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ASSESSMENT AND PRIORITIZATION OF ENVIRONMENTAL AND NATURAL RESOURCE THREATS FACING UGANDA AND OPPORTUNITIES FOR USAID INTERVENTION

SYNTHESIS REPORT

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TABLE OF CONTENTS

1.0 BACKGROUND

1.1 Introduction

USAID/Uganda is currently in the process of developing a strategic plan for sustainable development in Uganda. This plan will cover a 5-8 year planning period beginning in 1997. The environment and natural resources management sector (E/NRM) is one priority sector for intervention.

1.2 Uganda E/NRM Policy and Priorities

Uganda's recently completed National Environment Action Plan (NEAP) (June 1995), together with the State of the Environment (SOE) Report for Uganda 1994 (released early 1995) clearly lay out E/NRM agendas, issues and problems in Uganda. These works provide an ideal starting point for USAID's overall strategic planning process. In effect, Uganda has already enumerated and prioritized its E/NRM problems, and has further proposed solutions to a number of these problems. Rather than duplicating this excellent work, which was both highly participatory in its development and comprehensive in nature, what is required might be termed a "priority update" that revisits the situation of today, validating and/or adjusting issues and priorities presented in the NEAP and SOE Report.

1.3 USAID Environmental Policy and Priorities

USAID's Environment Strategy states that the wise use of natural resources and environmental protection are fundamental to USAID's assistance program. The strategy recognizes that concern for the environment and wise management of the natural resource base are absolute requirements of any successful development program. Thus, USAID's Strategies for Sustainable Development (USAID 1994) provides explicit treatment of the environment as one of the five principal areas of current agency interest, together with building democracy, stabilizing world population growth, encouraging broad-based economic growth, and providing humanitarian assistance. Strategies specified two "strategic goals".

(a) Reducing threats to the global environment, particularly loss of biodiversity and climate change; and

(b) Promoting sustainable economic growth locally, nationally, and regionally by addressing environmental, economic, and development practices that impede development and are unsustainable.

1.2 Objectives of the Assessment

The primary objective of the assessment has been to evaluate the condition of the environment and natural resources in Uganda, rank and prioritize threats in the E/NRM sector and suggest possible solutions to the problems.

1.3 Scope and Procedure

Six areas identified under the terms of reference for the assessment were covered. These included:

i Aquatic and Wetland Resources
ii Biodiversity Conservation
iii Rangeland Resources/Pastoralism and Agropastoralism
iv Agriculture
v Urbanization and Industrialization.
vi Policy, institution and legal issues relevant to E/NRM Sector

Consultants were contracted to carry out assessment and prioritization of threats in each of the six areas above. Consultants reports were discussed in a work. Synthesis report was then produced, discussed in a workshop and the final document produced.

2.0 ENVIRONMENTAL AND NATURAL RESOURCES SECTORS

2.1 Aquatic and Wetland Resources

2.1.1 Status

(a) Introduction

Aquatic and wetland systems consist of open water systems and wetlands. Open water systems cover 36,000 km^2 (15%) of the national surface area and consist of an extensive river system, dams and ponds. Lake Victoria with a surface area of 68,800 km^2 is shared between Uganda (43%), Kenya (6%) and Tanzania (51%). Lake Albert covers an area of 5335 km^2 and is shared between Uganda (54%) and Zaire (46%). Lake Edward is 2203 km^2 and is also shared between Zaire (61%) and Uganda (39%) and other smaller lakes. Other lakes are wholly within Uganda.

There are extensive wetlands covering 13% of Uganda's surface area. Most of the wetlands are associated with major water bodies such as lakes and rivers.

(b) Importance of resources from lakes and rivers

The most important resources from lakes and rivers are fisheries and water for domestic and industrial uses. Aquatic systems are also important for hydro-power generation, as avenues of transport and for sport and recreation. They also assist in moderation of local climate.

Fish is an important source of animal protein food in Uganda. The fishing industry provides employment for 0.5 to 1 million Ugandans. Fish is now a major export commodity ranking fourth among Uganda's exports with an income of US $ 33 million in 1994. This value could be higher if all exports were declared and smuggled fish officially exported.

(c) Importance of resources from wetlands

Wetlands are ecosystems of high diversity in plants and animals. They provide suitable habitats and refuge for many animals including birds, fish and wild mammals. Marginal wetland ecotones serve as breeding, nursery and feeding grounds for fish.
The high biomass materials especially papyrus in wetlands have potential for exploitation on a sustainable basis especially by the less privileged groups such as women and youths who collect materials like papyrus for crafts.

Wetlands are important water reservoirs. They assist in maintaining water regimes and climate patterns. Presence of wetlands along rivers can impede flooding.

Wetlands play an important role in buffering inputs from the basin catchment into lakes and rivers. They serve as large sinks trapping sediments, silt, nutrients, pollutants and toxins and are used for sewage treatment.

There is potential for agricultural production within wetlands by direct growth of crops and aquaculture. Wetlands can also serve as important grazing areas especially during dry seasons.

(d) Present condition

Uganda is thought to have the capacity to produce about 300,000 metric tonnes of fish annually on a sustainable basis. The maximum catches that have ever been realised were 245,000 metric tonnes in 1989 after which catches declined suggesting that maximum sustainable yield (MSY) is about 250,000 metric tonnes and that Uganda has reached the maximum amount of fish which it can produce from capture fisheries.

There are several wetlands in Uganda both seasonal and permanent. In Southern part many wetlands have been drained for crop cultivation and dairy farming. In Eastern Uganda several wetlands are being used for rice cultivation. The seasonal wetlands seem not to have been much affected by agriculture expansion.

2.1.2 Trends

(a) Aquatic (fisheries) resources

Fishing effort has increased. For instance the number of boats in Lake Victoria increased from 3200 in 1972 to 8000 in 1990. Total fishery yield after increasing with fishing effort reached a peak of 245,000 metric tonnes in 1989 and started to decline. In 1994 the fishing industry produced 227.3 metric tonnes of fish. Most of this came from Lake Victoria, followed by Kyoga, Albert, the Albert Nile, Edward and George. Catch rates of most important and desirable species on all the lakes have decreased.

The number of fish processing plants, mainly export-oriented, has increased rapidly since 1990. The export of fish reached 5,840 metric tonnes during 1994/95. A substantial amount of fish also leaves the country through smuggling to neighbouring countries. Consequently, there has been a fall in per capita fish consumption from 12.5 kg during the 1980s to about 8 kg during mid 1990.

Fish species diversity has declined. Some of the lakes especially Victoria had over 300 species of fish most of them endemic. Over 60% of these species may have disappeared due to predation by the Nile perch.

Some of the riverine migratory species such as *Labeo victorianus* appears to have been reduced by destructive fishing gears and methods as well as by siltation and pollution of their habitats.

Some of the species which have declined from lakes Victoria and Kyoga have been identified in certain refugia within the lake or in satellite lakes around lakes Victoria and Kyoga.

(b) Wetlands

Wetlands were originally regarded as waste lands. There was therefore no attempt to manage them sustainably. Since 1986, increasing attention has been paid to the wetlands. There has been a government ban on new reclamation of wetlands. The National Wetlands conservation Program is gatherng baseline data on the status of wetlands in terms of physical characteristics and biodiversity. It has also been carrying out some wetland management programmes. The public is now more sensitized about the values of wetlands expecially in districts such as Bushenyi and Kabale.

2.1.3 Threats and their root causes

A Threats to Fisheries Resources

The following were identified as threats to sustainability of fisheries resources and are given in order of their priority.

1. **Over fishing**

Over fishing is widespread in all the lakes resulting in decrease of catch rates of most important and desirable species. This problem is due to the following factors.

(a) **Inadequate Data**

There is no adequate quantitative data to assess the ecology, stock and sustainable yield of fish resources. The amount of data generated by the Fisheries Research Institute (FIRI) has not been able to match the needs of the industry. This is mainly

due to inadequate facilities and trained manpower. There are no reliable catch statistics upon which data for management of the fisheries can be based.

(b) **Inadequate mobilisation and involvement of the community**

The Top-down approach, where management of the fisheries is carried out exclusively by government gives an impression that the resource belongs to government and not the people. Fishermen, as ultimate managers of the resource, have not been adequately involved in the formulation and implementation of sustainable management of the resource.

(c) **Delay in update of legislation**

Legislation for fisheries management is embodied in the Fish and Crocodiles Act and its associated amendments, Statutory Instruments and Orders. The law permits the Minister concerned to make Statutory Instruments whenever changes are required. There have been changes in the fisheries sector towards sustainable management practices which have necessitated the Minister to make Statutory Instruments but this has not been done on time.

(d) **Weak Institutional Arrangement**

Previously, single fisheries administrators carried out law enforcement, statistical data collection and extension services. These functions were found not to be compatible and they have been separated since 1993. However, the field extension staff now report to the Director of Agricultural extension in the Ministry of Agriculture Animal Industry and Fisheries (MAAIF). This has weakened the flow of technical information from the Commissioner for Fisheries to his field staff and vice versa. Extension services have therefore been weakened.

(e) **Rapid growth of Fish Processing Plants**

The number of fish processing plants has increased considerably since 1990. Although a policy has been set to limit the amount of fish to be processed for export to 60,000 metric tons per year this is being exceeded because of weak enforcement of regulations to implement this policy.

2. **Increase in Eutrophication and Pollution**

Ecosystem studies show that some of the lakes especially Victoria have eutrophied. Algal biomass in Lake Victoria has increased four to five times. Depletion of haplochromine trophic groups which used to consume most of the organic matter in the lake has left much of it unconsumed and as it decays, it depletes the bottom water of oxygen. Hypoxia is thought to be enhanced by stability of the water column due to temperature changes arising

from global warming. Eutrophication is thought to be due to nutrient inputs arising from poor land use practices in the catchment area and atmospheric inputs mainly from combustion processes.

3. Water hyacinth Infestation

Lakes Victoria, Kyoga and Albert plus the Nile have been infested by the water hyacinth (*Eichhornia crassipes*). This weed thrives in shallow sheltered bays which are important breeding, nursery and feeding grounds for fish. The zone below extensive hyacinth mats is low in oxygen, which reduces habitable space for most fish and other aquatic organisms upon which fish feed. The weed also interferes with water transport, fishing activities and hydro-power generation.

4. Impact of exotic (Nile perch and Nile tilapia).

Some fish species have been considerably reduced and probably depleted from lakes Victoria and Kyoga by Nile Perch and Nile Tilapia introduced in these lakes. Fish species diversity has declined. Over 60% of the species in some lakes especially Victoria may have disappeared or been reduced considerably.

5. High post harvest losses

The fishery is primarily artisanal and fishermen do not have effecient methods of preserving their catch. Smoking and drying are the dominant traditional fish processing methods and in many cases result in poor products. Transport and marketing facilities are inadequate leading to high post harvest losses and further decrease in the amount of resource available to the consumer. It is estimated that 15-20% of the landed catch is lost to the consumer through post-harvest losses. These losses also encourage excessive fish harvesting to meet the rising demands.

6. Unsustainable Management of the Shared Water Resources

This is due to inadequate regional coordination in the management of the shared lakes and rivers. A regional consultative meeting to strengthen regional collaboration for joint management of the fisheries of lakes Albert and Edward took place in 1991 but this initiative has not yielded positive results on uniform management of these two lakes.

B Threats to wetlands

1. Conversion of Wetlands to Agricultural Use

Up to 75% of the wetlands in Kabale and up to 10% nation-wide have been drained for agricultural use and grazing. This has caused deterioration in the quality of the land. Large areas of wetlands especially in the eastern Uganda districts of Iganga to Tororo and

Pallisa have been converted to rice growing. This monoculture in wetlands reduces biodiversity and promotes pests.

The problem of conversion of wetlands to agricultural use is due to:

(a) Inadequate public awareness of the values of wetlands.

(b) Inadequate community involvement in the formulation and implementation of sustainable management of wetlands.

2. **Pollution**

Several industries dump their untreated wastes in wetlands especially around Kampala despite the existence of a law against pollution of the environment.

There are pollution threats to some of Uganda's other wetlands. For example copper and cadmium from Kilembe mines have been detected in lakes George and Edward. This poses health risks to people who feed on fish from these lakes. Deposits of petroleum are present in the Ugandan part of lake Albert. Its anticipated exploitation is a potential threat.

3. **Un-controlled harvesting of the resources**

This is widespread leading to degradation of the wetland resources and decline in wetland biodiversity. This problem is mainly caused by inadequate knowledge of sustainable wetland management.

4. **Lack of clear institutional set up to manage wetlands**

Management of wetlands is coordinated by the National Wetlands Conservation and Management Programme (NWCMP) in the Ministry of Natural Resources. There is however no clear institution to manage the wetlands. Wetlands, as common properties, have undefined ownership. This makes it difficult to control their use. This factor is also partly responsible for conversion of the wetlands to agricultural use.

5. **Lack of regional arrangement for wetlands management**

Development on Kagera River in Rwanda could adversely affect wetlands in Sango Bay and Lake Victoria.

2.1.4 Recommended Interventions

The following interventions correspond to the priority setting of the threats and their root causes.

A Interventions in fisheries resources

1(a) Strengthen research for data collection and monitoring.

(b) Mobilize and involve communities in fisheries management.

(c) Carry out regular update of legislation and enforce regulations on fishing gears and methods.

(d) Improve institutional arrangement to strengthen extension, and enforcement capacity.

(e) Limit the number of fish processing plants and regulate their capacity to conform to the policy of limitng the amount of fish to be processed for export.

2. Control loading of nutrient and contaminants into aquatic systems.

3. Strengthen the efforts to control spread of water hyacinth.

4(a) Control introduction of exotic species into the water bodies.
(b) Identify, protect and improve endangered species.

5. Improve landing sites, processing, transport and marketing facilities.

6. Follow up initiatives for development and management of the resources of lakes Edward and Albert.

2. Interventions in wetlands

1(a) Intensify public awareness programs on the values of wetlands.
(b) Mobilize and empower communities to be involved in the formulation and implementation of sustainable wetland management programs.
(c) Enforce the law banning drainage of wetlands.

2. Buffering capacities of wetlands should be quantified.

3(a) Develop training in wetland management at all levels.
(b) Develop sustainable use methods for wetlands.

4. Define and develop institutional arrangements for the proper management of wetlands. The National Wetland Conservation and Management Program should be developed into an institution for wetland management.

5. The Kagera Basin Organisation should include the concerns of wetlands in its regional programs.

2.2 BIODIVERSITY

2.2.1 Introduction

Inspite of its small size, Uganda has a very rich and varied biodiversity (Uganda is at the centre of 5 important phytochoria) and diverse physical features. For example, 7 of Africa's 18 biogeographic regions are found in Uganda. As of the 1960's Uganda had at least 90 types of natural and semi natural vegetation communities, ranging from scrub, various types of savannas to a diverse system of tropical forests. The challenge, facing Uganda therefore, is how to conserve the array of biodiversity for sustainable economic development.

Given the diverse nature of habitats in Uganda's ecosystems, better managed protected areas will be needed to effect sustainable and rational use of biodiversity. This will also require the establishment of complementary protected area systems that encompass all the major ecosystems and communities.

2.2.2 Forest Reserves

(a) **Status**

i Introduction

Uganda has roughly 700 forest reserves, covering about 7% of the land surface. The majority of these are located in areas of closed high forest and savanna woodlands. There is also roughly 156,000 ha of high forest on public land (mainly in Buganda) and even more extensive areas of ungazetted woodlands scattered in areas of low human population density. Over 80% of all forest reserves are quite small falling under 2500 ha. Most of the small reserves are located in woodland and open savanna areas. These are unlikely to hold viable populations of plants and animals in the long run.

ii Importance

In terms of protection of Uganda's biodiversity, forests and woodland reserves are very important. This is particularly so under the new concept of setting aside up to 20 percent of the forest estate, as Strict Nature Reserves (SNR) where all forms of exploitation is prohibited. Furthermore, these forests contain very significant portions of the country's biodiversity, particularly with regards to certain taxa: e.g. birds, primates, herpetiles and butterflies. Forest reserves of particular importance for biodiversity conservation in Uganda include:-

(a) those located along the Albertine rift mainly for bird species.

(b) the Kyaka-Mubende riverine forests and woodlands for high bird species diversity and rare ecosystems (and communities e.g. swamp forests).

(c) the Southern Lake Victoria system which has rare or endangered plant communities e.g. those containing *prodocarpus* species.

(b) **Trends**

In the past the integrity of the forest estate has been threatened by agricultural encroachment, uncontrolled and illegal harvesting of forest products and clearing of forest to control tsetse flies. These threats however, have been curtailed in the recent past.

The current trend is for better protected forest reserves through increased community participation in forestry management and privatizing some forest management activities such as peri-urban forestry development. The proposed zoning of Forest Reserves into strict conservation, production and buffer areas on the basis of the recent biodiversity inventories also augurs well for the long-term survival of biological diversity.

2.2.3 National Parks and Wildlife Protected Areas

(a) **Status**

i **Introduction**

Currently Uganda has 10 national parks, which cover a wide range of ecological habitats, ranging from open savanna to tropical high forests. There are no national parks in Buganda and there is only one in Eastern Uganda (Mt Elgon N.P.) and two in Northern Uganda. This imbalance may be soon rectified when some of the former game reserves are upgraded into national parks.

ii **Importance**

The present national parks system contains most critical ecosystems vital to the protection of Uganda's biodiversity.

iii **Present Condition**

Most of the former game reserves are badly encroached by peasant farmers and pastoralists. Most wildlife in these areas has been decimated through illegal hunting and/or habitat loss and degradation. The contribution of these protected areas to the protection of Uganda's biodiversity is currently minimal.

Some major ecosystems or communities are either not included or are poorly represented in the current protected areas system.

(b) **Trends**

According to the new Uganda Wildlife Authority Act (1996), the National Parks and former game reserves will be re-organised to constitute the following:-

(a) National Parks: These have remained more or less the same as under the old UNP.

(b) Wildlife reserves: This category replaces to old game reserves system, and

(c) Wildlife sanctuaries and community wildlife areas. These replace the animal sanctuaries and controlled hunting areas of the now defunct Game Department.

2.2.4 Biodiversity Outside Protected Areas

(a) **Status**

i **Introduction**

Even if the two current protected area systems comprising those under UWA and Forest Department were well managed and protected, a lot of biodiversity would still remain outside protected areas. This is particularly the case with forests and woodlands located in Buganda region.
Other critical habitats for the protection of biodiversity include the:

- o woodlands and riverine forests of Mwenge and Kyaka counties and parts of Kibale and Hoima districts;
- o woodlands and open savannas of Lake Kyoga ecosystems; and
- o woodlands and savanna habitats in Northern Uganda and parts of Karamoja.

ii **Importance**

Biodiversity outside protected areas is very important. It supports the human population directly. Over 90% of Uganda's population live in rural areas depend on biodiversity for energy needs, food, shelter and to some extent medicine among others. Maintenance of ecosystems outside protected areas is therefore essential for the survival and well-being of the people.

(b) **Trends**

Biodiversity outside protected areas is under severe threat from uncontrolled use. Many previously common plant and animal species appear to have disappeared from many areas. It has recently been recognised that many ungazetted areas still hold significant levels of biodiversity. This is why a large project to address conservation of biodiversity outside protected areas is currently being formulated by the Ministry of Tourism, Wildlife and Antiquities.

2.2.5 Threats to Biodiversity

Threats to biodiversity conservation in Uganda have been prioritized as follows:

1 **Loss of Biodiversity in Protected Area**

In the past some of the economic policies and practices have failed to recognise the contribution of biodiversity to sustained economic development. These include the following:-

i Degazetting forest and game reserves in areas of high human population density in an attempt to increase agricultural land.

ii Failure to provide sufficient financial and human resources for protected areas management. This resulted in the development of commercial poaching with the resultant reduction in the numbers of large mammals (and extinction of rhinos and cheetahs) and encroachment for settlement, agriculture and forest products.

iii Government policies failed to resolve conflicting demands on uses of natural resources. Fishing villages were located in protected areas, pastoralism allowed adjacent to protected areas. This led to encroachment on protected areas and poisoning of large carnivores by pastoralists.

2. **Unsustainable use of Biodiversity Resources**

The practice of increasing agricultural production has been by clearing areas, which results in great loss of biodiversity.

Most livestock in Uganda are communally grazed and entirely depend on natural pastures. Because large herds of livestock are kept, these lead to loss of biodiversity through overgrazing. Uncontrolled burning by pastoralists leads to changes from woodlands to bushland and open savannas outside protected areas.

Unsustainable use of fuel wood is causing high loss of biodiversity

The root causes of unsustainable use of biodiversity resources are:

(a) Lack of public education and awareness of the need to Conserve Biodiversity

(b) Inadequate local communities participation in biodiversity conservation

(C) Inadequate knowledge of the relationship between ecosystem integrity and biodiversity utilization.

(d) Lack of capacity to do research and monitoring.

(e) Some cultural practices such as not allowing women to own land or plant trees limit public participation in biodiversity conservation.

3. **Inadequate monitoring**

There is inadequate data on biodiversity in protected areas and outside protected areas. This limits the capacity to carry out comprehensive monitoring of the resource.

4. **External/International Threats to Biodiversity Conservation**

Protected Areas located on international borders tend to loss biodiversity through trade in wildlife and related resources.

5. **Donor Versus National Interests/Programmes**

In some cases conflicts have arisen between donors who have the majority of funds for biodiversity conservation and national priorities. Currently there are no modalities for resolving such conflicts.

2.2.5 Recommended Interventions

The following interventions correspond to the priority setting of the threats and their root causes.

1(a) Increased financial technical and managerial capacity for P.A. managers and institutions.

(b) Support the development and review of policy relevant for biodiversity conservation.

(c) Isolated and scattered protected areas should be centres of biodiversity conservation and should be surrounded with zones of low impact human activity with clearly defined land use practices through legislation. Such zones should be compatible with local community development and biodiversity conservation.

(d) Strengthen or upgrade some protected areas into strict nature reserves under Forest Department management e.g Sango bay Forest Reserve, Malabigambo Forest Reserve.

(e) Adopt an integrated approach to biodiversity conservation. This is particularly so where different types of protected areas are adjacent or near to each other.

(f) Set up a representative Protected Areas Technical Committee for planning Protected Area System in the Country to cater for:- networking, information collection, establishing mechanisms and standardization of monitoring programmes.

(g) Strengthen legislation and enforcement with regards to biodiversity conservation.

2(a) Facilitate the development of ulternative economic and social activities to reduce over-dependence on biodiversity.

(b) Review the status of protected areas and threatened ecosystems outside protected areas (public/private lands) with a view to gazette as protected areas important ecosystems outside protected areas and degazette unviable protected areas.

(c) Carry out capacity building for local communities to enhance their participation in resource management.

(d) Initiate programmes for integrating biodiversity Conservation outside protected areas into national economic development.

(e) Increase collaboration and cooperation between local community and protected areas system managers.

(f) Conduct specialised training for effective management of protected areas.

3(a) Strengthen institutions for management of biodiversity data storage, processing and dissemination.

(b) Facilitate biodiversity inventories and monitoring of ecosystem health within and outside protected areas.

(c) Improve logistical support for research, training and administration and public education.

4. Strengthen regional and international co-operation for biodiversity conservation.

5. Formulate policies for donor participation that encourage co-ordination to avoid duplication and conflict or neglect.

2.3 RANGELAND RESOURCES/PASTORALISM AND AGROPASTORALISM

2.3.1 Status

(a) Introduction

In East Africa, the term rangeland is often used to include areas of agricultural potential which consist mainly of natural grassland, bushland or woodland either under or over-utilized and whose development depends on the application of an extensive type of rangeland management especially for livestock production.

Estimates by FAO (1988) show that of Uganda's 20.4m ha of land surface 28.4% is forest and woodland, 33.5% is under arable and permanent crops and 25% is under pasture and range. The main rangeland area in Uganda is what has been described as the "Cattle Corridor stretching from Uganda's borders with Rwanda and Tanzania across the country to Karamoja in the North-East region.

The use of rangelands has been primarily grazing by wild and domestic animals on the native vegetation. Agropastoralism which involves crop farming as the main subsistence activity with animal husbandry as an integral part of the economy is the one being practiced in most parts of Uganda. Pure pastoralists are very rare today even when this production system still persists.

(b) Importance

Cattle in the traditional livestock sector accounts for about 90% of Uganda's cattle population, estimated at about 5 million animals. Most grazing is supported on communal pastures in very extensive areas where pastoralism is still being practiced as the main economic and social activity.

Uganda's rangeland is estimated to support over 5 million (33.4%) of the current estimated 18 million inhabitants and also supports 90% of all livestock. Collectively, the rangelands provide the basis for subsistence of a large segment of the population and also contributes to foreign exchange earnings from animal products. The livestock sector is a crucial part of Uganda's agriculture accounting for approximately 30% of the total value of agricultural production.

Uganda's rangelands are most recognized for livestock and wildlife use. A few rangeland products have however, not been adequately tapped. These include, honey production, plants for food, aromatics and oils.

(c) Present Condition

Range condition is usually defined with reference to the state of health of the range. Rangeland degradation as defined by Noble et al (1984) is considered to have occurred if there has been a measurable decline in the condition of the land. Change in condition refers to the sum change of the various rangeland attributes relative to their maximum potential for animal and crop production. The attributes include factors such as vegetation composition and biomass, soil stability and nutrient status. Going by the above definition, rangeland degradation in Uganda occurs in many forms and results from various causes. The present range condition cannot however be accurately stated because of lack of baseline data.

2.3.2 Trends

The problem of rangeland degradation in Uganda differs from that of the arid areas of the Eastern African region especially areas of the Sahel and the Sudano-Sahelian region, where there is extensive degradation characterized by severe desertification. The problem in Uganda is concerned primarily with slow deterioration and is difficult to detect. There is regional variation in the range condition depending on the extent and nature of degradation and its underlying causes.

As far back as 1971, some of the areas grazed by nomadic pastoralists were reported to have been suffering the effects of overgrazing (Langlands 1971). These include areas like Kashari, Nyabushozi, in western and Upe, Kaberameido, Pian, Amuria and Jie in north-eastern Uganda. The problem of overstocking in some of these areas may have worsened over the years, leading to more problems of overgrazing.
Instances of rangeland degradation continue to be evident around water sources and along cattle trails leading to the water sources.

The apparent rangeland degradation seems to affect both private and communal grazing areas perhaps due to a common water shortage problem. The problem of managing common property in rangelands is however, reducing due to the sedentary tendencies by the formerly nomadic societies (Kisamba-Mugerwa 1991). Government policy currently also discourages the movement of people and livestock under nomadic systems.

However there has been an increasing practice of settling and cultivating the areas that have been traditionally used for grazing particularly in rangelands neighbouring high population areas such as the districts of Ntungamo, Mbarara, Rakai and Kabarole. Refuge resettlement schemes have also been located in rangelands like the case has been in Nakivale and Oruchinga in Mbarara district and Kyaka in Kabarole. All these are leading to shrinkage and general degradation of the rangelands.

In Karamoja region overgrazing arising out of over-concentration of stock brought about by the limited water supply is still persistent.

2.3.3 Threats to Sustainable Utilization of the rangelands

Various factors affect the trend of range condition most of which are multiple and profoundly interrelated. They include ecological, and socio-economic factors. The following are the threats to sustainable management of the rangelands as prioritized.

1. **Lack of Management Options**

This results from the following factors:

(a) **Lack of baseline data**

There is a general trend of rangeland degradation but this has not been clearly monitored due to lack of baseline data on range ecology. Existing data covers largely socio-economic aspects of livestock keeping in the rangelands. These are insufficient for proper planning and management.

(b) **Inadequate policies**

There are no comprehensive land-use policies. Resource tenure rights in rangeland are not well defined. Government policy in Uganda currently puts emphasis on sedentary through increased water development and social infrastructure. Little interest is paid to the herding sector and little interest given to the human and social promotion of pastoral societies. The pastoralists have, for long, been perceived as being primitive, backward, isolated and conservative. Consequently sustainable management planning has not been developed.

(c) **Inadequate human resources**

There are very few range ecologists in the country which limits the capacity for effective planning.

(d) **Inadequate infrastructure**

Rangelands have lagged behind in socio-economic development because of inadequate infrastructure.

2. **Overgrazing**

Overstocking and over concentration at water points have led to overgrazing with multiple effects of increased soil erosion and range quality deterioration and pasture shortage. In the drier areas conditions of desertification are being experienced.
Pastoralism is still largely practiced in the traditional way as a form of subsistence economy. The pastoralists lack knowledge and skills for improved livestock keeping that avoids overstocking. Extension staff are not adequately facilitated to assist the pastoralists. The cultural desire for large number of animals also contributes to overgrazing.

3. Bush encroachment

Extensive Acacia bush encroachment and rapid colonisation by unpalatable grass in the rangelands is occurring especially in the southern areas. This considerably lowers the quality of the rangelands.

4. Diseases and Parasites

Vector transmitted diseases are common in the rangeland areas. Trypanosomiasis transmitted by tsetse flies renders vast areas of rangeland in the districts of Iganga and Kamuli unavailable for livestock use.

Tick borne diseases, are also a problem. Other diseases, such as viral and bacterial infections are a major concern to the livestock producer in the range area.

5. Loss of Genetic resources

The indigenous animals (local breeds) in Uganda have good survival ability in the often adverse condition of the rangelands. Although they have limited genetic capacity base they constitute a valuable resource to national socio-economic needs and an invaluable genetic resource for breeding. Continuous cross-breading with exotic breed is however threatening the survival of local breeds and may result in the loss of this genetic resource.

6. Expansion of cultivation

Uganda has an estimated population growth of 2.5% a year. The increase in population has increased the pressure on areas considered marginal for cultivation. This leads to shortage of pasture as a result of cultivation pressure. This has been due to the increasing practice of settling and cultivating the areas that have been traditionally used for grazing.

The need to increase production in response to the need for money and the generalization of cash crops leads to reduced fallow periods affecting the quality of the land and also leads to cultivation of otherwise dry season grazing reserves.

7. Uncontrolled Bush Burning

Uncontrolled bush burning is rampant in the rangelands. Though bush burning is prohibited by law there is inadequate capacity to enforce this law.

8. Frequent Drought

Drought has a tendency of being a recurrent phenomena and leads to shortage of water and crises in vegetation cycles. Desiccation arising from decades of dry periods has serious impact on pastoral systems, provoking, for instance, large movements of pastoral groups, exacerbating conflict, with agriculturalists, other pastoral groups and conservationists.

2.3.4 Recommended Interventions

The following interventions correspond to the priority setting of the threats and their root causes.

1(a) Carry out characterization,mapping and inventory of rangeland resources by accessing land sat images, aerial photographs, ground surveys and setting up a data bank.

(b) Review existing policies to enhance productivity and sustainable rangeland development.

(c) Conduct training at the community, technical and scientific level to improve research capacity and planning ability.

(d) Support community social and economic infrastructure in pastoral areas such as schools, health centres, roads so as to improve human social welfare and marketing of livestock products.

2. Support farmer training programmes, in-service training of extension personnel, and research to establish proper stocking rates, water development and management of catchment areas, and soil management, and establish strategic watering points.

3(a) Carry out research in economic bush control measures such as use of arboricides, burning, grazing control and hand hoeing.
(b) Develop programmes for pasture improvement.

4. Support extension services in the pastoral areas, train and empower the communities in basic animal care.

5. Undertake in-situ conservation of the long-horn Ankole cattle and the East African zebu in selected ranching/pastoral communities

6. Extend community education on family life education to the pastoral community. Plan and control general migration and refugee settlements in rangelands.

7. Sensitise the communities, opinion leaders and politicians on the existing policies and laws that concern sustainable resource use through workshops and seminars.

The sociol-political situation is difficult to predict. But support to control cattle raiding through community awareness can help.
Develop programs to minimise the effects of drought in the rangelands.

2.4 AGRICULTURE

2.4.1 Status

(a) Introduction

Uganda's farming systems, largely traditional, are out of step with sound environmental management practices. Generally, arable land is left bare for extended periods of the year, thus exposing it to agents of soil degradation.

Forest clearance, bush burning, overgrazing and continuous cultivation are widespread practices in the country and have caused tremendous soil productivity decline via structural breakdown, acid infertility due to excessive nutrient leaching and depletion, and soil erosion. Nutrient recycling through organic and/or inorganic fertilizer application is largely incidental and without research backing, except on large scale commercial farms e.g. sugar cane and tea estates, and horticultural farms.

(b) Importance

The agricultural sector still contributes more than 50% of Ugandan's GDP, despite the recent significant rise in the industrial sector resulting from foreign and local investments. The majority of Ugandans (90%) live in the countryside and are almost entirely dependent on agriculture. The sector has expanded considerably to include formerly non-traditional export crops such as vanilla, asparagus, pepper and simsim.

(c) Present conditions

i The intensive banana-coffee lake-shore system

This occurs in the Lake Victoria crescent. Mailo land tenure system, which dominates this region restricts tenants to small-holdings with limited or no guarantee of long term land occupancy. This has undermined sustainable land management efforts. Tenants cannot justify long term investment in land degradation management strategies such as soil fertility enhancing practices and erosion control structures.

ii The Western banana-coffee-cattle system

This system covers the south-western region of the country. Being dominated by hilly terrain, this region is faced with intensive soil erosion activity. High population density has resulted in serious land fragmentation problems and eventual encroachment of the otherwise originally forested steep slopes. This has opened way to accelerated run-off, soil erosion and nutrient removal, leaving the slopes bare, rocky and uncultivatable.

Cattle keeping is a major component in this system. Free range grazing is dominant and overgrazing along hillsides and watering points is also a common feature. Tremendous soil erosion has been caused by this practice, yet little is being done to address the problem. It is only in the densely populated areas that shortage of land has forced restricted grazing within fences and stall grazing, to a limited degree.

iii The forest-savanna mosaic banana-coffee system

This system covers most of Hoima, Masindi, north Kabarole, central Mubende, north Luwero, north Mukono and most of Kamuli. This region is relatively less populated and still has abundant forested and savanna expanses of land, uncommitted to agriculture. The terrain is mostly plateau with scanty hills. Under this system, environmental degradation is still minimal except in Luwero district where over-grazing has induced tremendous soil compaction and erosion. Land fallowing to regenerate soil productivity is still in practice. Unlike the other farming systems, the major obstacle to increased agricultural production here is shortage of labour required to open up new fields and maintain the fallowing system.

iv The medium-altitude-coffee system

This covers the highlands Mt. Ruwenzori, Elgon and the West Nile highlands. Areas under this system are hilly, densely populated and are faced with serious land fragmentation problems. Massive deforestation and use of inefficient farming systems are major contributors to soil degradation under this system and further threatens to silt water sources in these areas.

v The Kigezi annual food crops montane system

This system includes areas beyond 1,800 meters above sea level, particularly Kabale and Kisoro districts. High population density has diminished farm sizes considerably and acquisition of land is almost impossible. Crop and animal production are done on hill-side fringes and repeated use of land is inevitable.

vi The Northern and Eastern cereals - cotton - cattle system

Under this system, the soils are sandy and very easily erodible. They have low and fragile fertility, thus requiring extremely long fallow periods to regenerate soil productivity. However, lengthy fallow periods are no longer possible owing to high population pressure. The only exception are Apach and Gulu districts where land is still fairly plentiful. Communal grazing is widely practiced and ox-ploughing is the popular method of land preparation. Wind and water erosion are common features and silting of rivers and lakes is on the rise under this system.

vii The Nile cereals-cassava-tobacco system

This system covers the western part of Arua district and is characterized by intensive, mixed and double cropping. Use of poor farming systems along with communal grazing of cattle, sheep and goats has caused significant soil loss and nutrient depletion. Like under the other systems, the value of nutrient recycling is virtually unappreciated. The prosperity of tobacco, as the main cash crop has induced massive tree cutting to provide fuel wood for curing the leaf. Up to 10-30 metric tones of fuel woods is used to cure 1 metric tone of tobacco.

(c) Trends

Agricultural production in Uganda has been increasing steadily since 1986 with the revival of the economy. This increase is largely due to expansion in land under agricultural rather than increase in production per unit area. Expansion to fragile lands has apparently caused increasing land degradation in these areas.

2.4.2 Threats and their root causes

It is rather subjective to rank and prioritize the threats in the absence of quantitative data or a common scale of evaluation. Nevertheless, based on the frequency of occurrence under the various farming systems, Government and NGO focus, and people's perceptions, the following ranking and prioritization are suggested:

1. Soil erosion and physical deterioration

Soil erosion, though widely reckoned as a threat to national resources, is not at all characterized quantitatively. Concrete information on how much soil is actually lost per hectare per year, locally or across the country, is still lacking. Presently, evidence of rill erosion is clearly visible countrywide. Serious gully erosion activity, however, is visible only in steep slope areas such as Rwenzori and Elgon. In these areas, increasing frequency of landslides has become a threat to communities.

2. Nutrient depletion and acid infertility

In Uganda, nutrient depletion is currently viewed directly or indirectly as a threat to the soil resource. Acid infertility (*Lunnyu*), is one of the major manifestations of nutrient depletion that has caused increasing abandonment of originally productive land. With proper management, however, such land has a high productive potential that could save the country the current trend of encroachment on environmentally fragile lands.

3. Poor farming practices and encroachment on protected areas

The mounting pressure on land resulting from rapid human population increases (2.5 % per annum) has led to land fragmentation with repeated cultivation of the same land for many years. It has also led to cultivation of fringes of marginally productive lands along steep slopes, in addition to wetlands; in a bid to expand the arable acreage. This practice, together with the retrogressive practices of bush burning, deforestation and overgrazing, have accelerated environmental degradation.

4. Misuse of Agrochemicals

Unlike in other countries, the use of agrochemicals in Uganda is estimated to be still low and has not yet reached alarming proportions. The only exception being on large commercial farms such as sugar and tea estates. In addition to these, cash crop production (e.g. cotton, coffee, and horticultural crops) is greatly dependent on pesticides. The current national emphasis on traditional cash crops e.g. cotton and coffee will inevitably lead to increased demand for agrochemicals. Up to now, however, information on the type and amount of agrochemicals imported and applied, the modes of distribution and eventual application by farmers is seriously lacking. Many firms and institutions involved in importation and distribution of agrochemicals lack adequate professional knowledge of safe handling and use of the chemicals.

5. Acidification of swamps

Drainage of some swamps for arable farming has resulted in acidification and total extinction of plant growth including the originally luxuriant aquatic species.

The common root causes of the above threats are inadequate information on land resources, lack of comprehensive land use policy and land legislation, general low level of environmental awareness, level of skills among peasant farmers, low level of production, rapid population increase relying largely on agriculture and weak extension service.

2.4.3 Recommended Interventions

The following interventions correspond to the priority setting of the threats and their root causes.

1(a) Revisit and evaluate the possibility of re-establishing the old soil conservation structures which were effective but abandoned for various reasons. Revival and strengthening of some bye-laws to support conservation structures such as terraces, may be necessary. This should be done in conjunction with the farmers, especially women to enable them appreciate the value of these structures.

(b) Advocate for farming systems that maintain reasonable vegetative cover for most of the year to mitigate soil erosion and landslide occurrence. Use of well-designed crop rotations, inter- or mixed-cropping systems, including appropriate cover crops would be very appropriate.

(c) Integrate agroforestry practices which have proved viable in various farming systems; for instance alley cropping and hedgerows in the Kigezi Annual Crops Montane Farming System.

(d) Minimize cultivation of steep slopes outside the recommended slope ranges.

(e) Plant trees and other vegetation to cover the presently eroded slopes to prevent further erosion.

2(a) Promote recycling of crop and animal residues and other plant materials to enhance soil fertility, improve soil physical properties and consequently minimize soil erosion and its attendant problems. Both domestic and urban garbage could be composted and utilized for this purpose.

(b) Include nitrogen fixing legumes and mycorrhizae-forming plants in the cropping systems to enhance the nutrient status of the soil. This will serve to substitute for the need for fertilization.

(c) Emphasize the use of agrogeology, i.e. using natural rocks e.g. rock phosphate to enhance soil fertility.

3(a) Use of land productivity augmenting practices to maximize output per unit area. This will minimize the need for expanding the arable acreage to include environmentally fragile land. Examples of such practices include use of high yielding varieties, cultivation of disease, pest and acid infertility tolerant/resistant cultivars . A soil productivity enhancing package should be included.

(b) Encourage resettlement in areas still with free arable land. Provide facilitation of the resettlement exercise.

4(a) Strengthen the existing agrochemical regulatory system to effectively monitor, screen and coordinate importation and safe use of agrochemicals, while ensuring maximum benefit from their application.

(b) Establish the demand and supply of these chemicals with a view to preventing excessive availability of the chemicals in the environment.

(c) Do research to evaluate the agronomic and economic benefits derived from their use as well as establish suitable rates and timing of application.

(d) Promote the use of biological control of diseases and pests, and production of crop varieties with tolerance to acid infertility. This will reduce on the need for agrochemicals in agriculture.

5. Stop indiscriminate drainage of swamps which results in acidification with catastrophic effects on biodiversity in these ecosystems.

6. **Interventions for the common root causes are**

i Strengthen research to improve on land resources.

ii Develop comprehensive land use policy.

iii Review and update existing land laws and bye-laws.

iv Emphasize networking among researchers, extension staff and farmers.

v Encourage farmer participatory research while formulating research programs.

vi Strengthen the extension system through refresher training and facilitation of staff with transport and job incentives where necessary. Consolidate the existing unified extension system.

vii Enhance environmental awareness programmes.

2.5 URBANIZATION INDUSTRIALIZATION AND REFUGEES

2.5.1 Urbanization and Industrialization

(a) **Status**

i **Introduction**

Although the rest of the world made the transition from predominantly rural to predominantly urban prior to 1995, Africa and Asia are still predominantly rural and only expected to pass through the transition between 2015 and 2020. The urbanization rate in the regions is however higher than elsewhere in the world with Asia at 1.68% and Africa at 1.63% compared to about 0.43% in Europe.

The rapid urbanization in Africa is however not well distributed. The North African region shows highest levels (e.g. Libya at 82%) in 1990 whereas the East African region showed the lowest growth rate (e.g. Uganda 11.2% in 1990) similar trends are expected till 2020.

Both urbanization and industrialization impact social-services, natural resources and general environment

ii Importance

Urbanization can lead to improved access to social and economic facilities. It creates market for rural produce, and generally improves the well-being of the populace.

Industrialization is recognized as the way forward for future national economic growth. Industry provides the domestic market with adequate supply of basic goods, materials for export (and hence foreign exchange), employment, market for locally produced raw materials. The contribution of industry to human resources development has been reported mainly in terms of absolute numbers of employees and in terms of value added.

The contribution to Value Added of small scale enterprises is very significant. In establishments with 5-10 employees, 68.9% of all employers used 19.4% of all employees to generate 13.2% of Value Added

iii Present condition

In most African states, urban people are concentrated in a single prime city, usually the capital city. In Uganda, the 1991 population in the capital city, Kampala (774, 241) is greater than the total urban population in the northern, eastern and western regions combined.

Rural populations are in constant move to urban areas in search of better health facilities, education, shelter, water and sanitation and employment, among others.

The last comprehensive summary of Uganda's manufacturing establishments was done in 1989. The results show that Uganda's industrial base is still quite undeveloped. There are very few large scale manufacturing establishments. Out of 1,646 operational establishments in 1989, only 12 (or less than 1%) employ more than 500 employees. Five out of 12 are food processing industries, while 3 are agro-based (tobacco products, spinning and weaving textiles). All the 12 are found in Kampala, Mpigi and Mukono (in Central region) and in Jinja, Mbale and Tororo (Eastern region).

Smaller industries (5-9 employees) accounted for 42% (or 698 in all) of Ugandan factories. The Northern and Western regions had higher percentages of 51.6% and 45.5% respectively. The greatest numbers were in grain-milling (168). Furniture making (154) and motor vehicle repairs (125) have a fairly uniform distribution in the regions.

(b) Trends

Maximum urban growth rates in Uganda were observed during the periods 1959-1969 for most towns. The period 1969 - 1980 show the decline in growth rates of many areas around Uganda because of the insecurity in most urban areas and relative peace in some rural areas.

The 1991 census defined 11.3% of Uganda's population as urban. This rate of urbanization is much less than for neighbouring countries, with expected increase to 14.2% (2000), 18.80% (2110) and 25.1% (2020). If these trends are not countered with proper planning and investment, then the environment and natural resources of the land will be at stake, and the advantages of urbanization will be suffocated.

The manufacturing sector growth which was experienced in the 1960s plunged during the war-prone era of 1970-1986. With the start of the rehabilitation of industries in 1987, the sectors' contribution to GDP in 1994 rose to 9% compared to 4.7% in 1992.

2.5.2 Threats of Urbanization and Industrialization

Environmental threats of urbanisation and industrialization include the following as prioritized.

1. Health threats especially to low-income groups

Poor sanitation and inaccessibility to clean and safe drinking water in low-income settlements is a major health threat. This is coupled with the occupation of hazard-prone areas like the swampy areas of Katwe, Bwaise, and Namuwongo-Soweto of Kampala which are liable to flooding and water-borne diseases. The dense population around urban areas and the attraction of people with minimum education, and hence low income, encourages the spread of the AIDS virus.

2. Land degradation

Inadequate land management, overpopulation and land-use pressures have led to invasion of protected areas and degradation of sensitive natural resources like wetlands, forests, and to the loss of cultural reserves and open spaces. The Nakivubo swamp in Kampala, with its reported wastewater purification functions among others, is grossly encroached by low income groups for shelter and subsistence farming.

3. Industrial pollution

Air, water and land pollution especially due to indiscriminate and uncontrolled dumping of solid and liquid industrial wastes and air pollution. Inadequate hazard preparedness, is a threat to the environment.

4. Environmental hazards arising out of indiscriminate dumping of solid waste

Urbanization activities e.g., industrialization and large populations yield high amounts of waste. Inappropriate management of solid wastes, for example by Kampala City authorities causes health hazards like proliferation of vectors and rodents, ground water pollution and general aesthetic quality deterioration.

5. Uncoordinated growth of Urban centres.

Uncontrolled growth of urban centres leads to excessive urban sprawling. Limited services and facilities lead to congestion on the streets, inadequate transportation and recreation places. This is worsened by lack the acute lack of urban planners in Uganda's urban centres.

6. Vehicular and domestic air pollution.

Vehicular air pollution due to high levels of emission of fumes without any regulations and monitoring is a threat to the local and global environment. The use of wood fuel in most homesteads in Uganda causes indoor pollution.

7. Licensing of investment projects with negative environmental impact.

The Uganda Investment Authority does not have adequate capacity to vet proposals on environmental grounds. The newly-formed National Environment Management Authority still lacks qualified personnel to sufficiently assess potential environmental impacts of investment proposals.

2.5.3 Recommended interventions

The following interventions correspond to the priority setting of the threats and their root causes.

1(a) Enhance environmental awareness programmes among the urban community to minimise health risks.

(b) Facilitate and encourage communal acquisition of running water.

(c) Encourage use of affordable sanitation systems, such as Ventilated Improved Pit latrines (V.I.P).

(d) Promote low-cost waste water management technologies.

2(a) Formulate a comprehensive national urbanisation policy.

(b) Carry out studies in urban land tenure systems and management.

3. Reinforce factories inspectorate at the Ministry of Labour and Social Welfare and NEMA's capacity to monitor industrial pollution.

4(b) Promote community participation in collection and disposal of solid waste.
(b) Encourage privatisation of the collection and disposal of solid waste.
(c) Encourage private sector investment in the solid waste re-cycling industry.

5. Promote training in urban planning and strengthen enforcement of urban regulations.

6. Promote the development of standards by the National Bureau of Standards to facilitate the control of air and domestic pollution.

2.5.4 Refugees

(a) Present situation

Uganda's concern for protecting and encouraging better management of its natural resources is often frustrated by refugee emergencies. In April 1996, Uganda was hosting about 240,000 Sudanese refugees in Kitgum, Masindi, Moyo and Arua districts where about 2,000 Km^2 of land is set aside for refugee use.

Refugee camps in Uganda are of two types:

i Reception or transit camps where families of 3-4 are given temporary residential plots of about 20 x 30 m^2 from where they await either returning to their homes, or transferring to settlement camps, [Oxfam, pers. comm.] and

ii Settlement camps where refugees are given a chance to reconstruct their life by living a more organised life. Refugees are semi-independent and each is given about 0.3-0.4 ha of land for crop cultivation and animal grazing.

Because of the concentration of many people in a limited areas, these camps qualify as a form of "urban area".
Refugee camps are mostly located in the north western districts of Arua, Moyo, Kitgum and in the western districts of Mbarara, Kabale, and Masindi.

(b) Threats

1. Malnutrition due to non-balanced diet and delays in food delivery.

2. Rampant incidences of water-borne diseases in the camps.

3. Poor sanitation.

4. Land degradation caused by massive use of wood fuel and uncontrolled use of other natural resources.

(c) Recommended Interventions

The following interventions correspond to the priority setting of the threats and their root causes.

1. Promote awareness campaigns on balanced diet among refugees and improve on food delivery system.

2. Carry out health education to minimise cases of water-borne diseases.

3. Develop programmes to improve sanitation in the camps.

4(a) Encourage the use of energy saving stoves.

(b) Carry out environmental studies in target and existing camp sites and develop programmes to conserve the natural resources in the areas.

(c) Improve on disaster preparedness and make efforts to minimize conflicts within the region.

2.6 POLICY, LEGISLATION AND INSTITUTIONAL FRAMEWORK

2.6.1 Introduction

Uganda is one of the few African countries that have put in place some policies for sustainable management of the environment and natural resources. The National Environment Management Policy 1994 developed by the Ministry of Natural Resources is a broad cross-cutting policy that sets a framework for management of the environment and natural resources to attain sustainable development. Some sectors have also developed their policies for the management of specific resources.

The development of new policies has not taken place in every sector dealing with environment and natural resources at the same pace. Old policies which do not adequately promote sustainable management of the environment and natural resources still exist in many sectors.

New legislation has been developed to support new policies. Some sectors have however lagged behind in updating their legislation to support new approaches in environment and natural resource management.

In an effort to improve the management of the environment and natural resources, steps have been taken to create new institutional frameworks in several sectors.

2.6.2 Policies

Policies in the environment and natural resource sector are inherently cross-sectoral although their formulation has tended to be sectoral. Limitation in recognising this inherent cross-sectoral nature of the policies has resulted into unsustainable utilization and management of the natural resources.

For sustainable management of the environment and natural resources sectoral ministries/departments will continue to formulate and implement policies within the framework provided by the National Environment Management Policy, 1994.

(a) **Existing Policies**

(i) **The National Environment Management Policy 1994.**

This is a comprehensive policy whose overall goal is sustainable social and economic development which maintains or enhances environmental quality and resource productivity on a long-term basis that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.

The policy covers in broad terms, all sectors related to the environment and natural resources. It provides good guidelines for policy development for the management of specific natural resources. Its implementation would lead to sustainable management of the environment and natural resources.

However the policy cannot be implemented on its own. It requires the development of more detailed sectoral and cross-sectoral policies for which it provides the guiding principles.

ii) Policies related to biodiversity conservation

The National Environment Management Policy, 1994, provides for a strategy to develop comprehensive and coordinated policies, strategies and actions for biodiversity conservation.

Policies on biodiversity conservation are found in such sectors as wildlife, forestry, fisheries and wetlands.

In the wildlife policy, wildlife resources are managed in perpetuity for Ugandans and for the global community hence catering for the International Biodiversity Convention. The new Uganda Wildlife Policy provides for effective approach to biodiversity conservation. Its implementation would improve conservation outside protected areas and the degraded protected areas which have been outside the national parks.

The forestry policy aims at managing forest resources sustainably in protected areas and outside protected areas. It provides for increased forest production by the sector and the community. The policy provides effective approach for sustainable biodiversity management including those outside protected areas.

The fisheries policy is spelt out in the first development plan for 1961-62/1965-66. The policy aims at achieving maximum social economic exploitation of the country's extensive natural fish resources consistent with the preservation of these resources for future generations. It also aims at increasing the fish resources by artificial means such as fish farming.

To date the fish farming policy has been updated and extension services on fish farming are being re-activated. Emphasis on aquaculture provides effective approach towards improvement and conservation of the resource.

The wetlands policy aims at promoting the conservation of wetlands to sustain their ecological and socio-economic function for the present and future well-being of the people. Wetlands of significant national biodiversity value should be fully protected. The policy is comprehensive and its implementation would lead to sustainable utilisation of these resources which are being heavily degraded.

iii **Policies related to Rangelands/Pastoralism and Agro-pastoralism.**

There is no policy on rangelands except the provision in the National Environment Management Policy.

iv **Policies related to Agriculture.**
Agricultural policy provides for the promotion of farming systems and land use practices that conserve and enhance land productivity in an environmentally sustainable manner. Without a comprehensive land use policy and legislation proper implementation of this policy is difficult for sustainable management of the environment and natural resources.

v **Policies related to urbanization, industrialization and refugees**

There is no comprehensive policy for taking environmental concerns into account while setting industry, planning for urban development and establishing refugee settlements.

2.6.3 Legislation

(a) Environment Management Statute 1995.

This statute is an umbrella law to regulate the use of environment and natural resources. Apart from the wildlife statute 1996 which takes into consideration the provisions in environment management statute there is no other law recently enacted in environment/natural resource sector. The old sectoral laws are still in operation. Such laws include:

i Fish and Crocodiles Act 1967 which makes provision for the control and regulation of fishing, conservation, marketing and sales of crocodiles skins.

ii Forest Act

iii Legislation on rangelands is scattered in various acts and decrees such as Public Lands Act 1969, Plant Protection Act 1937, prohibition of Burning of Grass Decree No. 5, 1974 and Cattle Grazing Act.

iv Legislation on agriculture is embodied in the various Land Acts e.g. Cotton Act 1966, Control of Agricultural Chemical Statute, 1989.

v Legislation on urbanization and industrialization is embodied in the Urban Authority Act No. 8 of 1969, Decree No.3 of 1979 and Industrial Licensing Act, 15 of 1969.

2.6.4 Institutional Framework

The National Environment Management Authority (NEMA) is in charge of overseeing, coordinating and monitoring all activities related to environment and natural resource management in Uganda.

The day-to-day implementation of environmental/natural resources management activities is the responsibility of sectoral ministries, departments, public and private sector institutions and NGOs.

2.6.5 Issues/Problems

1 Institutional set up such as NEMA and UWA as of now, do not have adequate capacity to oversee, monitor and co-ordinate environmental and natural resources management activities throughout the country.

2. There is still lack of harmony between the sectoral policies because of sectoral approach to policy formulation.

3. There is still a weak linkage between NEMA and the lead environmental agencies despite efforts to establish liaison units in line departments.

4. Many of existing legislations are outdated and cannot support sustainable management policies and strategies.

5. So far it has been difficult for the Central Government to manage all the resources like streams and wells, ponds and swamps all over the country.

6. There seems to be a conflict between sustainable management policies and the government policy on privatization of productive resources. The former emphasises sustainable management while the latter emphasises profit maximization which can degrade the resources.

7. Most of the current environmental policies and legislations still lack up to date subsidiary legislations for the proper operational mechanisms.

2.6.6 Recommended Intervations

The following interventions correspond to the priority setting of the threats and their root causes.

1. Strengthen the institutions through manpower development.

2. Enhance and strengthen institutional linkages or the coordination between NEMA and the lead agencies.

3. Environmental and natural resource concerns being cross-sectional, an integrated multi-sectoral management approach which provides a comprehensive institutional mechanism to ensure wide and active participation should be adopted.

4(a) Review and update existing legislation in the E/NRM Sector.

5(a) Ensure community involvement, sensitization and/or mobilisation of the populace so that it appreciates the need to utilize, natural resources sustainably.
(b) Develop capacity for the local communities to be involved in the implementation of environmental and natural resource policies.

6. Strengthen the linkages between institutional framework of public sector bodies, the private sector and NGOs which will ensure that consumption patterns tally with the national policy of sustainable development.

The evolution of effective conservation and environmental lobby groups will facilitate enforcement of environmental policies and a quick development of subsidiary legislation.

3.0 COMMON ROOT CAUSES OF ENVIRONMENTAL THREATS

The highlands in South-western Uganda, the Ruwenzori mountains and Mount Elgon are among the major areas facing environmental threats. These areas have very high population, exerting severe pressure on the fragile ecosystems. Soil erosion is major concern.

Another area experiencing a high level of environmental degradation is the Lake Victoria basin with the high population density and large urban areas. Various other parts of Uganda are experiencing environmental problems to varying degrees.

Several of the environmental issues/threats identified in the sectors above are cross-cutting. Their solutions will therefore require a holistic and co-ordinated approach. Common root causes include the following:

1. **Lack of Land use Policy and Land use Planning**

   Efficient use of the resources largely depends on proper land use policy and planning. Lack of this policy leads to rapid degradation of fragile ecosystems and habitats such as hill slopes and wetlands with subsequent loss of productive agricultural land and biodiversity.

2. **Inadequate Legislation**

   Most of the legislation related to resource use is outdated.

3. **Lack of Rights of Tenure/ownership**

   Unclear resource tenure rights make it difficult to control resource use. Lack of rights over a resource by a community or an individual encourages its misuse.

4. **Lack of Coordination**

   Inadequate co-ordination both vertically and horizontally among government departments, private sector and NGOs in the E/NRM Sector.

5. **Inadequate Public Awareness**

   Low public awareness on environmental issues and the need to conserve the environment is still partly responsible for low community commitment to sustainable management of the natural resources and maintenance of good environmental quality in settlement areas.

6. **Lack of Adequate Community Involvement**

   Low level of Community Involvement in Natural Resources Management.

7. **Population Pressure**

   The rapid population growth is putting strain on all resources including those in protected areas. Coupled with poverty, low agricultural productivity and general lack of awareness, population pressure continues to be a major threat to the natural resources.

8. **Lack of Usable Data**

   Inadequate data on natural resources which limits effective planning for sustainable management.

9. Lack of Alternative Sources of Income

Underlying unsustainable utilization of the resources such as deforestation, wetland drainage, cultivation of marginal lands and encroachment in protected areas is lack of alternative sources of income which forces majority of people into such activities to make ends meet. Investments by the communities in resource conservation whose benefits cannot be immediately realised is very low because of low income level.

Annex 1 (a) Recent, current and planned donor interventions and interest in aquatic and wetland resources of Uganda

PROJECT TITLE	PROJECT OBJECTIVE	DONOR	FUNDING mil US $	PERIOD	STATUS
E U Regional Fisheries Project - Phase I	Improve research capacity of riparian institutions	EU	1.800	89-95	Project ended successfully
E U Regional Fisheries Project - Phase II	Stock assessment & preparation of management plan for Lake Victoria	EU	10.080	96-2001	Project has started
Establishment of Lake Victoria Fisheries Organisation (LVFO)	Establishment of regional mechanism for management of Lake Victoria	FAO	0.091	93-95	LVFO has been ratified
Fisheries Statistics & Information Systems	Rehabilitate fisheries statistical data collection	FAO/ UNDP		89-91	Project ended but has not been sustained by UG.
Institutional Support for protection of East African Biodiversity	Provide support for diversity studies in East African institutions	GEF	10.000	92-96	discussions for phase II proceeding
Water Hyacinth mechanical control	Purchase harvester for control of water hyacinth at Port Bell etc	EU	0.500		Project failed
Control of water hyacinth	Prepare an action program for control of water hyacinth	FAO	0.193	93-95	Plan preparations completed
Predicting Spatial & Temporal Dynamics of refugia in L. Victoria	Examine role of refugia in sustaining biodiversity in Lake Victoria	NSF (USA)	0.100	97-99	Funds already approved
Lake Ecosystem project	To examine the structure & functioning of the Lake Victoria ecosystem	NSF (USA)	0.600	94-96	Discussion for Phase II in progress

Nile Perch Project	Examine the impact of Nile perch on fish stocks in lakes Victoria and Kyoga	IDRC & UG	0.250	97-95	Donor funding ended but work continues with UG support
Lake productivity Project	Examine changes in Lake Productivity mechanisms in Lake Victoria following establishment of Nile perch	IDRC & UG	0.100	89-95	Project successfully ended
Fish Commodity Systems project	Examine socio-economic constraints from fish production to consumption	IDRC & UG	0.188	91-96	Project is winding up
East African Great Lakes Project	Investigate impact of changes in L. Victoria on lake-side communities	Marc. Found.	0.102	91-95	Donor support ended but project continues under UG
Victoria Lake Basin Management Project	Address changes threatening sustainability on the Victoria Lake ecosystem	IDRC & UG	0.210	96-98	Project has started
Uganda National Wetlands Program	Develop policy & guidelines on conservation & sustainable use of wetlands	Neth		86-95	Phase II is being planned
Wetland Ecotone Project - Phase I	Investigate the potential of wetland ecotones in waste-water treatment & sustainable management of wetland ecotone	NSF - Swiss	0.100	93-96	Second phase has been approved
Wetland Ecotone Project - Phase II	Expand on activities of - Phase I	NSF - Swiss	0.400	96-99	Phase II has started

Littoral Fish Production Systems & Wetland ecotone sustainability in L. Victoria (Uganda)	Capacity building & freshwater wetland conservation and management	IHE - Deft			Still in proposal form
Lake Victoria Environmental Management Project	Manage fisheries, water hyacinth and water quality in Lake Victoria including wetlands	GEF / WB	77.00	96-2001	Funds already secured - project to start Nov. 96.
Emergency Action Plan for Control of Water Hyacinth	Control water hyacinth	USAID/ UNDP -	6.000	96- ****	Some funds have been secured
IDEAL - International Decade for E.A. Great lakes	Study paleolimnological history of E.A. Great Lakes			95-2005	Project started with L. Victoria
Fishery survey of Lake Kyoga	Fishery survey of Lake Kyoga	IFAD/W B		86-92	Project ended
The Fisheries Master Plan	Draw up a fisheries master plan for Uganda	ADB	0.600	96-97	Project almost starting

Annex 1 (b) **Donor Intevetions and Interests in Biodiversity**

Activity	Objectives	Geographic area	Implementing agency/project title	Period	Funding Agency/level
	Biodiversity inventory in selected forest reserves. Setting up of strict nature reserves (SNR) for Biodiversity Conservation.		EC/FD	1992-96	GEF/FAO
	Train East Africans in making and preserving Field Collection. Develop expertise in documentation of flora & fauna World Bank. Protected Areas Management and Sustainable Use Project (PAM).		African Tropical Biodiversity Programme MUIENR/Chicago Field Museum		McArthur Foundation
	Capacity building in management and resource monitoring etc. to assist in the development of tourism and related activities to provid financial assistance for P.A's management.		Protected Areas Management and Sustainable Use Project (PAMSU) (UWA)		World Bank
	Training, establishment SNR, strengthen management capacity building		EC Nature Forest Conservation Management Project FD		CE

			USAID support for Natural Conservation (FD)		USAID
	To strengthen FD planning capacity		IUCN Mt Elgon Conservation Project (IUCN)		NORAD
	Community Conservation		IUCN Kibale Semuliki Conservation Development Project		Dutch Government
	This project supports park management and community conservation outreach aiming to achieve great community involvement in conservation. Provies a national level community conservation officer at UNP.		Support to Community Conservation with an Emphasis on Lake Mburo National Park African Wildlife Foundation	$1,671,405 for three years.	Cooperative Agreement until July 1998 USAID
	This project provides the Trust with support for two years to allow interest accrual in the endowment account set up by the World Bank. The endowment is $4.3 million		Operational Support to the Mgahinga and Bwindi Impenetrable Forest Conservation Trust	$880,700 for two years	Project Implementation Letter funding until July 1997

	Integrated Conservation and Development Project working in park management and out of park activities in communities on the slope of the Rwenzori Mountain.		Rwenzori Mountain Conservation and Development Project World Wildlife Fund	$1,831,508 for three years	Cooperative Agreement until September 1997 but will be extended. USAID
	Promotion of ecotourism activities around gorilla tourism in these two parks. Provides support and training to park personnel and inftastructure and policy for tourism. Assistance to UNP to manage revenue sharing program.		Ecotourism Developoment in Bwindi and Mgahinga National Parks. International Gorilla Conservation Program	$1,565,482 for three years	Cooperative Agreement until August 1998 USAID
	Introduction of improved shea butter processing, economic incentives and improved forest management practices to protect shea producing trees from deforestation and provide source of improved incomes.		Shea Project COVOL Lira District	$272,095 for two years	Cooperative Agreement until July 1997 USAID
	Funds management support, equipment and exhibit infrastructure of the Centre (nee Entebbe Zoo) for three years		Uganda Wildlife Education Centre	$1,167,512 for three years	Project Implementation Letter until July 1997 USAID

	Funded direct operational support to the Station and extension of electricity to the Station.		Support to Makerere University Biological Field Station	$588,000 until July, 1996	Project Implementation Letter USAID
	Technical Assistance and Training to the Makerere University Biological Field Station, with emphasis on marketing to move Station toward greater degrees of financial sustainability		Kibale Forest Project Consortium for International Development	$1,493,000 for two years	Cooperative Agreement USAID
	Promotion of economic development activity outside Murchison Falls National Park. Focus on development of district environmental planning capacity.		Environmental Planning and Economic Development: Masindi American Cooperative Development International	$984,831 for two years	Cooperative Agreement USAID
	Promote environmental education through the Wildlife Clubs at the District level. (15 districts) Will include school nurseries and education on energy.		District Enviromental Education Wildlife Clubs of Uganda	$267,000 for two years	Cooperative Agreement pending USAID

	Economic development activities outside the park to ease pressure on park resources. Component added to improve park management through technical assistance and some support to infrastructure		Development through conservation CARE	$4,348,405 of which $980,000 went through the GMU process funding since 1991	Cooperative Agreement with various amendments to be completed by June 30, 1997. USAID

Annex 1 (c) On-going Activities in Rangeland, Resources/Pastoralism and Agropastoralism

PROJECT TITLE	PROJECT OBJECTIVE	DONOR	FUNDING mil US $	PERIOD	STATUS
Nyabushozi Integrated Pastoral Development Project	Resettlement of squatters in the Ankole Ranching	GTZ	7m DM	5 years 1995	on-going
Livestock Services Project/Water Development Component	Availing water in pastoral areas by digging valley dams	World Bank	x	5 years 1992-1997	on-going
Project Dryland Husbandry Project	Empowerment of pastoralists	Sida	$ 80.000	2 years 1996-1997	on-going

Annex 1 (d) Donor activity in Agriculture

TITLE	PROJECT OBJECTIVE	DONOR	US mill. Dollars	PERIOD	STATUS/ ENDING
Agroforestry Research Network (ICRAF/NARO)	To increase sustainable agric. production using Agroforestry (location - Kabale)	EU/USAID	0.86	1995/96	1997
Mt. Elgon sustainable dev. & forestry conser.	To formulate and implement a long-term management plan for Mt Elgon	NORAD/IUCN	2.68	1994-99	1999
National Wetlands conserv. and management prog. phase II	To assist govt to develop policy for the conservation and sustainable use of wetlands	Netherlands Govt/UCN	0.39	94-96	1996
Tree seed project	To secure and increase the provision of genetically suitable seed and plant materials from selected seed sources of both indegenous and exotic wood spp.	UNSO/GOU	1.50	1995-98	1997
Envir. management capacity building project	To strengthen the institutional capacity for Environmental Planning and Management	WB/UNDP/SIDA	8.37	1995-2000	2000
FS Adaptive Research Pilot Project	To increase farm incomes and ensure food security	EU/GOU	2.24	1995-98	1998
Banana Cropping System	To restore food self-sufficiency and maintain the cultivated hectarage as well as improve the productivity of present banana	IDRC/ Rockefeller	1.04	1995-97	1997
Southweatern Region Agricultural Rehabilitation	To increase food production, incomes and living standards of small farmers in the five districts of SW Uganda.	IFAD/IDA	5.14	1994-95	1995
Agricultural Extension Project	To improve the delivery of extension skills. Enhance adoption and improve efficiency.	IDA	15.6	1995-97	1997
IITA/Banana Research	To provide systems analysis to determine the parameters affecting pests and diseases. To collect, characterize evaluate, document and conserve Manihot germplasm available in the region.	IITA/USAID	0.78	1999-95	1995

Annex 1(e) Ongoing /planned Activities in Urbanization Industrialization and Refugee

Activity	Objectives	Geographic area	Implementing agency	Period	Funding Agency /level
Tree Planting Re-afforestation	-Plant trees to meet human (refugee) demand -Create awareness by involving school children and public	East Moyo and Adjumani	ACORD	1993 - 1996 (so far 1.5 million seedlings planted).	-/-
Research on energy saving technologies	-To economically use and save firewood -Construct or saving stove to develop alternative energy sources like grass.	East Moyo	NAD Norwegian Association of Disabled / ACORD	Pilot	-/-
Study of nutrient loading from Kampala into L.Victoria	-Assess the role of a natural papyrus wetland in pollution control from Kampala -Quantify nutrient load into L.Victoria	Nakivubo swamp - Kampala	Dutch govt., MUK*. PhD research	1993 - 1997	Dutch Govt./ approx US$100,000
Management of chemicals in Uganda	-Carry out an inventory of chemicals imported in Uganda and where they end up -Make recommendations on chemical management in the country	Uganda, esp. industrial towns	Makerere University, Chemistry Dept.	1994 - 1996	IDRC/-
Assess nutrient pollution sources in the L.Victoria basin	Carry out a survey of the nutrient sources and quantities within the L.Victoria catchment.	Kampala, Jinja, Masaka, Tororo & Ssese Islands	Kawanda Agricultural and Fisheries Research Institutes	1996 - (pending funds)	IDRC/-
Programme to manage L.Victoria environment	An integrated programme to manage the L.Victoria waters and the catchment basin (water quality, fisheries, wetlands, land-use, wastewater management, etc.)	Uganda, Kenya and Tanzania	Directorate of Water Development, et al	1996 - 2001	World Bank, Global Environmental Facility,GOU/ US$70 million

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