THE IMPACT OF SLUM DEVELOPMENT ON FRAGILE ECOSYSTEMS (WETLANDS), A CASE STUDY OF NAMUWONGO SLUM, KAMPALA DISTRICT, UGANDA.

BY

AGERO RASHIDA

BEM/ 41377/ 91/ DU

A RESEARCH DESSERATATION SUBMITTED TO IN PARTIAL FULLFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE IN ENVIRONMENTAL MANAGEMENT OF KAMPALA INTERNATIONAL UNIVERSITY

AUGUST 2012

Declaration

I, the undersigned declare with sincerity that this work is entirely mine and solely a result of my own effort. It has never been submitted in any university for an award of a degree unless otherwise stated.

Signed by.....

Agero Rashida

Date....26/09/2012.....

Approval

This is to certify that this report has been submitted for examination with my approval as a university supervisor.

Supervisor

Signature.....

Orishaba R. Ammon

Date.....

Dedication

I would like to dedicate this Research to my father **AGERO RASHID** who taught me the basics of life and that **"in life you can overcome anything you undergo"** and to my dear beloved mother **MBABAZI ZAINAB** who has always taught me to work smart at all times and to me these have been my greatest lessons I have learnt as their daughter. May the Almighty Allah bless them abundantly

Acknowledgments

I would like to thank my lecturer; **Mr. Orishaba R. Ammon** for his directions, assistance and guidance during the writing of this Research. In particular, his recommendations and suggestions which have been so valuable for this report/dissertation. Thanks are also due to community members of Namuwongo slum for their assistance because without them i would not be able to gather the information for this report. Special thanks should also be given to my student colleagues who helped me in many ways with their various ideas during the writing of this Research. Finally, words alone cannot express the thanks I owe to my family and friends for their constant encouragement and support throughout my studies. May God bless them all.

Table of Contents

List of tables

List of Abbreviation

UNWP.....Uganda National Wetlands Programme

WID.....Wetlands Inspectorate Division

IUCN..... International Union for Conservation of Nature

EARO.....Eastern Africa Regional Office

NWCMP.....National Wetlands Conservation and Management Programme

MFPED.....Ministry of Finance, Planning and Economic Development

NWSC.....National Water and Sewerage Corporation

PAs.....Protected Areas

UNEP.....United Nation Environmental Programme

UNHS.....Uganda National Household Survey

NEMA.....National Environment and Management Authority

NFA.....National Forest Authority

Abstract

This Research is about the impact of slum development on fragile ecosystems in Namuwongo slum, Kampala district, Uganda. This study covers the negative effects of slums on the wetland. In this research a number of impacts were shown such as how they contribute to the degradation of the wetland through the different human activities such as agriculture, industrilisation and others and finally how the wetland has been conserved having all factors constant. These impacts were broken down into parts so that the research shows a clear view of what the thesis is implying.

The information stated in this research was obtained through interviewing a number of people in Namuwongo slum, some who were given questionnaires and also other approaches such as observation were also used by the researcher so that this research is completed.

CHAPTER ONE

1.0 Introduction

The chapter covers the background of the study, statement of the problem, objectives of the study, research questions, purpose of the study, and the significance of the study and the scope of the study.

1.1. BACK GROUND

Wetlands are earth's most productive ecosystems (Edward et al 1997), they provide many resources of economic importance especially to the people in their immediate vicinity. But wetlands may also go beyond the local people for example they sustain the environment and human being by providing a wide range of goods/resources. They are essential for nutrients for plant growth, stabilization of climate, support of inland fisheries, control of floods, ground water recharge, ground water discharge and shoreline stabilization. They also act as sinks for pollutants and wastes because they are efficient, decomposers and transformers of organic matter [Maltby, 1985].

In Uganda, wetlands have coverage of 11 percent of the total land area (UNEP 2009) making it the most prominate land cover type. They have a number of functions like they serve as granaries for water storage, nurseries for fish, Sustainability of high level of bio-diversity, tertiary treatment of urban waste water and they also have fertile soils for crop cultivation. (E J Huising)

Just over one sixth of Kampala district, or 31square kilometers is covered by wetlands, most of which drain into Lake Victoria (NWCMP 1996). Wetlands in Kampala such as the case of Nakivubo wetland on the Northern shore of lake Victoria have function of maintaining water quality. These help in the tertiary treatment of sewage and affluent run off from industries and residential areas. (Kansiime and Nalubega 1999)

However, with all the above benefits of wetlands on people's livelihood, it has been estimated that 2,376 square kilometers of wetland have been drained(NEMA 2001"(UNEP 2009) for settlement, agriculture and industrial development,(COWI/VKI 1998).The threats to wetlands in Uganda have been recognized in the recent years(Emerton etal 1999) and it is still continuing to increase due development of slums, which are in most cases in close proximity to the wetlands thus being seriously threatened thus altering wetland ecosystems(Okurut,2000)

1.2 Statement of the Problem

Nakivubo wetland is one of the largest wetlands in Uganda thus used for tertiary wastewater treatment (Kansime 1999) in addition to agriculture, biomass harvesting (Emerton 1998), and being a habitat for both fauna and flora. But like other wetlands there has always been a lot of human encroachment onto these wetlands due to the increasing population in the city (Kansime 1999 PhD). Recent estimates show that ¾ of the wetlands have been significantly affected by human activity (wet land status report for Kampala, 1996). Research carried out about the problem of wetland resources indicate that wetland loss has been caused by increased demand for resources, which creates conflicts between economic development and conservation which the government of Uganda has found hard to maintain thus leading to encroachment of wetlands.

1.3 Objective of the study

1.3.1. General objective

To assess the impact of Slum Development on Fragile Ecosystems (wetlands) in Uganda, the case of Namuwongo in Kampala District.

1.3.2. Specific Objectives

1) To identify the various human activities carried out by Namuwongo residents along Nakivubo wetland.
2) To assess the effects of these activities on the wetland.
3) To identify the suitable mitigation measures set to conserve Nakivubo wetland.

1.4 Research questions

The study will seek to answer the following questions;

1) What human activities are carried out by the people of Namuwongo slum along Nakivubo wetland?
2) What are the effects of these activities on the wetland?
3) What are the suitable mitigation measures set to conserve Nakivubo wetland?

1.5. Justification of the study

There is a danger that Nakivubo wetland may soon be modified and converted completely, resulting in the total loss of wetland resources and their associated economic benefits. Urban planners, decision-makers and developers have little understanding of the economic value of the wetland. While being well aware of the immediate gains in income and employment arising from wetland conversion, they have taken no account of environmental dangers that are associated with the loss of wetland resources. This study therefore, attempts to quantify the potential impacts of slum development on wetlands, so that they can be balanced with the potential gains

from its conversion and modification for industrial and residential developments as well as conserving them.

1.6. Significance of the Study

The study helped the community members of Namuwongo slum on how best they can conserve the Nakivubo wetland through proper wetland conservation practices which were to be introduced to them. Community members were also able to know the effectiveness of each human activity practices on the wetland

The study raised environmental awareness to the people in Namuwongo slum; hence they started conserving their environment so that it can continue to support their life and unborn generations

The study also was very helpful to the government of Uganda as it provided useful information about slum development and wetland degradation issues, which the researcher hoped would be able to help the government in introducing wetland management programs in places near or around wetlands.

The study helped students in universities and colleges who are pursuing Environmental management courses as it discussed the wetland management issues.

1.7 Scope of the study

This study was carried out in Namuwongo slum, Kampala district which is located in Makindye Divison. It's bordered by Lugogo to the North, Nakawa to the Northeast, Kiswa and Bugoloobi to the East, Muyenga to the Southeast, Kisugu and Kabalagala to the South, Kibuli to the West and Kololo to the Northwest. It was conducted between May 2011 to August 2012. The study looked at the human activities of Namuwongo slum, their effects on the wetland near the Namuwongo slum and the suitable mitigation measures set to conserve the wetland in all the sub divisions of the slum namely; kasanvu zone, Soweto zone, and kanyogoga zone.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Literature review encompasses areas relevant to the study that have been reviewed. It includes findings made by other researchers and scholars as well as analysis of these findings in order to reveal the gaps of the study that need attention.

2. 1. Human activities along Nakivubo Wetland

"Wetlands provide many important services to human society, but at the same time are ecologically sensitive and adaptive systems" (Turner et al, 2000: 8). In other words, wetlands are important ecosystems to both humans and the natural environment. However, wetlands have been exploited and this has led to loss and degradation of these natural ecosystems. Gren et al (1994) support this when they state that all wetlands are under threat from a variety of locally or regionally based human activities.

The upper slopes of the Nakivubo wetland adjacent zones are generally occupied by high cost residential settlement of the medium to low density, while the low lying residential area which area directly about Nakivubo are mainly composed of low cost, high density settlements and slums (Techniplan 1997).

The resources contained in Nakivubo wetland support various subsistence and income generating activities. These activities are carried out mainly by the residents of low cost settlement which directly border the wetland. The most significant use of the wetland resources of Nakivubo to surrounding populations is small scale cultivation. Other wetland utilization activities are currently of less economic importance including papyrus harvesting, brick making and fish farming (Tusiimwe *et al,* 1999).

Nakivubo wetland functions as buffer through which much urban and industrial wastes passes. The wetland plays an extremely important role in maintaining the quality of city's water supply. (IUCN, 1998). The nature of the wetland use is likely to affect the household livelihoods and wetland income in the household.

According to Waltz 1997 states the limited definition of economic value, only value associated with extractive use of component resources. Given society's increasing demands for employment, Income and infrastructures, development decision tend to maximize short term economic gains. Wetland is undervalued and there conservation appears less desirable in development terms and there is need to manage the wetland sustainably. This study will assess the contribution of the wetland basing on the income the household is deriving from the Nakivubo wetland and surrounding community in Namuwongo.

Nakivubo wetland supports farming by providing the water required for irrigated crop cultivation, as well as depositing sediments and nutrients that maintain soil fertility of an original area of 5.29 km2, it is estimated that 2.9 km2 is still intact, with 2.39 km2 converted, and that three-quarters of the modified area has been turned over to crops, with the remaining quarter used for settlements and industrial development. This results in a cropped wetland area of approximately 1.8 km2 or 180 ha (Emerton *et al.*, 1999). But the literature does no classify which activity is most supported and the most market value of the products (wetland from the activities)

Ecosystem functions are defined as "the capacity of natural processes and components of natural or semi-natural systems to provide goods and services that satisfy human needs" (de Groot, 1992). Wetland functions can generally be grouped into four types: regulation, provision of habitats, production and provision of information. It is generally understood, however, that increases in temperature and sea level, and changes in precipitation will degrade these benefits and services (IUCN, 1999).

Major ecological function of Nakivubo wetland is treatment and purification of wastewater from Kampala city (Kulindwa, 2010). Conservation efforts be guided by a management plan under participatory/stakeholder approach, this will lead to a sustainable utilisation/ wise use of wetland resources. More effort should be made by experts to demonstrate and impress upon decision makers the value of wetlands and to justify their conservation (Emerton al 1998).

The high water table and recurrent water logging in these areas, and the close proximity to the wetland, would require the construction of the pit Latrines to prevent the sewage from entering the wetland (Gauff and Parkman 1992). The major mitigative expenditure required to offset the effects impaired water quality resulting from the loss of the wetland treatment and water purification services to remove the inflow.

According to Kulindwa (2010) ecological values existing of wetlands in East Africa are similar to those found in similar types of wetlands elsewhere. Wetlands which are being studied under VicRes functions identified include aquatic habitat, breeding, feeding grounds and refugia (for some tilapia species, cichlid etc), Terrestrial habitat, carbon sink, and microclimate regulation. However, the author specialized in ecological values and therefore this study will assess the socio economic value obtained from the wetland.

Nationally it is estimated that 2,376 sq km of the wetlands area have been drained (SOER, 2001); the underlying cause being encroachment from agricultural expansion and industrial development. Pressure on the wetlands is exacerbated by the high annual population growth rate (3.2 %).The government has the capacity constrains for wetland management which limit it from effective in ensuring that the wetland is used wisely to maintain their roles in reducing the poverty (UBOS, 2002). Therefore the study will identify the community that depends on the

wetlands then will help the government to devise the means of protecting the wetland. is not adequately.

The economic value of the wetland goods and services is poorly understood (NFA, 2008). Therefore the study is intended to assess the economic value of the community within Namuwongo extracted from the wetland relating to the livelihood and income the community is sustaining from the wetland activities.

Nakivubo wetland makes a number of contributions to economic activities. As well as purifying domestic and industrial wastes and effluents thereby maintaining the quality of urban water supplies, wetland resources support a small scale income generating activities for the settlers. The financial and economic analyses have played a great role in encouraging the spread development, and urban settlement into the wetland (Lucy Lyango *et al 1998).*

Considerable parts of the wetlands were cleared for cultivation and construction materials, and the process is wide spread reaching deeper parts water points. The 1999 classification indicate that the northern section was almost completely converted while southern part is less affected. The majority of changes of the wetlands have taken place rapidly approximately 2.9 km of the original 5.29 km^2 of the wetland is unconverted (NEMA,2000).

From atop Muyenga Hill, the Nakivubo wetland appears too large to be threatened or robbed of its potential as it stretches in the valley below, all the way to Lake Victoria, bordered by the Namuwongo slum on one side and posh Bugolobi suburb of Kampala city on the other.However, on the ground, the wetland vulnerabilities yam, papyrus and sugar cane crops that are too numerous; a water level that is consequently too low; and construction projects that are too close dictate another story. As the most important water purifying mechanism in the country, the decline of the Nakivubo wetlands. (Oweyegha Afunaduula, chairman of Uganda Nile Discourse Forum).

Lake Victoria, explains Afunaduula, depends on the wetlands for its survival and without it, waste will permeate its shores, killing fish, hurting the economy and putting the health of everyone who relies on it as their source of water, in jeopardy.

But the construction workers in Bugolobi area of the wetland, topless and sweating, in a pristine neighborhood of red-tiled homes and driveways with sporty SUV, smile and wave, oblivious to the implications of their work. So too are the three boys who just crossed the swamp without hesitation, confident in the mud under their bare feet and too young to understand that it was not

always this easy. Sewage is a dirty topic and one that has been routinely ignored in a country where only 7.5% of the population have access to it. As a result, it is often left underground or dumped illegally into the Nakivubo channel which transports all types of garbage bags, bottles, waste from the city centre to the Nakivubo wetlands. (Sunday Vision June 10th 2012)

2.3 Effects of human activities on the wetland

Wetland degradation has a direct effect on the quality of water bodies, which are sources of water for production, domestic and industrial use. Wetlands are being modified because their resources are being over-exploited and their lands converted to other uses, as well as through the implementation of upstream developments that alter the quality and flow of water that feeds them (Emerton *et al.*, 1999).

Nakivubo wetland has become severely degraded over recent years, and is particul particularly threatened by the spread of industrial and residential developments. The areas surrounding Nakivubo, and the wetland itself, are regarded as prime sites for urban expansion due to their proximity to the city centre and industrial district, as a result of land shortage in higher areas of Kampala and because land prices are relatively cheap as compared to other part the municipality. The wetland has been encroached upon by settlement and industry, and small-scale cultivation on its fertile fringes has expanded. Much of the north-western part of Nakivubo wetland above the railway line, comprising up to half of its total area (COWI/VKI 1998, Tumusiime and Mijumbi 1999), has been modified or reclaimed for agriculture, industry and settlement.

The degradation of Nakivubo wetland, as well as leading to economic costs in terms of goods and services foregone, would have distributional implications. The impacts of wetland degradation for different groups must also be taken into account when developments are planned and implemented in and around Nakivubo. Whereas the gains from industrial and residential development accrue largely to individual property owners and industrialists, the economic impacts associated with wetland degradation are felt as broader, social costs. They are reflected in subsistence, income and employment losses for some of the poorest sectors of Kampala's population, as costs to many other residents of the city, and as increased public sector expenditures on the infrastructure required to replicate wetland functions or offset the effects of their loss. Many of these groups already face pressing constraints in income and expenditure, and are not in a position to bear increased costs or additional expenditures (John van Nostrand and Associates 1994).

NEMA states that Kampala is served by two major wetland systems; namely the Nsooba, Lubigi and Nakivubo Wetland systems. These also act as the main drainage systems out of Kampala. Recent developments have seen the clearing of the buffer zones of forests and open spaces, as well as encroachment on the wetlands in favour of unplanned settlements. Most of Kampala's land surface in the built up areas is highly paved leading to reduced water infiltration which leads

to generation of high storm waters. Of late storm water causes flooding in some places such as Bwaise, Kalerwe, Clock Tower and Kyambogo. (NEMA 2008)

NEMA asserts that there is a danger that Nakivubo may soon be modified and converted completely, resulting in the total loss of wetland resources and services and their associated economic benefits. Urban planners, decision-makers and developers have little understanding of the economic value of the wetland. While being well aware of the immediate gains in income and employment arising from wetland conversion, they have taken no account of possible economic costs associated with the loss of wetland resources and services. This study attempted to quantify present and potential economic benefits of wetland resources and services, so that they can be balanced with the potential gains from its conversion and modification for industrial and residential developments. (NEMA 2008)

Wetlands in many parts of the developing world, which are in close proximity to urban centres, are threatened with increased inflow of nutrients and extensive encroachment for agricultural activities and high settlement densities, which have altered wetland ecosystems (Okurut, 2000). It is realised that excess plant nutrient can lead to a disturbance of phosphorus-nitrogen balance in the system as well as excessive aquatic plant growth and intensify eutrophication of the water bodies like Lake Victoria. Nutrient storage has been reported to depend on plant tissue nutrient concentrations and on the ultimate phytomass accumulation (Reddy *et al.*, 1987).

Of recent, because of poor drainage systems in Kampala and pollution of the existing drainage channels like the Nakivubo channel, Kampala is experiencing a problem of flooding when it rains. This flooding is mainly because of man's interference with the existing wetlands around Kampala City. The rate at which the wetland is degrading depends on what activity is taking place around the wetland such as agriculture, industrialization and others. Therefore this research assessed the status of the wetland derived by the human activities of the people within Namuwongo. (Depletion of Uganda's wetlands 1997)

2.4 Mitigation measures suitable for conserving wetlands

Wetland management is the only practice that can mitigate wetland degradation in developed and developing countries. However, this does not preclude wetlands from being utilized; on the contrary, wetland management promotes the partial conversion of wetlands in order to meet economic needs of societies. A balance has to be struck between the environmental functioning of wetlands and their use for livelihood purposes thus promoting sustainable wetland management. (*The Open Environmental Engineering Journal,* 2011, *4,* 66-77)

Many communities and international organizations have found a way of encouraging wetlands management. For example the Ramsar Convention promotes the sustainable utilization of wetlands. As mentioned earlier, this is evident from the Ramsar strategic plan for 2003-2008; the Convention argues that the wise use of wetlands is one of the techniques that can be used in developed and developing countries. Ramsar Convention describes the wise use of wetlands as

the sustainable utilization of wetlands for the benefit of human kind in a way that is compatible with the maintenance of the natural properties of the ecosystem. Sustainable utilization is defined by the Convention as the human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations thus, the Ramsar Convention uses the wise use concept as a wetland management tool for the member states and wetlands of international importance (Africa Environmental Outlook, 2002).

Developing nations, which face strong demands for socioeconomic development, are encouraged to use and conserve wetlands in a sustainable manner. Conservation is recommended to manage the rate of change in ecosystems (Turner and Jones, 1991).

The use of indigenous knowledge in wetlands management is perceived to be effective in many communities. An example is the use of oral history in the rehabilitation and management in Kanyapella basin of Australia. Local history was found to improve scientific understanding and enhance policy implementation regarding the management of Kanyapella basin. In addition, oral history is perceived to be valued as an important element in incorporating local ecological knowledge in ecosystem management and rehabilitation including wetland management. Oral history was obtained from the local resource managers who provided information on hydrological as well as ecological history of the wetland. Thus, the local history gathered was integrated into the draft management plan of the wetland Indigenous knowledge can aid in the management of natural resources especially wetlands after all its human influence that has led to their degradation. (Robertson and McGee, 2003).

Clearly wetland management and conservation is the answer to many degraded wetlands in developing countries due to the fact that many local communities rely on wetlands for their basic livelihoods. The exclusion of communities in managing and conserving wetlands may lead to further exploitation leading to wetlands loss. Thus for an effective wetland management practice to take place local governments have to consider the attitudes of the local communities. (National policy for the conservation and wetland management resources,1995)

In Uganda, Environment Impact Assessment is a new phenomenon. Although now being appreciated, it will require concerted efforts of all sectors in our society if we are to reap its benefits.(Statute No.4 of 1995) of the Republic of Uganda brought into existence the National Environment Management Authority (NEMA) with power to ensure that, amongst other things, wetlands as integral parts of the ecosystems are protected from negative impacts resulting from human activities. In conjunction with other lead agencies such as Kampala City Council (KCC), NGOs (e.g. IUCN) etc. NEMA strives to protect the environment and threatened species. As pointed out, EIA is a new requirement and its adaptation is still regarded as an ordeal by most industrialists, since they consider it expensive and unnecessary. (Uganda EIA Wikipedia)

Wetlands in Uganda are now protected by legal legislation under law clauses 37 and 38 of the national environment statute, 1995. The statute states that; "Without written approval from the National Environment Management Authority (NEMA), it is now an offense for any person to

a)Reclaim or drain any wetland. (b) Erect, construct, place, alter, extend, remove or demolish any structure that is fixed in, on, under or over any wetland; (c) Disturb any wetland by drilling or tunneling in a manner that has or is likely to have an adverse effect on the wetlands; (d) Deposit in, on or under any wetland any substance in a manner that has or is likely to have an adverse effect on the wetlands; (e) Destroy, damage or disturb any wetland in a manner that has or is likely to have an adverse effect on any plant or animal in a wetland,(f) Introduce or plant any exotic or introduced plant or animal in a wetland. However, NEMA will exempt traditional uses of wetlands from these restrictions and the Authority shall, in consultation with the lead agency establish guidelines for the sustainable management of all wetlands in Uganda. In addition, the authority shall, with the assistance of the Local Environment Committees, District Environment Committees and lead agencies identify wetlands of local, national and international importance as ecosystems and habitants of species of fauna and flora and compile a national register of wetlands. Similarly, the policy committee may in consultation with the lead agency and the District environment committee, declare any wetland to be a protected there by excluding or limiting human activities (National policy for conservation and management of wetland resources Uganda, 1995)

NEMA is the regulatory and enforcing body with respect to industrial discharges. An Environmental Impact Assessment was submitted to NEMA in July 1998, in compliance with section 29 of the National Environmental Statute (1995). In accordance with this section of the statute, all proposed projects are to undergo NEMA approval to ensure that they meet the NEMA standards before they are allowed to operate. The Environmental Impact Assessment is to be prepared if the lead agency in consultation with NEMA is of the view that the project. (National policy for conservation and management of wetland resources Uganda, 1995)

Primary beneficiaries and other affected groups have been involved in, and have influenced, the project formulation in the following manners: Exchange of information between the interested groups which has enabled KCC to prepare an effective environmental Management plan for the projects around Nakivubo wetland, and execute them successful. (Emerton et al, 1999)

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter described the methodological approaches which were used in the study to collect, analyze and present the data. It included the description of the study area, study population, research design, sample size and sampling techniques, data collection methods and instruments, data analysis techniques and presentation, study limitations and ethical issues.

3.1 Description of the study area

3.1.1 Location of the study area

Namuwongo slum is the second largest slum situated in the South Eastern corner of Kampala in Uganda in Kampala district which is found in Makindye Division. It's bordered by Lugogo to the north, Nakawa to the northeast, Kiswa and Bugolobi to the east, Muyenga to the southeast, Kisugu and Kabalagala to the south, Kibuli to the west and Kololo to the northwest. The coordinates of Namuwongo are:00°18′40″N; 32°36′35″E (Latitude: 0.3110; Longitude: 32.6097).

3.1.2 Population

The total population of Namuwongo slum ranges approximately from 7,000 to 30,000 people. It is home to tens of thousands of people, most of whom are refugees from Northern Uganda and Congo.

3.1.3 Human activities

Nakivubo wetland supports farming to the people of Namuwongo by providing the water required for irrigated crop cultivation, as well as depositing sediments and nutrients that maintain soil fertility of an original area of 5.29 km2, it is estimated that 2.9 km2 is still intact, with 2.39 km2 converted, and that three-quarters of the modified area has been turned over to crops, with the remaining quarter used for settlements and industrial development. This results in a cropped wetland area of approximately 1.8 km2 or 180 ha. The resources contained in Nakivubo wetland support various subsistence and income generating activities. These activities are carried out mainly by the residents of low cost settlement which directly border the wetland (Namuwongo slum). The most significant use of the wetland resources of Nakivubo to surrounding populations

is small scale cultivation. Other wetland utilization activities are currently of less economic importance including papyrus harvesting, brick making and fish farming.

3.2 Research design

The study used descriptive research design. Descriptive research design is the method of collecting information by interviewing or administering a questionnaire to a sample of individuals. Its major purpose is to describe the state of affairs as it exists. It enabled the researcher to describe the state of wetland, by examining the existing human practices, their impacts on the wetland and i also established proper mitigation measures which can be used to conserve the wetland and improve the environment in the slum. The research was carried out basing on the research objectives and research questions and I was able to employ both qualitative and quantitative methods.

3.3 Sample size

The target population of the research was community members who practice mostly agriculture around the wetland and the host community was Namuwongo slum. However, ideally it's not possible to get information from the whole population due to limited resources thus obtaining a sample of fifty respondents (50) who were considered appropriate for the study. The sample included different members of the community regardless of their social status as long as they fell into the 50 selected respondents in Namuwongo slum, i.e. youth, children, women, elderly men and any other concerned parties who had interest in contributing any relevant information to this research.

The research employed random sampling and purpose sampling techniques. The major purpose for this was to ensure that precise information from the respondents was obtained which wasn't easy to allocate them and yet they were crucial for the Research. Furthermore the purpose sampling was important because selected informants were selected based on a great deal of knowledge about the subject.

3.4. Sampling techniques

This section described the sampling techniques, sampling size, sampling procedures and the reasons why certain sampling techniques, sampling size and procedures were employed from research. It ensured that each member of the study population had an equal and independent chance of being included in the sample.

3.5 Data collection methods

Primary data was acquired through interviews, questionnaires, focus group discussion, photographs and participatory observations, whereas secondary data was obtained from documentary reviews. The study collected both qualitative and quantitative data. Focus group

discussions with small respondents were used as the major source of qualitative data and questionnaires used as the basis of gathering quantitative data.

3.5.1 Research instruments

The researcher employed various instruments to collect relevant data from the field, thus the following research instruments were used in the study.

3.5.2 Questionnaire

Questionnaires were to be administered to the respondents at various subdivisions of the population sampled in Namuwongo slum for the three selected areas so as to get relevant data required in the study, these were composed of both closed and open ended questions. These questionnaires were translated in other local languages used by the people.

3.5.3 Observation

The observation guide helped the researcher in identifying the various impacts of the human activities, effects of these activities on the wetland and the various mitigation measures set to conserve the wetland in the area. The observation was done based on the researcher's fundamental questions. This was done in the area of study (Namuwongo slum)

3.5.4 Interview

Both Structured and non -structured interview were used to gather key data from the respondents and key informants. Interviews were used to collect information from key respondents particularly local leaders such as LC1, others. This helped the researcher to collect useful information from the members who are illiterate which was relevant to this study.

3.5.5 Photographs

A camera was used to get vivid pictures of the available human activities in the slum, to show areas how the human activities affected the wetland and different human activities carried out by the people of Namuwongo which helped the researcher in analyzing, interpreting and presenting the data.

3.6 Sources of data

The researcher focused on getting relevant data and information from diverse sources; however the researcher concentrated on two major sources i.e. primary source of data and secondary source of data.

3.6.1 Primary data

This data was mainly collected from the field using research instruments such as indepth interviews, focused group discussion, and direct observations as well as open end and close end questionnaires, among others.

3.6.2 Secondary data

Secondary data was gathered from the available documentation concerning about the impacts of slum development on fragile ecosystems (wetlands) in Namuwongo slum. The sources of information include books, journals, internet, and relevant documentation from the nongovernmental organization as well as government officials who work in those selected sites.

3.7 Data processing

Research objectives, qualitative and frame work guided the processing stage of which was then presented in tables.

3.8 Ethical issues

The permission to conduct the research "the impacts of slum development on fragile ecosystems (wetlands)" was obtained from the local chairman of Namuwongo. Questionnaires were administered to selected community members in the slum as scheduled. Required data was obtained through in-depth interviews, participant observations, documentary review, focus group discussions and a camera was used to take the necessary pictures within the slum.

I used the first four days of my field work to familiarize with my study area by visiting the area. I also visited the village leaders of Namuwongo slum where my study took place, trying to familiarize with them and other community members from which the study respondents was obtained. With the help of local leaders I was able to select the respondents to include in my study.

I used the second and third week of my field study to carry out the study, in which I helped the respondents to answer the questionnaires, interview the key respondents, holding focus discussion groups, taking photographs, observing the wetland condition near the slum and reviewing various literature materials. I also collected all the data for further analysis and

interpretations. I then thanked the community members and the local leader for their cooperation as may study was a successful one.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

This chapter presents the research analysis,interpretation and findings.The diverse research themes that were raised during the course of data collection were addressed.they include;human activities carried out along Nakivubo wetland,the effects of these activities on the wetland,and the mitigation measures set to conserve the wetland,the various reccomendations and suggestions that can be put in plce in order to ensure proper ways of wetland management in the area.The data to establish the above variables were generated from interviews and questionnaires of 50 households,stake holders and local council officers within Namuwongo slum.

4.1. Demographic Characteristicsof the respondents

Sex and age

The main intention of knowing the age and sex of respondents is to facilitate the researcher to get the reliable data and eventually arrive at pragmatic conclusions. The conclusion takes an aspect of gender balance in this study which is proven important because males and females contribute differently to the various impacts of wetland degradation. The summary of those findings are presented in the table 1 below.

Table 1: sex of respondents

	Frequency	Percentage(%)	Valid percentage(%)	Cummulative percentage
Valid Male	16	32.0	32	32.0
Female	34	68.0	68	68.0
TOTAL	50	100.0	100	100.0

Source: Field data

Majority (68%) of respondents were femamle while the (32%) were males.The majority 68% being females can be explained by the fact that women practise most of the activities such as agriculture but most of all just stay home to take care of the children since most of the farms are near their homes.

The ages of respondents from the whole community were grouped into five cohorts.This is presented in Table 2.

Table 2: Age of respondents

	Frequency	Percentage(%)	Valid percentage(%)	Cummulative percentage
Valid				
10-15	13	25.5	26.0	26,0
16-20	5	9.8	10.0	90.0
21-30	10	19.6	20.0	80.0
31-45	17	33.3	34.0	60.0
Above 45	5	9.8	10.0	100.0
TOTAL	50	100	100.0	

Source:Field Data

The findings on Table 2 above indicated that the majority 33.3% of the respondents were in the age bracket of 31-45 years,followed by 25.5% who were in the age braket of 10-15 years,19.6% were between the age of 21-30,and 9.8% were of ages between 16-20 and above 45 years.The biggest percentage were asked why they make up the majority portion and they answered that the reason as to why the slum is filled up with people of the age of 31-45 is that most of them migrated to the slum at that age that's why there is a majority of them the fact that most of them were married,they found it so easy to give birth to the number of children they wanted since most of the things are cheap to get most especially food since there is always free land for cultivation near the wetland.

Educational Level of Respondents

The educational level of people determines to a large extent the nature of their pesponse and their understanding of the issues at stake.The results are as shown in the table below.

Table 3: Educational level of respondents

		Frequency	Percentage(%)	Valid percentage (%)	Cummulative percentage
Valid	No formal education	7	14.0	14.0	14.0
	Primary education	21	42.0	42.0	56.0
	Seconadry education	17	34.0	34.0	90.0
	Post secondary	5	10.0	10.0	100.0
	TOTAL	50	100.0	100.0	

Source: Field data

Since most of the elders are involved in agriculture,they try as much as possible to take their childern to school but with the incraesing population in families,not mst of the children are able to finish school due to lack of school fees and the increasing rate of poverty.The majority of the respondents42% (21) have dropped out of school after completing the primary level because of lack of school fees since its considered more expensive than primary level so they resort to staying at home and helping their mothers in taking care of the family and other house chores,whereas 34% (17) had gone further to secondary education so that they can achieve enough money to take their siblings to school since they believe in education being a key to success,14% and 10% had attained no formal education at all and post secondary level respectively because its too expensive for them to offer.This shows that most of the respondents are mostly engeged in activities such as agriculture,fishing,brick laying and others other than curriculum experiences.

Marital Status Of Respondents

Table 4: Marital Status

	Frequency	Percentage(%)	Valid percentage(%)	Cummulative percentage
Valid single	13	26	26.0	26.0
Married	22	44	44.0	70.0
Divorced	9	18	18.0	88.0
Widowed	6	12	12.0	100.0
TOTAL	50	100	100	

Source: Field data

When asked about their marital status,44% of the respondents were married,followed by 26% who were single,18% wre divorced while 12% were widowed.

4.2 Acess to the wetland

As a major essential in wetland degradation, respondents were asked if they had any acess to the wetland and their responses were as shown in the table below.

Table 5: Acess to the wetland

	Frequency	Percentage(%)	Valid percentage(%)	Cummulative percentage
Valid Yes	35	70	70.0	70.0
N0	15	30	30.0	100.0
TOTAL	50	100	100.0	

Source: Field data

From the table above,70% of the respondents had the acess to the wetland which they used for purposes such as agriculture,fishing and other activities on a daily basis,whereas 30% of the respondents had no acess to the wetland at all because the slum is said to be large that means that not every one is able to have acess to it.Respondents say that a few who don't have acess to the wetland have no other choice than to buy food crops from the near by market since theres no free land other than that along the wetland which is not enough to cater for all the people in the slum.

4.2.1 Human activities carried out along the wetland

It was important to know the different human activies carried out along the wetland by the people of Namuwongo slum and to also know the major activities and the minor activities,a number of questions were asked and the respondents views were as follows;

Table 6: Human activities along the wetland

	Frequency	Percentage(%)	Valid percentage(%)	Cummulative percentage
Valid Brick laying	13	26	26.0	26.0
Crop production	22	44	44.0	70.0
Industrilisation	9	18	18.0	88.0
Animal production	6	12	12.0	100.0
TOTAL	50	100	100	

Source: Field data

From the findings,44% of the respondents carried out crop production growing crops such as maize,papayrus,sugarcane,beans and others while 26% of the respondents carried out brick laying,an activity that was said to be mostly done by males and leaving crp production to the females .18% and 12% of the respondents carried outindustrilisation and animal production respectively.Respondents when asked why the two activities were the least carried out they said that the slum lacked adequate land for these two activities to be carried out thus inorder to carry them out a large piece of land was needed that they don't have therefore resorting to crop production and bricklaying which don't need a larger piece of land and that with brick laying,the clay is obtained from the wetland itself making the activity easier.

4.3 Effects of these human activities on the wetland

In an attempt to know the distance the respondents take from their farms to the wetland,the respondents marked the distance as in the table below;

Table 7: Distance covered from the farm to the wetland

		Frequency	Percentage(%)	Valid percentage(%)	Cummulative percentage
Valid	Less than 200 meters	23	46	46.0	46.0
	Between 200&250 meters	15	30	30.0	76.0
	Between 250&350 meters	10	20	20.0	96.0
	More than 400 meters	2	4	4.0	100.0
TOTAL		50	100	100	

Source: Field data

From the table above,46% of the respondents showed that most of the activities they carry out are less than 200 meters away grom the wetland,30% and 20% show that activities are carried out at a distance of 200-250 maters away from the wetland,and 4% of the respondents carry out their activities at a distance of 400 meters away from the wetland but when asked why they say that they find it difficult in carrying out these activities especially crop production and bricklaying because the wetland provides water for the crops when irrigation is needed and also for mixing clay soil when making bricks,a priority they don't get because of inadequate land near the wetland unlike the others

4.4 Mitigation measures set to conserve the wetland

Environmental changes affect every part of the world,from third world countries to the first world countries and since the reason it happens is due to degradation of fragile ecosystems then theres always need to conserve them other than protection which is impossible due to the increasing population thus leading to an increase in demand for food,water and others therefore encroahing wetlands.By conserving the wetlannds,environmental degradation can be minimised through community awareness,restriction of laws about fragile ecosystems.

According to the interviews made about wetland conservation, it was observed that wetland management has not been successful in Namuwongo slum because the people prefer socio-economic development over wetland conservation. This is due to the fact that communities have little knowledge about the value and benefits wetlands provide.

The Research also observed that there was no emphasis in implementing wetland management in Namuwongo slum by either the local leaders/community members or the government itself and that there's no wetland management programme that exists in Namuwongo slum so people have gone ahead to degrade the wetland without knowing that they are doing so and since there is no legislation stoping them from encroaching the wetland, and also no public awareness about conserving the wetland the Nakivubo wetland has higher risks of being fully depleted if nothing is done about it.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter discusses the summary of findings, implications, recommendations and conclusions drawn from the findings. It highlights issues that were revealed during research with regard to the families carrying out activities such as agriculture especially as their economic activity. The findings are based on a survey of 50 respondents from households and farms in Namuwongo slum, Kampala district, Uganda.

5.1 Summary of findings

Wetlands in many parts of the developing world, which are in close proximity to urban centers, are threatened with increased inflow of nutrients and extensive encroachment for agricultural activities and high settlement densities, which have altered wetland ecosystems. The upper slopes of these wetland adjacent zones are generally occupied by high cost residential settlement of the medium to low density, while the low lying residential areas which are directly near Nakivubo wetland are mainly composed of low cost, high density settlements and increasing populations that have generated to creation of Namuwongo slum.

The resources contained in Nakivubo wetland support various subsistence and income generating activities. The most significant use of the wetland resources of Nakivubo to the surrounding population is small scale cultivation. Other wetland utilization activities are currently of less economic importance including papyrus harvesting, brick making and fish farming but most especially it supports farming by providing the water required for irrigated crop cultivation, as well as depositing sediments and nutrients that maintain soil fertility of an original area of 5.29 km2. This results in a cropped wetland area of approximately 1.8 km2 or 180 ha (Emerton *et al.*, 1999).

It is estimated that wetlands employ about 320,000 workers directly and provide subsistence employment for over 2.4 million people (MFPED, 2004). They provide raw materials for vulnerable groups, such as women for their cottage-based enterprises but given society's increasing demands for employment, Income and infrastructures, development decisions tend to maximize short term economic gains. Wetlands are undervalued and there conservation appears less desirable in development terms therefore there is need to manage the wetlands sustainably such as the Nakivubo wetland.

5.2 Conclusion

The study indicates that the female respondents are greater with 68% and male with 32%, implying female are dominant in home and wetland activities. These activities such as growing of yams, papyrus have contributed negatively to the wetland status by degrading it. The study therefore reveals independent factors like age, and non wetland activities among others will affect the status of the wetland either negatively or positively.

The study identifies various economic activities within the wetland such as papyrus harvesting, crop cultivation, water harvesting and Bricklaying. The major crops grown include yams, papyrus being dominant, cassava and maize and sugarcane .The animals grazed within the wetland are cows, goats and poultry .Besides there some individuals who wash cars in the washing bays within Nakivubo and there those who drain the water used for building.

The wetland contributes greatly to the increasing household income and thus increasing on the household saving. But the wetland income added to non income can help sustain the users or households depending on Nakivubo wetland in Namuwongo. The researcher also identified that educated farming doing well are not participating on the wetland activities and dominant are the Individuals who have low education and none who are greatly relying on the wetland for their household livelihoods.

Despite the greatest contribution of the wetland income to household, there is need for the government to control the activities and manage the wetland sustainably. Since the individuals are over exploiting and degrading the wetland thus a threat to the fragile ecosystem. The government should manage the wetland basing on the Ugandan laws like the Constitution and the National Environment (Lake shores, lands and riverbanks) Regulation 2003 with provision that "*the government shall hold in trust the natural resource(land, lakes and rivers) on behave of the people* "to ensure that the future generation benefit from the resources.

As revealed from the human activities of the people of Namuwongo slum, Nakivubo wetland has been subjected to a gradual process of conversion and reclamation and currently faces some of the most extreme threats and pressures. The areas around Nakivubo, including the wetland itself are regarded as prime sites for urban development due to their proximity to the city centre and industrial district. The interview results from the preliminary survey showed that Nakivubo wetland was under several anthropogenic uses. Increased agricultural development, urbanization and industrialization have increased the rate of loss of vegetation cover. Nakivubo wetland's characteristics and location means that it provides a unique and important set of services to Kampala's dwellers. It functions as a buffer through which much of the city's industrial and domestic wastewaters pass before being discharged into Lake Victoria at the Murchison Bay. Partially treated sewage from the Kampala Sewerage works is mixed with the untreated effluents already in the Nakivubo Channel before entering the wetland.

The recent rise in settlements around Nakivubo wetland like the Namuwongo slum is attributed to high demand for cheap accommodation by people who work as guards with the security companies located within the industrial area. A number of low income earners such as plant nursery girls and boys, workers with building companies and urban markets find cheap temporary houses built in the wetland affordable. The Namuwongo slum settlements are predominantly of northern Uganda origin and their main business activities centre on local alcohol and the harvesting of papyrus materials from Nakivubo wetland and beyond.

The degraded natural and cultural characteristics of the channel reflect lack of clear authority on the channel management. Nakivubo's location makes it suitable for providing unique and important ecological services to Kampala's dwellers. The wetland functions as a buffer to the city's industrial and domestic waste water passing through to Lake Victoria at the Murchison Bay. The majority of the low-cost residential settlements in the area are excluded from the municipal sewerage system. Therefore the community of Namuwongo mainly discharges domestic wastes into the wetland mainly as runoff into the surface waters or through groundwater inflows from the infiltration of rainfall. On the other hand effluents from industrial wastewaters passing through Bugolobi sewage treatment works, exhibits presence of detergents, lubricants, oils, acids, xenobiotics, and organic wastes.

5.3 Recommendations

The study has made recommendation the following as a measure to improve on the wetland activities and non wetland income activities as well as conserving the wetland itself. They include the following;

Continuous carrying out inventory studies on Nakivubo wetland since more information is needed to monitor and protect on the wetland value and services. The study should always capture all features related to the wetland like soil type, species type, status of the wetland and waste discharge by the factories

There is need for the government to protect and control the activities within the wetland since there many house depending on the wetland for their livelihoods and income. In addition the wetland is playing vital role in ecosystem services and inheritance gene protection and others. Therefore the government and other responsible stakeholders should become supportive and committed to ensure the wetland is protected.

The government and stakeholders should constantly do regular monitoring and evaluating the wetland and economic value generated from the wetland. This will help in revising the wetland, city policies, strategies and laws and devise the way forward for implementation.

There is need for more community sensitization and capacity building of population within the wetland. Since they are valuing the wetland using use value but no considering the wetland own value.This will help community to participatory control the activities within the wetland.

NEMA should be apply other wetland management strategies in Nakivubo wetland for example the Wise Use Concept. The government should adopt and implement the Cleaner Production project in all the industries in Uganda to ensure less industrial pollution especially those near fragile ecosystems.

NEMA should identify the institutions that are responsible for the management and conservation of wetlands and how these institutions can collaborate with each other and work together especially in managing Nakivubo wetland.

Quantitative studies of wetland loss and degradation are urgently required for much of Asia, Africa, South America, the Pacific Islands and Australia.

Further inventory should focus on a basic data set describing the location and size of each wetland, and its major biophysical features, including variations in area and the water regime. This information should be made available in both hardcopy and electronic formats.

Quantitative studies of wetland loss and degradation are urgently required for much of Asia, Africa, South America, the Pacific Islands and Australia.

Further inventory should focus on a basic data set describing the location and size of each wetland, and its major biophysical features, including variations in area and the water regime. This information should be made available in both hardcopy and electronic formats.

The Ramsar Convention should support the development and dissemination of models for improved globally-applicable wetland inventory. These should be derived from existing models (for example the Med Wet program) that are capable of using both remote sensing and ground techniques, as appropriate. Models should cover appropriate habitat classifications (e.g. those based on landform categories), information collation and storage, in particular Geographic Information Systems for spatial and temporal data that can be used for monitoring purposes.

The Ramsar Convention should support development of a central repository for both hardcopy and electronic inventories. The meta-data that describe the inventories should be published on the World Wide Web for greater accessibility

REFERENCES

1. COWI/VKI,1998.Kampala Water Quality Monitoring Programme Murchison Bay Water Quality Project; Report Prepared for Ministry of Natural Resources Natural Resources National Water and Sewage Corporation by COWI in association with VKI,Kampala

2. Davis T.J (1993). Towards Wise use of wetlands (Wise use project) gland Switzerland. Ramsar convention Bureau.

3. Department of Environment protection (1996). The Wetland status Report for Kampala. Ministry of Natural Resources.

4. Edward B Baiber, Mike Acreman and Duncan Knowler,1997,Economic Valuation of wetlands, Switzerland

5. Emertion L.L Lyingo, P. Luwum and A Malinga 1999, the present economic value of nakivubo urban wetland Uganda, Kampala Uganda. IUCN, the world conservation Union Eastern Africa Regional Office, Nairobi and National wet land Programme, Wetlands inspector Division, Ministry of water , land as Environment, Kampala (on line cht http//(msdata.iucn.org/downloads/cases study o7 Nakivubo pdy, last access 07/18/08

6. E.J.Huising, Wetland Monitoring In Uganda, institute of Environment and Natural Resources, Makerere University Kampala Uganda

7. Frank Kansiime, Maimuna Nalubega 1999,WasteWater Treatment by a Natural Wetland The Nakivubo Swamp Uganda

8. Kassim Kulindwa (2010). *An overview of values and conservation of selected wetlands in East Africa*. UDSM, Tanzania /Noragric, UMB, Norway

9. Kotze DC 1996,Wetlands and people what benefits do wetlands have and how are these benefits affected by our land use activities Wetland USE Booklet 1 share Net Howick

10. Maltby,E.(1985) water logged Wealth washing ton DC. International Institute for Environment and Development.

11. Mathew P. Mo cartney, Mutsa Masiyandima and Helena A.Houghton-carr. Working Wet lands classifying wetland potential for agriculture.

12. Mbabazi *et al* (2010).Ineffectiveness of Nakivubo wetland in out heavy metals from untreated Kampala urban effluent prior to discharge into Lake Victoria, Uganda. Department of Chemistry, Makerere University,

13. NEMA (2009).*Highlights of the Uganda Atlas of changing Environment,* Kampala's Changing Environment. Kampala, Uganda

14. NEMA, 2000/01. *State of Environment Report*. Kampala, Uganda.

15. NEMA, 2004. *State of Environment Report*. Kampala, Uganda.

16. NWCMP, 1996, *Wetlands Status Report for Kampala District*, National Wetlands Conservation and Management Programme, Ministry of Lands Water and Environment, Kampala

17. Okurut T.O. (2000*). A pilot study on municipal wastewater treatment using constructed wetlands in Uganda.* PhD thesis. A.A. Balkema, Rotterdam, Netherlands.

18. Techniplan, 1997, *Feasibility Study for the Rehabilitation of Nakivubo Channel Phase I,* Report Prepared for Kampala City Council by Techniplan SpA, Rome

19. Tumusiime, M. and Mijumbi, J., 1999, *Socio-Economic Survey of Nakivubo Wetland*, Report prepared for National Wetlands Conservation and Management Programmes, Ministry of Lands Water and Environment, Kampala

20. UNEP 2009, Uganda Enhancing Wetlands' Contribution to Growth, Employment and Prosperity, Kampala Uganda

21. Aryamanya-Mugisha,Henry (PhD) Executive Director National Environment Management Authority (NEMA), World Wetlands Day, 2ND February 2011 Theme: Wetlands for Forests

22. National policy for conservation and management of wetland resources Uganda, 1995

APPENDIX I

RESEARCH QUESTIONNAIRE

Dear respondent,

Iam **Agero Rashida**, a student carrying out a research that is being done as part of my studies for a Degree in Environmental Science and Management at Kampala International University which seeks to study the Impact of slum development on fragile ecosystems (wetlands) in your area. Your household has been randomly selected from this community to be included in the survey sample. The purpose of this research is purely academic and confidentiality is key in the survey, hence you will not be asked any irrelevant information.

Your complete return remains confidential to the researcher alone. Your generous participation will be highly appreciated.

SECTION A: Demographic and Bio Data of respondents

Basic information:

1. Age of respondent

a) 10-15 ( )
b) 16-20 ( )
c) 21-30 ( )
d) 31-45 ( )
e) Above 45 ( )

2. Sex of respondent

Male ( )

Female ( )

3. What is the marital status of the head of the family?

Single ( )

Married ( )

Separated /Divorced ( )

Widowed ( )

4. What is your level of education?

a. Primary ( )
b. Secondary complete ( )
c. Vocational complete ( )
d. Tertiary complete ( )
e. No formal education ( )

5. Do you know what wetlands are?
a) Yes ( ) b) No

6. Do you depend on wetlands?
   a) Yes b) No

7. If yes, what human activities do you carry out along the wetland?
   a. Crop production
   b. Brick laying
   c. Industrialisation
   d. Fishing

8. If none, what other human activities sustain your daily life?
   a. Iron smelting
   b. Weaving
   c. Others

9. What is the distance from your farm/area where you carry out a certain activity to the wetland?
   a. Less than 200 meters
   b. Between 200 &250 meters
   c. Between 250 & 350 meters
   d. More than 400 meters

10. Do you think carrying out these activities at a very short distance away from the wetland has affected the wetland?
    a) Yes b) No

11. If No, why do you think so?
    a. Because it's a water resource and it doesn't get affected
    b. Chemicals are not poured into the water
    c. The water cycle is the same
    d. Others

12. Do you pay any money to the authority that allows you to carry out these activities along the wetland?
    a) Yes b) No

13. If yes, how much do you pay per month?

14. Do you think wetlands should be conserved?

    a) Yes b) No

15. If No, why?

16. Has your community tried to conserve the wetland near it?

    a) Yes b) No

a) If No, why do you think so?

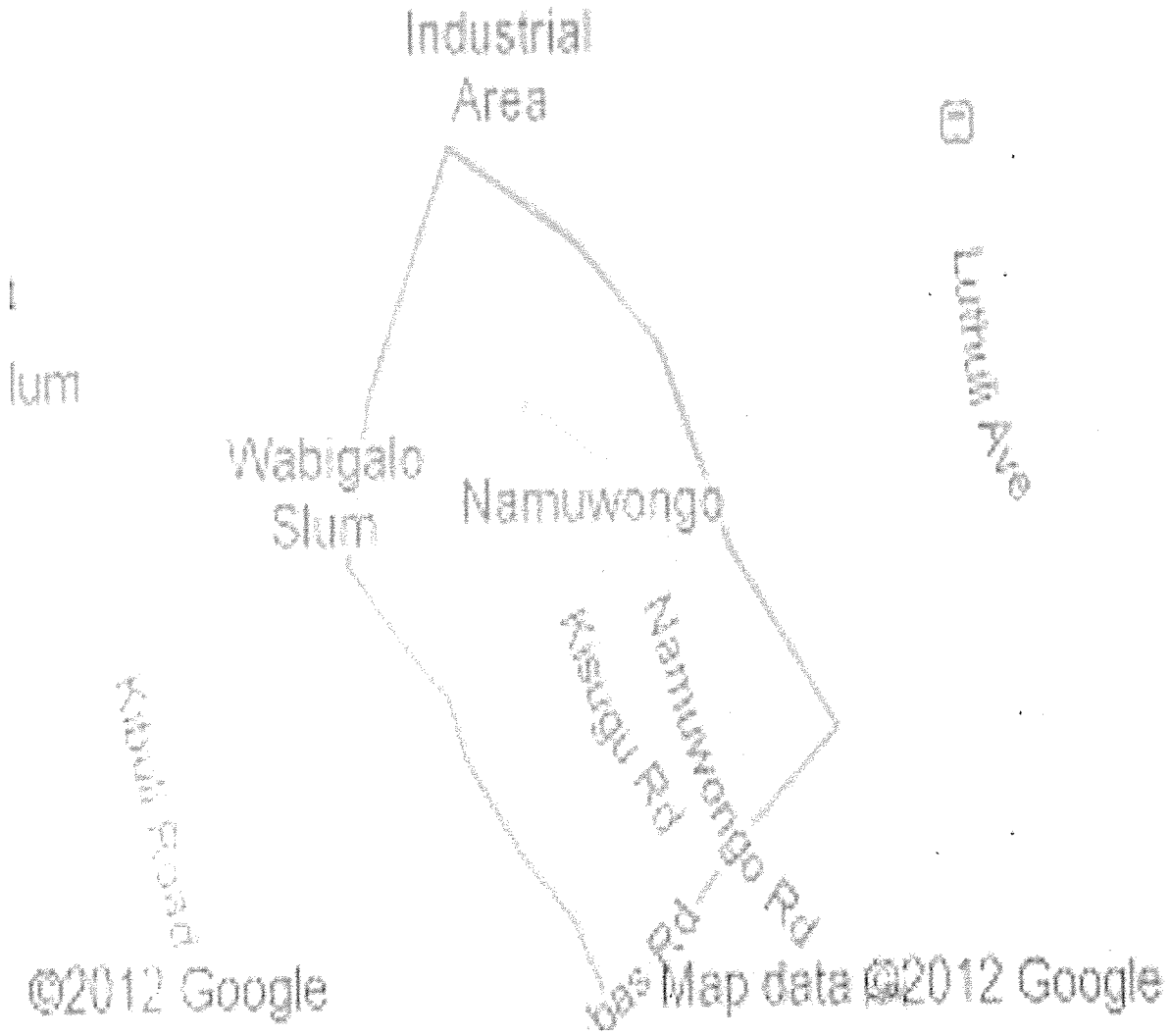
b) Do you know of any stakeholders that exist in your community who are concerned with conserving the wetland?
    a) Yes b) No

c) If none, why do you think so?
    a. Community members are too illiterate to understand
    b. The Government of Uganda doesn't care
    c. Others

d) Do you think this situation will change with time if the Government in Uganda tries harder in conserving all wetlands in the country?
    a) Yes b) No

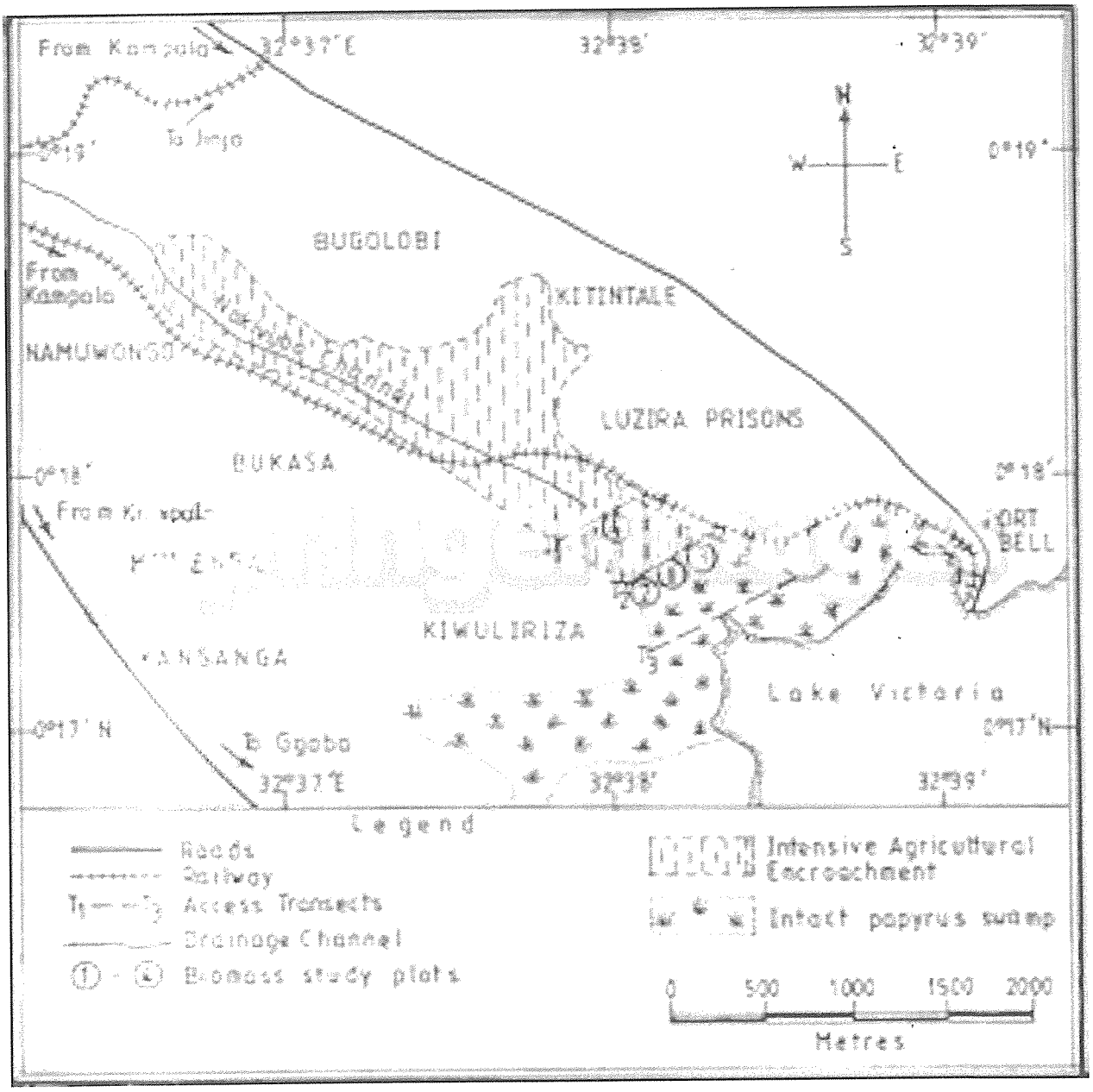
APPENDIX II

MAP OF NAMUWONGO



APPENDIX III

MAP OF NAKIVUBO WETLAND



KAMPALA
INTERNATIONAL
UNIVERSITY

Ggaba Road, Kansanga
PO BOX 20000 Kampala, Uganda
Tel: 256 41 267813, 267604
Fax: 041 501974
E-mail: admin@kiu.ac.ug

Office of the Principal

COLLEGE OF APPLIED SCIENCES & TECHNOLOGY (CAST)

Date: 26/09/2012

To : THE CHAIRMAN,
NAMUWONGO.
.....

This is to introduce to you **Mr/Ms AGERO RASHIDA Reg**. No **BEM/41377/91/DU** who is a bonafide student of Kampala International University. She is working on a research project entitled
THE IMPACT OF SLUM DEVELOPMENT ON FRAGILE ECOSYSTEMS (WETLANDS), CASE STUDY NAMUWONGO SLUM.
.....
for partial fulfillment of the award of a Degree at KIU. I hereby request you in the name of Kampala International University to accord him/her all the necessary assistance he/she may require for this work.

I have the pleasure of thanking you in advance for your cooperation.

Yours sincerely,

26/09/2012

Dominic Byarugaba

Principal-College of Applied Sciences & Technology