use conflict between pastoralism and wildlife conservation. The encroachment on the park is increasing as the rangeland outside is continuously being overgrazed and degraded. This has left the park in sharp contrast with the surrounding land.

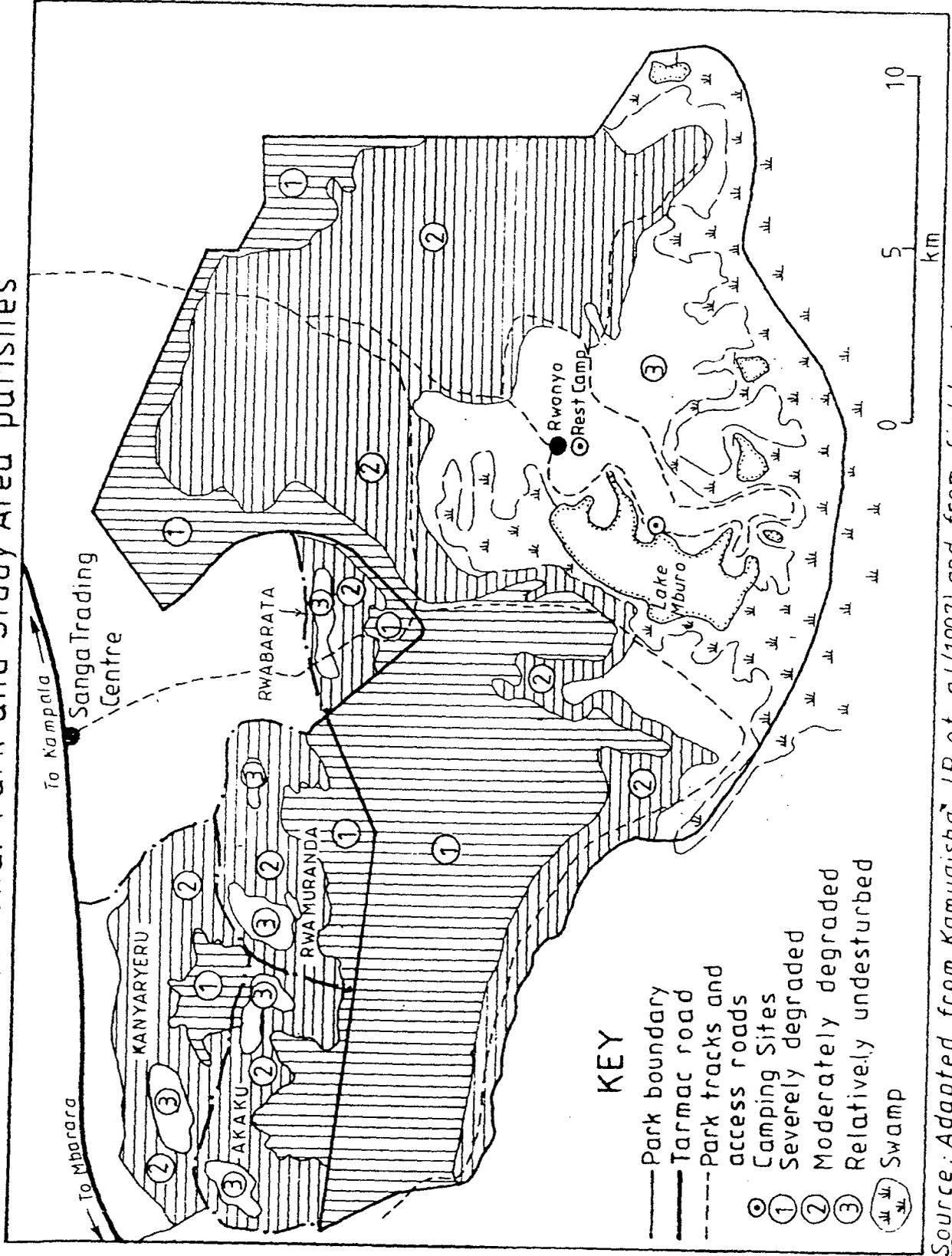
As earlier discussed in Section 4.1.2. the pastoralists faced with land shortage and land tenure insecurity, view the park as a communal grazing area. They argue that since wild animals move out of the park and graze from their land, and drink their water, then it is also right for them to be allowed to graze and water their cattle from the park. The park authorities realising the need for resource sharing had allowed the pastoralists access to water sources. The authorities later discontinued this access because of overgrazing and soil erosion along the cattle corridor. (as discussed in Section 4.3)

In the northern part of the park, cattle and some wildlife animals in the area do interact very closely, especially with the wild animals like buffalos and Impala whose requirements are similar to those of cattle. However, this co-existence has with time led to environmental degradation

(Map 4.1) due to the high and increasing numbers of cattle in the park, especially in the dry season.

The presence of cattle in the park obviously conflicts with the park management objectives, which among others include the conservation of the park's biodiversity . Therefore, the park authorities do not allow pastoralists to graze in the park, if they do and they are arrested by park rangers they are fined Uganda shillings 50,000. However, this has not deterred pastoralists from grazing in the park. They argue that without water and pasture in their areas, they have no alternative but to enter the park illegally, even if it means to be beaten by the game rangers, which they claim often happens.

Map 4.1 Approximate extent of degradation of Lake Mburo National Park and Study Area parishes



Source: Adapted from Kamugisha JR. et al. (1997) and from fieldwork research (1997)

PLATE 4.1

SEVERE OVERGRAZING AND EROSION



Photo taken from Rwamuranda Parish

NOTE: 1. The large extent of bare ground in the middle and
fore ground.

2. Developing gullies in the middle ground caused by
cattle movement and soil erosion.

PLATE 4.2: BUSH BURNING.



Photo taken from Rwabarata Parish.

- NOTE: 1. Short scattered grass in the middle and fore
ground.
2. Cattle grazing on young grass in the burnt area
which increases environmental degradation

PLATE 4.3: EROSION.



Photo taken from Rwamuranda Parish.

- NOTE: 1. The Area affected by Sheet Erosion and the large extent of bare ground in the fore ground
2. The short and scattered vegetation on the hill slopes in the background.

PLATE 4.4: GULLEY EROSION.



Photo taken from Akaku Parish.

- NOTE: 1. Gulley developing on the hill slope.
2. The gulley develops where the ground is bare.

PLATE 4.5: DEVELOPED EROSION GULLEY



Photo taken from Akaku Parish.

NOTE: 1. The deepening of the erosion gully in the middle
and fore ground.

PLATE 4.6: EFFECTS OF OVER-GRAZING



Photo taken from the park area bordering Akaku Parish.

- NOTE: 1. The short grass in the fore ground.
2. The bare ground in the fore ground.

Short distance incursions by pastoralists are the most difficult management problem mainly because the owners just let their cattle in the park and they go back to their homes. The cattle then graze freely and water from the nearby source. In the evenings the cattle may find their way back home or the owners stealthily go to the park and drive them home.

The large herds of cattle grazing in the park has had adverse effects on the park's ecosystem. The most affected is the vegetative cover. Due to overgrazing the pasture heights have been drastically reduced and bare patches are common in the park. (Plate 4.6) During the field study the researcher through a visual appraisal of the park area near the boundary, noticed large bare patches and also noticed large areas affected by sheet erosion. Hence, the parks biodiversity has been destroyed and it has reduced the wild game habitat. The pastoralists also set fires in the park in order to have fresh new grass when the wet season begins. This has also resulted in environmental degradation (Map 4.1), as discussed in Section 4.4.1.2

More so, animals like roan antelope (*Hippotragus equinus*) are very sensitive to grazing competition (Monday, 1991). Therefore such animals usually shift from areas when large numbers of cattle are present. This means that high livestock density may affect wild animal distribution and this may have negative effects not only on the environment but also on the

tourism industry. The presence of livestock in the park does not please many tourists, who are often looking for 'big game' and a 'wilderness' experience (Kasoma and Kamugisha, 1993). The avoidance of cattle by some wild animals like the roan antelope implies that the greater the cattle population the fewer some wild animals will be and the park will be less attractive for tourist hence reducing revenue collection.

Though the pastoralists traditionally disdain game meat and therefore do not hunt wild animals, they have made deliberate moves to exterminate some species, especially the large predators like lions, leopards and black jackal. They mostly poison them in order to protect their cattle from being killed and eaten. Most of the carnivorous species like lions are believed to be extinct (Appendix IV and V). This has affected the park's ecosystem and in the long run will also affect the ecological food chain, this issue calls for further study.

It is evident that cattle grazing in the park has led to environmental degradation. Therefore in order for the parks ecosystem to be preserved, it is essential for the park management authorities, the local council authorities and the local community to come up with appropriate methods of land utilisation of areas adjacent to the park.

4.5 ATTITUDES AND PERCEPTIONS OF THE COMMUNITY TOWARDS CONSERVATION

The communities living around the park have been in continuous resource use conflict and this has had an impact on their attitudes and perceptions towards conservation. This is discussed in two major parts, the park-community relationship and the factors affecting attitude formation.

4.5.1 Park-community Relationship

The park-community relationship mainly has been poor as a result of a buffer zone and the use of the traditional approach to conservation, that is by use of force police and eviction as a means of resolving conflicts. The park authorities only thought about protecting wildlife and ignored the needs and feelings of the local people. As earlier noted in section 4.1, the local people were not consulted about the creation of the park or compensated for the loss of their property and homes, nor was any real attempt made to explain to the people what conservation is, why the area was important for conservation or what the government's intention was.

Therefore, systematic attempt was made to destroy wildlife which was identified as the cause of the creation of the park in the first place and which had led to their suffering. So most of the wildlife animals were killed off, leading to reduced numbers, as evidenced in the 1990 and 1992 estimates (appendix V). Park facilities were also looted and infrastructure

destroyed (Fieldwork research, 1997). Despite of the fact that 60% of the park was degazated, the community still views the national park as an enemy which has brought a lot of suffering and which should be got rid of. When the respondents were asked to describe the relationship between the park management and the pastoralists, the majority (46.2%) described it as bad, and 7.7% described it as very bad. 25.6% described the relationship as fair, 7.7% as good and 12.8% as very good.

The relationship between the park management authorities and the people remains negative; one of conflict and suspicion. The park authorities view the community as enemies to wildlife conservation, and the community views the park as a threat to their livelihood. However, the people will only conserve wildlife only if they derive benefit from it. Hence the park authorities should look at the community as partners in the important task of conservation, not as enemies.

Regarding the respondents' perception of the purpose of the park, the majority showed that they had a clear and positive perception of the parks purpose. 36.7% perceived the primary purpose of the park as that of protecting and saving animals and plants. 28.3% cited earning revenue for the government as the main purpose and 35.0% gave tourism as the main purpose.

Asked to indicate whether the purpose they attributed to the park was a good or bad idea, 64% said the purpose of the park was a good idea,

27% said it was not and 9% said they did not know. Those who viewed the existence of the park as a bad idea gave four main reasons, 34.0% indicated that it deprives people to utilise resources in the area, 29.8% viewed the park as a waste of land, 21.3% mentioned that wildlife was destructive and 14.9% indicated that the park is of no use because people do not fully benefit from its existence. According to the Uganda wildlife statute 1996, section 70 sub-section 4, 20 percent of park entry fees collected should be given to the areas surrounding the park. However, the community complained of not benefiting from this arrangement because the funds are lost through corrupt community leaders. The respondents level of education and distance from the park boundary were found to have significant effect on the above responses as discussed in Section 4.5.2

4.5.2 Factors affecting attitude formation

In order to gauge the respondents' attitude towards conservation, an index of attitudes was developed which was then cross tabulated against a series of variables. The index was formulated through the use of eight statements from check list (Appendix II). These eight statements about conservation were given to the respondents who were asked to either agree or disagree. Depending on the answer, it was then determined whether it was a positive or negative attitude the respondent held.

Among the variables considered affecting attitude formation was the level of education. The findings on the respondents level of education versus the conservation index are presented in table 4.7.

Table 4.7 Level of Education and Conservation index

Level attained	Percentages	Conservation Index	
		Positive	Negative
None	50		
Primary 1-3	15	18%	82%
Primary 4-7	15		
Secondary 1-6	12.5	89%	11%
Post secondary	7.5		

The hypothesis for this specific investigation was:

THE LEVEL OF EDUCATION INFLUENCES THE PEOPLES ATTITUDE TOWARDS CONSERVATION.

In order to test this hypothesis, the respondents level of education was related to the attitudes he or she held towards conservation.

The level of the respondents education was found to have a significant effect on the attitude towards conservation. Respondents with relatively more education (that is greater than primary 4) were found to be more supportive of conservation. 89% of the respondents in this educational bracket positively agreed with the conservation attitudes. Only 11% had negative attitudes. On the other hand the less educated (below

primary 4) the majority (82%) expressed negative attitudes towards conservation and only 18% had positive attitudes.

During group discussions, it was observed that the older respondents tended to voice more negative attitudes to wildlife conservation while the younger respondents tended to be more positive. This provided evidence that age had an effect on attitude towards conservation. The younger people were more likely to have had formal education in schools, therefore, they showed positive attitudes compared to the older respondents who held more conservative views because of less formal education. The older respondents attitudes can also be attributed to the negative experiences they have had in the long history of conflict with the park.

The above demonstrates that the future of effective conservation lies with the park management working closely with young people in order to capitalise on their apparent positive predisposition towards the park and conservation in general.

Another variable considered in affecting attitude formation was the distance from the park. It was hypothesized that:

THE INCREASE IN DISTANCE FROM THE PARK
BOUNDARY HAS NO EFFECT ON THE POSITIVE ATTITUDE
OF THE LOCAL PEOPLE TOWARDS WILDLIFE
CONSERVATION.

In order to test this hypothesis, each parish bordering the park was divided into two. One sample area would border with the park in the first five kilometre range from the border, while the second sample area would not border with the park, that is within the next five kilometre range. This dichotomy of the samples was mainly to determine if the geographic distance from the park boundary had an effect on attitude formation and intensity of the resource use conflict.

Table 4.8: Geographic Distribution of the Sample in Various Parishes

Parish	Number of respondents	Respondents in enumeration area	
		Bordering park 0-5 km range	Not bordering park 5-10 km range
Akaku	30	15	15
Rwamuranda	38	16	12
Rwabarata	21	11	10

Source: Field Research, 1997

Kanyaryeru parish was not divided as the other parishes because it does not border with the park. However, the parish was later considered as a sample area not bordering the park, and the attitudes of the people were also considered separately.

Both the respondents bordering and not bordering the park, were given a list of statements to respond to, (appendix II) in order to develop an index of attitudes. Basing on the response, percentages of those who held positive or negative attitude towards conservation, were calculated, as in Table 4.9 below

Table 4.9 Effect of distance on attitude towards conservation.

	Conservation index for respondents within 0-5 km range from park boundary		Conservation index for respondents in 5-10 km range away from the park boundary	
	Positive	Negative	Positive	Negative
Akaku	13.5%	86%	72%	26%
Rwamuranda	11%	88%	67.5%	32%
Rwabarata	17.5%	82%	64%	35%

Source: Field Research, 1997

From the results it was found that the respondents living near the park (0 - 5km range) held more negative views about conservation. This is attributed mainly to the fact that they were more exposed to park related problems than those who are some distance away. The respondents cited various reasons for their resentment of the park, which include harassment by game ranger, crop damage by wildlife animals, disease spread to livestock from wild animals, lack of compensation for property damaged by wild animals and general restriction of utilising some necessary resources from the park like medicinal plants.

The pastoralists living near the park mainly feel that they have not benefited anything, but they are always on the losing side. They argue that sometimes wild animals come from the park, graze on their land, lick their salt and drink their water. Therefore they should also in turn be allowed to graze and water their cattle from the park, as a form of compensation. However the park management, after the failure of the access corridor arrangement (section 4.3) has not accepted this proposal, hence increasing the negative attitude of the local community towards conservation.

As revealed in table 4.9 the sample areas not bordering with the park, the attitude towards conservation was more positive than negative. The high positive attitude is mainly attributed to the fact that the people living a distance from the park boundary are less exposed to the park related problems like crop damage by wildlife animals, disease spread and game ranger harassment. Therefore the people not bordering the park are bound to have a more positive attitude towards conservation since they have little conflict with the park. This provides evidence that distance from the park border has an effect on attitude formation towards wildlife conservation.

The hypothesis is therefore rejected because as the distance from the park boundary increases the attitude of the local people towards conservation becomes more positive.

However, it is noted that, a rather substantial percentage of the responses, have negative attitudes towards the park, despite living a distance away from park. This is mainly due to the fact that though some people live relatively far from the park, they still would like to utilise some resources from the park, but they are forbidden. The pastoralists for instance, in Kanyaryeru parish, irrespective of the distance from the park, hold negative attitudes (43%) towards conservation, because they are denied access to graze and water their cattle from the park, especially in the dry season when water has dried up in their areas. Most of the pastoralists argue that they have no alternative other than to defy the law prohibiting grazing from the park. When they are arrested by park rangers, they are fined, sometimes their cattle are confiscated and they are often beaten by the rangers (personal comm.).

All this has increased the negative attitudes the pastoralists hold towards the park in particular and conservation in general. They felt that the only relationship they have with the park is that of harassment and bribery to the rangers in order to be allowed to graze in the park.

4.5.3 Soil Conservation

Apart from wildlife conservation, the respondents were asked about soil conservation, on how best soil erosion could be controlled and on the importance of controlling soil erosion.

According to the responses, the majority knew the importance of soil erosion control, 78.4% mentioned that it was a good idea, 10.8% indicated it was slightly good, 2.7% mentioned that it was not important, while 8.1% indicated they had no opinion.

More so, the majority of the respondents revealed that they were aware of the possible solutions to the problem of soil erosion as indicated in Table 4.10 below.

Table 4.10: Soil Erosion Control

Method of Control	Response in Percentages
Through better grazing methods	21.1
Avoid overstocking and over grazing	32.2
Planting trees	42.0
Do not know	4.7
Total	100%

Source: Fieldwork research, 1997.

Among other solutions given, the respondents argued that soil erosion can be controlled only if they have enough land from where to graze their animals and cultivate crops. They revealed that, with the current land tenure uncertainty, they do not see any reason of conserving the land when they are not very sure it is theirs. This opinion was reflected when they were asked if owning land is associated with interest in soil erosion control. The majority (76.3%) agreed, while 23.7% disagreed, though most of them might have disagreed because they were not

sure(Fieldwork research, 1997).

Despite the fact that the majority of the respondents were well aware of the solutions to soil erosion, it was observed that no action was being taken to control soil erosion in the study area. The reasons given by the respondents for this apparent tendency of not controlling soil erosion (ranked from the most significant) were; Lack of investment capital, shortage of land and land tenure insecurity, inability to control nature (like erosive rains), the difficulty of controlling grazing and lack of knowledge of what to do exactly.

4.6 COMMUNITY CONSERVATION

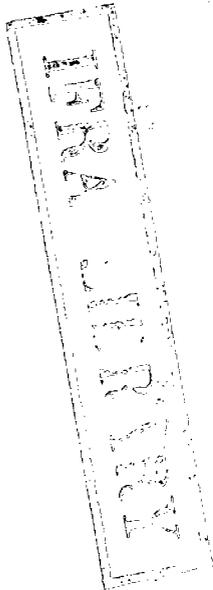
Realising the extent of the land use conflict in Lake Mburo National Park area, the Uganda National parks working hand in hand with the African Wild Foundation (AWF) established a community conservation programme (CCP) in 1989. This programme with the theme 'Protected areas, Neighbours as Partners' was mainly set up with the objective of educating the people, raise their awareness of the values of conservation and to involve the people as partners in the conservation process. This was mainly to help build positive links with the local communities, which is very necessary for the future of protected areas.

The research findings indicate that, the CCP has worked with the people through the local council structures and through local advisory

communities set up to participate in the management of the park. Each parish elected a Park Management Advisory Committee (PMAC) to act as a link between the local community and the park management authorities.

In order to raise the awareness of the people about the values of conservation, the community conservation project has mainly used education as a tool to achieve its objectives. The project set up an education unit with the major purpose of reaching the communities around the park and teach them about the usefulness of the park in particular and conservation in general.

The researcher was informed by the Parks Assistant Education Officer, Mr. Matovu that, the education unit has mainly put emphasis on teaching primary school pupils in the parishes surrounding the park. An education time table is drawn and members from the education unit visit these primary schools teaching the pupils about wildlife conservation, advantages of the park and about environmental conservation in general. In order to give the pupils practical experience of the park and conservation, the unit organises park drives, guided walks and the pupils also camp in the park. All this is mainly done in order to generate positive perceptions towards conservation, enrich and widen their knowledge about environmental issues and at the same time contribute to their school curriculum.



However, the education unit realised that education for only primary pupils was a long term solution to a rather currently strained relationship between the park and the community. Therefore the education unit has started a programme of educating the local community about the importance of conservation. During this research it was found out that a pilot education programme, using drama as a medium of communication, had been started. Drama was chosen as an effective and simple means of putting forward the message to a generally illiterate community. According to the Assistant Education Officer, this method of communication through drama was so far very successful and it was attracting many people who had hitherto not been interested in attending education meetings.

More so, in order to increase the awareness of the people about conservation, the park and its use, the park management has started organising game drives and guided walks for the local community. While at the park headquarters the researcher witnessed the locals from Rushasha parish going for a park drive, after which a talk would be organised and educative drama performed. This is a step forward in improving the park-community relationship through increased communication and interaction between both parties. For instance in Akaku parish where a lot of wildlife education has been carried out and the park management advisory committee has been active, the community has taken up the responsibility

of wildlife conservation. A good example is when the community of Akaku parish arrested some hunters who were going to poach in the park and handed them over to the park rangers (Field findings, 1997).

Apart from education, as a means of resolving the conflict and improving on the relationship, the conservation unit also regularly holds meetings and discussions with the local community. Basing on the questionnaire results, it was revealed that the majority of the respondents (75.7%) had at least had a meeting with the conservation unit members in the past year. 24.3% of the respondents said they have never had a meeting, but this could have been as a result of non attendance of meetings. On how regular the meetings were held, 20% of the respondents indicated they had never met, 7.7% said they met once, 41% twice, 20.5% thrice, 7.7% four times and 2.6% five times. This reveals that on average they have three meetings in a year. However, these meetings do not include those held by the Park Management Advisory Committee, which meets more regularly. In these meetings discussions are held about the problems the community faces in relation to the park and then solutions are sought by both parties.

The conservation unit has even facilitated some community initiated projects. For instance, in Akaku parish, the conservation unit contributed both money and building materials worth 600,000 Uganda Shillings, for the

construction of Akaku Primary School. Other primary schools which have benefitted from this similar arrangement in the study area include Rwemikunyu, Nyakahita and Rwakaterera primary schools. However, the conservation unit insists that it is not a development project, therefore, it is not under obligation to initiate and fully fund all projects, like the local community is demanding. This is why the conservation unit with limited resources, only supports community initiated projects like tree planting project and bee keeping projects for instance in Kakagate.

In general, the community upholds and appreciates the idea and efforts of the community conservation unit. However, they note that the major causes of the conflict between the park and the community, are not yet fully resolved. For instance, they argue that the failure of the park to compensate them for their livestock and crops destroyed by wild animals is a major factor hindering their full cooperation with the conservation unit. When asked if the efforts to resolve the land use conflict had been successful, the majority (60%) responded that it had not been successful while (40%) said it had been successful.

The failure of the conservation unit to resolve the resource use conflict and improve the relationship between the park and the community, is attributed to various factors. Among them is the failure of the Park management Advisory Committee to effectively carry out its duties. Most

of the chairmen of these committee are blamed by the community for not calling meetings, not communicating their ideas to the park authorities and likewise not giving them a feed back from the park authorities. Some chairmen also have been blamed for embezzling funds and revenue generated from the park meant to support community projects. The result of all this has been loss of confidence in the advisory committees by the local community who have tended to look at these committees more as representative of the park than of the people themselves. Furthermore, the local people blame the park authorities they accuse of employing outsiders and not offering them jobs as rangers and tour guides. This has led the people to still view the park as useless.

More so, some of the local people also share the blame for the failure of the conservation unit in achieving its objectives. Some of them do not attend meetings and therefore they are not informed of the developments in the park-community relations. For instance, in Rwabarata parish, though the majority of the people knew that there was a school under construction, very few of them were aware that the community conservation programme had contributed to the construction of the school.

In general to a great extent the community conservation programme has been successful especially in raising the level of awareness of the people about the need for conservation. However, in most areas this

awareness has not yet been translated into positive attitudes towards conservation. But with increased interaction and education, it is bound to be achieved and hence improving the park-community relationship.

CHAPTER FIVE

5.0 IMPLICATIONS, RECOMMENDATIONS AND CONCLUSION

5.1 IMPLICATION OF THE RESEARCH FINDINGS

In the study area there is need to harmonise the land use, environmental conservation and development of the land resources. This can mainly be done, if the people living in the area develop an interest in conservation and development.

The researcher realised the need to study the land use conflict as a means of achieving the above goal. The implications of these findings are given below.

5.1.1 Land Issues

The research findings indicate that among the major problems in the area is land tenure uncertainty. The community is not aware of its legal position to the land they occupy. Even those holding land by customary land tenure are not certain it is theirs, because government can take it over any time like it did in 1983 when the national park was established. However, the 1998 Land Act, provides a legal frame work through which people holding land under customary land tenure, are able

to have full rights of ownership. This can be done by applying for a certificate of customary ownership. This later enables one to apply and easily acquire a land title under the free hold land tenure system.

The implication is that, the local people unaware of their land rights have tended to follow practices which accelerate land degradation. This is mainly because they lack the incentives to undertake land conservation practices, for instance, most of the respondents argued that they cannot plant trees as a method of soil erosion control, because they are not sure if the land they occupy is permanently theirs. This also implies that the people cannot undertake basic development for their communities like construction of hospitals, roads and decent housing because of their uncertainty of land ownership. The Community also views the existence of the national park as the cause of this uncertainty, hence they hold negative attitudes towards its existence and wildlife conservation in general. However as people become more aware of their land rights, it will contribute to the efforts of resolving the conflict between the park and the community.

The expanding population in the area has resulted into land scarcity, leading to increased encroachment on the park. The only method of increasing one's land size is by purchasing. This implies that only the relatively rich people can acquire big pieces of land. The concentration of

land in the hands of a few rich people, is bound to create a class of landless people. They may turn into squatters and this would mean that like in the Ankole Ranching Scheme, this area would face squatter related problems.

The most common method of acquiring land is by inheritance. However, this method is no longer very reliable because the rules are becoming more vague and much dependent upon the expressed wish of the individual, the parents and the amount of land available.

5.1.2 Resource Use

According to the research findings, the most widely used resources in the study area include water, pasture, firewood, building wood and farming land. The findings also indicate that some of the resources like pasture and water are got from the park.

The implication is that, with increasing population and increased resource use, there has been unsustainable use of resources and this has led to their depletion and eventually environmental degradation. The situation has been worsened by poor land management practices, like uncontrolled grazing and bush burning.

With the areas adjacent to the park depleted, the national park becomes the only area where pastoralists can get resources like water and pasture. Unless the park authorities together with the local community

leadership come up with a permanent solution to the water problem, the pastoralists will keep invading the park in search of water. This encroachment on the park has led to increased conflict as the park authorities, in a bid to protect the biodiversity, have applied laws restricting the local community from entering the park. Therefore, as long as some resources only exist inside the park, the pastoralists will continue violating these laws and invading the park. This not only implies continued poor park-community relationship, but it also means continued threat to the existence of the parks biodiversity .

5.1.3 Effects of Pastoralism on the Environment

As indicated in the findings section 4.4, pastoralism as a land use practice has had adverse effects on the environment. This has mainly been as a result of practices like over stocking, over grazing and bush burning. All this has resulted into devegetation, soil erosion, siltation and general loss of soil fertility.

The implication of uncontrolled burning include, increased invasion of pastures by fire resistant weeds, reduced pasture species, increased bare ground and increased soil erosion. All this means increased threat to the livelihood of the community especially the pastoralists whose primary means of production is dependent on the environment.

Another implication of pastoralism on the environment is the encroachment on the park. The future of the park is under threat with increased number of cattle grazing in the park. Areas under intensive grazing in the park, already show signs of bare ground, increasing sheet erosion, and reducing numbers of some wild animals. Uncontrolled grazing in the park, is not only a threat to the park's biodiversity, but also a threat to the tourism industry in general.

5.1.4 Attitudes and Perceptions of the community towards conservation

On the establishment of the Mbuoro area as a protected area, the people were not sensitized about the importance and usefulness of natural resource conservation. Therefore the people regard the park as a common resource that should be freely utilised and the parks refusal to accept this has resulted into the community holding negative attitudes and perceptions towards the park.

In the study, two major variables were found to have considerable effect on attitude formation. It was revealed that people with higher education levels were more positive towards conservation. The implication is that, with current low levels of education in the study area, the attitudes and perceptions of the people towards conservation are bound to remain negative.

It therefore implies that, perceptions and attitudes of the people may improve by increasing the general level of education. The present government policy of universal primary education which has increased school enrolment in the area, provides hope for future attitude change. This combined with the education efforts of the community conservation unit will lead to more positive change in the perception of the park and conservation in general.

Another variable found to have considerable influence on attitude formation was distance from the park. The study shows that, those living near the park border were more negative towards conservation than those living further away. This was mainly because of the intensity of the park related problems, (as discussed in detail in section 4.5.2) yet with the current size of the park 260km² (after degazetting approximately 60%) it is unrealistic to suggest the creation of any buffer zone. For some of the species like the wide ranging eland, the park is already small to hold a viable population.

The implication is that those living near the park border, with that negative attitude, are a threat to the conservation of the park's biodiversity. This is because they view the park as a wastage of land where they would have had uncontrolled access to the resources.

Another implication is that those adjacent to the park have found it difficult to improve on their agricultural practices due to wild animal related problems. For example, despite the pastoralists becoming sedentary, they find it difficult to improve on their livestock rearing practices. This is because wild animals spread diseases, animals like zebras break down their fences, graze on their land, lick their salt and drink their water. More so, some animals like hippos and buffalos cause adverse effects on water sources. They not only drink the water, but they also wallow in it. This destroys the few water sources the pastoralists have outside the park. The situation is worsened because the park authorities hardly compensate them for the loss and damage of their property. The community has resorted to encroaching on the park as a form of compensation, and this has resulted into a more strained park-community relationship.

Crops cultivated in the areas adjacent to the park face destruction by wild animals. For instance, wild pigs usually attack gardens at night and destroy some crops like maize, potatoes, and beans. All this implies that, the livelihood of the people near the park is under continuous threat and they are bound to continue having very low social and economic standards.

5.1.5 Community Conservation

The study reveals that, after realising the role of the community in conservation of protected areas, the Lake Mburu Community Conservation programme was set up in 1989. It has carried out a lot of education in the study area and supported some community development projects as indicated in Section 4.6.

However, the researcher observed that though the efforts of the conservation unit have led to some positive change in attitudes and perceptions towards the park, most of the people have not yet practically revealed this by change in behavior. They still encroach on the park and carry out practices which lead to environmental degradation. This conforms to the theory that the community will practically engage in conservation only if they gain from it. The implication is that, unless the park authorities map out strategies from which the community will directly benefit, the theme of 'neighbours as partners in conservation' will never be realised.

The park authorities argue that they do not have the funds to facilitate rural development and that in any case, they are not a development agency. However, they stand to benefit if the community surrounding the park is developed because this will improve the park-community relationship and lessen the land use conflict. Therefore the

park authorities, who are in better position, should help the community lobby for more development funds from the government, development agencies, and non-governmental organisations . The park management authorities should therefore take interest in the development of the communities living near the park. It is then that the people will diversify their sources of income and no longer look at the park as the only means of ensuring their survival.

5.2 RECOMMENDATIONS

5.2.1 Land Issues

This study recommends that land related problems should be dealt with immediately if meaningful, agricultural development is to take place. This study suggests that in order to reduce the land tenure uncertainty and the land use conflict, individuals should be educated about their constitutional right over the land as stipulated in the 1998 Land act and they should be encouraged to apply for certificates of customary ownership and for free hold tenure.

This can be facilitated by the government making the land surveying procedure more quicker, simpler and cheaper. Acquiring land titles would even be more simpler if the individuals organised themselves in pressure groups. The people in Kanyaryeru resettlement scheme who already have

a central administrative system, would easily acquire land titles for each individual household.

Programmes aimed at addressing land issues should specifically look at the need for policy initiatives regarding property rights of land. The setting up of Kanyaryeru resettlement scheme is a step in the right direction of ending the land use conflict. The initiation of a secure land tenure system for all the communities living around the park is recommended. This will encourage the people to adopt more modern land use practices and they will take into account environmental conservation.

5.2.2 Land Use

The study recommends, the first priority for Sanga sub-county to be land use planning, at least of a 'skeletal' nature. Planning at village level, which involves the local people should be emphasised and such planning should pay special attention to environmental conservation, land classification and land use pattern. This can later be followed by careful institutional planning, comprising of land tenure arrangements, rural welfare and provision of socio-economic services. It is important that the local community be involved in the process of formulating, implementing and integrating the land use plans. This will enable them appreciate the meaning and benefits of land use planning in their region.

The landuse planning should mainly emphasize sustainable resource use, enhancing increase of rural incomes and diversification of production. Pastoralism should be transformed into modern livestock rearing by encouraging mixed farming involving controlled grazing and crop production. This will result in increased land productivity and sustainable resource use.

5.2.3 The Environment

In order to achieve reduced environmental degradation in Sanga sub-county, the rates and patterns of resource use should be addressed. The study recommends that policy guidelines should be put in place to ensure sustainable resource use in the study area. Landscape ecological surveys are required for determining the appropriate cattle stocking rates for particular land units basing on the seasonal and locational variations of the quality and quantity of the pasture and water. This should then be followed by measures to improve the pastures and improve on their management. Tree planting, even in form of agro-forestry should be encouraged in order to meet the peoples' demands of fire wood and building wood. All this will eventually reduce soil erosion.

The environment in Sanga sub-county, has mainly been degraded due to the unsustainable use of resources by the majority of the people.

The study therefore recommends that the people should diversify their production base. This can be done through systematic mixed farming based on on-farm land capability assessments and by encouraging alternative economic activities like bee-keeping. It is expected that under such circumstances the number of cattle will start declining. However, such a decline should be accompanied by increasing incomes, for that's the only way by which this option will be attractive to the herdsmen. For instance this can be achieved by use of modern animal husbandry techniques like Zero grazing. Any attempts at the reduction of livestock numbers that is not concurrently marched by higher and sustained revenues is impracticable in this area and should therefore as much as possible be avoided.

The improvement and rehabilitation of the degraded soils provides the basis of all agricultural prosperity and reduced encroachment on the park. The study strongly recommends that definite action on environmental conservation be formulated and implemented. Therefore there is need to develop an environmental conservation ethic. An ethic in which the community acknowledges that the environmental conservation of both their areas and the park is of enormous importance for the prosperity, development and ecological stability of the Sub-county.

5.2.4 Community Conservation

The majority of the people living around the park have a negative attitude towards its existence. The community, whose livelihood mainly centres on cattle and which still relies mainly on traditional practices, is unlikely to appreciate present day concerns about conservation of the biodiversity.

In order to increase community participation in the conservation of the biodiversity, the study recommends that the following be intensified:

- (i) Conservation awareness of the local community through education.
- ii) Involving the community in planning the conservation strategies of natural resources, in order for them to play a custodial role in ensuring the protection and well being of those resources.
- (iii) Ensuring that the community gets direct and specific benefits, from the existence of the park, for the role they play in its conservation and the opportunity cost suffered. This can for instance be done by offering more direct employment in the park to some members of the community and by encouraging sharing of revenue generated from the park.
- (iv) Setting up of specific policies and guidelines on use rights of resources from inside the park.

The above measures will mainly result in increased community participation, reduced resource use conflict, reduced environmental degradation and increased conservation of the park's biodiversity.

5.2.5 Park - Community Relationship

The Park - community relationship can mainly be improved by resolving the resource use conflict. The park authorities and the government, in joint collaboration with the local community, should ensure that some resources like pasture and water outside the park are improved on. Therefore resources will not only exist in the park especially in the dry season.

The study recommends that permanent water sources like valley tanks and dams be constructed in areas outside the park, where they can easily be accessed by the local people. More so, appropriate pasture management practices be taught to the people and they should be encouraged to use them for instance, controlled grazing, avoiding over stocking and bush burning. Such measures will result in availability of resources outside the park, therefore the community won't encroach on the park resources.

In a situation where the above is not possible, the study recommends that land utilisation guidelines for the co-existence of wildlife and other

land uses be developed since the creation of a buffer zone is not practical due to limited land. An appropriate mix of cattle and a variety of herbivorous wild animals would ensure optimum utilisation of the land in and around the park. This can be done through identifying those species that are compatible with the type of land use and the culture of the people. This would lead to reduced resource use conflict and also ensure effective environmental conservation and sustainable resource use.

As a way of improving the park-community relationship the study also recommends that the park management further enhances the revenue sharing system. The management should ensure that the 20% share of revenue collected is effectively put to the benefit of the people. They should mainly target development projects from which the people will benefit directly and individually. In the study area the park management through the conservation unit has supported projects like schools, but most of the people do not feel they have directly benefitted since it was for the general public, not individuals. Therefore projects to be set up, should specifically target on improving the individuals socio-economic standards. Such small scale projects could include bee keeping, handcraft making, retail shops and other various projects, which will mainly target increasing individual household incomes.

5.2.6 Water Resources

The study identified water shortage (especially in the dry season) as the major cause of the land use conflict and general environmental degradation. The area seems to be becoming more drier and more frequent droughts of 10 months duration were reported to have a return period of five years. This has triggered off encroachment on the park which contains most of the permanent water sources.

In order for Sanga sub-county to have adequate and permanent water sources, the study recommends that all the hydrological information available (local and technical) should be used to identify the most suitable sites for the construction of valley tanks and dams. This will ensure the collection and storage of enough water in the rainy season. Water utilisation and conservation guidelines should be put in place to limit water wastage. This will ensure the availability of enough water even during the dry season.

More so, hydro-geological surveys should also be conducted in order to exploit underground water resources especially by use of boreholes. Water shortage can also be overcome by improving on the existing water sources. Existing dams should be rehabilitated by desiltation and enlargement to increase their water holding capacity. The few existing boreholes should be rehabilitated and the community should

be trained in simple maintenance skills of the pumps. However, since the community does not have adequate funds and equipment to construct such water reservoirs, help from the government and other development agencies is very instrumental in the success of solving the water problem in the study area.

In all, the provision of more water to the community is not adequate. The people need to be educated and mobilised for water conservation. More so, emphasis should not only centre on the quantity of water, but also on its quality. Water contamination should be minimised in order to reduce public health hazards. This therefore calls for the strengthening or establishing of local institutions which will encourage community participation in sustainable management of the water resource.

5.2.7 Rural Development

Most of the problems faced by the people in Sanga sub-county are as a result of under development. This study recommends that local community initiative and participation in rural community development projects be encouraged. The community conservation unit which has encouraged and partly funded some development projects. However, its efforts to bring about development have been greatly limited by lack of funds and by mismanagement of resources by some community leaders.

The people should also be encouraged to have an economic stake in whatever development venture they participate in.

The government should make an effort to, provide a solution to the land tenure uncertainty, improve on the transport network and the marketing system in the area. This should be done through the local government (Local Councils) which provides an excellent institution for the active mobilisation and participation of the people in local development affairs. The study recommends that the government must at all levels take a more responsible attitude towards resource use and land use conflict. It should also consider the interdependency of land resource conservation and the needs of society, when evaluating policies which impinge on the use and management of land resources.

More so, in order to improve on the peoples socio-economic standards, the government and the park management should facilitate the marketing of their products like, ghee, milk, meat and crops. Currently there is only one milk collection and cooling plant at Sanga trading centre , but it is far away from most of the pastoralists especially from parishes like Rwabarata and Rwamuranda. Therefore as a means of improving the marketing system, more milk cooling plants should be set up in Sanga sub-county and in Nyabushozi county generally. Weekly cattle markets exist (like at Biharwe), but most of the pastoralists are discouraged from selling

their livestock and livestock products. This is due to the very low prices offered to them by the businessmen from major towns like Kampala, who always want to take advantage of the rural poor. Therefore, a marketing system which ensures that the pastoralists are not cheated should be designed.

The study further recommends that, the leadership of Sanga sub-county through local councils, Park management Advisory committees and the District development committee (under the decentralisation programme), should mobilise the local residents and make them aware of their potential, responsibility and duty to participate in the long term growth and development of their area. In this sense a system of public guidance and support is what should be enhanced.

5.2.8 Legislative and Legal Framework

Rural planning and development in Uganda has been very much an occasional and unsystematic activity. This has resulted in land use conflicts as evidenced in Sanga sub-county. The solutions to the land use problems in Sanga lie in the initiation of legislative and legal framework to guide rural planning and development.

The study recommends that government comes up with a legislative and legal frame work to guide rural development in aspects of land tenure,

land distribution, resource utilisation, rural credit financing, production and marketing and provision of extension services to the people like education, health, water, communication, technical services, etc.

5.2.9 Further Research

Intensive or detailed research and surveys are necessary to enhance systematic and sustainable development of the area.

The study recommends land resource evolution studies to identify areas suitable for crop cultivation, pasture, agro-forestry, forestry and areas which could sustain game ranching. All this would encourage an integrated land resource utilisation, without depleting the environment. It would also encourage adoption of more productive land use systems than the current systems.

The available literature shows that over a long time cattle have co-existed with wild animals in and outside the park. The researcher recommends specific and intensive research into game ranching. Specific attention should be centred on the ecological viability and on the legislative frame work to guide this co-existence land utilisation system.

In all, the study emphasizes that the above recommendations should not be considered as fixed and final prescriptions. They mainly throw light on those factors that planners need to bear in mind in taking decisions.

However, it should be noted that the recommendations above are not absolute, hence they can be adjusted as the abilities and aspirations of people in Sanga sub-county change.

5.3 CONCLUSION

The land use practices in Sanga sub-county like pastoralism and crop cultivation are becoming increasingly difficult to sustain, both economically and environmentally. The root cause of this whole situation lies in the rather poor resource use and environmental conservation policies, which have resulted into overstocking, overgrazing, soil erosion, poverty and general poor standards of living. This calls for use of sound approaches such as landuse planning.

The land use planning process for Sanga sub-county must be comprehensive. This can be done by using the bottom-up planning approach that includes all relevant decision makers and by integrating information from all aspects and sectors within the region. This should be initiated from the village level upwards to link with the district planning

and eventually the National land use planning. Since cattle keeping is the main activity in this area, land use planning should give it special emphasis. Attention should be centred on stabilising land ownership, proper stocking rates, provision of adequate water within manageable radii and innovative integration of cattle rearing and wildlife conservation.

The study found out that though the people in Sanga Sub-county could identify their problems and propose remedial strategies, they still remained underdeveloped. This is mainly because they lack technical extension services and institutional arrangements which could have organised them to acquire these skills and services for economic and social emancipation. Therefore unless these services are granted and coordination provided to ensure the transformation from the traditional methods to modern methods of agriculture, the people of Sanga are likely to remain underdeveloped.

Therefore specific research on land use planning integrating cattle rearing, crop cultivation and wildlife conservation should be carried out. This will help the people to come up with appropriate means of how to increase production using appropriate land management systems.

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APPENDIX I
RESEARCH QUESTIONNAIRE

The questionnaire was given to the respondents who either ticked or recorded the responses in the spaces provided. The responses were later compiled and analysed.

RESEARCH TOPIC: CONFLICTING LAND USE IN AND AROUND LAKE MBURO NATIONAL PARK, SANGA SUB-COUNTY, MBARARA DISTRICT

Instructions:

Please tick only the most appropriate answer to the respective questions. In cases where you are asked to explain, space has been provided for you to do so.

A. SOCIAL ECONOMIC BACKGROUND

1. County.....
2. Sub county.....
3. LC 1
4. Gender: Male.....
Female.....
5. Place of origin.....(District)
6. Have you ever been to school? Yes..... No.....
7. What is the highest level of education and class you attained?
 - (a) None.....
 - (b) Primary 1-3
 - (c) Primary 4-7
 - (d) Secondary 1-6
 - (e) Post-Secondary
 - (f) Other (specify).....

8. What are your sources of Income?
- (a) Sale of livestock products
 - (b) Paid employment
 - (c) Agriculture
 - (d) Business or petty trade
 - (e) Any other (specify)

B. PASTORAL ACTIVITIES

9. Where do you graze your livestock?
- (a) In the park
 - (b) Outside the park
 - (c) Both In and Outside the park
10. What is the attitude of the park authorities towards grazing from the park?
11. If you graze from the park, in what months of the year?
(Use a tick)

J	F	M	A	M	J	J	A	S	O	N	D
1	2	3	4	5	6	7	8	9	10	11	12

12. What are your objectives of rearing cattle?
- (a) Profit
 - (b) Survival
 - (c) Gifts
 - (d) Prestige
13. What is the form of land Acquisition?
- (a) Hired land
 - (b) Inherited
 - (c) Government owned
 - (d) Borrowed

- (e) Rented
- (f) Purchased
- (g) Any Other (specify)
-

C. SOIL CONSERVATION

- 14. Are you able to give a brief description or an example of erosion.
 - (a) Sure
 - (b) Not sure
 - (c) Slightly sure
- 15. If able, when did you become aware of an erosion problem in the park.
 - (a) Unaware of what erosion is or Unaware of an erosion problem
 -
 - (b) Had been aware of an erosion problem for more than four (4) years
 - (c) Had been aware that an erosion problem existed for one (1) to four (4) years
- 16. How severe is soil erosion in the park and the surroundings.
 - (a) very slight
 - (b) slight
 - (c) severe
 - (d) very severe
- 17. What has been your observation about soil erosion for the last five (5) years in and outside the park?
 - (a) increasing
 - (b) decreasing

(c) remained constant

18. Which months of the year do you normally notice erosion in the park?

J	F	M	A	M	J	J	A	S	O	N	D
1	2	3	4	5	6	7	8	9	10	11	12

19. In your opinion what might be the causes of soil erosion?

(rank according to importance)

(a) Over grazing

(b) Over stocking

(c) Erosive rains

(d) bush burning

(e) slope gradient

(f) improper cultivation of steep land

(g) Do not know

20. Does an increase in the number of livestock lead to increase in soil erosion?

(a) Strongly agree

(b) agree

(c) Undecided

(d) Disagree

(e) Strongly disagree

21. How can soil erosion be controlled?

(a) Through better grazing methods

(b) Avoiding overstocking and over grazing

(c) Planting trees

(d) Any other (specify)

(e) Do not know

- 22. Is soil erosion control important?
 - (a) Good idea
 - (b) Bad Idea
 - (c) No opinion
 - (d) Slightly bad
 - (e) Slightly good
- 23. Do you think owning land is associated with interest in soil erosion control?
Yes..... No.....
- 24. How do you feel about the park authorities (government) enforcing laws on you to control erosion?
 - (a) good idea
 - (b) Bad
 - (c) no opinion
 - (d) slightly bad
 - (e) slightly good
- 25. Would you briefly explain why you feel so? (as selected above)
.....
- 26. Have you noticed burning (bush burning) in and around the park.
Yes No.....
- 27. Do you use the practice of burning?
Yes No
- 28. What do you think are the effects of burning
 - (a) Leads to growth of fresh (new) grass
 - (b) Controls ticks
 - (c) Leads to soil erosion
 - (d) spoils the soil and lose of fertility
 - (e) No effect
 - (f) Any other (specify)
 -

D. THE COMMUNITY AND CONSERVATION

29. In your opinion what is the purpose of the park?
 (a) Protect and save animals and plants
 (b) Earn revenue for government
 (c) Tourism purposes
30. What is your view about the existence of the park
 (a) A waste of land
 (b) It deprives people to utilise resources in the area

 (c) Wildlife is destructive
 (d) No use because people do not benefit from the revenue generated
31. Do you utilise resources in the park
 Yes No.....
32. What resources do you and would you utilise (use) from the park?

	Current Use	Source in park	Use if permitted
(a) Pasture			
(b) Water			
(c) Building wood			
(d) Firewood.....			
(e) Game meat			
(f) Medicinal plants			
(g) Fish			
(h) farming land			
(i) Thatching grass			
(j) Papyrus			
(k) Any other (specify).....			

33. In your opinion, do you think pastoralists can graze in the park side by side with wild animals without environmental degradation?
 Yes..... No.....
34. Briefly explain why
-
-

35. In your view does increased cattle grazing in the park lead to a decrease in the number of wildlife animals (a) very sure
(b) sure
(c) Slightly sure
(d) not sure

36. What is the relationship between the park management and the pastoralists?
(a) very good
(b) good
(c) fair
(d) bad
(e) very bad

37. In your opinion have the efforts which are in place to resolve the land use conflict been successful?
Yes No

38. If the answer is no, briefly explain why?
.....
.....
.....

39. What measures can be taken to resolve this conflict?
.....
.....
.....

40. Have you had a meeting with an official from the park Conservation Unit?
Yes No.....

41. If the answer is yes how many times annually?
.....
.....

42. What form of assistance do you get from the park authorities?

.....
.....

43. What do you think the pastoralists have benefitted from the park?

.....
.....

44. How can the pastoralists benefit more from the park?

.....
.....
.....

45. How would the park management encourage pastoralists to help manage and conserve the environment?

42. What form of assistance do you get from the park authorities?

.....
.....

43. What do you think the pastoralists have benefitted from the park?

.....
.....

44. How can the pastoralists benefit more from the park?

.....
.....
.....

45. How would the park management encourage pastoralists to help manage and conserve the environment?

APPENDIX II
CHECK LIST OF STATEMENTS

The following are comments about the park and conservation. You are requested to state whether you agree, disagree or do not know any thing about them.

	A	D	NR	Dk
1. What people and their livestock need are more important than saving plants and animals	-	-	-	-
2. People should be allowed to use the park for grazing and farming as they wish.	-	-	-	-
3. It is important to protect the animals and plants so that our children may know and use them.	-	-	-	-
4. Grazing and farming must be prevented in the park or all the animals will be driven away.	-	-	-	-
5. The government made the park because they want to take our land and keep us poor.	-	-	-	-
6. Parks are a waste of land, while people are short of land.	-	-	-	-
7. It is important to set aside a place for the animals and plants to live in.	-	-	-	-
8. It is important to protect our environment other than expecting the government to do it for us.	-	-	-	-
	A - Agree			
	D - Disagree			
	NR - No response			
	DK - Do not know			

APPENDIX III

INTERVIEW SCHEDULE

The interview schedule was a set of questions which were verbally asked to the respondents, especially for consultation purposes.

1. Do you think that there is a land use conflict in Sanga sub-county between pastoralism and wildlife conservation?
2. What factors can you identify as being the major cause of this land use conflict?
3. In your view has the land use conflict for the last 10 years increased, decreased or remained constant and why?
4. What effects has this conflict had on the environment?
5. Do you think this conflict in this region is in a way a constraint to the development of this area?
6. What measures would you like to see put in place to protect and conserve the environment?
7. What can be done to encourage the community to develop a positive attitude towards the park and conservation in general?
8. Basing on the work done by the parks community conservation unit, can you refer to their efforts as a failure or as a success? And why?
9. What areas would you advise the conservation unit to put more emphasis?
10. How can this land use conflict be resolved?

THANK YOU

APPENDIX IV

Classification of Lake Mbuoro National Park Large Mammals according to IUCN categories. These terms are locally used with respect to LMNP.

IUNC CATEGORY	MAMMAL SPECIES	RESPONSIBLE FACTORS
Extinct	Lions	Bait poisoning/hunting
	Elephants	Lack of seasonal migration routes.
	Rhinos	Not known possibly hunting.
	Hunting Dogs	Bait poisoning, hunting, lack of seasonal migration routes.
	Giant Forest Hogs	Hunting, Tse-tse fly control methods.
Endangered	Roan Antelope	Habitat loss, Hunting.
	Klipspringer	Habitat loss.
	Hyaenas	Bait poisoning.
	Silver Backed Jackals	Bait Poisoning.

Threatened	Buffalo Waterbuck Topi Eland Bushbuck Bushpig	Habitat loss/overgrazing. Habitat loss/overgrazing. Lack of adequate seasonal migrational areas. Habitat loss/overgrazing. Habitat loss/overgrazing. Lack of enough range.
Rare	Giant Pangolin Common Porcupine Wildcat Serval Cat	Not known. Restricted distribution. Not known. Not known.
Indeterminate	Sitatunga Hippopotamus Warthog Bohor's Reedbuck Leopard	Inaccessible habitat. Inaccessible habitat. Low population. Low population. Not known.
Stable	Impala Common Zebra Bushduiker Oribi	Improved protection. Improved Protection. Improved Protection. Improved Protection.

APPENDIX V

Estimated Total Wild life Population for
Lake Mbuoro National Park from 1982 - 1993.

Year	1982	1986	1990	1992	1993
Animal					
Zebra:	821	1733	2907	4163	3922
Bushpig:	-	-	283	120	125
Warthog:	56	200	174	394	575
Hippopotamus:	144	200	180	340	184
Oribi:	-	1176	728	126	1070
Bushduiker:	46	150	86	211	260
Klipspringer:	-	50	-	-	52
Impala:	6231	10170	10993	16185	13267
Topi:	25	450	125	251	674
Reedbuck:	15	1300	120	195	475
Waterbuck:	41	300	25	378	490
Eland:	185	358	699	85	119
Cattle:	-	15127	26624	143966	7028
Buffalo:	41	600	156	1042	936
Roan antelope:	-	25	3	-	-
Bushbuck:	15	170	21	116	170
Shoats:	-	-	650	10428	-
Domestic Dog:	-	-	28	49	-
African Hare:	-	-	-	-	505
Vervet Monkey:	-	-	-	-	1389

* Sources of Data:

1. Malpas, 1982. -(Report on aerial survey of Lake Mbuoro Game reserve). These are animals seen during the survey and not total population estimates.
2. Tindigarukayo-Kashagyire, 1989. M.Sc. thesis.-(Ground transects).

3. Monday, 1991. M.Sc. thesis.-(Ground transects).
4. Olivier, 1992. -(Report on aerial survey of Lake Mbuoro National Park).

NB: - Data for 1982 and 1986 are estimates for the former Game reserve with an area of 650 km².

- Data for 1992 is an estimate for the greater Lake Mbuoro ecosystem which includes all the ranches to the north and East of the park (area = 2010 km²).

- Data for 1990 and 1993 are estimated for only Lake Mbuoro Park (area = 260 km²)

WMO 63702 LOCAL NNO 9030003 LAT 0036 LONG 03041 E ELEV 1420
 PERIOD: 1960-1994
 LOCATION: MBARARA
 MAXIMUM TEMPERATURES

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN	26.9	27.1	27.0	26.3	26.2	26.6	26.8	26.9	26.8	26.1	25.8	26.1	26.6
	29.6	29.6	29.0	27.6	27.8	28.0	28.6	28.5	30.1	27.3	27.5	28.3	28.5
MIN	24.0	25.0	25.5	25.3	24.9	25.0	24.5	25.0	24.5	24.7	23.4	24.3	25.5

MINIMUM TEMPERATURE

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MEAN	13.3	13.7	14.1	14.1	13.7	13.4	13.2	13.9	13.9	14.3	14.1	13.3	13.8
MAX	15.0	15.6	16.4	15.9	16.2	19.7	15.4	15.5	16.0	19.3	16.1	14.9	16.3
MIN	10.6	10.6	11.7	11.3	11.1	11.1	10.6	10.1	10.5	10.3	11.8	10.6	10.9

WMO NO 63702 NATIONAL NO. 90300030 STATION NAME MBARARA ELEVATION 1412 LATITUDE -00° 36' LONGITUDE +30° 41'
 PERIOD 1960-1994
 MONTHLY TOTAL RAINFALL (mm)

YEAR	1993	1991	MEAN	MAX	MIN	No. YRS	DECADE MEAN				
							60-90	61-70	71-80	81-90	91-93
JAN	41.2	100.2	52.1	138.4	0.0	32	52.2	61.7	58.2	35.7	34.5
FEB	49.4	40.0	52.5	121.5	4.7	33	54.1	72.1	49.9	38.9	41.0
MAR	60.5	108.9	93.6	164.2	34.6	32	95.1	93.1	106.4	85.9	74.4
APR	170.1	86.4	129.8	284.0	65.0	33	129.7	132.1	130.9	126.2	145.9
MAY	98.4	120.9	61.2	204.4	0.0	34	63.4	65.8	66.5	58.0	53.5
JUN	20.8	172.1	25.3	172.1	0.0	33	19.8	14.8	36.0	10.3	29.7
JUL	TR	6.0	24.2	90.7	0.0	32	25.1	11.4	37.4	28.0	21.5
AUG	125.6	46.4	64.0	178.3	0.0	33	64.3	52.8	81.4	60.3	66.4
SEP	67.1	34.8	101.8	320.3	31.9	31	107.0	83.0	107.2	133.4	77.6
OCT	114.1		127.3	287.1	51.0	30	123.6	102.9	131.9	139.1	160.6
NOV	50.2		133.6	254.3	36.2	31	139.6	165.8	143.1	106.9	77.8

APPENDIX VI