WETLAND DEGRADATION IN JINJA DISTRICT; A CASE STUDY OF LAKE VICTORIA, UGANDA

BY

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DECLARATION

I **NAIGAGA KISAKYE VIOLET, the undersigned** declare that, the work contained in this dissertation entitled "**Wetland Degradation in Jinja District, Uganda: A case study of Lake Victoria**" with the exception of the acknowledged references, ideas and concerns is my original compilation and has never been presented for fulfillment to any Organization or Institution of higher learning either as a paper or for any academic award I also hold full responsibilities for all the mistakes in this study.

Signature

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Date: 22/07/2010

APPROVAL

I declare that this is my original work concerning the research that was carried out and has not been presented in any University for Academic credit and where other works have been incorporated, sources have been acknowledged.

This project has been submitted for examination with my approval as University Supervisor

Name: Mr. Sekabira Kassim

Sign: .....

Date: 22/07/2010

DEDICATION

This project is written in honor of my beloved country women who struggle to build and develop the Economy of The Republic of Uganda.

Special dedication to my beloved parents Mr. Owor John and Mrs. Jerimina Owor and Mayanja Paul, among others, may the almighty God shower you with abundant blessings for all your great support and love towards my education. However, it is also dedicated to my dad, Mr. Balikowa john for his support. May his soul rest in eternal peace.

Final dedication is extended to my beloved sisters; Akumu Mercy and Nyadoi Ann and brothers; Oketch Francis and Opali Centrio.

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I wish to extend my sincere gratitude to Mr. Owor John and Mrs. Owor Jeri mina who tirelessly supported me all the way from my childhood and ensured that I received education which my fellow country women and men are longing for but can not access due to poverty. Besides, I really appreciate the Late Mr. Balikowa John, my Dad for everything he provided me with while in and out of school for the short time we lived together. May his soul rest in eternal peace. Further appreciation to COG for its support.

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Lastly, I thank all respondents whose responses contributed to the completion of this study. Thank you and May God bless you all.

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LIST OF ACRONYMS

CBO	Community Based organization
FIRI	Fisheries Research Institute
GOU	Government of Uganda
IBA	International Bird Area
JUWWP	Jinja Urban Wetland Women's Project
KIU	Kampala International University
LVEMP	Lake Victoria Environment Management Project
MWLE	Ministry of Water, lands and Environment
NEAP	National Environmental Action Plan
NEMA	National Environment Management Authority
NGO	Non Governmental Organization
NWP	National Wetlands Programme
SPSS	Statistical Package for Social Sciences
TDS	Total Dissolved Solids
UFFRO	Uganda Freshwater Fisheries Research Organization
USA	United States of America
WID	Wetland Inspection Division
WSSP	Wetland Sector Strategic Plan

DEFINITION OF TERMS

Effect: The outcome experienced or realized after something like an activity has happened. It may be either negative (destructive) or positive (beneficial)

Government officials: These refer to persons working for the Government of Uganda (GOU).

Invasive species: These are either exotic plant or animal species that are introduced into a habitat from which they never existed before. Their reproductive capacities are high and multiply so fast with the abilities of feeding or preying on the indigenous species.

NGO/CBO staff: These refer to individuals who work for the Non-governmental organizations of Community based organizations.

Pollution: Pollution is the introduction of dangerous substances to the environment (water, soil or land and atmosphere).

Sedimentation: This is the deposition and accumulation of sediments in an area. It may be through surface runoff especially during rainy seasons from high elevated areas to areas of low elevation.

Wetlands

According to the Ramsar convention, wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, flooded with water that is static or flowing , fresh, brackish or salty, including areas of marine water that do not exceed 6 meters at low tide.

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ABSTRACT

The main purpose of this study was to find out the causes of wetland degradation in Jinja District, Uganda. The study covered the awareness of the people on wetlands; the values of the ecosystems; and the impacts of wetland' degradation, so as to come up with strategies for better management and conservation of the Lake Victoria wetlands.

This study found that wetland degradation was attributed to by anthropogenic factors including industrial pollution, over-harvesting, dumping, introduction of invasive species, deforestation, sedimentation and increased human population. However, pollution was the highest (27%), agriculture being the second as others follow.

A total number of 160 respondents were randomly and purposively sampled. Data were collected using questionnaires, interview and literature review. The data collected were analyzed using Statistical Package for Social Sciences (SPSS Ver.11.5) and presented in frequencies and percentages in various graphs.

The study recommended some measures to be put in place
Among the proposed measures include to equip the environmental planners with facilities and resources such as finance and to monitor the ecosystems and various activities taking place around it, use of laws and further research to quantify and distinguish between the contributions of the major causes of wetland degradation (of Lake Victoria) to its present was recommended.

Public awareness through education by trained officers to the local people should be done to achieve the best of wetland management and sustainable use of resources.

CHAPTER ONE

INTRODUCTION

1.1 Background

Wetlands cover about 15 percent (31,406 square kilometers) of Uganda's total land area (205,212 square kilometers) and can be found in almost every sub county. Most individual wetlands are linked through a complex network of permanent and seasonal streams, rivers and lakes, making them an essential part of the entire drainage system in Uganda (NWP, 2000).

While such, a dispersed geographic coverage provides wetlands benefits to a greater number of people, Uganda's high level of political and administrative decentralization adds to this risk. Most wetlands systems cross administrative boundaries, which, because of compartmentalization of decision making at the local level, makes it more difficult to manage in an integrative manner.

With 11 sites designated as wetlands of international importance, Uganda is internationally recognized for leading the effort in Africa to conserve wetlands that are regionally and globally important for migratory bird species (IBA-International Bird Area) and biodiversity (Ramsar, 2006). Nonetheless, besides those wetlands that have international or national protection status, the majority of wetlands lie outside the natural protected area system (NEMA, 2000) Establishing a solid condition is therefore essential to identifying successful wetland management approaches for the future.

1.2 Statement of the problem

Wetland degradation involves rendering natural wetland process functionally unable to support the species present. In this process, the organisms which previously habited the ecosystem are displaced, reducing biodiversity. Wetland degradation in Jinja district is mainly due to human activities through over harvesting natural resources for individual or communal consumption and production, industrialization, logging, population growth, settlements, agriculture, pollution, introduction of invasive species and urbanization. It is

currently ranked as the most important cause of species extinction in Lake Victoria (NEMA, 1999). Therefore, the research focused on finding out the major causes of wetland degradation, its impacts to both ecosystems and human life so as to find out the specific measures that can be used to conserve and manage Lake Victoria ecosystem.

1.3 Objectives

1.3.1 Main objective

The general purpose of the research is to find out the major causes of wetland degradation in the area of study

1.3.2 Specific objectives

1. Tc find out the major causes of wetland degradation in Jinja district
2. To identify values of the ecosystem to the people adjacent the wetland
3. To find out the impacts of wetland degradation in the study area
4. To find out various solutions and strategies for conservation and management of the lake region.

1.4 Research questions

1. What are the major causes of wetland degradation in Jinja District?
2. What are the values of the ecosystem to the people?
3. What are of the impacts that result due to wetland degradation in Jinja?
4. What are of the solutions to be put into consideration for conservation and management of the Lake?

1.5 Significance of the study

The study focused on the major factors that have resulted to wetland degradation, values of wetlands, impacts of wetland degradation and solutions to combat such factors. However, the study will help the researcher to identify various activities carried out by the local people and their effects on wetlands. This helped the researcher to come up with solutions for proper management and conservation measures for the wetlands.

The findings of this research are useful in providing necessary information for policy formulation by stakeholders, specifically the Government of Uganda with regard to extreme natural resource management. Furthermore, this research can be used to guide other researchers in the same area of study. Besides, the work will benefit scholars, students, policy-makers and development agencies from nations emerging from wetland degradation in any part of the world.

1.6 Organization of the study

Chapter two of the study presents the literature review while chapter three and four present methodology used and data analysis respectively. Chapter five presents summary, recommendations and conclusion.

1.7 Scope and Delimitation of the study.

The study is limited on wetland degradation in Jinja District, a case study of Lake Victoria. It targets GOU and NGOs/CBOs workers since they are the ones who are expected to provide reliable information regarding the research objectives. The research will also identify various activities carried out by the local people and their effects on wetlands, besides, besides, values of wetlands will be found out as well as the impacts of wetland degradation. Researcher focuses on them in order to come up with solutions to combat wetland degradation and to find out ways that will be implemented to sustainably use and conserve wetlands and their components particularly biological diversity.

In terms of area, the study covers community members (n = 100), GOU (n = 50) agencies, and NGOs/CBOs (n = 10). The sample considered 100 of community members; 10 agencies, each with 5 respondents and 5 NGOs/CBOs, each comprising of 2 respondents. This sample size was expected to provide the required information that would be helpful in answering the research objectives.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

According to the Ramsar Convention, wetlands are areas of marsh, fen, peat land or water whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salty, including areas of marine water that do not exceed 6m at low tide.

2.1 Size and Distribution

Uganda's wetlands cover about 9,000 sq. km., or 15% of the total area of the country. They include areas of seasonally flooded grassland, swampy forests, permanently flooded papyrus, grass swamps and upland bog. As a result of the vast surface area and the narrow river like shape of many of the wetlands, there is a very extensive wetland edge (MWLE, 2001a).

There are basically two broad distributions of wetland ecosystems in Uganda: (a) the natural lakes and Lacustrine swamps which include Lake Victoria region, Kyoga swamp complex, L. George area, L. Kyoga area, L. Edward wetlands, L. Albert area, Bunyonyi swamp, Kijaneborola swamp, Bisinia and Opeta lakes area, L. Wamala area and wetlands associated with minor lakes; (b) the riverine and flood plain wetlands which are associated with the major rivers systems in Uganda (Fig.1). Examples are: R. Nile, R. Kafu and R. Aswa. Except for Sango Bay, the bulk of Uganda's wetlands lie outside protected areas.

Fig. 1: Map of Uganda showing the distribution of wetlands (WID, 2000).

2.2 WETLAND CATEGORIZATION AND CAUSES OF DEGRADATION

2.2.1 Wetland characteristics

To describe and categorize these resources, wetlands managers often begin with three basic characteristics of wetlands. The permanence and seasonality of their moisture regime, the main vegetation and land cover types and the resource pressure from human use. The following section categorizes Uganda's wetlands by these characteristics.

About 75 percent of Uganda's wetlands are seasonal.

Seasonal wetlands can be found in almost every corner of Uganda. The great majority of these are narrow and elongated in shape, following valley bottoms and streams. These wetlands form densely branched networks especially around Lake Kyoga, but they are also found in other areas such as Ssembabule, Lyantode, and Kiruhura Districts. Large seasonal wetlands are located in various extensive floodplains, such as Katakwi, Nakapiripirit, and Moroto Districts (northern Uganda); at the Southern end of Lake Albert, in Kasese Districts, and in Rakai District, bordering Tanzania.

Permanent wetlands are mostly located near open water bodies such as lakes and rivers. The largest permanent wetlands are directly connected to Lake Kyoga and Lake Victoria. Others follow the banks of the Nile River from Lake Albert to the Sudanese border.

Wetlands in Uganda are covered by a variety of vegetation types and occur in all of Uganda's main land cover classes; tropical high forests, woodland, bush land, grassland, papyrus (Including other sedges, reeds, and floating, plants) and small and large scale farmland. The most common wetlands in Uganda are seasonally wet grasslands and the second most common with 16 percent. Permanent wetlands consisting of papyrus and other sedges, reeds, and floating plants are the most common wetland type and represent 15 percent (4,840 square kilometers) of Uganda's wetland area covered by small- scale farmland.

The economic and subsistence uses of wetlands vary with land cover and whether they are seasonal or permanent. The type and level of use in turn determine how vulnerable each wetland is to becoming permanently degraded. Grasslands, for example are primarily used for livestock grazing. If they have the right soils and water regime, they are also very desirable for growing crops. In the context of Uganda's heavy dependence on agriculture and its growing demand for agricultural land, these wetlands are often prime targets for agricultural expansion.

Woodland and papyrus wetlands, on the other hand, provide raw materials, the former for construction and fuel, and the latter for crafts and mats. Both woodland and papyrus

wetlands are very vulnerable to over- harvesting of these products,, especially if they are close to high demand centers or located along major transport routes (NEMA, 1999).

2.2.2 Types of wetlands in Uganda

Distribution of wetlands in Uganda is contributed to by different factors both of which are physical or natural; climate, topography among others, human factors inclusive and basing on the various activities being carried out in such areas that may contribute to the existence or disappearance of wetlands in such areas. However, wetlands in Uganda are of different types in consideration with the factors that lead to their formation, as seen in the table 1 below.

Table 1: The different types of wetlands in Uganda (NEMA, 1999)

Class/type	**Dominant feature**	**Location**
Fresh Water		
Fresh Emergent Reed swamp	Papyrus swamps	L. Kyoga, L.Victoria, Nile River-line and associated flood plain, South west Uganda
	Miscanthus	
	Vossia swamps	Kazinga channel, Albert Nile
	Phragmites swamps	R. Semuliki, L. Kanyamukali,
	Cladium	Mubuku Valley near L. George
	Typha swamp	Lumbuye Dam
Fresh Water Floating leafed	Nymphaea spp.	L. Kimunuo
	Potamogeton spp	
	Trapa natas	
Fresh Water submerged	Ceratophyllum spp	

rooted		
Macrophyte communities		
	Najas spp	
	Potamegoton	
Fresh Water submerged not	Ceratophyllum spp	
	Lemna trisula	
Fresh Water Surface Floating	Pistia stratiotes	
	Eichhornia classiest	Albert Nile
Seasonally Flooded Wooded	Acacia-hyparhenia	L. Kafu, Lower Kalamoja
Seasonally Flooded Herbaceous	Echinochloa-prinicum ripens-cynodon swamps	L. Opeta, L. Bisinia
	Loudetia-cynodon-Setaria	L. Nabugabo
	Cynodon-setaria-Hyparrhenia-brachiaria	L. George
	Cyprus-leerasia hexandra	
	oryza	
Freshwater palustrine forests	Permanent swamp forest dominated by Mitragyna, alchornes or Syzigium	Sse Island, Ishasha Valley
	Spondiann thus	Sango bay
	Phoenix or Raphia	L. Victoria Shores
	Macaranga	
	Seasonal swamp dominated by	Sango Bay
Freshwater riverline forests	Acacia, Ficus, Combretum, Zizyphus	L. Victoria shore
Freshwater montane(bogs)	Sphagnum	

Salt water		
Permanent saline	Cyperus leavigatus	L. Katwe, Sempaya Hot springs
Seasonally flooded saline	Sporobolus spp.	Munyanyange Forest
Man made		
Aquaculture	Fish and shrimp ponds	
Agriculture	Farm ponds, rice field, canals, seasonally flooded arable land	
Salt exploitation	Salt pans	
Urban/industrial	Excavations, waste treatment areas, water storage reservoirs, hydro-dams, etc.	

2.2.3 Major Causes of wetland degradation in Jinja district

Many people consider wetlands to be wastelands. After all you can not grow wheat or tomatoes or even build a house in a bog. Over the years 40 percent of the marshes in Uganda have been drained or filled in and replaced with farms, forests, or commercial developments like industries. However, an analysis of freshwater wetlands shows that their overall value is surprisingly great (Jonathan and Amos Turk, 1984, pg 374).

Lake Victoria's natural status consistently and continuously been interfered with, leading to a decline in its value. Rather than having a symbiotic existence, the Lake has been greatly exploited by man leading to an imbalance in the ecosystem for example through destruction of aquatic life. Pollution of all kinds has been directed towards the Lake among which include the following.

2.2.3.1 Dumping

Wastes from industries, towns and any sources are dumped into the Lake. Lakes present special pollution because of their hydraulic character. Most notably, they serve as

pollution sinks for upstream and Lakeside activities. The Lake Victoria shoreline is particularly polluted by human and animal waste, industrial waste water, agricultural runoff, storm water and urban runoff. Notable among the industries are breweries, tanning, fish processing, (sugar, coffee), agro (sugar, coffee) and abattoirs.

2.2.3.2 Pollution

The largest single common type of pollution in Lake Victoria is waste disposal. At all its breadth, Lake Victoria is surrounded by a number of industries such as BIDCO Uganda Limited, which release toxic waste into the Lake. Much of the Lake's waters have been contaminated and this has at all times led to death and suffocation of aquatic animals in the ecosystem. There are many towns sprawling up (planned and un planned) but without proper sewerage waste disposal facilities. They dump domestic wastes and other pollutants for example, in Budumbuli and Masese sites are polluted by municipal and Industrial effluents which are channeled directly into the Lake. As a result, water quality in the Lake has declined greatly owing chiefly from increased inflow of nutrients into the Lake Victoria.

2.2.3.3 Water hyacinth

The water hyacinth is a floating aquatic weed which forms a dense mat cover on water and is seen most cases along the shores. It can be dispersed either by seed or vegetatively. It originated in South America. It is estimated that the water hyacinth covered 0.1 percent of Lake Victoria's area especially the shorelines. The plant is able to adapt to varying circumstances. The mats formed by the weed can be up to 2 meters thick, and so dense. They are always difficult to penetrate with boats. The weed also blocks the turbines of the dam, which can cause a lower productivity of electricity. The access to water quality and supply from the Lake to the different communities is affected, and it causes health hazards as the mats of the weed are breeding places for mosquitoes which spread malaria (Kennedy and Donkin, 1986).

2.2.3.4 Introduction of new species

With the establishment of introduced species in Lake Victoria, the trophic ecology of the system changed, both through predator-prey and competitive interactions, and through

the removal of various trophic groups from the food web (Reinthal and Kling, 1994). The detritive or phytoplanktivore group, which constituted 40 percent and 16 percent respectively of the total dermersal fish biomass, disappeared in the early 1980s, with the explosive increase of the introduced Nile perch. Only after the haplochromines densities had declined to near zero did the Nile perch switch to other prey, such as the atyid prawn caridina nilotica (Goldschmidt *et al,* 1993).

The loss of species and trophic diversity, and associated alterations in food webs have been accompanied by more frequent algal blooms (Ochumba and Kibara, 1989) deoxygenation of the deeper water of the lake, which sometimes has been associated with mass fish kills in lake Victoria (Hecky et al, 1994). The accumulation of the excess organic matter is an indication that much of the organic matter produced in the lake is not being channeled efficiently through the food web. Originally the native fishes occupied virtually all trophic levels, insectivores, zooplanktivores, phytoplanktivores, molluscivores, detritivores, and piscivores and maintained an efficient flow of organic matter in the system. The depletion in stocks of this trophically diverse fish community by Nile perch changed the food web ecosystem in the lake.

2.2.3.5 Deforestation

Forests offer the best ground protection mechanism in watershed areas. The high water retention capacity and soil binding mechanisms all constitute important processes for preventing floods and soil erosion. But the entire catchment area of Lake Victoria is experiencing high deforestation rate due to high human population pressure which has led to soil erosion and nutrient load into the Lake hence causing sedimentation of the Lake.

2.2.3.6 Human population

Human settlements are not simply housing or merely physical structures of an area but are an integrated combination of human activities which include, among others, domestic purposes, recreation, agriculture, mining, and construction. The increase of human population near the Lake involves a partial transformation of the natural resource. In people's efforts to harness or use the Lake for domestic and other purposes the Lake is

often degraded. It is in this regard that the need for sustainable use and management of the Lake is of fundamental concern to man (LVEMP, 1996).

2.3 VALUES AND BENEFITS OF WETLANDS

Uganda's wetlands support a rich diversity of plants and animals. Wetlands have intrinsic attributes, perform functions and services and produce goods of local, regional, national or international importance (NEMA, 2002). Together, they represent considerable ecological, social and Economic values. Table 2 below shows wetlands benefits- derived from attributes, functions, goods and services- classified into four categories.

Wetlands are vital natural resources just as forests and agriculture are. In the rural areas millions of households are engaged in wetland farming, papyrus harvesting, pottery, brick-making and sand mining (NEMA, 2002). About 5 million people, many of them cattle keepers, depend directly on wetlands for their livestock water needs. In urban areas wetlands purify industrial, commercial and domestic effluents such as sewerage and the dirt washed down with rainstorms through urban centre drainage systems (NEMA, 2002)

The total value of wetlands in economic terms and their contributions to the national economy may be difficult to calculate – but it is definitely high. Wetlands provide social and economic values, through their interaction with human society. The monetary value of wetlands is difficult to determine because some of the values are free public goods such as environmental services. Others are indirectly values. For example, Nakivubo wetland in Kampala alone contributes US$ 1.7 million to the economy annually as a tertiary wastewater treatment plant (MWLE, 2001a). About US$ 100,000 is estimated to accrue from wetlands resources through crop cultivation, papyrus harvesting, brick making and fish farming. Rural households in Pallisa are estimated to derive about US$ 200/hectare/year from papyrus harvesting (MWLE, 2001a).

Table 2: Wetland Benefits

Direct values	Indirect values	Option values	Non-Use values
Production and consumption of goods and such as:	**Ecosystem functions and services such as:**	**Premium placed on possible future uses and application such as:**	**intrinsic Significance in terms of:**
• Fish • Fuel wood • Building poles • Sand, gravel, clay • Thatch • Water • Wild foods • Transport/Navigation • Medicinal herbs • Agriculture • Pasture/grazing Recreation • Craft materials such as cyperus papyrus, Sesbania sesban, Vossia	• Water quality • Water flow • Water storage • Water-purification • Water recharge • Flood control • Nutrient-retention • Storm protection • Micro-climate-regulation • Shore - stabilization • Biodiversity and habitat provision	• Pharmaceutical • Agriculture • Industrial • Leisure • Water use • Gene pool	• Cultural values • Aesthetic values • Heritage value • Bequest value

Source: MWLE, 2001a

Economic valuation of water is difficult but it has been attempted by the wetlands Inspection Division (WID). It is assumed that 1 million families directly depend on wetlands for water, with consumption of five jerricans (each 20 liters per family, each at

UShs20. this implies that the value of water alone is Ushs100million/day (about US$50,000). For 30,000 sq. km of wetland area, this translates to $8/ha/year in terms of the value of water for domestic purposes alone. Another valuation based on five million users puts the value at US$25 million per year. Wetlands contribute to water supply for both the neighboring communities and the whole population through groundwater storage and water purification (NEMA, 2002)

Rapid population growth and the increasing rate of development require a sufficient and steady supply of water and effluent discharge at an affordable cost. Many urban settlements including Kampala city are dependent on wetlands for water supply, and the treatment and discharge of effluent (NEMA, 2002)

Some natural resource products can be substituted with other products when they are depleted. However, many products, and most natural resources services (such as ground water discharge, storm water buffering or microclimate amelioration) can not be substituted, or only at a very high cost. It follows that natural resource management is a key element in poverty reduction and economic growth.

2.4 WETLAND MANAGEMENT AND CONSERVATION

2.4.1 Management of wetlands in Districts

The local Governments Act 1997 section 5 (xii) decentralizes the conservation and management of wetlands to the local governments. This means that the wetland is primarily the responsibility of the district in which it falls. In some instances, wetlands systems and sections often straddle borders and pass through more than one district. Formal linkages to the districts are through district Environment Officers and/or other members of the District Technical Planning Committee or wetlands Co-coordinators for example in Kabale, Masaka and Pallisa districts.

The decentralization of wetlands management is a very big challenge to the districts. Many districts have huge areas of wetlands and insufficient personnel, knowledge and funds to effectively manage resources. WID, therefore, allocates considerable resources

to build capacity for local level wetland management in their district development plans, partly due to the fact that planners at this level are not sufficiently aware of what should be planned for and how much budget to allocate to the activities involved in wetlands management.

The Wetlands Inspection Division (WID), the lead agency, has drawn up a framework to guide local governments in planning and budgeting for wetlands, based on the wetland sector Strategic Plan (WSSP) 2001-2010. The overall objective of wetland management in districts is "contributions of wetlands to the welfare of the district's population and environmental protection". Once the priorities have been set, a work plan and budget is developed, with detailed activities that contribute to achieving the general objectives and fit within the key actions. The work plan should also fit within other priorities and work plans of the district, notably with those of other related sectors such as agriculture, forestry and water resources development.

Funding of wetlands activities is by both district and central government. From the Central funds, the local Government development programme funds, the plan for modernization of Agriculture grant and conditional grants related to water development are possible sources for funding wetland management. District level funding and management of wetlands under the WSSP is estimated at US$5.13 million. In some cases, donors may fund wetland activities that are integrated into existing donor funded programmes, or sectoral programmes for agriculture, forestry, tourism, environmental management and rural development. The wetlands sector is looking for possibilities of engaging the private sector in wetlands management.

Although in principle, extensive and strict legislation is in place, enforcement is still weak. The NWP has developed a surveillance and assessment tool for district officers for purposes of assessing the importance of a wetland and the impacts of developments in it. District officials have been trained in the application of this tool.

2.4.2 Management of Wetlands in Communities

Communities are empowered through the National Environment Statute, Local Government Act, to plan and manage their natural resources including wetlands. For sustainable wetland management at community level to be effective, local communities should be empowered and voluntarily participate in the management of wetlands.

The NWP has therefore, developed systems and procedures for wetland management planning at community level, which is currently being implemented in several districts. Some NGOs and CBOs have developed Community Wetlands Management Plans. Community-oriented service organizations such as Jinja urban wetland women project, were targeted in terms of training, follow-up and general support, to enable them to become effective agents of wetland policy, management planning and implementation. WSSP in support of wetland management at the community level has allocated US$6.95 million for community-based regulation and administration of wetlands resource use.

CHAPTER THREE

MATERIALS AND METHODS

3.0 Introduction

This chapter presents the research materials and methods adopted in the study. The specific issues discussed here include the description of the study area, research design used and why it was chosen, identification of target population, sampling procedure, and data collection methods, tools and data analysis.

3.1 Description of the study area

Lake Victoria is the world's second largest freshwater Lake by surface area, only second to Lake Superior in North America. However, it is also referred to as Victoria Nyanza, the main reservoir of the Nile River and is also the largest lake in Africa. It is shared by the three East African countries; Tanzania, Kenya and Uganda (Worthington, 1930; Azza. 2006). Beadle (1981), observed that Lake Victoria is situated between the Western and Eastern Rift valleys.

Lake Victoria stretches 412 km from North to South between Latitudes $0^0 30^0$Nand $3^0 12^0$S, and 355 km from West to East between Longitudes $31^0 37^0$W and $34^0 53^0$E. The Lake is situated at an altitude of 1,134m above sea level. It has a volume of 2760 km^2 and an average depth of 40 m. The maximum depth is 80 m and the largest Lake in Africa with a surface area of 68,800 km^2 and a catchment area of 193,000 km^2 (Andjelic. 1999).

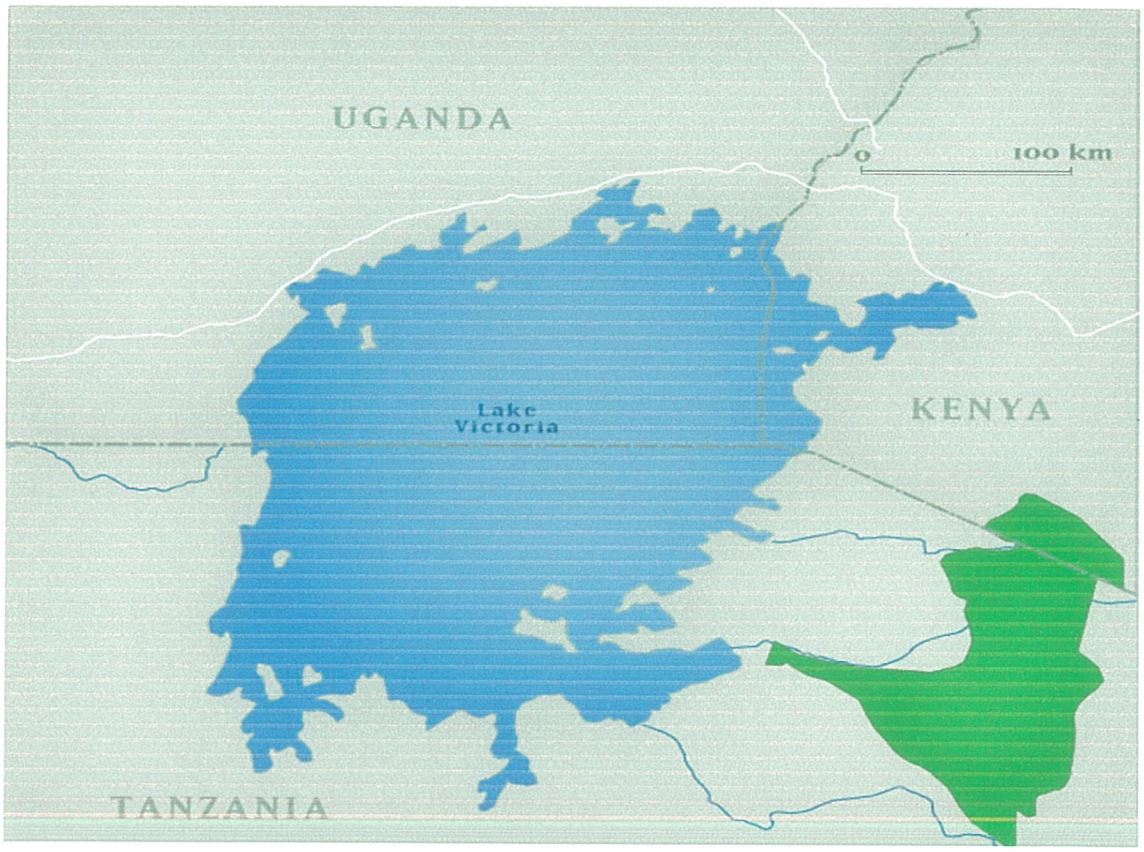

Fig. 2: Map of Lake Victoria (Pickatrail, 2010)

3.2 Research design

It is characterized by systematic collection of data from members of a given population through questionnaires and interviews. It also followed procedures such as identifying the target population, developing questionnaires and field tests, selection of a relevant sample, administration of questionnaires in person, descriptive analysis of data using tables, frequencies and percentages. The researcher used both questionnaire and interview to collect data from the target population.

3.3 Target population

According to Barton (2001) any scientific research targets a given population through which various data collection instruments are used to collect data for analysis. This study had targeted population consisting of community members, government officials and NGOs/CBOs staff in Jinja District. This was expected to provide crucial information on

the degradation of wetlands in Jinja. They also possessed relevant experience in the promotion of other services which include education, health care, water supplies, agricultural training and developmental infrastructure.

3.4 Samples and Sampling Techniques

The study population of Jinja district is 211,400. The participants in the study area was drawn from a sample of 100 respondents (n = 100) who were community members both men and women. Individual government officers 50 (n = 50). The number from NGO was 10 (n = 10). In total there were one hundred and sixty respondents (N = 160).

Simple random sampling and purposive sampling was used. 100 respondents were selected from four counties in Jinja District by using simple random sampling. The key informants such as governmental officials (Environmental officers, local leaders and commissioners) and development partners were selected using purposive sampling to provide the required information with respect to the objectives of the study.

The sample size of the study was calculated using the formula of; $\mathbf{n = N/ (1 + N. e^2)}$, where **n** is the desired sample size (this was used because the population is less than 100), **N** is the total population and, **e** is the estimate or probability of the population size which is always 0.05 (constant).

Table 3: Summary of the Sample Size of Respondents

Participants	Estimated population	Target sample size
Community member	133	100
Government officials	57	50
NGOs/CBOs	10	10
Total	**200**	**160**

According to the above table, samples of respondents were taken from three groups; (i) community members of which out of 100 respondents, a representative sample size of 100 was considered (n = 100). From this sample, all the 100 representatives responded to

questionnaires (n = 100) (Table 3). Systematic random sampling procedure was then considered to have less bias and of reasonable time convenience, was used to select representative of the community; (ii) government officers of which ten (10) offices were selected from 50 government agencies. Out of these 10 agencies, 5 participants were drawn from each, making a total of fifty (10 x 5) individuals (n = 50) (Table 3) and (iii) development partners where a purposive sampling procedure was used to select five (5) offices from 10 NGOs/CBOs. Of these five (5) NGOs/CBOs, 2 participants were drawn from each, giving a total of 10 (n = 10) (Table 3). This method was used since only these development partners are deemed to be running programs that impact on management and conservation of wetlands in Jinja district and that the information they had might be appropriate in answering the research questions for this study.

3.5 Data Collection

Data was collected by means of questionnaires from respondents. Questionnaires were distributed to farmers, government officials and NGOs/CBOs that gave relevant information that answered the research questions. This helped the Researcher to compare the data to answer the research questions.

3.6 Data Collection Tools

3.6.1 Interview

Interview method of data collection was used to obtain information from respondents particularly individual government officers and workers from NGOs/CBOs. This was done with the help of interview guide.

3.6.2Questionnaire

Questionnaires also were used to acquire primary data from respondents particularly community members (farmers, fishermen, and local leaders). The questionnaires were used since they were straightforward and less time consuming for the respondents. They were also used because they reached large number of people within a short time.

3.7 Data collection and analysis

The Human relation Officer from the selected government offices and the NGO/CBOs were contacted to explain the purpose of the study, obtain their consent and request for their permission and assistance where necessary. For the community members, any representative community members were randomly approached and informed about the purpose of the study.

Before responding to questionnaires and interview, the respondents were given instructions where necessary. Their confidence was obtained by assuring them that their identity would be not be revealed. Each respondent had the discretion to respond to the questionnaire and interview items independently to minimize the tendency of information bias. The respondents were given ample time to fill in the questionnaire to reduce the problem related to impulsive responses. Completed questionnaires were collected immediately. Where this was not possible, arrangements were made to pick them later.

The data collected was organized and prepared for analysis by coding and entering them into the Statistical Package for Social Sciences (SPSS, Ver.11.5). The study used descriptive statistics such as frequencies and percentages. The outcomes of the quantitative data from the coded close-ended items were analyzed using descriptive statistics. Further, the data was interpreted and discussed in relation to the research questions. On the other hand, the qualitative data generated from open-ended questions was converted into quantitative data and where necessary, presented in a narrative form.

3.8 Limitation of the study

3.8.1 Delays. Some officials tend to respond to the questionnaires so slow due to their responsibilities that make them so busy.

3.8.2 Language barrier. This is mainly evidenced from the high illiteracy level in this area. This in fact affects interview sessions especially to the local people by the researcher. It avails the researcher with incomplete data or information about the problem of study.

CHAPTER FOUR

4.0 RESEARCH FINDINGS, INTERPRETATION AND DISCUSSION

4.1 INTRODUCTION

This chapter presents data analysis and presentation of the findings on wetland degradation (Lake Victoria), Jinja district, Uganda. The data was analyzed using a Computer programme, SPSS Version 11.5. This enabled the presentation of data in frequencies, percentages and sketched as graphs and tables.

This chapter is organized along the major research questions except for the first section that deals with the demographic information of the respondents. Other sections are organized as follows; awareness on wetlands, the causes of wetland degradation in Jinja district, major pollutants of wetlands, the values of the ecosystem to the people' and various solutions, conclusions and recommendations for conservation and management of the Lake.

4.2 Background information

The study considered demographic characteristics of three groups; community members, development partners (NGOs), and government officials.

4.2.1 Community members: The background information of community member considered includes gender, age, marital status, and occupation.

Table 4: Summary of the demographic characteristics

Background information of the Community members		
Background Information (Gender, Marital status)		
Gender	**Frequency**	**Percent**
Male	40	40
Female	60	60
Marital status		
Married	53	53
Not married	47	47

Majority of those who participated in the study were the community members, males were 40 (40%), and females were 60 which is equal to 60% of the respondents who were community members. 53 percent of the respondents were married and the rest (47%) were not married. However, this may not have any implications since the sample was selected randomly.

4.2.2 **Government Officials:** The demographic characteristics of the government officials that were considered include gender, designation and working experience. Table 5 below shows the summary of background information of the officials.

Table 5: Background information of Government officials

Gender	**Frequency**	**Percent**
Male	30	60
Female	20	40
Education level		
Primary	5	10
Secondary	25	50
Tertiary	20	40
Working experience		
< 5 years	5	10
> 5 years	18	36
Above 10 years	27	54

The majority of government officials (60%) were males, and only 40% were females. These were from different designations; Managers, Directors, Secretaries, Environmental Officers, Information Officers among others. Slightly more than half of them (54%) had working experience of more than ten (10) years, 10 percent had experience of less than five (5) years and 36% of respondents had worked for more than five years but less than ten (10) years.

4.2.3 Development Partners: A number of Development partners were considered in the study that included Environmental Conservation Effort, Lake Victoria Environment

Management Project, National Fisheries Resource Research Institute among others. Most of them are local organizations which are operated in Jinja District.

4.3 AWARENESS ON WETLANDS TO THE PEOPLE OF JINJA DISTRICT

4.3.1 Wetlands as wastelands

Generally, wetlands have been for a along time viewed at as an obstacle towards development. A similar view was concluded about wetlands under the two agreements of Toro in 1900 and Ankole in 1901. The rest of Uganda was declared Crown land. As such wetlands were governed directly by British law in the whole of Uganda in the colonial period (NEMA, 2002). Besides, in various periods, women and children are always found washing pans just alongside the wetlands, because of easy access to enough water.

According to the research findings, the researcher found out that wetlands were referred to as **wastelands** basing on the data presented by respondents as indicated in fig. 3 below.

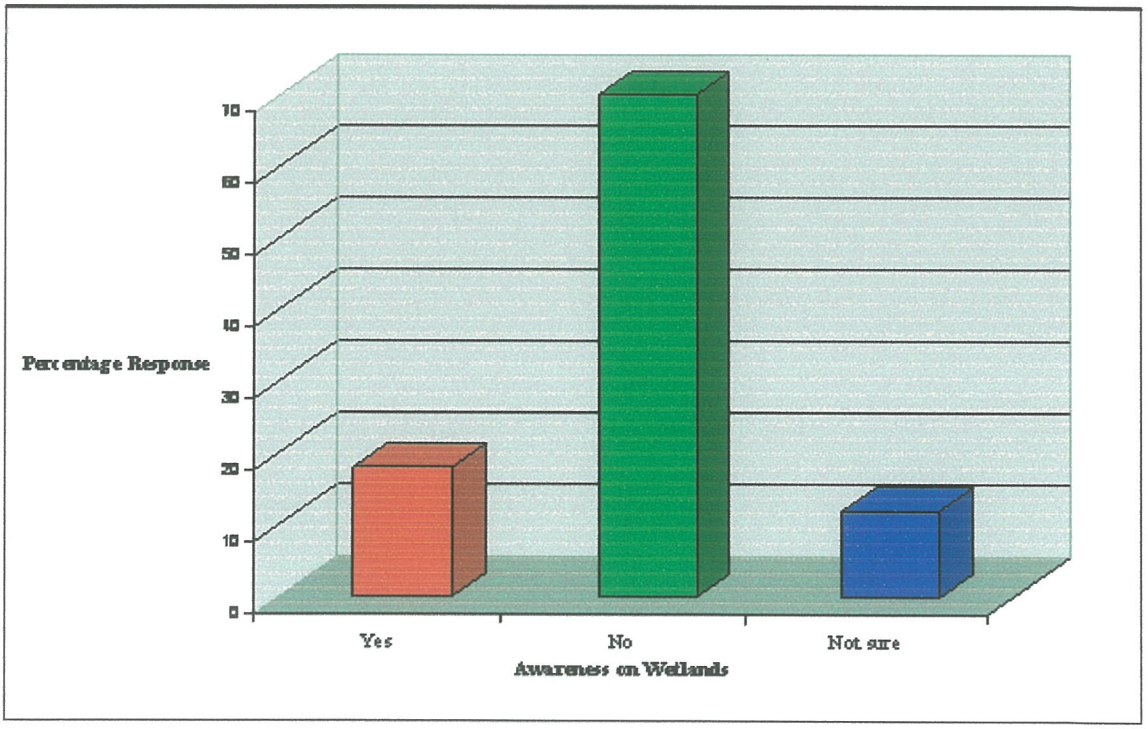

Fig. 3: Community response on wetlands as wastelands

Majority of the respondents indicated that wetlands were not waste lands (70%), wastelands (18%) while (12%) not sure if wetlands are wastelands.

4.4 MAJOR CAUSES OF WETLAND DEGRADATION IN JINJA DISTRICT

The study was investigating the causes of wetlands degradation in Jinja District. The findings of the study are presented in the graph, Figure.4 below.

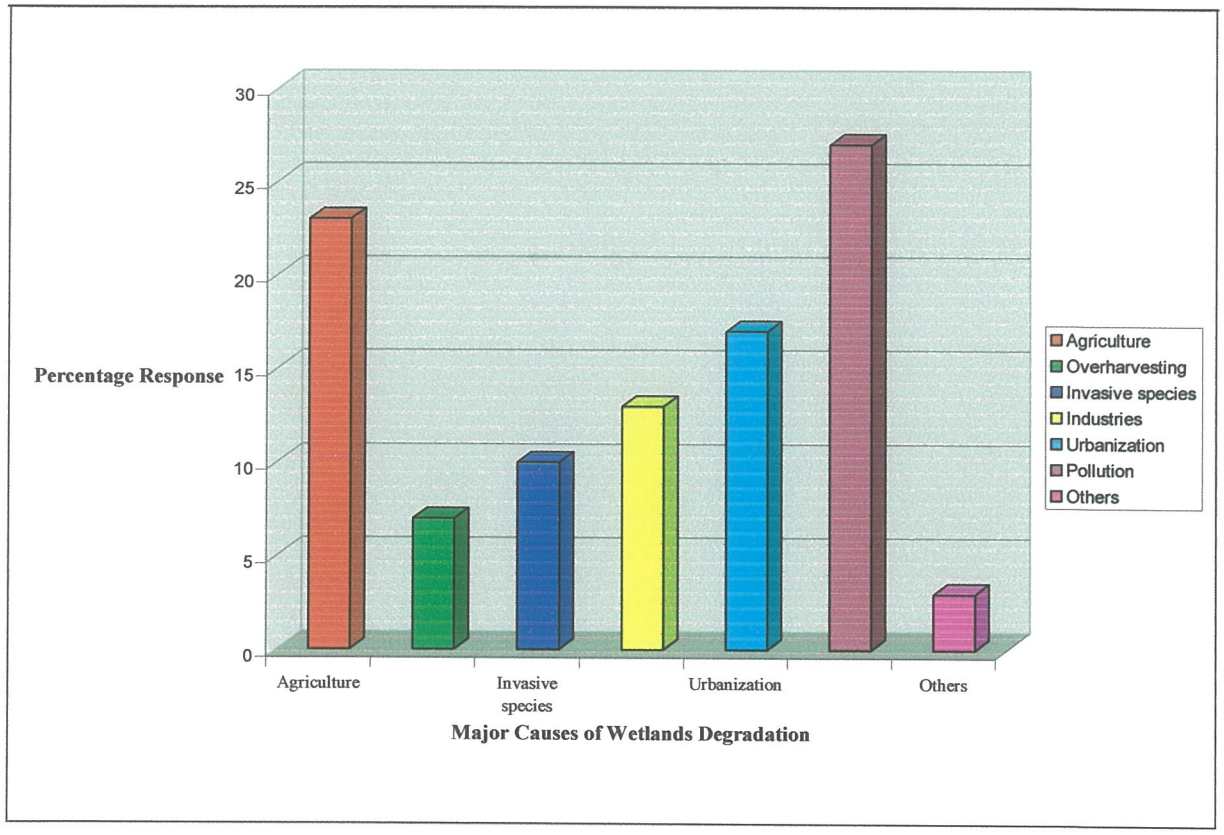

Fig. 4: The causes of Wetland' degradation in Jinja District

Figure 4 above showed that pollution contributed alot to wetland degradation (27%). According to NEMA, 1994, there is clear data on the quantity of effluents discharged by industries into the wetland (13%). Besides, agriculture was indicated as the second major pollutant (23%) followed by (17%) of urbanization, (10%) of invasive species and (7%) over harvesting, other micro and macro substances inclusive.

4.5 Major pollutants of wetlands identified in Jinja

A study was also conducted to find out the major pollutants of wetland in Jinja district, about six pollutants were identified, and these include nutrients, sediments, salinity, toxins, pathogens as well as thermal pollution, and the results are presented in the graph below.

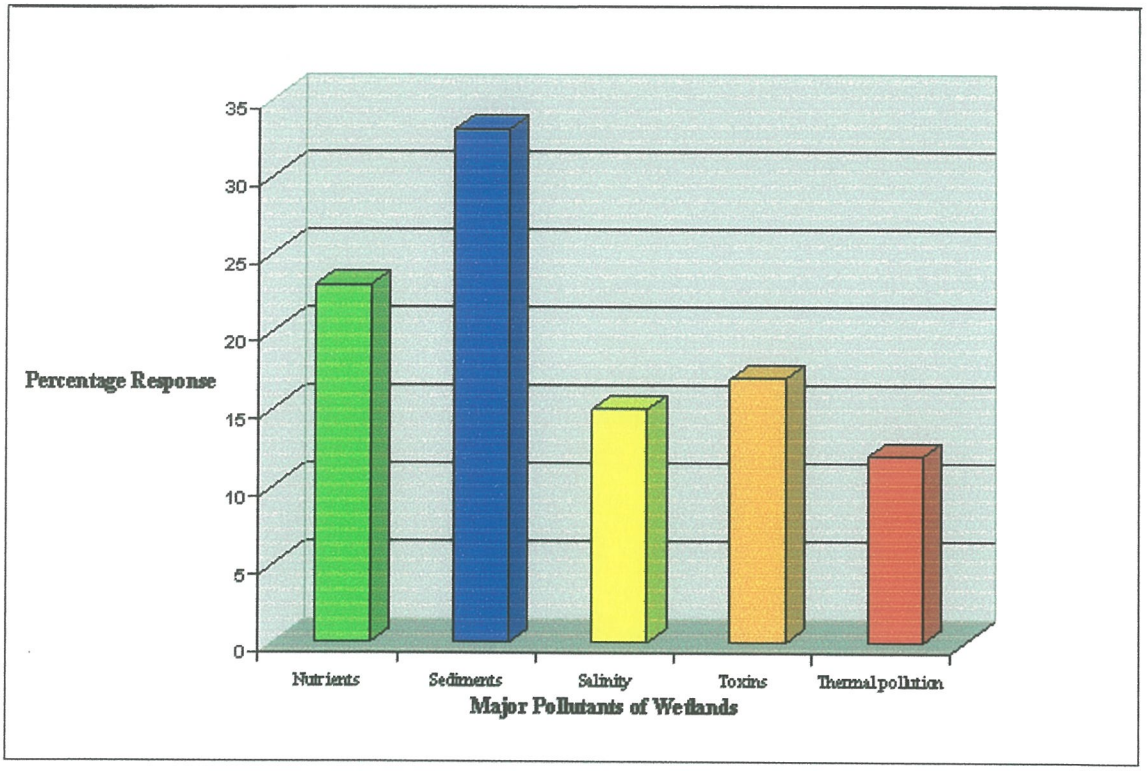

Fig. 5: The major pollutants of Wetlands in Jinja District

The study findings indicate that sediments are the major pollutants (33%) which are in form of agricultural return flows (fertilizers) from cultivated fields around the Lake, animal wastes and waste water (Fig.5). These findings are in agreement with those of Barbier *et al,* (1997). (23%) of nutrients contributed to pollution in the Lake as it is attributed to by dumping of industrial wastes that result to eutrophication, salinity (15%) and thermal pollution (12%) were also found out to be part of the pollutants but at a low rate.

and thermal pollution (12%) were also found out to be part of the pollutants but at a low rate.

4.6 IMPACTS OF WETLAND DEGRADATION TO THE COMMUNITIES OF JINJA DISTRICT

4.6.1 Fish decline

Increased demand for fish as a source of protein has led to the use of unsuitable fishing gear such as beach seine and gill nets. Thus, one of the causes of the loss of fish species at a local level is poor fishing methods commonly used at the Lake. This problem is compounded by inadequate enforcement of fishing regulations, including lack of consistent monitoring around the dam and along the lake.

4.6.2 Reduction in water quality

There is a high of development around the Lake, simply because of availability of water used for industrial processes, cooling of engines of machines. Such industries and factories include, Breweries in Luzira and Jinja, Coca cola Company, BIDCO Uganda LTD and fish industry in Luzira. However, during production, the waste products are released into the Lake which is not treated. These contribute a lot in changing the quality of water, causing eutrophication resulting to algal bloom and leading to suffocation of fish species and sedimentation.

4.6.3 Reduced precipitation

One of the important ecological importances of Lake Victoria is the modification of climate through the hydrological cycle or formation of rainfall. This is attributed to by the sea and land breezes. To account for all this in addition, it's due to the presence of vegetation species that exist around the Lake that there is enough convectional rainfall received and conducive conditions at the shores. Therefore increased deforestation and over harvesting of vegetation around the Lake, may mean a lot on the amount of rainfall received continuously around the Lake.

4.6.4 Species extinction

The growth of water weeds and shrubs that are not common in Lake Victoria in Jinja District, have to a large extent contributed a lot to fish extinction. Besides, industrial pollutants have on the other hand led to migration of fish due to poor water conditions for their existence. In addition, changes in water PH limit on fish existence but instead contribute to their reduction in population.

4.6.5 Sedimentation

Sediments can have an important role in the ecological dynamics of Lakes as virtually all types of heavy metals, organic micro pollutants and plant nutrients have an affinity for sediments, particularly the fine-grained materials thus resulting to eutrophication and eventually algal bloom formation.

In large Lakes like Lake Victoria, the resuspension of bottom sediments with adsorbed substances often introduce fluxes of contaminants and nutrients to the overlying water that are much larger than fluxes from external sources (Eadie and Robbins, 1987).
The distribution of sediments in Lakes is a complex process resulting from the interaction between various confining factors such as bathymetry, size, and shape of basin; forcing functions such as wind and currents; and the differential response of particles of various sizes and suspended load concentrations (Sly, 1978; Evans, 1994).

4.6.6 Changes in the water level

This is attributed to by increased sedimentation brought about by either industrial pollution or floods that drain wastes into the Lake. As the level of these sediments rises, the water level on other hand decreases. This also results to siltation of the water body as a result of too much concentration of pollutants and sand that comes along way through floods during rainy seasons to the Lake.

4.6.7 Floods

Increase in the water level especially during rainy periods with additional sediments and pollutants cause floods. Results of this however, show that due to deforestation around the Lake by people to spare space for cultivation, settlement and fishing due to the Lake's

strategic location trees are cut. As the water level rises, the trees which would control the rate and speed of runoff around the shores, are cut for fuel especially during fish smoking. Thus water with high pressure created by the waves drains into people's houses especially those that are around the shores. Destruction of property and death of people occur, as water born diseases such as Bilharzia (water snails), and Malaria are caused or spread.

4.7 SOLUIONS AND STRATEGIES FOR PROPER MANAGEMENT AND CONSERVATION OF LAKE VICTORIA WETLAND

4.7.1 Control of industrial pollution

The ultimate objects behind the control measures to pollution maintain safety of man, material and machinery (three Ms). The implementation of control measures should be based on the principle of recovery or recycling of the pollutants and must be taken as an integral part of production i.e. never as a liability but s an asset.

- Control at the source. Industry can modify manufacturing processes so fewer wastes are created. Recycling or reclaiming materials that otherwise might be discarded in the waste stream also reduces pollution. Producers are required instead to separate their wastes. It turns out that a variety of valuable metals can be recovered from wastes and reused or sold for other purposes.
- Selection of industry site. The industrial wastes should be properly examined considering the climate and topographical characteristics before setting of the industry.
- Treatment of industrial waste. The industrial wastes should be subjected to proper treatment before their discharge to the Lake. People should be educated about the dangers of dumping wastes in waters and available alternatives of handling such wastes
- Assessment of the Environmental impacts by developers. However, developers should account for the damages caused by their development activities mainly through paying pollution taxes, and proper treatment of wastes.

4.7.2 Afforestation and awareness

Afforestation and planting of grasses around the Lake shores to reduce on floods by wave action should be done Forestry projects should be set supported by the National Forestry Authority. However, both public servants responsible for their management and users of wetlands need to be made aware and kept informed of the range of values provided by the wetlands. All government sectors, particularly those at district level, need to be provided with technical guidance to assist them in evaluating wetlands development. Settlements around Lake shores should be avoided as it creates more pressure to the Lake's resources.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the summary of the findings, conclusion and recommendations based on the findings on wetland degradation in Jinja district (Uganda), Lake Victoria being the case study.

5.1 Discussion

The main purpose of this study was to find out the major causes of wetland degradation in Jinja district. The study also sought to find out the various values of the Lake and impacts that result from wetland degradation to the surrounding people and Uganda as a whole and to examine the relevant solutions for the sustainable use and proper management of the Lake.

The sample consisted of governmental officials (n = 50), Development partners (n = 10) and community members (n = 100). The researcher used simple randomly sampling to sample community members and purposive sampling methods to sample governmental officials and development partners (NGOs/CBOs). The data collection' instruments used were questionnaires, observation and interviews. These were used to collect data from community members, government officials and NGOs/CBOs staffs.

The researcher used SPSS (Statistical Package for Social Sciences) to analyze data. Descriptive statistics such as frequency and percentages were used to summarize the data. From the analysis, the study found out that sediments that mainly result from industrial activities and Lake Shore drainage all originate mainly from human activities.

5.2 Conclusion

A major conclusion that can be drawn from these studies with regard to the major causes of wetland degradation in Jinja district is that human factors are responsible for the dynamics and ecological changes of the Lake.

Below are some of the conclusions;

The major causes of wetland degradation in Jinja district were discussed. The mainly include human factors involving; industrial pollution, cultivation, over harvesting, introduction of invasive species (Nile perch), sedimentation and deforestation. Therefore, the above background serves to show the complexity of the environmental and ecological dynamics of the Victoria ecosystem, and it is now acknowledged that human activities have greatly contributed to the Lake's degradation.

Results show that Lake Victoria basin provides a variety of benefits to the users. The conducive conditions around the Lake favor people's settlement and encroachment to the ecosystem, for instance fertile soils, available precipitation for crop production (vegetable growing), a variety of delicious fish species, raw materials for craft making as well as industrial inputs like *Cyperus, Papyrus (Ebitooko), Vossia cuspidate,* source of water for both industrial and domestic consumption, and the Lake also acts as a conducive habitat for a variety of plant and animal species.

The exploitive pressure created to the Lake for its vast resources, creates impacts that later on affect its surrounding environment and the people utilizing it. In this research, impacts such as fish decline, reduction in the water quality, floods that lead to spread of water born diseases, reduction in the amount of precipitation received changes in the water level, species extinction and sedimentation.

The development strategies should therefore consider interventions which will involve the local people especially those living around the Lake fully in community participation for the sustainable use and management of the basin. This should consider men and women as sharing partners on all projects. In return, it should consider their needs and anxieties, their channels for participation, services of support and professional guidance.

Wetland degradation can be improved through; treatment of industrial effluents before they are dumped into the Lake, protection of water catchments by planting trees or grass around them, proper fishnets should be used, and restocking of the over fished species.

5.3 Recommendations

Following from the above findings and preceding general discussion on their significance, below are some of the recommendations to address the Lake's degradation.

5.3.1 Government: Uganda's government should equip environmental planners with facilities and resources such as finance and human resource for monitoring the ecosystem and the various activities taking place around it. This should be done with immediate effect because development planners are so few to balance with the load of activities coming up. The government should also increase on strict laws, because the existing ones seem to be inapplicable and inactive with high penalties to offenders, for instance polluter pays principle should have high penalties and serious monitoring should be carried out on different basis that polluters are not aware of.

5.3.2 Developers: Any development around the wetland is likely to impact on to the wetlands. Therefore, in response, the Department of Environment protection should produce and implement a set of policies and guidelines which developers are required to follow. Environmental impact assessments and audits should be critically implemented by developers to ensure conservation and management of wetlands.

5.3.3 Public awareness: Public awareness should be enriched to the local people especially those around and efficiently utilizing the wetlands. However, this should be done by government and development partners to teach the local people on how to sustainably use the wetlands and various relevant conservation measures to be taken.

5.3.4 Fisheries development: Due to a wide range of values Lake Victoria provides not only to the people in the study area, but the whole of East African countries, the Fisheries Department should assist in developing appropriate management techniques and the fisheries resource itself with respect to species selection. In addition, however, it should also facilitate in training fish farmers.

5.3.5 Further research: Further research to quantify and distinguish between the contributions of the major causes of the Lake's degradation to its present is recommended. However, this should be done in a manner that will ensure improved fish stock and management of the Lake.

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APPENDIX

KAMPALA INTERNATIONAL UNIVERSITY
SCHOOL OF ENGINEERING AND APPLIED SCIENCES
P. O. BOX 20000 KAMPALA UGANDA

QUESTIONNAIRE FOR COMMUNITY MEMBERS

Purpose

I am Naigaga Kisakye Violet, a student of Kampala International University, Uganda. As Requirement for the fulfillment of award of Bachelor of Science degree in Environmental Management, I am expecting to carry out research and document the findings. In this regard I have chosen to carry out a research on **"Wetland degradation in Jinja district: Case study of Lake Victoria".** The information obtained will be used for this study. I assure you of the anonymity and confidentiality of the information you provide.

Instruction

Please tick in the bracket (√) in front of the most suitable response that best describes your opinion. Where brief explanation is required, use the space

A. Demographic Data

1. Gender Male ( ) Female ( )
2. Age.....
3. Marital status

   Married ( ) Not married ( )

4. Occupation.....

5. Where do you work?

   (i) Government ( )

(ii) NGOs ( )

(iii) Self employed ( )

(iv) Other ( ) Specify.....

6 Education level

None ( )

Primary ( )

Secondary ( )

Tertiary ( )

7. Do you think wetlands are wastelands?

No ( ) Yes ( )

8. What are the major causes of wetland degradation in this area?

Agriculture ( ) Over harvesting ( ) Invasive species ( )

Industries ( ) Urbanization ( ) Pollution ( )

Others ( )

9. What are the major pollutants of wetlands?

Nutrients ( ) Sediments ( ) Salinity ( ) Pathogens ( )

Toxins ( ) Thermal pollution ( )

10. What are the effects of wetland degradation?

Fish decline ( ) Water pollution ( ) Species extinction ( )

Sedimentation ( ) Agriculture decline ( ) others ( )

11. What are the benefits that you obtain from wetlands?

Transport ( ) Food materials ( ) Arable land ( )

Income ( ) others ( )

12. In your own opinion, comment on the benefits of using Lake Victoria

---

What are the major causes of wetland degradation?

What are some of the impacts that result from wetland degradation?

END

Thanks for your co-operation

KAMPALA INTERNATIONAL UNIVERSITY
SCHOOL OF ENGINEERING AND APPLIED SCIENCES
P. O. BOX 20000 KAMPALA UGANDA

QUESTIONNAIRE FOR GOVERNMENT OFFICIALS

Purpose

I am Naigaga Kisakye Violet, a student of Kampala International University, Uganda. As Requirement for the fulfillment of award of Bachelor of Science degree in Environmental Management, I am expecting to carry out research and document the findings. In this regard I have chosen to carry out a research on **"Wetland degradation in Jinja district: Case study of Lake Victoria".** The information obtained will be used for this study. I assure you of the anonymity and confidentiality of the information you provide.

Instruction

Please tick in the bracket (√) in front of the most suitable response that best describes your opinion. Where brief explanation is required, use the space

A. Demographic Data

1. Gender Male ( ) Female ( )
2. Age.....
3. Marital status

   Married ( ) Not married ( )

4. Occupation.....
5. Education level

   Primary ( )

   Secondary ( )

   Tertiary ( )

6. Name of your ministry/commission.....

7. For how long have you worked for your organization in Jinja? .....

8. Which activities is your organization carry out in its places of operation?

Programmes	**Yes**	**No**
Education	( )	( )
Environmental conservation	( )	( )
Health	( )	( )
Women empowerment	( )	( )
Agricultural training	( )	( )
Others		
(specify).....		

9. How is your organization involved in implementing the programmes of wetland management?

_____

_____

_____

10. What challenges does the government face in implementing development programmes?

_____

_____

11. What do you think other development partners should do to improve sustainable use of Lake Victoria?

12. What do you think the communities should do to combat wetland degradation?

END

Thanks for your cooperation

KAMPALA INTERNATIONAL UNIVERSITY
SCHOOL OF ENGINEERING AND APPLIED SCIENCES
P. O. BOX 20000 KAMPALA UGANDA

QUESTIONNAIRE FOR DEVELOPMENT PARTNERS

Purpose

I am Naigaga Kisakye Violet, a student of Kampala International University, Uganda. As Requirement for the fulfillment of award of Bachelor of Science degree in Environmental Management, I am expecting to carry out research and document the findings. In this regard I have chosen to carry out a research on **"Wetland degradation in Jinja district: Case study of Lake Victoria".** The information obtained will be used for this study. I assure you of the anonymity and confidentiality of the information you provide.

Instruction

Please tick in the bracket (√) in front of the most suitable response that best describes your opinion. Where brief explanation is required, use the space

A. Demographic Data

1. Gender Male ( ) Female ( )
2. Age.....
3. Marital status

   Married ( ) Not married ( )

4. Occupation.....
5. Education level

   Primary ( )

   Secondary ( )

Tertiary ( )

6. Name of your organization.....

7. For how long have you worked for your organization in Jinja? .....

8. Which activities is your organization carry out in its places of operation?

Programmes	**Yes**	**No**
Education	( )	( )
Environmental conservation	( )	( )
Health	( )	( )
Women empowerment	( )	( )
Agricultural training	( )	( )

Others

(specify).....

9. What is the rate of degradation of Lake Victoria ecosystem?

Fast ( ) Moderate ( ) Slow ( ) Not known ( )

10. How is the government of Uganda involved in implementing your programmes or projects?

_____

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11. How are the local communities involved in implementing your programmes?

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12. Briefly explain how you think the programmes implemented by your organization have improved upon wetland conservation?

13. What is your policy of sustainable development for natural resources in Jinja?

14. What do you think other development partners should do to improve sustainable use of wetlands especially Lake Victoria?

15. What challenges does your organization face in conserving wetlands?

16. What measures/strategies should be implemented to conserve Lake Victoria?

Thanks for your cooperation