FACTORS INFLUENCING CONSERVATION OF LAKE VICTORIA BEACHES IN KISUMU EAST DISTRICT-KISUMU COUNTY

BY
GREGORY ODHIAMBO OUKO

A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF ARTS IN PROJECT PLANNING AND MANAGEMENT OF THE UNIVERSITY OF NAIROBI

2012

DECLARATION

This research project is my original work and has not been presented for a degree or any award in any other University.

Signature…….. Date……..

Ouko Gregory Odhiambo
L50/72942/2009

The research project has been submitted for examination with our approval as the university supervisors.

Signature……. Date…….
Dr. Charles Rambo
Senior Lecturer
Department of Extra Mural studies
University of Nairobi

Signature……. Date…….
Dr. Raphael Nyonje
Lecturer
Department of Extra Mural Studies
University of Nairobi

DEDICATION

I dedicate this research project to my Late father Raymond Ouko Maoro because I attribute my achievements to his legacy. I have kept his spirit active by naming my first borne son after him.

ACKNOWLEDGEMENTS

I give special tribute to my supervisors Dr. Charles Rambo and Dr. Raphael Nyonje for their tireless effort in giving guidance and very useful suggestions in the preparation of this study. I thank the university of Nairobi, Kisumu campus lecturers Prof.Omollo Ongati, Dr Ouru John Nyaegah, Dr Mariah Onyango, Dr Paul Odundo, Mr Wilson Nyaoro and Mr Michael Ochieng for their dedication during the coursework that imparted to me the knowledge and skills which enabled me to successfully carry out this study.

Special thanks also go to fellow students and support staff at the University of Nairobi, Kisumu campus for a good and memorable time. I feel obliged to recognize the efforts of my research assistants, Nicholas Didi, Samwel Owino, Charles Onyango, Elizabeth Aoko and Caroline Maseka all of Dunga beach, whose honest one week data collection resulted into the findings of this study. I also wish to express my appreciation to Mr. Linus Ochieng of CDC who assisted me with both data entry and analysis. His expertise in computer based analysis enabled the transformation of raw data into comprehendible analytical summaries .I also feel greatly indebted to my wife Everline Opiyo whose invaluable support made me carry out the study successfully. Finally I appreciate the contribution of my friends Joseph Opole, Dan, Saline, Monica Toto, Justus omuse, George of Teso, George Jobando, Patrick Odame, Julie, Patrick Nyangweso, Bibian, Ken, John Odinya, Rose, Frankline, Kirui and Ochino who supported me both psychologically and materially to make this document complete.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

AFTPORS	Association for the Preservation of Rural Scotland
BOD	Biological Oxygen Demand
CITES	Convention on International Trade in Endangered species
CPUE	Catch per unit effort
EAC	East African community
ECOVIC	East Africa Communities Organization for the Management of Lake Victoria Resources
GEF	Global Environmental Facility
GIWA	Global International Waters Assessment
GLC	Great Lakes Commission
IMCF	Inter Ministerial Committee For Environment
IUCN	International Union for Conservation of Nature
LVB	Lake Vitoria Beaches
LVBC	Lake Victoria Basin Commission
LVBE	Lake Victoria Basin Environment
LVFO	Lake Victoria Fisheries Organization
NAWMP	North American Waterfowl Management Plan
NEAPS	National Environment Action Plans
NGOs	Non-Governmental Organizations
NRCS	Natural Resources Conservation Service
NWSC	National Wetlands Standing Committee
ODNR	Ohio Department of Agriculture's
RAMSAR	Convention on Wetlands of International Importance
SEDAWOG	Socio-Economic Data Working Group
UNEP	United Nations Environment Program
WCMC	World Conservation Monitoring Centre
WWF	World Wildlife Fund

ABSTRACT

In recent times, it has been increasingly acknowledged that healthy ecosystems and biodiversity are extremely critical to vital functioning of communities living around Lake Victoria especially the 1600 beaches (fish landing sites) that dot its shoreline. Significantly, healthy ecosystems provide a myriad of economic, socio- cultural and ecological benefits as well as goods and services that underpin various industries and by extension, the human well-being. This notwithstanding, Lake Victoria as a natural resource has faced degradation in recent times. Similarly, rapid degradation of ecological forest and biodiversity has exacerbated poverty in the shores of the lake with an estimated 50 per cent of the local population living below the poverty line. The purpose of this study was, therefore, to investigate factors influencing conservation of Lake Victoria Beaches in Kisumu East District and establish the factors that greatly influence the conservation of Lake Victoria beaches in Kisumu East District to enable intensive conservation of the same. The study was localized at Lwang'ni, Kichinjio, Dunga and Usoma Beaches around Kisumu city because these communities border Lake Victoria and their livelihood is dependent on this Lake. The study was guided by the cultural theory of Thompson et al which aimed at giving a description of the relationship between natural and human systems both at individual and society levels. The study adopted a descriptive survey design and both quantitative and qualitative techniques were used to collect and analyze data to establish major factors influencing the conservation of beaches in Kisumu East District. This design was useful in capturing past experiences to inform the current state of affairs. The study had a target population of 3000 people either living or visiting the studied beaches. The study used the sample of Krejce and Morgan (1970) where a sample of 341 is considered appropriate for a population of 3000. Due to projected questionnaire return failure the researcher decided to sample more respondents of 360 to cushion this eventuality. The study got the proportionate sample of various target groups by dividing the group sample by the target population and then multiplying the outcome with the study sample size. The collected data was coded and entered through Access 2007 to create a database for easier analysis. The study used Statistical Analysis software (SAS) for quantitative analysis because it was easier to code and provided a highly summarized and user friendly data output. Frequencies and percentages were arrived at after the analysis. Based on the objectives of the study, it was established that fishing is the economic factor that mostly affects the conservation of lake Victoria beaches at 57.94%. The respondents rated education as one of the socio cultural practices that to a large extent impacts on beach conservation at 34.26%. The factor rated as having none effect is religion at 28.13%. 56.04% felt that the government and NGO agencies had succeeded in Lake Victoria beach conservation to a moderate extent. Observation was also used to beef up the quantitative findings of the study. Fishing activities, waste disposal mechanisms and intervention by Government agencies were established by this study as the main factors influencing the conservation of Lake Victoria beaches in Kisumu East District and thus the study recommended that environmental education should be given to both beach residents and visitors with a deliberate bias on the youth who constitute a bigger percentage of the target population.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

A lake is a body of fresh or salt water of considerable size that is surrounded by land. On earth a body of water is considered a lake when it is inland, not part of the ocean and is larger and deeper than a pond (*wikipedia.org/wiki/Lake)*.Lakes do not end at their shores and cannot be isolated from the land around them. They are profoundly affected by their locality and by changes taking place on land even at great distances from the lake itself.

Natural lakes on Earth are generally found in mountainous areas, rift zones, and areas with ongoing or recent glaciations. Other lakes are found in endorheic basins or along the courses of mature rivers. In some parts of the world there are many lakes because of chaotic drainage patterns left over from the last Ice Age. All lakes are temporary over geologic time scales, as they will slowly fill in with sediments or spill out of the basin containing them(Smith,2008).

Lakes hold almost 90% of the liquid surface freshwater on earth, and are major regulators in global carbon, nitrogen and phosphorus cycles (Shiklomanov 1993). Lakes are important reservoirs for freshwater, purifiers of terrestrial wastes, and zones for aquifer recharge. Lakes provide critical habitat for fish, crustaceans, mollusks, turtles, amphibians, birds, mammals, insects and aquatic plants, and support biodiversity on surrounding land hence the human settlement that dots their shores. Due to the isolation between most lakes, many lakes harbor high numbers of endemic species, existing nowhere else on earth. Despite their importance, lakes and their beaches continue to be fairly invisible on the global conservation screen. Lakes, their watersheds and beaches are dramatically underrepresented both in protected areas and in conservation funding (Duker, 2001)

World lakes beaches are in crisis. Diversion of lake water for use in irrigation and industry, invasions of plant and animal exotic species, and contamination by toxics and nutrients from industry, farms, sewage, and urban runoff are common on a scale today that significantly threatens lake ecosystems on every continent but Antarctica (Jorgensen & Matsui, 1997). Poor lake management prevents, delays or distorts the efficient planning, implementing and enforcement of comprehensive, participatory lake management plans in both developed and developing countries (Khan & Siddique, 2000).

In most parts of the world anthropogenic impacts on lakes beaches are spreading geographically and becoming more intense in quantity and quality due to human population increases and the globalization of trade, which has increased deforestation and the use of pesticides and fertilizers, and has spurred the spread of invasive species (Ayres et al, 1996). Globally, conservation of the lakes' beaches has been tried in Florida which is home to a wide array of wildlife including many species that are protected by the US Endangered Species Act(ESA). Florida beaches are also home to a large growing population of seasonal and year round residents who place an increasing burden on this coastal resource. Construction and other activities that may impact the beach dune system typically require coastal construction control line (CCCL) permit.(www.dep.state.fl.us/beaches/publications/pdf/HCPBronchure 09.pdf.). The Department of environmental protection endeavors to condition these permits to avoid harm to listed marine purple species. Department of environmental protection prepared a habitat conservation plan to ensure full compliance with endangered species act. The habitat conservation plan provides a framework for citizens to engage in important and lawful economic activities while conserving threatened and endangered species of plants and animals at the beaches. This department also has the Beaches Environmental Assessment and Coastal Health Act of 2000, it amends the clean water act to better protect public health at the Nations beaches.(www.dep.state.fl.us/beaches/publications/pdf/HCPBronchure 09.pdf.)

Lake Titicana which is the largest lake in South America, supports hundreds of small Aymara indigenous farming and fishing towns in Peru and Bolivia but unchecked urban boom is contaminating the water and threatening lakeshore life.(http:// pulitzercenter .org/ project/ lakes). In Canada the Lake Huron beaches faced the same environmental challenges like those of lake Titicana. The biological diversity of lake Hurons coast was being compromised by overdevelopment, fragmentation of forest areas, the spread of alien invasive species and damage to sensitive coastal environment. This led to the formation of the lake Huron centre for coastal conservation in 1998 with the goals of protecting and restoring Lake Huron's coastal environment and promoting a healthy coastal ecosystem (http:// lake huron.ca).

In the U.S,the Great Lakes of Superior, Michigan, Huron, Erie and Ontario along with the rivers, channels and lesser lakes feeding or draining them have experienced receding waters and compromised water quality.This has been a matter of concern to the multitudinous cities and farms dependent on lake water, the boating and fishing segments and the operators

of deep draft ships that ply these inland ports and waterways to hitch North Americas heartland to the markets of the world. New Hampshires Lakes beaches are conserved by the New Hampshire Lakes association which is a non profit, tax exempt volunteer organization formed in 1992 to protect the shoreland and the watershed and provide Lake Environment education. (http\ www.nhlakes.org/lakeconservation- corps.htm)

Africa is endowed with hundreds of lakes, both natural and artificial. According to World Lake database, there are 677 lakes in Africa, with 88 of them listed as principle lakes. Although the lakes are a source of livelihood in most of African societies, they are also major source of natural disasters, tropical diseases and pandemics. It's important to note that African lakes are undergoing significant changes due to a combination of human activities and climatic changes with potential serious implication for people's livelihoods and aquatic biodiversity. Among African lakes, the internationally recognized ones are Albert, Chad, Edward, Fianga, Kariba, Kivu, Mweru, Nasser, Malawi, Tanganyika, Turkana and Victoria.(en. Wikipedia . org/wiki/ list_ of_ Lakes). Lake Chad for example is a crucial watering point for millions of European and West Asian migratory birds that fly over the Sahara desert and its basin sustains about 20 million people. However, the lake is threatened by creeping desertification and poor management of its water and fisheries. Its inscription as the 13th trans boundary formally recognized wetland is highly significant as most of the other declared Areas are in Europe. (Newswatch national geographic com/2010/02/lake_chad_ramsar onventio). Lake Chad is the remnant of a much larger lake known as Mega- Chad which 22000 years ago drained a greener Sahara and was three times the size of Lake Victoria.

Lake Albert is shared between Uganda (54%) and the DRC (46%). The broad waters of Albert (5,270 km2) are fed by the Semliki River from the south and the River Nile, which loops in and out of the northern tip of the lake. As with the other great lakes of the Western Rift valley, Lake Albert contains a great variety of fish. The statistical record indicates that annual catches over a thirty year period (1955- 1986) fluctuated between lows of around 4000 tonnes to highs of over 20000 tonnes. Major landing sites along the Ugandan shoreline include Ntoroko, Butiaba, Bugoigo and Wanseko. An estimated 8800 fishers with a fleet of around 2500 small craft operate within Ugandan waters. Even though Lake Albert is shared between DRC and Uganda there is no arrangement to manage its resources regionally. However, under the Nile Basin Initiative, effort is being made to seek a regional approach to

the exploitation and development of the fishery including the landing sites (en .wikipedia .org/ wiki / lake Albert_ Uganda) .

Lake Malawi is an African Great lake. It's the southern most lake in the East African Rift system. It's the third largest in Africa and the eighth largest in the world. It is located between Malawi, Mozambique and Tanzania. It is the second deepest lake in Africa, although its placid northern shore gives no hint of its depth. It's the habitat of more species of fish than those of any other body of fresh water on earth, including more than 1000 species of cichlids. Lake Malawi was officially declared a reserve by the Government of Mozambique in 2011 in an effort to protect its biodiversity (en .wikipedia . org/ wiki/ lake Malawi)

In East Africa the international lakes that are found within the region include Victoria, Tanganyika, Turkana and Kivu among others. Lake Tanganyika's waters lap Tanzania, Burundi, Congo DR, and Zambia. Its the longest freshwater lake in the world and the second deepest after lake Baikal in Russia. The immense depth is because it lies in the Great Rift Valley which also has created its steep shoreline. It reaches a depth of 1433 metres (4700 ft) which is an astounding 642 metres below sea level(www.zambiatourism. com/travel/places/tanganyi. Htm).

Lake Tanganyika boasts over 350 species of fish of which most are endemic. Like lake Malawi, Lake Tanganyika is extremely old and the combination of its age and ecological isolation has led to the evolution of unique fish populations. Since new species are being discovered continually in these remarkable lakes, it is difficult to determine which has the highest diversity but they at least share the distinction of being the top two lakes in terms of bio diversity. This has led to the establishment of the Lake Tanganyika Biodiversty Project whose goal is to ensure that the biological diversity of the lake is maintained. The aim of the project is to produce an effective and sustainable system of managing and conserving the biodiversity of Lake Tanganyika. The project was funded by the Global Environmental facility through United Nations Development programme. The lake is also useful for Transport, fishing, recreation, and tourism along its landing sites.(www.zambiatourism.co./travel/places/tanganyika.htm)

Lake Turkana is another lake in the region found in the northern district of Kenya. It has a deep alkaline green water surrounded by cliffs, gentle beaches, deserts and dark outcrops of volcanic rock. The lake is the only permanent source of water in this area. Lake

Turkana has organizations such as Friends of Lake Turkana who are interested in the survival and conservation of lake Turkana and its ecosystem. Another organization that is helping with the lake Turkana conservation is the Indigenous Fisher Peoples network (IFP) which is a conservation and rights based organization (www.hemingways.co.ke/lake-turkana.html)

Lake Victoria, the largest of all African Lakes, is also the second widest freshwater body in the world. Its extensive surface belongs to the three countries; the northern half to Uganda, the southern half to Tanzania, and part of the northeastern sector to Kenya. The lake occupies a wide depression near the equator, between the East and West Great Rift Valleys, but its drainage basin is relatively small, being slightly less than three times the lake's surface in area. The lake water is drained at a rate of about 600 m^3 sec^{-1}, at Jinja on the northern shore, into the Victoria Nile which flows northward via Lake Albert and the White Nile forming the uppermost reaches of the Nile River.(URT,2001)

Land use in the lake basin has intensified and human and livestock population has increased, especially along the lake shore and on the islands in the lake. Increased pollution from the municipal and industrial discharges is visible in most of the rivers feeding the lake, and in the settlements along its shores represented by beaches and urban areas such as Kisumu, Mwanza, and Kampala. The pollution sources to the lake include a number of basic industries such as breweries, tanning, fish processing, and agrochemicals. Small scale gold mining is on the increase in parts of Tanzania catchment and if the mining waste are not well contained, might lead to mercury discharges into the lake water. Increased nutrient inflow is entering the lake from eroded sediments in the catchment, burning of wood fuels, and from human and animal waste from areas surrounding the Lake (Aseto, 2003)

Pollution due to urban waste water and runoff from 87 large towns and hundreds of beaches along Lake Victoria is a major degradation factor. The total pollutant loading from these urban centers and beach settlements was 6,955 tones/year of biochemical demand (BOD), 3028tones/year of total Nitrogen (T-N), and 2686 tones/year of total Phosphorous (T-P). These figures represent the pollutant load from urban areas close to lake shore and does not consider the pollutants load from towns located far away from the lake that drain into it via streams and rivers.

The Lake ecology is characterized by enormous biodiversity. It is inhabited by over 500 species of fish, 90% of which are Cichlids belonging to the Haplochromis genus.

They are known for their extraordinary ability to evolve rapidly to suit extremely localised and diverse environments, a characteristic termed 'evolutionary plasticity'. This ability made the cichlid species of Lake Victoria an extremely successful fish. Haplochromis species accounted for some 80% of the fish biomass of the lake, an abundance which led Graham to believe that this species flock could support a trawler fishery of up to 200 boats and therefore contributing to the growth of beaches. It also meant that Lake Victoria at one time boasted one of the most diverse fish environments on earth. With such diversity, the cichlids of Lake Victoria managed to exploit virtually every food source available, including most detritus, zoo- and phyto-plankton. On the whole, however, Haplochromis species are a small and bony species, and were generally not favoured in catches. Riparian populations preferred the lake's two endemic species of tilapia (*Oreochromis esculentus* and *O. variabili*). One of the main events of importance to the lake system in the past 50years or so was the introduction of new fish species in the lake ecosystem. The introduction of Nile perch (*Lates Niloticus*) and Nile Tilapia (*Oreochromis Rendalli*) changed the equation. (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1690916/pdf/11886641.pdf)

The efforts of governments to mitigate the environmental challenges facing the Lake Victoria beaches have been futile. The areas around the shore of lake Victoria are densely populated especially at the beaches (fish landing sites). This complicates government's effort of mitigating environmental challenges facing the lake. Kenyan side of Lake Victoria shoreline has 306 beaches with Kisumu East District accounting for eight of them. However, NGOs tend to fill gaps in government service, providing research, facilities and services that a government is unable or unwilling to providing. The entrance of NGOs has really changed the way natural resources are being handled in the lake region. They are complementing the efforts of the three governments in the conservation of Lake Victoria beaches. The NGOs are both national and international and usually they tend to rely on donors and funders to keep the organizations running and to pay for individual projects. (http://www.worldagroforestry.org/downloads/publications/PDFs/OP14439.PDF)

The NGOs have grown rapidly in number in Lake Region and now are taking on a larger role in conservation work. Their influence has grown with the growth in their numbers and in the amounts that they disburse. The NGOs working in the conservation efforts of lake

Victoria beaches include Lake Victoria Fisheries Organization (LVFO), SANA International, Osienala, Plan International, ECOVIC, Care international among others.

1.2 Statement of the problem

The Victoria lake basin directly provides for the livelihoods of about one third of the combined population of the three riparian East African community partner states and about the same proportion of their combined gross domestic product (GDP). Subsistence agriculture, pastoralism and fishing currently support about 21 million people in the basin with average incomes equivalent to a range of USD 90-270 per annum (World Bank, 1996).

Lake Victoria is also very rich in biodiversity. Its biodiversity consists of fish, birds, higher vertebrates, mammals and several plant species. Biodiversity as an asset of Lake Victoria basin offers both social and economic uses in tourism, traditional medicine, food security and trade (UNEP, 2004). In spite of its socio- economic and ecological importance lake Victoria experienced dramatic changes in the past century as a result of land use and land cover changes, industrialization, agricultural developments, introduction of invasive alien species and non selective fishing. These among other factors have led to the destruction of native and endemic biota specific to the Lake Victoria basin which has consequently resulted in deteriorating water quality and diminishing fish stock and thus threatening the source of livelihood for the riparian communities.

In Kisumu East district, Kisumu County, it is assumed that micro biological pollution of the lake is caused by municipal untreated sewage, runoff and storm water, animal waste and maritime transport waste. Municipal untreated effluent is mainly derived from agro industry and urbanization, collapsed Kenya breweries, several tanning fish processing plants and abattoirs. The floods experienced in Nyatike, sections of Rangwe, Rachuonyo, Nyakach and Nyando leads to contamination of the lake water due to poor sanitation. This consequently leads to outbreak of cholera and other communicable diseases. For example between June 1997 and March 1998 14,275 cholera admissions were registered in Nyanza province with 547 deaths reported (Karanja, 2002). Enhanced erosion of the lake shore and river channels are directly contributing to increased suspended solids in the lake. Analysis of nutrients N and P in the rainy season of 2001 in the Nyando, Sondu, Nzoia and Yala rivers indicated that continued addition of input of such high nutrient concentrations into the Winam gulf will seriously affect aquatic systems and water quality (Swallow,2002). Several species

of Haplochromine ciclid fish are extinct in lake Victoria primarily as a result of the introduction of the Nile perch (Johnson,1996). The menace of the alien species water hyacinth is also wide spread in the winam gulf. These environmental adversities facing Lake Victoria are exacerbated by the high density settlements (beaches) that dot the shores of lake Victoria in the Esast African region. That is why it is important for this study to identify the economic, socio cultural and political factors influencing the conservation in the aforementioned settlements to nip in the bud these environmental hazards that are threatening to kill Lake Victoria.

1.3 Purpose of the study

The purpose of this study was therefore to investigate factors influencing conservation of Lake Victoria Beaches in Kisumu East District

1.4 Objectives of the Study

This study was guided by the following objectives;

1. To establish the extent to which economic activities influence conservation of Lake Victoria beaches in Kisumu East District.
2. To examine the level at which socio-cultural practices influence conservation of Lake Victoria beaches in Kisumu East District.
3. To assess how Government policy influences conservation of Lake Victoria beaches in Kisumu East District.

1.5 Research Questions

This study was guided by the following research questions:

1. To what extent do economic activities influence conservation of Lake Victoria beaches in Kisumu East District?
2. What is the level at which socio cultural factors influence the conservation of Lake Victoria Beaches in Kisumu East District?
3. How do Government policies influence conservation of Lake Victoria beaches in Kisumu East District?

1.6 Significance of the study

It is hoped that the findings of this study would help the stakeholders involved in the conservation of Lake Victoria beaches in Kisumu East District identify the gaps in their conservation activities. Such stakeholders; includes, Fisher folk, Beach Management Unit Committees, Public Health Officers, Environmentalists and Kisumu County Authority. It is also hoped that The Government would develop appropriate policies and strategies for the sustainable management of Lake Victoria beaches in Kisumu East district for the improved livelihoods of the riparian communities. It is also hoped that the study would motivate other scholars to undertake more studies focussing on conservation of Lake Victoria beaches regionally.

1.7 Basic assumptions of the study

The study assumed that the respondents would cooperate and provide required data to address the research problem. It also assumed that the policies that govern NGO's and CBO's working in the conservation of Lake Victoria in Kenya could be replicated to other organizations in the entire lake region and that the impact of their intervention could be reflected in the environment and the riparian community. Finally the study assumed that the policy frameworks governing the operations of the organizations involved in the conservation of the lake in the region were effectively addressing the challenges in the lake basin and that a transformation line could be drawn between the initial stages before their operations and after their operations commenced.

1.8 Limitations of the study

The study was limited by the mobile nature of the target group. The fisher folk and the traders usually move from one beach to the next in search of business opportunities.

The targeted key informants were mostly busy individuals and securing appointments with them was challenging. To deal with the wandering nature of the target group, the researcher and his assistants would report to the beaches as early as 7am to wait for the fisher folk to conclude their morning engagement and then administer the questionnaire on each respondent. The researcher also arranged with the BMU chairmen of the studied beaches to organize for a meeting with the targeted key informants. Currently, beaches have interested scholars only as tourist resorts as opposed to fish boat landing sites. There is therefore very

little documented facts about the latter. The researcher however relied on the internet to surmount this obstacle to some extent.

1.9 Delimitations of the study

The study was delimited to only four beaches selected purposively due to their accessibility and strategic socio economic importance that was derived from mere observation by the researcher.

1.10 Definition of significant terms used in this study

Conservation of Lake Victoria Beaches - as used in this study meant ethical use of resources, their preservation and protection. Its primary focus was on maintaining the natural health of the beaches

Economic activities-as used in this study referred to involvement of people in income generating transactions

Socio-cultural activities- it referred to actions influenced by the beliefs and behaviors of the beach residents.

Government policy- was used to illustrate the formulation and enforcement of law by Government agencies to establish order at the beaches.

Stakeholders- it referred to various groups of people with interest in the management of beaches.

Beaches- this referred to emerging trading centers on the shores of Lake Victoria that are used by fisher folk as landing sites for the sale of their catch. The main item of trade was fish but other items were also transacted in these emerging centers.

1.11 Organization of the study

The study was organized in five chapters. Chapter one discussed the background of the study, the problem statement, the purpose of the study, Objectives and research questions, significance of the study, basic assumption of the study, delimitations, limitations and the organization of the study and definition of significant terms. Chapter two discussed the literature related to the topic of the study, the theoretical framework and the conceptual framework. Chapter three of the study discusses the research design, target population, population sample, sampling procedure, research instruments, their reliability and validity,

data analysis and presentation, ethical consideration and dissemination. Chapter four consisted of data analysis, presentation, interpretations and discussions, while chapter five discussed summary of findings conclusions and recommendations. Finally, the references were also presented.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses how socio- economic factors, government policy and community participation influences the conservation of Lake Victoria beaches in Kisumu East District. It also discusses the theoretical and conceptual framework and the ethical issues that the researcher observed while undertaking this study.

2.2 Economic activities and conservation of Lake Victoria Beaches

This item discusses the economic activities and how they are influencing the conservation of Lake Victoria Beaches in Kisumu East District.

Lake Victoria is international water that is under considerable pressure from a variety of interlinked human activities. It has undergone enormous environmental changes within the last forty years or so. Overfishing, siltation from the erosion of deforested watersheds, species introductions, pollution and climate change are all contributing to a host of rapidly evolving changes in the lake that seriously threatens its ecosystem function and overall diversity (Hecky,1992). Today nearly half of the lake floor experiences prolonged anoxia (lack of oxygen) spells for several months of the year compared to four decades ago when anoxia was sporadic and localized (Bugenyi,1994) . Algal biomass concentration is almost five times greater in the surface waters today than reported in the 1960s which indicates higher rates of photosynthesis (Mugidde ,1993).The transparency values have decreased to one third, and the silica concentration has gone down to one tenth of what they were about forty years ago (Lehman,1996).

These and other related environmental changes arising out of natural or anthropogenic causes have significantly impacted Lake Victoria's fish populations. For example, the extinction of several hundred species of Haplochromine ciclid fish in Victoria, primarily as a result of the introduction of the nile perch, remains a single most dramatic event of vertebrate species extinction attributable to specific human activities (Johnson,1996).

The environmental degradation of lake victoria beaches (LVB) over the last three decades due to unsustainable use of natural resources, massive algal blooms, waterborne diseases, water hyacinth infestation, oxygen depletion, introduction of alien species among others has put the economically important fisheries sector at risk. It has been estimated that if the large export fishery for Nile perch is lost, the riparian communities stand to loose USD 270- 520 million in revenue (World Bank, 1996)

The alarm over the accelerated degradation was the key driving force for the approval of the lake victoria GEF project in the mid 1990s, as the then largest GEF international waters project at USD 77 million (Duda , 2002) .At about the same time the Lake Victoria fisheries organization (LVFO) was formed by Kenya, Uganda and Tanzania and the convention of fisheries. The Lake Victoria five year GEF project was the first of several intended intervention over time (Duda , 2002)

The major economic factors influencing conservation of Lake Victoria beaches according to Global International Waters Assessment (GIWA) is unsustainable exploitation of fisheries and pollution. Overexploitation of fisheries is mainly due to increased total fishing effort, efficiency of fishing gear and extension of fishing grounds to maintain yield. This has resulted into a progressive decline in catch per unit effort (CPUE) and mean size of fish caught (Mkumbo , 1999). In all the three countries, efforts in terms of boats and numbers of fishermen have more than doubled in the past ten years (Asila, 2001).

The number of fishermen in Lake Victoria increased from about 84000 in 1990/1991 to about 122000 in 2000. With increased fishing pressure, predation and competition among species, the multispecies fishery of lake victoria fishery has changed to only three species: Nile perch(lates Niloticus),The pelagic cyprinid- dagaa(Rastrioneobola argentea pellegrin) and the introduced Tilapiine (Oreochromis niloticus l). By 1998, total nile perch catches were half those at the beginning of the decade despite increased effort, and catches of Rastrineobola argentea have also leveled off despite increased effort (Othina ,1999). The increase in the number of fishermen could be attributed to young school dropouts living around Lake Victoria who inherit the knowledge and practice of fishing from their parents.(Ong'ang'a, 2003)

Overexploitation of fisheries is also related to technological change (20 – 30 %).Changes in the efficiency of fishing gears, motorization of canoes and increase in total

fishing effort to maintain production have contributed to the decline of the nile perch since the mid-1990s (Bathwondi et al, 2001). Most of the region's factories suffer from fish supply problems attributed to low catches and competition and in order to stay operational, they drive fishermen to catch more fish (SEDAWOG,1999)

Reduced capacity to meet human needs also accounts for up to 40% of the destructive fishing practices. As traditional fishing methods are now often considered inadequate for landing a sufficient catch, fishermen increasingly resort to deploying illegal fishing gear such as cast nets, fish poison and weirs to improve their catches (Ntiba , 2001). Some of the gears used to fish are a fallout from other sectors such as the flower industry, where the fine mesh nets that are used to protect flowers from birds are now being used in the fishing industry. In a 1999 LVRF study of 1066 fishers in all the three east African countries of the lake, 33% of respondents linked decline in the stock to the contravention of regulations, 32% felt this was due to excessive fishing effort and 11% to pollution or the presence of water hyacinth (SEDAWOG,2000).

Pollution is another factor that greatly influences conservation of Lake Victoria beaches in Kisumu East District. Micro biological pollution of the lake is caused by municipal untreated sewage, runoff and storm water, animal waste and maritime transport waste. These have contributed to the degradation of river and lake water quality for habitats and drinking use (Ntiba, 2001). Runoff and storm water collect a lot of animal, plant, and human waste from point and non point sources and channel these to rivers and the lake creating an environment that supports microbiological pathogens. Municipal untreated effluent is mainly derived from agro – industry and urbanization. Beer brewing, pulp and paper production, tanning, fish processing, agro – processing and abattoirs discharge raw waste to feeder rivers and lake victoria (Wandiga, 1987). The number of people without sewers in urban populations is high and with an urban population growth of over 5 – 10% per annum in Kisumu and 2 – 4% in most parts of the lake basin, the situation is likely to get worse (Scheren,2000)

An assessment of Biological Oxygen Demand (BOD) loading of lake victoria shows that domestic pollution account for most of the BOD load with the contribution of the industry being relatively low (Scheren,2000). Kenya contributes a BOD load of 7510 tonnes per year with Uganda and Tanzania contributing 4540 tonnes per year and 3920 tonnes per year respectively. 75% of the BOD load from Uganda originates from Kampala while Kisumu

contributes 50% of the BOD load on the Kenyan side. Water hyacinth infestations have also been reported to lower the water quality in Kenya, Uganda and Tanzania in terms of colour, PH and turbidity (www.worldlakes.org/uploads/report.2.pdf)

2.3 Socio- cultural activities on conservation of Lake Victoria Beaches.

The low standards of health in the region are caused by a general lack of awareness of good hygiene practices, direct contamination of beach waters through bathing and washing and uncontrolled waste disposal around the shoreline (Karanja, 2002). Reduction of the BOD load of such effluent can significantly reduce the occurrence of waterborne diseases such as typhoid and cholera which are common in the Kisumu East District beaches.

The municipality by-laws, such as those of Kisumu city did not predict the fast growth and the type of industries existing today, and so they do not have the capacity to manage the waste from these industries. Industries flout the by- laws and regulations as there is no monitoring and enforcement mechanism. Poor planning, maintenance and inadequate investment in municipality waste water treatment systems have contributed to the increased untreated effluent discharge. If the present treatment plants in Kisumu performed optimally, the BOD loads could be brought down by 50% (Scheren, 2000)

Water supply to both municipalities and villages is also affected by water hyacinth. In the municipalities water hyacinth interferes with the water intake points through blockage which lowers the quantity of water pumped. For example, in Kisumu, the water supply has dropped from 20,000m^3 per day to about 10,000 m^3. This decline in water supply invariably causes more people to look for alternative which more often is untreated water sources.

Flooding is common in the Lake Victoria Beaches particularly during rainy season. This is mostly experienced in Nyatike, sections of Rangwe, Rachuonyo, Nyakach, Nyando and Budalangi areas.Its impact is exacerbated by poor practices in wildlife, agriculture, urban development, deforestation and unplanned rural settlements. Contamination of drinking water results from poor sanitation, hygiene, and poor flood water management. For example there were 14,275 cholera admissions in Nyanza province, Kenya, alone between June 1997 and March 1998, with 547 deaths reported (Karanja, 2002). The period coincided with wide spread heavy rainfall that caused flooding across the East and the horn of Africa (Conway,

2002). Analyses of sediment cores from Lake show an increasing rate of sedimentation over the past 150 years (Swallow et al, 2002). There are also many densely cultivated areas around Lake Victoria Beaches, especially in Kenya, Rwanda and Burundi (scheren, 2000). Some rivers such as the Sio, Nzoia, Yala, Sondu, Nyando and Kuja in the Lake Victria Basin, Kenya, drain highly productive agricultural areas. The sediment load of the Nyando River alone has increased by 7.5 times during the last 16 years with turbidity measured at 527 NTV in the rainy season of 2001.

Habitat modification through vegetation clearance for infrastructure provision, agriculture, urban settlements and plant harvesting for use as building materials, furniture crafting and fuel wood enhances erosion and increases the suspended solids load in rivers. Enhanced erosion of the lakeshore and river channels are directly contributing to increased suspended solids in the lake. Some soaps and detergents that are being used within the basin are outdated or banned and are contributing to eutrophication. Analysis of nutrients in the rainy season of 2001 in the Nyando, Sondu, Nzoia and Yala rivers indicated that continual addition of input of such high nutrient concentrations into the Winam Gulf will seriously affect aquatic systems and water quality (swallow et al 2002). Nutrient loads to the lake are associated mainly with atmospheric deposition and land runoff together accounting for about 90% of the phosphorous and 94% of the nitrogen input into the lake (scheren, 2000).

Human population increase, as well as increased rates of urbanization and agriculture around the Lake Victoria Beaches has increased the per capita demand for land. More land is therefore cleared to create the additional space required for these sectors including wetlands (www.unep.org/dewa/giwa/publications/articles/ambio/article-3pdf) leading to increased sediment deposition in the rivers and lake. An example is large scale draining of the Yala Swamp (LVR- Kenya) to create land for agriculture and settlement (www.unep.org/dewa/giwa/.../causal-chain-analysis_giwa_r47.pdf). Clearing of riparian vegetation has led to erosion and loss of the vegetation that acted as filters (Lowe – Mc Connel, 1994). Nutrient rich sediments from agricultural runoff coupled with deforested riparian zones contribute to eutrophication and feed the carpets of water hyacinth (Wilson et al, 1999).

2.4 Government policy and conservation of Lake Victoria beaches.

The partner states of the East African community (EAC) designated the lake Vitoria basin (LVB) as an economic growth zone to be developed jointly by the partner states. The lake Victoria Basin commission (LVBC) is an institution of the East African Community (EAC) responsible for harmonized and coordinated development of the LVB.

There are many international policies and legal instruments that address the threats to biodiversity such as the Declaration of the United Nations Conference on Human Environment, Rio Declaration on Environment and Development, the Johannesburg Declaration on sustainable development and the millennium declaration.

Sustainable and equitable use, and conservation of biodiversity has been the concern of a number of international conventions and protocols such as the Convention for Biological diversity, the Ramsar Convention, CITES, the Convention on Conservation of Migratory Species of Wild animals, the framework convention on climate change, the World Heritage Convention and the Code of Conduct for Responsible Fisheries (LVBC, 2011)

The EAC Partner states have regional policies which cover conservation of biodiversity in the treaty. These include the Lake Victoria fisheries organization (LVFO) convention, the protocol for sustainable development of the LVB and the protocol on environment and Natural Resources Management. The LVFO Council of ministers has made a number of commitments towards sustainable management of fisheries such as LVFO Regional plan of Action to prevent, deter and eliminate illegal, unreported and unregulated fishing.

Individual partner states have policies, legal instruments and institutions that operationalize the international and regional legal instruments. These are covered in the National constitutions, the National Environment Management Acts; the water acts, the fisheries Acts and Wildlife Conservation Acts.

The management of Wetlands in Kenya is currently under various institutions whose mandates and activities are sectional. These include Kenya Wildlife Service, National Museums of Kenya, the Ministry of environment and Natural Resources, the Ministry of planning and National Development, Universities, Local authorities, Regional Development Authorities, National Irrigation Board and NGOs.

Realizing the sectorial nature of the institutions mentioned above and the ever increasing threat to Lake Victoria Beaches and other Wetlands, the Government of Kenya established in 1994 a National Wetlands standing committee (NWSC) within the Inter-ministerial committee for Environment (IMCE). The committee consulted government and academic institutions, NGOs and community based institutions to build the necessary consensus on a clear National Working Definition of Wetlands. The Kenya Government has the National Policy on water resources management and development and the water Act cap 372, 2002. These legal instruments on water management provide for planning, use, protection and management of water resources and supply.(www.tanariverdelta.org/tana/975-DSY/version/default/part/attachmentData/Data/MUMIAS_Tana_EIA-part 5.pdf)

Community participation in the conservation of the beaches also helps the government in the formulation of policies. It involves holding discussions and open forums by the community members themselves or with government authorities or Non-Governmental Organizations involved in advocacy so as to contribute ideas for inclusion in policy development and change in operation strategy.

Social movements in Lake Victoria basin are currently being formed. An example is the Nyakach Elders Forum involved in the management and regulation of the Sondu – Miriu water project. Other social movements are the lake wide network of Beach Management units (BMUs) for restoration of beaches and fish breeding grounds as well as fisheries issues among fisher people.

2.5 Theoretical Framework

This study will be guided by the cultural theory of Thompson et al. 1990,(www.public.dsu.edu-majansse/pubs/egec.pdf.) which aims at giving a description of the relationship between natural and human systems, and their social relations. They claim that heterogeneity among worldviews can be classified by five perspectives; hierarchist, egalitarian, fatalist, individualist and hermit. The adoption of these perspectives is a dynamic process. Change occurs because of "Surprise"- that is the discrepancy between expected and the actual, which is of central importance in dislodging individuals from a previously adopted perspective.

Rayner, 1991 further divides these perspectives into two groups, the active and the autonomous. The former includes the hierarchist, the egalitarian and the individualist while

the latter includes the hermit and the fatalist. The three active perspectives from the cultural theory can be viewed as the corners of a triangle. Hierarchists believe that humans are born sinful but can nevertheless be redeemed by virtuous institutions. To them nature is stable in most circumstances but can collapse if it crosses the limits of capacity. Therefore control is advocated for as a management style.

Egalitarians believe that human beings are born virtuous but are also highly malleable by evil institutions. To them nature is highly unstable and the least human intervention may lead to is complete collapse. A management style that prevents heavy intrusion by humans is preferred. The individualists opine that humans are self seeking and unmalleable. Nature provides an abundance of resources and is believed to remain stable under human interventions. A reactive management style is advocated. The hermits are not interested in what happens in the world but prefer to distance themselves from it while for the fatalists everything is a lottery. To the Fatalists the behavior of both humans and nature are unpredictable and therefore should not be examined.

Thompson's cultural theory like this study takes into account the environment and its relationship to people at individual, organizational and community levels. It looked at individual behavioural patterns within the context of system of relationships that form their environment. It helps us to identify factors that promote individual patterns of behavior that either degrades or conserves the environment.

In Thompson's cultural theory hierarchists and individualists interaction with the environment is motivated by highly valued outcomes which is similar to the motivation behind economic factors influencing beach conservation like fishing, hotelier, eco- tourism, tree rearing and car wash among others. This theory like this study also asserts that individuals interaction with the environment can also be influenced by the social environment like family, organizations, cultural values and norms. In the findings of this study such influences are established like the riparian community's way of life of bathing in the lake, disposal of waste into the lake, unplanned settlements at the beaches and the system of education that nurtures students to respond to the environment in a particular manner.

Hierarchists in the cultural theory recognizes the role played by policy in influencing individuals behavior in relation to their environment .Policy here refers to legislation, regulatory or policy making actions that have the potential to affect individual participation in

any activity. The government has the obligation of controlling the behavior of their people through the enforcement of policies, laws, rules and regulations.

However Thompson's cultural theory failed to address the extent to which these factors influence individuals interaction with the environment and how the negative magnitude of these influences could be remedied to ensure a sustainable interaction with the environment, facts that this study established.

2.6 Conceptual Framework

This study was guided by the following conceptual framework:

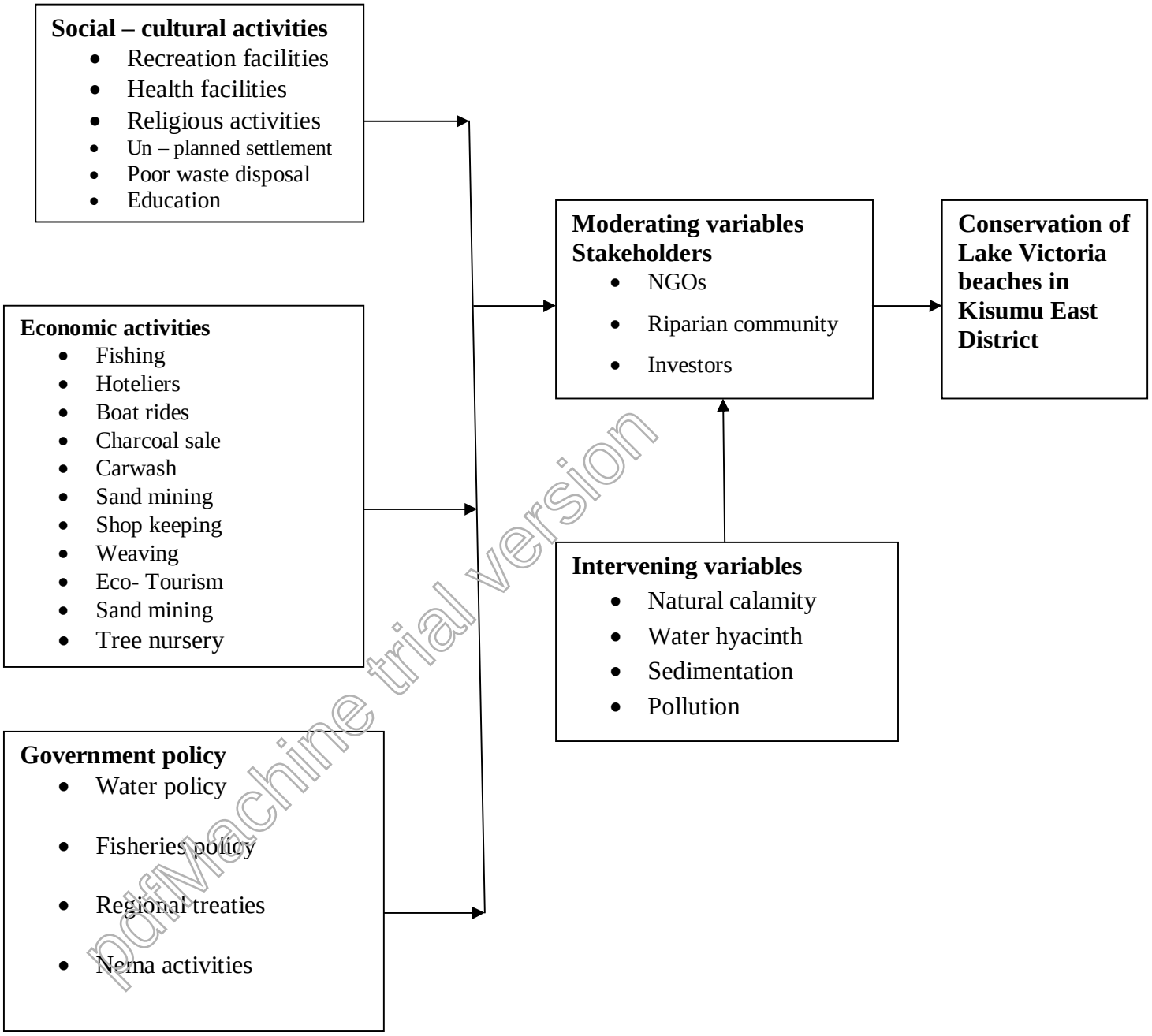

Fig.2.1 shows the conceptual framework of this study

In figure 2.1 socio – cultural activities, economic activities and government policy are the independent variables. They influence the conservation of Lake Victoria beaches which is the dependent variables either positively or negatively.

Unplanned settlement as a socio cultural activity has brought dysfunctional sewerage systems water pollution and shortage of water supply which subsequently leads to degradation of Lake Victoria Beaches. Fishing as a major economic activity affects Lake Victoria Beach Conservation. Over fishing and introduction of alien species seriously threaten the ecosystem of the lake. On the other hand, the planting of trees ecotourism, shop keeping are economic activities that are environmentally friendly hence the conservation of Lake Victoria beaches.

The Government has formulated several policies on water fisheries and regional treaties which are meant to promote the conservation of Lake Victoria beaches. NEMA as an environmental institution operationalises this policies for enhanced conservation of Lake Victoria beaches.

Lake Victoria Beach stakeholders like NGOs, fishers and fish processing factory owners have moderating influence on the conservation of Lake Victoria Beaches but have no influence on the independent variables. Natural calamity like floods, water hyacinth, inversion and sedimentation can drastically alter the efforts towards conservation of Lake Victoria beaches hence their being considered intervening variables

2.7 Summary of Literature Review

The literature reviewed established that degradation of Lake Victoria beaches arises out of natural and anthropogenic causes which has resulted into unsustainable exploitation of fisheries and pollution. Overexploitation of fisheries is related to technological change that has enhanced the efficiency of fishing gears while microbiological pollution of the lake is caused by municipal untreated sewage, runoff water, animal waste and maritime transport waste.

The literature reviewed also identified low standards of health in the beaches as being caused by a general lack of awareness of good hygiene practices, direct contamination of beach waters through bathing and washing and uncontrolled waste disposal around the shoreline. Flooding, sedimentation, deforestation and human population increase are other socio cultural factors that influence the conservation of these beaches.

The literature reviewed also established that the Government of Kenya has a national policy on water resources management and development. This policy is supported by the water act cap 372, 2002. These legal instruments provide for planning, use, protection and management of water resources and supply. This study was guided by the cultural theory of Thompson,1990, which aimed at giving a description of the relationship between natural and human systems and their social relations. From this theory a conceptual framework was developed.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methods used in carrying out the study .The chapter is organized in the following sub-headings namely; Research Design, Area of Study, Target Population, Sample Size and Sampling procedure, Research instrument, Reliability and validity of the instruments, Data Collection Procedures , Data Analysis Techniques and ethical considerations.

3.2 Research Design

The study adopted a descriptive survey design. According to Kombo and Tromp, (2006) descriptive research is the process of explaining the state of affairs as it exists. Description is not only restricted to fact finding but also results into the formulation of important principles of knowledge and solution to significant problems(Kerlinger,1969). The study used both the quantitative and qualitative techniques to collect and analyze data. This was aimed at knowing the situation on the ground. Similarly, qualitative analysis was used to measure the perceptions and cultural believes of the beach community. This design was useful in capturing past experiences to inform the current state of affairs.

3.3 Target Population

According to Oso and Onen (2008), a target population describes the total number of units which the researcher has in mind and to which he or she intends to generalize the findings of the study. In this study the target population was 3000 people from the four beaches of the study. Among the target population 1800 were individuals who visit the beach, 1138 people run businesses at the beaches and 62 were BMU leaders. Among individuals who own businesses in the beaches 490 were fisher folk, 68 were hoteliers, 71 were boat riders, 202 were charcoal sellers, 85 were shopkeepers, 30 were weavers, 49 were in eco-tourism, 98 were sand miners, Car washers were 25 while 20 were in tree nursery business.

3.4 Sample Size and Sampling procedure

Under this section the study discussed sample size and sampling procedures that were adopted in the study.

3.4.1 Sample Size

According to Krejce and Morgan, (1970), (www.sageperformance.com/dr jeffallen/DrA/..../5480/samplesize.htm) a sample of 341 is appropriate for a population of 3000. However the researcher administered 360 questionnaires to ensure acceptable questionnaire return rate.

3.4.2 Sampling procedure

The study got the proportionate sample of various groups by dividing the group sample by the target population and then multiplying the outcome with the study sample size as shown in table 3.1 (see appendix V)

TABLE 3.1: Sample selection

Group	Group Population	Proportionate size	Sample size
Visitors	**1800**	**1800/3000 x 359**	**215**
BMUs	**62**	**62/3000 x 359**	**7**
Shop keepers	**85**	**85/3000 x 359**	**10**
Fisher folk	**490**	**490/3000 x 359**	**59**
Hoteliers	**68**	**68/3000 x 359**	**8**
Boat riders	**71**	**71/3000 x 359**	**8**
Car washers	**25**	**25/3000 x 359**	**3**
Charcoal sellers	**202**	**202/3000 x 359**	**24**
Weavers	**30**	**30/3000 x 359**	**4**
Eco-Tourism	**49**	**49/3000 x 359**	**7**
Sand miners	**98**	**98/3000 x 359**	**12**
Tree nursery	**20**	**20/3000 x 359**	**2**
TOTAL	**3000**		**359**

For the selected sample of each group, the study divided that sample with four which was the total number of beaches studied to arrive at a sample for every beach. A simple random sampling technique was then used to give each stratum equal chance for all the potential respondents in each category except the visitors for whom the study used

systematic random sampling where every fifth visitor was interviewed. The former was done by giving a number to the total population of each category which was then placed in a container and consequently picked at random. The beach residents for each category corresponding to the numbers picked were included in the sample (Mugenda & Mugenda, 1999).

3.5 Research instrument

Instruments are tools used to collect data (Oso & Onen, 2008) .The common tools include Questionnaires, interviews, observations, focus group discussions and document analysis (Amin, 2005; Oso & Onen, 2008; Kothari, 1990). This study used questionnaires, interviews, documentary analysis and observation techniques to collect data. The selection of these tools was guided by the nature of data to be collected, the time available as well as the objectives of the study.

A questionnaire is a self report used for gathering information about variables of interest in an investigation (Mugenda&Mugenda, 1999). Questionnaires were administered on beach residents and key informants who formed the sample population. The questionnaires had closed questions to allow the respondents to fully capture the issues under investigation. The questionnaires had five sections, A, B, C, D and E which inquired about, Demographic information, economic issues, socio-cultural issues, Government policy and Stakeholder's information respectively.

Interviews are person to person verbal communication in which one person (or group of persons) asks the other questions intended to elicit information or opinion (Oso & Onen, 2008).An interview schedule is a set of questions that the interviewer asks when interviewing. An interview schedule makes it possible to obtain data required to meet specific objectives of the study (Mugenda & Mugenda, 1999).The study used structured interviews to solicit information from the respondents which included Chairmen of BMUs ,Chiefs, Sampled traders, and fisher folk . Interviews appeared more flexible than questionnaires as it allowed the respondents to explain better the purpose of the study and gave room for additional probing by the researcher.

Observation was also used to collect information. A researcher utilizes an observation as a method of data collection to record what he or she observes during data collection (Mugenda &Mugenda, 1999). Observation was guided by a matrix that facilitated collection

of data pertaining to conservation activities going on in the area of study selected. The activities included economic activities within the beach, residents lifestyle, environmental intervention programs and the level of beach residents involvement in these environmental intervention programs.

The researcher purposely selected opinion leaders and gate keepers while considering their areas of activity and homogeneity in relation to age groups, gender, education, income brackets as well as profession in order to open up the topic for free discussion.

For literature review, the researcher went through periodicals, Newspapers, Magazines, Reports, Newsletter articles and Journals that discussed issues relevant to the topic of study. The researcher visited the following libraries: University of Nairobi library, National library services, Osienala library, and Maseno University library.

3.5.1 Pilot Testing

Piloting is a preliminary survey that helps to reveal and adjust ambiguous items (Malusu, 1990). The researcher tries out the study on a small scale to notice and correct the challenges that could have occurred during the main study, and to determine whether or not the study will produce the expected results (Mugenda & Mugenda, 1990). This stage is crucial in the research process because it enables the researcher to detect problems or weaknesses that could be encountered during the main research, and therefore take precautions before the major study (Oso & Onen, 2009). The instruments were piloted in Sango Rota: Sango Rota was selected at random from the list of beaches in Lake Victoria in Kisumu County.

3.5.2 Validity of Instruments

Validity is the degree to which empirical measures or several measures of a concept accurately measure a concept (Khan, 2003): that is, the extent to which study results can be accurately interpreted and generalized to other populations (Oso & Onen, 2009). Validity was ensured through use of experts. The instruments were given to two senior lecturers in project planning and management to evaluate the relevance of each item in the instrument to the objectives on a scale of 1-4, such that 1 was not relevant, 2 was somewhat relevant, 3 was relevant and 4 was very relevant. Validity index was then determined from the assessors agreement, on items rated 3 or 4 by both experts, and a content validity index calculated as

$n_{3/4}/N$, where $n_{3/4}$ is the number of items marked good by all experts and N was the total number of items assessed. The results summarized in Table 3.1 were obtained.

Table 3.1

Assessors Rating of Instruments

		Lecturer I				
		1	2	3	4	Total
Lecturer II	1	0	1	0	0	1
	2	1	1	0	0	2
	3	0	1	3	3	7
	4	0	0	4	3	7
	Total	1	3	7	6	17

Table 3.1 shows that validity index $n_{3/4}/N = 13/17 = 0.764$, which was acceptable since it was higher than 0.70 recommended by Oso and Onen (2009). Hence out of any ten items used in this study, at least seven of them measured what they were intended to measure.

3.10 Reliability of Instruments

Reliability is the extent to which research results are consistent over time, over place and over methods (Oso & Onen, 2009). Reliability was determined by the test-re-test method. The researcher administered the instruments to a convenient sample of 30 beach operators in Sango Rota Beach in Kisumu West District, twice within a span of 14 days. The instruments were administered to a set of randomly selected 30 beach operators, and the instruments were collected back. All responses for the first administration were coded 1. After 14 days, the researcher administered the same instruments to the same 30 respondents that were used in the first administration. The instruments were also collected and coded such that all responses of each respondent that were similar to the response in the first administration were coded 1, and any different response was coded 2. The responses of each respondent on each administration were added and the total score for each respondent on the questionnaire determined. The score on the test and re-test were correlated using Pearson Product Moment Correlation, and a reliability index of 0.786 was reported. Like in the case of validity, this was acceptable since it was higher than 0.70 recommended by Oso and Onen (2009). This shows

that out of any ten items used in this study, at least seven of them produced consistent responses over time.

3.6 Data Collection Procedures

A research permit to conduct the study was obtained from National Council for Science and Technology. The researcher then established a research team comprising himself and six research assistants one of whom was a guide who was very knowledgeable about the beaches of interest. The research assistants were consequently trained the data collection techniques by the researcher then they assisted in the distribution of questionnaires to the sampled respondents every morning for a period of seven days. The research team collected the questionnaires from the respondents' everyday between 4pm and 5pm. The research team then held a meeting to review operations within the day. In the event of language difficulty on the part of the respondents in grasping the content of the questionnaire, the research assistants acted as translators. Observations and Interviews were mostly done by the lead researcher, who arranged for interview sessions with beach management unit leaders of every beach studied from 11am after they were through with their morning chores.

3.7 Data Analysis Techniques

Bogdan & Biklen (1992), defines data analysis as the process of systematically searching and arranging field findings for presentation. It involves working with data, organizing, breaking into manageable units, synthesizing, searching for patterns, deciding what's important and deciding what to tell others. The collected data was coded and entered through Access 2007 to create a database for easier analysis. The data collected was analyzed using both qualitative and quantitative approaches. Statistical procedures included descriptive statistics and inferential analysis. The initial stages of descriptive statistics included means, frequencies and percentages to investigate the individual set of observed variables. The data was presented using descriptive statistics, cross tabulations and figures. The result was displayed comparatively in tables of individual variables, indicating the importance, levels of significant disagreements and standard deviations. Finally, statistical Analysis Software (SAS) was used because it was easier to code and provided a highly summarized and user friendly data output.

3.8 Ethical considerations

Ethics refers to the appropriateness of the researcher's behavior in relation to the rights of those who become the subject of one's work. Ethics in research is ensured so that no one is harmed or suffers adverse consequences from the research activities. We established a basis for trust between us and the study participants. Permission was sought from the local administration as well as from the respondents with explanations on how the research would contribute towards enhancing proper environmental practices. Privacy, confidentiality and dignity of the respondents were considered during the research. Names of the respondents were not being exposed and codes were used instead. A feedback session was also organized in order to disseminate the research findings to the community as well as to thank the community for their assistance during the research.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSIONS

4.1 Introduction

This chapter presents the study results which has been analyzed and discussed based on the following themes and sub thematic areas: questionnaire return rate, background information of the respondents, and on economic, socio-cultural activities and Government policies and conservation of Lake Victoria beaches.

4.2 Questionnaire Return Rate

The researcher administered 360 questionnaires, out of which 359 (99.70%) were returned. This was an acceptable return rate since it was more than the 70.0% return rate recommended by Amin (2005) or the 75.00% return rate recommended by Meyer (1996) for survey research. This high return rate was achieved because the research assistants were thoroughly trained on questionnaire administration and respondents follow up; a task which they accomplished well in the field. The researcher also visited the research sites several times in advance prior to the actual study and established good rapport with all gate keepers; the researcher also visited the sites during the data collection process to ensure that research assistants conducted their assignment professionally.

4.3 Background Information of the Respondents

The study investigated the background characteristics of the respondents concerning gender, age and level of education. Background of the respondents was necessary to portray the distribution of various characteristics of the sample and to enable comparison of the sample to the population. This also enables the readers to establish population validity and to generalize the sample results to other populations.

4.3.1 Distribution of the Respondents by Gender

The study investigated the gender of the respondents due to increasing attention being directed towards the status of women in the society. There are several conversation programs targeting women and it was important to determine how women of Lake Victoria Beaches have taken up these ventures. It was also important to establish the extent of involvement of

women in economic, socio-cultural activities and policy implementation as well as in conservation of Lake Victoria Beaches. So respondents were asked to indicate their gender and they responded as summarized in Table 4.1.

Table 4.1

Distribution of Respondents by Gender

Gender	Frequency	Percent
Male	208	57.9
Female	151	42.1
Total	359	100.0

Table 4.1 shows that majority 208 (57.9%) of the respondents were male while the rest 151 (42.1%) were females. These results suggest that most women remain behind in the village to take care of household chores when men go out to the fields to fend. This connotes that the economic and socio cultural activities within the beaches are male dominated. A study by Yongo et al. (2008) on Gender Integration in the Management of the Lake Victoria Fisheries indicated that more males participated in the fishing activities than females. This is an agreement with the findings of this study. The study also confirms the findings of Oyugi et al. (2003) on fishing and gender in rural Kisumu that commercial fishing and processing employs more men than women. This has impacted negatively on women who were previously engaged in fish processing and marketing. When men migrate to the beaches, they leave behind women and children to bear the brunt of agricultural activities, and such heavy workload has somehow affected women reproductive role, leading to their poor health.

4.3.2 Distribution of the Respondents by Age

The respondents were asked to indicate their age by checking on the appropriate age bracket. They responded as summarized in Table 4.2

Table 4.2

Distribution of the Respondents by Age

Age (years)	Frequency	Percent
15-25	135	37.60
26-36	127	35.38
37-47	53	14.76
48-58	23	6.41
59 and above	21	5.85
Total	359	100.00

Table 4.2 shows that most 135 (37.60%) of the respondents were young people aged between 15-25 years, while those aged between 26-36 years were 127 (35.38%). Those aged between 37-47 years were 53 (14.76%), and those aged between 48-58 years were 23 (6.41%). Another 59 21(5.85%) of the respondents were aged 59 years and above. Overall the results indicated that the majority (72.98%) of the respondents were youths aged between 15-36 years. This shows that most of the youth are involved in beach activities. Hence the beaches employ the most active age of the generation. Thus if youth friendly activities are supplemented with conservation programs at the beaches, the effective conservation of the lake and the beaches can be achieved since most of the youths are in the beach most of the time. This finding also supports the work of Ong'ang'a (2003) who asserted that many youths in the beaches are school drop outs who inherit the knowledge of fishing from their poor parents. The fact that the beaches are dominated by youth who are mostly lowly educated could lead to destruction of the beaches along Lake Victoria. Youth are very active and high numbers of lowly educated youth in an area, as is the case in beaches along Lake Victoria, can be very destructive. This is a possible explanation to why conservation efforts at the beaches are not taken seriously.

4.3.3 Distribution of the Respondents by Level of Education

The respondents were also asked to indicate the highest level of education. Education being very critical element in any development endeavor, and it was important to determine

the level of education of respondents and whether or not it has a link to the conservation of the beach. The results are summarized in Table 4.3.

Table 4.3

Distribution of the Respondents by Education

Level of Education	Frequency	Percent
Secondary	143	39.83
Primary	128	35.65
Tertiary	45	12.53
University	31	8.64
None	12	3.34
Total	359	100.00

Table 4.3 shows that most 143 (39.83%) of the respondents had secondary level of education, 128 (35.65%) of the respondents had primary level of education, while 45 (12.53%) had tertiary level of education. Another 31 (8.64%) of the respondents had University level of Education and the remaining 12 (3.34%) had other levels of education. In the overall analysis, majority 219 (61.00%) of the respondents had at least secondary level of education. This suggests that the level of education was not a major determinant of Lake Victoria beach conservation issues in Kisumu East District. This finding contradicts the assertion of Ong'ang'a (2003) that many of the youths operating at the beaches of Lake Victoria are illiterate school dropouts. It can be deduced from these results that most of the people at the beaches have the necessary education for understanding conservation issues. Therefore inadequate conservation of Lake Victoria beaches cannot be blamed on the level of education among the population.

The researcher further investigated the link between the level of education and issues of beach conservation such as policy formulation and implementation, community mobilization, advocacy and law enforcement. The respondents were requested to indicate whether or not they have taken part in the formulation and implementation of beach conservation policies, or in community mobilization, or in advocacy and law enforcement. They responded as summarized in Table 4.4.

Table 4.4

Association between Level of Education and Beach Conservation Issues

	Beach Conservation Issues: I have been involved in:																
	Policy Formulation & Implementation				Community Mobilization				Law Enforcement				Advocacy				
	Yes		No		Yes		No		Yes		No		Yes		No		
Education	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	Total
None	6	1.66	5	1.39	5	1.35	7	1.89	0	0.00	8	2.16	5	1.35	8	2.16	44
Primary	32	8.89	97	27.02	48	12.96	79	21.33	28	7.56	102	27.54	21	5.67	108	29.16	515
Secondary	40	11.12	105	29.25	68	18.36	75	20.25	27	7.29	117	35.59	25	6.75	120	37.40	577
Tertiary	18	5.00	28	7.80	32	8.64	13	3.51	10	2.70	35	9.45	18	4.86	27	7.29	181
University	4	1.12	24	6.69	18	4.86	14	3.78	5	1.35	27	9.29	5	1.35	22	7.29	119
Total	100	27.85	259	72.15	171	47.63	188	52.37	70	19.50	289	80.50	74	20.61	285	79.39	1436

Table 4.4 shows the association between the level of education and involvement in beach conservation. The table shows that high concentration of beach conservation issues was found among secondary level education while the least involvement was found among the primary level of education. Thus while most 40 (10.80%) of the respondents were involved in policy formulation and implementation had secondary education, 103 (23.81%) of the respondents who were not involved in policy formulation and implementation also had secondary level of education. Further, while most 68, (18.36%) of the respondents who were involved in community mobilization had secondary level education, but most 68, (18.36%) of the respondents who were not involved in community mobilization also had secondary education. But the table shows that most 79, (21.33%) of the respondents who were involved in law enforcement had primary level education, while most 28, (7.56%) of those who indicated that they are not involved in law enforcement also had primary level of education. But most 25 (96.75%) of respondents who indicated that they have been involved in advocacy had secondary education while most 120 (32.40%) of those who indicated that they were not involved in community mobilization also had secondary education.

4.4 Factors influencing Conservation of Lake Victoria Beaches

Having described the demographic features of the respondents, the study now describes the factors that influence the beach conservation in Lake Victoria. The study stated three specific objectives. This section presents the findings along the three objectives with each objective as major themes. The findings are summarized in the following subsections.

4.4.1 Economic Activities and Conservation of Lake Victoria Beaches

The first objective of this study was to determine the extent to which economic activities at the Beach influence the conservation of Lake Victoria beaches in Kisumu East District. To achieve this objective, the respondents were asked to indicate the economic activities taking place at the beaches and rate, on a scale of none to large, the extent to which those activities influence beach conservation. The results of the analyses are summarized in the following sub sections.

4.4.1.1 Economic Activities in the Beaches

Respondents were asked to indicate the most important economic activity taking place at the beaches. This information was relevant because economic activities have a direct effect on the environment and hence on conservation. The results of the analysis are summarized in Table 4.5.

Table 4.5

Economic activities at the Beaches

Economic Activities	Frequency	Percent
Fishing	66	18.38
Hotelier	54	15.04
Shop Keeping	46	12.81
Eco-Tourism	41	11.42
Car Washing	32	8.91
Agriculture	32	8.91
Charcoal Selling	27	7.52
Weaving	20	5.57
Tree Nursery	18	5.01
Sand Harvesting	13	3.62
Other	10	2.79
Total	359	100.00

Table 4.5 shows that most of respondents 66 (18.38%) engaged in fishing while the least preferred economic activity at the beaches was 'other' with 10 (2.79%) of respondents. Other economic activities performed at the beaches were Hotelier 54 (15.04%), shop keeping 46 (12.81%), eco-tourism 41 (11.42%), and car washing 32 (8.91%). Other economic activities include agriculture 32 (8.91%), charcoal burning 27 (7.52%), weaving 20 (5.57%), tree nursery 18 (5.01%) and sand harvesting 13 (3.62%). These results show that beach residents are involved in all the viable economic activities around the lake. As such any beach conservation intervention must involve all beach stakeholders for it to be effective. But because they are involved in all economic activities, there is need to encourage them to get involved in economic activities that are environmentally friendly and avoid those that degrade

the beach environment. This follows from the information presented earlier that economic activities have direct impact on the environment.

4.4.1.2 Rating of Economic Activities and Beach Conservation

The study also investigated the views of the respondents on the extent to which economic activities influence conservation at the beaches. To achieve this objective, the respondents were asked to rate the effect of different economic activities on the beaches on a scale of none to large. The analyses are summarized in Table 4.6.

Table 4.6

Rating of the Influence of Economic Activities on Beach Conservation

	Extent of Influence on Beach Conservation							
	Large		Moderate		Low		None	
	f	%	f	%	f	%	f	%
Fishing	208	57.94	88	24.51	43	11.98	20	5.57
Shop Keeping	69	19.22	151	42.06	59	16.43	80	22.28
Boat Riding	140	39.35	78	21.45	52	14.21	89	24.79
Eco-Tourism	142	39.55	89	24.79	43	11.98	85	23.67
Sand Harvesting	88	24.51	31	8.63	35	9.75	205	57.10
Weaving	74	20.61	79	22.01	48	13.37	158	44.01
Charcoal Selling	107	29.81	58	16.16	92	25.63	102	28.69
Hotelier	151	42.06	95	26.46	62	17.27	51	14.21
Tree Nursery	62	17.27	72	20.06	86	23.95	135	38.72

Table 4.6 shows the different economic activities that influence beach conservation rated as large, moderate, and low and none based on the perceived effects on beach conservation. Fishing was rated as large by majority 208 (57.94%) of the respondents while just 62 (17.27%) of the respondents rated tree nursery as having a large effect on beach conservation. Shop keeping was rated moderate by most 151 (42.06%) of the respondents while 31 (8.63%) of the respondents rated sand harvesting as moderate. The economic activity rated low by most respondents 92 (25.63%) was charcoal selling while activity rated as low by least respondents 35 (9.375%) was also charcoal selling. Sand harvesting was rated none

by majority 205 (52.10%) of the respondents while only 9 (5.357%) rated fishing as having no effect on beach conservation.

It can be seen that there is consistency in the ratings of the economic activities on beach conservation by respondents. The activity rated large (fishing) by most respondents is also rated none by most respondents, and the activity rated moderate (shop keeping) is also rated seventh on the category of none while the activity rated low by most respondents (charcoal selling) is also rated fourth on one category. Further the category rated low (tree nursery) is also rated third on the 'none' category. Thus there is consistency such that the activity rated as having large effect and those rated as having low or none effects do not share the same levels.

The finding that fishing is the economic activity that mostly affects Lake Victoria beach conservation is in line with the assertions of Hecky et al (1993) that overfishing among other activities such as siltation from the erosion of the deforested watershed, species introduction, pollution and climate change that contributes to the rapidly evolving changes in the Lake and interferes with its ecosystem function and overall diversity. It also supports the views of Global International Water Assessment (GIWA) (2008) that unsustainable exploitation of fisheries is a major economic factor influencing environmental conservation. As Ong'ang'a (2003) had noted, introduction of the Nile Perch into the Lake in 1950s by the colonial Government in Uganda led to increased interest in fishing; and in response to increased landings of Nile perch in the 1980s and 1990s more fishermen were recruited into the fishery. According to Ong'ang'a (2003), the number of fishermen increased from about 11,000 in 1971 to 22,000 in 1989 and to 24,000 in 1992 on the Kenyan side of Lake Victoria. There are currently about 38,000 fishermen. Thus introduction of the Nile Perch has had a multiplier effect on the social scene. In fact in the 1980s, additional 180,000 jobs were created in the primary and secondary fields of the fisheries with devastating effect on the environment (Abila et al., 1997).

This finding also concurs with the findings of Mkisi (1991) on fishermen, traders and consumers in Mwanza region. Mkisi (1991) investigated the living conditions, division of ownership, and characteristics of fishing units, fishing operations, costs, earnings and income generation activities and concluded that Lake Victoria has undergone a complete transformation from the self-regulating system to a highly commercialized fishery following

the Nile perch boom of the 1980s. This has also had negative environmental effect and lead to poor conservation at the beaches on Lake Victoria.

4.4.1.3 Environmental Effects of Economic Activities at the Beaches

Having determined the different economic activities that take place at the beaches of Lake Victoria and their extents, the study then determined the specific environmental hazards caused by the economic activities at the beaches. The respondents were asked to state the major environmental effects of the economic activities practiced at the beaches. The responses obtained were analyzed as summarized in Table 4.7.

Table 4.7

Effects of Economic Activities on Beach Conservation

Environmental Effect	Frequency	Percent
Water Pollution	70	19.49
Increased Wastes	62	17.23
Increased Income	58	16.12
Soil Erosion and Sedimentation	56	15.56
Depleted Fish Stock	52	14.45
Water Purification	29	8.06
Increased Forest Cover	23	6.39
Other	9	2.50
Total	359	100.00

Table 4.7 shows that most common effect of economic activities is water pollution 70 (19.49%) followed by increased water 62 (17.23%). This is followed by increased income 58 (16.12%), then soil erosion and sedimentation 56 (15.56%), then depleted fish stock 52 (14.45%), and water purification 29 (8.06%). The seventh effect is reduced forest cover 23 (6.39%) and the least effect was 'other' 9 (2.10%). The effects suggested by this study are similar to results obtained by Hecky (1992) who observed that overfishing, siltation from erosion of deforested water shades, pollution and climate change all contribute to the rapidly evolving changes in the lake and greatly threatens its ecosystem functions. It also corroborates

the findings of Lehman (1966) that the transparency values of the Lake had decreased to one third, and the Silica concentration had gone down to one tenth of its value 40 years ago due to economic activities. The soil surface has been eroded by running water and other human activities like cattle grazing (see Appendix IV). The finding that economic activities lead to depleted fish stock also supports assertions of Johnson et al. (1966) that extinction of several hundred species of Haplo chromine ciclid fish in Lake Victoria is primarily the result of the introduction of the Nile Perch that remains the single most dramatic event of vertebrates species extinction attributable to specific human activities. The Global International Water Assessment (2008) noted that there is over exploitation of fisheries due to increased total fishing efforts, efficiency of fishing gear and extension of fishing grounds to maintain yield. This has led to the depletion of fish stock.

4.4.2 Socio-Cultural Activities and Beach conservation

The second objective of this study was to determine the extent to which socio-cultural factors influence beach conservation in Lake Victoria. To achieve this objective, the respondents were asked to state the socio-cultural factors that commonly take place at the beaches and rate such factors on a scale of none, low, moderate and lager. They were also asked to state the effect of those factors on beach conservation. The results are summarized in the following sub sections.

4.4.2.1 Rating of Socio-Cultural Activities and Beach Conservation

The respondents were asked to state the socio-cultural activities that take place at the beaches and then rate such factors in relation to each other on the scale of 'none' to 'large'. The responses obtained and the subsequent analyses are summarized in Table 4.8.

Table 4.8

Rating of Socio-Cultural Activities and Beach Conservation

	Extent of Influence on Beach Conservation							
	Large		Moderate		Low		None	
	f	%	f	%	f	%	f	%
Recreation	89	24.79	107	29.80	99	27.57	64	17.84
Religious	50	13.92	109	30.36	99	27.58	101	28.13
Unplanned Settlements	89	24.79	148	41.23	73	20.33	49	1364
Education	123	34.26	161	44.85	38	10.58	37	10.31

Table 4.8 shows that the common socio-cultural activities at then beaches of Lake Victoria are recreation, religion, unplanned settlements and education. The table further shows that education was rated as having large effect on beach conservation by 123 (34.26%) of the respondents while religious activities was rated as having a large effect by least number of respondents at 50 (13.92%). The factor rated as having a moderate effect by most 161 (44.85%) respondents was also education while the factors rated moderate by least number of respondents 107 (29.80%) was recreation. But on the low category, the factors rated by most 99 (25.57%) of the respondents was education. The factors rated as having 'none' effect by most 101 (28.13%) of respondents was religious activities and the factors rated least on the 'none' category was education with 37 (10.31%) of respondents. Factors ranked as high by most respondents are also ranked as low by most respondents. Apart from religion which was ranked low by most respondents and also ranked none by most respondents, all other factors were ranked on the extreme needs of the scale. But the rating of religious activities as high in both levels can be understood because the categories are both towards the ends. But the popular activity with the highest effect on beach conservation is education.

This finding corroborates the findings Karanja (2002) that the low standard of health in the source of Lake Victoria are caused by a general lack of awareness of good hygiene practices, direct contamination of beach waters through bathing, washing and uncontrolled waste disposal around the shoreline. All these are direct consequences of low education. Again, lack of properly planned infrastructural development has brought many problems of

dysfunctional sewerage systems, industrial pollution and shortage of water supply to the beach (Oyugi & Ong'ang'a, 2003). These effects are also the results of low education.

4.4.2.2 Effect of Socio-Cultural Activities on Beach Conservation

Having determined the different socio-cultural activities that place at the beaches of Lake Victoria and their extents, the study the determined the specific environmental hazards caused by the socio-cultural activities at the beaches. The respondents were asked to state the major environmental effects of the socio-cultural activities practiced at the beaches. The responses obtained were analyzed as summarized in Table 4.9.

Table 4.9

Effects of Socio-Cultural Activities on Beach Conservation

Environmental Effect	Frequency	Percent
Water Pollution	73	20.33
Environmental Awareness	65	18.07
Increased Wastes	61	16.95
Soil Erosion and Sedimentation	53	14.73
Depleted Fish Stock	47	13.06
Water Purification	35	9.77
Increased Forest Cover	25	6.95
Other	0	0.00
Total	359	100.00

Table 4.9 shows that there are eight major effects of socio-cultural activities on beach conservation. The most common socio-cultural activities on beach conservation is water pollution 73 (20.53%) followed by environmental awareness 65 (18.05%) and then by increased wastes 61 (16.95%). The fourth most common effect of socio-cultural factors on beach conservation is soil erosion and Lake sedimentation 53 (14.73%) followed by depleted fish 47 (14.73%), then followed by water purification 35 (9.73%). The least rated effect of socio-cultural activities on beach conservation is increased forest cover 25 (6.95%). Read together with Table 4.7, it can be seen that water pollution has been ranked highest in both

cases, but the second ranks and 'other' are reversed. This shows that economic and socio-cultural factors have different effects on beach conservation

This finding supports the data appended in Appendices IV_1, IV_2, and IV_3, and confirmed that riparian peoples' life style for using the lake for leisure and income generation enhances waste disposal in to the lake. This also confirms Karanja (2002) views that the low standards of living in the region were caused by a general lack of awareness of good hygiene practices, direct contamination of beach waters through bathing and washing and uncontrolled waste disposal around the show line.

4.4.3 Government Polices and Beach Conservation

The last objective of this study was to determine the influence of government policies on beach conservation. The policies on conservation were policies on water, fisheries, regional treaties and NEMA. To determine status of these factors, respondents were asked to indicate whether or not government officials visit the beaches, and the designation of the officials who visit the beaches. They were also asked to indicate the roles of the officials who visit the beaches and the perceived levels of success of such visits. The responses and the analyses are summarized in the following sub sections.

4.4.3.1 Visits by Government Officials

Respondents were asked to indicate whether or not government officials visit the beaches. This was necessary to assess whether the government follows on its polices, and to what extent. The results of the analyses are summarized in Table 4.10:

Table 4.10

Visits by Government Officials

Government officials visit this Beach	Frequency	Percent
Yes	338	94.20
No	14	3.90
Don't Know	7	1.90
Total	359	100

Table 4.10 shows that majority 338 (94.2%) of the respondents indicated that the beaches are visited by Government representatives while only 14 (3.9%) indicated that the beaches are not visited by government officials. But another 7 (1.9%) indicated that they did not know whether the beaches are visited by government officials or not. Even though the findings of the study indicated that officials visited the beaches; observation data (see appendix IV_1, and IV_3) indicated that the impact of their visits are minimal. Most beaches were dirty with no dustbins, toilets, running water trenches and environmental awareness warning signs. Many youths were engaged in Car washing business that directly polluted the lake. The housing structures that dot the beaches are unplanned indicative of lack of a physical plan for the beaches by the Government.

4.4.3.2 Designation of Government Officials who Visit the Beaches

The study investigated the designation of Government officials who visit the beaches. This was necessary because the caliber of government officials is a proxy indicator of the weight that the government attaches to its policies. The results of the analysis are summarized in Table 4.11.

Table 4.11

Designation of Government Officials visiting the Beach

Government Representative	Frequency	Percent
Chiefs/Assistant Chiefs	75	20.89
Fisheries Officers	74	20.57
Municipal Environmental Officers	60	16.68
Environmental NGOs	51	14.17
District Environmental Officers	40	11.12
NEMA	37	10.28
Other	22	6.11
Total	359	100.00

Table 4.11 shows most 75 (20.89%) of government officials who visit the beaches are chiefs and their assistants, followed by fisheries officers 74 (20.57%) then municipal environmental officers 60 (16.68%). Environmental NGO officers 51 (14.17%), District

environmental officers 40 (11.12%), NEMA officials 37 (10.28%) and 'other' - who were mostly police officers - 22 (6.11%) follow in that order. The finding shows that government officials who visit the beaches are mostly junior government officers: there is no single case of a District Officer and above ranks visiting the beaches. This shows that the government is not very aggressive in implementing the policies for beach conservation. This supports the view of UN (2008) that most third world countries do not implement policies that address biodiversity.

4.4.3.3 Roles of Government Officials at the Beaches

The study also enquired into the roles of government officials who visit the beaches. This was necessary as an indicator of how far and to what extent the government, through its officers, are involved in beach conservation. The results of the analysis are summarized in Table 4.12

Table 4.12

Role of Government officials in Beach Conservation

Role	Frequency	Percent (%)
Policy formulation and implementation	106	29.52
Community Mobilization	102	28.35
Law Enforcement	86	23.90
Advocacy	56	15.56
Others	9	2.50
Total	359	100.00

Table 4.12 shows that most 160 (29.52%) of government officials that visit the beaches get involved in policy formulation and implementation while 102 (28.35%) in community mobilization. Another 86 (23.90%) get involved in law enforcement while 56 (15.56%) of the government officials who visit the beaches get involved in advocacy at 123 (34.26%) and others at 17(4.74%). But some 9 (2.50%) of the government officials who visit the beaches get involved in 'other' activities. This analysis shows that all the facets of implementing a program are being observed by Government or its agents in different intensities. This contradicts the finding reported in 4.4.3.2 that government is not keen in

beach conservation due to the low caliber of officials involved. But the two results are similar in that they both show government involvement in all facets of beach conservation tough mostly by lower cadre of officials.

4.4.4.4 Success by Government Officials

The study also investigated whether or not Government officials were achieving their objectives of visiting the beaches. The respondents were asked to rate whether in their opinion, the visits have been successful by rating the success of such visits on a scale of none, low, moderate and large. It was necessary to determine whether the objectives of the visits are being achieved so as to assess whether the beaches were being conserved as a results of those efforts. The results of the analyses are summarized in Table 4.13

Table 4.13

Relative Success of Government Officials Visits

Extent of Success	Frequency	Percent
Moderate	203	56.40
Large	104	28.97
None	36	10.03
Low	16	4.60
Total	359	100.00

Table 4.13 shows that majority 203 (56.40%) of the respondents rated the success of government officials and government agencies as moderate while 104 (28.97%) of the respondents rated the success of such visits as large. Another 36 (10.03%) of the respondents did not know whether the visits are successful or not, while 16 (4.60%) of the respondents indicated that the visits by government officials have low success. In the overall analysis, the visits can be successful in beach conservation as over 58.15% of the respondents rated such visits as successful. These results should prompt beach conservationists to infuse monitoring and evaluation mechanisms in their programmatic operations, as Ong'ang'a (2003) notes, to produce more results.

But these results could be hampered because the interview data indicated that those assigned to monitor, control and surveillance do not have resources to effectively carry out their mandate. This explains why the government officials visiting Lake Victoria beaches have succeeded in their functions to a moderate extent. As Swallow et al. (2002) notes, approach used by the three East African Governments to manage Lake Victoria is futile. Further, as Karanja (2002) notes, the ongoing co-management intended to increase local participation and involvement in decision making, implementation, monitoring and enforcement lack legal backing. This finding concurs with the views of Scheren (2000) that the success of co-management depends on the political commitment on the part of the governments because it would require support by appropriate legislation and adequate technical and financial resources.

4.4.4.5 Involvement of Residents and Visitors in Beach Conservation

The study also investigated the level of involvement of beach residents and visitors in conservation of beaches. It was necessary to determine whether beach conservation policies arte participative and inclusive. This would help to advise the government and other stakeholders on the best approaches. The respondents were asked to indicate whether or not they are involved in beach conservation, and the nature of their involvement. The results of the analyses are summarized in Table 4.14

Table 4.14

Involvement of respondents in Beach Conservation

Involved in Beach Conservation	Frequency	Percent
Yes	248	69.08
No	94	26.18
Don't Know	17	4.70
Total	359	100.00

Table 4.14 shows that majority 248 (69.08%) of respondents indicated that they are involved in beach conservation programs while 94 (26.18%) of the respondents indicated that they are not involved in beach conservation programs. Another 17 (4.7%) of the respondents

indicated they did not know whether or not they are involved in beach conservation programs. Though the population of those who did not know is low, it nevertheless calls for enhanced awareness creation on environmental conservation among beach residents and other Lake Victoria stakeholders. Otherwise, such programmes, no matter how noble would continue to suffer due to sheer ignorance.

When the respondents were asked to indicate the nature of their involvement, and that of the visitors in beach conservation, the responses are summarized in Table 4.15. It was necessary to determine the nature of involvement so as to determine whether the activities undertaken at the beach are in line with the official government policies on beach conservation.

Table 4.15

Nature of Involvement of Beach Residents and Visitors in Beach Conservation

Activity	Frequency	Percent (%)
Community Mobilization	140	38.92
Policy Formulation and Implementation	81	22.51
Law Enforcement	58	16.12
Advocacy	57	15.84
Others	25	6.39
Total	359	100.00

Table 4.15 shows five main ways in which beach residents and visitors get involved in beach conservation efforts. Table 4.15 shows that most 165 (38.92%) of respondents indicate are involved in community mobilization, 81 (22.51%) of the respondents indicated that beach residents and visitors are involved in policy formulation and implementation, while 58 (16.12%) of the respondents indicated that beach residents and visitors are involved in law enforcement. Another 57 (15.84%) of the respondents indicated beach residents and visitors are involved in advocacy while 27 (6.39%) of the respondents indicated that beach residents and visitors are involved in 'other' activities like volunteering environmental cleaning services. This analysis shows that many beach residents and visitors are involved in a variety of beach conservation activities. When beach conservation is low or poor, then such results should be blamed on the quality of the activity and not on the extent of such involvement.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter summarizes the main findings of the study, the conclusions arising from the findings and recommendations on how best the Lake Victoria beaches in Kisumu east can be conserved. Contribution to the body of knowledge and suggestions for further research are also provided. In this chapter, the following sub topics were discussed namely: Summary of findings, Conclusions of the study and Recommendations for further research.

5.2 Summary of Findings

Based on the objectives of the study, it was established that fishing is the economic factor that mostly affects the conservation of lake Victoria beaches at 208(57.94%), followed by Hotelier at 151(42.06%), Eco-tourism at 142(39.55%) and Boat riding at 140(39.35%), charcoal selling 107(29.81%), shop keeping 69(19.22%), sand mining 88(24.51%), weaving at 74(20.61%) and tree nursery at 62(17.27%). The respondents rated education as one of the socio cultural practices that to a large extent impacts on beach conservation at 123 (34.26%), followed recreation and unplanned settlement both at 89 (24.79%). Education was also rated as having moderate effect at 161(44.85%) while the socio cultural factor having least moderate is recreation at 107 (29.80%). On the low class the factors that most affect beach conservation are recreation and religion at 99(25.57%) while the factor that is rated least is education at 38 (10.58%). The factor rated as having none effect is religion at 101 (28.13%).

Those who felt that the government and NGOs agencies had succeeded to a moderate extent in the conservation of lake Victoria beaches were at 203 (56.04%). Those who thought that they had succeeded to a large extent were 104 (28.97%) and 16 (4.60%) said that they had succeeded to a low extent. Finally, 28 (10.03%) did not know whether the visits were successful or not. Using the observation schedule, the study found that the beaches are not serviced with well-maintained roads, have no schools and health facilities. The study also observed that the beaches have loose management structures leading to a dirty and bushy environment with unplanned housing, tall grass and lack of sanitation facilities.

5.3 Conclusions

Based on the findings, the study concluded the following:

That environmental intervention should target the youth. The population of the lake region shows a high growth rate at about 3.0% per annum (SEDAWOG 1999). The rainfall distribution around the lake shore is low and erratic. Due to the factors aforementioned, most of the areas along the lake shore experience a scarcity of agricultural land and a shortage of employment opportunities. The available agricultural activities are basically at subsistence level. Fishing which is regarded as traditional and is therefore passed down from father to son offers a fallback alternative for many young people as a source of income. This explains their large numbers at the fishing beaches. Given that most of them have primary education according to the finding of this study, if targeted with beach conservation education, they can receive, understand and act.

The findings established that education is a major factor in promoting beach conservation. It is therefore important for lake Victoria beach conservation stakeholders to have environmental sensitization programmes at the beaches and also to lobby the ministry of education to include environmental education in the school curriculum. The riparian communities need to be mobilized, sensitized and trained to know their responsibilities with regard to the management of lake Victoria beaches. To overcome management problem in these beaches, it's necessary for the state to cooperate with community organizations such as BMUs. The state needs to empower and strengthen the community institutions and set in place mechanisms to sustain them.

Proper legal framework should be put in place to guide the operations of beach residents and visitors. This can be spearheaded by the lake victoria fisheries organization (LVFO) which was formed by Kenya, Uganda and Tanzania to bring together institutions concerned with the development and management of lake Victoria's fisheries. It must also be emphasized however that stakeholders at all levels must be drawn into the process of deciding how resources are allocated to implement the various aspects of environmental conservation of lake Victoria beaches. A crucial component of legislative reform would be the provision of legal rights and protection of the beach fishing and trading communities to be involved in the planning, formulation, and implementation of the regulations. Other laws and regulations governing the conservation of Lake Victoria as a resource like RAMSAR convention, CITES,

and Biological Diversity Convention Agenda 21 of the Rio Conference should be respected and adhered to. The National Environmental Action Plans (NEAP) being implemented by the three East African countries provides a framework for integrating environmental concerns when designing and implementing projects. All the three East African governments have a local government act which specifies the services to be undertaken by the local government. The Kisumu county authority should enforce the laws protecting the environment including the banks of lakes, rivers, streams and wetlands.

5.4 Recommendations

Based on the findings and the conclusion, the study recommends that:

Youths and investors living in and visiting the beaches should be educated on environmental practices that enhance beach conservation. The training needs of the youths should be identified and training courses relevant to their needs established. This would lead to youths and investors who are knowledgeable in monitoring, control and surveillance of Lake Victoria as a resource. The youths in the beaches should also be encouraged to participate in meetings to draft the by -laws for improved management of beaches and obtain appropriate gazetting of the by-laws. The government should hold regular meetings and sensitize the youths, industrialists and urban councils on the need of their involvement in the treatment of urban and industrial effluent. The youths should also be able to resolve conflicts among incompatible activities impacting on the aquatic system including cross sectorial activities like forestry, transport, agriculture and hydroelectric power generation.

Government policy implementers should incorporate monitoring and evaluation in their dissemination system to enable government policy influence beach conservation to a large extent instead of the moderate extent that the study found out. Policies need to be formulated and made adoptable to the characteristics of the resource system, uncertainty and complexity as well as stakeholder interests. The policy should prioritize on sensitization of riparian community on the impacts of pollutants, good agricultural practices, afforestation and conservation of wetlands and encourage their use thereof.

A legislated legal framework should be provided to Lake Victoria stakeholders to strengthen beach management institutions so that conservation of beaches can be improved. Several shortcomings have been noted regarding the institutional arrangements for the environmental sub sector of Lake Victoria. There is therefore need for the provision of

adequate funds to the sub sector from the central government and other sources including bilateral, multi-lateral and NGO contributions. With adequate funding, the research institutions should be able to provide the knowledge on sound environmental practices along Lake Victoria beaches. The beach management units have to be well organized and legitimized as accredited local institutions and trained in environmental management activities to enable them undertake the responsibility of beach environmental management.

Social infrastructure like roads, schools, electricity and health centers should be put up at the beaches because a knowledgeable and healthy population at the beaches will conversely enhance beach conservation. The remoteness of the beaches and general poor infra-structure impose severe constraints on the beach stakeholders.

5.5 Contribution to the body of knowledge

Table 5.1 Contribution to body of Knowledge

Objectives	Contribution to body of knowledge
1. To establish the extent to which economic activities influence conservation of Lake Victoria beaches	The finding that fishing is the economic factor that majorly influence the conservation of Lake Victoria beaches
2. To examine the level at which socio-cultural practices influence conservation of Lake Victoria beaches	Identifying Education as the main socio cultural factor influencing the conservation of beaches to a large extent
3. To assess how Government policy influences conservation of lake victoria beaches	The realization that Policy implementers need to infuse monitoring and evaluation mechanisms into their programmatic operations to enable them influence the conservation of lake Victoria beaches.

5.5.1 Recommendations for Policy action

In pursuance to the success of the beach conservation, all the stakeholders should be fully involved, for example all the beach population should be well informed as far as the conservation of the beaches is concerned and the bottom-up model applied to enable beach residents own the process, since beach conservation affects them directly.

5.6 Suggestions for further Research

This study highlighted several issues; however, the study recommends further research in some areas. Future research should involve regional sampling of beaches from all the three East African countries. There may also be need to investigate the relationship between infra-structure development in the beaches and conservation efforts.

Study can also be done to establish the level of effectiveness of public and private organizations running Lake Victoria intervention program

REFERENCES

Abila, R.O. 2002. *The Development of the Lake Victoria Fishery: A Boon or Bane for Food* Security*?* Working document for Lake Victoria fisheries management decisions. Lake Victoria Fisheries Research Project, March 2001, Jinja, Uganda, 30 pp

Aseto, Oyugi, Ong'ang'a,2003 *Lake Victoria (Kenya) and its Environs: Resources, Opportunities, and Challenges*. Kendu Bay: Africa Herald Publishing House.

Asila, A.A. 2001. Working document for Lake Victoria fishereis management decisions.

Borrini-Feyerabend, G. (2004). *Governance of protected areas, participation and equity* (No. 15, CBD Technical Series). Montreal, Quebec: Secretariat of the Convention on Biological Diversity.

Ayres ET AL. 1996. *Integrated lake and reservoir management: World Bank approach and experience*. World Bank Technical Paper No. 358. Washington, D.C.

Bauman, A. and Smith B. (1999) *Geographical Influence Upon Physical Activity Participation* Evidence of coastal effect. Australian and New Zealand journal of public Health, 23(*3*)322 – 324.

Bogdan, R. C. & Biklen, S. K. (1998). *Qualitative research in education: An introduction to theory and methods* (3rd ed.). Needham Heights, MA: Allyn & Bacon.

Bronfenbrenner, U. (1979). *The Ecology of human development*: Experiment by nature and design. Harvard University press. Cambridge Massachusetts.

Bronfenbrenner, U. (1994). *The Ecological Model of Human Development.* International Encyclopedia of Education. Vol III,Oxford, Elsevier.
.

Bwathondi, P.O.J., Ogutu-Ohwayo, R. and Ogari, J. 2001. *Lake Victoria Fisheries Management Plan.* LVFRP/TECH/01/16, Technical Document No. 16, 64 pp. Edited

by I.G. Cowx and K. Crean.

Chambers, Christoper P., 2005. *"An axiomatic theory of political representation*," Working Papers 1218, California Institute of Technology, Division of the Humanities and Social Sciences.

Cohen, A.S., Kaufman, L. and Ogutu-Ohwayo, R. 1996. Anthropogenic threats, impacts and conservation strategies in the African Great, Lakes

David Hulme *2001,Governance Reform in Developing Countries, Public Management Review*, 3(3), pp.297-443

Duda, A. 2002. *Restoring and protecting the African Great Lake Basin ecosystems – lessons* from the North American Great Lakes and the GEF.

Edwards, M. and D. Hulme. 1992. **"***Scaling-up the developmental impact of NGOs: Concepts and experiences.*" In Making a difference: NGOs and Development in a Changing World

En.wikipedia.org/wiki/Lake_Albert_Uganda

En.wikipedia.org/wiki/Lake_Malawi

En.wikipedi.org/wiki/Lake_Simoe_Region_Conservation_Authority

En.wikipedia.org/wiki/List_of_Lakes

Fowler, A. (2000). *The Virtuous Spiral: A Guide to Sustainability for NGOs in International Development*. Earthscan. London.

Hecky, R.E. 1993. The eutrophication of Lake Victoria. *Proc. Int. Ass. Theor. Appl. Limnol. 25,* 39 –48.

Hecky, R.E. and Bugenyi, F.W.B. 1992. *Hydrology and chemistry of the African great lakes and water-quality issues: Problems and solutions*

Hecky, R.E., Bugenyi, F.W.B., Ochumba, P.O. B., Talling, J.F., Mugidde, R., Gophen, M. and Kaufman, L. 1994. Deoxygenation of the hypolimnion of Lake Victoria

Helmich, H. (1999). Introduction to Smillie, I., Helmich, H., German, T., and Randel, J., *Stakeholders: Government-NGO Partnership for International Development*. Earthscan. London.

Hoekstra, J. M., T. M. Boucher, T. H. Ricketts, and C. Roberts. 2005. *Confronting a biome crisis: Global disparities of habitat loss and protection. Ecology* Letters 8:23–29. CrossRef

http:\ \lake huron.cal

http\ \pulitzercenter.org/project/lakes

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1690916/pdf/11886641.pdf

http/www.nhlakers.org/lake conservation –corps.htm

http://www.worldagroforestry.org/downloads/publications/PDFs/OP14439.PDF

I.G. Cowx (eds). LVFRP/TECH/99/06, Technical Document No. 6, pp. 73-78.

I.G. Cowx and D. Tweddle (eds). LVFRP/TECH/99/07, The Lake Victoria Fisheries

Johnson, T.C., Scholz, C.A., Talbot. M. R., Kelts, K., Ricketts, R.D., Ngobi, G., Beuning, K. R.M., Ssemanda, I. and McGill, J.W. 1996. Late Pleistocene desiccation of Lake Victoria and rapid evolution of cichlid fishes.

Karanja, D.M.S. 2002. Health and diseases: a case study of Lake Victoria basin. In: *The Lake Victoria Training Project, Annual Report 2002.* Pan-African START Secretariat, Nairobi.

Kerlinger (1969) *Ethnographic and Qualitative Design in Education Research*. San Diego. Harcont Brace, Vanonc.

Kombo, Donald Kisilu and Delno L.A. Tromp (2006) *Proposal and Thesis Writing: An Introduction*. . Dauggters of St. Paul, P.O. Box 49026, 00100 Nairobi GPO (Kenya) pg. 12. Paulines Publications Africa,

Kooiman, J. (Ed.). (1993). *Modern governace: new government-society interactions*. London: Sage

Krejece, R.V and Morgan, (1970) "*Determining Sample Size for Research Activities,"* Educational and psychological Measurement. Sage Publications, Inc.

Kulindwa, K.A. 2001. *The Contribution of Lake Victoria Fisheries to the Tanzanian Economy.* Report Submtted to: The Vice President's Office, Lake Victoria Environmental Management Project (LVEMP), Dar es Salaam.

Kuhn A. (2003), The Logic of Social systems. San Francisco: Jossey- Bass.

Lehman, J.T. 1996. Pelagic food webs of the East African Great Lakes. In: *The Limnology, Climatology and Paleoclimatology of the East African Lakes.* Johnson, T.C. and Odada, E. (eds). Gordon and Breach, Toronto, pp. 281-301.

Lewis, D. (2001). *The Management of Non-Governmental Development Organisations: An Introduction*. Routledge. Taylor and Francis Group.

Ligtvoet, W. and Mkumbo, O.C. 1991. A pilot sampling survey for monitoring the artisanal Nile perch *Lates niloticus* fishery in the southern Lake Victoria (East Africa).

LVFO 2000. *The Results of the First Regional Fisheries Frame Survey on Lake Victoria.* Lake Victoria Fisheries Organization Publication. Jinja, Uganda.

McCleave, J. M., Booth, K., & Espiner, S. R. (2004). Love thy neighbour? The relationship between Kahurangi National Park and the border communities of Karamea and Golden Bay, New Zealand.

Mitlin, D., Hickey, S., and Bebbington, A. (2005). "Reclaiming Development? NGOs and the Challenge of Alternatives."

Mkisi, M. (1991). *Fisheries Socio-economic Surveys for the Tanzanian Side of Lake Victoria.* Paper presented at the Symposium of Socio-Economic Aspects of Lake Victoria Fisheries,

Mkumbo, O.C. 1999. Recent trends in the distribution patterns and catch rates from trawl surveys in Lake Victoria, Tanzania

Mkumbo, O.C. and Cowx, I.G. (1999). Catch trends from Lake Victoria – Tanzanian waters.

Mugenda Olive,Mugenda Abel, (1999), *Research Methods: Qualitative aand Quantitative Approaches African Centre for Technology Studies*, Nairobi, kenya

Mugidde, R. 1993. The increase in phytoplankton productivity and biomass in Lake Victoria (Uganda).

Namisi, P.W. 2000. *Socioeconomic Implications of the Fish Export Trade on the Fishers and Fisheries of Lake Victoria in Uganda.*

Nelson, J. G., Day, J. C., Sportza, L. M., Vazquez, C., & Loucky, J. (2003). *Overview of protected areas and the regional planning imperative in North America*: integrating nature conservation and sustainable development.

Newswatch. Nationalgeographic.com/2010/02/lake_chad_ramsar_convention.

Ntiba, M.J., Kudoja, W.M. and Mukasa, C.T. 2001. Management issues in the Lake Victoria watershed. *Lakes Reservoirs: Res. Mgmt 6,* 211-216.

Odada, E.O., Olago, D.O., Bugenyi, F., Kulindwa, K., Karimumuryango, J., West, K., Ntiba, M., Wandiga, S., Aloo-Obudho, P. and Achola, P. 2003. Environmental assessment of East African Rift Valley lakes. *Aquat. Sci. 65,* 254-271.

Odongkara, O.K. and Okaronon, J.O. 1999. Impact of economic reforms on the performance of fish processing firms and the fisheries resource.

Onen, D. and Oso,WY(2008*), A general guide to writing Research Proposal and Report. Ahand book for beginning researchers,* Makerere University, Kampala

Othina, A. 1999. The status of the artisanal fishery of Lake Victoria, Kenya.

Republic of Kenya (2001). The 1999 Population & Housing Census: Counting our people for development Vol II: Socio-Economic profile of the Population. Central Bureau of Statistics, Ministry of finance and planning. Nairobi.

SEDAWOG 1999. *Marketing Study.* LVFRP/TECH/99/02, The Lake Victoria Fisheries Research Project Technical Document No. 2, Jinja, Uganda.

SEDAWOG 2000. Fisheries co-management options at Kiumba beach: a participatory pilot study. LVFRP/TECH/00/08, The Lake Victoria Fisheries Research Project Technical Document No. 6, Jinja, Uganda.

Shepherd, K., Walsh, M., Mugo, F., Ong, C., Hansen, T.S., Swallow, B., Awiti, A., Hai, M., Nyantika, D., Ombao, D., Grunder, M., Mbote, F. and Mungai, D. 2000. *Improved Land Management in the Lake Victoria Basin: Linking Land and Lake, Research and Extension, Catchment and Lake Basin.*

Shivji, I.G. (2004). "Reflections on NGOs in Tanzania: What We Are, What We Are Not, a nd What We Ought to Be." *Development in Practice*, Volume 14, Number 5, pp. 689-695.

Smillie, I. (1999). "At Sea in a Sieve? Trends and Issues in Relationship Between Northern NGOs and Northern Government," London.

Smith M., B. L. Allen, and David A. Haukos. 1997. *Effects of sedimentation on Playa wetland volume.* Ecological Applications 7

Talling, J.F. 1966. The annual cycle of stratification and phytoplankton growth in Lake Victoria. *Int. Rev. ges. Hydrobiol. Hydrogr. 51,* 545-621.

Tendler, J. (1997) *Good government in the tropics.* Baltimore. MD, USA, Johns Hopkins University Press.

Turner and Hulme (1997) NGOs and Their Role in the Global South - IJNL Vol. 9 Iss. 1

URT, 2001. Poverty Monitoring Master Plan, Dar es Salaam. URT, 2000. *Poverty Reduction Strategy Paper.* Dar es Salaam. World Bank, 2005. Study on Growth and Environment ...

Verschuren, D., Johnson, T.C., Kling, H.J., Edgington, D.N. Leavitt, P.R., Brown, E.T., Talbot, M.R. and Hecky, R.E. 2002. History and timing of human impact on Lake Victoria, East Africa. *Proc. Roy. Soc. London B. 269,* 289-294.

Wandiga, S. and Onyari, J. 1987. The concentration of heavy metals: Mn, Fe, Cu, Zn, Cd and Pb in sediments and fish from the Winam Gulf of Lake Victoria and fish bought in Mombasa town markets. *Kenya J. Sci. 8,* 5-18.

World Bank 1996. *Kenya, Tanzania and Uganda: Lake Victoria Environmental Management Project.* GEF Documentation Report No. 15541 – ARF.

World Bank 1996. *Kenya, Tanzania and Uganda: Lake Victoria Environmental Management Project.* GEF Documentation Report No. 15541 – ARF.

World Bank 1999. *Country Profiles* (Burundi, D.R. Congo, Tanzania, Zambia). (http://www.worldbank.org.html.extdr/offrep/afr)

WWW.dep.state .fl.us/beaches/publications/pdf/Hcp Bronchure 09 .pdf

WWW.hemingways.co.ke/Lake -Turkana

WWW.KVDA.go.ke/tourism.html

WWW: Public.asu.edu/-majansse/pubs/egec.pdf

WWW: sage performance.com/drjesffallen/DrA/……/5480/sample size.htm

WWW.tanariverdelta.org/tana/975DSY/version/default/part/attachmentData/Data/MUMIAS Tana_EIA_part 5.pdf)

WWW: unep.org/dewa/giwa/publications/articles/ambio/article-3pdf

WWW: unep.org/dewa/giwa/…/causal-chain-analysis-giwa- r47.pdf

WWW:worldlakes.org/uploads/report2.pdf

www.Zambia tourism.com/travel/places/tanganyi.htm

Yongo, E.O. 2000. *Poor Fisheries, Poor Fisherfolk: Sustaining the Fisheries of Lake Victoria for Future Use.* MSc. Thesis, University of Hull, Hull, UK. 114 pp.

Zube, E. H. (1995). No park is an island. In J. A. McNeely (Ed.), *Expanding partnerships in conservation* (pp. 160-177). Washington, DC: Island Press.

Appendix I

Letter of Transmittal

University Of Nairobi,
P. O Box 30197,
Nairobi.

Dear Respondent,

I am Gregory Odhiambo Ouko, a master of arts (Project Planning and Management) student at the university of Nairobi, Kisumu campus. As part of the master degree requirement, I am conducting a study on factors influencing the conservation of Lake Victoria beaches in Kisumu East District – Kisumu County.

The study's recommendations may be used to formulate and implement policies on enhanced management of the beaches and Lake Victoria as a resource. You are therefore requested to provide relevant information using the questionnaires provided. All responses will be treated with a lot of confidentiality.

Thank you in advance for supporting this study.

Yours sincerely,

Gregory Odhiambo Ouko
Lead Researcher

Appendix II

Beach population Questionnaire

Introduction

I am ....., thank you for agreeing to fill this questionnaire. You have been identified as one of the individuals who have interest in this beach and you have the opportunity of contributing to this study which seeks to know the activities influencing the conservation of Lake Victoria Beaches. The questionnaire focuses on three main themes:

1. Investigating the extent to which economic activities influence conservation of Lake Victoria beaches.
2. Examining the level at which socio cultural practices influence conservation of Lake Victoria beaches.
3. Establishing how government policy influences conservation of Lake Victoria beaches.

I assure you of strict confidentiality. Do you have any questions at this point?

SECTION A: Demographic information

1. **Gender**

□ Male □ Female

2. **Age**

□ 15-25□ 26-36□ 37-47□ 48-58 □ 59+

3. **Education level**

□ Primary□ secondary □ Tertiary □ University □Other specify……

SECTION B. Economic activities

4. **What are the economic activities taking place in this beach?**

□ Fishing □Shop keeping □ Car wash □ Agriculture □Eco- Tourism□ Sand mining

□ Weaving □Charcoal burning □Hotelier □ Tree nursery □Other specify……..

5. Rate the extent at which the following economic activities influence the conservation of the beaches?

Activities	**Rate**			
	Large extent	Moderate extent	Low extent	None
Fishing				
Weaving				
Hoteliers				
Sand mining				
Shop keeping				
Boat rides				
Charcoal sale				
Eco-tourism				
Tree nursery				
Other specify				

6. If it affects the conservation to a large, moderate and low extent, then how? Tick all that apply

□ Water pollution □ Water purified □ Increased household income

□ Depleted fish stock □ Increased soil erosion and Lake sedimentation

□ Increased forest cover□ Increased waste □Other specify……..

SECTION C: Socio-cultural practices

7. Rate the extent at which the following Socio-cultural practices influence the conservation of the beaches?

Activities	**Rate**			
	Large extent	Moderate extent	Low extent	None
Recreation				
Health facilities				
Religious activities				
Un-planned settlement				
Education				
Waste disposal/sanitation				
Lake water for domestic use				
Other specify…….				

8. If it affects the conservation to a large, moderate and low extent, then how? Tick all that apply

□ Water pollution □ Water purification □ Environmental awareness

□ Depleted fish stock □ Increased soil erosion and Lake sedimentation

□ Increased forest cover □ Increased waste

□ High prevalence of communicable diseases □Other specify……..

SECTION D. Government Policy

9. Do Government representatives/agencies and NGOs come to this beach?

□ Yes □ NO□ Don't know

10. If yes, who are they?

□ Chiefs/Assistant chiefs□ Fisheries Officer□ Municipal Environment Officer □ District Environment Officer□ NEMA □ Environmental NGOs □ others specify…….

11. What activities are they involved in that assist in the conservation of the beaches?

□ Policy formulation and implementation □ community mobilization □ Law enforcement □ Advocacy □ Other specify

12. To what extent have they succeeded in the conservation of this beach?

□ Large □ Moderate □ Low □ Don't know

13. Are you also involved as a resident of this beach?

□ Yes □ No □ Don't know

14. If yes, how?

□ Policy formulation and implementation □ community mobilization □ Law enforcement □ Advocacy □ Other specify

Appendix III

Observation schedule

1. General organization of the four selected beaches
2. Economic, Socio-cultural and political activities taking place within the four selected beaches
3. Condition of the beach environment

Appendix IV

IV.1

A photo showing eroded beach surface and cows grazing at Dunga beach

IV.2

A photo showing car washing and poor waste disposal at Lwan'gni beach

1V.3

Lwang'ni beach with no Toilets and environmental warning signs

APPENDIX V

DETERMINATION OF SAMPLE SIZE FOR RESEARCH ACTIVITIES

Table for determining needed sizes of a randomly chosen sample from a given finite population of n cases such that the sample proportion ***p*** will be within. 05 of the population proportion *p* with a 95 percent level of confidence.

Population	Sample size	Population	Sample	Population	Sample size
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	100000	384

Adapted from RV Krejecie and DW. Morgan, "Determining Sample Size for Research activities," educational and Psychological Measurement, 30 (3), p,608, copyright 1970 sage publications, Inc. Reprinted by Permission of Sage Publications, Inc.

Appendix VI

REPUBLIC OF KENYA

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telegrams:"SCIENCETECH", Nairobi
Telephone: 254-020-241349, 2213102
254-020-310571, 2213123.
Fax: 254-020-2213215, 318245, 318249
When replying please quote

P.O. Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke

Our Ref: **NCST/RRI/12/1/ES-011/45/4**

Date: **29th July 2011**

Gregory Odhiambo Ouko
University of Nairobi
Kisumu Campus
P. O. Box 825 - 40100
KISUMU

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on **"Factors influencing the conservation of Lake Victoria beaches in Kisumu East District, Kisumu County"** I am pleased to inform you that you have been authorized to undertake research in **Kisumu East District** for a period ending ***31st December, 2011.***

You are advised to report to **the District Commissioner, the District Education Officer, the District NEMA Officer & Kisumu Municipality Environmental Officer** before embarking on the research project.

On completion of the research, you are expected to submit **one hard copy and one soft copy** of the research report/thesis to our office.

P. N. NYAKUNDI
FOR: SECRETARY/CEO

Copy to:

The District Commissioner
Kisumu East District

The District Education Officer
Kisumu East District

PAGE 2

THIS IS TO CERTIFY THAT:
Prof./Dr./Mr./Mrs./Miss/Institution
Gregory Odhiambo Ouko
of (Address) University *of Nairobi*
P.O. Box 825, Kisumu
has been permitted to conduct research in

Winam	Location
Kisumu East	District
Nyanza	Province

on the topic: Factors influencing the conservation of Lake Victoria beaches in Kisumu East District-Kisumu County.

for a period ending 30th December 2011

PAGE 3

Research Permit No. *NCST/RR1/12/1/ES-011/453*
Date of issue *29th July 2011*
Fee received *KES1,000*

.....
Applicant's Signature

.....
Secretary
National Council for Science and Technology

Appendix VII

CONDITIONS

1. You must report to the District Commissioner and the District Education Office of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit
2. Government Officers will not be interviewed with-out prior appointment.
3. No questionnaire will be used unless it has been approved
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2)/four(4) bound copies of your final report for Kenyans and non-Kenyans respectively.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice

REPUBLIC OF KENYA

RESEARCH CLEARANCE PERMIT

GPK6055t3mt10/2011

(CONDITIONS—see back page)