

**THE EFFECT OF LANDING SITES AROUND WATER BODIES: A CASE STUDY OF
GGABA LANDING SITE ON LAKE VICTORIA,
MAKINDYE-KAMPALA UGANDA**

BY

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KAMPALA INTERNATIONAL UNIVERSITY**

APRIL, 2017

DECLARATION

This research report is my original work and has never been presented anywhere for any award in any other university or institution of higher learning.

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APPROVAL

This is to certify that this dissertation entitled “**The effect of landing sites around water bodies: a case study of Ggaba landing site on Lake Victoria, Makindye-Kampala Uganda**” has been done under my supervision and marked to be submitted to the Department of Biological and Environmental Sciences of Kampala International University.

Sign: 

Date: 

Lecturer & supervisor: LUYIGA SUZAN

DEDICATION

This report is dedicated to my entire family and my friends for their encouragement, spiritual and moral support. May the Almighty God reward you abundantly.

ACKNOWLEDGEMENT

I would like to acknowledge the Almighty God for the strength, wisdom and understanding granted to me in completion of this course. I take the honor to thanks my parents and dear family like Babangida yahaya, Murtala yahaya, Abduljala saeed, Mubarak, Addulrauf, Maaruf, Suraj, Robilu, Musa and Wasila for the endless support throughout the journey of the academics, their encouragement and support financially, physical and spiritually. I will like to thank my friend like Mansur Aliyu Saeed, Mubarak Idris, Ahmad Usman, Isah Abubakar Galadima,Usman B. Umar to mention but few for the support and encouragement.

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May God bless you abundantly in your future endeavors.

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LIST OF ABBREVIATIONS

CRP	Conservation Reserve Program
EEA	European Environment Agency
EIA	Environmental Impact Assessment
EPA	Environment Protection Act
GDP	Gross Domestic Product
IRI	International Research Institute
IUCN	International Union for Conservation of Nature
NEMA	National Environment Management Authority
NGO	Non-Governmental Organization
PAHs	Polynuclear Aromatic Hydrocarbons
pH	Potential Hydrogen
SCS	South China Sea
UNEP	United Nations Environment Programme
UN-HABITAT	United Nations Human Settlements Programme
USDA	United States Department of Agriculture
USEPA	United States Environment Protection Agency

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CHAPTER ONE

INTRODUCTION

1.0 Background of the study

Lake Victoria is the largest among the African Great Lakes in East African region that are believed to have both dynamic and fragile aquatic ecosystems. Lake Victoria is the second largest fresh water lake in the world with over 200 fish species. A total of 1,493 landing sites were reported along the 3,450 km lake shoreline, translating to one landing site in every 2.3 km of shoreline (LVFRP, 2001).

Within two decades, the lake has experienced extensive resource exploitation leading to constrained productivity and drastic decline of native biodiversity. Intensive non-selective fishing, catchment vegetation degradation, industrial and agricultural pollution, the introduction of exotic species and uneven patchwork of governmental laws are some of the reasons for the current ecological woes facing Lake Victoria. Lake Victoria is a source of livelihood and development for an estimated 35 million people who live in rural and urban settlements within its catchment area. Although urbanization drives economic growth, it brings with it serious challenges. Without policy, physical planning and institutional reform, there is a real risk of urban services becoming unsustainable, leading to environmental degradation and serious health problems. These outcomes ultimately undermine the competitiveness of towns and cities, making them less livable.

The Lake Victoria is a treasured natural resource in the larger Eastern African region as it supports the livelihoods of about 35 million people directly or indirectly (World Bank, 1996; Odada *et al.*, 2006). The region has experienced rapid urbanization over the recent past with the towns concentrated along the lake's edge growing at rates far in excess of the regional average of 3% per year (World Bank, 1996; EAC, 2008). The urbanization process in the East African countries has increased under the impact of several factors including rural poverty that has stimulated rural-urban migration and land pressures (Abila, 2000). The Lake is heavily utilized for fisheries, transportation, tourism, water supply and waste disposal (EAC, 2008).

Lake Victoria has faced increased algal productivity with a corresponding drop in water transparency which was attributed to an increase in anthropogenic nutrient loads or changes in

nutrient dynamics within the lake (Ogutu- Ohwayo, 1990). Loss of detritivorous haplochromines is likely to have accelerated an algal production, exacerbating eutrophication, loss of transparency, and deep water hypoxia (Goldschmidt *et al.*, 1993). Even though Nile perch are widely considered the main cause for the decline of their main prey, it is generally acknowledged that haplochromine populations were already declining, likely in response to fishing and perhaps also increased eutrophication and the subsequent deterioration of the lake's water quality (Witte *et al.*, 1992). Eutrophication induced loss of deep water oxygen started in the early 1960s, and may have contributed to the 1980s collapse of indigenous fish stocks by eliminating suitable habitats for certain deep-water cichlids (Ogutu-Ohw).ayo, 1990

Eutrophication has increased over the last century (Verschuren *et al.*, 2002), and manifested itself in the presence of more widespread and longer lasting anoxia, fish-kills from the sudden mixing of anoxic water, as well as in the invasion of the introduced water hyacinth in the 1990s (Hecky *et al.*, 2010).

1.1 Problem statement

Ggaba landing site among other landing sites on the shore of Lake Victoria has grown very fast with increased population and increased business. This is economically positive but environmentally negative to the water body. More wastes are produced and there is increased demand for fish and water which has put the lake on a higher risk of pollution. The wastes produced at Ggaba landing site are either dumped or led into the lake by runoffs which leads to enrichment of the water body. Nutrient enrichment of the lake has led to pronounced blooms of algae especially of the toxic blue-greens (Lungayia *et al.*, 2000; Mugidde *et al.*, 2005) which have led to reduction in dissolved oxygen, at times dipping below 1.9 mg l^{-1} , a level considered lethal to tolerant cichlid fishes (Mhlanga *et al.*, 2006). There has been a loss of about 30-50% of the oxygenated waters volume in Lake Victoria since the 1960s, which has reduced the fish habitat (Mugidde *et al.*, 2005). Low dissolved oxygen concentrations and probably phyto-toxins contributed to occasional fish mortality observed in the Nyanza Gulf of Lake Victoria (Ochumba, 1990).

1.2 Objectives

1.2.1 General objective

To examine the impacts of human activities practiced on a Ggaba landing site on Lake Victoria

1.2.2 Specific objectives

The specific objectives of the study are;

- i. To identify the possible factors that could have led to the development of Ggaba Landing site
- ii. To identify the activities carried out at Ggaba landing site
- iii. To determine the effects of human activities done at Ggaba landing site on lake Victoria

1.3 Research questions.

- i. What are factors leading to development of Ggaba Landing site?
- ii. What activities are carried out at Ggaba landing site?
- iii. What are the effects of human activities Lake Victoria?

1.4 Scope.

Geographical scope

This research was based on Ggaba landing site located at the shores of Lake Victoria in Makindye division Kampala district central Uganda.

Content scope

This research was focused on examining the impacts of human activities practiced on a Ggaba landing site on Lake Victoria by identifying the factors leading to development of Ggaba Landing site, determining the effects of human activities done at Ggaba landing site on lake Victoria and assessing the effects of such human activities on lake Victoria.

Time scope

The study lasted for three months that is; February, March and April 2017.

1.5 Significance of the study.

This research can act as a base line to academicians and future researchers, developers and politicians who might wish to use it. It can also help the researcher to get more knowledge about water resources as it is on the ground and be able to make conclusions and recommendations. It can also provide more knowledge to all other interested readers about the impacts of human activities done on landing sites on water bodies. Gaps left for the future researchers were also be clearly identified.

It helps the developers to identify how their activities affect the water resources like Lakes. It also helps them to identify some conservation measures that could be used to conserve their water resources and/or following the set environmental procedures like Environmental Impact Assessment (EIA).

1.6 Definition of key terms.

1.6.1 Impact

It is the action of one object coming forcibly on to contact with another.

1.6.2 Human activities

This refers to every effort man puts into action especially during exploitation of natural resources in the environment. Human activities include farming, mining, fishing, and transport among others

1.6.3 Lake

A lake is a large body of water surrounded by land.

1.6.4 Management

This refers to any human initiatives directed towards sustainable utilization of the environmental resources.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents and reviews secondary data that is related to the topic of study.

2.1 Factors that lead to development of Ggaba landing site

The Lake Victoria is a treasured natural resource in the larger Eastern African region as it supports the livelihoods of about 30 million people directly or indirectly (World Bank, 1996; Odada *et al.*, 2006). The region has experienced rapid urbanization over the recent past with the towns concentrated along the lake's edge growing at rates far in excess of the regional average of 3% per year (World Bank, 1996; EAC, 2008).

Approximately 60% of urban population growth worldwide is caused by natural increase, with migration accounting for only 25% of growth in Africa and 34% in Latin America. In Asia however, migration remains the dominant factor, providing for 64% of city growth across the continent (Brennen-Galvin, 2001). Urban expansion and subsequent LULC changes in Shanghai have largely been driven by policy reform, population growth and economic development (Kim *et al.*, 2007).

Since the early 1970s, several Sub-Sahara African governments pursued post-independence macro-economic policies that incentivized urbanization. These policies encouraged the establishment of large scale, capital-intensive industries situated in large cities (Todaro, 2000). In addition, policies related to agriculture, food subsidies and exchange rates have tended to keep food prices low for urban consumers at the expense of the farmers (Nsiah, 2003). Largely due to these policies, the level of urbanization in Sub-Saharan Africa has increased dramatically to nearly 40 per cent today. This translates into a total urban population of about 250 million. The United Nations Population Fund (UNFPA) projects that Sub-Saharan Africa's urban population will double between 2000 and 2030 (UNPF, 2007).

Pro-urban development strategies adopted by countries in Africa have left urban areas more developed than the rural areas. The greater opportunities cities offered in the urban areas in terms

of employment, education, health and other facilities tend to attract the youth to the urban areas (Nsiah, 2003).

In -Saharan Africa migration from rural areas on average accounts for about 60 per cent of the urban population and in exceptional cases, as much as 75 per cent. Rural-to-urban migration has many causes like poverty in rural areas resulting from low agricultural productivity, aggravated by demographic growth and natural disasters (Todaro, 2000). Rural areas are relatively under-served in terms of physical, financial, social and economic infrastructure. This neglect of rural areas is reflected in the inadequate allocation of resources for operational expenses and insufficient investment in rural infrastructure, agriculture, schools and hospitals (Mediel *et al.*, 2013).

In Bamenda city-Cameroon, the numerous services offered have somehow encouraged rural exodus and accelerated the urbanization process. People, especially the youthful folk migrate into Bamenda in search of jobs and high birth rate in rural areas is the most influential factor (World Bank, 2002).

On one hand, political strife, natural disasters, socio-cultural constraints, religious persecution, economic decline in rural areas are some of the 'push' factors in Ghana. For example, Accra experienced net out-migration during the worst of Ghana's economic crisis in the 1980s (Simon, 1999).

Despite these planning schemes, developments in Kampala especially housing have continued to be haphazard, unplanned and located outside planned area (MLHUD, 1993). This is blamed on Kampala Capital City's (KCC) failure to implement/enforce the planning schemes, continued political interference, conflicting land use policies, uncoordinated instructions between KCC and Ministry of Local Government and at times State House. Kampala currently accommodates 40% of all urban residents in Uganda (MLHUD, 1993).

2.2 Human activities carried out on landing sites

The problem of overfishing in Lake Victoria was mentioned as early as 1920s when the first fishery survey was conducted by Graham in 1927-1928 (Kolding *et al.*, 2008). The introduction of gill-nets of 5 inch mesh size was believed to have had severe impacts on the Tilapiine stocks in some parts of the lake (Graham, 1929). Commercial fishing on tilapia started when the

railroad arrived in Kisumu (Vershuren *et al.*, 2002) in the early 20th century (1901). Prior to the Nile perch introduction, Lake Victoria fishery was composed of the native tilapia (*Oreochromis esculentus* and *Oreochromis variabilis*) (Ogutu- Ohwayo, 1990). There was however, a localized decrease in individual catches in the Winam Gulf of Kenya (Graham, 1929), and may have prompted the introduction of Nile tilapia (*Oreochromis niloticus*) and other tilapiine species to boost fisheries productivity (Kudhongania and Chitamwebwa, 1995).

Overfishing was again mentioned when Ray Beverton visited the lake in 1957, (nBeverto1959). The native species were exploited using rudimentary gears such as papyrus seine nets, basket traps, harpoons and hooks (Graham 1929, Muhoozi, 2002); however, with the introduction of nylon gill nets and outboard engines, fishing became efficient which led to a decline in the native species. Since the mid1980s, commercial fishing in Lake Victoria has been based on Nile Perch, Nile Tilapia and Dagaa which together make up 85-90% of the catch.

The Nile perch boom in the 1980s led to increased exploitation which had a significant impact on societies around the fishery with increased incomes as a result of the high demand from European markets (Balirwa, 2007). The high demand has attracted huge infrastructural growth in form of fish processing plants that has led to an increase in human population and further exerted fishing pressure on the Nile perch (Balirwa, 2007).

The artisanal fishery has developed with multiple types of fishing boats with both propelled and outboard motors which carry a variety of fishing gears, some of which target particular species while others are more general in their selectivity and catch more than one species (LVFO, 2013). The number of fishers has increased from 129,000, with 43,000 boats, in 2000 to 200,000 fishers with 70,000 boats in 2012. Furthermore, increased use of some nonselective gears especially monofilament nets, small mesh-sized multifilament gillnet, beach seine nets and mosquito nets are perceived to negatively influence fish catches (LVFO, 2013; Njiru, *et al.*, 2014). The recent frame survey by LVFO in 2013, reported an increase in the use of gillnets [multifilament] in the Lake from 650 652 in 2000, to 1 032 948 in 2012.

2.3 Effects of human activities done at Ggaba on Lake Victoria

The relationship between the changing water quality, sediment properties of the lake and the beginning of rapid expansion of human population and agricultural activity in 1970s (Verschuren *et al.*, 2002). The urbanization process in the East African countries has increased under the impact of several factors including rural poverty that has stimulated rural-urban migration and

land pressures (Abila, 2000). The Lake is heavily utilized for fisheries, transportation, tourism, water supply and waste disposal (EAC, 2008).

In Lake Victoria situation, fish stock sizes, catches and landings in beaches have drastically declined within the last two decades and many species are close to extinction (Twong'o & Sikoyo, 2004; Odada *et al.* 2006). Destructive fishing gears are used in fish harvesting, which severely harms the lakes ecosystem and fish habitats (Njiru *et al.*, 2005; 2006). For years, the expansion of Lake Victoria fisheries encouraged fishermen to exploit fish resources in an unsustainable manner (Yongo *et al.*, 2005). The growing demand for fish has led to an increase in prices such that even the local communities including fishermen cannot afford to buy freshly landed fish. Under such conditions, every fisherman strives to maximize his / her benefit oblivious to the damages caused to the future fisheries stock. Consequently local communities around Lake Victoria are left insecure with regard to food security (Abila, 2000; Odongkara *et al.*, 2005).

In the year 2000, the Lake Victoria Fisheries Organization (LVFO) commissioned a coordinated survey on the entire Lake Victoria to determine the level of the lake's fishing effort. The findings of the survey revealed the severity of fishing pressure exerted on the Lake Victoria fishery. A total of 1,493 landing sites were reported along the 3,450 km lake shoreline, translating to one landing site in every 2.3 km of shoreline (LVFRP, 2001; LVEMP, 2003; LVFO, 2008a, 2008b). Up to 129,328 fishermen using 42,548 fishing crafts including variety of fishing gears such as beach seines, scoop nets, *dagaaseines*, cast nets, long line hooks, hand line hooks, traps and mosquito nets were reported (LVEMP, 2003) (Table 1). Indeed, the Nyanza gulf is the most intensively fished part of the lake with more than 10 fishermen per km² compared to about 2 per km² in the rest of the lake (LVFO, 2008c). Overall, Lake Victoria fisheries like other regulated access fisheries show significant signs of over-exploitation, overcapitalization and low profitability (Bokea & Ikiara, 2000). This decline in fish stocks threatens the survival of nearly half a million communities in Kenya who depend on the lakes fishery (Yongo *et al.*, 2009).

The invasion and rapid spread of the alien water hyacinth, *Eichhornia crassipes*, may have affected the lake ecologically by blocking sun light hence causing anoxia, but the major effect was the hindrance of fishing activities as fishers would be stranded and left in the middle of the lake without passage. Water hyacinth first appeared in Lake Victoria in 1989 (Twongo *et al.*,

1995) and later disappeared during 1990s after mechanical and manual removal, changes in ecological succession and the application of the weevils *Neochetina eichhorniae* and *N. bruchi* for biological control (Williams *et al.*, 2005). More so, the clearance of swamps for human settlement and agriculture around Lake Victoria has reduced marginal vegetation and this has negatively affected recruitment and survival of fish species which depend on the fringing zones during their early stages of development (Njiru *et al.*, 2006).

It has, for instance, been claimed that the disappearance of water lilies and other aquatic weeds reduced the spawning grounds for *O. esculentus*, while decline of plants such as *Potamogeton pectinatus* and *Ceratophyllum demersum* favoured by *T. zillii* drastically reduced its feeding niche (Welcomme, 1967). With regard to future perspectives, the effects of climate change are unpredictable and recent climate models suggest that East Africa will experience increased wet season rainfall with runoff and fresh water availability (Doherty *et al.*, 2010). Although this seems beneficial to fisheries, increased rainfall coupled with deforestation and agriculture could lead to severe erosion, siltation, and nutrient runoff, with little beneficial effect to fisheries (Njiru *et al.*, 2014).

Lake Victoria has experienced increases in subsistence agricultural growth, deforestation, municipal and industrial effluents, and human encroachment on the shoreline has given rise to historically unprecedented nutrient loadings into the lake (Hecky 1993; Vershuren *et al.*, 2002). With current estimates projecting a doubling of the regional human population to 53 million around the lake by the year 2020 (United Nations, 1995), further degradation of the Lake Victoria ecosystem is likely to continue unless effective nutrient management strategies are implemented on a multinational and basin-wide scale.

Lake Victoria has faced increased algal productivity with a corresponding drop in water transparency which was attributed to an increase in anthropogenic nutrient loads or changes in nutrient dynamics within the lake (Ogutu- Ohwayo, 1990). Loss of detritivorous haplochromines is likely to have accelerated an algal production, exacerbating eutrophication, loss of transparency, and deep water hypoxia (Goldschmidt *et al.*, 1993). Even though Nile perch are widely considered the main cause for the decline of their main prey, it is generally acknowledged that haplochromine populations were already declining, likely in response to fishing and perhaps

also increased eutrophication and the subsequent deterioration of the lake's water quality (Witte *et al.*, 1992).

Eutrophication induced loss of deep water oxygen started in the early 1960s, and may have contributed to the 1980s collapse of indigenous fish stocks by eliminating suitable habitats for certain deep-water cichlids (Ogutu-Ohwayo, 1990). Eutrophication has increased over the last century (Verschuren *et al.*, 2002), and manifested itself in the presence of more widespread and longer lasting anoxia, fish-kills from the sudden mixing of anoxic water, as well as in the invasion of the introduced water hyacinth in the 1990s (Hecky *et al.*, 2010).

Nutrient enrichment of the lake has led to pronounced blooms of algae especially of the toxic blue-greens (Lungaya *et al.*, 2000; Mugidde *et al.*, 2005) which have led to reduction in dissolved oxygen, at times dipping below 1.9 mg/l, a level considered lethal to tolerant cichlid fishes (Mhlanga *et al.*, 2006). There has been a loss of about 30-50% of the oxygenated waters volume in Lake Victoria since the 1960s, which has reduced the fish habitat (Mugidde *et al.*, 2005). Low dissolved oxygen concentrations and probably phyto-toxins contributed to occasional fish mortality observed in the Nyanza Gulf of Lake Victoria (Ochumba, 1990).

Furthermore, increased stability of stratification, together with higher organic sedimentation to the hypolimnion, has significantly augmented the volume of seasonally anoxic water (Hecky *et al.*, 1994) and caused loss of fish habitat and a shift in the benthic invertebrate community toward anoxia-tolerant species (Verschuren *et al.*, 2002). Evidence of increasing algal abundance (Hecky and Bugenyi, 1992; Mugidde, 1993) and fish kills raises the possibility of declining oxygen concentrations in the deeper water of the lake. The focus of many discussions has been on the dramatic ecosystem alterations caused by food web changes from "top-down" predation by the introduced Nile perch and overfishing (Goudswaard *et al.*, 2008).

There is however, a strong evidence that the increased nutrient loading results in a "bottom-up" effect and changes the phytoplankton productivity (Mugidde, 1993; Kolding *et al.*, 2008) and community structure (Kling *et al.*, 2001).

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The artisanal fishery has developed with multiple types of fishing boats with both propelled and outboard motors which carry a variety of fishing gears, some of which target particular species while others are more general in their selectivity and catch more than one species (LVFO, 2013). The number of fishers has increased from 129,000, with 43,000 boats, in 2000 to 200,000 fishers with 70,000 boats in 2012. Furthermore, increased use of some nonselective gears especially monofilament nets, small mesh-sized multifilament gillnet, beach seine nets and mosquito nets are perceived to negatively influence fish catches (LVFO, 2013; Njiru *et al.*, 2014).

CHAPTER THREE

MATERIALS & METHODS

3.0. Description of the study area

Ggaba landing site is located on northern shores of Lake Victoria, in Ggaba, Makindye division Kampala Uganda. It is within Murchison bay in Lake Victoria to the south and east, the village of Kawuku to the north east, Bbunga to the north, Buziga to the northwest and Munyonyo to the southwest. The road distance between Ggaba and Kampalas central business district is approximately 11 kilometres. The coordinates of Ggaba are 0°15'23.0"N, 32°38'10.0"E (Latitude 0.256390, longitude 32.636113). The Lake, which is located in the upper reaches of the Nile River Basin, lies astride of the equator between latitude 2.5°S and 1.5°N, and longitude 32° and 35°E. The lake is shared by three East African countries in varying proportions: Kenya (6%), Uganda (43%) and Tanzania (51%). Other countries such as Rwanda and Burundi are within upper watershed that drains into the Lake Victoria through river Kagera (Swallow *et al.*, 2003). According to seismic reflection profiles, the Lake Victoria, which originated as a result of regional tectonic tilting, is estimated to be 400,000 years old (Johnson *et al.*, 2000).

3.1 Research Design.

This researcher used descriptive survey research design utilizing both qualitative and quantitative approaches. This research design was seen to be the most desirable because the study sought to describe the impacts of human activities practiced on a Ggaba landing site on Lake Victoria. Surveys are well-known instruments that can be used to gather a lot of information in a short period of time. The study used both qualitative and quantitative research approaches. Qualitative approach was used through asking questions and getting the feedback which were recorded and presented in a descriptive way. Quantitative approach was used to reveal the numerical form of data such as statistics, percentages and so forth. It was used to quantify the size, distribution and association of the variables.

3.2 Target Population

According to Ogula (2005) a population refers to any group of institutions, people or objects that have common characteristics. The target population was the residents of Ggaba landing site and anybody who does business from that area. Since Ggaba receives very many people daily and the population is higher during day and lower at night, the researcher considered people who work from there excluding those just visit the place.

3.3 Sampling Design

3.3.1 Sample Size

The total sample size of the study was 400 respondents. The researcher used Slovenes' formula for calculating sample size for the respondents in the area based on the estimations of the researcher. The researcher estimates the population to be 6754 living in or near Ggaba.

Slovenes' formula of calculating sample size

$$n = \frac{N}{1+N(e^2)}$$

Where, n = sample size

N = population size

e = Level of significance = e = 0.05

Population of respondents in Ggaba = 6754

$$n = \frac{6754}{1+6754(0.0025)}$$

$$n = \frac{6754}{16.8875}$$

$$n = 400$$

Therefore, the sample size was 400 respondents.

3.3.2 Sampling Method

The researcher used simple random sampling that gave each member an equal chance to be chosen in the sample group.

Purposive/Judgmental sampling which is a non-random sampling method was used to select the key respondents like local leader, elders and a member of the management committee.

3.3.3 Sampling procedure

The researcher introduced himself to the local leader as soon as he got on the field of study and then use simple random sampling by requesting the people interested in giving relevant data to gather in one place. Their number became higher than required, and the researcher rolled papers equivalent to their number but some of them possessed numbers equivalent to the sample size required from the local people. Those who picked papers numbered formed the group that represented the rest of the community members. For the key respondents, the researcher judged following their availability and readiness to give information.

3.4 Sources of Data

The source of data for the study was both primary and secondary.

3.4.1 Primary data

This involved collection of data from the respondents and staff that work in the designated area using research instruments such as in-depth interviews, focus group discussion as well as use of questionnaires.

3.4.2 Secondary data

Secondary data was gathered from the available documentation concerning the impacts of human activities practiced on landing sites on water bodies. The sources of data included books, journals, and internet and newspapers among others.

3.5 Data collection methods

In order to address the objectives of the research, the researcher used the following instruments in gathering and collecting data.

3.5.1 Questionnaires

Questionnaires were issued to the selected respondents, made up of open and closed ended questions. The questionnaires were self-administered amongst the respondents.

3.5.2 Interview guide

The researcher conducted personal interviews with the key informants.

3.5.3 Focus Group Discussions

This instrument was used in data collection in that, the researcher put respondents in small groups of between 20 to 30 people and ask them to give responses to the set questions in the interview guide also discuss them allowing respondents to give their views and comments. The responses were then recorded and later compiled to make them relevant to the study.

3.6 Validity and Reliability

In order to ascertain the validity of instruments, expert opinion was sought from the supervisor, lecturers, and peers on face, content and format of the questionnaires, interviews and group organization. Consultations with the supervisors, other lecturers, and peers helped to identify errors and offer the opportunity to modify and improve the instruments. Drawing on the expert opinions from the supervisors, lecturers, head teachers, and peers, appropriate corrections were made on the instruments. Thereafter, all instruments were administered by the researcher and data collected was analyzed and presented as the findings of the study in chapter four of the research report.

3.7 Data Analysis and Presentation

Descriptive analysis was used to analyze the data collected from the field by relating them to the study objectives. Tables and a pie chart were used to present the field results.

CHAPTER FOUR

PRESENTATION OF FINDINGS AND DISCUSSION

4.0 Introduction

This chapter comprises the research findings which includes among others; factors for the growth of Ggaba landing site, human activities done at Ggaba landing site and the effects of such activities on Lake Victoria.

4.1 Demographic characteristic of respondent

Among the respondents involved in this research, female (58%) were higher than males (42%), as indicated that there is high reproduction which is one of the reason why there is population increase of people living Ggaba

4.2 Factors for the growth of the landing site

Table 1: Factors for the growth of Ggaba landing site

FACTOR	SA	A	SD	D	Total response	Total sample
High population	194	137	18	51	400	400
Security	201	142	16	41	400	400
Strategic location	221	113	31	35	400	400
Business opportunities	198	108	36	50	392	400
Social services	156	134	41	69	400	400
Presence of Lake Victoria	257	143	0	0	400	400

Source; primary source

SA	Strongly agree
A	Agree
AD	Strongly Disagree
D	Disagree

Table 1 above indicates that there are various factors which contributed to the growth and development of Ggaba landing site. Most of the respondents at Ggaba landing site strongly agreed that the presence of the Lake Victoria is the main factor that lead to the development of Ggaba landing site. It was clearly reported by many respondents that if it was not because of

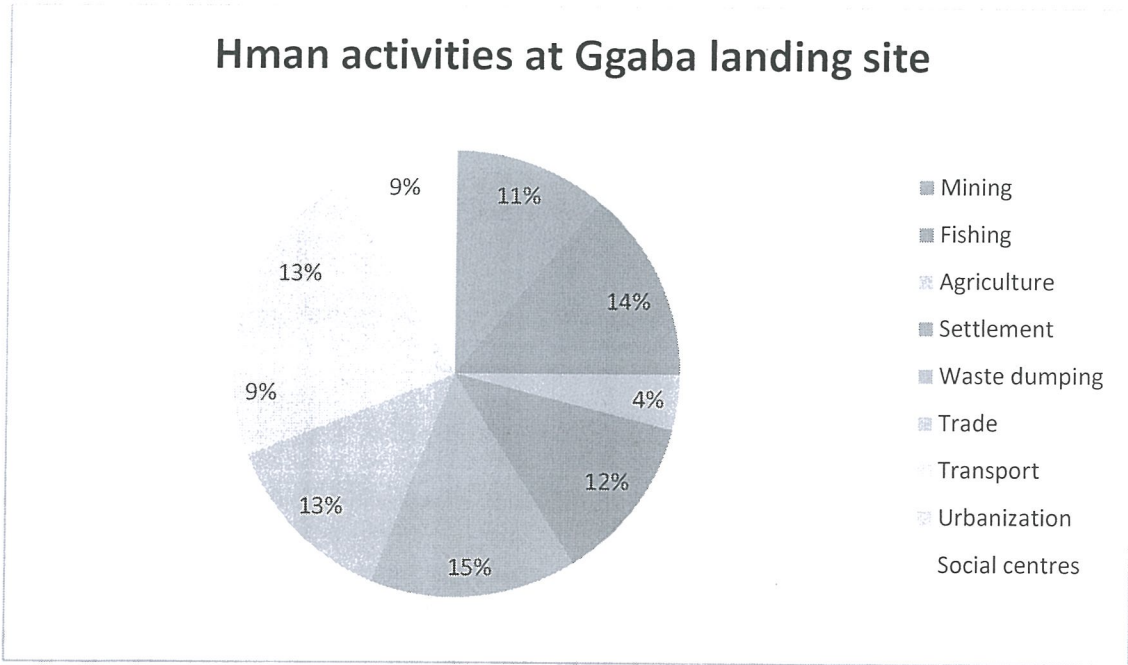
Lake Victoria, the landing site would not be in place. According to the respondents, their presence in the area is much influenced by the strategic location of Ggaba landing site on the shores of Lake Victoria and in Kampala city where there is need for the lake products like fish, sand, fire wood and charcoal which originate from the islands with the Lake. None of the respondents disagreed about the contribution of in addition Lake Victoria to the growth and development of the landing site.

In addition to the presence of Lake Victoria and strategic location, many other respondents also strongly reported that security in that area and availability of social services like health centres and schools has attracted many people to the area and this has influenced trade and urbanization. The increased population at Ggaba landing site has increased market for fish, fire wood, charcoal, and other agricultural products which are carried to Ggaba for sale.

A few respondents disagreed that the growth and development of Ggaba Landing site was due to strategic location, increased population and availability of security and other social services like schools and health centres.

4.2Human activities done at Ggaba landing site on Lake Victoria

Figure 1: Human activities done at Ggaba landing site on Lake Victoria



Source; primary source

As represented by chart above, the most human activity which is evidenced at Ggaba landing site is waste dumping (15%) followed by fishing (14%), trade (13%) and urbanization (13%). In the study, the confident reporters argued that waste dumping around Ggaba landing site is inevitable because the population is very high and this leads to increased fishing, trade and urbanization all of which generate more wastes that are dumped around the water body. According to Mrs. Namusoke who is a dealer fish, there are a lot of wastes produced by the business as much fish is caught which needs to be cleaned by removing the intestinal parts and the scale of which generate wastes. Trade of other commodities like edible stuffs also leads to generation of much waste in the area.

The least but also significant pointed out human activities at Ggaba landing site pointed out by the respondents include settlement (12%), mining (11%) transport and social activities like schools and health centres. However, these activities were said to have a significant impact on the growth and development of Ggaba landing site and also have effects on the existence of the lake

Table 2: Occupation of respondents

OCCUPATION	FREQUENCY	PERCENTAGE
Fisherman	26	33
Student	14	18
Farmer	9	12
Official	2	3
professional	6	8
Fish dealer	21	26
TOTAL	78	100

Source; field data

Most of the people living in Ggaba are fishermen (33%) and the least number of respondent were officers (3%) and professional workers like teachers and nurses (8%) indicating that most people that are there is more utilization of the lake Victoria as a resource for business and therefore the effect can be evident in the area due to increased population of business people

4.3 Effects of human activities done at Ggaba on Lake Victoria

Table 3: Effects of human activities done at Ggaba on Lake Victoria

FFEECT	COUNT	PERCENTAGE
Death of species	58	15
Water pollution	97	24
Growth of water hyacinth	81	20
Overfishing	54	14
Vegetation loss	41	10
Anthropogenic erosion into the lake	69	17
TOTAL	400	100

Source; primary source

The above table indicate that there are different effects on Lake Victoria which result from the human activities carried out at Ggaba landing site. Water pollution (24%), growth of water hyacinth (20%) and anthropogenic erosion into the lake (17%) were pointed out as the most pressing effects of human activities on Lake Victoria. It was well explained by one of the residents in the area named Musoke that due to high levels of waste generation, there is illegal dumping of wastes especially the biodegradable ones into the Lake. This is further worsened by the erosion which washes away all other wastes that were poorly disposed by the settlers into the lake. Much concentration of biodegradable wastes leads to increased suspended solids and decomposition leading to the release of nutrients into the lake. As a result, eutrophication shows up and the water is no longer fit for human use unless it is expensively treated through the Ggaba water treatment plant. In addition to eutrophication, there is increased Biological Oxygen Demand (BOD) which increases the competition between the living organism helping in

decomposition and the aquatic animals like fish. This leads to poor growth and suffocation of the most important aquatic species like fish which affects the economy of the people and the country as a whole.

The respondents continued to narrate that other effects like death of species (15%), overfishing (14%) and vegetation loss (10%) were also evident in the area. For example due to pollution by both organic matter and chemicals, some fish species are affected and they have severally been found floating though at a less extent but this is a sign of poor management of the water body caused by the human activities on the landing site. Due to the fact that most people rush to the landing sites for money, overfishing has been evident on Lake Victoria and this has put some fish species at a risk of extinction. Overfishing also affects the ecosystem its self because other larger aquatic animals may die due lack of food that was overfished by people for their own interests. The loss of vegetation around the lake at Ggaba landing site has been due to urbanization and development of re-creative centres like Ggaba beach and KK beach. These claim good vegetation near the shore because they extend to the lake and have to provide a clean environment for people to swim.

Table 4; Measures taken to reduce the effects

MEASURE	FREQUENCY	PERCENTAGE
Laws and policies related to wetlands	103	26
Public awareness	71	18
Treatment of wastes before dumping	86	21
Water treatment	95	24
Management committees	45	11
Total	400	100

Source; primary source

Respondents informed me that there are some measures taken to reduce the impact of human activities carried out at Ggaba on Lake Victoria. Laws and policies (26%) were pointed out as the most measures used to protect the water body. Laws and policies in water body management are related to (USEPA, 1994) which stated that in the United States of America, wetland and water resources' protection has in one way been achieved through laws and policies. Section 404 is the backbone of wetland protection in the United States today. They reported that there are some small management committees (11%) chaired by the chosen leaders to help in implementation of these policies among the local people.

Laws and policies and management committees, respondents also reported that public awareness (18%) has been somewhat influential in reducing effects of human activities on the Lake. They said they are aware of the causes, effects and management strategies like policies. They also said that it is through the committees, media and face to face interaction that the government and other organizations disseminate the information to them. However, respondents continued and said that policies and management committees are there but not all that active. Many respondents reported that there is the presence of Ggaba landing site which helps in the chemical treatment of water from Lake Victoria and then supplied to other parts of the city including Ggaba. However, this was reported to be very expensive as it requires a lot of chemicals and electricity to be effective. Some respondents (21%) claimed that they were advised to treat their wastes instead of dumping them in the lake while others claimed that they dump them into the lake but after treating such wastes.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.0 CONCLUSIONS

Conclusively, the study found out that the presence of Lake Victoria, the strategic location on the shores of Lake Victoria and in the city and security were the leading factors that lead to the growth and development of Ggaba landing site. Other factors included population increase that provided market for the products and presence of social services in the area.

The human activities carried out at Ggaba landing site include waste dumping (15%) followed by fishing (14%), trade (13%) and urbanization (13%). Reporters argued that waste dumping around Ggaba landing site is inevitable because the population is very high and this leads to increased fishing, trade and urbanization all of which generate more wastes that are dumped around the water body. The least but also significant pointed out human activities at Ggaba landing site pointed out by the respondents include settlement (12%), mining (11%) transport and social activities like schools and health centres.

However, these activities were said to have a significant impact on the growth and development of Ggaba landing site and also have effects on the existence of the lake. Water pollution (24%), growth of water hyacinth (20%) and anthropogenic erosion into the lake (17%) were pointed out as the most pressing effects of human activities on Lake Victoria. The least effects pointed out were death of species (15%), overfishing (14%) and vegetation loss (10%). Measures taken include Laws and policies related to wetlands, public awareness, and treatment of wastes before dumping them, water treatment and management committees

5.1 RECOMMENDATIONS

The recommends that the government of Uganda through NEMA and the police should work together and realize the need to protect water bodies especially the ecological and hydrological functions and strictly implement the available laws and policies to protect them. Water bodies and all other natural resources in Uganda have continually been degraded not because there are no conservation measures but because they are poorly implemented.

With the current effects of human activities on water bodies like water pollution, death of species and drainage, the study recommends rehabilitation of the water bodies by using the laws and policies as mentioned above, alongside intensive sensitization of people about the ecological, hydrological and social values of water bodies.

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APPENDIX I

QUESTIONNAIRE

General introduction

I want to thank you for taking the time to meet with me today. My name is **KALAMI YAHAYA** a student of Kampala International University and I would like to talk to you about the **effect of I Ggaba landing site around Lake Victoria**. Remember, you don't have to talk about anything you don't want to and you may end the interview/questionnaire at any time.

Questionnaire number.....

Date.....

Circle the right options

Section A: Socio-Demographic data

1. Sex

- a. Male
- b. Female

3. Residence

- a. Resident (within Ggaba)
- b. Nonresident (outside Ggaba)

4. Occupation

- a. fishermen
- b. Official
- c. fish dealer

- a. Other specify.....
- b.

Section B: Factors for the growth of the landing site

5. What are the measures taken to keep the fish clean?

.....

6. What factors encouraged you to be a fisherman

.....

7. How many disposal site are proved for waste disposal

.....

8. What are factors leading to development of Ggaba Landing site?

Factors	Strongly agree	Agree	Strongly disagree	Disagree
High population				
Security				
Strategic location				
Business opportunities				
Social services				
Presence of Lake Victoria				

Section C: Human activities done at Ggaba landing site on Lake Victoria

9. What are the human activities that take place at Ggaba landing site

Activities	Tick your choice
Mining	
Fishing	
Crop farming	
Animal grazing	
Settlement	
Waste dumping	
Trade	
Transport	
Urbanization	
Industrialization	
Schools and health centres	

Section D: Effects of human activities done at Ggaba on Lake Victoria

10. What are the effects of human activities done at Ggaba landing site on Lake Victoria?

Effect	Tick your choice
Death of species	
Water pollution	
Growth of water hyacinth	
Overfishing	
Vegetation loss	
Anthropogenic erosion into the lake	

11. What are the measures are being taken to reduce the effects on Lake Victoria

Measure	Strongly agree	Agree	Strongly disagree	Disagree
Laws and policies				
Public awareness				
Treatment of wastes before dumping				
Water treatment				
Management committees				

APPENDIX II

INTERVIEW GUIDE

- a. What factors led to the development of Ggaba landing site?
- b. What activities are done on Ggaba landing site?
- c. What are effects activities done on the landing site on the lake?
- d. What are the effects on water?
- e. What are the effects on aquatic plants and animals?
- f. What measures are being undertaken?
- g. What other measures would you suggest?
- h. Who is promoting or implementing those measures?
- i. What challenges are faced by the implementing bodies?

