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Enhancing Wetlands' Contribution to Growth, Employment and Prosperity




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Photos

(Top right to left)
Fish consumer in Pallisa District, 2008
Fishers with their woven reed baskets in Apapa wetlands in Pallisa District
(Bottom left)
Residents of Buseta in Pallisa district draw water from a seasonal wetland in 2008
Photo credit**:** George Lubega Matovu.
(Bottom right)
Wetlands vegetation prevents waterway siltation, Shipping at Port Bell, Luzira, Kampala
Photo Credit: Rose Hogan.

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Acronyms and Abbreviations

CBD	Convention on Biological Diversity
CSO	Civil society organization
DWAP	District Wetland Action Plan
ENR	Environment and natural resource/s
NDP	National Development Programme
NEMA	National Environment Management Authority
NEMP	National Environment Management Policy
NFA	National Forestry Authority
NWP	National Wetlands Programme
PEAP	Poverty Eradication Action Plan
RTSU	Regional Technical Support Units
SIP	Sector Investment Plan
SWAP	Sector-wide approach to planning
UBOS	Uganda Bureau of Statistics
UIA	Uganda Investment Authority
WID	Wetlands Inspection Division
WRI	World Resources Institute
WSSP	Water Sector Support Programme

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Foreword

Uganda started the process of developing a 5-Year National Development Plan (NDP) for the period 2009/10 – 2014/15 to replace the Poverty Eradication Action Plan (PEAP) as a national development framework. The theme of the NDP is: "**Growth, Employment and Prosperity**". This wetland report has been written to inform the preparation of the Environment and Natural Resource Sector Paper for the National Development Plan process and demonstrates the contribution of the Wetlands sector to the NDP objectives.

Wetlands make a critical contribution to Uganda's economy. Wetland resources represent one of Uganda's vital ecological and economic natural resources. In addition to their direct use values such as crop cultivation, fishing and extraction of useful materials, wetlands are essential for life support processes such as stabilization of the hydrological cycle and microclimate regulation, protection of riverbanks, nutrient and toxin retention, and sewerage treatment among other uses.

There are critical linkages between wetlands and the performance of other sectors such as the water and agricultural sectors. Wetlands degradation can therefore affect the functions and costs of these sectors and can hamper the attainment of their strategic objectives.

Wetland resources are also important contributors to the attainment of the Millennium Development Goals (MDGs) of eradicating extreme poverty and hunger, promoting gender and equity, improving health, and ensuring environmental sustainability.

Despite their contribution to national socio-economic development, the full economic value of wetlands is not adequately understood nor appreciated. Nationally it is estimated that 2,376 sq. km of wetland areas have been drained (NEMA, 2001); the underlying cause being encroachment for agricultural expansion and industrial development. Pressure on wetlands is exacerbated by the high annual population growth rate (3.2%). Government has capacity constraints for wetland management which limit it from being more effective in ensuring that wetlands are used wisely to maintain their roles in reducing poverty.

The NDP planning process provides an opportunity for developing strategies and implementing practical programmes to address these limitations. In line with the NDP objectives this report identifies the following strategic objectives for the wetlands sector:

- Promote development and implementation of community wetlands management plans.
- Promote implementation of sustainable wetlands management programmes.
- Enhance sustainable conservation, and management and use of wetlands so as to optimize their socio-economic and ecological benefits to the local, national and international communities;
- Restore environmentally degraded wetland ecosystems by undertaking restoration activities involving all concerned stakeholders.
- Promote research to improve the productivity of the wetlands natural resource base and map out critical and vital wetlands throughout the country.
- Review and update laws, policies, regulations, standards and guidelines for wetlands management and ensure that they are enforced for efficient and effective wetland resources management.
- Strengthen the capacity of lead agencies and other institutions to implement programmes for wetland management.
- Strengthen the institutional framework for wetland management at all levels.
- Provide timely and correct information on wetlands.

When these strategic objectives are achieved the wetlands will regain their full potential to contribute to the economy and to the NDP aims of growth, employment and prosperity.

I therefore urge all central and local government agencies, civil society organizations, the private sector, communities, individuals and development partners, to support the attainment of these strategic objectives.

Dr. Aryamanya-Mugisha, Henry (PhD)
Executive Director
National Environment Management Authority (NEMA)

Executive Summary

Wetlands cover approximately 26,600 km^2 of Uganda's total area of 241,500 km^2, including water bodies. With a coverage of 11 percent of the total land area, wetland resources represent one of the country's vital ecological and economic natural resources. Unfortunately, their importance is almost exclusively associated with their direct consumptive use values such as crop cultivation, human settlement and extraction of useful materials. The essential life support processes – stabilization of the hydrological cycle and microclimates, protection of riverbanks, nutrient and toxin retention, and sewerage treatment – are the least recognized.

It is estimated that, approximately 5 million people depend directly on wetlands for their water supply needs, valued at US$25.0 million per year. The importance of wetlands to water resources management is observed through groundwater recharging, water storage and water purification. In this way, wetlands serve as freshwater reservoirs that release water slowly to the major drainage basins. This slow release of water ensures continuous water availability, particularly during the dry season, to support the economy.

The Poverty Eradication Action Plan (PEAP) recognizes wetlands as one of the vital natural resources that play a role in creating economic, social and environmental benefits for the people of Uganda. The PEAP also emphasizes that Uganda's economic growth and its sustainability will depend on how well such components of the environment and natural resources are managed and used. In particular, the PEAP highlights the need for improved wetland management to provide a wide range of associated products and ecological functions.

At the moment, the PEAP is being revised to inform the new five-year National Development Plan (NDP), which will replace it as Uganda's principal planning framework and public investment vehicle. This *Wetlands Resources Sub-sector study* aims at contributing to the Environment and Natural Resources (ENR) Sector Paper, which will feed into the NDP.

The Wetland Sector Strategic Plan (WSSP) recognizes the contribution of wetland resources to two major PAEP pillars – increasing the ability of the poor to raise their incomes and increasing the quality of life of the poor. The overall goal for the wetlands sub-sector is to *''ensure the conservation, wise use and protection of wetlands in Uganda through increased appreciation and effective management, as a means to achieving sustainable development throughout the country"*. This goal is consistent with the current national development aspiration of promoting ***Growth, Employment and Prosperity.***

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Status of wetlands resources, trends and implications for sustainability

The communities that access wetlands use them for agriculture, extraction of various raw materials and fishing. Consequently, a significant amount of encroachment on wetlands has occurred. NEMA (2000) estimated that 64 percent of the total seasonal wetlands in Iganga, for instance, and 68 percent in Pallisa have been converted for rice cultivation.

By 2000, an estimated 2,376.4 km^2 percent of wetlands had been converted for agriculture, industrial and related activities. By the late 1990s, almost 8 percent of the wetland had been converted (NEMA, 2000). Preliminary data from the National Biomass Study Unit of the NFA (2008) suggest that, in 2005, Uganda's wetlands cover as a proportion of the total land area had been reduced by an estimated 11 percent. The underlying cause was largely attributed to the insatiable desire of both the rich and the poor to derive livelihoods from the wetlands. This is exacerbated by the high annual population growth rate of 3.7 percent (UBOS, 2002) and pressure for industrial expansion, especially in urban areas.

In urban areas, particularly Kampala, wetlands are seen as the cheapest areas for industrial development. Many wetlands have been converted to industrial or agricultural use, or have gradually been taken over by semi-slum residential housing and associated uses, such as cultivation, waste disposal or business sites for local manufacturing artisans (*jua kali).*

Wetlands as a core asset for national development

Wetlands provide goods and services that contribute towards the economic, social and environmental benefits for human well-being, national development as highlighted below.

- production of wetland-related goods and services;
- contribution to the national economy (although the goods and services are not integrated in the national statistics);
- contribution to the livelihoods of communities living around wetlands. It is estimated that those engaged in wetland activities earn up to US$200 per capita per year.
- a source of water for domestic use and for production;
- water treatment and purification services;
- wetland-based eco-tourism development;
- biodiversity conservation, in particular as habitats for birds of international significance, as shown by the 11 wetlands designated as Ramsar Sites in the country;
- important breeding grounds for fish and birds.

When both the marketed and non-marketed values of wetland ecosystem services are accounted for, the total economic value of unconverted wetlands can be greater than that of converted wetlands. For example, conservative economic value estimates put the direct value of wetlands at U Sh450,000– 900,000 per ha (WRI, 2009). Based on these estimates, and taking into consideration the total national wetland area of approximately 2,600,000 ha (NFA, 2008), the potential total economic value of wetlands in Uganda is approximately U Sh1.2–2.4 billion per annum (equivalent to about US$780,000–1,560,000).

Economic valuation studies that include a broader set of non-marketed regulating services, such as water purification and carbon sequestration, suggest a per-hectare value of U Sh 15 million (MFED, 2004). Unfortunately, despite their high economic

value, wetlands are not managed as environmental capital worthy of protection and investment.

Wetland resources are important contributors to the attainment of the Millennium Development Goals of eradicating extreme poverty and hunger, promoting gender and equity, improving health, and ensuring environmental sustainability.

The linkages of the wetlands sub-sector to the performance of other sectors stem from the functions and values of wetlands in terms of ecological, social and economic parameters. On the one hand, the linkages can enhance the sectors' performance; on the other, their failure can have far-reaching impacts on the wetlands. Wetlands degradation can affect the functions and costs of sectors as follows:

- *Impact on water quality and water treatment*. Wetland degradation affects water quality as observed in the changes in the colour and turbidity of the water. This increases the cost of water purification in the water treatment plants, including the cost of chemicals and power.
- *Impact on road infrastructure*. The degradation of wetlands leads to a reduction of their capacity to contain storm run-off from wetland catchments, thereby resulting in flooding, which affected the roads. This costs the government dearly in meeting emergency and unplanned road repairs.
- *Provision and effective use of water for production facilities in order to restore growth in rural incomes*. The sector promotes the development of sustainable water supply for agricultural crop production, livestock, aquaculture and rural industries, thus enhancing production.
- *Provision of sustainable safe water supply and sanitation facilities including hygienic use in rural areas*. This involves the provision and maintenance of an adequate supply of water for human consumption and domestic use for improved quality of life leading to human development.
- *Integrated and sustainable water resources management*, including sustainability of agricultural crop production, hydropower development, water supply and environmental management.

Priorities, strategies and key assumptions for the wetlands resources sub-sector

In contributing to national economic 'growth, employment and prosperity', the sub-sector will deliver on the following priority interventions in the NDP, based on the issues and concerns raised:

- Strengthening the decentralized functions of wetland management.
- Improving community livelihoods from wetland resources.
- Expanding and increasing economic productivity of wetland resources.
- Improving wetlands information management.
- Improving wetland resources and management.

Emerging from the above priority interventions the following strategic objectives will be pursued, based on the premise that Uganda wetlands are resilient and can be utilized to meet social, economic and environmental needs of the local, national and international communities without threatening their integrity.

- Enhance sustainable conservation and management of wetlands so as to optimize their socio-economic and ecological benefits to the local, national and international communities through improved knowledge and understanding of ecological processes and socio-economic values of wetlands among the communities.
- Gradually make positive changes in restoring environmentally degraded wetland ecosystems by providing technical support, advice and information to the relevant stakeholders.
- Promote research to improve the productivity of the wetlands' natural resource base by providing technical support, advice and information to relevant stakeholders. Identify critical and vital wetlands throughout the country.
- Establish comprehensive laws, policies, regulations, standards and guidelines for wetlands management and ensure that they are enforced for efficient and effective wetland resources management.
- Strengthen the capacity of lead agencies and other institutions to implement programmes for wetland management by conducting research.
- Review and establish appropriate wetlands policy and legislation for realistic enforcement.
- Strengthen the institutional framework for wetland management at all levels.

For the implementation of the Water Sector Support Programme (WSSP) over its 2001–2010 period, a budget ceiling or resource envelope of US$20 million has been established based on

- the fact that such a sum can be sourced from the central government;
- local government contributions;
- bilateral and multilateral donor grants;
- to a lesser or minor extent, some forms of conventional funding.

Monitoring and evaluation indicators

Monitoring and evaluation are important in delivering the strategies outlined above. The following indicators will be used as the basis of the WSSP performance monitoring system.

- knowledge and understanding of ecological processes and socio-economic values of wetlands enhanced;
- public and stakeholder awareness of wetlands and their beneficial products and services increased;
- planning and management of wetlands systems improved;
- institutional framework for wetlands management further developed and maintained;
- appropriate wetlands policy and legislation in place and enforced;
- vital wetlands protected and their characteristics and functions conserved;
- community-based regulation and administration of wetlands resource use established and strengthened.; and
- local and international financing mechanisms for wetlands management and conservation in Uganda mobilized.

1. Introduction

1.1 Background

Purpose of the Study

This *Wetlands Resources Sub-sector Study* is one of the five studies undertaken through the National Environment Management Authority (NEMA) as an input for revising the Poverty Eradication Action Plan (PEAP) and developing the National Development Plan (NDP). The PEAP, which expires in 2008, has been Uganda's Poverty Reduction Strategy and a comprehensive national development framework. It is being revised to inform the new five-year National Development Plan (NDP). NDP's theme is '**Growth, employment and prosperity'**. This study aims at contributing to the Environment and Natural Resources (ENR) Sector Working Paper for the PEAP review. It is an opportunity for the ENR sector to move forward on the basis of experiences gained, lessons learned, and the challenges and opportunities presented by emerging situations.

The ENR Sector Investment Plan (SIP), 2007 recognizes that Uganda's economic growth has been based on its natural resources, with over 50 percent of its gross domestic product (GDP) depending on its natural resource base (MWE, 2007). Wetlands resources constitute an important component of natural resources in the country.

This study reviews the contribution of wetlands resources towards growth, employment and prosperity, and determines the priority areas for the wetland resources sub-sector and the strategies to achieve them in the five years of the NDP. This study also provides valid and reliable background information for the ENR sector, which will enable the PEAP revision process to recognize the contribution of wetland resources as a sub-sector and identify priority strategic interventions to integrate into the NDP. Finally, the study may be used as reference material in other processes that support the role of wetland resources in the national development process.

Tasks of this Study

In line with the theme of the proposed NDP, the Terms of Reference (ToRs) for this consultancy outlined the following tasks:

- Collect, analyse and present data on the contribution of wetlands resources to 'growth, employment and prosperity';
- Prepare a *Wetlands Resources Sub-sector Paper* to inform the development of the ENR Sector Paper;
- Ensure that the contents and priority areas of the wetlands resources sub-sector are integrated into the ENR Sector Working Paper.

Methods of the Study

This study was undertaken by the consultants through the methods outlined in **Table 1**.

Table 1: Study methods, activities and outcomes

Method	**Activities**	**Outcomes**
Literature survey	Examine the current literature (policy and the relevant laws, strategic/ sector plan, guidelines related to GDP, NDP, PEAP) from the lead agencies in ENR sector.	Clarification on what has been done, lessons learned and the gaps that need to be addressed in the study.
Semi-structured interviews on wetlands resources-based opportunities, their level of development, concerns and issues.	Participate in meetings with wetlands resource-based lead agencies (leaders and technical personnel) and development partners.	Clarification on policy, laws and implementation issues, land use opportunities, weaknesses, threats and access, ownership, roles played by wetlands resources in their organizational mandates and their linkages to 'growth, employment and prosperity ' established.
Data compilation and analysis.	Collate, analyse and document the results. Establish trends.	Synthesized information and trends.
Presentation of key aspects of the *Wetlands Resources Sub-sector Paper*, followed by discussions.	Draft and present the *Draft Wetlands Resource Sub-sector Paper* to the ENR Sector Drafting Committee.	Clarification on various aspects in the paper; approval from the ENR Sector Drafting Committee.
Completion of the report and submission to Sector Working Paper drafting team coordinator at NEMA.	Prepare the final report.	Report on the study with a summary of the findings and recommendations.

1.2 Wetlands resources in national development

The Ramsar Convention 1971 defines wetlands as "areas of marsh, fen, peat land or water whether natural or artificial, permanent or seasonal with water that is static or flowing, fresh, brackish or salt, including area of marine waters the depth of which at low tide does not exceed 6 metres". The National Environment Act, Cap 153, defines wetlands (or swamp) *"areas which are permanently or seasonally flooded and where plants and animals have become adapted. In general, a wetland can be defined as a shallow water body with teeming life of complex fauna and flora."*

The Poverty Eradication Action Plan (PEAP) recognizes wetlands as one of the natural resources that plays a vital role in creating economic, social and environmental benefits for the people of Uganda. PEAP also emphasizes that Uganda's economic growth and its sustainability will depend on how well the components of the environment and natural resources are managed and used. In particular, the PEAP highlights the need for improved wetland management for the provision of a wide range of associated products and ecological functions, as outlined in below (Para; *Source of products for food security and economic growth*) and summarized in **Table 2.**

The importance of wetlands to water resources management is observed through groundwater recharging, water storage and water purification. In this way, wetlands serve as water reservoirs that slowly release water to the major drainage basins. This slow release ensures continuous water availability, particularly during the dry season, to support the economy.

The Wetland Sector Strategic Plan (WSSP) estimated a requirement of US$28 million over the ten-year period, hence an annual estimate of US$2.8 million for the management of wetland resources throughout the entire country. It recognizes the contribution of wetland resources towards two major PEAP pillars; increased ability of the poor to raise their incomes and increased quality of life of the poor.

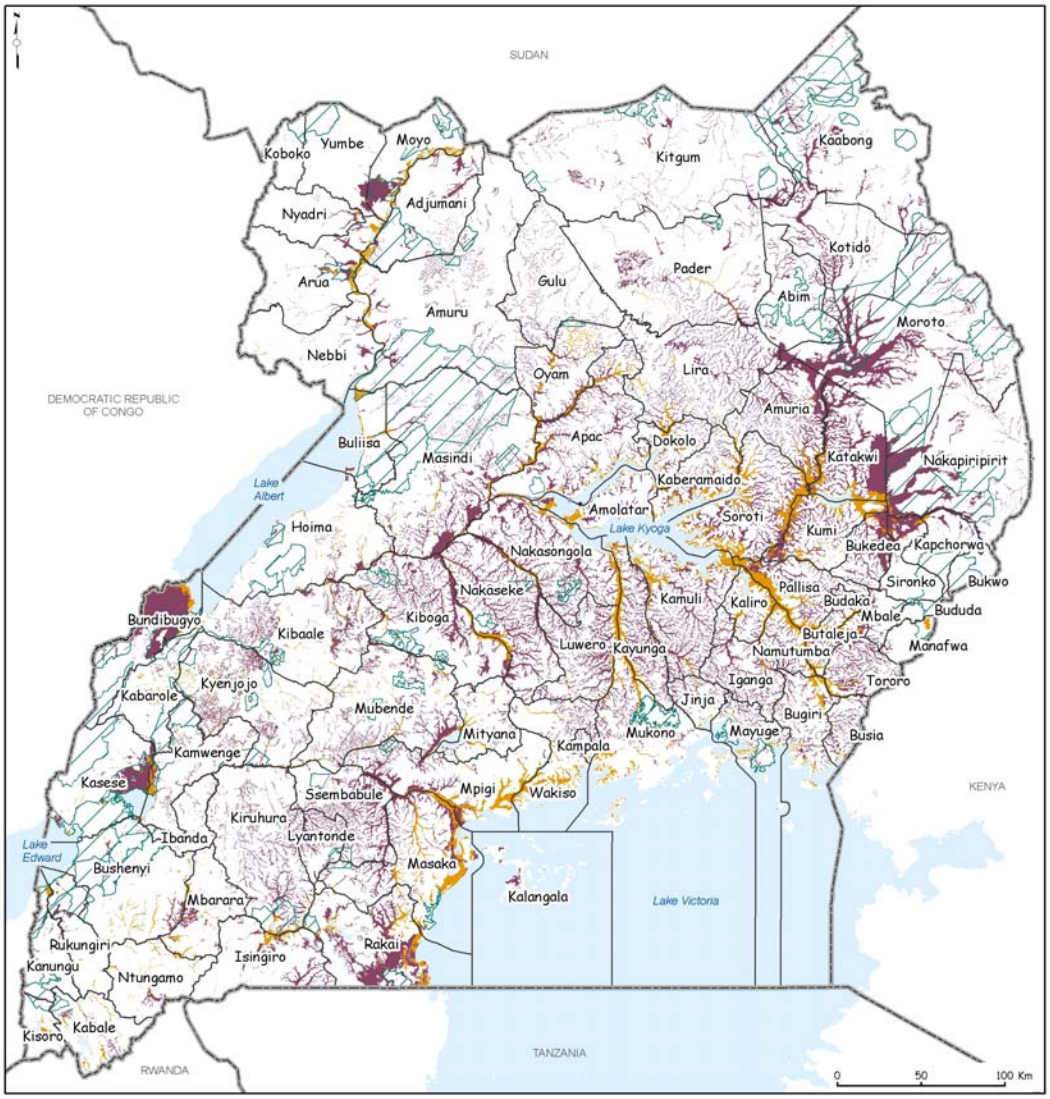
Other specific contributions of wetland resources to sustainable development are described below.

Source of products for food security and economic growth

Wetlands are important sources of fish and crops such as yams, rice and papyrus. They also provide inputs for domestic production such as roofing materials, livestock fodder and raw materials for crafts. These products contribute to the national economy, food security and income generation for communities.

Wetlands provide a range of benefits, such as crops (yams, rice, papyrus), fish, inputs into domestic production (e.g. roofing materials, livestock fodder and raw materials for crafts) and services (e.g. water storage, purification, flood control), as summarized in **Table 2**.

Figure 1: Wetland Types in Uganda 1



Source: Adapted from WRI (2009)

WETNESS TYPE

Permanent wetland

Seasonal wetland

OTHER FEATURES

District boundaries

Major national protected areas (over 5,000 ha)

Water bodies

Water storage reservoirs

The Sector Strategic Plan (2001–2010) estimates that approximately five million people depend directly on wetlands for their water supply, valued at US$25.0 million per year. The importance of wetlands to water resources management is seen through groundwater recharging, water storage and water purification. The water from wetland reservoirs ensures a reliable supply of water for domestic consumption, industrial use and generation of energy. Today, access to safe drinking water has been increasing, at 61 percent coverage (UBOS, 2006), due to drilling of boreholes, protection of wells and springs, and treatment of water from open reservoirs, a function performed by wetlands through recharging of aquifer rocks. In addition, wetlands provide important ecological services that support the performance of other sectors, including water for production and domestic use. However, this potential is not clearly captured in the national economy. In an attempt to capture the importance of these resources, the Wetlands Sub-sector has conducted case studies on the economic valuation of selected wetlands, including Nakivubo, Pallisa and Bushenyi.

Water purification and waste water treatment function

Wetlands contribute to the economy of Uganda by purifying domestic and industrial wastes and effluents, thereby maintaining the quality of urban water supplies. Nakivubo Wetland in Kampala, for example, is recognized as important in the purification of water that drains into Lake Victoria. The wetland carries a big load of untreated sewerage, solid waste and effluents discharged from various sources, including industries and vehicle garages from the city. This wetland therefore acts as a retention basin for polluted surface run-off and as a natural purifier to improve the water quality, which can be observed from both its colour and turbidity.

The degradation of wetlands leads to increased costs of water treatment. For instance, at present, according to the NWSC, the cost of treating water at Ggaba intake point has risen from U Sh100 million per month in the 1990s to over U Sh400 million per month in 2008 (C. Oloya, pers. comm., 2008).

Flood control function

Wetlands act as drainage systems that receive storm water from the associated watersheds, retain it, and slowly and systematically release it to its systems and environment thereby reducing the number and ferocity of flood incidences. Degradation of wetlands in eastern Uganda led to their failure to perform their ecological function of storage and systematically regulating water release to environment which caused incidences of massive floods in the region.

Source of employment

It is estimated that wetlands employ about 320,000 workers directly and provide subsistence employment for over 2.4 million people (MFPED, 2004). They provide raw materials for vulnerable groups, such as women for their cottage-based enterprises.

Biodiversity conservation

Wetland areas have a rich biological diversity of birds, primates, and other flora and fauna. They have demonstrated their potential for eco-tourism development and as livelihood sources for the local communities. They also provide sources of food and contribute to the socio-cultural importance to the communities. For example, the Bigodi Wetland Sanctuary in western Uganda is one of the most important eco-systems in Uganda and home to approximately 200 bird species, including the Papyrus Gonolek, Great Blue Turaco, the snowy-headed Robin-Chat, the Black-and-White Casqued Hornbill and the Emerald Cuckoo. There are eight primate species, an abundance of butterflies and rich vegetation, such as wild palms, *Polita* figs and the dominant papyrus. Guided walks through this sanctuary have been developed with the aim of assisting community development projects in the Kibale area.

Furthermore, wetlands have vital attributes such as providing gene pool research material, cultural and aesthetic values. Wetlands are important breeding grounds for some species of fish and birds. Of specific importance is the crested crane – a national emblem of Uganda – that breeds exclusively in wetlands, which are now threatened with rampant reclamation.

Table 1: Ecosystem goods and services provided by wetlands

Services	**Examples**
Providing ecosystem services.	**Products obtained from ecosystems.**
Food	Production of fish, wild game, fruits and grains.
Fresh water	Storage and retention of water for domestic, industrial and agricultural use.
Fibre and fuel	Production of logs, fuelwood, peat and fodder
Biochemicals	Extraction of medicines and other materials from biota.
Genetic materials	Genes for resistance to plant pathogens, ornamental species, etc.
Regulating Ecosystem Services.	**Benefits obtained from regulation of ecosystem processes.**
Climate Regulation	Source of and sink for greenhouse gases; influences local and regional temperature, precipitation, and other climatic processes.
Water Regulation (Hydrological Flows)	Ground water re-charge and discharge retention.
Water Purification and Water Treatment	Retention, recovery and removal of excess nutrients and other pollutants.
Erosion Regulation	Retention of soils and sediments.
Natural Hazard Regulation	Flood control and storm protection.
Cultural Ecosystem Services.	**Non-material benefits obtained from ecosystems.**
Spiritual and Inspirational	Sources of inspiration; many religions

	attach spiritual and religious values to aspects of wetland ecosystems.
Recreational	Opportunities for recreational activities.
Aesthetics	Wetland ecosystems and their resources are a source of beauty and attraction to tourists.
Educational	Opportunities for formal and informal education and training.
Supporting Ecosystem Services.	**Services necessary for the production of all other ecosystem services.**
Soil Formation	Sediment retention and accumulation of organic matter.
Nutrient Cycling	Storage, recycling, processing and acquisition of nutrients.

Source: WRI, 2009

1.3 Wetland resources in Uganda

Wetlands cover approximately 26,600 $km^{2,}$, representing about 11 percent of Uganda's total area land area (NFA, 2008).[1] The wetlands are categorized into permanent wetlands and seasonal wetlands, with the latter accounting for 75 percent of the total wetland resources **(see Figures 1 and 2)**. Depending on the vegetation of the individual wetlands, these can be further categorized into:

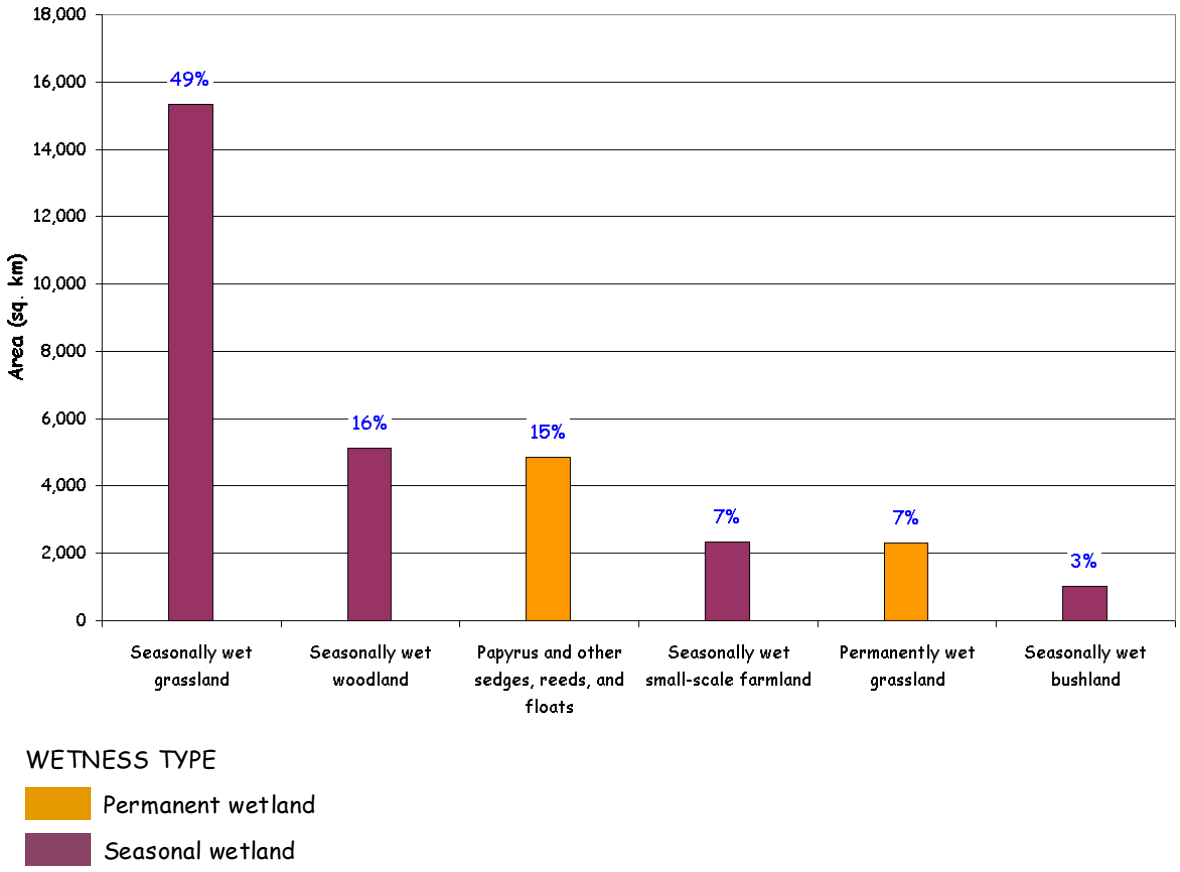
- Seasonally wet grasslands;
- Seasonally wet woodlands;
- Papyrus and other sedges, reeds and floats;
- Seasonally wet small-scale farmlands;
- Permanently wet grassland; and
- Seasonally wet bushlands

Wetland resources represent one of the country's vital ecological and economic natural resources **(Figure 1).** Unfortunately, their importance is associated only with the direct consumptive use values such as crop cultivation, human settlement and extraction of useful materials. The essential life support processes are the least recognized, for example, stabilization of the hydrological cycle and microclimates, protection of riverbanks, nutrient and toxin retention, and sewerage treatment.

Destruction of the wetland ecosystems is a serious environmental problem currently facing the country. The problem has reached alarming levels in many parts of the country, such as in eastern Uganda, where about 20 percent of wetlands have been converted to cultivation of largely paddy rice **(Annex 2)**. Underlying causes of this destruction are the desire of the poverty-stricken sector of the population to derive alternative livelihood sources; and the desire of those with capital to develop industries in the cheapest land adjacent to urban areas. The demand for cheap starch food is a driver for conversion to agricultural cropping.

[1] Preliminary report of the National Biomass Study, NFA (2008).

Figure 2: Wetland Types Categories Based on Vegetation



Source: Adapted from WRI, 2009

Some obvious impacts of wetland destruction include increased frequency of flooding, destruction of habitats, associated biodiversity and ecological processes. Adverse local climate modification is characterized by prolonged drought. This has largely contributed to a 2 m-drop in the water level of the Nile River and Lake Victoria. The government has pioneered several interventions to counter wetland degradation, including public awareness and research, and the establishment of relevant policies, legislation and institutional frameworks for sustainable management of wetland resources.

1.4 Government policy objectives

Uganda has made great strides in providing a good and coherent policy, legal and institutional framework for environment and natural resources management including wetlands. For instance, the Constitution of the Republic of Uganda, 1995 and Vision 2025 both aim at sustainable national development that addresses environmental conservation, social development and economic growth. The Constitution empowers the government, including local administrations, to hold protected areas (PAs) which include wetlands, in trust for the people of Uganda.

The government policy directives on wetlands are integrated into a number of policy and legal instruments, as shown below.

The National Environment Management Policy, 1994

The National Environment Management Policy for Uganda, 1994 recognizes the importance of wetlands in providing social-economic and ecological values and functions, and sets out to promote their conservation so that they may continue providing their ecological and socio-economic functions for the present and future well-being of the people.

Specifically, the National Environment Policy for Uganda (NEMP) emphasizes the following with respect to wetland management:

- sustainable management of wetlands;
- provision of guidelines for wetland resources management to local administrators, communities and wetland users;
- participation of local authorities/users in wetland resource planning and management;
- environment impact assessment;
- protection of wetlands of significant national biodiversity value;
- protection of wetlands serving as a source of water supply and/or as an effluent filter for human settlement;
- traditional uses of wetland resources by local people encouraged under the guidelines which are compatible with the national policies.

The National Policy for the Conservation and Management of Wetland Resources, 1995

The National Policy for the Conservation and Management of Wetland Resources, 1995 was developed with the overall objective to promote the conservation of Uganda's wetlands in order to sustain their ecological and socio-economic functions for the present and future well-being of the people.

In support of this aim, the government sets out to achieve the following goals:

- Establish the principles by which wetland resources can be optimally used and their productivity maintained into the future.
- End unsustainable exploitative practices in wetlands to avert the decline in their productivity.
- Maintain biological diversity in wetlands, either in the natural community of plants and animals, or in the variety of agricultural activities,
- Maintain the functions and values derived from wetland resources throughout Uganda.
- Promote the recognition of wetland functions, resources management and economic development decision-making with regard to sector policy and programmes, such as forestry, agriculture, fisheries, wildlife and sound environmental management.

Other policies and laws relating to wetland resources management

Other policies and laws with deliberate provisions on wetland resources management include:

- the Uganda Forestry Policy (2001) and the National Forestry and Tree Planting Act (2003);
- The National Environment (wetlands, river banks and lakeshores management) Regulations of 2000.

The Water Act, Cap 152 provides for:

- the water rights and administration and inventory of water resources and the preparation of national water plans. It also provides that construction or operation of any works should be under permit and that the permit holders must not cause or allow pollution of water. It requires that waste water that is discharged into the water ecosystems be regulated under a permit, and that the land should be inspected in relation to water use.

The Fish Act, Cap 197 provides for:

- restriction of fishing industry and trade.
- fishing in any waters with specific vessels to be licensed.
- fish processing to be done under licence.
- use of poison, explosives or electrical devices forbidden unless written permission is obtained from the Chief Fisheries Officer.
- prohibition against introduction or transfer of fish or their eggs.

The Wildlife Act, Cap 200 provides for:

- preservation of selected examples of selected biotic communities of Uganda and their environments.
- protection of areas of aesthetic beauty and of special interest.
- preservation of populations of rare, endemic, and endangered species of wildlife.
- assistance of water catchment conservation.
- generation of economic benefits from wildlife conservation for the people of Uganda.
- restriction of entry to protected areas without authority.

1.5 Wetlands in the ENR Sector Investment Plan

Wetlands is one of the sub-sectors under the ENR sector. The ENR SIP is a ten-year plan – 2008/09 to 2017/18. Within the Key Result Areas, the Wetland resources sub-sector addresses strategic objectives shown below.

Key Result Area 1: Sustainable harnessing and use of natural resources

The overall strategic objectives in the ENR SIP for the sub-sector are to enhance sustainable conservation and management of wetlands in order to optimize socio-economic and ecological benefits to local, national and international communities. This is based on the premise that Uganda wetlands are resilient and can be utilized to

meet social, economic and environmental needs of the local, national and International communities without compromising their integrity. This is to be achieved by:

- improving the knowledge base and understanding of the ecological and socio-economic values of wetlands;
- establishing and strengthening the capacities of the institutional structures for effective wetland management at all levels;
- developing and enforcing comprehensive laws, policies, regulations, standards and guidelines to ensure wetlands conservation;
- providing technical support, advice, and information to the relevant stakeholders on a regular basis;
- improving planning and management of wetland systems at both local and regional levels.

Key Result Area 4: Productive natural resources base

The SIP aims at deliberately directing efforts towards increasing the productive potential of the natural resources to meet ever-increasing demand from the larger population. Specifically, the SIP seeks to gradually make changes in the restoration of environmentally degraded ecosystems, including wetlands. Specifically, it aims at identifying critical and vital wetlands, demarcating, restoring, and gazetting the degraded critical wetlands.

In addition, it aims at promoting research for the improvement of environment and natural resources.

2. Sub-Sector Self-Assessment and Institutional Analysis

An assessment of the sub-sector's performance in terms of achieving the set goals over the 2004–2008 period was undertaken and the findings are summarized below.

2.1 Assessment of previous performance

Table 3 summarizes the performance of the wetlands sub-sector measured against the annual plans over the 2004–2008 period.

Table 3: Summary of the Wetlands Sub-sector Annual Performance, 2004–2008

Task	Performance
Complete wetland inventories for the development of the District Wetland Action Plan (DWAP).	1. 10 wetland inventories completed, and the process ongoing in the districts to provide information for planning for sustainable wetland utilization. 2. 10 studies for economic valuation of wetland resources undertaken, establishing their contributions to the national development process. This data has helped to draw the attention of the decision makers to the need to invest in wetland

	management.
Review, update and distribute awareness materials and carry out electronic and print media activities.	3. Public awareness materials developed, published and widely disseminated to a wide range of stakeholders, including central government agencies, local governments, non-governmental organizations (NGOs), community-based organizations (CBOs), the private sector, training institutions and research organizations.
Formulate by-laws and ordinances.	4. National wetlands policy being revised and a Wetlands Draft Bill produced. 5. District wetland resources ordinances formulated in five districts and one by-law formulated in one municipality.
Monitor compliance of wetland policies and associated legislation.	6. 960 monitoring and inspections conducted to enforce compliance. 7. 420 Environmental Impact Assessment (EIA) reports reviewed and evaluated to enforce compliance with the policy and regulations.
Survey, demarcate and restore critical and vital wetlands integrity.	8. Attempt to survey three critical wetlands ongoing with some resistance from the affected stakeholders.
Develop community wetland management plans.	9. 60 Wetland Action Plans prepared in some districts aimed at reducing further wetland degradation and encroachment due to limited benefits to communities. 10. Management plans prepared for three RAMSAR sites.
Produce resource use guidelines.	11. Two guidelines finalized and published on fish farming in seasonal wetlands, and wetland edge gardening.
Gazette vital and critical wetlands.	12. Gazettement of 3 vital and critical wetlands ongoing 13. 9 vital and critical wetlands designated as RAMSAR sites, with an additional one proposed for designation.
Develop District Wetland Action Plans (DWAPs) and Community Wetlands Management Plans (CWMP).	14. 60 DWAPs developed and integrated in the district development plans (DDPs) in 60 districts. 15. 33 CWMPs prepared for valuable wetlands. 16. Prepared Management Plans for 3 RAMSAR sites.
Support Regional Technical Support Units (RTSUs).	17. 4 RTSUs established and supported to provide technical backstopping to the field in wetland management.
Strengthen institutions.	18. 4 vehicles procured.
Build the capacities of districts and other institutions in wetland management skills.	19. Training and equipping of district officials with logistical and financial support ongoing.

Sources: Ministerial Policy Statements, 2004–2008

2.2 Achievements and the underlying reasons

The wetland resources sub-sector has registered commendable achievements during the period, as shown below.

Planning and Management of Wetland Resources

In 1989, the Uganda Government established the National Wetlands Programme (NWP) to develop and implement policies and plans for the sustainable management of the country's wetland resources. During its first ten years, NWP was implemented on a project basis in the Ministry of Natural Resources, later under the Ministry of Water, Lands and Environment (MWLE), and currently under the Ministry of Water and Environment (MWE). NWP efforts were directed towards policy formulation, which culminated in the promulgation of the National Wetlands Policy in 1995. This was then followed by the development of the Wetland Sector Strategic Plan for 2001–2010.

WSSP has provided fundamental guidance to the management of the wetlands resources. Subsequent planning for wetland management has drawn from this strategic plan, including the ENR SIP and the annual development of the *Budget Framework Paper*. WSSP has therefore integrated the wetlands sub-sector into the government's sector-wide approach to planning (SWAP) planning process, thereby streamlining priorities and resources allocation to the wetland sub-sector. WSSP provides the basis for informed investment discussions by the central government, local governments and development partners by outlining the needs and aspirations of Uganda for wetland utilization and sustainable management.

Establishment of supportive legislation

Since the NWP promulgation in 1995, management of wetlands as national assets have been provided for in the Constitution of the Republic of Uganda (1995), the National Environment Act Cap 135, the Local Government Act (1995) and the Land Act Cap 220. Plans are underway to formulate a specific Act on wetland resources in the near future.

Establishment of an institutional framework for wetland resource management

In fulfilment of the policy, an institutional framework was defined with the creation of the Wetlands Inspection Division (WID), now the Department of Wetlands Management. At the district level, there has been marked effort in mainstreaming wetland management into their technical management structures, with some of the districts already appointing District Wetland Officers specifically to deal with wetland issues. In addition, four RTSUs have been established to provide technical backstopping to districts falling within each RSTU mandate. The local governments have virtually integrated wetlands management plans into their activities. DWAPs are budgeted by the districts.

The formation of an Inter-sectoral Wetlands Advisory Group composed of Directors and Commissioners from the Ministry of Local Government (MOLG), the Ministry of Lands, Housing and Urban Development (MLHUD) and the Uganda Investment Authority (UIA), among others, has been instrumental in the preparation of draft wetland law, which is now before Cabinet.

Resource mobilization for wetland resources management

The introduction of the SWAP in the Sector Working Groups shifts from a piecemeal to a project-oriented approach, and implies that financial support for the wetland sub-sector will now be mobilized through the new approach that emphasizes priority setting for the sectors.

Increased awareness

Over the period of the NWP, there has been increased understanding among the communities of wetland ecosystems, including wetlands' contribution to the welfare and livelihoods of the people. In addition, national awareness on wetlands within different segments of society has increased; national consensus has been built on the importance of wetlands; and the government currently recognizes wetland ecosystems as a vital natural resources sub-sector, just like forests and agriculture.

2.3 Failures to meet sector outcomes and underlying causes

The wetlands resources sub-sector has registered some failures in fulfilling its mandate, as described below.

Failure to gazette additional wetlands

The Wetlands Management Department acknowledges failure in gazetting additional protected wetlands as originally planned. This is attributed to the slow process of formulating the draft legislation and obtaining cabinet approval for the draft legislation.

Inability to halt wetland degradation

Despite having an institutional framework for wetland management together with policies and legislations, the rate of wetland degradation is still high and a challenge to the Department. This cannot be attributed to one single aspect, but an interplay of political, economic, social and other factors.

Lack of coordination among stakeholders

There is still erratic implementation of development decisions among government agencies. For instance, UIA and Kampala City Council at times licences developers to build developments in wetland areas.

Institutional issues

Since the commencement of the drive to sustainably manage wetlands under the NWP in 1989, the institutional 'home' for the sub-sector has changed ministries following re-organizations of the ministries and departments by the government. These changes have had their own impacts on the sustainability of the sub-sector and its relative positioning under various ministries and departments. Until recently, the sub-sector was overseen by the Wetlands Inspection Division under the Department of Environmental Affairs under MWLE, with five core staff. This institutional structure was not conducive to effective delivery of services, particularly when faced with the increasing wetland issues at national level.

Currently, there are considerable weaknesses in the institutional set-up for wetlands management, particularly at the district level. Poor facilitation has hampered the implementation of DWAPs. As a result, halting encroachment on wetlands has remained a challenge.

2.4 Constraints and challenges faced

Legacies of the previous laws and policies

The previous governments put in place certain policies that did not favour wetland management. For instance, in the 1960s and 1970s, there were policies to double agricultural production, which encouraged cultivation of paddy rice in swamps, e.g. the Doho, Kibimba and Olweny Rice Schemes, which contributed to the drainage of wetlands.

Also, although the law now recognizes wetlands as public lands that should not be leased, some people have acquired land titles to wetlands. This raises the issue of compensating landlords with wetland titles, which presents a continuous challenge in the sustainable management of wetlands.

Lack of coordination among key stakeholders

There are some uncoordinated plans that tend to interfere with wetland management. For instance, in 2002, market vendors opened a market in a wetland in Ntinda, a Kampala suburb. Efforts by both NEMA and WID to evict the market vendors from the wetland were blocked, by some politicians on the grounds that the local people were looking for ways of fighting poverty. Such actions have been common throughout the country, especially as elections approached.

Poverty-environment linkage

One of the key challenges in Uganda and for most of the developing world is to find workable approaches that build on the poverty-environment-development linkage. The assumption is that the poorest in the communities often lack alternatives to natural resource use and thus become even more vulnerable once a resource is overused and degraded. The key challenge is to find practical ways that allow the sustainable use of wetland resources to contribute to poverty reduction.

Institutional capacity

The Wetlands Management Department is the lead agency on wetlands in the country. In addition to addressing mounting pressures on wetlands, it is also mandated to develop the capacity of its stakeholders in wetlands management, such as the districts to effectively manage wetlands issues at the local levels. However, the resources available to the Department are inadequate, including human resources.

Pending land reforms

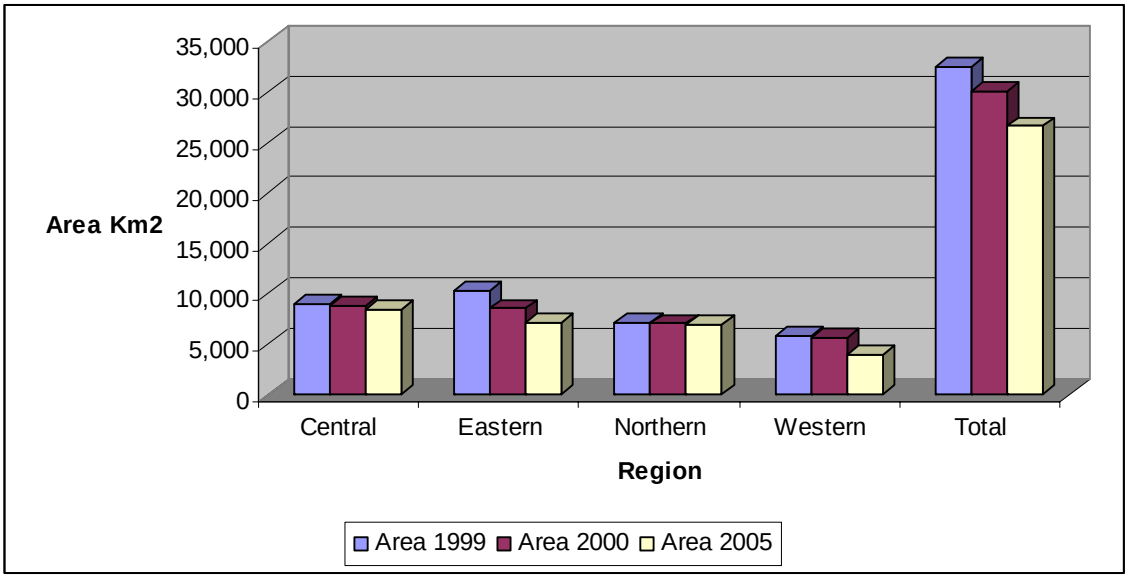
The public is suspicious over matters of land: the current debate on land in Uganda is sensitive, which makes discussions on wetlands equally sensitive.

3. Analysis of the Wetlands Sub-Sector's Linkage to National Development

3.1 Status of wetlands resources, trends and implications for sustainability

The total area of wetlands was estimated at 32,000 km^2 in 1964. In 1999, it had decreased to 30,000 km^2, or about 13 percent of the total area of Uganda (NEMA, 2004). Preliminary data from the National Biomass Study Unit of the NFA (2008) suggest that Uganda's wetlands cover, as estimated in 2005, has now been reduced to 26,640 km^2, or 11 percent of total land area. **Figure 3** shows the national and regional trends in wetland areas.

Figure 3: Trends in Uganda's Wetlands Area (1999 – 2005)



Source: Adopted from NFA, 2008

The underlying cause of wetlands destruction is largely attributed to the insatiable desire of both the rich and the poor to derive their livelihoods from the wetlands. This is exacerbated by the high annual population growth rate of 3.3 percent (UBOS, 2002) and pressure from industrial expansion.

In the 1980s, pressure on wetlands mounted in both rural and urban areas. The communities that access these wetlands use them for agriculture, extraction of various raw materials and fishing. Consequently, a significant amount of encroachment on wetlands has occurred. NEMA (2000) estimated that 64 percent of the total seasonal wetlands in Iganga and 68 percent in Pallisa have been converted for rice cultivation. It is estimated that 2,376 km^2 of Uganda's wetland areas have been drained.

In urban areas, particularly Kampala, wetlands have been seen as the cheapest areas for industrial development. Many wetlands have been converted to industrial or agricultural use, or have gradually been taken over by semi-slum residential housing

and associated uses, such as cultivation, waste disposal or *jua kali* commerce. **Box 3.1** provides an overview of the trends in the Nakivubo wetlands.

Box 3.1 Wetland trends: the case of the Nakivubo wetland in Kampala area

The Nakivubo wetland, a permanent wetland, was studied in an attempt to find answers to questions relating to the nature and rate of change, the definition and delineation of wetlands, among others. In 1955, it extended more than 400 m towards the open water body of Lake Victoria. Presently, this has greatly decreased through the various types of land use that has especially affected its north-western extremities.

Further analysis of the wetland suggests that its situation in 1964 was basically the same as in 1955 except for a retreat of wetland edge to the open water of the Lake Victoria, evidenced by the widening of the inlet. In 1973, there was evidence of clearance of the channel through papyrus harvesting for cottage use. In 1988, there was more clearance. Then, in 1995, considerable parts of the wetland were cleared for cultivation and construction, and the process became widespread, reaching as far as its deeper water points. The 1999 classification indicated that the northern section was almost completely converted, while the southern part seemed less affected. The evidence from the study suggests that major changes in this wetland have taken place more rapidly over the last 25 years. In 1999, it was estimated that 2.9 km^2 of the original 5.29 km^2 of Nakivubo wetland remained unconverted, which means that approximately 45 percent of this wetland had been modified or converted. This is also an indication of the trends in other wetlands, especially in rural areas where close to 50-65 percent of the areas have been converted to other uses.

Source: Ministry of Housing, unpublished report.

By the late 1990s, almost 8 percent of the wetland had been converted (NEMA, 2000). By 2000, an estimated 2,376.4 km^2 of wetland had been converted for agriculture, industrial and related activities.

In 2006, with the exception of the two Ramsar sites, about 26 community wetlands were managed under community-based management plans. Some pockets of wetlands in various protected areas are under formal protection, but, in general a large portion of the wetlands still face degradation.

3.2 Wetlands as a core asset for national development.

Functions and goods from wetlands

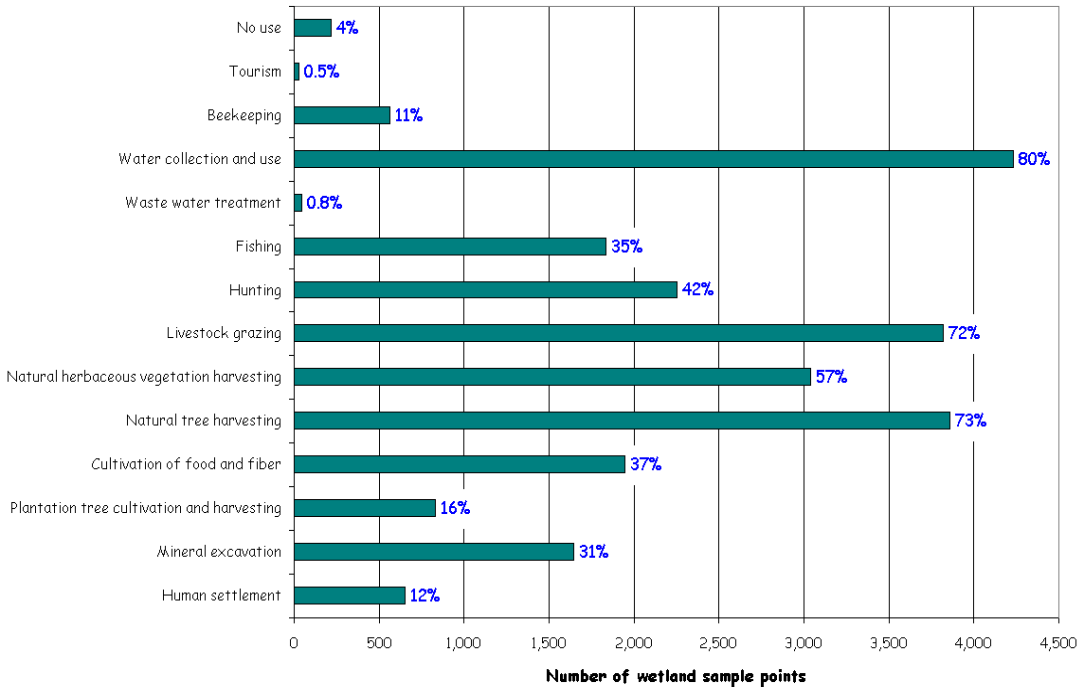
Wetlands have intrinsic attributes, perform functions and services, and produce goods. Some of these are of primarily local interest, but others have regional, national and/or international importance. They represent considerable ecological, social and economic value as summarized on **Table 4** and **Figure 4.**

Table 4: Summary of Wetland Values

Direct values	Indirect values	Option values	Non-use values
Production and consumption goods and services such as: * fish * fuel wood * building poles * sand, gravel, clay * thatch * water * wild foods * medicines * cultivation * pasture * recreation * transport	Ecosystem functions and services such as: * water quality * water flow * water shortage * water purification * water recharge * flood control * storm protection * nutrient retention * micro-climate stabilisation * shore stabilization	Premium placed on possible future uses and application such as: * pharmaceutical * agricultural * industrial * leisure * water use	Intrinsic significance in terms of: * cultural value * aesthetic value * heritage values * bequest value * existence value

Source: WID/IUCN, 2005

Figure 4: Frequency of Main Wetland Uses Inventoried in Uganda's National Wetlands Information System, 1997–2001



** The percentage related to waste water treatment only refers to those wetlands that are part of an established human wastewater treatment plant (WRI, 2008).*
Source: WRI, 2009

Contribution to economic growth

Wetlands significantly contribute to the national economy of Uganda, although in the past, goods and services generated by them tended not to be counted in national statistics. The government, development agencies and donors have often undervalued the potential that natural resources – including wetlands – can play in poverty reduction and economic development. It has been estimated that wetlands contribute around US$200 worth of goods and services per capita to users (WID/IUCN, 2005). Wetlands offer a range of products – crops, fish, and other plants and animals – that contribute to the national economy and local development.

When both the marketed and non-marketed values of wetland ecosystem services are accounted for, the total economic value of unconverted wetlands can be greater than that of converted wetlands. For example, conservative economic value estimates put the direct value of wetlands at U Sh450, 000–900,000 per ha (WRI, 2009). Based on these estimates, and taking into account the total national wetland area of approximately 2,600,000 ha (NFA, 2008), the potential total economic value of wetlands in Uganda is approximately U Sh1.2–2.4 billion per annum (equivalent to about US$780,000–1,560,000).

Economic valuation studies that include a broader set of non-marketed regulating services, such as water purification and carbon sequestration, suggest a per ha value of U Sh15 million (MFED, 2004). Unfortunately, despite their high economic value, wetlands are not managed as environmental capital worthy of protection and investment.

Employment

It is estimated that wetlands employ about 320,000 workers directly and provide subsistence employment for over 2.4 million people (MFPED, 2004). They provide raw materials for vulnerable groups, such as women for their cottage-based enterprises. Hence, wetlands contribute immensely to people's livelihoods, poverty alleviation and to the health of the environment. Human activities in wetlands generate a wide range of products consumed locally or exported throughout the world. The welfare of many communities living around the wetlands depends to a significant extent on wetland resources.

3.3 Wetlands in the national development process: case studies

The overall economic value of wetlands in Uganda has not yet been quantified to establish the contribution of wetlands from its various functions, goods and services to the national economy. Emerton *et al*. (1999) estimate the purification function of the 5 km^2 Nakivubo wetland in Kampala at US$1.3 million per year. Papyrus harvesting and mat-making in rural wetlands in eastern Uganda contribute close to US$200 per year to family income (IUCN, 2005). However, current figures for the Nakivubo wetland in Kampala, which is only 3.5 km^2, set the economic values of the wetland at US$1.8 million per year accruing from water treatment and purification services as well as crop cultivation, papyrus harvesting, brick making and fish farming. In rural areas, approximately 400,000 households that engage in wetland-

based activities earn about US$200 each per year towards household income (WID/IUCN, 2005).

Currently, there are no national figures for the total value of wetlands' contribution to the national economy. However, the following case studies provide an indication of the potential economic values of wetlands in national economic development and the GDP.

The economic importance of Nakivubo Wetland

The water, land, soils, plants, hydrological and ecological characteristics of Nakivubo wetland directly support economic activities in terms of wetland resources and services. Nakivubo wetland resources support various subsistence and income-generating activities of the residents of the low-cost settlements that directly border the wetland. The most significant uses of the wetland resources by the surrounding population are small-scale cultivation, papyrus harvesting, brick making and fish farming.

i) Cultivation in Nakivubo wetland

Nakivubo wetland supports farming by providing the water required for irrigated crop cultivation, as well as depositing sediments and nutrients that maintain soil fertility. Of an original area of 5.29 km^2, it is estimated that 2.9 km^2 is still intact, with 2.39 km^2 converted, and that three-quarters of the modified area has been turned over to crops, with the rem aining quarter used for settlements and industrial development. This results in a cropped wetland area of approximately 1.8 km^2, or 180 ha (Emerton *et al*., 1999).

There are 450–500 farmers in Nakivubo wetland living in low-cost settlements that border the wetland within 3 km or less from its edge. The mean plot sizes are of 0.2–0.5 ha in which cocoyams, sugar cane, sweet potatoes and vegetables are grown. Accordingly, crop production in Nakivubo wetland has a gross value close to U Sh200 million per year **(Table 5)**, including both the value of crops grown for home consumption and those sold.

Table 5: Gross values of cultivation in the Nakivubo wetland

			Average per farmer		**Total all wetland**	
Crop	**Yield (kg/ha/year)**	**Price U Sh/kg**	**Area (ha)**	**Value (U Sh/year)**	**Area(ha)**	**Value (U Sh million/year**
Cocoyam	2.625	300	0.14	112,219	68	53.16
Sugarcane	9,000	200	0.14	256,500	68	121.50
Subtotal water-logged areas			**0.29**	**368,719**	**135**	**174.66**
Cassava	5,250	150	0.02	18,703	11	8.86
Sweet potatoes	3,750	150	0.02	13,309	11	6.33
Mixed	1,500	100	0.02	3,563	11	1.69

vegetables						
Matooke	6,938	100	0.02	16,477	11	7.80
Subtotal for drier areas			0.10	52,102	45	24.68
Total			**0.38**	**420,820**	**180**	**199.34**

Source: Emerton *et al*., 1999

The economic value of Nakivubo's support to cultivation can be quantified by assessing the contribution of wetland to agricultural output. In the absence of the wetland, crop production would still be possible in the wetland if it remained as open land and not completely converted, but its arable potential would be far more limited than is currently the case. Without permanent standing water, cultivation would be confined to rainfed crops and the yields would be lower without the nutrients and sediments carried through wastewater and deposited by the wetland, thereby maintaining its fertility.

The added value generated by irrigated crops can be calculated by taking the difference in returns generated for farmers in wetland areas compared to crops grown in terrestrial areas. The productivity added by wetland-borne nutrients and sediments can be calculated by considering expenditures saved on alternative purchased fertilizers that would be required to maintain yields in the absence of the wetland. Quantifying these incremental benefits suggest that, in total, the Nakivubo wetland adds a value of approximately U Sh110 million a year, or a 55 percent to agricultural production, as shown in **Table 6**.

Table 6: Value added by Nakivubo wetland to cultivation

No.	**Returns**	**Value in U Sh/ha/year**	**Average value/farmer (U Sh/year**	**Total wetland value (U Sh million /year)**
01.	Returns to cocoyam and sugar cane	1,293,750	368,719	174.66
02.	Returns to drier area crops	495,625	141,253	66.91
03.	Value added by the wetland to water logged areas	798,126	227,466	107.75
04.	Gross returns without artificial fertilizers	548,438	52,102	24.68
05.	Net returns using fertilizers	495,624	47,084	22.30
06.	Value added by the wetland to drier areas	52,814	5,017	2.38
Total value added by the wetland		**850,940**	**232,483**	**110.12**

Source: Emerton *et al*., 1999

Papyrus harvesting

Most papyrus is harvested from shallow parts of this wetland around the south-east of the railway line. Papyrus generates income in three major ways: selling raw papyrus, making rough mats and harvesting papyrus to make fine mats. From the case study, it is assumed that over 5,000 bundles, or 180 tonnes, of dry papyrus may be harvested annually from Nakivubo wetland. Annual yields were estimated at some 200 tonnes of dry papyrus per year at nine-month harvesting intervals and re-growth cycle, which corresponds to the utilization of just under 9 ha of wetland **(Table 7)**.

Table 7: Economic potential of Nakivubo wetland papyrus

Activity	**Gross returns to production (U Sh/harvests/year)**	**Gross returns to production (U Sh '000,000)**
Selling raw papyrus	250,000	6.25
Making rough mats	357,143	4.46
Harvesting papyrus to make fine mats	535,714	6.70
Total	1,142,857	17.41

*Source***:** Emerton *et al*., 1999

Without the wetland, there would be no papyrus; hence, the full economic value of papyrus harvesting can be attributed to it. With most papyrus harvesters working throughout the year and earning a gross annual income of U Sh250,000–536,000, the total papyrus harvesting in the Nakivubo wetland can be worth up to U Sh17.5 million per year, as shown in Table 7. Therefore, the economic potential of Nakivubo wetland and its contribution to the welfare of the adjacent population are enormous and play a major role in the NDP process.

iii) Water treatment and purification functions of Nakivubo wetland

Nakivubo wetland functions as a buffer through which much of Kampala's industrial and urban waste water passes. It therefore plays an important role in maintaining the quality of the city's water supply. Nakivubo wetland physically, chemically and biologically removes pollutants and sediments from the wastewater that passes through it, and reduces the pollution load entering Inner Murchison Bay (IMB) through the mineralization and sedimentation process.

Of importance is the capacity of the wetland plants to remove phosphorus and nitrogen, the accumulation of suspended solids, pollutants and pathogenic organisms in the wetlands' bottom sediments and their decomposition; the conversion of heavy metals from soluble to insoluble forms; and the dilution of effluents effected through density currents caused by the difference in temperatures between the wetland and the Bay waters.

Economic values of wetlands of Bushenyi District

Bushenyi wetlands provides a range of tangible benefits to the local people. In the district, papyrus is mainly used for making handicrafts for own use and sale. Papyrus also produces excellent roofing materials; other sedges are used for mulch, thatch, handicrafts and dry season grazing. Wetlands are also a source of food, permanent drinking water, firewood and traditional medicines. In the district, the wetlands also supply non-tangible but important services for peoples' livelihoods. Some of the benefits from wetlands in Bushenyi are highlighted below.

i) *Wetland contribution to milk production in Bushenyi District*

The total milk production in the Bushenyi District is estimated at 126,000 litres a month. It is estimated that 10 percent of the total production in the district originates from grazing in wetlands, implying that monthly productivity levels of 126,000 litres are wetland-supported. The gross annual values added to wetland pasture through gate price of U Sh300/litre is U Sh435,600,000 **(Table 8)**.

Table 8: Gross value addition through milk production

Total annual milk production for Bushenyi (litres)	15,120,000
Share assigned to wetlands (%)	10
Milk production assigned to wetlands (litres)	1,512,000
Price of milk (U Sh)	300
Gross value of milk production (U Sh)	**435,600,000**

Source: IUCN, 2004

ii) Water reservoir and purification

The importance of wetlands with respect to water resource management is twofold. First, the wetlands act as water reservoirs that store water and allow it to slowly recharge local and eventually regional water systems. Second, wetlands filter and clean dirty storm water and make it suitable for human consumption and livestock use. Wetlands can remove up to 95 percent of the sediments in water and considerable amounts of heavy metals and nutrients.

Many rural households obtain their supplies of safe and clean drinking water from wetlands. A GIS model of household dependence on wetland-based water sources per year estimated that at least 83,000 households in Bushenyi District depend on wetlands for their domestic water supplies **(Table 9)**. The study further established that, on average, each such household uses 60 litres of water per day. These households therefore consume 1,817,700,000 litres (1,817,700 M^3) of water per annum, implying a wetland gross value of water provision of U Sh9,088,500 per year.

Table 9: Gross value of water for domestic consumption (USh)

No. of households using wetland-based water sources		
83,000		
Water use per household per day (litres)		
60		
Water use per household per annum (litres)		21,900
Water use for all the household per year (m^2)		
1,817,700		
Market price per m^3		5,000
NWSC-subsidized prices:	public water stand	424
	institutional supplies	854
	domestic supplies	695
Gross annual value of water for domestic consumption		**9,088,500**

iii) Wetland water provision for livestock production

Livestock obtain their water requirements from the wetlands. Through interviews with farmers, it was found that each cow consumes on average about 40 litres of water per day, or an annual water consumption of around 130,816,000 litres. The gross value associated with the provision of water was U Sh654,080,000 per annum in 2004 **(Table 10).**

Table 10: Gross value of water for livestock

No. of cattle obtaining water from wetlands	8,960
Amount of water consumed per day per head of cattle (litres)	
40	
Total amount of water consumed per year (litres)	130,816,000
Cost of water per 20 litres (U Sh)	100
Gross annual value of water for livestock production (USh)	**654,080,000**

iv) Indirect and indirect and non-use values of wetlands

In many cases, the outputs resulting from the use of wetland resources cannot be directly measured. They are, nonetheless, extremely important and their computation would significantly increase the overall gross value of wetlands. The category of output is non-use and indirect. It includes mostly the functional values of wetlands such as carbon sequestration, ground water recharge, gene bank functions, option value for pharmaceutical use, cultural, aesthetic and heritage value.

The World Conservation Union (IUCN, 2004) attributed a greater proportion of the total value of wetlands to the above-mentioned ecosystem services than to harvest of

wetland resources such as grass or papyrus. Other economic contributions of wetland ecosystem services are summarized in **Table 11.**

Table 11: Indirect and Non-Use Values of Wetlands in Bushenyi

Wetland function	Economic value in US$/ha/year	Equivalent in USh*	Total value in USh for the 18,300 ha of wetlands
Micro-climate regulation	265,000	461,100	8,438,130,00
Flood control	7,240,000	12,597,600	230,536,080,000
Water regulation/recharge	30,000	52,200	955,260,000
Habitat/refugia	439.00	763,860	13,978,638,000
Recreation/aesthetic	491.00	854,340	15,634,422,000
Cultural	1,761.00	3,064,140	56,073,762,000
Total	**10,226,00**	**17,793,240**	**325,616,292,000**

Source: IUCN, 2004

*__Note__: The exchange rate is USh1,740 = US$1, as at 2004.

Economic value of Pallisa wetlands

As sources of livelihoods, the Pallisa wetlands are particularly threatened by agricultural conversion to rice fields. The wetlands contribute greatly towards poverty eradication by providing sources of water, grazing of livestock, fuel wood and raw materials for handicrafts.

i) Value of wetland grass in Pallisa District

The population of Pallisa District is estimated at 474,000. The average household has 5.4 persons; 83.6 percent of them use grass for roof thatching. A standard house requires about 50 bundles of grass, which costs an average of USh 750. The roof thatch is replaced every year. Based on these figures, the wetland grass resources of Pallisa District are worth close to U Sh3 billion **(Table 12).**

Table 12: The net value of wetland grass in Pallisa District

Resource characteristics/volumes	Cost (U Sh)
Total population in Pallisa District	474,000.00
Average no. of person/household	5.40
Average no. of households in Pallisa District	87,778.00
No. of households using wetland grass for roof-thatching	73,382.00 (83.6 percent)
Standard house (thatch replaced every year) requires 50 bundles	50.00
Total no. of wetland grass thatch bundles collected every year	3,669,112.00
Average price/bundle (U Sh)	750.00
Total value of wetland grass/year	**2,751,833,000.00**

Source: IUCN 2001

ii) Wetland fishery value in Pallisa District

There are nine gazetted landing sites in Pallisa District on the nine small lakes of Lemwa, Kawi, Gigati, Nakuwa, Meito, Geme, Nyaguo, Komunuo and Nyasala. There are a total of 147 fishing boats; 99 percent of the fresh fish is caught and sold at Pallisa town market. The total annual net value of fish from the wetlands in Pallisa District is U Sh875,385,000 (IUCN, 2001). Although fishing is carried out in wetlands is mainly for domestic purposes, it also contributes cash income to several fisher groups. Due to the lack of processing facilities in Pallisa District, much revenue is foregone.

iii) Water transport value of Pallisa Wetlands

Since the road network in Iganga and Kumi Districts bordering Pallisa District is not well developed, water transport is very important, especially to the neighbouring districts, which are separated from Pallisa District by huge wetlands and water bodies. An economic case study on Kasodo wetland was conducted based on five boats that ferry 16–20 people up to three trips a day. A net economic value of water transport is estimated at U Sh250 million, as summarized in **Table 13.**

Table 13: Water transport value in Pallisa District

Water transport value	No. of boats at Kasodo – 5	Net Revenue/boat/year	Total net annual value (U Sh/year at Kasodo landing site)
Net value of water transport	No. of major landing sites –4	12,510,000.00 Average net annual value/site (U Sh/year)	62,550,000.00 Total net annual value
Total water transport value		62,550,000.00	250,200,000

Source: IUCN, 2001

3.4 Eco-tourism potential of wetlands: the case of Bigodi Wetland Sanctuary

Bigodi Wetland Sanctuary is located in Bigodi village, on the Fort Portal-Kamwenge-Mbarara road, 39 km from Fort Portal (western Uganda). The ecotourism services offered are mainly guided walks around the swamp in the morning and late afternoon (2–4 hours' duration), sales of crafts and training in craftmaking.

The Wetland Sanctuary provides one of the most important ecosystems in Uganda and is home to approximately 200 bird species, including the Papyrus Gonolek, the Great Blue Turaco, the Snowy-Headed Robin-Chat, the Black-and-White Casqued Hornbill and the Emerald Cuckoo. There are reportedly eight primate species, an abundance of butterflies and rich vegetation, such as wild palms, polita figs and the dominant papyrus.

The Bigodi Wetland Sanctuary is managed by the Kibale Association for Rural and Environmental Development (KAFRED). KAFRED is a community-based environmental organization formed in 1992 with the aim of achieving social and economic development for local communities. The services are guided walks – non-Ugandans, US$12 per person; Ugandans and students, US$6 per person; and rental of Wellington boots, US$0.5.

KAFRED has used income generated from the ecotourism services of the wetland to build the Bigodi Secondary School and pay teacher salaries. KAFRED has also opened a library to the entire community. This further demonstrates the potential contribution of wetlands to the NDP. In addition to the Bigodi Wetland Sanctuary, there are other wetland sites with eco-tourism potential such as Kyojja Wetland in Masaka.

3.5 Scientific importance of wetlands

To date, Uganda has designated a total of 11 wetland areas Ramsar Sites that are of international of importance, for their role in supporting habitats for birds **(Table 14).** The Uganda Ramsar Sites are part of the country's Important Bird Areas (IBAs). These sites play the following vital roles:

- Contribute to the development and the implementation of national biodiversity conservation strategies in line with the Convention on Biodiversity (CBD), and in particular, assist national organizations and agencies to identify and conserve areas of high biodiversity value;
- Assist the government in the implementation of and in active participation in international, regional agreements such as the CBD and Ramsar Conventions;
- Inform decision makers and their advisers at all levels regarding the importance of these vital sites so that policies and zonations for wetlands use will be formulated or modified accordingly.
- Help in identifying future priorities for action required in bird conservation and research in the country – in terms of important sites, species, habitats, and threats to them – in order to motivate the scientific community to continue in the research agenda on thematic topics of wetlands.

These sites have potential for eco-tourism and provide a source of livelihood for the local communities. They are also of socio-cultural importance to the communities. Uganda should provide support to these sites in order to enhance their economic importance. However, their total economic value has not been determined yet.

Table 14: Summary of globally threatened birds in the new RAMSAR Sites

Species	Status	Ramsar Sites							
		Nyamuriro	**Mabanda Bay**	**Lutembe Bay**	**Sango Bay**	**Nabugabo Wetland**	**L. Nakuwa**	**L. Opeta**	**L. Bisina**
Madagscar Pond-Heron	NT	X		X					
Shoebill stork.	NT		X	X		X	X	X	X
Pallid Harrier	NT		X			X			
Great Spine	NT					X			
African Skimmer	NT			X					
Papyrus Gonolek	NT	X	X	X	X	X	X	X	X
Papyrus Yellow Warbler	VU	X		X			X		
Blue Swallow	VU		X		X				
Total		03	04	05	02	04	03	02	02

Source: IBA, 2001

Breeding grounds for the crested crane: national heritage function of Wetlands

The country's national emblem, the Crested Crane (*Balearica regulorum gibbericeps)*, breeds exclusively in wetland ecosystems. However, these habitats are increasingly being threatened mainly by clearance for cultivation, which has led to the loss of the breeding grounds and the resultant negative impact on the survival of the crested crane. It is reported that over the last 25 years, there has been a 30 percent decline in the breeding and survival of the Crested Crane, from 1.3 young birds per breeding pair in 1974/75 to 0.88 in 1999/2000 (Olupot and Plumptre, 2006). If the current trend of wetland loss continues, it is feared that no Crested Cranes will breed successfully in the country within the next half a century. It is important, therefore, that wetlands be given due conservation attention to support the survival of its national emblem.

Millennium Development Goals with respect to the wetlands

The Millennium Development Goals (MDGs) are an important step to increase the focus on the poor and bring them out of the poverty trap. The wetland resources contribute to their achievement, as outlined below.

MDG No. 1: Eradicate Extreme Poverty and Hunger

Many Ugandans depend on wetland resources products for food, building materials, medicine, supply of clean water for domestic use, grazing, water supply for animals, and maintenance of soil fertility. Products such as papyrus, palms and rattan are a raw material for crafts and a source of household income that go far in eradicating poverty. As noted above, over 320,000 people are engaged in formal employment within the wetlands sector, and over 2.4 million people derive their livelihoods from wetland resources.

MDG No. 3: Promote Gender Equality and Empower Women

Wetland resources contribute to the promotion of gender equality and empowerment of women in Uganda. The wetlands provide raw materials, thus empowering women and children to produce wealth: the crafts industry in Uganda has been largely promoted by women and the skills imparted to the children. Women and children are actively involved in raising crops in the wetlands such as rice and yams to earn their livelihoods. In addition, wetland-based agricultural enterprises such as the Kibimba Rice Scheme and Doho Rice Scheme provide employment and food security for women as well.

MDG No. 4, Reduce Child Mortality; No 5: Improve Maternal Health; No. 6: Combat HIV/AIDS, Malaria and Other Diseases

Benefits from a sustainably managed wetland ecosystem include:

- adequate and safe water supply for both urban and rural communities;
- improved sanitation and hygiene, which act as natural filter and biodegradation of sewerage effluents;
- reduction and eradication of communicable and non-communicable illnesses, especially of water-related diseases;
- high nutritional value of wetland resources (fish, plants, animals);
- many indigenous wetland plants and animals with significant medicinal values, which are often the only source of medicine available to the indigenous people.

Human development and population growth exerts many and diverse pressures on the wetland ecosystem. This is more marked in Uganda's peri-urban and urban growth centres. This directly leads to outbreaks of many diseases that contribute significantly to the national disease burden. For example, infectious, water-related diseases are a major cause of morbidity and mortality worldwide, and Uganda in particular. Women and children are at greatest risk of poor health, since they work in the wetland gardens and collect water, among other activities. Wetlands contribute to the reduction in the spread of water-borne diseases by filtering polluted water from run-off and sewerage systems for direct consumption by people, and hence reducing mortality.

MDG No. 7: Ensure Environmental Sustainability

Wetland ecosystems are a key component of the environment and therefore their sustainable management contributes significantly to its sustainability. Sustainable wetland management is included in the various government policies and laws of Uganda, including the Constitution, the National Environment Management policy, the wetlands policy and related laws. In addition, it is emphasized in the macro-economic policies such as the PEAP and the Plan for Modernization of Agriculture (PMA). Effective wetland management ensures the integrity of wetland ecosystems to continuously provide the same amount and type of benefit and functions for present and future generations. However, the implementation of the policies, laws and programmes remains a challenge.

MDG No. 8: Develop a Global Partnership for Development

Due to its cross-cutting nature, forestry provides a platform for global partnerships in biodiversity conservation, climate change, conservation of water resources, sustainable land management and improved governance.

Linkages of wetlands to the performance of other sectors

The linkages of the wetlands sub-sector to other sectors' performances stem from the wetlands' functions and values in terms of ecological, social and economic dimensions. Based on the dimension under consideration, the linkages can enhance the performance of the sector under consideration, or directly/ indirectly lead to increased costs of operations and performance of such sectors.

Implications of wetland degradation on water quality

Wetland degradation has a direct effect on the quality of water bodies, which are sources of water for production, domestic and industrial use. As seen throughout this study, wetlands are being modified because their resources are being over-exploited and their lands converted to other uses, as well as through the implementation of upstream developments that alter the quality and flow of water that feeds them. A case in point is Nakivubo wetland, which contributes to the economy by purifying domestic and industrial wastes and effluents, thereby maintaining the quality of urban water supplies. Further, its wetland resources support a range of small-scale income-generating activities for adjacent slum dwellers. The threats to it currently include drainage for industrial and residential expansion, and solid waste and effluent discharge among others (Emerton *et al*., 1999).

The Nakivubo wetland is the main drainage system receiving most of the storm water from Kampala city. It runs from Makerere Kivulu through Owino Market and Nakivubo channel, and ends in the Inner Murchison Bay of Lake Victoria. Inner Murchison Bay is the raw water source

for Kampala, Mukono and Wakiso Districts. The Bay has been receiving untreated sewerage and solid waste via the Nakivubo channel for the last 30 years. This has resulted in increasingly deterioration of the lake water quality in the bay. Along the Nakivubo channel, the wetlands that acts as a retention basin for polluted surface runoff is increasingly being destroyed due to a number of anthropogenic activities such as construction works, cultivation of yams, clogging with solid waste and loading with nutrients from industries, among others. All these have affected the functioning of this natural ecosystem, which has led to several direct and indirect impacts on activities of other sectors, especially the operations of industries. These have affected the Nakivubo channel discharge into the Inner Murchison Bay (IMB) with regard to the water quality and water treatment at Ggaba water works and the associated implications on the consumers and the economy at large.

Photo 1: **Part of the channel with solid garbage clogging**
Note the dark polluted water
(*Photo*: R. Oyo, 2006)

Photo 2: Growing yams in Nakivubo wetland - Part of Nakivubo channel with yams which have affected its ecology
(*Photo*: R. Oyo, 2006)

Photo 3: Heavy cultivation along Nakivubo channel leads to silt loading on the channel thereby affecting water quality of the lake waters
(*Photo*: R. Oyo, 2006)

Photo 4: Appearance of water 150 m away from Nakivubo channel inlet to Lake Victoria

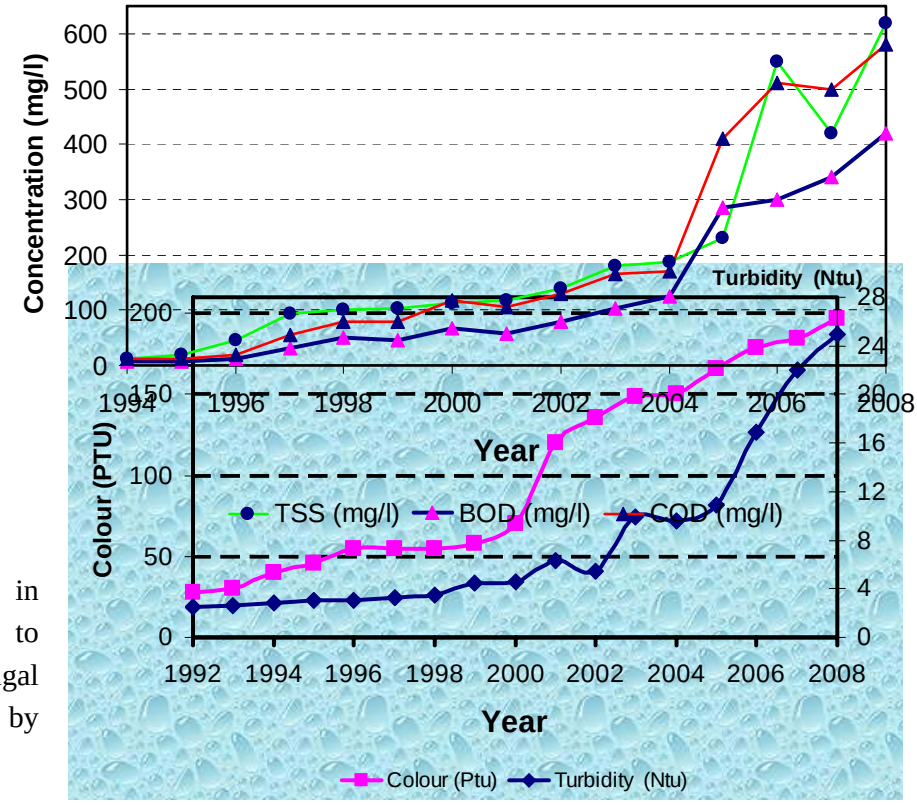
(*Photo*: R. Oyo, 2006)

The sediments also contain many nutrients that trigger algae growth (green water), as shown on photos 4 and 5. The algal bloom peak occurs in September to October.

Photo 5: Algal bloom at the Gaba abstraction point during peak season

(*Photo*: R. Oyo, 2006)

Based on the lake monitoring data, the water quality at Inner Murchison Bay (IMB) has deteriorated, as observed by the increasing colour and turbidity **(Figures 5 and 6)**. The



increased in colour is attributed to the intense algal bloom triggered by the excessive nutrients and sediments discharged via the Nakivubo channel. The increase has been more pronounced from 2000 to 2008, which is related to some extent to the rehabilitation of the channel.

Figure 5: Colour and Turbidity Trend in the Inner Murchison Bay, 1992–2008

Source: Oyo, 2006

Figure 6: BOD, TSS and COD Level 200 M from the Discharge Point of Nakivubo Inlet to Lake Victoria

The intense algal growth within the bay has resulted in the need for increased chemical doses at Ggaba II water works as shown in **Figure 7**. The aluminium sulphate dose in the last six years increased three times. This increased is explained by the deterioration in the lake water quality as result of the discharge of polluted water via the Nakivubo channel.

Figure 7: Aluminium Sulphate Dose at Gaba II, 1993–2008

The poor water quality in the Bay has resulted in increased power usage **(Figure 8)**, particularly in cleaning the filters more frequently since they are often clogged. During the peak season of

the algal bloom in the Bay, the filters are frequently clogged resulting in the interruption of the water treatment. This contributes to the worsening of water supply shortages in some parts of Kampala City.

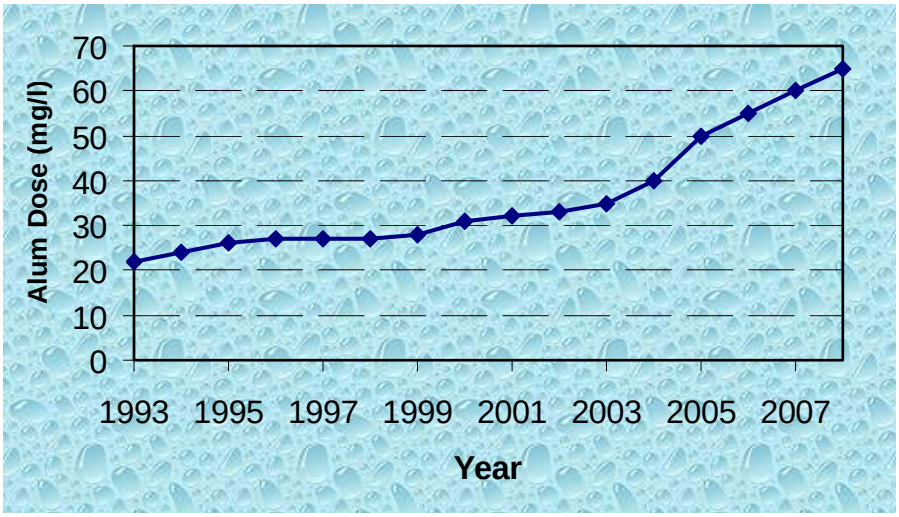
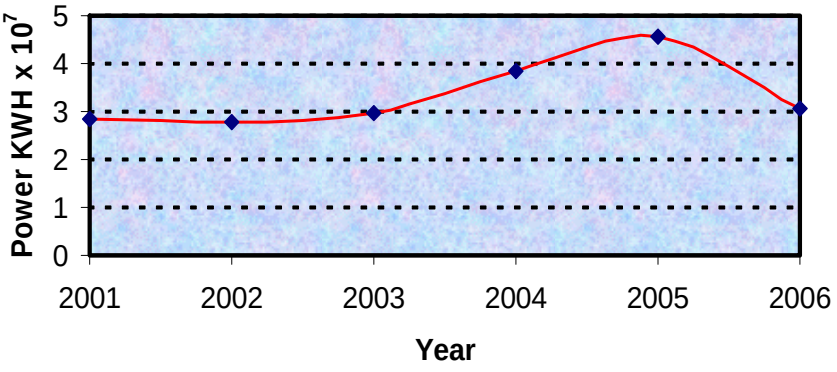


Figure 8: Energy Consumption Levels, 2001–2006

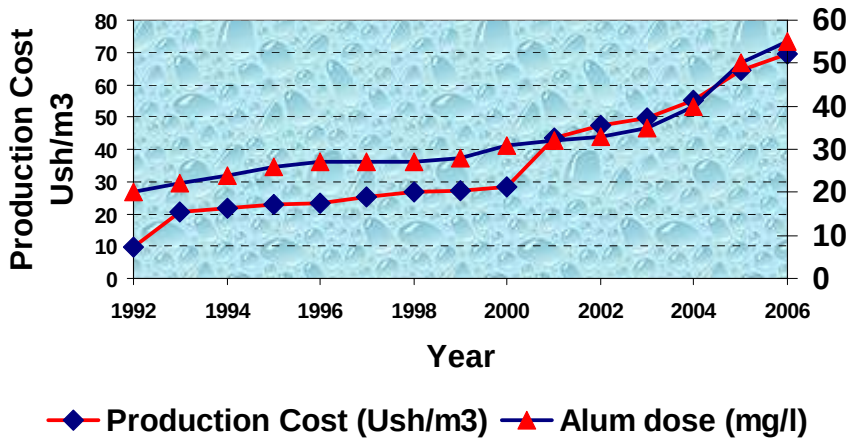
In addition to the excessive nutrients (phosphorus and nitrogen) from the watershed, the channel transports a great deal of sediments from the watershed, which has led to the heavy silting of the lake at the outlet of the Nakivubo channel, as shown in **Figure 6.**



Water treatment costs

Due to all these factors relating to the state of the water at the intake point, the unit production costs for water have gone up due to the need for chemicals and physical treatment costs **(Figure 9).**

Figure 9: Unit Water Production Costs



The discharge of polluted water from Nakivubo channel has led to the deterioration of the lake water quality, and hence increased water treatment costs at Gaba II water works. There is now an increased use of chemicals and electric power in the water treatment processes.

There is therefore an urgent need to improve the management of solid and effluent waste in Kampala City and its environs. In the long run this will contribute to a reduced unit cost of water treatment and to the healthier environment of Nakivubo wetland.

Impact on road infrastructure

The June/July 2007 period witnessed unprecedented flooding in the eastern districts of Uganda (Sironko, Mbale, Katawi, Amuria and Soroti). This was largely due to the failure of the wetlands in the areas to perform their ecological roles of flood control, resulting from rampant and rapid degradation of the wetlands there (Annex 1). The degradation led to a reduction in the capacity of wetlands to contain the storm runoff, thereby resulting in flooding that affected roads and other sectors. This called for an emergency, and previously unplanned repairs and re-allocation of resources for road maintenance (J. Ongom, pers. comm., Sept. 2008), as indicated in **Table 15.**

Table 15: Cost estimates for emergency repairs of some roads affected by the floods in eastern Uganda and other parts of the country

Road	District	Length (km)	Cost of repairs (U Sh billion)
Soroti-Katakwi (Komolo Bridge and its swamp approaches)	Soroti/Katakwi	0.7	0.3
Soroti-Kumi (Awoja Bridge and the swamp approaches)	Soroti/Kumi	4.0	2.0
Kumi-Brooks Corner (including Agu Bridge)	Kumi/Soroti	48.0	1.5
Katooke-Muzizi (Muzizi Bridge)		1.0	0.1
Aswa Bridge			0.02
Aloi-Olilim			0.02
Muyembe-Moroto (Cheptui Bridge)			0.4
Kampala-Mukono (towards Mbalala areas)			0.35
Katine-Ochero	Kaberamaido-Soroti		0.8
Gulu-Atiak-Pabbo			1.8
Total			**6.29**

Source: Uganda National Roads Authority (UNRA) Road Maintenance Plan Records FY 2007/8

Table 15 shows that the costs for emergency road repairs do not include repairs on other roads in the country that were affected by the floods nor other emergency relief items such as food and utensils given to the flood-affected people.

Other sector linkages

The important contribution of wetlands to the livelihoods of the communities and the potential to maximize outputs through deliberate commitment of resources has been highlighted above. **Table 16** provides a summary of the relationship between wetlands and sector performance, which refers to the economic values of Nakivubo wetlands, Bushenyi and Pallisa wetlands, as shown in section 3.3.

Table 16: Linkage between wetlands and other sectors

Sector	Implications of wetlands on other sectors	Implications of other sectors on wetlands
Agriculture, livestock keeping and fisheries.	Wetlands provide water for agricultural production, including milk production. Wetlands contribute directly to agricultural production through wetland farming. Sediments and organic matter carried in wetlands contributes to productivity in wetlands with no need for use of artificial fertilizers. Provision of fish and fishing as economic activity, thus contributing to employment opportunities. Wetlands contribute to climatic stabilization, thus facilitating agricultural production without subjecting it to erratic seasonality. Wetlands are a mode of transport and relatively central in the transportation of agricultural produce to markets. Wetlands trap and hold excess storm water and release it gradually and systematically into the lake systems, thus controlling flooding and reducing negative impacts of floods on agricultural production.	Agriculture leads to pollution of wetlands through agro-chemicals, thus leading to eutrophication of water bodies. It contributes to the silt loading in wetlands, thus reducing the area of wetlands. Overgrazing of wetlands interferes with the habitat and its biodiversity. Agriculture degrades wetlands with attendant flooding of agricultural areas. Seasonal burning of wetlands for grazing, fishing and cultivation affects wetland habits, and ecosystem integrity.
Water availability and purification for human consumption	Wetlands purify water, and when in tact, their water is clean for consumption. Wetlands recharge water sources, thus making water available to the consumer.	Dumping of waste water into wetlands degrades them, as occurs in the Nakivubo wetlands.

Energy	At domestic levels, wetlands supply fuel wood for domestic purposes in terms of wood and papyrus. Wetlands contribute to the modification of micro-climate and maintain the water levels in lakes and rivers. The water level of the Nile River and Lake Victoria has dropped by 2 m, which affects electricity generation. Degradation of Nakivubo wetland is leading to increased consumption of energy for water works in Kampala (Sections 3.6).	Over-harvesting of wetland fuel wood resources can lead to wetland degradation. Over-extraction of water for energy generation and agriculture (the enterprise which uses the highest quantity of water) degrades wetland ecosystems.
Transport	Wetlands contribute to transport by boats, which enables the movement of goods and merchandize, thereby enabling access to markets and services. Flooding of wetlands leads to destruction of road infrastructure, which has impacts on the operation and maintenance of both roads and vehicles.	The use of motorized boats may lead to oil spillages into the wetland ecosystems. Degradation of wetlands leads to floods, which damage transport infrastructure.
Health	Wetlands provide medicinal herbs used for medication for over 80 percent of the population in Uganda.	Poor waste management of health institutions results in dumping of hazardous waste in wetlands, thereby posing health risks and contamination to humans.
Education	Wetlands offer a wealth of knowledge and as a whole, are sites for learning and for student training.	The education sector grooms and trains students who are the future leaders, technocrats and users of the wetlands.

1.4 Backwards and forwards linkages of wetland resources and climate to other sectors' performance

1.4.1 Water for production

In order to restore growth in rural incomes the sector promotes development of sustainable water supply for crop production, livestock, aquaculture and rural industries **(Table 16).**

1.4.2 Water for domestic use

Wetlands play a vital role in providing a sustainable safe water supply and sanitation facilities, including hygienic use in rural areas. This involves the provision and maintenance of adequate supply of water for human consumption and domestic use for improved quality of life leading to human development, which is in line with Pillar 5 of PEAP. The wetlands provide sources of water needed for domestic use in many spheres.

1.4.3 Water for industrial development

Integrated and sustainable water resources management is a key to sustainable socio-economic development that results in health and economic benefits, and hence poverty alleviation. Sustainability of agricultural crop production, hydropower development, water supply and environmental management, *inter alia*, depend on the level and status of water resources management, which is in line with Pillars 2 and 3 of PEAP. Agriculture, water supply and hydropower development all depend on the ecological and hydrological functions of wetlands.

2. EMERGING ISSUES, OPPORTUNITIES AND LESSONS LEARNED

2.1 Emerging issues

Sustainable wetlands management is faced with the following emerging issues – institutional, political as well as economic.

2.1.1 Appreciation of the importance of wetlands

There is increasing appreciation of the importance of wetlands as a national resource with potential in sustainable socio-economic development. This is shown in the NDP consultation process and even more so, in the public's awareness of the laws governing wetland management.

2.1.2 Institutional development

The Department of Wetlands Management is the lead agency on wetlands management in Uganda. It is mandated with the roles of policy, regulation and monitoring as well as capacity development of local governments in the management of wetlands. This is an enormous task for the Department considering the low level resources in the Department.

2.1.3 Political dynamics

Political dynamics affect the management of wetlands. At times, politicians tend to support local initiatives that encroach on wetlands on the grounds that the poor are trying to earn their livelihoods or that the rich are providing employment opportunities. thTs makes sustainable wetlands management very difficult.

In addition, building capacities of local leaders in wetlands management is a constant challenge with elections held every five years and thus the constant need to train the newly elected groups of elected leaders.

2.1.4 Population pressure

The current population of Uganda is estimated at 30 million people and the average land holding is decreasing. This means that the pressure on land is continuing to grow, especially when the economy of the country is based on agriculture. This is leading to mounting pressure on the available land area, including on wetlands.

2.1.5 Sustainable funding modalities

Since the early 1990s, wetlands funding has relied mainly on donor support, which has contributed to the current build-up of the knowledge base on wetlands resources. International support is not as easily forthcoming for this sub-sector as it is in other areas in the economy.

In addition, one of the challenges with accessing funding in ENR is the need to ensure that the sub-sector tangibly contributes to the economy. Unfortunately, wetlands provide ecological services that are non-tangible; hence, their contribution is difficult to reflect in the national accounting procedures.

2.1.6 Oil discovery in the Albertine Rift Region

The discovery of oil in western Uganda is an emerging issue that will affect wetland resources in the region, with far-reaching impacts such as increased pollution. Increased populations due to oil exploration and exploitation will lead to overexploitation of these resources, and hence increase the challenges of wetland security and sustainability.

2.1.7 The return of peace in northern Uganda and security in the Great Lakes Region

With the eminent return of peace to the areas in northern Uganda, and the subsequent return of internally displaced persons to their homes, the pressure on wetlands in this part of the country will likely grow due to the desire of the returnees to venture into other means of livelihood such as paddy rice growing in wetlands.

2.1.8 Current development policies

The government has put in place a number of policies aimed at lifting the local communities out of poverty, which include ‘prosperity for all’ and the Plan for Modernization of Agriculture (PMA). All of these policies focus on the use of land resources, which is becoming increasingly scarce in many areas. The implication of such policies is that the people may resort to using marginal lands such as wetlands for agriculture and other livelihood initiatives. These policies will therefore need to integrate concepts of sustainable development as enshrined in the National Environment Management Policy, 1994.

2.1.9 Policy paradigm shift

There should be a deliberate effort to promote payment for ecosystem services given that wetlands supply ecosystem and provisioning services such as water purification, maintenance of hydrological cycles and ground water recharge, climate regulation and a source of water for urban centres and rural communities. Hence, extending appropriate financial contributions by the private sector that benefits from such services to wetland management institutions would be a big step towards raising resources for the conservation and sustainable use of the wetlands.

2.2 Opportunities

2.2.1 Climate change and disaster risk reduction

Wetlands provide several critical functions that are essential for sustainable development in many areas. Ecosystem functions are defined as “the capacity of natural processes and components of natural or semi-natural systems to provide goods and services that satisfy human needs" (de Groot, 1992). Wetland functions can generally be grouped into four types: regulation, provision of habitats, production and provision of information. It is generally understood, however, that increases in temperature and sea level, and changes in precipitation will degrade these benefits and services. These changes will likely affect waterfowl that depend on wetlands as habitats and may contribute to desertification processes (IUCN, 1999).

Furthermore, direct effects of climate change on wetlands are likely to be accentuated by human-induced land use changes, including encroachment on wetlands for agricultural production, drainage for industrial and residential construction. These changes will increase stress and degradation of the wetland ecosystems thus preventing them from continuously providing the underlying products and services. However, it is important to realize the degree of uncertainty associated with projections of the consequences for wetland ecosystems resulting from climate change. Wetland responses to climate change are still poorly understood and are often not included in global and national models of the effects of climate change (Clair *et al.*, 1997). Since there is a wide range of wetland types,, it is difficult to accurately predict whether they will continue to function as hydrological buffers for extreme events or provide other important ecological, social and economic services (IUCN, 1999).

2.2.2 Investment incentives in stimulating private sector-led growth

Wetlands have potential for supporting a wide range of profitable and specialized enterprises such as paddy rice growing, horticulture, fish farming and ecotourism. These enterprises are likely to attract investments, create employment opportunities and contribute to economic development of the country and the general wellbeing of the population.

2.3 Lessons learned

Lessons learned in this assignment can be summarized as follows:

- Wetland resources continue to play an important role in people’s livelihoods in social, economic, socio-cultural and political dimensions, making substantial contributions to the national and local economy. Since they form an integral part of the environment, efforts should be directed towards their conservation and sustainable and wise use to support developments and human wellbeing.

- Wetland valuation is becoming a key tool for conservationists to deliver messages on wetland values across to decision makers. The valuation process captures both values and goods and services of wetlands in economic terms, and therefore gives an idea of attendant costs incurred if wetlands are degraded.
- Wetland conservation can only be achieved through a coordinated and co-operative approach involving a wide range of stakeholders, including government ministries and departments, statutory bodies, local government, cultural institutions, NGOs and the private sector, who attach various degrees of interest to wetland values and services.
- The role of the lead agency on wetlands is overstretched, while the resources at its disposal for its management are limited.
- Ownership of wetland resources is key for their successful management. As long as they remain public goods in many parts of the country, efforts for their sustainable management will remain a challenge.

3. PRIORITIES, STRATEGIES AND KEY ASSUMPTIONS

This section establishes the wetlands resources sub-sector priority interventions for the next five years under the National Development Plan (NDP). It includes the vision, goal, sub-sector priorities, strategies and activities, as well as the investment plan necessary to achieve them. The roles and responsibilities of different stakeholders during the implementation of the Plan are also clarified. Key assumptions and crucial risks in the implementation of the Plan have also been identified.

3.1 Vision, goal and mission of the wetlands resources sub-sector

"Uganda's wetlands provide sustainable in benefits to the population of Uganda as a whole, mankind in general, and the environment." This vision is central to the sub-sector's growth and development, and serves as a reference point against which to evaluate the appropriateness of strategies, outputs and activities in wetland management. It emphasizes the importance of wetlands and a commitment to their sustainable management to benefit the people of Uganda and their environment.

The overall goal of the wetland resources sub-sector is to ensure that Uganda's wetlands contribute to human welfare and increased health of the environment. Its purpose is to ensure that they are managed and used more wisely, i.e. in ways that are conducive to conserving the environment and its biodiversity, as well as optimizing sustainable benefits to the people of Uganda and to mankind in general.

The overall strategic objective of the wetland sub-sector is to enhance sustainable conservation and management of wetlands so as to optimize socio-economic and ecological benefits to local, national and international communities.

3.2 Priorities of the wetland resources sub-sector

In contributing to national economic growth, employment and prosperity, the wetlands resources sub-sector will deliver on the following priority interventions in the NDP, based on the issues and concerns raised through the assessment undertaken:

- Strengthening the decentralized functions of wetland management.
- Improving community livelihoods from wetland resources.
- Expanding and increasing economic productivity of wetland resources.
- Improving wetlands information management.
- Improve wetland resources and management.

3.3 Strengthening the decentralized functions of wetland management

Wetland management is one of the decentralized functions of local governments and hence under their charge. There is a need to provide incentives for districts to discharge their wetland management responsibilities as stipulated in the Local Government Act 1997. Accordingly, the sub-sector will strengthen linkages with local governments and urban authorities both at district and sub-district levels, and build their capacities to manage wetland resources sustainably.

Improving community livelihoods from wetland resources

The Wetlands Sector Strategic Plan (2001–2010) aims to encourage a sustainable use of wetland resources, focusing on benefits to the poor with collaborative community-level participation. The sub-sector will promote community participation by developing and implementing community wetland management plans as a means to empower communities to manage their wetland resources and identify opportunities for improving livelihoods. The communities adjacent to the wetlands will implement this with technical support from the local governments and the Wetland Management Department. It is suggested in the WSSP that, the water users should pay for some of the benefits of water purification that accrue from the wetlands. It might be possible to allocate some of the proceeds to communities to provide an incentive for them to manage the wetlands.

Expanding and increasing economic productivity of wetland resources

Focus should be on improving wetlands product quality and pricing, and efforts to reach export markets. Alternatives to wetlands resources and better management practices also need to be promoted to reduce the costs of degradation.

Improving wetlands information management

Wetlands have a wealth of unique flora and fauna of economic importance, yet they are not fully understood by various stakeholders. Wetland-based tourism depends on the availability of information. Similarly, the impact of human activities on wetlands will be appreciated only with well-researched information to guide management. Therefore, there will be pro-active efforts to generate information on wetlands for education, awareness-raising, lobbying and advocacy, and for general management purposes.

Improving wetland resources and management

There is need to develop, strengthen and operationalize comprehensive wetlands legislation and enforcement structures to ensure sustainability and resolve ownership issues. The appropriate policies, laws, procedures and regulations will be enforced to curtail degradation of wetland resources. In addition, guidelines to promote wise use of wetland resources will be developed and disseminated.

Major sub-sector strategies for implementing priority interventions

Arising out of the above priorities and in line with SIP, the following strategic objectives will be pursued based on the premise that Uganda's wetlands are resilient and can be utilized to meet social, economic and environmental needs of the local, national and international communities without threatening their integrity:

1. Enhance sustainable conservation and management of wetlands in order to optimize socio-economic and ecological benefits to local, national and international communities.
2. Gradually make positive changes in the restoration of environmentally degraded wetland ecosystems.
3. Promote research for the improvement of the productivity of the wetlands natural resource base.
4. Establish comprehensive laws, policies, regulations, standards and guidelines and ensure that they are enforced for efficient and effective management of the wetland resources.
5. Strengthen the capacity of lead agencies and other institutions to implement programmes for wetland management.

Strategic Objective 1: Enhance sustainable conservation and management of wetlands in order to optimize socio-economic and ecological benefits to local, national and international communities.

Strategy 1.1 Improve knowledge and understanding of ecological process and socio-economic values of wetlands among the communities

This strategy will be implemented through the following activities:

i. Maintain and update inventories of all wetlands in Uganda.
ii. Carry out targeted awareness campaigns using messages and media appropriate to target audience.
iii. Introduce and support inclusion of wetlands management-related topics in primary and secondary education syllabus and curriculum.
iv. Strengthen collaboration with civil society organizations in information management and support.
v. Undertake other awareness activities to inform the communities of the importance of wetlands.
vi. Support and organize the World Wetlands Day and any other days of international importance relevant to wetlands management.

Strategy 1.2 Provide technical support, advice and information to relevant stakeholders

This strategy will be implemented through the following activities:

i. Provide routine technical backstopping to local governments and urban authorities.
ii. Participate in regional and international meetings.

Strategy 1.3 Improve planning and management of wetland systems at local levels

This strategy will be implemented through the following activities:

i. Undertake training of district officials on wetland planning and management annually.
ii. Complete wetlands inventories for District Wetlands Plan.
iii. Implement local Wetland Management Plans.
iv. Develop urban wetland management plans.
v. Ensure that all districts have prepared District Wetland Action Plans for incorporation into the District Development Plan annually.

Strategy 1.4 Identify critical/vital wetlands throughout the country

This strategy will be implemented through the following activities:

i. Gazette critical wetlands.
ii. Establish necessary regulations and by-laws related to the gazetted wetlands.
iii. Designate and manage wetlands of international importance as RAMSAR sites.

Strategic Objective 2: Gradually make positive changes in the restoration of environmentally degraded wetland ecosystems.

Strategy 2.1 Restore/rehabilitate degraded wetlands and watersheds

This strategy will be implemented through the following activities:

i. Raise community awareness of wetlands values.
ii. Remove encroachers from wetlands.
iii. Restore degraded wetlands through effective protection.
iv. Rehabilitate fragile ecosystems (riverbanks, bare hills, lakeshores) that serve as important watersheds.

Strategic Objective 3: Promote research for the improvement of the productivity of the wetlands natural resource base.

Strategy 3.1 Conduct research

This strategy will be implemented through the following activities:

i. Undertake socio-economic impact of wetland resources.
ii. Undertake applied research on key wetlands.
iii. Undertake total economic valuation of selected wetland ecosystems.

Strategic Objective 4: Establish comprehensive laws, policies, regulations, standards and guidelines and ensure that they are enforced for efficient and effective management of the wetland resources.

Strategy 4.1 Review and establish appropriate wetlands policy and legislation for realistic enforcement

This strategy will be implemented through the following activities:

i. Review and revise wetland management policy every three years.
ii. Complete the legislation process for the wetland management.
iii. Disseminate the policy and legislation to stakeholders.
iv. Train and equip law enforcement agencies to apply wetlands legislation.
v. Monitor compliance with wetlands policy and legislation.

Strategic Objective 5: Strengthen the capacity of lead agencies and other Institutions to implement programmes for wetland management.

Strategy 5.1 Strengthen the institutional framework for wetland management at all levels.

This strategy will be implemented through the following activities:

i. Strengthen the capacity of the Wetlands Management Department to carry out its functions effectively.
ii. Scale up the establishment of wetland management structure in local governments and urban authorities to meet the challenges in the sub-sector.
iii. Establish and maintain the National Wetlands Inter-Agency Coordination Committee.
iv. Advocate and influence the creation of a budget line specifically for wetland management at district and local government levels.
v. Undertake training and back-up support to district and lower-level wetland management officers.

5.1 Financing the sub-sector

Initial investment efforts

As discussed above, before 1989, the importance of wetlands management had neither been expressed in terms of human and financial resources, nor in an institutional structure to undertake its management. The designers of the NWP, had to grapple with issues of resource mobilization in terms of financial, human and technical support for the policy development process. At the start of the NWP, financial resources were mobilized by IUCN, initially from the Norwegian Development Agency (NORAD), with counterpart support from the Government of Uganda and its district local governments.

After the first two-year phase the national wetlands policy had been developed and translated into a programme, the National Wetlands Programme (NWP), to implement the policy. Subsequently, there was a need to ensure long-term financing, develop human resources, and set up various delivery mechanisms.

Long-term financing arrangements

Financial sustainability is one of the crucial factors in the government's efforts to establish a permanent and well-functioning Wetlands Management Department (WMD); a clear direction and a logical framework for actions targeting priority outputs in the management and conservation of Uganda's wetlands was a pre-requisite to achieve this. Efforts were reflected in the development of a long-term water resources management plan, which clearly articulates why the government and all its partners were concerned with improving the management and conservation of wetlands, the goal and the means of achieving it. These efforts were financed by the Royal Netherlands Embassy over a ten-year period.

Currently, Belgium, through the Belgium Technical Cooperation, is funding a five-year programme to support the implementation of the Wetlands Sector Strategic Plan (WSSP) 2001–2010, whose assistance became effective in 2003, at EUR3,995,500. The programme's objective is to strengthen national institutions, local governments and committees in order to encourage the population to use wetland resources wisely. Other donors and smaller agencies have also

made contributions to funding some aspects of wetlands management. In total, about US$9.65 million has been received by the wetlands programme over the past 15 years.

Financing by the Government of Uganda

Right from the inception of the National Wetlands Programme (NWP), the government committed financial resources towards the wetlands management activities. With the launch of WSSP 2001–2010, there have been remarkable government efforts in supporting sustainable wetlands management. The government's commitment of resources to implement WSSP activities is consistently entrenched in its overarching priority policies of the Poverty Eradication Action Plan (PEAP), the Plan for Modernization of Agriculture (PMA) and the recently adopted SWAP.

In line with the government's development policies, the Ministry of Finance, Planning and Economic Development (MoFPED) recognized wetlands as a vital natural resource sub-sector and has incorporated it into the Poverty Action Fund (PAF), a fund targeted to poverty alleviation programmes.

The total PAF contribution by the government towards the wetlands sub-sector has steadily grown from U Sh300 million for the 2000/01 financial year to U Sh500 million for the 2001/02 financial year and then to U Sh660 million for the 2002/03 financial year, which is the allocation over the subsequent years. In total, since 2000, the government has invested approximately U Sh3.77 billion (or approximately US$2.15 million) towards strengthening wetland management in Uganda. Nevertheless, this funding was not adequate to cover the WSSP projection, especially at the districts.

Investment budget under the Wetlands Sector Strategic Plan

Unlike other sectors where investments in set activities are relatively direct, in the wetlands sub-sector, the process has been relatively unsystematic and has depended largely on donor support until the late 1990s. Donor support is sometimes difficult to show since some of their resources can be channelled through technical support and provision of equipment, among others. It becomes difficult to determine exact investments and expenditures in the wetlands resources sub-sector.

For the implementation of WSSP 2001–2010, a budget ceiling or resource envelope of US$20 million has been used based on:

- the fact that such a sum can be sourced from central government;
- local government contributions;
- bilateral and multilateral donor grants;
- to a lesser and minor extent, some forms of conventional funding.

Furthermore, it is believed that substantial progress can be achieved country wide with such a sum of investment. Details of the breakdown of the funds allocation over the period broken over the first three years, second five years, and for the whole ten years is shown in **Table 17.**

Table 17: Investment budget 2001/02–2010/11

Cost category	Year			Year			Total 2001/02–2010/11	Percentage (%)
	2001/02	2002/03	2003/04	**Total 2001/02 – 2003/04**	**Total 2001/02 – 2005/06**	**Total 2001/02–2010/11**		
Institutional support	0.04	0.03	0.04	0.11	0.11	0.18	0.28	01.00
Policy and legislation	0.04	0.03	0.02	0.09	0.13	0.09	0.22	01.00
Awareness and training materials	0.11	0.13	0.16	0.40	0.81	1.44	2.25	08.00
Wetland inventory and monitoring	0.10	0.11	0.16	0.37	0.86	1.72	2.57	09.00
Community management planning	0.13	0.15	0.20	0.47	1.06	2.56	3.62	12.00
District support	0.10	1.13	0.18	0.40	0.94	2.31	3.25	11.00
Research	0.01	0.03	0.04	0.90	0.24	0.54	0.78	03.00
Staff development	0.07	0.06	0.06	0.19	0.30	0.18	0.48	02.00
Wetland protection and gazettement	0.10	0.13	0.16	0.38	0.82	1.73	2.55	09.00
Management and operations	0.70	1.81	0.96	2.47	4.74	7.30	12.03	44.00
Total	**1.40**	**1.61**	**1.96**	**4.97**	**10.09**	**17.99**	**28.10**	**100.00**

Source: WSSP 2001–2010

The roles of different stakeholders in the implementation of priority interventions

The Department of Wetlands Management is still understaffed and under-resourced with respect to the scale of its tasks. It currently has the main responsibility of discharging the functions of policy formulation, setting standards and guidelines, supervision, monitoring and resource allocation.

The roles of other stakeholders in matters of wetlands management can be defined as follows:

Roles of the Wetlands Management Department

As the national lead agency, the roles of the Wetlands Management Department include:

- liaising with, and building the capacities of, other agencies, in particular, local governments and national government agencies, to deal with wetlands issues within their jurisdiction;

- drafting and proposing policy and legal frameworks for wetlands management;
- undertaking monitoring and inspection of wetlands;
- promoting and collaborating in research on wetlands and their management;
- ensuring integration of wetlands issues into policies and strategies of other sectors, e.g. agriculture, forestry, fisheries, water, industry, rural and urban planning;
- programming the WSSP by preparing medium-term (three-year) plans and annual operations plans, etc. in collaboration with other implementation partners;
- mobilizing resources for implementation of NWSSP;
- overseeing and monitoring implementation of NWSSP;
- reporting periodically to the parent ministry on the performance of the sub-sector.

Roles of local governments

In accordance with the Local Government Act, 1997, wetlands management is a decentralized function. The roles of the district local governments with respect to wetlands management and conservation include:

- coordinating wetland management including wetlands policy formulation;
- developing and implementing District Wetland Action Plans as integral parts of the District Development Plans;
- enforcing the laws relating to wetlands;
- monitoring wetlands management and conservation, which includes maintaining and disseminating accurate, up-to-date information on the wetlands in the district in the form of District Wetlands Inventories;
- mobilizing and supporting local communities, resource user groups, local NGOs and CBOs in wetlands management and conservation, including preparation and implementation of Wetlands Management Plans;
- identifying vital and critical wetlands that need protection, and where required, ensuring the fulfilment of Uganda's obligations under the Ramsar Convention and other international agreements.

Roles of the private sector

The government need not have a monopoly on funding or implementing wetland management. The country's rapidly expanding private sector, including large-scale commercial enterprises as well as small-scale and community-level groups, have the potential to support investments in wetlands management.

Roles of civil society organizations

Principally, the roles of the CSOs include:

- helping near-wetland communities to build their capacities in terms of technical and logistical support to meet the demands of NWSSP at the local levels;
- mobilizing communities to participate in wetlands management strategies; and
- ensuring sustainable management of the wetland resources in the local settings through awareness creation and education campaigns.

Roles of the Development Partners

Over the next ten years, the implementation of the NWSSP will largely be undertaken by the donors. The Wetlands Management Department will have to draft targeted programmes or project proposals, taking into account particular interests and concerns of specific donors.

Major assumptions

Successful achievement of the Strategic Objectives of the WSSP will depend to some extent on the following assumptions:

- Political and economic stability is maintained.
- Appropriate legislation including a Wetlands Act is passed and implemented.
- International good will and commitment towards wetlands conservation is sustained.
- Stakeholders at all levels are ready and willing to cooperate in partnerships of sustainable wetland management.

Risks and strategies to manage them

Some external risks could militate against the achievement of the objectives and targets of the WSSP over its planned period:

- Budgeted funds might not be available when required for the implementation of planned activities.
- There could be an unstable security environment.
- There will be no serious bureaucratic administrative delays in the course of the implementation of the scheduled WSSP activities.
- The target areas might not be open to accessibility with many serious limitations on movements and related restrictions.
- WSSP implementation partners may not be able to attract and retain their key staff.

Monitoring and Evaluation Framework

Monitoring and evaluation indicators

Monitoring and evaluation will be important in the delivery of the strategies outlined above. The following set of indicators will be used as the basis of the WSSP performance monitoring system **(Table 18).**

Table 18: Broad indicators for monitoring implementation of the Wetlands Resource Sub-sector Plan

No.	Priority	Indicator
1.	Knowledge and understanding of ecological processes and socio-economic values of wetlands enhanced.	All district wetlands inventories reassessed, revised and reissued at intervals of at most five years. The National Wetlands Inventory System (NIS) updated with inventory data. Findings, conclusions, and recommendations of research on identified topics available and disseminated. Increased public awareness of wetlands' functions and benefits as measured by repeat Knowledge, Attitude and Practices (KAP) surveys. Increased levels of favourable media coverage of wetlands issues. Wetlands-related topics taught as part of the curriculum in primary and secondary schools. District-level wetlands management structures established, staffed and equipped in accordance with prescribed standards. Comprehensive wetlands related by-laws in place at the district level. Increased awareness of wetlands policy and legislation among key stakeholders. Reduced level of wetlands abuse.
2.	Public and stakeholder awareness of wetlands and their beneficial products and services increased.	Increased public awareness of wetlands functions and benefits, as measured by repeat KAP surveys. Increased levels of favourable media coverage of wetlands issues. Wetlands-related topics taught as part of the curriculum in primary and secondary schools.

No.	Priority	Indicator
3.	Planning and management of wetlands systems improved.	District Wetlands Action Plans prepared and integrated into District Development Plans. Overall state of wetlands improved in relation to prescribed criteria and targets. Wetlands Management Plans in place for vulnerable critical wetlands. Wetlands resource use agreements negotiated and in operation. Wetlands resources used in accordance with published guidelines.
4.	Institutional framework for wetlands management further developed and maintained.	Adequately staffed and equipped national lead agency established. District-level wetlands management structures established, staffed, and equipped in accordance with prescribed standards. State of gazetted wetlands matches prescribed criteria and targets.
5.	Appropriate wetlands policy and legislation in place and enforced.	Wetlands Act in place. Comprehensive wetlands related by-laws in place at the district level. Increased awareness of wetlands policy and legislation among key stakeholders. Reduced level of wetlands abuse.
6.	Vital wetlands protected and their characteristics and functions conserved.	Vital and critical wetlands gazetted. Wetlands Management Plans in place for gazetted wetlands. State of gazetted wetlands in accordance with prescribed criteria and targets.
7.	Community-based regulation and administration of wetlands resource use established and strengthened.	Wetlands Management Plans in place for vulnerable critical wetlands. Wetlands resource use agreements negotiated and in operation. Wetlands resources used according to published guidelines.
8.	Local and international financing mechanisms for wetlands management	WSSP budget targets met for each source of income.

No.	Priority	Indicator
	and conservation mobilized.	

Source: NWSSP, 2001–2010

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Annex 1: Estimated total wetland area (km^2) and area converted per district

Region	District	Total area of District (km^2)	Present total District wetland area (km^2)	Present area converted per district (km^2)	Total original wetland area in the District (km^2)	Converted as % total original District wetland area (%)	contribution to converted wetland area in (%)	Wetland as % of total District area (%)
CENTRAL	Kalangala	9,067	40	0	40	0.0	0.0	0.4
	Kampala	197	33	8	41	19.7	0.34	16.5
61,354 km^2	Kiboga	4,046	844	11	855	1.3	0.47	20.9
25.4% Uganda	Luwero / Nakasongola	9,204	2,422	28	2,445	1.1	1.17	26.3
	Masaka / Sembabule	7,010	1,425	12	1,436	0.8	0.50	20.3
Region is 14.4% wetland	Mpigi/Wakiso	6,414	1,053	15	1,068	1.4	0.62	16.4
	Mubende	6,198	758	25	783	3.2	1.05	12.2
	Mukono/Kayunga	14,309	987	109	1,096	10.0	4.60	6.9
	Rakai	4,909	1,278	44	1,322	3.3	1.84	26.0
Regional total		**61,354**	**8,840**	**252**	**9,086**	**40.8**	**10.59**	**14.4**
EASTERN	Iganga / Bugiri/Mayuge	12,792	1,215	591	1,806	32.7	24.91	9.5
	Jinja	768	100	76	176	43.2	3.2	13.0
39,526 km^2	Kamuli	4,302	1,080	316	1,396	22.6	13.32	25.1
16.4% Uganda	Kapchorwa	1,732	105	1	106	0.8	0.03	6.1
	Kumi	2,848	989	61	1,050	5.8	2.56	34.7
Region is 21.6% wetland	Mbale/Sironko	2,467	356	68	423	16.0	2.85	14.4
	Pallisa	1,992	711	258	969	26.6	10.86	35.7
	Soroti / Katakwi	10,016	3,206	9	3,215	0.3	0.39	32.0
	Tororo / Busia	2,609	787	375	1,160	32.2	15.73	30.1

Regional total		***39,526***	***8,547***	***1,752***	***10,299***	***17.0***	***73.8***	***21.6***
NORTHERN	Apac	6,541	1,147	13	1,161	1.2	0.56	17.5
	Arua/Yumbe	7,879	216	0	216	0.0	0.0	2.7
85,393 km^2	Gulu	11,716	610	0	610	0.0	0.0	5.2
35.4% Uganda	Kitgum	16,564	592	0	592	0.0	0.0	3.6
	Kitido	13,245	845	0	845	0.0	0.0	6.4
Region is	Lira	7,201	1,091	37	1,128	3.3	1.57	15.2
8.3% wetland	Moroto/Nakapiripirit	14,352	2,219	120	2,339	5.1	5.07	15.5
	Moyo /Ajumani	4,978	234	0	234	0.0	0.0	4.7
	Nebbi	2,917	111	1	112	0.9	0.04	3.8
Regional total		***85,393***	***7,065***	***172***	***7,237***	***2.4***	***7.25***	***8.3***
WESTERN	Bundibugio	2,262	912	11	922	1.2	0.45	40.3
	Bushenyi	4,293	183	7	190	3.8	0.31	4.3
55,282 km^2	Hoima	5,933	183	0	183	0.0	0.0	3.1
10.2% Uganda	Kabale	1,730	111	64	175	36.6	2.70	6.4
	Kabarole	8,318	946	16	962	1.6	0.66	11.4
Region is	Kasese	3,390	407	0	407	0.0	0.0	12.0
10.2% wetland	Kibaale	4,246	535	11	546	2.1	0.47	12.6
	Kisoro	730	33	23	56	40.3	0.95	4.6
	Masindi	9,443	983	8	991	0.8	0.35	10.4
	Mbarara	10,021	1,109	15	1,124	1.4	0.64	11.1
	Ntungamo	2,056	108	1	109	0.9	0.04	5.2
	Rukungiri/Kanungu	2,860	146	45	191	23.7	1.90	5.1
Regional total		***55,282***	***5,654***	***201***	***5,856***	***3.4***	***8.47***	***ξ 10.2***
Uganda total		***241,555***	***30,105***	***2,376***	***32,481***	***7.32***	***100***	***ξ 12.5***

Source: Biomass 1990–1992 satellite imagery

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