

**THE IMPACT OF POPULATION GROWTH ON WETLAND
MANAGEMENT-A CASE STUDY OF KATABU ZONE,
KANSANGA PARISH, MAKINDYE DIVISION.**

BY

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A handwritten signature in blue ink, appearing to be 'GSI', is located to the right of the author's name.

**A RESEARCH DISSERTATION SUBMITTED TO THE FACULTY
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DECLARATION

I, Adokorach Irene, declare that, this Report on the “Impact of Population Growth on Wetland Management” a case study of Katabu Zone, is my original piece of work and has not been submitted to any other institution or university for any academic award whatsoever.

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APPROVAL

This Report on the “Impact of Population Growth on Wetland Management” a case study of Katabu Zone, has been approved by me, as the university supervisor.

Signature

Supervisor: Mr. Ssemugenyi Fred

Date:

DEDICATION

I dedicate this piece of work, to my parents Mr John M. Obwoya and Mrs Dorish Rose Obwoya for their wonderful contribution in my academic career .

ACKNOWLEDGEMENT

I owe my gratitude to all those who financially, academically and psychologically and socially contributed to accomplishment of this research. My special gratitude goes to my supervisor Mr. Ssemugenyi Fred who corrected and guided me in this study, thanks for your patience and understanding.

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May God bless you all

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LIST OF ACRONYMS

NEMA	National Environment Management Authority
LC	Local Council
NBI	Nile Basin Initiative
DRC	Democratic Republic of Congo
SPSS	Statistical Package for Social Scientists

ABSTRACT

The study on the “Impact of Population Growth on the Management of Wetlands” was carried out in Katabu Zone in Kansanga with specific aims of; finding out the importance of wetlands, how wetlands are managed, challenges experienced in the management of wetlands and the determining possible intervention measures that can be adopted in to improve the management of wetlands. A review of related literature was carried out on already existing information on the specific aims of this paper as a way of comprehending the problem and enriching and supplements the study findings. The study relied on a qualitative research design under which questionnaires were administered and interviews were conducted with community members, Environmentalists and local leaders.

It was established that, wetlands were important because they provide medicine and food, generate employment, regulate climate, filter and purify water, maintain soil fertility, and provide water catchments. The mechanisms for wetland management were reported to include law enforcement, seepage and indigenous knowledge the management authority experienced challenges such as flooding, land degeneration, extinction of resources, technological effects, blocking of passages and weakening of the catchments areas however, solutions including inclusive policies, sustainable urbanization, generating employment opportunities, research, family planning and stricter laws were suggested. This paper concludes that, Despite the usefulness of wetlands to the communities and countries, management authority will continue to experience challenges in trying to control the impact of the mankind on the wetlands if revision of the existing policy is done and generation of more employment opportunities among others.

The study recommends; Provision of appropriate education, capacity building, sustainable development, research, incorporating know how and skills and sensitizing the young generation

CHAPTER ONE

INTRODUCTION

1.0 Background of the Study

Laura Klappenbach defines wetlands as, habitats that fall somewhere on the environmental spectrum between land and waters, because they lie at the interface of terrestrial and aquatic habitats. She also points out that, wetlands are highly productive communities and provide habitat and food resources for a wide range of species.

Similarly, Koppen, et al, (2007), define a wetland as vegetated area of lowland that is wet and flooded either permanently or seasonally. Rainfall and dew which precipitate on the catchments, and is not returned to the atmosphere by either transpiration or evaporation, flows down through the catchments towards the low laying areas such as depressions and basins that were formed by down warping of land to form wetlands. They may stay wet long enough for certain plants and animals to grow. Wetlands include forest, papyrus, and grass swamps, bogs, flood plains, shallow lakes and rivers.

According Coles and Olivier (2001), it is emphasized that, globally, wetland are said to be, inherently diverse and the fate of wetlands and human settlement has been linked inextricably for millennia. However, it is widely accepted that more than 50% of specific types of wetlands were destroyed in parts of North America, Europe, and New Zealand during the twentieth century. Many other wetland systems continue to be degraded across the globe. They also point out that, urban human populations and wetlands have been joined in a turbulent symbiotic marriage since the dawn of civilization. The advent of the earliest urban conurbations in Mesopotamia was dependent on wetlands and the benefits they provided. For almost five millennia humans remained predominantly occupants of rural areas and that, the situation has changed markedly in the last few years. Since the mid 2000s more than 50% of Earth's population now resides in cities, towns and urban settlements. The shift to a predominantly urban population is predicted to continue at average rates up to almost 1.6% per annum worldwide with low growth rates in the most developed and least developed countries. Unsustainable use of water resources has significant impacts on wetlands and the biodiversity they support far beyond the peri-

urban environment, but wetlands have progressively been lost and degraded due to human activities for thousands of years. It is apparent that we continue to mismanage wetlands and fail to learn from the lessons delivered over five thousand years of human development.

However, they are now recognized as being lost at a rate that is greater than for any other type of ecosystem. This has raised global concern, treaties like the popular RAMSAR treaty are trying to conserve and advocate for wise use of wetlands and their biological resources. This can be attributed to the different values derived from them. Conservation of wetlands is an assurance of income and good health of people who live near them. These values can be divided into three main groups; wetland services, wetland products and wetland attributes.

About 10% of Uganda's total land area, 205,000 km², is occupied by wetlands and historically these areas were referred to as wastelands. Lind (1956) notes that although they occupy a large area of Uganda, these waterlogged areas have hitherto attracted little attention, being considered useless except to provide a few fish and building materials in a country where good agricultural land was plentiful. This notion has apparently changed and over the last 20 years the wetland resource has been put under considerable pressure from agriculture resulting in the draining of many wetlands and modification of several others. However, there is growing concern within the government that much of the agriculture on wetland soils is not sustainable and, therefore, there is need to develop a policy that ensures sustainable and national utilization of wetland resources (Bailey et al, 2005).

At community level, in Makindye Division the population growth rate is rapid and due to this, people have settled on wetlands particularly in Katabu Zone. This brings about a need for integrated food production and waste processing technologies that can enable communities to secure their livelihood without endangering the integrity of the natural resources. The study therefore intended to examine the connection between population growth and wetland management, by analyzing how population growth rate had impacted on management of the wetlands. Due to this background and setting the research was

conducted in Kansanga, particularly Katabu zone which has a wetland experiencing population growth.

1.1 Statement of the Problem

Despite the useful contribution of wetlands to the livelihoods of millions of people by providing food and income, support biodiversity and to form a hydrological and ecological buffer between upland areas and water bodies, population growth with its associated environmental degradation exert increasing pressure on wetlands. Human population growth, introduction of exotic fish species, over fishing and eutrophication have led to a deterioration of the wetland resources. This poses a threat to the livelihood of the riparian communities and thus generates global concern.

It is imperative to state that, there is a relationship between population growth and management of wetlands. Due to population growth, the available land is not sufficient and thus is leading to increasing pressure on wetlands. Kansanga just like any other region in the country is experiencing population growth and people have sought occupancy in the wetland of Katabu zone. It was clear that population growth must stop sometime within the foreseeable future due to various impacts such as destruction of wetlands through animal and plant extinction , limited food and water supplies, lack of land for settlement, limited energy and natural resources, pollution, and the contamination and scarcity of many other much needed materials. The study therefore sought to understand the impact of population growth on wetland management in Katabu Zone – Kansanga to provide possible remedies..

1.2 Objectives of the Study

1.2.1 General Objective

The overall objective of the study was to examine the impact of population growth on wetland management in Katabu Zone, Kansaga.

1.2.2 Specific Objectives

- i) To find out the importance of wetlands.
- ii) To assess how wetland management is carried out.

- iii) To find out the challenges experienced in the management of wetlands as a result of population growth.
- iv) To determine possible intervention measures that can be adopted to improve on wetland management in Katabu Zone.

1.3 Research Questions

- i) What is the importance of wetlands?
- ii) What are the mechanisms followed in the management of wetlands?
- iii) What are the challenges experienced in the management of wetlands as a result of population growth?
- iv) What interventional measures can be adopted to improve on wetland management?

1.4 Scope of the Study

1.4.1 Geographical Scope

Katabu Zone is located in Kansaga, which is part of Makindye Division in Kampala District. It is bordered by Kabalagala and Kisugu in the North, Muyenga to the North East, Kiwafu to the East and Konge to the South and Lukuli to the South West and Nsambya to the Northwest. Kampala District, with a population of approximately 11,234 according to the Kampala District Environment Profile.

1.4.2 Content Scope

The study examined the impact of population growth on wetland management in Katabu zone. It was restricted to examining the mechanisms adopted in the management of wetlands in regard to usefulness of wetlands, not leaving out other challenges experienced in order to provide ample interventional measures to improve the performance of concerned actors in protecting and managing wetlands.

The study covered a sample of 60 respondents, cutting across different age groups. These included employees from the National Environment Management Authority (NEMA), community members of Katabu Zone as well as local council leaders.

1.4.3 Time Scope

The study was expected to cover a period of three months and would place from May 2010 to July 2010 due to the work activity that was expected to be carried out.

1.5 Significance of the Study

It was expected that when this study had been carried out and accomplished successfully, it would contribute substantial awareness on the management of wetlands by providing useful information to concerned actors, (both local and international) as well government agencies and the entire community and households at large on population growth and wetland management.

The study assisted in identifying appropriate means of determining an immediate solution to population growth for effective sustenance and management of wetlands.

The study was expected to provide a foundation for future research as well as helping to narrow the existing gap about population growth and wetland management.

The study contributed towards empowering existing actors in terms of changing the community attitude on population growth and preservation of wetlands.

The study was significant to the researcher in fulfilling one of the requirements for award a Bachelor's Degree in Education.

1.6 Conceptual Framework Showing the Impact of Population Growth on Wetland Management

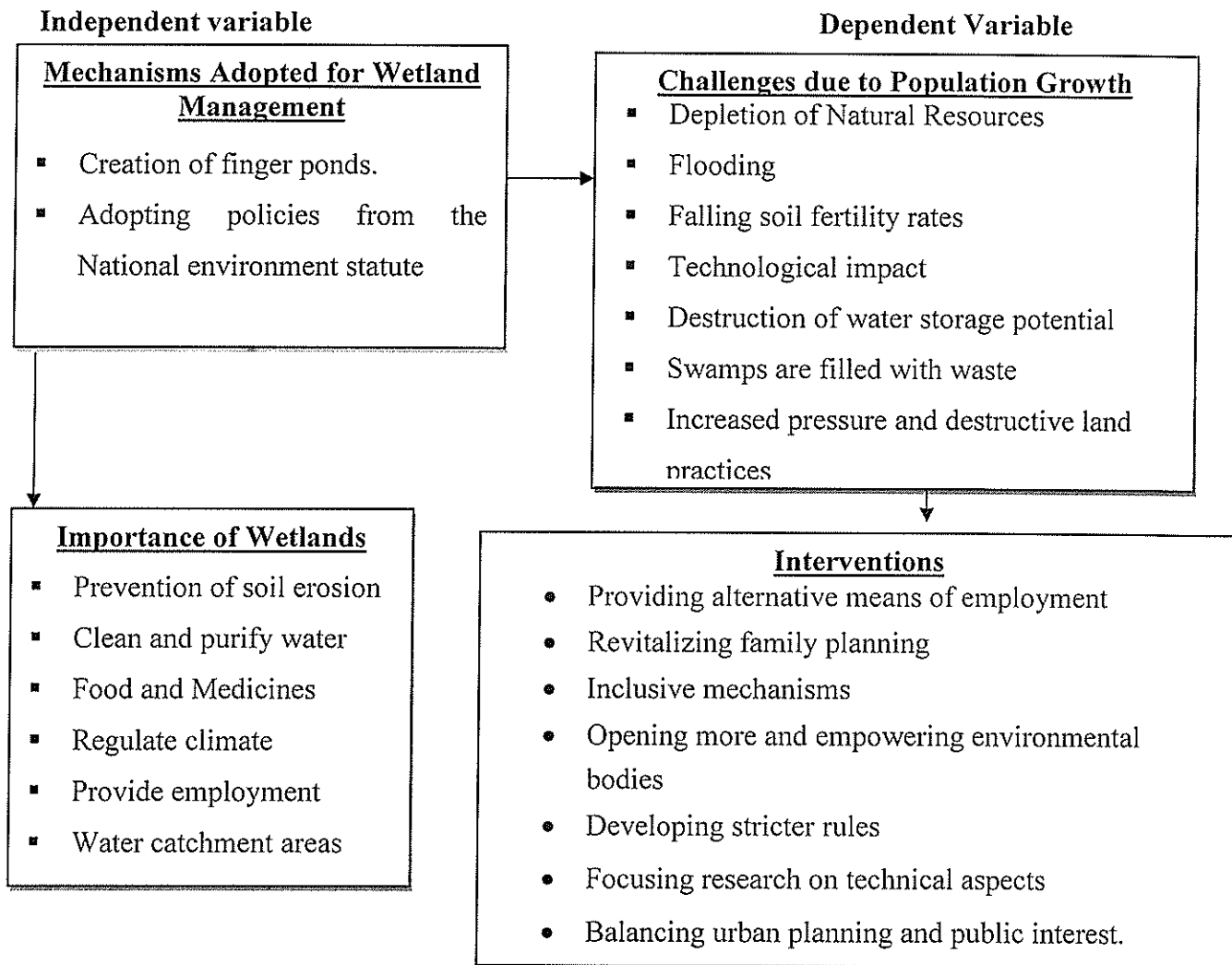


Figure 1: Conceptual Framework

Wetlands are famously known for providing employment, water catchments, foods and medicines, cleaning and purifying water and prevention of soil erosion. Due to their importance, measures such as finger pond and regulations from the environmental statute are adopted to help in managing wetlands but population growth deters this effort through depletion of natural resources, destructive land practices, flooding, falling soil fertility

rates, technological impact, destruction of water storage potential and filling swamps with waste. However, solutions such as providing alternative employment, research, balancing planning, and stricter rules can be adopted to uplift wetland management.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The study reviewed literature from various scholars on the major variables of the study which are the; usefulness of wetlands, mechanisms adopted in the management of wetlands, challenges experienced in the management of wetlands as a result of population growth and interventional measures that can improve on wetland management.

2.1 The Concept of Population Growth

Siago, (2001), defines population growth as the increase in the number of people who inhabit a territory or state. He further defines it as, the change in population over time which can be quantified as the change in the number of individuals in a population using "per unit time" for measurement, which change in size can either be positive or negative. Similarly Bhande et al (1978), defines it as the change in the number of people in a given area. It can refer to the change in the number of people in a given area as result of variation in fertility and mortality rate. Globally, population growth has been calculated to be increasing by two percent each year as pointed out by Birg (1995), which according to Brown, et al (1997), is a much more rapid increase than has ever occurred in the history of the planet. In Uganda, population growth is projected to double in the next 21 years, when the world population will double after 54 year, which puts Uganda's population growth among the highest in the Africa as pointed out by Nafula and Miti (2007).

2.2 Importance of Wetlands

2.2.1 Water Catchments Areas

Silvius et al (2000), note that, Wetlands act as sponges during dry periods of the year; they regulate run-off and recharge groundwater resources, and they purify water supplies. Their capacity to store water means they are able to support livelihood strategies, such as shining, pastoralism and agriculture, as well as providing craft materials, clean drinking water and medicinal plants. People's long association with wetlands means that

indigenous systems of wetland management and utilization are to be found throughout the developing world.

2.2.2 Provide Employment Opportunities

Wetlands supply direct or subsistence employment for 2.7 million people, almost 10 per cent of the population. In many parts of the country, wetland products and services are the sole source for livelihoods and the main safety net for the poorest households. And globally, wetlands hold the bulk of the world's fresh water stock and in the East Africa, wetlands store, distribute and clean most of our water (Dugan, 1990).

Conservation of wetlands implies growth of the country's tourism industry since wetlands are a natural habitat for many different animals and plant species. This increases foreign exchange for the country. Wetlands provide touristic materials, a beautiful landscape and cultural heritage. Uganda has a wide range of resources ranging from fresh water to saline craters, low land to snowy-capped mountains. This provides good scenery attractive not only to humans but also to other forms of living animals. It is known for example that Uganda is a popular destination to very many migrant bird species.(Nafula Jane and Joseph Miti (2007).

2.2.3 Regulate Climate

The Miti (2009), wetlands can act as a reservoir to store carbon dioxide, mitigating climate change impacts. In Uganda wetlands play a role in regulating climate and in reducing the greenhouse effect through their capacity for retaining carbon. It is widely accepted that wetlands play an essential part in reducing natural risks such as drought and floods.

2.2.4 Wetlands Clean and Purify Water

Wetlands clean and purify water. Most of the wetlands especially the papyrus swamps retain sediments and absorb harmful substances in water. The sediments help bury any pollutants and the natural decay of plant material helps to convert the toxic substances into harmless ones. Therefore the wetlands ensure that the water leaving them is free from pollutants and is clean enough for human consumption. Wetlands are well known

for storing water. This is due to the fact that they have the special ability to retain water and release it gradually. This water can be used for several purposes like in the construction of infrastructure by industries, households, for irrigation and animal consumption during times of drought. Their ability to retain water has enabled them to control floods by storing the collected water hence the more reason to protect them. In addition, they reduce extremes of flow by acting like leaky-dams holding- back water when they receive it and subsequently letting it flow through slowly. This results in maximizing the area of land, which can be kept moist for productive purposes, as well as the length of time during the year for such activities (Botkin, 2005).

2.2.5 Wetlands Prevent Soil Erosion

Wetlands prevent erosion by retarding the flow of water. If the regions downstream of a wetland received full erosion force of storm events, it would result into soil and stream bank degradation. In addition, wetlands maintain the flow of rivers throughout the year as well as ensuring the constant flow of water from boreholes and wells. The wetlands act as water reserves thus ensuring a continued supply of water. Wetlands also help in formation of convectional rainfall. Water from the wetlands is released in form of water vapor into the atmosphere due to high temperatures. This vapor later condenses and falls as rain and the cycle is repeated over and over (Salafsky and Wollenberg, 2000).

2.2.6 Wetland Products (Food, Medicine and Others)

Denny (1991) observes that, wetlands can be used to provide food to the population since agriculture may be practiced along their banks, which have rich fertile soils. Crops such as sugarcane, rice and some vegetables do well along the banks of wetlands. In addition to this, wetlands provide fish, which is a high quality source of protein. This is evidenced by the different fish species like the catfish and lungfish, which are found in most wetlands. This source of protein should be conserved for future generations. The economic prospects that can be derived from carefully using our wetlands can not all be mentioned. Several people in Uganda today venture daily into these swampy places to emerge with an array of raw materials which are then turned into useful and profitable products. They include fishing, material for manufacture of art and crafts, providing building materials, agriculture, brick making and many others. The importance of

wetlands can also be appreciated through their medicinal values. The revelation in the "NEW VISION" Uganda's leading daily newspaper, that Uganda's wetlands may hold the key to an asthma cure. This is a clear example of the unknown potentials wetlands have in stock for us. Traditional herbs like the "*mululuza*" for cure of malaria are all products of wetlands.

Van Dam et al (2006), point out that, wetlands are important for the livelihoods of millions of people. They provide food and income, support biodiversity and form a hydrological and ecological buffer between upland areas and water bodies. Miti (2009) notes from the Water and Environment Minister (Ms Maria Mutagamba) that, wetlands are the most valuable ecosystems the country has, and, marshlands are environmental capital which if utilized appropriately, can eliminate extreme poverty in the region and that, people in Uganda, use wetlands often called the country's "granaries for water" in various ways to sustain their lives and livelihoods. They rely on them for water, construction material, and fuel, and use them for farming, fishing, as well as to graze livestock and many other products that keep the rural and urban areas ticking. They also bring beauty, in the form of scenic landscapes, forests, animals and birds.

2.3 Mechanisms Adopted in the Management of Wetlands

2.3.1 Through the National Environment Statute (1995)

Deriving from <http://www.uganda.co.ug/nema/>, website, wetlands in Uganda are protected in law under clauses 37 and 38 of the national environment statute, 1995. The statute states that; "Without written approval from the national environment management authority (NEMA), it is an offense for any person to:

- a) Reclaim or drain any wetland;
- b) erect, construct, place, alter, extend, remove or demolish any structure that is fixed in, on, under or over any wetland;
- c) disturb any wetland by drilling or tunneling in a manner that has or is likely to have an adverse effect on the wetlands;
- d) deposit in, on or under any wetland any substance in a manner that has or is likely to have an adverse effect on the wetlands;
- e) destroy, damage or disturb any wetland in a manner that has or is likely to have an adverse effect on any plant or animal in a wetland;
- f) introduce or plant any exotic or introduced plant or animal in a wetland.

In addition to which, NEMA exempts traditional uses of wetlands from these restrictions and the Authority in consultation with the lead agency establishes guidelines for the sustainable management of all wetlands in Uganda. It also, through the assistance of the Local Environment Committees, District Environment Committees and lead agencies identify wetlands of local, national and international importance as ecosystems and habitats of species of fauna and flora and compile a national register of wetlands. Similarly, the policy committee may in consultation with the lead agency and the District environment committee, declare any wetland to be a protected there by excluding or limiting human activities.

2.3.2 Creation of Finger ponds set up

Finger ponds are ponds dug from the landward edge of wetlands that extend like fingers into the swamp (hence the term “finger ponds”). Soil from the ponds can be heaped between the ponds to form raised beds for crop cultivation. The ponds are stocked with fish through natural flooding in the rainy season. As the waters recede, the trapped fish are cultured using manure, crop wastes and household wastes to fertilize the ponds and feed the fish. The water level in the ponds is maintained into the dry season by seepage from the adjacent wetland. The idea of finger ponds in the Lake Victoria region was described by Denny (1991) and Bugenyi (1991). It has developed from flood retreat farming and flood-based fishing practices found in many seasonally-flooded areas as the Sudd and Lake Chad. It is also similar to the many other seasonal aquaculture systems in other parts of the world, e.g. traditional coastal aquaculture systems like the tambak systems for milkfish production in Indonesia or the dambo ponds in southern Malawi.

According to Van Dam et al (2006), ponds are dug from the landward edge of wetlands and extend like fingers into the swamp (hence the term “finger ponds”). Soil from the ponds is heaped between the ponds to form raised beds for crop cultivation. The ponds are stocked with fish through natural flooding in the rainy season. As the waters recede, the trapped fish are cultured using manure, crop and household wastes to fertilize the ponds and feed the fish.

The main features of finger ponds are: (1) water supply by natural flooding; (2) self-stocking through fish coming in with the flood water; (3) polyculture; (4) integration with crop production on the beds and with wastes and/or manures from household and livestock. Natural water supply and natural fish stocking in combination with waste inputs mean that the operating costs of these systems are kept low. The downside of this is that control over the operation is limited. Sites may remain flooded longer than expected, may flood unexpectedly during the culture season or may dry up sooner than expected, thus reducing the length of the culture period (Bakiika, 2009).

2.4 How Population Growth Affects Wetland Management

2.4.1 Increasing Pressure and Destructive Land Practices

This technology is integrated wetland pond aquaculture, or “finger ponds.” Population growth and the associated environmental degradation exert increasing pressure on wetlands. For example the Lake Victoria basin in East Africa with approximately 30 million people, where human population growth, introduction of exotic fish species, over fishing and increasing waste discharges (leading to eutrophication) have led to a deterioration of the wetland resources. For the riparian communities, this means a threat to their livelihoods as they depend on the wetland for food and income from fishing, seasonal agriculture and harvesting of wetland products. There is a need for integrated food production and waste processing technologies that enable communities to secure their livelihoods without endangering the integrity of the natural resources (Salafsky and Wollenberg, 2000)

Bugenyi, (1991), points out that, in many areas population growth has been associated with land fragmentation and resettlement schemes in fragile environments that directly affect food production. Similarly, Bailey et al (2005), emphasize that, land fragmentation contributes to inefficient and destructive farming practices and increased cultivation of marginal land, which often reduces food production. Because of population growth and land distribution policies, the average farm size in Ethiopia fell from 1.2 hectares to 0.8 hectares during the 1990s.

Bailey et al (2005), point out that through archeological and paleobotanical studies it is suggested that the attainment of civilization which eventually led to a monolithical development aspect in Africa destroyed its self through over population and abuse of natural resources. For example deforestation and wetland settlement, due to the need to attain sustainable development, have been a major problem.

2.4.2 Filling Swamplands with Waste

Miti (2009), for a long time, wetlands in Uganda were condemned and seen as dangerous habitat that provide breeding ground for deadly reptiles, animals and insects such as the anopheles mosquito that causes malaria. This perception, placed wetlands under great danger as people launched war against them. Large chunks of wetlands countrywide especially in east, central and western Uganda were converted to agricultural land and grazing fields and with the current increasing population and urbanization, marshlands are facing the highest degree of degradation. On a daily basis, people degrade swampland by filling them with all sorts of waste. This is done purposely to reclaim land for human settlements and industrial parks.

2.4.3 Destruction of the Wetland Potential from Storing Water

Miti (2009), points out that, due to high population growth rate people have resorted to occupying wetlands. This unplanned wetland conversion has greatly devastated their potential of storing water, filtering nutrients and pollutants. Moreover, it has caused natural calamities such as floods that affect some parts of the country, pollution of most water bodies for example, Lake Victoria and declining fish stocks as well as falling water tables and micro-climatic changes. But, due to their high economic value, environmentalists have embarked on transforming their obscurity and negative image to something.

2.4.4 Technological Impact

Balkin and Keller, (2005) note that, the dangers of human population is as a result of two factors that is the number of people and the impact of each person on development. He said “when there were few people on earth with limited technology used, human impact

was not much". The fundamental problem is that there are so many people with powerful technology which has left the global environmental resources in a total danger and as a result of that it has affected the development of the area in the political, social and economic point of view. For example due to the technological advancement, most of the swampy areas have been encroached upon by man through reclamation practices in an attempt for man to meet their demand which affects the development of the area economically in away that most of the aquatic life in swampy areas has been depleted due to lack of space for human expansion or survival. Yet worse still, swampy areas can help in climatic modification. In this manner the level of development has been affected due to the advancement of technology in the present situation compared to the past where the level of technology was limited.

2.4.5 Falling Soil Fertility Rates

Whilst most wetland users would agree that crop yields have declined over the years as a result of falling fertility in the wetlands, there is little evidence of widespread wetland degradation characterized by falling water table levels and the inability of wetlands to support agriculture or cheffe production (Chiesura, 2004).

2.4.6 Flooding of Occupied Wetlands

It is also important to note that high demand for land for settlement in urban centers like Kampala is endangering existing wetlands e.g. Nakawa, Industrial area, Nalukolongo, Kansanga and Bwaise. Today, most of these areas are affected by frequent flooding especially when it rains heavily (Silvius,et al, 2000).

2.4.7 Depletion of Natural Resources

Climate change, increasing population, and overuse of land, fisheries, and water supplies threaten to undermi;;ne wetland management in Uganda, (Sawa, 2008) for the Africa Science News Service. Gravin et al, (1998), further emphasize that population growth is associated with depletion of environment resources such as soil vegetation plants and animal species have been degraded and al the wetlands are being destroyed. Therefore, from the above analysis, Katabu zone is reflected because currently it is under occupancy with a very high population which affects the management of this wetland.

2.5 Solutions to Challenges Experienced

2.5.1 Balancing Urban Planning and Public Interest

Urban planning must be realistic in balancing interest against private interest. This is especially important when making decisions associated with economic development and the growth of export income. In other words, There is need to consider sustainable urbanization which embraces the application of sustainable development principles founded on principles or economic environmental and social sustainability within urban development plans and associated policies (Coles and Olivier, 2001).

2.5.2 Focusing Research on Technical Aspects

Research focuses on the technical aspects, and on the socio-economic and environmental impacts of this technology. Also, options for integrating finger ponds with other wetland technology, such as the use of natural or constructed wetlands for wastewater treatment, need to be evaluated. Initial results of the research from Kenya and Uganda show that flooding can yield enough fish for stocking the ponds and that manuring of the ponds can increase their productivity (Van Dam et al, 2006).

2.5.3 Developing Stricter Rules and Regulations on Wetland Degradation

According to Miti (2009), it is pointed out that, currently, the Wetlands Department is reviewing the National wetlands policy and drafting a bill to address all issues threatening the source. The Commissioner for Wetland Management Department Paul Mafabi, explains that, the revised policy would explain wiser use of wetlands.

2.5.4 Advocating for Wetland Conservation

The best solution to wetland depletion is massive education of the people. This education and campaign can be done through meetings with the local councils and through different environmental programs. The Ministry of Water and Environment and environmental organizations like the Nile Basin Initiative are trading the gospel of managing and conserving wetlands, since land has become scarce and people are now depending on wetlands for survival. Going by their advantages, Ms Mutagamba (Minister), during the Anglophone 5th regional training, program on wetlands and poverty reduction, said that, some special emphasis is being put on their management. "Being granaries of water alone

has warranted effort to ensure that wetlands are managed in the way that would enable them to survive to serve the future generations. The workshop, attracted wetland practitioners from Kenya, Rwanda, Burundi, Tanzania, Uganda, Egypt, Sudan, Ethiopia and DRC, was sponsored by the Nile Basin Initiative (NBI).

Minister Mutagamba explains that though the ministry is advocating for swampland conservation, the issue is that marshlands should not be left entirely alone. "This means that whatever activities we propose in wetlands must not endanger their key-functions like water recharge and discharge, flood control and water purification," the minister said adding, "Secondary, development in wetlands should not bar current users from their rights to access benefits, nor should they have severe negative impacts downstream community."

2.5.5 Open Environmental Bodies and Empowering the Existing Ones

Environmental Bodies Environmental bodies have been formed like the National Environmental Management Authority so that they aid wetland conservation. Organizations like the Wildlife club of Uganda are assisting in the sensitization of the masses about conservation of the flora and fauna. The government should take a leading role by legislating against the reclamation of swamps and wetlands. More so, the government should provide proper directions and guideline on the procedures to be followed when reclaiming wetlands if this becomes inevitable. Government should also be prepared to act when confronted with cases of unnecessary wetland and swamp reclamation. As mentioned before, overpopulation has contributed to wetland depletion.

2.5.6 Inclusive Mechanisms that can Incorporate Indigenous Knowledge

Locally developed institutions that include rules and regulations, common values and mechanisms of conflict resolution are increasingly regarded as adaptive solutions to resource management problems at the grass-roots level. Since they are rooted in community social capital rather than in external, top-down decision making, they are seen as being dynamic, flexible and responsive to societal and environmental change and, as such, they promote sustainability (Koppen et al, 2007).

2.5.7 Providing Alternative Means of Employment to the Poor

Considering the level of income of some Ugandans, swamps are a major source of building materials such as papyrus for thatching and making ropes. Alternative sources of income generation may be the best alternative instead of exploiting the wetlands. Instead of encroaching on these wetlands, one can conserve them thereby promoting the tourism industry (Bakiika, 2009).

2.5.8 Revitalizing Family Planning

A number of measures can be taken to control the population like adopting better family planning programs. This aims at minimizing excessive need for land which tends to force people to encroach on these wetlands. The only solution to urban reclamation of wetlands in this case is the encouragement of vertical rather than horizontal expansion. City planners, Engineers and Architects should make sure that wetlands are left out of their plans for expansion of the city (Saigo (2001).

Similarly, Nafula and Miti, (2007), also encourage Kampala Officials from the Ministry of Health and the Population Secretariat to call for revitalization of family planning services to check the rapid population growth rate in the country.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter explained the specific research methodology and techniques that the researcher employed in order to obtain data. It is an analysis of the geographical study research design, description of the population sampling strategies and sample design, data collection techniques measurements and data analysis techniques.

3.1 Research Design

The study used an explanatory research design because it focused on perception, facts, feelings, experiences as well as the emotions of respondents since the generated research questions required observance of an explanatory, descriptive and analytical perspective in order to find out the importance of wetlands, mechanisms adopted in the management of wetlands, challenges experienced as well as solutions that can be adopted on wetland management.

Both Quantitative and qualitative methods was observed in data collection and analysis. General information on the subject matter was collected from environmentalists, residents and community leaders.

3.2 Description of the Study Area

The study took place in Katabu zone in Kansanga, in Makindye Division. The area was purposely selected due to high population growth rate that it experiences, and thus harbours the major study elements. The area has a population of approximately 11,234 according to the Kampala District Environment Profile.

3.3 Sample Size

A sample of 60 respondents was drawn in the study and was cutting across different age groups. This involved 20 environmentalists from NEMA and other environmental organizations in the area, 5 local leaders and 35 community members particularly those that generate income from the wetland.

3.4 Sample Procedure

The study was done through purposive sampling method where environmentalists were of significant importance. Purposive sampling was administered on the employees of environmental organizations because, they are active participants in the protection of wetlands and stratified sampling was administered on local leaders purposely because they head the selected study area and have vital knowledge about the subject under study and thus satisfy the strata. Community members were randomly selected, because they are occupants of the wetland and some of them directly benefited from it economically. During the study, the researcher took into consideration the different attributes of respondents such as age, sex and education. The procedure therefore was relying on demographic characteristics of the study respondents.

3.5 Data Collection

3.5.1 Sources of Data

Primary Data

This was obtained through use of self administered questionnaires, Interviews and observation.

Secondary Data

This was obtained through the help of text books and other related works of outstanding scholars such as published, magazines, written data sources including published and unpublished documents, agency reports and internet sources were referred to, to throw more light on the management of wetlands.

3.5.2 Research Instruments.

Interviews

The researcher organized key informant interviews with environmentalists who enriched the findings of the study. The researcher interacted with the respondents face to face and asked them relevant questions to the study. Qualitative design involved in-depth interviewing of environmentalists, local council leaders and community members who were found illiterate.

Questionnaires

Both open and close ended questionnaires were used in the collection of data and these were distributed to the literate community members who were able to read and understand and fill in the correct information. The quantitative section thus involved the use of close-ended questionnaires which was issued to community members because this method was convenient.

Observation

Observation was used in obtaining first hand information through observing wetland occupancy. This was a guided procedure which was planned in advance and conducted using a checklist containing observable issues. The researcher used her naked eye to observe activities carried out on the wetlands and also in examining the phenomenal events as they happened and later drew conclusions.

3.6 Data Processing

The processing of data was done after the collection of data for verification of the information gathered and for attainment of completeness, accuracy and uniformity. Data editing involved checking the information for errors which were advantageous because it enabled the researcher to delete and eliminate possible errors traced that can manipulate the results of the study. Data was analyzed concurrently to avoid duplication thereby guiding the entire study for balanced and critical analysis. The researcher used hypothesis based on the questionnaire and for other items, tabulation pie-charts and percentage methods was used for data presentation, analysis and qualification.

3.7 Data Analysis

The study explained, described and presented the study findings basing on the specific objectives of the study, and research questions where data analysis was done through sketchy and generalized summaries of the findings such as observation and conclusions in the process of data collection. Data analysis was done using Statistical Package for Social Scientists (SPSS) version and presented in charts.

3.8 Ethical Consideration

The researcher carried out the study with, full knowledge and authorisation of the community leaders. A letter of introduction from the university, was obtained, assigning researcher to the field which helped to erase doubt on the side of the participants. The researcher thereafter went ahead to book respondents after which she delivered/picked the questionnaires or conducted interviews on agreed upon dates. The researcher also had the task of assuring the respondents of thier confidentiality in the proces of coding data.

CHAPTER FOUR

PRESENTATIONS, ANALYSIS AND DISCUSSIONS OF THE FINDINGS

4.0 Introduction

This chapter covers the presentation, analysis and discussion of the findings focusing on the main variables of the study which were to; find out the importance of wetlands, assess how wetland management is carried out, find out the challenges experienced in the management of wetlands as a result of population growth and determining possible interventional measures that can be adopted to improve the management of wetlands in regard to population growth.

4.1 Demographic Distribution of the Respondents

The study sought about the differences in the demographic characteristics of the respondents and the findings were presented in Table 1 to Table 3.

4.1.1 Distribution of the Respondents by Gender

The study sought about the differences in gender of the respondents and the results of the findings were as presented in Table 1.

Table 1: Gender Distribution of Respondents

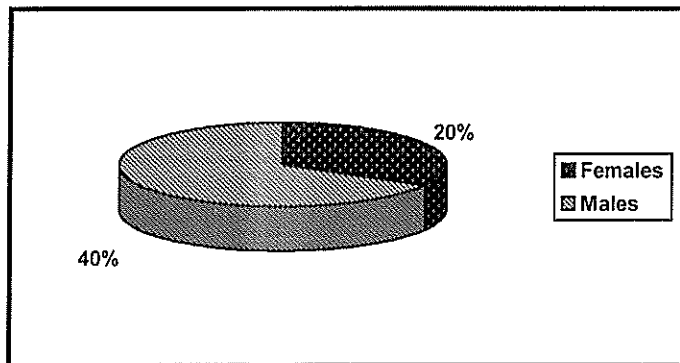
Sex	No of respondents	Percentage
Females	20	33.3%
Males	40	66.7%
Total	60	100

Source: Field Research Findings (2010)

According to the study findings, it was established that the males dominated the sample and thus constituted 66.7% of the total sample whereas the females were 33.3%. According to the researcher, this representation can be attributed to the fact that, it is the

men that are more prone to carrying out activities that have impact on wetlands than women and thus constituted the majority of the sample.

Figure 2: Gender Distribution of the Respondents



Source: Field Research Findings (2010)

4.1.2 Distribution of the Respondents by Age

The study sought information about the age distribution of the respondents and the findings were as presented in table 2.

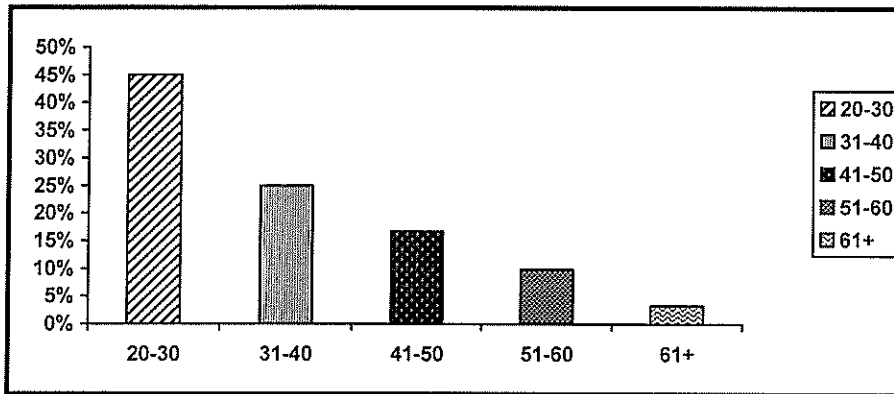
Table 2: Age Distribution of the Respondents

Age group	Frequency	Percentage (%)
20 – 30	27	45%
31 - 40	15	25%
41-50	10	16.7%
51-60	6	10%
61+	2	3.3%
Total	60	100%

Source: Field Research Findings (2010)

According to the study findings in table 2 and figure 2, it was revealed that age group 20–30 (45%) was the highest represented, 31 – 40 comprised of (25%), age group 41-50 consisted of 16.7%, the 51-60 consisted of 10% while the 61+ represented the least of the sample particularly because they are less vigorous and therefore not liable to carry out activities which destroy wetlands.

Figure 3: Age Distribution of the Respondents



Source: *Field Research Findings (2010)*

4.1.3 Level of Education of the Respondents

The study also sought information about the level of education and the study findings were as established in table 3;

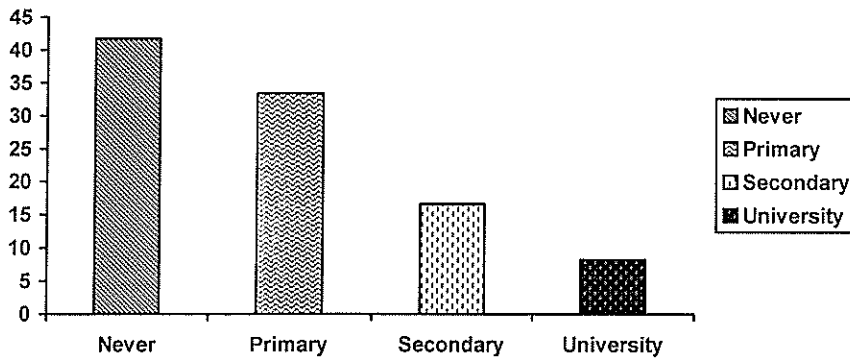
Table 3: Education Level of the Respondents

Education	Total	Percentage (%)
University	5	8.3%
Secondary	10	16.7%
Primary	20	33.3%
Never	25	41.7%
Total	60	100%

Source: *Field Research Findings (2010)*

In regard to the findings in Table 3 it was revealed that, 8.3% of the total sample had attained University education, 16.3% had attained secondary education, 33.3% had primary education and 41.7% had never been to school. According the researcher, this implies that those who had never been to school constituted the majority of the sample purposely because they had less knowledge, if not without knowledge about the usefulness of wetlands.

Figure 4: Education Level of the Respondents



Source: Field Data (2010)

4.2 Importance of Wetlands

The study aimed at establishing the usefulness of wetlands and the study findings were as revealed in table 4;

Table 4: Establishing the Importance of Wetlands

Factor	Agree	Disagree	Total Frequency	Total Percentage
Provide medicine/food	15(25%)	45(75%)	60	100
Generates employment	25(41.7%)	35(58.3%)	60	100
Climate regulation	10(16.7%)	50(83.3%)	60	100
Filters water	4(6.7%)	56(93.3%)	60	100
Maintain Soil fertility	22(36.7%)	38(63.3%)	60	100
Catchment area	11(18.3%)	49(81.7%)	60	100

Source: Field Research Findings (2010)

According to the study findings table 4 it was established wetlands were useful in such a way that they; provide medicine and food as represented by 25% of the total responses, generate employment (41.7%), regulate climate (10.6%), filter water (6.7%), Maintain soil fertility (36.7%) and that they are also useful in water catchment as represented by 18.3% of the responses.

It was established in the study that wetlands act as water filters, they store all the dirty water from different drainage systems with all the pollution that it harbours ranging from garbage right to human excreta and that the purpose of these wetlands is to filter all these wastes and send back clean water to the lakes and rivers. This view however is also supported by Botkin (2005) on how wetlands clean and purify water and how papyrus swamps retain and absorb harmful substances in water by burying the pollutants and converting toxins into harmless ones.

According to the researcher's opinion this implies that, when all the waste enters the wetlands, it is trapped from further drainage and only that water that is waste free comes out of wetlands and recycled to lakes and rivers for use.

It was further pointed out that wetlands generate employment for the poor people around and that the community encroaches on the wetland for their survival and among the employment mentioned was that they used it to grow crops, some of them had turned part of it into a washing bay (wash cars), others brought in their cattle for water whereas others collected papyrus for weaving, and hay for sale as well as for feeding their animals. Dugan (1990), view is in the same line, when he observes that, wetland supply subsistence employment and that wetland products and services are a source of survival. This same view is upheld by Nafula and Miti (2007), on how wetlands provide touristic materials, a landscape as well as cultural heritage and thus help in growth of tourism. The same view is held by Silvius et al (2000), on how wetlands are able to support livelihood strategies, such as shining, pastoralism and agriculture, as well as providing craft materials, clean drinking water and medicinal plants. Van Dam et al (2006), has the same observation that, wetlands are important for the livelihoods of millions of people. They provide food and income,

According to the researcher, this implies that, the poor surrounding these wetlands make use of the products as provided by nature to gainful utilize them for the survival at almost a zero if no cost.

It was further pointed out that wetlands play a role in maintaining the level of soil fertility, this was reportedly true particularly when the wetlands trap water in the catchment areas which would have flowed to erode the top soil. This view however, is in contention with Salafsky and Wollenberg (2000), view on how wetlands prevent soil erosion by retarding the flow of water.

It can therefore be submitted that, wetlands trap water that would otherwise have flowed to erode the top layer of the soil which if eroded would lead to loss of nutrients, this excess water enters the wetlands through the drainage system where it is recycled and supplied back to the rivers and lakes.

In relation to the above, it was established from the respondents that, wetlands have catchment areas which trap water, that part of these catchments is a bit soggy and thus when water enters it is absorbed and retained for recycling. This is envisaged by Silvius et al (2000), on how wetlands act as sponges in dry periods by regulating run-off and recharging ground water resources as well as purify water. Salafsky and Wollenberg, (2000) also support this opinion about wetlands maintaining the flow of rivers throughout the year and ensure the constant flow of water from boreholes and wells and thus act as water reserves providing continuous supply.

Yet to mention was the importance of the products derived from the wetlands like medicinal plants, food such as yams and others. It was pointed out that these products at times tend to grow on their own especially the medicinal plants and that the yams grew favourably in wetlands thereby providing food to the people around. This is also pointed out by Denny (1991), who observes that, wetlands provide food to the population when agriculture is carried out along their banks, which have rich fertile soils and that people venture into these swampy places to acquire raw materials which they turn into useful and profitable products and how wetlands are appreciated for their medicinal values. Miti (2009) reports on the same view from the Water and Environment Minister (Ms Maria Mutagamba) that, wetlands are the most valuable ecosystems the country has, and, marshlands are environmental capital which if utilized appropriately.

This implies that wetlands are a very useful source of income if sustainably utilized and thus should not be left to degenerate. This calls for sustainable consumption.

It was also reported that wetlands help in regulating the climate in that they are a part in the formation of rain when they release water in form of vapor into the atmosphere especially when it is very hot. Salasky and Wollenberg (2000) support the same opinion on how wetlands release water vapour which is later on condensed and turns into rainfall. Miti (2009) envisages the same when he states that, wetlands can act as a reservoir to store carbon dioxide, mitigating climate change impacts.

According to the researcher's opinion, this implies that, due the excessive water that wetlands trap, when they are overheated they release it turns into vapour and later condenses to turn into rain and thus good regulators of climate.

4.3 How Wetland Management is Carried Out

The study aimed at assessing how wetland management is carried out and the findings were as established in table 5;

Table 5: Assessing the Management of Wetlands

Impact	Agree	Disagree	Frequency	Total
Indigenous knowledge	10(16.7%)	50(83.3%)	60	100
Seepage	37(61.7%)	23(38.3%)	60	100
Observation of the law	48(80%)	12(20%)	60	100

Source: Field Research Findings (2010)

In the study it was established that management of wetland was enforced through the law, seepage and also through partly through indigenous knowledge. According to the findings enforcement by law received responses of 80% of the total responses, whereas seepage was represented by 61.7% and indigenous knowledge was the least represented with 16.7 of total responses, purposely because the community due to their ignorance seemed less aware of the significant contribution of wetlands.

It was emphasized that management of the wetland was done especially through law enforcement, where the LCs work hand in hand with concerned actors to stop unsustainable practices on the wetland and that those found misusing the wetland are penalized depending on the impact of the destruction caused.

This is in line with <http://www.uganda.co.ug/nema/>, when it points out on the protection of land as stipulated in the National Environment Statute under clause 37 and 38 of how it is an offence to “drain or reclaim any wetland, construct, alter, remove or demolish structures fixed on in, on, under or over the wetland...”

According to the researcher, this implies that although it is against the National Environment Statute to encroach on wetlands without permission, the community does less to protect the wetland given the statistical responses and thus their destructive wetland practices.

It was further established that wetland management is done through seepages, and that in this case finger like ponds are dug, which gives the soils from the pond a chance to receive a raised platform upon which crops can be grown. This is contention with Denny (1991), on how finger ponds are dug from landward edges and heap soils forming raised beds for cultivation.

This implies that the soil content when driven by the waves in the water is trapped between the finger ponds and becomes part of the soil and when evaded by water it raises thereby providing a chance for cultivation of plants.

Last but not least it was pointed out that through use of indigenous knowledge people try to utilize wetlands by carry out traditional mechanisms of wetland management trying to redirect water depending on the position of the catchment area although according to some respondents it was put clear that at times the redirection is not effective and results into flooding. Bugenyi (1991) view corresponds with this analysis when he observes that, this has developed the flood retreat farming practices found in seasonally flooded areas and according to Bakiika (2009), it is emphasized that, sites may remain flooded longer than expected, or may dry up sooner than expected and that this reduces the length of the culture period (Bakiika, 2009).

According to the researcher, this implies that, the community is ignorant on how to manage the wetland and the mechanisms that they apply at times lead to flooding or drying up of wetland instead and it could be for this purpose that <http://www.uganda.co.ug/nema/>, NEMA exempts traditional uses of wetlands from these restrictions and NEMA declares any wetland to be a protected and excludes or limits human activities because if not directed, they do more harm than good.

4.4. Challenges Experienced in Management of Wetlands as a Result of Population of Growth

The study sought to find out the challenges experienced in wetland management as a result of population growth and the findings were as presented in table 6.

Table 6: Challenges experienced

Challenges	Agree	Disagree	Frequency	Total
Flooding	58(96.7%)	2(3.3%)	60	100
Technological advancements	40(66.7%)	20(33.3%)	60	100
Land degeneration	57(95%)	3(5%)	60	100
Weakening catchments	37(61.7%)	23(38.3%)	60	100
Extinction of resources	48(80%)	12(20%)	60	100
Blocking passages	39(65%)	21(35%)	60	100

Source: *Field Research Findings (2010)*

In regard to the challenges experienced, it was established that responsible authority met challenges along the way in trying to manage wetlands in face of the growing population. These challenges were identified as flooding (96.7%), land degeneration (95%), extinction of resources (80%), technological effects (66.7%), blocking of passages (65%) and weakening of the catchment areas.

It was established from the respondents that management experiences a problem of flooding of the wetlands which at times may result into loss of lives and destruction of property in case of heavy rains. This was reported to be true particularly due to

destructive wetland practices which prevent excessive water from being filtered and purified to find its way back to the rivers and lakes due to the destructive wetland practices of the growing population. This is supported by Silvius et al (2000) that the high demand for land settlement in urban centers which endangers the existing wetlands and areas are affected by frequent flooding when it rains.

According to the researcher this implies, when man carries out unsustainable practices, the wetlands are protected from performing their functions and thus this may lead to unpurified but toxic water being sent back to rivers and lakes, ponds or wells which may be harmful to aquatic life as well as human beings who drink directly from the water sources.

It was also pointed out due to human activity and pressure on the wetlands such as permanent settlement, cultivation and other unsustainable practices, the wetland cannot perform many of its functions because of such interferences. It was pointed out the wetland is divided and occupied by so many people and that the community destroys wetland papyrus to construct permanent houses and yet these help in trapping unwanted wastes from flowing into the system. The purpose of wetlands in this case is nullified and health standards cannot be maintained. Salafsky and Wollenberg (2000), share the same view when they comment about how population growth and the associated environmental degradation exert increasing pressure on wetlands which endangers the integrity of the wetlands. Bugenyi and Bailey et al (2000:2005) support the issue of fragmentation of the wetlands as a result of population growth which brings about increased cultivation of marginal land. In the researcher's opinion this implies that, with increasing population, people become less able to afford a decent home and thus settle in wetlands which act as their homes, sources of food and all other practices thereby abusing the integrity of wetlands.

Yet to mention is the weakening of the catchment areas, it was emphasized that when the growing population in the community concentrates on the wetland and carry out unsustainable land practices, the wetland loses its capacity to trap water and in so doing the catchment areas are weakened. Chiesura (2004) carries the same observation, on how

wetland degradation is characterized by falling water tables and inability of wetlands to support agriculture due to falling fertility of the wetlands. Miti (2009), also holds the same view on how due to high population growth community resorts to occupying wetlands which unplanned wetland conversion devastates its potential to store water.

According to the researcher this implies that, because of poor planning and ignorance, the community take up settlement on the wetland and thus break the strength of the wetland to store water and this is detrimental to lives both aquatic and human.

It was further pointed out that, management authority experience a challenge of depletion of the resources which can be of more economic value as well as protective of wetlands all of which are due to the population growth rate in the area. Sawa (2008) points out that increasing population and overuse of land as undermining wetland management and also by Gravin et al, (1998), on how population growth is associated with depletion of environment resources.

In the researcher's opinion this implies that, useful natural resources that would have fetched revenue for the country become extinct due to the increasing population that rely on the resources unsustainably for their survival.

Further still it was pointed out that due to increasing population, and increased impact of the community on the wetland, the water drainage system is blocked, that they dispose off their waste and garbage irresponsibly and ignorantly and in the end water passage is blocked and flooding is experienced. Miti (2009), holds the same opinion on how people degrade swampland by filling them with all sorts of waste.

According to the researcher, this implies that, with the level of ignorance at hand, such waste is dumped in view that it will find its way through the waters not knowing that they are blocking the system instead and causing more havoc.

It was further pointed out that changes in technology were also endangering the integrity of the wetlands. It was emphasized that, some community members particularly the rich had bought land that was partly wetland and thus through technology had raised their houses on platforms high beyond the rest blocking the water from free movement and at

the same time having their drainage system affect their neighbours. This is supported by Balkin and Keller, (2005) on how there are so many people with powerful technology which has left the resources in total danger.

According to the researcher, this implies that those that can afford the use of technology are using them at the expense of the community which cannot afford the same means.

4.5. Solutions to Challenges Experienced in Management of Wetlands

The study sought to find out the solutions that curb challenges experienced in the management of wetlands and these were as presented in table 7.

Table 7: Solutions to Challenges Experienced in Management of Wetlands

Solution	Agree	Disagree	Frequency	Total
Stricter laws	55(91.7%)	5(8.3%)	60	100
Generation of employment	33(55%)	27(45%)	60	100
Sustainable urbanization	45(75%)	15(25%)	60	100
Family planning	52(86.7%)	8(13.3%)	60	100
Involvement of community	47(78.3%)	13(21.7%)	60	100
More research on preservation measures	37(61.7%)	23(38.3%)	60	100

Source: *Field Research Findings (2010)*

Solutions were suggested to be implementation of stricter laws (91.3%) family planning (86.7%), involvement of the community (78.3%), sustainable urbanization (75%), conducting more research (61.7%) and generating employment opportunities as represented by 55% of the responses.

It was suggested that to better the management of the wetlands it called for sustainable urban practices under which, those that encroach on the wetlands should do it only strict observation and sustainably. In this way dependence on the resources should not be an endless process but also a process through which regeneration of resources should be allowed to take place. This view is in line with Coles and Olivier (2001), on how urban

planning should balance public interest against private interest by way of embracing sustainable development principles.

According to the researcher, this means that, however much the communities are to depend on the resources found in or on wetlands, they should be monitored to carry out sustainable practices.

In relation to the above it was suggested that the management authority should devise stricter rules and penalties that can act as lesson to those that violate the rules and operate outside self interest to destroy wetlands. The culprits if penalized and the rule of law maintained to equal to all, not sparing the rich from the poor, then a more realistic dependence will be realized. Miti (2009) holds the same solution on how the law is being revised and how the revised policy explains wiser use of wetlands.

This implies that management of wetlands will be improved upon if the law acts regardless of fear or favour.

It was also suggested that more research needs to be carried out to improve on the means through which wetlands are managed, particularly on the finger ponds or even devising a better solution. Because at times in cases of great rains the water overflows and covers the fingers as well. Van Dam et al (2006) also recognizes the importance of research to focus on technical aspects, and that finger ponds can be integrated with other wetland technology.

In the researcher's opinion this implies that, when finger ponds although used have not done much to conserve the integrity of wetlands and need to be improved upon or substituted by better technology.

It was also observed that family planning needs to be encouraged to control population growth in order to reduce on the impact of big populations on the wetlands. That in case population is kept minimal, there will be less human activities and impact on the wetland as supported by Saigo (2001) on how better family planning programs can be taken to control population growth to minimize excessive need for land and encroachment on

wetlands. Similarly, Nafula and Miti, (2007), encourage a call upon revitalization of family planning services to check the rapid population growth rate in the country.

In the researcher's opinion this implies that wetland management can be improved upon if population growth is checked. Through uncontrolled birth rates, there is a tendency for people to give unnecessary births even without subsistence maintenance and thus end up looking for survival and encroaching on every public resources that they come across, as though it is their own.

It was further suggested that, the community should also be sensitized into the conservational practices of wetlands, that they should not merely be stopped from consumption of the resources but should be shown into the advantages of sustainable practices if they are to follow suit. But if merely left out and kicked out of the wetlands, they stubbornly destroy wetlands. Koppen et al (2007) also supports top-down decision making which should involve the society for responsiveness and sustainability and that the best solution to wetland depletion is massive education of the people.

In the researcher's opinion, this implies that, if the community is left out in the management of the wetlands, they will not gain a sense of responsibility towards the protection of wetlands but will instead stubbornly want to destroy what is put in place so they should be made part and partial of the decision making of their societies.

Last but not least it was also suggested that income generating activities be established in the community to employ and sustain the poor as a way of stopping them from entirely depending on wetlands for survival. Bakiika (2009) supports this on how alternative sources of income generation may be the best alternative to exploitation of wetlands.

In the researcher's view this indicates that, people rely on wetlands because they don't have alternative means of survival and thus if employed they would not exploit the wetlands.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter covers the summary, conclusions and recommendations of the study findings on the three major variables.

5.1 Summary of the Findings

According to the findings it was revealed that wetlands were of importance to the community although they are being degenerated by unsustainable practices of man, due to population growth however measures are underway to manage wetlands but there are challenges experienced along the way to which solutions can be devised that can better the management of wetlands despite the population growth.

5.1.1 Importance of Wetlands

The study revealed that, the importance of wetlands to be provision of employment medicine and food, regulating climate filtering and purifying water maintaining soil fertility as well as a water catchment.

It was established that, wetlands act as water filters when through filtration they remove impurities from the dirty water channeled via the drainage system and recycle it to the rivers and lakes for further consumption as supported by Botkin (2005). Wetlands are further attributed to the generating employment by supplying touristic materials, grazing and growing crops as envisaged by Dugan (1990) and Nafula and Miti (2007). Wetlands maintain soil fertility and prevent erosion as upheld by Salafsky and Wollenberg (2000) and on top of this provide catchment areas. Wetlands also provide food and medicine to the community around as supported by Denny (1991) and at the same time regulate climate through evaporation and rain formation in line with Miti (2009).

5.1.2 How Wetland Management is Carried Out

In study revealed that mechanisms of wetland management include law enforcement, through, seepage and through indigenous knowledge.

The law enforcement officers work hand in hand with the local leaders to protect against unsustainable practices and misuse of wetland resources as pointed out by law enforcement, <http://www.uganda.co.ug/nema/>, Through seepages finger like ponds also protect wetlands by heaping soils which get raised and to receive waste from the water and is good for cultivation as supported by Denny (1991). Use of indigenous knowledge were people try to protect against flooding and redirect water to the catchment area, although at times not rightly done and causes flooding or drying as supported by Bakiika (2009).

5.1.3 Challenges Experienced in Wetland Management

The challenges experienced in wetland management were established as, flooding, land degeneration, extinction of resources, technological effects, blocking of passages and weakening of the catchment areas.

Flooding occurs due to settling of people in wetland who dump their waste in wetland leaving the water passages blocked and water table weakened due to the fact that the ability of and integrity of the wetlands to filter and purify water is rendered powerless. In case of heavy rains, flooding becomes obvious because water can no longer find its way through the passage thereby affecting the aquatic life, plant life as well as humans. opinion on how people degrade swampland by filling them with all sorts of waste. This increasing impact of the community on the wetlands is undermining their management.

5.1.4 Solutions to Challenges Experienced

The study revealed that solutions to problems encountered in wetland management to be stricter laws, family planning, involvement of the community, sustainable urbanization, conducting more research and generating employment opportunities for the poor.

Management of wetlands can be bettered if the community sustainably utilize and conserve the wetland because this reduces the impact of overexploitation and embraces sustainability and strict laws and monitoring of wetlands should also work hand in hand with sensitization of the public as well as availing employment opportunities to curb overdependence on wetlands. This should however not leave out revitalizing family planning to control population growth. In addition to this research for better methods of wetland conservation should be carried out to review the existing or devise new measures.

5.2 Conclusion

5.2.1 Importance of Wetlands

In regard to the importance of wetlands, the study concluded that, despite the usefulness of the wetlands in filtering water, providing catchment areas, generating employment, regulating climate, and maintaining soil fertility, very few of the respondents were aware of their usefulness, which can be attributed to their low levels of education, and thus their unsustainable practices on the wetlands as reflected through the low responses on the importance of wetlands. The majority were ignorant about the usefulness of the wetlands and thus destructed the wetlands to meet their needs.

However, it is concluded that wetlands trap and filter dirty water and recycle it to the rivers and lakes for reuse and thus control erosion from taking place when they trap excessive running water. this as well prevents the washing away of the top fertile soil and thus maintain fertility of the soil and that people carry out gainful activities on wetlands for survival.

5.2.2 How Wetlands are Managed

In regard to the management of wetlands, the study concluded that traditional practices on the wetland destroy them because the people are ignorant of how to it but NEMA should instead play its part to educate the community on how to sustainably rely on the environment than stopping community encroachment, because even despite the existence

of the law and its enforcement, the community still relies on the wetlands stealthily and unsustainably because as population grows resources become more scarce due to dependability.

5.2.3 Challenges Experienced in Management of Wetlands

The study concludes that management of wetlands is continuing to be undermined if interventions are not taken to control population growth as a way of curbing unsustainable wetland practices, and if community is not sensitized on the goodness of the wetlands their strength and integrity will continue to be abused and thus the aquatic, human and plant life will all be put at stake and the country will also lose out on its possible source of revenue.

5.2.4 Solutions to Challenges Experienced in Wetland Management

The study concluded that wetland management can be improved upon, if population growth is checked and the man's impact on the environment lessened on top of which the existing mechanisms call for research to be improved or upon or replaced by new and better methods of wetland management, however, the law should be uniformly enforced and alternative means of employment should be availed to the people to reduce on their encroachment on the wetlands.

5.3 Recommendations

On summarizing the findings and drawing conclusions of the findings, the researcher made the following recommendations that there is need to;

Provide appropriate education both formal and informal on the intractable challenges facing humans co-existence with other living creatures on Earth. Concerned actors should be made aware of the legally binding agreements entered into by their governments regarding wetland management.

Capacity building of the relevant stakeholders focus on developing and generating employment opportunities in accordance with wetland sustainable requirements.

Facilitate concerned actors, though there are definitional and implementation flaws, environment NGOs and activists need to be given credit and accolades for creating a nation-wide awareness of the crisis of environment deterioration.

Ensure that a society is creating the wealth needed to reach acceptable living conditions through sustainable development.

Research to support the generation of new knowledge and use of environmentally friendly alternatives for sustainable natural resource management.

For moral education to instill genuinely environment respecting moral values in the young student society because conventional educational methodology is no longer adequate for the real needs of tomorrow.

Education should be introduced as a voluntary, extra-curricular activity to arouse the interest and awareness of students in green issues.

Focusing the educational curricula for global sustainable development by incorporating the know how and skills and also the moral imperatives to control the willingness of man's action on the environment in the future.

Sensitize the young generation to proactively involve and begin to protect the environment that they are to inherit in the future and also alerting the public to the need to achieve global sustainable development and the likely consequences of failing to do so.

5.3 Suggestion for Future Research

This study looked at the impact of population growth rate on wetland management and thus researcher suggests that more studies should be conducted on what measures should be taken to improve and stabilize development despite the increasing population growth rate.

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APPENDIX (A): QUESTIONNAIRE SCHEDULES

Dear Respondent,

I am Adokorach Irene, a student from Kampala International University pursuing a Bachelors degree Education. I am conducting a research on “The Impact of Population Growth on Wetland Management” Case Study of Katabu Zone in Kansanga, Makindye Division, which is part of the requirement of the award of the Bachelor of Education of Kampala International University. I kindly request you, to fill in blank boxes and spaces as indicated. All the information provided will be used purposely for academics and it will be treated with utmost confidentiality.

INSTRUCTION: PLEASE TICK WHERE APPROPRIATE

Section A: Biographical Information.

- 1) Sex
a) Male b)Female
- 2) Age
A) 18-30 years B) 31-40 years C) 41-50 C) 51 & plus
- 3) Education level
A) Certificate B) Diploma C) Bachelors D)Others (specify).....
- 4) Marital Status
A) Single B) Married C) Widowed D) Divorced

Section B: Importance of Wetlands

- 5) What is a wetland?
.....
.....
- 6) What is the importance of wetlands?
.....
.....

7) Does your community in any way benefit from the wetland?

a) Yes b) No

b) If yes, how do they benefit?

.....
.....

Section C: Mechanisms Adopted in the Management of Wetlands

8. Are there any mechanisms that have been adopted in the management of wetlands?

a) Yes b) No

If yes, which are they?

.....
.....

9) Do you consider them to effectively be contributing to the management of the wetland?

a) Yes b) No

If yes/no state

.....
.....

10) Is there any community effort towards management of wetlands?

a) Yes b) No

If yes state them/ if no why?

.....
.....

Section D: Challenges Experienced due to Population Growth

11) Are there any challenges experienced in the performance in the management of this wetland that is due to population growth?

a) Yes [] b) No []

If yes, what are they and how have they affected the management of the wetland

.....
.....

Section E: Solutions to Challenge Encountered

Has the community been sensitized in any way, on how to properly manage the wetland?

a) Yes [] b) No []

If yes explain.

.....
.....

13. Given your experience what are possible workable solutions that you would suggest to help in reducing the problems experienced in the management of the wetland?

.....
.....

2. Are policy measures in the country effectively implemented?

a) Yes b) No

If yes/No state

.....
.....

Thanks for your Response

APPENDIX B: INTERVIEW GUIDE

IDENTIFYING INFORMATION

- A) Adokorach Irene, Interviewing Date:.....
- B) Interview number 1 - 20
- C) Survey Interview
- D) Despite the various mechanisms adopted to manage wetlands, population growth bars these efforts from effective application and has thus brought about numerous challenges in the management of the wetlands. However some solutions can be devised to promote the management of these wetlands. It is for this purpose that there is a realized concern to control population growth in order to improve wetland management in Katabu Zone in Kansanga.

Guiding areas

- Population growth
- Usefulness of wetlands
- Mechanisms adopted in Management of wetlands
- Challenges experienced in management of wetlands
- Possible solution to promote management of wetlands.