

**THE ROLE OF WETLAND INSPECTION DIVISION IN PROMOTION OF
WETLAND CONSERVATION ACASE STUDY OF
MUTUNGO PARISH KAMPALA
DISTRICT**

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OCTOBER, 2011.

DECLARATION

I OTAI DAVID declare that this research report is my original work and has not been awarded for any other degree to other higher institutions of learning before. Where other people's work has been used, it has been acknowledged.

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APPROVAL

This is to certify that this research report on the role of Wetland Inspection Division in promotion of wetland Conservation of OTAI DAVID has been under my supervision.

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Signed 

Date 17th OCT. 2011

DEDICATION

This work has been dedicated to my parents, Mr Ebitu James and Mrs Ebitu Teopista who kept on giving me financial support and praying for my success. I also thank my sisters, Ms Ariokot Ester, Arengo Theresa and Adeke Olivia Victoria, brothers, Okello Fred, Okello Robert, Omongotel Peter and Ebitu Steven and my Uncle Mr Okello Thomas for their constant care and love.

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ACRONYMS

CBO	Community Based Organization
CBWMP	Community Based Wetland Management Plans
DEO	District Environment Officer
DSOER	District State of Environment Report
DWO	District Wetland Officer
EIA	Environment Impact Assessment
GoU	Government of Uganda
IUCN	International Union for Conservation of Nature
LVEMP	Lake Victoria Environment Management Program
MNR	Ministry of Natural Resources
MOFPED	Ministry of Finance Planning and Economic Development
MUIENR	Makerere University Institute of Environment and Natural Resources
MWLE	Ministry of Water Lands and Environment
NEAP	National Environment Action Plan
NEMA	National Environment Management Authority
NGO	Non Governmental Organization
NWP	National Wetland Program
SOER	State Of Environment Report
UBOS	Uganda Bureau of Statistics
UNEP	United Nations Environment Program
WID	Wetland inspection Division

ABSTRACT

The study was carried out at Mutungo parish, part of Kirombi-Kachanga wetland Kampala District as a chosen case study to identify the activities carried out In Mutungo wetland, find out what the Wetland Inspection Division does to conserve wetlands and to establish the challenges faced by the Wetland Inspection Division in executing its activities. In carrying out the study the researcher, adopted a research design which was descriptive simple random sampling and purposive sampling were used, and a total of 60 respondents were sampled consisting of 18 females and 42 males which had a good representation was selected, questionnaire were used to get information. It was established that Wetland Inspection Division has played a great role in ensuring that human impacts on the wetlands are reduced. This has been achieved by enactment of rules and regulations on wetlands management, conducting EIA before any project can commence in and around the wetland ecosystems, gazettement of the wetlands and promotion of public awareness together with the involvement of the public in the gazettement and management of wetlands. The results indicated that there is a strong positive relationship between the role of WID towards wetland conservation and the activities carried out on wetlands. This was revealed by the spearman's rank correlation (r) of 0.88. Changes in the role of WID towards wetland conservation affect the activities carried out on wetlands by 88%. This implies that wetland conservation is greatly promoted by the roles played by WID. The report will therefore assist management of WID in improving on the quality of its role in wetland conservation and management through use of the recommendations and take them as guidelines to improve on the quality of its roles from the researcher's observations and respondents' answers the following recommendations were regarded as the best ways to improve on the quality of wetland conservation. These are; The need to conduct more research on the species that exist in the wetlands and the extent of human impact on these ecosystems, which activity degrades the ecosystems the more and the appropriate remedies to manage wetlands. The laws and regulations should be strengthened and implemented to ensure that the wetlands are less degraded in order to conserve the resources that exist in such ecosystems. In order for projects to succeed especially, the ecosystem management projects, the community should be involved in all the processes of wetland conservation

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

There are more than 50 definitions of wetlands used throughout the world, but the broadest is one provided by the Ramsar convention, which defines wetlands as ‘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 salt, including areas of marine water the depth of which at low tide does not exceed six meters (Blasco D, Ramsar Convention 1971).

Globally, wetland ecosystems account for 6% of the total land area and they are one of the most threatened environmental resources. Land uses including agriculture, industry, and residential activities are the key players leading to much of the physical losses. The tropical wetlands in developing countries are also facing severe damage due to increased access to these resources, population growth and economic development. In developed countries wetland stocks have already been transformed by human intervention (UNEP, 2000).

Long regarded as wastelands, wetlands are now recognized as important features in the landscape that provide numerous beneficial services for people and for fish and wildlife. Some of these services, or functions, include protecting and improving water quality, providing fish and wildlife habitats, storing flood waters, and maintaining surface water flow during dry periods. These beneficial services, considered valuable to societies worldwide, are the result of the inherent and unique natural characteristics of wetlands. Wetlands cover approximately 13% of Uganda’s total land area (NEMA 2001). Wetlands include impeded drainage areas accounting for 69% of all wetlands, swamps 30% and swamp forests 1%. Virtually every district has a wetland area. Districts with extensive wetlands accounting for 5-20% of their respective areas include Pallisa, Kayunga, Tororo, Iganga, Kamuli, Soroti, Kampala, and Moyo (NEMA 2001).

Unfortunately, significant areas of wetlands have been degraded, some completely reclaiming thus undermining the functions of and access to wetland resources. This is especially true for wetlands outside protected areas. Some of the practices which have led to wetland degradation include drainage or reclamation for agriculture, and for property and other infrastructure development, sand and clay mining, waste dumping, deforestation and fires.

The rate of wetlands degradation was extremely low (0.5%) per year in the 1960's, but this increased dramatically to 7.9% per annum in the early 1990's. However, it has since been significantly reduced to 2.9% per year. Wetland degradation is high in eastern Uganda, followed by western, then central and lastly northern region (NEMA 2003).

1.2 Problem statement

Although wetlands provide the ecosystem services, they are under severe pressure from water and land based human activities, which are jeopardizing the natural services that they provide. In fact, some wetlands are drying up due to human activities such as agriculture; livestock rearing and cultivation, dumping of solid wastes, residential, commercial and industrial establishment, water collection for domestic and industrial use, and for recreation among others. Shortage of agricultural land in relation to increases in population, the low awareness of communities regarding the ecosystem benefits of wetlands and the lack of technical and financial support for wetland conservation are among the major factors leading to the pressure that the wetlands are facing (SOER, Ethiopia 2003). Since the Wetland Inspection Division is charged to address issues of loss and degradation of wetlands, the main interests is to find out what activities are carried out in the wetlands, the activities of the Wetlands Inspection Division, what it is doing to ensure that the wetlands are conserved and the challenges it faces.

1.3 General objective

To assess the role of Wetland Inspection Division in promotion of wetland conservation.

1.4 Objectives of the study

1. To identify the values and functions of wetland
2. To determine the human activities that lead to wetland degradation
3. To establish the challenges faced by the wetlands Inspection division in wetland conservation
4. To find out the measures put in place to ensure efficient wetland conservation.

1.5 Research questions

What activities are carried out in the wetlands?

What are the activities of the wetland inspection division?

What is the wetland inspection division doing to ensure that the wetlands are conserved?

What are the challenges faced by the wetland inspection division?

1.6 Scope of the study

The research was covered in Kirombi-Kachanga wetland, in Nakawa sub-county about 7.5 kilometer East of Kampala, located in Butabika, Mutungo and Kirombe villages, in the northern shores of Lake Victoria. The wetland has an area of about 2.44 Km².

The research study was concentrated in Mutungo parish because it contains a number of people and developments are prominent here as well as several activities that deplete the wetlands are sensitive in this area that needs attention and the researcher got much information. The research was based on finding out the major activities that are carried out in the wetland, the activities of the wetland inspection division, strategies put in place by the wetland inspection division to ensure wetlands are conserved and the challenges that the inspection division faces in executing its duty.

1.7 Significance of the study

The research study has unveiled the extent to which the community and the Wetland Inspection Division corporation has helped in the wetland conservation measures in place and this will help other wetland management authorities in other areas in the country

This research study is relevant especially to the government and policy makers because it has contributed to the already existing applicable policies and laws on wetland conservation.

The research study also has created awareness amongst the people around wetland on the effects of wetland degradation on their health and well being. Therefore, this has helped the surrounding people to change their living standards.

The research findings are helpful to academicians especially those working with Wetland Inspection Division and also the stakeholders whose goals are to safeguard the wetlands they include; the lobby groups, Non governmental and governmental organizations, for easiness in decision making as well as forecasting the outcomes of the wetland status in perspective to the maintenance of the wetland functions, which are important to, not only the environment but also to the residents in the vicinity of the wetland.

The final analysis is helpful to the understanding the loopholes affecting the wetland protection and path way for new planning strategies and dialogue amongst the management organization and the local community.

CHAPTER TWO

LITERATURE REVIEW

2.1 Value and Functions of Wetlands.

Swamps, marshes, bogs, and fens, known collectively as wetlands, are ecosystems that straddle the boundary between land and water. Irrespective of its vegetation, every wetland overlies a substrate that is either saturated with water or entirely flooded for at least part of the year. Wetlands occur within all types of eco regions. Most are not large enough to be indicated on small-scale maps, but some are quite extensive.

Swamps are simply flooded forests or woodlands. Freshwater swamps may line the banks of rivers or grow in their floodplains. Others may stand at the margins of lakes or in the basins of former marshes or ponds that are in transition to dry land. Examples of major swamplands are the flooded várzea and Igapó forests of the Amazon region, the Okefenokee and Big Cypress swamps and the Mississippi River bottomlands of the United States, and the swamps of the Congo Basin and the Niger Delta in Africa. (Wilcox, 2009).

Mangrove swamps grow in estuarine or coastal situations, so it is brackish or salty water that inundates the roots (and sometimes the trunks and crowns) of the trees at high tide. The species of mangroves belong to a number of different families, but all have evolved to tolerate growing with their feet in salt water. Mangrove swamps are widespread in the tropics and subtropics, where they are best developed in river deltas, in the lee of coral reefs or islands, and along broad and gently sloping shores. A significant mangrove swamp is the Sundarbans of Bangladesh, where the Ganges River empties into the Bay of Bengal. Other major mangrove belts are in the Philippines, New Guinea, and Belize. (Wilcox, 2009)

In marshes, the dominant vegetation is herbaceous rather than woody. If a swamp is a flooded forest, then a marsh is flooded grassland. Freshwater marshes fringe the shores of many lakes and streams, and may form in any shallow depression in which water collects. Marsh vegetation is emergent—the stems and leaves of the plants stick out above the water surface. Perennial marshes remain wet through the year, but other marshes are ephemeral, flourishing during the season when water is available and then drying up. The Sudd of southern Sudan is an enormous marsh, as are the Okavango Delta in Botswana; the llanos of Venezuela; the

Pantanal of Brazil, Bolivia, and Paraguay; and the Everglades of southern Florida in the United States. The northern Great Plains in Canada and the United States are freckled with prairie potholes, the marshes of which are the breeding grounds for most of the continent's ducks.

Just as swamps may develop in salty or brackish water, so too may marshes. The salt marshes of the temperate zone replace the mangrove swamps of the subtropics. These marshes are among the most productive ecosystems on earth. Their influence is far-reaching: Coastal food chains are based on organic detritus from the marshes, and many of the fish and shellfish nourished offshore will return to the marshes to breed. Most salt marshes are situated along coasts, but some develop inland, especially in desert areas. The marshes of The Wash in eastern England, the Camargue in southern France, and the Coto Doñana in southwestern Spain are extensive, as are those of Chesapeake Bay in the United States. (Encarta Interactive World Atlas).

Bogs and fens—together called mires—are wetlands that develop over peat, the partly decomposed remains of mosses and other plants. In contrast, the soils on which swamps and marshes develop are composed of minerals, with more or less organic humus mixed in. Peat-based wetlands are especially widespread in cool, damp boreal regions with a high water table and poor drainage. In bogs, sphagnum and other mosses are the dominant vegetation. Because they are watered principally by rain, which is low in nutrients, bogs are infertile places, and some species of plants supplement their diets by trapping and digesting insects. Fens, in which sedges, grasses, and rushes dominate, are kept wet by seeps, springs, or streams, and are more fertile than bogs. The Atlantic heath region of the British Isles and Scandinavia is famous for its blanket bogs, but it cannot compare in extent to the vast peat lands of western Siberia. (Encarta Interactive World Atlas).

Because wetlands are intermediate between land and water, and because their aspect may differ radically from season to season, they are not always easy to distinguish. A meadow grades into a marsh, and a marsh into a pond, which is a shallow, water-filled basin vegetated across its entire bottom with plants that are entirely submerged or have leaves that float at the surface. A marsh, bog, or fen may be invaded at its margins by trees and may evolve in time into a swamp, and later, perhaps, into an upland forest. (Encarta Interactive World Atlas).

Particularly in industrialized countries, wetlands have historically been considered impediments to development, to be drained, filled, and converted to a “useful” condition. More enlightened attitudes now prevail, and the enormous value of wetlands—from providing natural flood control and water filtration services to supporting populations of fish and wildlife on which people depend for food, employment, and recreation—is increasingly appreciated. (Source: Encarta Interactive World Atlas).

Because they have both land and aquatic characteristics, wetlands are some of the most diverse ecosystems on earth. The different plant species of a wetland provide habitat for varied animal communities. In addition to micro-organisms and invertebrates, reptiles, such as turtles, snakes, and alligators, are common in wetlands. Many amphibians—frogs, salamanders, and toads—live in wetlands during at least part of their life cycle. A large number of fish species require wetland habitat for spawning, feeding, or protection from predation. Birds are attracted to wetlands by abundant food resources and sites for nesting, resting, and feeding. Many breeding and migratory birds, especially waterfowl, are associated with wetlands, as are mammals such as muskrats, nutria, mink, raccoons, and beavers. About one-fourth of the plants, one-half of the fishes, two-thirds of the birds, and three-fourths of the amphibians listed as threatened or endangered in the United States are associated with wetlands. (<http://www.hww.ca/hww2>).

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Inland wetlands may help control floods by storing water and slowly releasing it to downstream areas after the flood peak. Wetlands can reduce wave action and slow down the flow of water, lessening erosion and causing sediments to settle out of the water. This improves water quality, as does the removal of nutrients and contaminants from the water by growing wetland plants and by chemical processes in wetland sediments. Wetlands may also serve as sites where surface water can seep into the ground and replenish the groundwater. (<http://www.hww.ca/hww2>).

Wetlands provide many opportunities for recreational activities, such as bird-watching, hunting, fishing, trapping, and hiking, and they provide educational opportunities for nature studies and scientific research. Some North American wetlands are of archaeological interest because Native American settlements were located near them. Peat lands in Denmark and

England have yielded human fossil remains from about 2000 years ago, well preserved by acidic and anaerobic (low-oxygen) conditions. Wetlands are also valuable for the food and timber harvested from them. (<http://www.hww.ca/hww2.asp?pid=0&cid=2&id=233>).

Some resources are so unique or valuable that they are protected from activities that would destroy or degrade them. For example, national parks and wilderness areas are protected from logging or mining in the United States because such activities would reduce the economic, recreational, and aesthetic values of the resource. Forests and wetlands (areas with high soil moisture or surface water) may be protected from development because they enhance air and water quality and provide habitat for a wide variety of plants and animals. Unfortunately, these areas are often threatened with development because it is difficult to measure the economic benefits of cleaner air, cleaner water, and the many other environmental benefits of these ecosystems (the plants and animals of a natural community and their physical environment). (Engel, 2008).

Clean freshwater resources are essential for drinking, bathing, cooking, irrigation, industry, and for plant and animal survival. Unfortunately, the global supply of freshwater is distributed unevenly. Chronic water shortages exist in most of Africa and drought is common over much of the globe. The sources of most freshwater supplies—groundwater (water located below the soil surface), reservoirs, and rivers—are under severe and increasing environmental stress because of overuse, water pollution, and ecosystem degradation. Over 95 percent of urban sewage in developing countries is discharged untreated into surface waters such as rivers and harbors. (Hart, 2008)

Population growth and pollution place enormous stress on the world's supply of usable water. The world's population continues to increase, but the water supply remains constant and is unevenly distributed. By the end of the 21st century, enough usable water may not exist for everyone. In this February 2000 article from *Encarta Yearbook*, freelance writer Steve Turner surveys a range of expert opinion on the need to protect water supplies and use them more efficiently.

About 65 percent of the global freshwater supply is used in agriculture and 25 percent is used in industry. Freshwater conservation therefore requires a reduction in wasteful practices like

inefficient irrigation, reforms in agriculture and industry, and strict pollution controls worldwide. In addition, water supplies can be increased through effective management of watersheds (areas that drain into one shared waterway). By restoring natural vegetation to forests or fields, communities can increase the storage and filtering capacity of these watersheds and minimize wasteful flooding and erosion. Restoration and protection of wetlands is crucial to water conservation. Like giant sponges, wetlands stabilize groundwater supplies by holding rainfall and discharging the water slowly, acting as natural flood-control reservoirs. Wetlands have intrinsic attributes, perform functions and produce goods and service. Some of these are of primarily local interests but others have regional, national or international importance. In short, wetlands represent considerable ecological, social and economic values. The box below shows wetland values derived from attribute, function, goods and services classified in four categories

Box 1. Wetland values

Direct value	Indirect value	Option value	Non-use value
Production and consumption goods and services such as; <ul style="list-style-type: none"> • Fish • Fuel wood • Building poles • Sand, gravel • Clay • Thatch • Water • Wild foods • Medicine • Agriculture • Pasture/grazing • Transport • Recreation 	Ecosystem function and service such as; <ul style="list-style-type: none"> • Water quality • Water flow • Water storage • Water purification • Water recharge • Flood control • Storm protection • Nutrient retention • Microclimate regulation • Shore stabilization 	Premium placed on possible future use and application; <ul style="list-style-type: none"> • Pharmaceutical • Agricultural • Industrial • Leisure • Water use 	Intrinsic significance in terms of; <ul style="list-style-type: none"> • Cultural • Aesthetic • Heritage • Bequest • existence

(Source:Emerton, 1999).

Wetlands have many uses that include hunting, Fishing, Rice growing, brick making, harvesting of raw materials [such as clay and poles] for building houses. Other uses include stabilization of the Hydrological cycle, Biological diversity [habitat] and species richness, Biomass production [reeds and papyrus] and the trapping of sediments and nutrients. It is difficult to attach monetary figures to these values but attempts have been made to value some of the services they provide for example, the services that Nakivubo wetland in Kampala provides is estimated at US\$17million per year (Emerton et al 1999) as for rural areas people involved in papyrus harvesting derive about US\$200million per household per year from wetland (MWLE, 2000).

Also, wetlands provide a large array of ecosystem services defined as the benefits people derive from nature –to Ugandans in urban and rural areas, Wetlands have long been known to provide a buffering capacity against pollution, flooding and siltation. They are also known to provide seasonal pastures as the water table recedes during the dry season. In addition, they also provide critical ecological services that include offering sanctuary to migratory birds and as breeding grounds for fish. Uganda wetlands have been exposed to increasing industrial pollution and alien invasive weeds. They are under going rapid conversion to other uses while some are being over harvested. There is excessive sedimentation dumping of solid wastes and discharge of huge amounts of sewerage. All these lead to loss of biodiversity and the functional integrity of wetlands [NEMA 2004\5]. Of the 28million Ugandans, it is estimated that wetlands provide about 320,000 workers with direct employment and provide subsistence employment for over 2.4 million (MOFPED 2004).

Therefore, Wetlands constitute resource of great economic, cultural, scientific and recreational value to human life and are essential habitat for numerous threatened and endangered species of flora and fauna. Despite their importance, wetlands are often difficult to define since they occupy the transitional zone between permanently wet and dry environments and contain an enormous variety and types of fauna and flora. For this reason, categories for wetlands can be vague and inconsistent with other attempts. Therefore, this overview has adopted abroad view of wetlands and includes more than mere heritage sites with other significant wetland values which may be ecological, botanical, zoological, immunological or hydrological, including such phenomena as thermal features and underground rivers (NEMA 2007).

2.2 The human activities that lead to wetland Degradation

Wetlands play a crucial role in the environmental cycle. They provide important wildlife habitat, can prevent flooding, and actually help clean contaminated water through natural filtering processes. In the 1980s and 1990s measures to preserve wetlands in the United States began to pay off.

Between 1985 and 1995 more than 485,000 hectares (about 1.2 million acres) of wetlands disappeared in the United States, a study released by the U.S. government on September 17, 1997, reported. The loss represented a significant decline from earlier decades, according to the study. (Encarta Year Book, 1997).

The U.S. Fish and Wildlife Service's National Wetlands Inventory, required at ten-year intervals by federal law, estimated the average net loss of wetlands in the United States at about 47,350 hectares (about 117,000 acres) per year during the decade ending in 1995. A decade earlier, wetlands were lost at an average annual rate of about 117,360 hectares (about 290,000 acres).

The United States has an estimated 89.4 million hectares (about 221 million acres) of wetlands in the 48 contiguous states, less than half the amount that existed in the 1780s, the report said. Wetlands typically occur where the water table is at, above, or just below the land's surface. In addition to providing habitat for an extraordinary diversity of birds, fish, mammals, insects, and plant life, wetlands absorb floodwaters, recharge groundwater, and filter impurities from water.

Almost 80 percent of the recent losses took place on agricultural land, leading some environmentalists to call for stronger enforcement of wetland regulations on farms. Forested wetlands also showed significant declines, but the losses were partially offset by gains in freshwater shrub wetlands, according to the report.

The study attributed the overall decline in wetland losses to various factors, including implementation of a program under Section 404 of the 1972 Clean Water Act (amended in 1975), state and local wetland regulations, public and private restoration efforts, and tax-law changes that have reduced the profitability of development on wetlands.

(Encarta Yearbook, September, 1997).

Botswana's Okavango Delta is one of Africa's largest and most unique wetlands. The Okavango River, with its source in the highlands of Angola, forms a huge, swampy inland delta as it approaches the Kalahari Desert. During the annual floods, the swamp doubles in size. Although it has several outlets, virtually all of the water entering the Okavango Delta evaporates or is absorbed into the sandy subsurface. The Okavango supports a rich indigenous flora and fauna, and attracts huge numbers of migratory wildlife during the dry season. Like many others, this vital and sensitive wetland ecosystem is threatened by the growth of ranching and tourism, and by proposals to divert water for irrigation and other uses. (Adams et al, 1996).

It was estimated in the 1990's that an average of 7.3 percent of the original wetlands in Uganda had been converted to other uses (WME et al 2009). This ranged from as high as 43.2 percent and 40.3 percent for Jinja and Kisoro districts respectively to as low as 0 percent in districts such as Kalangala, Gulu, Kasese and Hoima. Except for wetlands in protected areas, the rest although protected by the National Environment Statute (1995) continue to be reclaimed and degraded. The major causes of the degradation continue to be encroached for agriculture, settlement, sand and clay mining, deforestation of swamp forests and dumping of garbage and swamp fires. (NEMA, 2008).

The issue of wetland degradation had not been looked at seriously since the laws on wetlands management had not been set up. Currently, thirty percent of Kamwenge District wetlands have been encroached on and turned into agricultural fields and farmlands in parts of kahunge Sub County, kicheche, Nyara and other areas in Mayyoro and Nkoma [Kamwenge District Local Government 2004]. During the 1960s, Government policies encouraged the drainage of wetlands by way of reclaiming them for agriculture and other activities, a total of 1,620 ha [16.2km²] of swamp area was reclaimed through drainage [Kamugisha 1993]. The water resources survey of Uganda [1954\1955] concluded that Kigezi had 4,328ha [43.28km²] of peat swamp land suitable for reclamation while for the rest of the country, clay swamp land constituting 8,600 ha [860km²] were available for reclamation [UNEP 1988].

Poverty, meeting immediate, short term, personal needs such as food, water, shelter, school fees takes over protecting attributes that provide longer term, indirect, general benefits such as water storage and recharging, microclimate regulation and biodiversity conservation.

Wetlands provide investment opportunities where they can be transformed to portable agricultural land, industrial or commercial estate and housing. At community level, many wetlands are common property resources with open access, set aside for edge cultivation, fishing, grazing and harvesting natural products. Different available wetland products are not of equal interest to all people living nearby. In a given wetland section, some people may specialize in extracting one product, while others concentrate in another. According to social attributes like gender or age, young men predominantly carry out papyrus harvesting and brick making, women harvest palm leaves and weave them in to mats (Mafabi, 2005).

Community regulations for the use of permanent wetlands and grazing areas stipulate free access and use rights for all community members. But individual farmers in the south-west have obtained either legal title or exclusive rights from their community to reclaimed wetlands. In many of the seasonal wetland valley bottoms in the east, families obtained exclusive rights from the community or clan some generations ago (Mafabi, 2005).

However, exclusivity only started to be asserted when rice cultivation increased the value of the land significantly. In the process, the original owners turned their valley bottoms into rice fields or leased them to rice cultivators. Farmers and pastoralists with no use rights to valley bottoms then lost their access to seasonal grazing areas. This has led to tension and some conflict between rice cultivators and cattle grazers (Mafabi, 2005).

In the 1980's and 1990's, pressure on Uganda's wetlands mounted in both rural and urban areas. In the rural areas, small but continuous nibbling at the edges has reduced the areas of wetlands, nearly the seasonal wetlands. In the east, however, almost all the seasonal wetland bottoms fit for rice cultivation have been converted to that use. In some parts of the south-west, large areas of wetlands have been converted to pasture for grazing or to cultivation. Never the less, the damage to permanent wetlands in rural areas is generally still limited. Poor accessibility and lack of suitable drainage technology afford some natural protection from encroachment and wholesale drainage (Mafabi, 2005).

Despite efforts by the wetlands management department in the MWLE to conserve Uganda's wetlands, they continue to suffer from encroachment and degradation. Recent estimates indicate that more than 7 percent of the original wetland area in Uganda has been converted for other uses (UBOS, 1999). This has resulted in loss of biodiversity, especially for species that thrive in wetland habitats or those that use wetlands for breeding such as aquatic birds and fish. In addition to conversion, aquatic systems have been affected by various negative processes including pollution and siltation, which adversely affect aquatic biodiversity. The rapid growth rate of industrialization especially in urban areas has contributed towards harmful effluents, including heavy metals finding their way into aquatic systems. Such industries include the breweries, tanneries, mining and the farming sector (NEMA, 2008).

Also, in Kabale [part of Kigezi], vast areas of wetlands were leased to dairy farmers who in turn have replaced the natural vegetation with pastures which for long, have been associated with diseases like malaria. This could be one of the reasons why they have been degraded. In the 1950's, campaign against malaria eradication contributed to the draining of wetlands took place for agricultural and industrial purposes. Looking back at the situation in 1994, which is our base line, the issue of wetland degradation had not been emphasized and specific department for wetland management had been set up. Conversion of wetland areas for other uses e.g. agriculture, particularly rice growing, The growing of eucalyptus and for industrial purposes for example the Gitundwe wetland in Nyundo and Nyakabande sub-counties of Kisoro District [Kisoro District Local Government 2004].

In addition, in Kampala District, Nakivubo swamp currently faces severe threats from cultivation, brick making and residential housing and commercial and industrial construction. On the other hand, agricultural encroachment for mainly sugar cane, yams, sweet potatoes and bananas in the upper Murchison bay already claimed more than sixty percent of the original wetland area [MNR 1995]. Population pressure is threatening the existence of wetlands, especially in heavily settled areas, mechanism for enforcing environment laws and regulations on wetlands are still weak, there is ambiguity in the concept of "Government holding wetlands on behalf of the people," confusion still exists over the rights and obligation of ownership and management of wetlands, there are still information gaps regarding the functions, values and importance of wetlands to the people and alternative sources of income have not been identified to dissuade people from continuing to over exploit

wetland resources [NEMA 2002] in urban areas ,particularly Kampala, wetlands are the last free or cheap areas for infrastructure development and many sections have been taken over by semi-slum residential housing and associated uses e.g. cultivation, waste disposal, 'jua kali; commerce. In the rural areas, small but continuous nibbling at the edges has reduced wetlands areas, but this is mainly restricted to seasonal wetlands. Also, in recent years, this pattern of resource loss has led to emigration to the extensive and humid Caribbean plains where the new settlers have brought with them their agriculture and extensive cattle ranching have led to erosion of the fragile soils. Today, wetlands degradation in the world continues for instance, in the Caribbean side with the expansion of the agriculture frontiers, particularly for banana, citrus fruits and oil palm plantations. Drainage of fresh water wetlands is common and siltation, eutrophication and high levels of pesticides are affecting the previously pristine coastal lagoons of the Caribbean coast (UNEP 2000).

According to NEMA 1999, the lack of awareness about the wetland importance or values, functions including the reasons as to why they should be protected, the hunters and pastoralists communities have always intentionally and accidentally set fire on the wetland ecosystems. While the consequences of wetlands burning are not exactly known, this poses a threat to the biodiversity in these areas, some of which may not be fire tolerant, and also triggers succession changes leading to replacement of natural wetland vegetation, exposure to agents of erosion that is animals, water and wind which reduces the fertility of the soils hence poor growth of papyrus and pasture for the grazing of animals. For example, swamp fires are common in Mpigi, Apac and Lira districts where they are mainly started deliberately by hunters or to encourage regeneration of new papyrus.

2.3 Challenges faced in wetland conservation

2.3.1 Growth and development

All ecosystems have an important role to play in helping society meet the needs of the 21st century, but the productivity of wetlands and the multiple benefits that they yield give them a special significance. Similarly, the heavy burden people place on wetlands and their vulnerability to climate change highlight the need for effective management practices.

2.3.1.1 Population growth

The world today is characterized by great social, political, economic and environmental change. Some of these changes have brought benefits, but for many people conditions are much worse than 25 years ago. Rising population, largely in the poorer regions of the world, is one of the major factors that will continue to weigh heavily upon the environmental debate. The world's population was estimated at 5.2 billion in 1990; a population of around 8.5 billion is predicted for 2025. This increase will be concentrated in the developing world; 60 percent will be living in coastal zones and around half will live in towns and cities. As populations grow, pressure upon all natural resources undoubtedly will increase. Because of modern demographic changes, this pressure will be especially acute in coastal regions and near urban centers. Coastal wetlands and the floodplains of rivers are therefore likely to be increasingly damaged by urban, industrial and agricultural uses. Wetland conservation plans need to address these trends and their potentially damaging implications. (Smardon, 1999)

Floating market place in Bangkok, six thousand years ago it was the productivity of flood plain wetlands in Africa and Asia that permitted a rapid population increase, which in turn stimulated civilization and urban development. Today, the process threatens to work partly in reverse. The rapid growth of civilized urban populations, which require living space, food and electricity, threatens the continued existence of many natural wetlands. (Smardon, 1999)

2.3.1.2 Uninformed development

Development investment is still dominated by economists and engineers, for many of whom environmental concerns remain peripheral rather than urgent issues. If they are to change their policies, they will need to be convinced of the real value of wetlands and of the way in which wetland management can underpin rural development. As we seek to establish suitable models of management, much is being learned from traditional forms of wetland use.

However, these practices must be adapted to today's conditions and supported by government policies that give greater control over resources to local communities. This in turn requires governments to understand the full value of wetland ecosystems and the role that their sustainable use can play in achieving social and economic goals. (Smardon, 1999)

2.3.1.3 Economic growth

It is widely predicted that in the next 30 years economic growth will make a major contribution to the quality of life and to the stabilization of population in areas of East and

southern Asia, South and Central America and other regions. Economic growth, however, will continue to place enormous pressure on the natural resources on which sustainable development depends (Smardon, 1999).

All too often, economic growth is based on the conversion of natural ecosystems for the short-term profit of a few entrepreneurs. Not only does this lead to a loss of diversity, but also to lost opportunities for local people who, for example, find their traditional fisheries and farmlands given over to intensive, yet unsustainable, shrimp production and cereal farming, to address this problem there must be effective policies that will not only give vigorous protection to those areas of highest ecological value, but will also help to identify those areas where economic expansion can be pursued without harming natural resources. (Smardon, 1999).

With rise in population and pursuit of economic growth, problems such as pollution have also increased. In the industrialized world, many of these problems have already reached crisis level, precipitating concerted programs of action by governments at national and local levels, as well as many pressure groups. These programs are costly, however, and the challenge will be for developing nations to address the problems before they become critical. (Smardon, 1999).

2.3.2 Climate change

World temperature is predicted to raise above the 1985 average by about 1-2°C (2-3.5°F) by 2025, with temperature increases in the polar zones between two- and-half and five the global average. Rainfall patterns are likely to change, with precipitations predicted to be greater in the northern high altitudes, and higher than the average through out much of the world. In the tropics, climatic extremes are predicted to increase in their severity. Monsoon and tropical storm systems may become more intense, and it is thought that in arid areas increased evaporation caused by rising temperatures will coincide with reduced rainfall.

It is clear therefore that while there continues to be substantial uncertainty over the precise pattern of climate change and rainfall distribution, the consensus is that wet areas will get wetter and dry areas dryer. Floods and droughts are likely to increase in number as well as in severity and duration. (Smardon, 1999). The predicted hydrological changes associated with

climate change will potentially affect the performance of the structure (example, surface water management system) and thereby, will affect the different uses of water in many areas. An increase in extreme drought and floods will heavily stress organisms and add to human induced stress factors. Future climate changes will affect wetlands in two fundamental ways: the number of functioning wetlands (and their functional capacity) within most eco-regions will decline and the geographic location of certain types of wetlands will shift. Simulations in a recent study on North America prairie wetlands indicate that the northern short grasslands were the most vulnerable portion of the prairie pothole region to increase in temperature. Semi-permanent wetlands in this eco-region have historically functioned on the margin, and any increased temperature would result in decreased water levels and increased vegetation covers (Johnson et al 2005). www.wetlands.org/./fulltext.pdf.

2.4 Measures put in place to ensure efficient wetland conservation

Since the late 1700s, over half of the wetlands of the United States, excluding Alaska, have been lost. About 35 percent were gone by the 1950s; wetland destruction during the next two decades resulted in an additional loss equal to the combined area of Massachusetts, Connecticut, and Rhode Island. Although still substantial, the rate of loss has since decreased, with inland marshes receiving better protection but forested wetlands sustaining more damage. Wetland losses have resulted in greater flooding and erosion, reduced water quality, and reduced populations of many plants and animals. (Adams et al, 1996).

Beginning in the early 1980s, wetland science emerged as a separate field of study, and better information concerning the importance of wetlands was made available to the public.

Training and networking with NGOs and CBOs has been carried out in wetland management aspects for key NGOs in the districts of Uganda leading to development of collaborative strategies for wetland management in the region. Also training of councilors and action plan development at district and sub county levels is exercised. This process is complete for Masaka, Ntungamo, Kisoro Rukungiri and Kabale. At national, district and community levels WID promotes general awareness through radio programs and provision of awareness materials (posters, brochures, calendars) and school awareness programs. (WID, 2000).

As a result of the heightened awareness of wetland values, attitudes began to change; laws such as Section 404 of the Clean Water Act of 1972 of the United States of America (revised

1975), which regulates the dumping of solids into wetlands and waterways, and the 1985 Swampbuster provisions of the Flood Control Act were passed to protect and preserve wetlands; public and private programs were developed to restore wetlands; and wetland losses began to decrease. In 1988 recommendations were made by the National Wetlands Policy Forum for a program of “no net loss of wetlands,” with stronger wetland protection policies but also recognition that some wetlands will inevitably be destroyed by development. Under this program, lost acreage and function may be recovered by the creation of new wetlands and the restoration of degraded wetlands. (<http://www.epa.gov/OWOW/>).

By 1991 over 60 countries had joined the Convention on Wetlands of International Importance Especially as Waterfowl Habitat, adopted in Ramsar, Iran, in 1971 (enforced since 1975) and known as the Ramsar Convention. Member countries are required to designate at least one wetland as a conservation project to add to the List of Wetlands of International Importance. The Ramsar List includes more than 30 million hectares (74 million acres) of wetlands in more than 500 locations—still only 3 percent of the total wetland area of the world. Twenty of these sites are considered to be seriously at risk, and many have no management program. (Encarta, 2009).

There has been heightened activity by the MWE to consolidate the implementation of wetlands policy in Uganda. During financial year 2007/8, the WID developed a site management plan for the Lake George RAMSAR wetland site. WID further updated 4 district wetland inventories and produced and printed wetland maps for all the 80 districts. An economic valuation study of wetlands was undertaken. Most importantly MWE revised the National Wetlands Policy to improve it and make it more relevant to the situations obtaining in the country today. (NEMA, 2008).

Systems and procedures are a basic requirement for enforcing wetlands and environmental policy and laws; it's important to know what to monitor, how to monitor, what information is to be collected, how to collect it and who is involved. WID activities in the south – west and western regions of Uganda, has Kitanga project site Kabale district; main activities fish farming and bee keeping, aimed at learning lessons on the impact of such activities on wetland and thereafter develop management guidelines for use in the relevant areas. Project

sites or community level wetland management have helped in achieving guidelines on how to monitor wetlands. (WID, 2000).

WID in collaboration with the Makerere University Institute of Environment and Natural Resources (MUIENR) and additional funding from LVEMP, trained 44 extension officers from 10 districts. The International course on African Wetland Management (convened by Kenya, Uganda and Tanzania hosted in Kenya) has trained 4 officers from 3 districts. (WID/IUCN, 2000).

Conflicts over wetland policies remain, since the general public benefits the most and individuals the least from restrictions on developing wetlands. Much of the controversy centers on the legal definition of a wetland. Many wetland advocates believe that a greater area of a wetland should be protected than the area suggested by some landowners or developers. (<http://www.ramsar.org>).

Wetlands are presently protected under the following pieces of legislation in Uganda [a] The constitution of Uganda, 1995.[b] The Water statute 1995, [c] The Local Government Act 1997, [d] The Water statute 1998, [e] The Wetlands Policy 1995 and [f] Guidelines for wetlands developers 1995. The national environment [Wetlands, Riverbanks, Lakeshores mgt]Regulations 2000. Sustainable utilization of wetlands, resources and management is enhanced by the above legislation while the overall objective of the wetlands policy is to enhance equitable distribution of wetlands benefits to all stake holders. There are also well defined procedures for initiating development projects in wetland areas and dealing with wetlands conservation. The wetlands phase 111 program, 1996, addresses issues pertaining to wetlands management, conservation, research and policy implementation including institutional strengthening and inter-sector coordination, public awareness programs that take place at all levels of governance in the District [DSOER, PALLISA 2005].

During the colonial period, these wetlands were designated as reserve and placed under the central government. Traditional institutions also had in place, machinery and authority to protect them. However, with political changes after independence the powers of traditional institutions were reduced, and the local communities lost sense of attachment to wetlands.

The people, whose lands border the wetlands, have assumed the role of land lords and thus the collective responsibility over wetlands has been modified. While cultivation is carried out by individual owners, the other resources are harvested by all the community. In such dual tenure, it is difficult to implement common strategies for sustainable management of wetlands [Kizito and Nsubuga 1996].

More to that, the jurisdiction of these wetlands as a decentralized function, is under the institutional frame work of the local government at all levels. They are charged with the responsibility of formulating policies and bye laws for the proper management of the wetlands resources. Most of the wetlands are public land e.g. Mpologoma, Namatala and Lake Kyoga fringes. A few wetlands are gazette as forests reserves e.g. Limoto and Saala [DSOER, PALLISA 2005].

They fulfill the function of developing new approaches and showing the benefits of improved wetland management. In this way, they also directly contribute to implementation of the law, by raising awareness of various stakeholders and increasing the capacity of staff and community alike to deliver similar results in other wetlands. For example, Kyojja project site, Masaka district; use of papyrus (harvesting, crafts making, house roofing), bee – keeping though not an indigenous activity), tree nursery (especially palm trees), training, organizing awareness programs, establishment of viable networks, including those with district or local authorities, establishing viable management committee and establishing of a crafts centre. Fire tests (project sites) have been established in the west, east and central parts of Uganda. (WID, 2000).

2.4.1 WID Organizational structure and mandate

NWP a1995, the government states that, although the conservation and management of wetlands is a responsibility for all Ugandans, the central government should play a leading role in managing, wetlands. The government regards it as their national and international responsibility to ensure a sound management of wetlands (MoNR, 1995).

Figure 1: Organogram of the Wetland Inspection Division

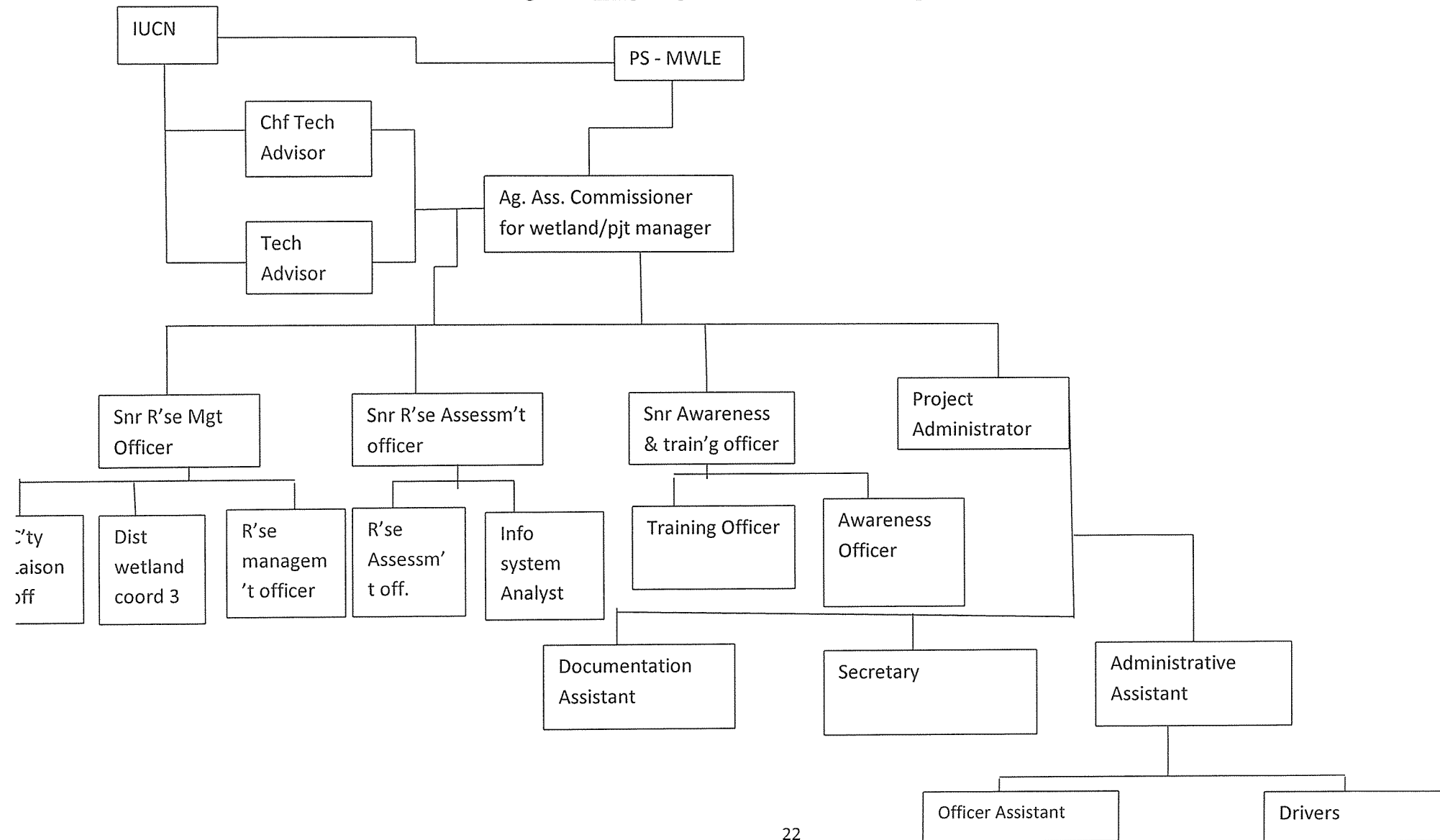
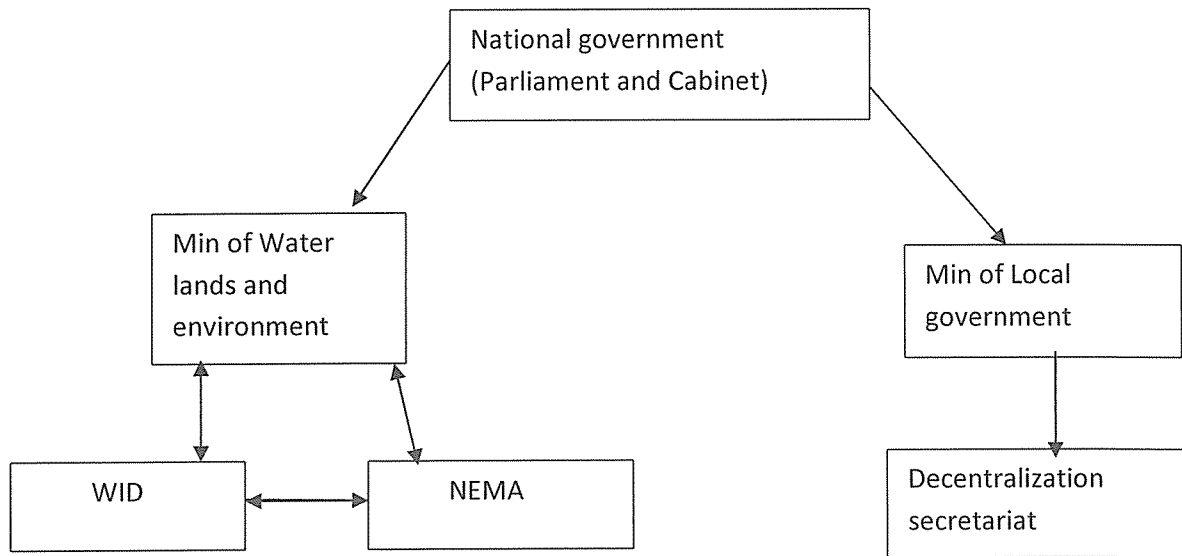


Figure 2: WID MANDATE



The national government consisting out of the parliament and the cabinet with several ministers, including MWLE is the leading agent in national policy and standard setting. It has the function to provide policy guidelines to formulate and coordinate policies and to ensure implementation of the policies. NEMA established under section five of the National Environment statute 1995, is the leading actor in environment management. NEMA is concerned with the management of the environment and is under general supervision of the MWLE (GoU, 1995). NEMA should coordinate the implementation of environmental policies from the central government and can propose policies as well. NEMA's task is to ensure integration of the environment in overall national planning and in all development projects as well. They should also promote public awareness about environmental issues (GoU, 1995: section 7).

WID is one of the significant institutional changes was that in 1998, the NWP became a permanent institution within the MWLE. It continued its life as a donor- Funded project of the partnership between the Government of Uganda and IUCN- the world conservation Union. What the technical side of the governance system is concerned, NEMA and WID are the main co-coordinators of environment and wetland policy implementation at the national level. They connect with the DEO and/or DWO at the district for giving advice on wetland issues and getting information about wetland conditions at the local level. The WID, and also

the DEO and DWO interrelate with the lower local level in the same way; they receive information about wetlands in the sub counties and give guidelines and assistance in the management and implementation to the lower-local levels. Surveillance and periodic monitoring has been undertaken by the NWP/WID since 1997. Routine surveillance is undertaken at a few selected vital wetlands, such as, Nakivubo, Kinawataka, Kansanga and Lubigi wetlands in Kampala. Non routine surveillance is done in response to reports or observations of suspected illegal activities. In 2000 to 2003 about 3 inspections were done per week. A number of requests for inspections increased greatly after NEMA issued restoration orders in July 2004. Also the National Environment management authority has the overall responsibility for coordinating, monitoring and supervising environmental matters in Uganda. This extends to providing technical support and supervision to kick starts the management of wetlands [NEMA 1999]. The government through the WID has gazetted some critical wetlands. These include Nabajuzzi wetlands in Masaka Municipality for its water supply functions as well as its important role as habitat to wild life, in particular, the Sitatunga, and Nakivubo and Kirinya swamps for their effluent water purification roles. [NEMA 2002].

The levels also interrelate with each other on the subject of planning and budgeting. This also includes environmental planning which must be done at the lowest levels. The inputs of budgets and plans are done to suit the highest level. Plans must be all in line with the national standards and guidelines and the NEAP constructed by NEMA. Moreover, Uganda is a signatory to the Ramsar convention, which addresses issues of loss and degradation of wetlands. The country became a signatory in 1997. This convention designates wetlands of international importance and stipulates wise use of wetlands. The convention is being made effective to address wetlands issues both at national policy level and individual Ramsar sites, for example, Lake George through the national wetlands policy [NEMA 2005].

The national actors of WID are supported by Regional Technical Support Unit, It was estimated by the link between central and local government provision. These units have regional wetlands coordinators with Regional offices in Eastern, Northern, Western and central Uganda, who have the task to provide technical backstopping to the districts actors to support the implementation of wetland management in their districts. They are supported financially and technically by WID. (WID/IUCN, 2005).

To protect an interest in using wetland resources the land act provides for the formation of communal land or wetland associations, these gives users rights to exclude other intending users from access to resources within the association registered area of wetland before communal wetland can be registered, members agree to a management plan for the area [section 16 and 25 of the land act 1998, Uganda] Land owners with land adjacent to wetlands should not deny access by other local residents to the adjacent wetlands when they wish to pursue traditional uses of the wetland such as livestock watering and grazing, fishing and grass and papyrus harvesting [MWLE 2000].

There is need to reduce the impact of the encroachers as stipulated in the law, in order to allow the wetland to regenerate, Compel all political and community leaders who find themselves having to talk about wetlands to avoid making promises and declarations that amount to challenging the wetlands policy and figures; Invite local communities to get organized and to ready themselves for opportunities and form an implementing organization, conduct research to get the necessary facts and figures, establish the necessary physical structures and administration[by local communities [NEMA, 2006].

EIA assists in recommending ways and measures for removing or reducing the negative impacts, as per section 2 of the National Environment Act of 1995. Even though the EIA “culture” is still at its infancy in Uganda, the practice is growing.

WID reviews EIAs for developments that may impact wetlands and make a report to NEMA, who take the decision whether or not a development is allowed. WID is the leading agency at national level in relation to wetlands, charged with the formulation of policy, the setting of standards and guidelines, supervision and monitoring of wetlands throughout the country. The EIAs for development projects that may have an impact on wetlands have to be reviewed by the WID, who they report to NEMA, who has the responsibility of approving the development project or not (WID/IUCN, 2005).

It is important to note that better roles of Wetland Inspection Division activities will improve on wetland conservation. Though the WID may aim at fulfilling its mandate as the wetland management institute, wetland conservation activities designed should be favorable to the stakeholders especially the local communities and other users of wetlands. This is because anything that WID does will affect the wetland conservation.

CHAPTER THREE

3.0 STUDY AREA AND RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the methods employed in data collection and analysis. It describes the research design; sample procedure, the sample size then data sources, research instruments methods of data analysis.

3.1 Research design

The study design was descriptive and both qualitative and quantitative data were employed to gain an in depth understanding of activities carried out in wetlands, activities of WID and the challenges faced by WID.

3.2 Study Area

The study was conducted in Mutungo parish which is found in Kampala District, The research covered Kirombi-Kachanga wetland, in Nakawa sub-county about 7.5 kilometer East of Kampala, located in Butabika, Mutungo and Kirombe villages, in the northern shores of Lake Victoria. The wetland has an area of about 2.44 Km².

3.3 Population of Study

The sample of 60 respondents was chosen and the research was gender sensitive. The respondents included community inhabitants and the Wetland Inspection Division staff.

3.4 Sampling strategies

3.4.1 Sample procedure

The study used both random sampling and purposive sampling procedures. Purposive was used to select different activities in the area of investigation in order to get the required data and information. Random sampling was used because respondents have equal chances of being selected.

3.4.2 Sample size

A sample of 60 comprising of 40 local residents using the wetland resource and 20 staff members in WID was considered.

3.5 Data Collection Methods

Data was collected from the primary and secondary sources. the primary data was obtained from respondents through visiting the field physically while personal review on documented resources like text books, newspapers, magazines, journals, reports, presentations and on line presentations were also done.

3.5.1 Data Collection instruments

Questionnaire

The data was collected using Likert scale designed questionnaires. This included open ended and closed questions which meet the objectives and topic of the research. This questionnaire targeted gathering responses from the community and the WID staff.

3.6 Data analysis techniques

The data collected by the questionnaire was coded, and a coding sheet was constructed in the process. A figure was then be assigned to each answer in the questionnaire with a corresponding figure on the coding sheet. Then the same coding sheet was made on the computer using ms word. Frequency tables were worked out basing on the data entered into ms word tables. Analysis was done with a corresponding percentage, in the frequency tables. However, a statistical method of Spearman's rank correlation coefficient was used to analyze the valid percentages to find out the relationship between the independent variable (WID) and the dependent variable (wetland conservation).

3.7 Anticipated Limitations of the study

Some of the targeted respondents were not willing to set aside time to respond to the investigator's questions, thus being insufficient to the researcher. This was solved through trying to convince the respondents that the research is intended to improve wetland conservation further with WID. Since research requires money for printing and transport, it brought on a financial constraint. However the researcher had to minimize the costs as low as possible. There was mounting pressure from the administration for students to complete the research on schedule; however the researcher devoted most of the time on the research.

CHAPTER FOUR

4.0 PRESENTATION, INTERPRETATION AND DISCUSSION OF FINDINGS

Introduction

This chapter presents, interprets and discusses the findings of the study with reference to the wetland Inspection Department towards the promotion of wetland conservation. This was done mainly through questionnaire to the selected respondents.

4.1 Demographic characteristics of respondents

The researcher considered information on personal data and the findings are indicated in the table below.

4.1.1 Age Range of Respondents

Age range of respondents were considered and the findings are indicated in the (table 1) below.

Table 1: Age Range of respondents

Age	Frequency	Valid percent	Cumulative percent
Below 25 years	15	25	25
25 – 29 years	24	40	65
30 – 39 years	12	20	85
Above 40 years	9	15	100
Total	60	100	

Source: Primary Data

From table 1 above, 25% of the respondents were below 25 years of age, 40% of the respondents were between 25 – 29 years, 20% were between 30 – 39 years and 15% were above 40 years. However, of those who were between 25 – 29 years, 30% were local residents and 10% staff members. This implies that the information got is viable in answering the research questions since the highest percentage of 40% (table 1) indicates that most of the respondents were well versed with the information regarding wetlands management and the resultant human impacts accruing from human activities conducted in the wetland ecosystem of Mutungo.

4.1.2 Gender of Respondents

The gender of respondents were considered and they can be evidenced in the (table 2) below

Table 2: Gender of Respondents

Sex	Frequency	Valid Percent	Cumulative Percent
Male	42	70	70
Female	18	30	100
Total	60	100	

Source: Primary Data

From the table above, 70% were male and 30% of the respondents were 30%. However, of the male respondents 40% were local residents and 30% were staff members. This therefore indicates that the sex aspect of gender was well looked in the study. also the study revealed that most of the activities conducted in the wetland affected both male and female sex directly or indirectly for instance the practice of wetland use for agriculture especially growing of yams and sweet potatoes, construction of houses, water for domestic use ,and art and crafts among other wetland uses cited.

4.1.3 Level of education

The education background were considered and can be evidenced in the (table 3) below.

Table 3: Level of education

Level of education	Frequency	Valid Percent	Cumulative Percent
Primary	6	10	10
Secondary	15	25	35
Vocational	9	15	50
University	30	50	100
No education	0	0	100
Others	0	0	100
Total	60	100	

Source: Primary Data

From the above (table 3), 10% of the respondents level of education was primary, 25% attained secondary school level and of these 20% were still in secondary school and 5% that was their level of education, 15% of the respondents obtained vocational skills and 50% of

the respondent's level of education was university, of which, 35% were staff members of WID and 15% were local residents. This implies that all the respondents had the capacity to understand the questionnaire and answered it accordingly. Moreover, being able to understand the questionnaire was an indication that they were much knowledgeable as regards the topic of research being conducted. However, despite the level of education, some of the respondents especially from the community members were not positive since much of their response was based on the doctrine that wetlands are “waste lands” and therefore subject to degradation through reclamation for different purposes a reason as to why most of the activities conducted in this ecosystem are unfriendly to the biological diversity in it (habitat).

4.1.4 Household members

The number of people in the household were considered and can be evidenced in the (table 4) below.

Table 4: Household members

Number	Frequency	Valid Percent	Cumulative Percent
Less than 2	2	5	5
2 – 5	16	40	45
5 – 8	12	30	75
8 and Above	10	25	100
Total	40	100	

Source: Primary Data

From the above (table 4), 5% were less than 2 in the household, 40% were between 2 – 5 people in the house hold, 30% were 5 – 8 people in the house hold, and 25% were 8 and above. Since the percentage of house holds with two and above occupants was above 55%, this indicates the rate at which demand for land is high both for agriculture and settlement and this is exacerbated by the levels of income of the inhabitants making the wetland prone to all kinds of damage as the users are left with no alternative for survival.

4.2 Values/functions of wetlands

Table 5: Wetland values and/or functions

Uses/functions of Wetlands	Response	Frequency	Valid Percentage	Cumulative Percentage
Agricultural Purposes	Strongly agree	15	25	25
	Agree	42	70	95
	Not sure	3	5	100
	Disagree	0	0	100
	Strongly disagree	0	0	100
Total		60	100	
Medicine Collection	Strongly agree	12	20	20
	Agree	15	25	45
	Not sure	1	2	47
	Disagree	20	33	80
	Strongly disagree	12	20	100
Total		60	100	
Recreational Purposes	Strongly agree	25	41	41
	Agree	18	30	71
	Not sure	4	7	78
	Disagree	13	22	100
	Strongly disagree	0	0	100
Total		60	100	
Fish and other aquatic animals	Strongly agree	9	15	15
	Agree	15	25	40
	Not sure	10	17	57
	Disagree	17	28	85
	Strongly disagree	9	15	100
Total		60	100	

Source: Primary Data

From the above table, 25% of the respondents strongly agreed that wetlands were the best place for agricultural purposes, 70% agreed 5% were not sure and none of the respondents disagreed. However, of the respondents who agreed, 40% were local residents and 30% were

staff members. This implies that, most of the respondents agreed to the fact that agriculture is best done in wetlands simply because they have not suffered much pertaining harvesting low yields from the crops they plant, since the soils and weather is favorable for the growth of the crops grown such as yams, potatoes, rice, bananas etc fostering degradation in both the short run and long run especially loss of habitat for biological diversity, scenic beauty, climate modification, art and craft raw materials, flood control and many others.

From table 5, 20% of the respondents strongly agreed that wetlands were helpful for herbal medicine collection, 25% agreed, 2% were not sure, 33% disagreed and 20% strongly disagreed. However, of the respondents who agreed, 23% were staff members and 10% were local members. This implies that most respondents disagreed that wetlands were helpful for herbal medicine collection. This may mean that most of the people are not aware of the presence of medicinal plants in this habitats, the medicinal plants are few or the need for the medicinal plants is limited resulting from a clear shift from traditional medicine to modern medicine a condition which makes respondents to disagree with the idea that wetlands are majorly used for collecting herbal medicine.

From the (table 5) above, 41% of the respondents strongly agreed and 30% agreed that wetlands provide with recreational purposes, 7% were not sure, 22% disagreed although none strongly disagreed. However, of the respondents who strongly agreed and agreed that were 71%, 40% were staff members and 31% were local residents. That implies that, a bigger number of respondents agreed that wetlands provide with recreational purposes given the beautiful scenery and the biological diversity that exists in this ecosystems.

From the (table 5) above, 15% of the respondents strongly agreed and 25% agreed that wetlands provide them with fish and other aquatic edible animals, 17% were not sure, 28% disagreed and 15% strongly disagreed. From this data, the respondents had mixed reactions over this issue of fish and other edible aquatic animal provision of wetlands. This may be true because some of the respondents are not informed of the fish species that breeds in the wetlands, the wetland organisms that are edible such as birds, and even if they knew that such species existed, it is against their culture to eat birds especially as most respondents are Baganda.

4.3 Human activities that lead to wetlands degradation

Findings on activities carried out on wetlands were considered and are shown below.

4.3.1 Utilization of wetlands

The utilization of wetlands are evidenced in the (table 6) below

Table 6: Utilization of wetlands

Response	Frequency	Valid Percent	Cumulative Percent
No	6	10	10
Yes	54	90	100
Total	60	100	

Source: Primary Data

From the (table 6) above, 10% of the respondents had never utilized a wetland, and 90% of the respondents had ever utilized a wetland. However, of the respondents who had utilized a wetland, 70% were local residents and 20% were staff members. This implies that all the respondents accessed the wetland for one use or another, a reason behind the high rate of human encroachment and the resultant destruction of this particular ecosystem.

4.3.2 Human Activities that degrade wetlands

The activities carried out in the wetlands were considered and are evidenced in the (table 7) below

Table 7: Wetland activities

Activities	Frequency	Valid Percent	Cumulative Percent
To pour solid wastes	3	5	5
Plant growth	6	10	15
Grazing	0	0	15
Construction	12	20	35
Water collection	30	50	85
Livestock rearing	3	5	90
Brick making	6	10	100
Total	60	100	

Source: Primary Data

In Kampala, Nakivubo swamp currently faces severe threats from cultivation, brick making and residential housing and commercial and industrial construction. On the other hand, agricultural encroachment for mainly sugar cane, yams, sweet potatoes and bananas in the upper Murchison bay already claimed more than sixty percent of the original wetland area [MNR 1995]. Like Nakivubo, Mutungo also faces the same wealth of activities in that 5% of the respondents pour solid wastes in the wetlands, Poor accessibility and lack of suitable drainage technology afford some natural protection from encroachment and wholesale drainage, Mafabi (2005). However, 10% grew plants, 20% constructed along the wetlands, [NEMA 2002] in urban areas, particularly Kampala, wetlands are the last free or cheap areas for infrastructure development and many sections have been taken over by semi slum residential housing and associated uses e.g. cultivation, waste disposal, ‘jua kali’; commerce, 50% collected water from the wetlands, 5% reared livestock in the wetlands and 10% made bricks from the wetlands. However, of the respondents who collected water, 40% were local residents and 10% were staff members (table 7). This implies that, most of the respondents have a direct access to the wetlands and know the values and functions one thing that accelerates their encroachment. The major causes of the degradation continue to be encroached for agriculture, settlement, sand and clay mining, deforestation of swamp forests and dumping of garbage and swamp fires. (NEMA, 2008). At community level, many wetlands are common property resources with open access, set aside for edge cultivation, fishing, grazing and harvesting natural products. Different available wetland products are not of equal interest to all people living nearby. In a given wetland section, some people may specialize in extracting one product, while others concentrate in another. According to social attributes like gender or age, young men predominantly carry out papyrus harvesting and brick making, women harvest palm leaves and weave them in to mats. (Mafabi, 2005).

4.4 Challenges faced in wetland conservation by WID

There are some challenges that were generated from WID respondents among which include; Waste has become a serious environmental problem in most developing world urban centers. Some of the major causes of this are increasing industrialization, urbanization and rapid population growth among others. This has come along with a lot of in migrations where a good number of people leave the rural areas to settle in towns where they hope to find “greener pastures” or better livelihoods (NEMA, March 2007).

In relation to this News, the urban population expand as settlement becomes more difficult, waste management more complex thus the who it may concern or “not in my backyard”

practice where people dump or throw indiscriminately, including into drainage channels so long as it is a little far away from their vicinity (NEMA, March 2007). This practices as mentioned above have continued to choke the mutungo wetlands suffocating the entire environment in wetland habitations. This is a challenge especially to the living organisms that depend on the wetland vegetation richness for their survival. More still, the purification function of the wetlands is frustrated by the increasing disposal of non bio-degradable wastes like the plastic bags (keveera), bottles that find their way to the wetlands.

NEMA (March, 2007) noted that so many metric tons of plastic waste including polyethylene bags (kaveera) have accumulated in Uganda's environment. Like poor waste management in general. Plastic bags have a number of effects on the environment hence hindrance of water penetrating in the solid, limited soil air circulation, plant root penetration due to soil compaction and poor soil fertility. This is challenging in terms of wetlands management as more and more wastes find their way in to the wetlands especially the kaveera then the organisms are more likely to be affected as breeding grounds of most aquatic organisms in the wetland ecosystem.

The world today is characterized by great social, political, economic and environmental change. Some of these changes have brought benefits, but for many people conditions are much worse than 25 years ago. Rising population, largely in the poorer regions of the world, is one of the major factors that will continue to weigh heavily upon the environmental debate. The rapid growth of civilized urban populations, which require living space, food and electricity, threatens the continued existence of many natural wetlands. (Smardon, 1999).

In Mutungo just as any other wetland next to sprouting settlements, has lead to more wetland areas being exlaimed. It's evidenced that people have continued to pour soils on to the wetland region to pave way for construction of housing units needed by the increasing number of people. This is done illegally especially by the residents who claim that the land where the wetland is located is their land and they have the rights over its use. The mechanism for enforcing environment laws and regulations on wetlands are still weak, there is ambiguity in the concept of "Government holding wetlands on behalf of the people, " confusion still exists over the rights and obligation of ownership and management of wetlands, there are still information gaps regarding the functions, values and importance of wetlands to the people and alternative sources of income have not been identified to dissuade

people from continuing to over exploit wetland resources [NEMA 2002]. In urban areas ,particularly Kampala, Mutungo is one of the wetlands that are the last free or cheap areas for infrastructure development and many sections have been taken over by semi - slum residential housing.

The existing legislation is fragmented in the different laws. Access to these pieces to the general public is therefore constrained.

Political interference in the allocation of wetlands to people for settlement, industrialization through patronage and political rewards is the big challenge. This deters enforcement mechanisms in place. Understaffing puts tremendous pressure on the limited number of staff especially at national level. The WID which is the umbrella institution, for instance has few staff. There is no formal mechanism to coordinate between sectors and align wetland management with other related natural resources management.

Funding is inadequate and much of it comes from donors. This imposes uncertainty in the absence of donors. The failure to put in place practical ways that allow sustainable use of wetlands to contribute to poverty reduction threatens the sustainability of community based wetland management plans (CBWMP) over time. The communities are still not aware that wetlands are legally owned by government for the good of all Ugandan citizens. There is still continued encroachment. The problem is further compounded by lack of statutory regulations defining the identification or demarcation of wetland boundaries. There is still serious lack of knowledge about wetlands. The existing wetlands inventory does not provide comprehensive data required for management purposes. The inventory for example does not provide adequate quantitative data on the status of wetlands. Even available research data is not accessible to especially the communities. The country lacks a land use policy to guide general land use in entire catchment areas.

4.5 Wetland Conservation measures

Findings on wetlands conservation were considered and are shown below.

4.5.1 Awareness on wetlands degradation

Whether there is awareness on wetlands degradation

Table 8: The extent of awareness about wetlands degradation in this community

Response	Frequency	Valid Percent	Cumulative Percent
Yes	25	62	62
No	15	38	100
Total	40	100	

Source: Primary Data

From the above (table 8), 62% of the respondents responded yes to whether anyone has ever told them of the wetland degradation in their community and 38% responded no to the statement. This implies that, a lot of the respondents had been told of wetland degradation in their community which explains their level of awareness about the human impact on wetlands.

4.5.2 Source of information about wetlands degradation

Wetlands degradation information source were considered and are evidenced in the (table 9) below

Table 9: The source of information on wetland degradation

Source	Frequency	Valid Percent	Cumulative Percent
Local community	2	5	5
Community elders	6	15	20
Local council (KCC)	20	50	70
CBOs	2	5	75
NGOs	1	2	77
Any Others	9	23	100
Total	40	100	

Source: Primary data

From the above (table 9), out of all the respondents interviewed, 5% were told about wetlands degradation by the fellow local community members, 15% were told by their local elders in their villages, 50% were told about the wetlands degradation by Kampala City Council officers, 5% of the respondents were told by CBOs, 2% were told by NGOs and 23% of the respondents were told of wetlands degradation by any other means, institutions not

mentioned above. This implies that, of all the respondents interviewed all of them had been told about wetlands degradation. Therefore, the data the researcher wanted was collected from the right respondents.

4.5.3 Knowledge of Wetlands Inspection Division?

Knowledge of Wetland Inspection Division was evidenced in the (table 10) below.

Table 10: Wetlands Inspection Division awareness

Response	Frequency	Valid Percent	Cumulative Percent
Yes	32	80	80
No	8	20	100
Total	40	100	

Source: Primary Data

From the (table 10) above, 80% of the respondents said yes to whether they had heard of the Wetlands Inspection Division and 20% of the respondents said that they had never heard of Wetlands Inspection Division. This implies that, 80% of the respondents know of the WID and its related activities.

4.5.4 There is need for wetland conservation by an institution

Findings on whether wetlands were very much in need for conservation by an institution so that they are not exploited are evidenced in the (table 11) below.

Table 11:Need for conservation of wetlands

Response	Frequency	Valid Percent	Cumulative Percent
Strongly Agree	20	33	33
Agree	15	25	58
Not sure	8	13	71
Disagree	10	17	88
Strongly Disagree	7	12	100
Total	60	100	

Source: Primary Data

From the above (table 11), 33% of the respondents strongly agreed and 25% agreed that wetlands were very much in need for conservation by an institution so that the wetlands are

not exploited, 13% were not sure, 17% disagreed and 12% strongly disagreed. However, the total percentage of those who agreed, strongly is 58% therefore, the respondents were informed of the existence of the WID which is the sole wetlands management institution in the area and the whole country mandated to reduce the impact of human activities on this ecosystems and enhance environmentally friendly initiative or ensuring environment impact assessment is conducted well before a major development project is established. This prevents the likely impacts that may accrue from the activities of such projects.

Table 12: Measures put in place to ensure efficient wetland conservation

Wetlands conservation Measures	response	Frequency	Valid frequency	Cumulative frequency
Carrying out of EIA for development projects	Strongly Agree	3	15	15
	Agree	8	40	55
	Not Sure	5	25	80
	Disagree	4	20	100
	Strongly Agree	0	0	100
Total		20	100	
Wetland monitoring	Strongly Agree	15	75	75
	Agree	5	25	100
	Not Sure	0	0	100
	Disagree	0	0	100
	Strongly Disagree	0	0	100
Total		20	100	
Availability of finances in WID	Strongly Agree	0	0	0
	Agree	1	5	5
	Not Sure	4	20	25
	Disagree	10	50	75

	Strongly Disagree	5	25	100
Total		20	100	
Availability of experts in WID	Strongly Agree	0	0	0
	Agree	3	15	15
	Not Sure	5	25	40
	Disagree	8	40	80
	Strongly Disagree	4	20	100
Total		20	100	
Strength of WID	Strongly Agree	6	30	30
	Agree	9	45	75
	Not Sure	2	10	85
	Disagree	2	10	95
	Strongly Disagree	1	5	100
Total		20	100	
Assistance of other organizations or community to WID	Strongly Agree	7	35	35
	Agree	9	45	80
	Not Sure	2	10	90
	Disagree	1	5	95
	Strongly Disagree	1	5	100
Total		20	100	

Source: primary Data

From the (table 12) above, 15% respondents strongly agreed that they carryout EIAs for all developments carried out in wetlands, 40% agreed, 25% were not sure, 20% disagreed. However, the sum of the respondents who strongly and only agreed was 55%. This implies that, they carry out EIAs on most of the developments that take place in wetlands. The EIAs for development projects that may have an impact on wetlands have to be reviewed by the WID, who they report to NEMA, who has the responsibility of approving the development project or not (WID/IUCN, 2005).

From the above (table 12), 75% strongly agreed that they monitor wetlands and 25% only agreed. None disagreed to this statement. This implies that, all the respondents agreed that they monitor wetlands ensure that as communities use the ecosystem. The government through the WID has gazetted some critical wetlands. These include Nabajuzzi wetlands in Masaka Municipality for its water supply functions as well as its important role as habitat to wild life, in particular, the Sitatunga, and Nakivubo and Kirinya swamps for their effluent water purification roles. [NEMA 2002]. Also in Mutungo, it is in a manner likely to cause little damage and for the projects that the EIA have been conducted the guidelines are strictly followed.

From the (table 12) above, only 5% of the respondents agreed that WID had enough money to carry on with their activities, 20% were not sure, 50% disagreed and 25% strongly disagreed. However, for the respondents who only disagreed and strongly disagreed, the percentage is 75%, which implies that, the highest percentage of the staff members disagreed that WID had enough money to carry on with its activities. This is a major challenge that affects the mandate of the WID.

From the (table 12) above, 15% of the respondents agreed that WID had enough experts for wetlands management, 25% were not sure, 40% disagreed and 20% strongly disagreed. This implies that, the percentage that disagreed of 60% respondents thinks that WID does not have enough experts for wetlands management. This like other factors also affects very much the promotion of wetlands conservation in not only Mutungo wetland but also other wetland ecosystems. Therefore, WID in collaboration with the Makerere University Institute of Environment and Natural Resources (MUIENR) and additional funding from LVEMP, trained 44 extension officers from 10 districts. The International course on African Wetland Management (convened by Kenya, Uganda and Tanzania hosted in Kenya) has trained 4 officers from 3 districts. (WID/IUCN, 2000) This has continued to be enforced to supplement on the number of experts needed to carry out wetland conservation activities.

From the (table 12) above, 30% of the respondents strongly agreed that WID is a strong institution for conserving wetlands in Uganda, 45% also agreed, 10% were not sure, 10% disagreed and 5% strongly disagreed. This implies that, from the 30% agreed and 45% who

strongly agreed, WID is a strong institution for conserving wetlands in Uganda since it is the mandated institution by the National Environment Management Authority.

From the (table 12)above, 35% strongly agreed that WID gets assistance from other organizations or communities for wetlands conservation, 45% also agreed, 10% were not sure, 5% disagreed and 5% strongly disagreed. This implies that, 35% who agreed and 45% who strongly agreed, add up to 80% of the respondents agreed that WID gets assistance from other organizations or communities for wetlands management.

4.6 Sustainable use and management of wetlands

There is need to strengthen the laws, regulations, policies and programs aimed at ensuring that the wetland use is regulated to reduce on the impacts of the human activities in the ecosystem. This can further be important if integrated with the EIA before any project is commissioned.

There is wide spread creation of awareness on wetlands importance's, rate of degradation as a result of human induced impacts ,functions of the wetlands and the measures that have been put in place to reduce human impacts on such ecosystems.

The government has introduced population control measures aimed at reducing the rate at which human population increases which therefore reduces the pressure that will be exerted on the resource base. It is the population increase that has forced people to inhabit and encroach on the wetlands and the related ecosystems.

4.7. The interaction of the roles of WID and wetland conservation.

In finding out the interaction of the role of WID and wetland conservation to determine the how the activities on wetlands were affected, results of wetland conservation measures by WID together with those of the values and the functions of wetlands where used. The researcher performed data analysis using spearman's rank correlation coefficient.

The researcher used table 12, from wetland conservation measures, and table 5 from the values and functions of wetlands side, as shown in the table 13 below;

Let wetland conservation measures be Ranked X, and values and functions of wetlands be ranked Y. n is the number of ranks given.

Table 13: The interaction of the roles of WID and wetland conservation

	Valid percent	Rank X	Valid percent	Rank Y	d=X-Y	d ²
	15	4	41	1	3	9
	40	1	30	2	-1	1
	25	2	7	4	-2	4
	20	3	22	3	0	0
	0	5	0	5	0	0
$\Sigma(\text{sum})$	100		100			14

$$r = 1 - \frac{\sum d^2}{n(n^2 - 1)}$$

$$r = 1 - \frac{14}{5 \cdot (25 - 1)}$$

$$r = 1 - 0.117$$

$$r = 0.88$$

r is the rank correlation coefficient.

From the table above, findings indicated that there is a strong positive relationship between the role of WID towards wetland conservation and the activities carried out on wetlands at spearman's rank correlation (r) of 0.88. A change in the roles of WID towards wetland conservation may affect the activities carried out on wetlands by 88%. This implies that wetland conservation is greatly affected by the roles played by WID.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATION

Introduction

This chapter presents the summary, conclusion and recommendations of the findings. The summary focuses on the findings in relation to objectives of the study that it intends to achieve. The summary is followed by the conclusion, which is also based on the findings of the study and lastly the recommendations.

5.1 Summary of the findings

5.1.1 Activities on wetlands

The findings indicated that all the respondents accessed the wetland for one use or another, a reason behind the rate of human encroachment and the resultant destruction of wetlands, the people know the value and functions of wetlands that accelerates this encroachment, agriculture is suitable since the soils and weather is favorable for the growth of the crops like yams, rice, bananas, communities do not depend entirely on the raw materials extracted from the wetland, the need for medicinal plants is limited resulting from a shift from traditional to modern medicine, wetland provide with recreational activities given their beautiful scenery and biological diversity that exists, there is mixed reaction over the fish and other edible aquatic animals due to unawareness of edible wetland habitats.

5.1.2 Wetland conservation

The findings indicated that there is high level of public awareness about human impacts on wetlands and wetland degradation by different authorities WID inclusive, also they are aware of WID's existence and its activities. The findings indicate that wetlands are managed by WID, it offers training to the communities that live near and use the wetlands, carryout EIAs on most development projects that take place in wetlands, monitor projects that the EIAs have been conducted through guidelines provided.

5.1.3 Challenges

The findings indicate that WID as an institution is mandated with constitutional authority by the government of Uganda through NEMA to manage wetlands and also gets assistance from

international organizations for wetland management but there is an indication of inadequate finance and expertise to manage wetlands to high level standards especially technically.

5.2 Conclusion

Generally, Wetlands Inspection Division has played a great role in ensuring that human impacts on the wetlands are reduced in order to make them able to provide for the present and future generations with the same stock of assets like we inherited from the previous generation. this has been achieved through the enactment of rules and regulations on wetlands management, conducting EIA before any project can commence in and around the wetland ecosystem, gazzeting the wetlands and promotion of public awareness together with the involvement of the public in the process of gazzeting and management of wetlands.

5.3 Recommendations

There is need to conduct more research on the species that exist in the wetlands and the extent of human impact on these ecosystems, which activity degrades the ecosystems the more and the appropriate remedies to manage wetlands.

The laws and regulations should be strengthened and implemented to ensure that the wetlands are less degraded in order to conserve the resources that exist in such ecosystems.

In order for projects to succeed especially, the ecosystem management projects, the community should be involved in all the processes of wetland conservation.

REFERENCES

- Adams, William M.; A. S. Goudie; and A. R. Orme, eds. 1999, *the Physical Geography of Africa., the physical environment of Africa*. Oxford University Press, United Kingdom.
- Blasco D, 1971, *a Guide to the Convention on Wetlands, the Ramsar Convention Manual*, 2nd Edition, Ramsar Convention Bureau, Gland Switzerland. Pg 1.
- Canadian Wildlife Services and the Canadian Wildlife Federation, *Ecological role of wetlands*, <http://www.hww.ca/hww2.asp?pid=0&cid=2&id233>, 21-May-2009, 4:34pm.
- Encarta (2009), *Interactive world Atlas*, Microsoft Encarta Encyclopedia (2009 edition DVD), Redmond, WA: Microsoft Corporation, Washington, USA. 20 August, 2009.
- Emerton Lucy, L. Lyango, P. Luwum and A. Malinga, (1999), *the Present Economic Value Of Nakivubo Urban Wetland*, Kampala, Uganda, IUCN, Eastern Africa Program, Economics And Biodiversity Program, Nairobi, Kenya.
- Engel king Paul, 2008, *Pollution*, Microsoft Encarta Encyclopedia (2008 edition DVD), Redmond, Microsoft Corporation, Washington, USA. July 20, 2009.
- Hart John, 2009, *Water Pollution*, Microsoft Encarta Encyclopedia (2009 edition DVD), Redmond, Microsoft Corporation Washington, USA July 12, 2009.
- Kamugisha, Jones, R, (1993), *Management of Natural Resources and Environment in Uganda*. Managing wetlands with changing times-Uganda's experience, riversymposium.com/2007/index.php. 12th may 2009.
- Kamwenge District Local Government, (2004), *District State of Environment Report*, NEMA, Kamwenge, Uganda. Pg 23-25.
- Kevin L. Erwin, 2008, Wetland and global Climate Change: The role of wetland restoration in a changing world, <http://www.wetlands.org/./fulltext.pdf> 18 June, 2011.

Kisoro District Local Government, 2004, *District State of Environment Report*, second edition, NEMA, Kisoro, Uganda. Pg 8:9.

Kizito and Nsubuga, 1996, *Individualization of Communal Wetlands in Uganda: A Case of Igogero Wetlands*, Kampala, Uganda.

Ministry of Water Resources (2002) *Water sector paper presented for the National Consultative workshop of PRSP*, MoWR: Addis Ababa, Ethiopia.

MoNR, (1994), *State of the Environment Report for Uganda*. National environment information centre, Kampala, Uganda.

MoNR, (1995) *National Policy for the Conservation and Management of Wetland Resources*. National environment information centre, Kampala, Uganda.

MoNR et al, 1996, *The National Wetlands conservation and Management program (Initial environment Assessment in Brick-making in Mukono district)*, Kampala, Uganda.

MWLE, (2000), *Wetlands and Law: Legislation governing the ownership, use and access to Wetlands and their Resources*, MWLE, Kampala, Uganda.

National Wetlands and Conservation Management Program, (2000), *Key Points on Wetlands Management and Conservation*. Brochure supplement for world wetlands day, Kampala, Uganda.

NEMA (2008), *the State of Environment Report for Uganda*. NEMA (Kijani centre), Kampala, Uganda. Pg 102:108.

NEMA (2006/7), *the State of Environment Report for Uganda*. NEMA, Kampala, Uganda.

NEMA, (2004/5), *the State of Environment Report for Uganda*. NEMA, Kampala, Uganda. Pg110:115-116.

NEMA, (2002/3), *State of Environment Report for Uganda*, NEMA, Kampala, Uganda.

NEMA, (2000/1), *State of Environment Report for Uganda*, NEMA, Kampala, Uganda. Pg 38:47.

NEMA (2006), News letter, Volume 4, Number 20, NEMA (Department of District Support Coordination and Public Education), Kampala Uganda.

NEMA (2007), Newsletter, volume 6, Number 1, NEMA, Kampala, Uganda.

Pallisa District Local Government (2005), District State of Environment Report, 2nd edition, NEMA, Pallisa, Uganda. Pg 38.

Paul Mafabi, et al (2005), From Conversion to Conservation (Fifteen Years of Managing Wetland for People and the Environment in Uganda), WID, Kampala, Uganda, IUCN-The World Conservation Union, Eastern Africa Regional Program, Pg 6-7, 35, 45, 90.

Steve Turner (2000), Will there be Enough Water in the next Century, February 2000 article From Encarta Year book, Microsoft Encarta Encyclopedia (2000 edition DVD), Redmond, Microsoft Corporation, Washington, USA July 05, 2010.

The National Environment Statute (1995), Popular version of the National Environment Statute Number 4 of 1995, NEMA, Hoonkab Printers Limited, Republic of Uganda, GoU. Pg. 40-42.

The Ramsar convention on wetlands of international importance, signed in ramsar, Iran, 1971, site documents pertaining to the treaty, photographs and other resources, <http://www.ramsar.org>, 08-August-2009, 7:30pm.

UNEP, 2000, *Environment Data report, Monitoring and Assessment Research Centre*, Basil Blackwell. London, UK.

UNEP (1988), *Strategic Resources Planning in Uganda*, Wetlands volume IX. Nairobi, Kenya.

Wetland Regulatory Authority, <http://www.epa.gov/owow/wetlands/regs>, 12-May-2009, 2:05pm.

WID (2000), *Options, Criteria and setting Priorities for sustainable management of Uganda's Wetlands*, Ministry of Water, Lands and Environment, Kampala, Uganda.

WID (2001), *Wetlands Sector Strategic plan 2001-2010*, MWLE and WID, Kampala, Uganda.

Wilcox Douglas. A (2009), *Wetland*, Microsoft Encarta Encyclopedia (2009 edition DVD), Redmond, Microsoft Corporation, Washington, USA. *April 18, 2010*. 2009.

APPENDICES

APPENDIX 1:

QUESTIONNAIRE FOR LOCAL RESIDENTS RESEARCH

QUESTIONNAIRE

Dear respondent,

I am Otai David a student of Kampala international university, department of environment. Currently conducting research to find out the role of the Wetland Inspection Division in the conservation of wetlands. Therefore, your response will be of great importance to me and it shall be kept as confidential as possible.

Instructions

(Please tick ☐ the most appropriate option provided below or fill in the spaces given)

SECTION A: PERSONAL DATA

1. Sex

Male ☐ Female ☐

2. Your age

Below 25 yrs ☐ 25 yrs-29 yrs ☐ 30 yrs-39 yrs ☐

40 yrs and Above ☐

3. Marital status

Single ☐ Married ☐

4. Education background

Primary ☐ secondary ☐ vocational ☐ University ☐

No education ☐ any other ☐

5. Number of people in this household

Less than 2 ☐ 2-5 ☐ 5-8 ☐ 8 and more ☐

SECTION B: WETLAND VALUES

6. Have you ever utilized a wetland? YES ☐ NO ☐

7. If yes, what activities do you carry out in the wetland?

To pour solid wastes ☐ plant growth ☐ grazing ☐ construction ☐

Water collection ☐ livestock rearing ☐ brick making ☐

Any other specify

.....

.....

In the following questions below, show to what extent you agree or Disagree with the statement, whether you; strongly Agree, Agree, Not sure, strongly Disagree, Disagree. (Single mention)

8. The wetland is the best place for agricultural purposes

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

9. The wetland is the only natural resource available for harvesting raw materials

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

10. Wetlands are helpful for herbal medicine collection

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

11. Wetlands provide with recreational purposes

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

12. Wetlands provides us with fish and other aquatic edible animals

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

Any other.....

SECTION C: WETLAND CONSERVATION

13. Has any one told of wetlands degradation in this community?

YES ☐ NO ☐

14. Who has told you about wetland degradation?

.....

15. Have you heard of Wetland Inspection Department?

YES ☐

NO ☐

In the following questions below, show to what extent you agree or Disagree with the statement, whether you; strongly Agree, Agree, Not sure, strongly Disagree, Disagree.
(Single mention)

16 Wetlands are very much in need for conservation by an institution so that they are not exploited

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

17 What do you think should be done to ensure sustainable use and management of wetland?

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

THANKS A LOT AND MAY GOD BLESS YOU.

APPENDIX 2: QUESTIONNAIRE FOR THE STAFF OF WID
RESEARCH QUESTIONNAIRE

Dear respondent,

I am Otai David a student of Kampala international university, department of environment. Currently conducting research to find out the role of the Wetland Inspection Division in the conservation of wetlands. Therefore, your response will be of great importance to me and it shall be kept as confidential as possible.

Instructions

(Please tick ☐ the most appropriate option provided below or fill in the spaces given)

SECTION A: PERSONAL DATA

1. Sex

Male ☐ Female ☐

2. Your age

Below 25 yrs ☐ 25 yrs-29 yrs ☐ 30 yrs-39 yrs ☐

40 yrs and Above ☐

3. Marital status

Single ☐ Married ☐

4. Education background

Primary ☐ secondary ☐ vocational ☐

University ☐ No education ☐ any other

5. For how long have you been working with WID?

Less than 4 yrs ☐ 4- 10 yrs ☐ 10 yrs and Above ☐

SECTION B: WETLAND VALUES

6. Have you ever utilized a wetland? YES ☐ NO ☐

7. If yes, what activities do you carry out in the wetland?

To pour solid wastes ☐ plant growth ☐ grazing ☐ construction ☐

Water collection ☐ livestock rearing ☐ brick making ☐

Any other specify

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

In the following questions below, show to what extent you agree or Disagree with the statement, whether you; strongly Agree, Agree, Not sure, strongly Disagree, Disagree.
(Single mention)

8. The wetland is the best place for agricultural purposes

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

9. The wetland is the only natural resource available for harvesting raw materials

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

10. Wetlands are helpful for herbal medicine collection

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

11. Wetlands provide with recreational purposes

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

12. Wetlands provides us with fish and other aquatic edible animals

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

Any other.....

SECTION C: WETLAND CONSERVATION

In the following questions below, show to what extent you agree or Disagree with the statement, whether you; strongly Agree, Agree, Not sure, strongly Disagree, Disagree.
(Single mention)

13. Wetlands are very much in need for conservation by an institution so that they are not exploited

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

14. We offer training facilities?

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

15. We carryout Environment Impact Assessment for all developments carried out in wetlands?

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

16. We monitor wetlands?

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

SECTION D: CHALLENGES IN WETLAND CONSERVATION

In the following questions below, show to what extent you agree or Disagree with the statement, whether you; strongly Agree, Agree, Not sure, strongly Disagree, Disagree. (Single mention)

17. Wetland Inspection Department has enough money to carry on with their activities

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

18. Wetland Inspection Department has enough experts for wetland management

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

19. Wetland Inspection Department is a strong institution for conserving wetlands in Uganda

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

20. WID gets assistance from other organizations or community for wetland conservation?

Strongly Agree	Agree	Not sure	Disagree	Strongly Agree

21. What do you think should be done to ensure sustainable use and management of wetland?

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.....

.....

THANKS A LOT AND MAY GOD BLESS YOU.

APPENDIX 3: INTERVIEW GUIDE

1. Which activities do you think are carried out in Mutungo wetland?

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.....

2. Why do you think this activities are carried in this ecosystem and not elsewhere?

.....
.....

3. Which government organization is responsible for ensuring wise use of wetlands?

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.....

How do you gauge the performance of the Wetland Inspection Division in promotion of
and conservation in Uganda?

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.....

5. What challenges does Wetland Inspection Division have as far as promotion of wetland
conservation is concerned?

.....
.....

6. According to you, what do you think should be done to ensure sustainable use of the
wetland resource?

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.....

THANK YOU VERY MUCH AND GODBLESS YOU