DETERMINANTS OF UTILIZATION OF RESEARCH FINDINGS AND POLICY IMPLICATION ON ENVIRONMENTAL MANAGEMENT AMONG FISHER FOLKS IN KISUMU CITY, KENYA

BY

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SCHOOL OF ENVIRONMENT AND EARTH SCIENCES

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DECLARATION

Declaration by Candidate

I hereby declare that this Thesis is my original work; it has never been partly or wholly presented to any institution for award of certificate, diploma or degree to the best of my knowledge.

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The work in this thesis has been carried out under our supervision as university supervisors

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DEDICATION

Dedicated to the Almighty God, who has given me tremendous inspiration and strength during my studies at Maseno University in Kenya, as well as my two grandparents, Herenia Adipo and Lewtina Orina Okoko. You had a big impact on my academic life from elementary school to this point. You were never present when I achieved my goal.

ABSTRACT

Around the world, human activities such as resource exploitation and pollution have put the natural environment in peril. Lake Victoria is no exception to this dilemma, as it suffers from pollution and over-exploitation of its resources, yet supporting a diverse range of socio-economic activity. In the Lake Victoria Basin (LVB), many empirical studies on environmental and fisheries research have been conducted, but only a few have been used or distributed to fishermen, despite the fact that policies exist to encourage the use of research findings. Despite the availability of study findings and policy, Kisumu City continues to face ecosystem health issues such as poor water quality, inadequate fish product handling, and diminishing fish catches. This is most likely due to resource users' inadequate application of study findings. As a result, the purpose of this research was to investigate the factors that influence research utilization and policy implications in environmental management among Kisumu City fisherfolks. The goal of this study was to determine how socioeconomic factors, information distribution channels, and policy issues influenced how research findings were used in environmental and fisheries management. In this study, a cross-sectional research design was used. From a population of 15,179 fisherfolks, 384 were chosen using stratified random selection. The household data was collected, and the unit of analysis was the household head, who may be either a father or a mother. Data was collected from policymakers at County and National level. Purposive sampling was used to choose all 11 policymakers for the research. The two sets of questionnaires used to collect data from fishermen and policymakers were piloted in Nyamuare and Homa-bay counties. A cronch alpha of 0.8 demonstrated significant ralibility of questionnaires. 8 key informants were purposively sampled and interviewed. 9 Focus Group Discussions were conducted using FGD guide. Analysis of the data revealed that 52.8% and 63.8% of fisherfolks had no access to environmental research findings and fisheries research findings respectively. Radio 23.36%, television 17.10% and public baraza 15.8% were the most prefered channels for deseminating research findings. Accordingly, 55% of the policymakers revealed that environmental research disseminating policy exist but 83% of them decried of no political good will from the government and lack of financial resources leading to poor utilization of environmental and fisheries research findings. Chi-Square test revealed that under socioeconomics, education (0.020) was significant influencer of utilization of fisheries research finding at p value 0.05. Furthermore, the most preferred dissemination channels of environmental study findings were radio ($p=0.001$), television ($p=0.000$), and newspaper ($p=0.000$) at ($p <0.05$). It was recommended that capacity buildings and intensified social support network like cash transfer was necessary to increase utilization of environmental research. More environmental and fisheries research finding information should be disseminated through radios and public baraza. Increased fundings and minimum political interference in pertinent environmental issues would improve environmental quality in LVB. This findings will enhance effective dissemination and application of environmental and fisheries research findings by Government and fisherfolks respectively for improvement of environmental and fisheries management.

TABLE OF CONTENTS

DECLARATION ii
ACKNOWLEDGEMENT iii
DEDICATION iv
ABSTRACT v
TABLE OF CONTENTS vi
LIST OF ABBREVIATONS AND ACRONYMS viii
WORKING DEFINITION OF TERMS ix
LIST OF TABLES x
LIST OF FIGURES xii
LIST OF PLATES xiii
CHAPTER ONE: INTRODUCTION 1
1.1 Background to the Study 1
1.2 Statement of the Problem 13
1.3 Objective of the Study 14
1.3.1 General Objective 14
1.3.2 Specific Objectives 14
1.4 Research Questions 14
1.5 Justification of the Study 15
1.6 Scope and Limitation of the Study 15
CHAPTER TWO: LITERATURE REVIEW 18
2.1 Introduction 18
2.2 Influence of Socioe-conomic Factors on the Utilization of Research Findings 18
2.3 Influence of Dissemination Channels on the Utilization of Research Findings 23
2.4 Influence of Policy Issues on the Utilization of Research Findings 30
2.5 Theoretical Framework 42
2.5.1 Rogers Diffusion Innovation Theory 43
2.5.2 The Theory of Change 44
2.6 Conceptual Framework 46
CHAPTER THREE: RESEARCH METHODOLOGY 49
3.1 Introduction 49
3.2 Study Area 49
3.2.1 Location 49
3.2.2 Climate 50
3.2.3 Human Population 50
3.3 Research Design 51

3.4 Population of the Study 52
3.5 Sample Size and Sampling Procedure 52
3.6 Data Collection Methods 54
3.7 Reliability and Validity 55
3.8 Data Analysis 56
3.9 Research Ethics 57
CHAPTER FOUR: RESULTS AND DISCUSSION 58
4.1 Introduction 58
4.2 Response Rate 58
4.3 Demographic Information 59
4.3.1 Gender 59
4.3.2 Marital Status 60
4.3.3 Age 61
4.3.4 Occupation 62
4.3.5 Number of Dependents 63
4.3.6 Highest Education Level 63
4.3.7 Number of Years Stayed in the Region 64
4.4 Manifestation of Study Variables 65
4.4.1 Socioeconomic Factors 65
4.4.2 Methods of Disseminating Environmental and Fisheries Research Findings 69
4.4.3 Utilization of Research Finding 71
4.5 Test of Research Objectives 76
4.5.1 Influence of Socioeconomic Factors on the Utilization of Research Findings 76
4.5.2 Influence of Dissemination Channels on the Utilization of Research Findings 86
4.5.3 Policy Issues that Act as Barriers and Facilitators in the Utilization of Research Findings 92
4.6 Chapter Summary 100
CHAPTER FIVE: SUMMARY OF KEY FINDINGS, CONCLUSION AND RECOMMENDATIONS 101
5.1 Introduction 101
5.2 Summary of the Key Findings 101
5.3 Conclusion 102
5.4 Recommendations 103
5.5 Limitations of the Study 104
5.6 Suggestions for Further Research 105
REFERENCES 106
APPENDICES 116

LIST OF ABBREVIATONS AND ACRONYMS

CBOs	Community-Based Organizations
GoK	Government of Kenya
ICT	Information and Communication Technology
INLA	Integrated Nested Laplace Approximation
KEMRI	Kenya Medical Research Institute
KIPPRA	Kenya Institute of Public Policy Research and Analysis
MPA	Marine Protected Areas
LVB	Lake Victoria Basin
LVEMP	Lake Victoria Environmental Management Project
NACOSTI	National Commission of Science Technology and Innovation
NEMA	National Environment Management Authority
NGOs	Non-Government Organizations
SPSS	Statistical Package for Social Scientists
VIRED	Victoria Research and Development

WORKING DEFINITION OF TERMS

The following key terms are operationally defined as follows

Determinant: A factor that influences the utilization of research findings.

Ecosystem: Within the Lake Victoria Basin, a complex system where living species and the physical environment interact.

Environment: The surrounding and fisheries activities within the Lake Victoria Basin.

Environmental degradation: The process through which socioeconomic activities of the communties around Lake Victoria are affecting its ability to support life systems.

Environmental management: The control of pollution and fishing efforts within the Lake Victoria Basin.

Environmental research findings: Refers to all the research done on terrestial areas within LVB which covers physical, biological and chemical of intereaction of living organisms and its environment. These research findings can be used to understand the terrestial ecosystem better and how to use them in a sustainable way.

Fisher folk: The consumers of fish, traders such as fish mongers and fisher men and boat makers, within Lake Victoria.

Policy: A government guideline which guide the utilization of environmental research findings and backed by a legislations.

Social economic factor: The usage of research findings in this study was influenced by age, education level, gender, occupation, income level, number of dependants, and marital status.

Utilization of Research Findings: In this study it was the process where the fisherfolks use research which has been generated to solve environmental and fisheries challenges. Specifically on level of awareness, accessibility, application.

LIST OF TABLES

Table 3.1: Sample Distribution 53
Table 4.1: Response Rate 59
Table 4.2: Distribution of Respondents by Gender 60
Table 4.3: Distribution of Respondents by Marital Status 60
Table 4.4: Distribution of Respondents by Age 61
Table 4.5: Distribution of Respondents by Occupation 62
Table 4.6: Distribution of Respondents by Household Size 63
Table 4.7: Distribution of Respondents by Education Level 64
Table 4.8: Number of Years Stayed in the Region 64
Table 4.9: Access to Social Amenities 66
Table 4.10: Average Monthly Income Estimate from Economic Activities 67
Table 4.11: Frequency of Income Payment 68
Table 4.12: Adequacy of Income 68
Table 4.13: Source of Research Information 69
Table 4.14: Frequency of Using Various Research Dissemination Channels 70
Table 4.15: Access to Research on Environmental Management 71
Table 4.16: Utilization of Research Findings in Environmental Management 72
Table 4.17: Access to Research Findings on Fisheries 74
Table 4.18: Utilization of Research Findings on Fisheries 74
Table 4.19: Chi-square Test results for Socio-economic Factors and Access to Environmental Research Findings 77
Table 4.20: Chi-square Test results for Socio-economic Factors and Access to Fisheries Research findings 79
Table 4.21: Chi-square Test results for Socio-economic Factors and Utilization of Environmental Research findings 80
Table 4.22: Chi-square Test results for Socio-economic Factor and Utilization of Fisheries Research Findings 81
Table 4.23: Regression Test of Socio-economic factors and utilization of research finding .85
Table 4.24: Chi-square Test Results for dissemination Channels and Access to Environmental Research Findings 87
Table 4.25: Chi-square Test Results for Dissemination Channels and Access to Fisheries Research findings 88

Table 4.26: Chi-square Test Results for dissemination Channels and Utilization of Environmental Research findings 89
Table 4.27: Chi-square Test Results dissemination channels and utilization of fisheries research findings.....90
Table 4.28: Regression Test.....92

LIST OF FIGURES

Figure 2.1: Conceptual Framework 48
Figure 3.1: Map Showing the Study Area 50
Figure 4.1: Availability of Policies that Promote Utilization of Research Findings 93

LIST OF PLATES

Plate 1: A Restaurant under Construction on a Riparian Section of Dunga Beach 84

Plate 2: Restaurant in Operation on a Riparian Section of Dunga Beach.....85

CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

The environment is made up of both biotic (living) and abiotic (non-living) components that interact to keep the environment healthy (Abdala-Robert *et al*., 2016). The living component of the environment derives most of its benefits from the non-living component of the environment while the non-living factors derive their benefits when living components die (Jesse *et al*. 2017). For biotic components to derive maximum benefits from the natural environment then abiotic factors such as air, water and soil must be free from pollution (Laurance, Sayer & Cassman, 2014). Similar sentiments have been echoed by Lu *et al*. (2013) who noted that pollution causes changes in abiotic factors which could result in devastating effects on the biotic factors.

Environmental sustainability is achievable through the issuance of effective policies and regulations, education, enforcement and application of research findings (Stewart, 2001). As pertains to the link between research and environmental sustainability, a recent study by Birgit, Birgit and Andrew (2015) found that researchers are motivated to create visibility of their environmental research work and driven by the interests of research funders. This studies had strengthen in the sense that they demonstrated that their is a strong link between abiotic factors and the biotic factors. It went further to state that most researcher are driven by the interest of the research funder which is a weakness. Research studies should go beyond the interest of the research funder and cover other factors such as socioeconomic factors, dissemination channels and policy issues which will influence the utilization of the generated research information to conserve the environment. This was as a gap which this research addressed.

The global impact of human activities is increasingly receiving scientific attention as evidenced by the high number of studies that have examined how these activities affect the abiotic natural environment. Human activities such as resource exploitation and pollution, for example, have a variety of repercussions on the natural environment, according to Newbold et al. (2015). According to research by David et al. (2006) and Janse et al. (2015), climate change, overexploitation of renewable and nonrenewable resources, and population growth are all instances of human activities that impact the ecosystem on a global scale. The shape and function of both aquatic and terrestrial ecosystems are quickly changing, posing a severe threat to biodiversity.

For instance, as noted by Stephen, Emily and Zanden (2011) lakes, reservoirs and rivers are the most vulnerable to human actions and pressures as well as the most affected ecosystem. Sharing the same sentiments, Tharme (2003) pointed out that the magnitude of damage caused by human actions to the environment can be demonstrated by the increasingly changing hydrological regimes of rivers worldwide. Therefore, on the basis of these studies, it is apparent that environmental degradation is a prevalent problem, which is further exacerbated by human actions. The Strengthen of this studies are they demonstrate the effect of human activities which are affecting the environmental ecosystems. The weakness in this studies is that they are not going further to come with suggestion on how to use the generated information to reverse the degradation. The prevalence of this problem suggests that there is a need for utilization of environmental, fisheries research information and policy response to solve environmental problems within LVB and beyond. These challenges of utilization of research findings was a gap which formed the basis for this research. This study investigated the socioeconomic factors, dissemination channels and policy issues affecting research utilization.

Grinnell (1917) in USA conducted study to analyse the niche linkages of California Thrasher in the early twentieth century, and studies on the relationship between biotic and abiotic factors can be traced back to that time. The study found that certain biotic and abiotic conditions present in the California Thrasher's ecosystem influenced the birds' nest-site selection behaviour. The researcher noted that ultimately these factors limited the dispersal and distribution of the birds. George and David (1995) implemented a similar study in which they assessed the behaviour of various bird species. The study was conducted over a large geographical area and the results demonstrated that bird species tend to increase from the edge of a particular range to the center. These studies had the strength in the sense that they were able to demonstrate the relationship between the abiotic factors and biotic factors. However the weakness in these studies were they did not go further to demonstrate how they can be used to conserve the environment and its biodiversity. This was a gap which this study address by establishing factors affecting utilization of research findings. Users of resources and policymakers will be interested in this type of research.

In a separate study, Leach, Montgomery, and Reid (2016) examined the impact of biotic variables on species distribution. The researchers used the Integrated Nested Laplace Approximation (INLA) model to examine the prediction abilities of models that only contained abiotic factors to models that included both biotic and abiotic elements. The study found that models that included both biotic and abiotic components performed much better than those that solely included abiotic factors. In light of these findings, the researchers concluded that biotic factors must be considered during species distribution modeling for greater accuracy in predicting species distributions, both now and in the future.

According to Jesse et al., a study done in the United States of America (USA), biotic and abiotic factors are increasingly being identified as interacting to affect broad-scale species

distributions (2017). The relative role of biotic and abiotic factors in shaping species distributions, according to the researchers, is yet unknown. For example, the study found that changes in key anthropogenic factors like land use were underrepresented in species distribution modeling, which reduced the models' predictive capacity. Again these were very important studies which need to be utilised by resource users to conserve the environment but are not used effectively and that is what this study is addressing.

Population growth has been the main driver in environmental degradation and modification (Eric *et al*., 2004). At the moment, it has become difficult to understand and predict how environmental changes will interact since many parts of the earth have been polluted in one way or the other (Novine *et al*., 2010). In Asia which has been experiencing high population growth which has also come with its own demands and challenges too. Among the demand and challenges are needs for more fire wood, more agricultural land to grow more food, increased sanitation challenges due to increase of more informal settlements and processing of waste generated has been a problem. Apart from this, more nutrient enrichment of water bodies has been taking place from untreated sewage discharge, and erosion of nitrogen fertilizers which are used in agricultural activities. In China particularly, 47% of the wet lands are manmade composed of rice paddy and fish ponds (Wolfgang *et al*., 2013). This has led to algae bloom in the water bodies which is a health risk to the surrounding population. The question is, are the people of China aware of this emerging challenges of environmental degradation and what are they doing to address it? Probable various research done on environmental issues are not reaching the people to use them to address these challenges. A similar situation is taking place in Kenya particularly Lake Victoria where serious degradation of environment is taking place and just like China, the public need to be involved and educated to conserve the environment to reverse this trend. Lake Victoria is currently

polluted from many sectors starting with surrounding industries, untreated sewage being discharged into the Lake, oil spillages from refinary systems and poor management of waste products, which all combined has increased the nutrient load of the lake. This has lead to the growth of water hycinth which affects the lake ecosystem which is increasingly becoming clear with each passing day. The strength of this studies were that they demonstrated that environmental degradation is going on despite the availability of those findings. However the weakness in these studies were that they did not go further to address how these research findings can be used to address the environmental challenges. This was a gap which this research addressed to understand the socioeconomic factors, dissemintion channels and policy issues which affect the utilization of research findings.

In South America, which covers 17.8 million square kilometers, environmental degradation is still a severe problem. The continent's population has been growing at a pace of 2.8 percent per year since 2003 (Brea, 2003), and the continent today has a population of 381 million people. The end result has been environmental degradation since waste products are not being managed properly and nutrient enrichment is taking place in water points resulting in algae bloom (Wolfgang et al., 2013). This is particularly experienced in Brazil where there has been growth of agro-industries and urbanization which have resulted in discharge of untreated waste water into rivers and water reservoirs. The precence toxic cyanobacterial bloom has been discovered in 11 out of 26 Brazilian states. These blooms are most prevalent in reservoirs, although they can also be found in coastal lagoons, natural lakes, rivers, and estuaries. There is little information about cyanotoxin analysis to acertain the extend of the bloom. Different authorities in charge of the environment and water quality control are unaware of the repercussions of hazardous cyanobacteria blooms. Authorities' actions are normally handled with caution, and they are only carried out when there is a significant

public uproar. It's common to see that these measures are only in place for a few days after the uproar, depending on how much national attention the issue receives (Ingrid, 2005).

In Brazil just like China very little is done to address the environmental degradation going on and this is probably due to lack of access to research findings which create awareness of effects of socioeconomic activities to reverse the process. In this case probable lack of dissemination of environmental research findings has led to low awareness of effects of environmental degradation and its impact to the environment and population health and this need to be addressed. A similar situation of what is happening in Brazil is happening in Lake Victoria Basin Kenya. The strength of these studies were that it demonstrated that population growth was a factor in in environmental degradation, however the weakness in these studies were, they did not go further to demonstrate what imped the population from using generated research findings to reverse the environmental degradation going on. This was a gap which this study addressed to establish the socioeconomic factors, dissemination channels and policy issues which affect the utilization of research findings.

There are 57 countries in Africa, some of which are small islands, while others, such as the Democratic Republic of Congo and the Central African Republic, are experiencing national turmoil or civil conflict. Despite the existence of many Pan-African research bodies and the involvement of more industrialized countries such as South Africa across the continent, there is a dearth of research interchange in the disciplines of water resource management, agriculture, and public health (Harding, 2004). There is lack of access and creating awareness to various research finds which can be used in management of natural in many countries. A characteristics that that is found in developing countries (Codd *et al*., 2005). Just like Asia the African population is growing very fast especially in cities where the big problem at the

moment are sanitation, discharge of waste and most of it end up in water bodies (Ogutu-ohwayo *et al*., 2006).

This has been observed in Lake Tanganyika, Lake Kariba, Lake Malawi and Lake Victoria. This problem of waste management is also being experienced in large towns and cities which have poor planning and hence compounding the problem (World Bank, 2002). The main drive in degradation of environment has probably been catalyzed by lack of access to environmental research findings to create awareness on socioeconomic activities which are impacting environment negatively. The strength in this studies is that they demonstrate that population in African countries is growing very fast and this has increased the rate of environmental degradation. The weakness in these studies they did not go further to study which the research are not utilised by resource users. This was a weakness and a gap that this study addressed by identifying the socioeconomic factors, dissemination channels, and policy concerns that influenced resource consumers' adoption of research findings.

The impact of cyanobacteria is extremely extensive in Kenya. Ten lakes and river systems have been identified as hotspots. In the Lake Embu disaster, cyanotoxins have been linked to 100 human deaths. In Kenya, there are no surveys or epidemiological research on the relationship between cyanobacteria populations, cyanotoxins, and health, and no information on the negative influence of cyanobacterial mass populations on water supply, water body use, or ecological status (Albay et al., 2003). There are no management actions or instruments in place to mitigate the negative impact of cyanobacteria mass populations and cyanotoxin. There is no educational, training, or awareness-raising material, practice, or needs available. However, there is surprising room for inclusion in aquatic science courses at universities and research institutes (Codd *et al*., 2005). From the foregoing, there is scanty literature on utilization of research findings to reverse environmental degradation taking place. There is

still more to be done in terms of socioeconomic aspects, dissemination methods, policy challenges, and the application of research findings to environmental and fisheries management, which constituted the foundation of this study. This was done to address the difficulties of utilizing research to raise awareness among fisherfolks about the challenges that the lake and its environment experience.

In terms of research results use, works addressing this issue may be traced back to Weiss (1979), who offered a working definition of research utilization. As part of society's intellectual activity, the author claimed that research usage embodied a range of models, including the knowledge-driven model, a problem-solving model, an interactive model, a political model, a tactical model, and an enlightenment model. According to Garner, Kale, Dickson, Dans, and Salinas (1998), a number of factors influence the usage of research findings generated by studies in the United States, including funding constraints, research volume, and the channels via which the findings are communicated. In their research, Almeida and Bascolo (2006) discovered a link between scientific knowledge development and its application in policy formulation and execution. Their findings revealed that research usage in promoting significant change was still low, and that much more work was needed to optimize the benefits of research. The study's strength was that it demonstrated the numerous models that influence how research findings are used. The flaw is that it did not go any farther in highlighting the issues that hinder the application of study findings. This study bridged the gap in the sector. The study looked into the socioeconomic factors, distribution channels, and policy concerns that influence how research findings are used.

According to a recent study by Oliver et al., the use of research findings remains a hurdle (2014). The experts identified a lack of cooperation, a lack of capacity building among users of the findings, and a lack of proper and timely access to the study findings as some of the

major barriers to research consumption. These barriers further reflected that if proper measures are put in place that addresses them, research findings could be used effectively in policy formulation for solving environmental challenges. The same challenge was being experience within LVB which needs to be addressed and that was the basis of this research.

David et al., (2015) investigated ways to improve the contribution of research findings to the transformation of health outcomes in Bangladesh in a study. Workshops, scientific papers, policy briefs, technical assistance to policymakers, and one-on-one interactions with officials are all suggested as strategies to spread research findings. Langlois et al., (2016) found that in order to promote evidence-informed policymaking, there is a need for collaborative engagement between researchers and policymakers. This was very critical as this findings were more on health sector and they are also applicable in environmental science to conserve the environment. This was a gap which this study addressed.

Garner et al. (1998) highlighted insufficient financial resources as one of the primary obstacles impeding the use of research findings in Papua New Guinea in their study. The scholars also emphasized that their findings highlighted the importance of dissemination in promoting awareness of research evidence. Despite the relevance of research findings in the creation of health policies, Albert, Fretheim, and Maiga (2007) noted that their application in policymaking is often fraught with difficulties. Accessibility, the relevance of the study, the legitimacy of the findings, and the amount of time required to translate the evidence into policy were among the problems mentioned by the scholars. Ssengooba et al., (2011) highlighted that research translation is a complicated and ever-evolving process in Uganda, highlighting difficulties to translating research evidence into policy. The scholars further noted that although tertiary institutions such as universities are constantly generating research

evidence, their strategies and approaches to ensuring the evidence is utilized in informing national policies are still weak.

Collins et al. (2011) found that increasing capacity provided assets that allowed communities to respond appropriately to contextual, cultural, and historical health challenges in South Africa. This focused more on health policy and Kaino, Mtetwa and Kasanda (2014) while examining experiences in the utilization of research evidence relating to information and communication technology (ICT) observed that a majority of research studies did not target specific community groups. In other words, the generated research findings did not capture the unique needs of potential end-users. The study recommended the development of policies and strategies for monitoring research outputs and intensification of dissemination efforts. Sombie *et al*., (2013) in their study found that about 50% of West African countries faced challenges in translating research evidence into health policies due to insufficient funds to support research structures and capacity building of researchers.

In Kenya, a report by Jaetzold, Schmidt and Shisanya (2006) revealed that transfer of knowledge from research findings to farmers and rural development organizations in Western Kenya was curtailed by lack of common source of reference. The report also pointed to the need for increased efforts in making research information accessible to the targeted users. Similar findings were obtained by Christian Partners Development Christian Partners Development Agency (2008) who noted that information flow and sharing within the Kenyan tea sub-sector was poor. Dwelling on the tea subsector, Mbigidde (2011) and Rosephy (2012) found that although access to research evidence was a potential avenue for increasing tea yields, little work has been done to quantify the sources of research information and how much they affect the yields. The scholars established that a majority of farmers obtain farming information from extension agents while a few get the information from fellow

agents and the media. In examining the experiences of farmers that participated in farmers field school, Hiller, Onduru and Dejager (2009) found there was a significant increase in farmers' knowledge following exposure to new information and that a majority of them implemented what they had learned.

According to a study by Kimeu (2014), agricultural research initiatives in Machakos County were aimed at contributing to existing knowledge and improving overall quality of life. According to the report, the majority of agricultural research studies in the area concentrated on biodiversity assessment and conventional high yield crops. The assessment also discovered that, despite multiple research attempts, agricultural production remained low, and poverty levels remained high. The studies' strengths were that they were able to bring up concerns that were hurting the environment, but their weaknesses were that they were not able to show how this study could be used to overcome the challenges. This was a void that this study filled.

Lake Victoria, with a surface area of 68,000km2 and a proximity to the research site, is the world's second largest freshwater lake (Linda et al., 2003). Kenya, Uganda, and Tanzania are three East African countries that share it. Kenya accounts for around 6% of the total water mass, Uganda for 43%, and Tanzania for 51%. (Regional Frame Survey Report, 2012). The lake has a catchment area of 193,000 km^2 (Uganda 30,880 km^2, 16 percent; Kenya 42,460 km^2, 22 percent; Tanzania 84,920 km^2, 44 percent; Rwanda 21,120 km^2, 11 percent; Burundi 13,510 km^2, 11 percent) and a population of roughly 35 million people (2009). With a maximum depth of 69 meters, the lake is shallow (Johnson, Kelt & Odada, 2000). A high population around Lake Victoria implies an increase in socioeconomic activities which could potentially cause degradation of the ecosystem due to the equally high demand for environmental and fishery resources. As a result of the expanding population around the lake,

there is a higher demand for resources, which has accelerated the lake's degradation. As a result, research findings must be utilized in order to support well-informed policy responses linked to the lake's resources' long-term sustainability.

The amount of data and study available on Lake Victoria and its drainage system is staggering (Appendix VIII). The number of research studies and projects done to generate knowledge is estimated at about 405 (Lake Victoria Basin Commission (LVBC), 2013). Aquatic vegetation, fish parasites, a variety of fish, the water budget, invertebrates, human socio-economic activities, pollutants dumped into Lake Victoria, and the impact of climate change on the Lake Victoria Basin are just a few of the key topics that have been researched. These environmental and fisheries research findings are important to the people living and working within the Lake Victoria Basin depending on their socioeconomic activities.

Out of 405 research studies, only 9 have addressed how the research evidence could be utilized in solving emerging environmental and fishery problems. In addition, only 13 of the studies are in relation to policy implications on the LVB. Based on the forgoing review, it is noticeable that most of the studies on utilization of research findings have focused majorly on the fields of nursing, health and agriculture.

The utilization of research findings in solving environmental and fishery problems has, however, received very little attention. Assessing the state of utilization of research evidence in environmental and fishery management is critical, particularly in the study site, Kisumu City. This is because the population of the inhabitants in the region is rapidy increasing, degradation of the environment is taking place yet research findings are available that could be used in solving these emerging problems. As a result, in order to aid in the sustainable use of the lake's resources, it is vital to explore socioeconomic elements, dissemination channels, and policy concerns that influence the utilization of research findings.

1.2 Statement of the Problem

Clean air, water, fisheries, land, and forests are all important for citizens' health, business, agriculture, and access to natural and environmental resources like air, water, fisheries, land, and forests. Despite this, the environment of most sub-locations around Lake Victoria's coastlines inside Kisumu city has deteriorated, as indicated by pollution, fish resource depletion, and bad ecosystems. Many studies have been conducted around the Lake with the aim of addressing this environmental degradation. The expectation is that relevant national and County governments, stakeholders and local communities would use the research findings to address these environment issues. However, most of the expected beneficiaries, the fisher folks included, who reside on the shores of the Lake within Kisumu city, majority of whom are fisher folks, rarely utilize the research findings to address the environment challenges and fisheries challenges that they face. The low utilization of research findings by fisher folks could be due to socio-economic factors, channels of dissemination and policies. This study examined into the factors that influence the use of environmental research findings and policy implications for environmental management among Kisumu City's fisherfolks. The determinants examined were socio-economic factors, channels of communication and policies. Literature reveals that studies on utilization of research findings have been conducted in Europe, Asia, United Stated, Africa and Kenya. However, there is hardly any literature on determinants of utilization of research findings and policy implications on environmental and fisheries management among the fisher folk in Kisumu City, Kenya. The research was conducted to address a gap in the literature.

1.3 Objective of the Study

1.3.1 General Objective

The broad objective of this study was to examine the determinants of utilization of research findings and policy implications on environmental management among the fisherfolk in Kisumu City, Kenya.

1.3.2 Specific Objectives

The study was guided by the following specific objectives:

i. To determine the influence of socioeconomic factors (age, education level, gender, occupation, income level, number of dependants, and Marital status) on the utilization of research findings (Level of awareness, accessibility, application) in environmental management among the fisher folk in Kisumu City.

ii. To determine the influence of dissemination channels (baraza, radio, TV, internet, fliers, pamplets, newspaper) on the utilization of research findings (Level of awareness, accessibility, application) in environmental management among the fisher folk in Kisumu City.

iii. To assess policy issues that influence the utilization of research findings in environmental management among the fisher folk in Kisumu City.

1.4 Research Questions

This study was steered by the following research questions:

i. What are the influence of socioeconomic factors (age, education level, gender, occupation, income level, number of dependants, and Marital status) on the utilization of research findings (Level of awareness, accessibility, application) in environmental management among the fisher folk in Kisumu City?

ii. What are the influence of dissemination channels (baraza, radio, TV, internet, fliers, pamplets, newspaper) on the utilization of research findings (Level of awareness,

accessibility, application) in environmental management among the fisher folk in Kisumu City?

iii. What are the policy issues that influence the utilization of research findings in environmental management among the fisher folk in Kisumu City?

1.5 Justification of the Study

For the majority of Kisumu's fisherfolks, the lake is their principal source of income. This group of fisherfolks are likely to lose their source of income in the future as the habitat around the LVB deteriorates.. Therefore, there is a need for research exploring the best practices to utilize the environmental and fishery resources offered by the lake in a sustainable manner. More importantly, there is the need to investigate why existing research evidence linked to the LVB is not translated into policies and practice.

All users of the LVB, including policymakers, will benefit from the conclusions of this study.The findings expose the key barriers and facilitators in connection with the utilization of research findings. The fisherfolks of Kisumu City are expected to be equipped to make informed decisions about the sustainable management of ecosystem resources, ensuring that their source of livelihood is not jeopardized. Furthermore, the outcomes of this study indicate the need for researchers to be more aware of Kisumu City's fisherfolks' information demands and how to better respond to them in the future. Similarly, the study emphasizes the necessity for politicians to develop better regulations that encourage the dissemination of research findings in order to effectively solve environmental and fishery concerns.

1.6 Scope and Limitation of the Study

The research was carried out in Kisumu, Kenya. The study sites were Dunga Beach (Nyalenda B), Paga Beach (Kanyawegi) and Usoma Beach (Kogony). The impact of socioeconomic factors on the use of environmental research findings, the impact of

dissemination channels on the use of environmental research findings, and the impact of policies on the use of environmental research findings in addressing environmental challenges were all investigated in Kisumu City and its environs. The study did not cover other locations or cities where other fisher folks have a stake in Lake Victoria are found. This was due to lack of sufficient funds and resources on the researcher's part to facilitated such a study.

There are several limitations to this study that may have influenced the results. Acquiescence bias, social desirability bias, sponsor prejudice, confirmation bias, cultural bias, and question-order bias all contributed to these limitations. Due to their perception of the interviewers as experts, a respondent's inclination to agree with and be positive about whatever the interviewers provide is known as acquiescence bias. The researcher overcome this constraint by asking questions that focused on the respondents' real point of view rather than those that implied there were correct responses. Respondents with social desirability bias answer questions in a way that they believe would lead to acceptance and liking. By framing questions in a way that reflected their genuine feelings, the researcher was able to reduce prejudice. This allowed respondents to project their own emotions while still giving truthful and representative responses.

When respondents are aware of the research's sponsors, they are likely to be biased. When responding questions, this may have an impact on their sentiments and opinions. The researcher mitigated by maintaining a neutral stand, explaining the purpose of research and informed respondents there was no monetary motivation. Confirmation bias occurs when a researcher adopts an opinion and uses respondent data to corroborate that opinion while rejecting evidence that contradicts it. The researcher mitigated this limitation by continuously re-evaluating the impression of respondents and challenged pre-existing assumptions and

beliefs. Cultural bias is an assumption about motivation and influence that are based on researcher cultural lens. To minimize cultural bias the researcher focused on understanding the culture of the target population and unconditionally positively accepted the way it was. When one question effects the replies to following questions, this is known as question-order bias. Words and concepts offered in questions primed respondents, influencing their thoughts, feelings, and attitudes in following inquiries. This was mitigated by mixing of questions.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter will provide an overview of prior research investigations on the topic of this research. Previous research on the impact of socioeconomic factors on the use of research findings, as well as the impact of dissemination channels on research findings adoption, is highlighted in this study. This chapter also includes a review of studies that looked at policy concerns that could operate as both barriers and facilitators in the use of research findings.

2.2 Influence of Socioe-conomic Factors on the Utilization of Research Findings

Rodgers (2000) investigated the utilization of research findings in nursing education in Scotland. The primary purpose of the study was to determine how frequently nurses used research and what factors made it simpler for them to do so. The findings of the study demonstrated that nurses' educational level and their usage of research findings had a favorable and substantial association. It also emerged that nurses who read at least one research journal regularly had more study leave or attended research courses use research more. Another study was undertaken by Hennink and Stephenson (2005) to explore basic barriers to decision-makers' adoption of research findings. The findings revealed the following stumbling blocks: a lack of understanding of the critical role of research in policymaking and program creation, as well as ineffective packaging of research findings to meet the demands of various policy audiences and practitioners.

In their investigation, Monique and Rob (2006) discovered a number of fundamental barriers to decisionmakers' adoption of research. One of the roadblocks was a lack of understanding of the crucial role that research can play in policy and program development, as well as an inability to package research findings in a way that satisfies the needs of various policy audiences and practitioners. Policymakers do not employ research evidence as much as they could in their decision-making processes, according to Michael, Atle, and Diadie (2007). The

study discovered a variety of reasons that contribute to their inadequate use of research findings. Limited access to research information, uncertain relevance and meaningfulness of research, belief that research is a time-consuming process, distrust in research, incompetence in research methodologies, priority, and accountability were among the factors identified. These studies' strength is that they were able to uncover a variety of roadblocks to policymakers' utilization of research findings. The studies, on the other hand, had limitations in that they did not link the utilization of study findings to the respondent users' age, gender, income level, or marital status. This study was inspired by a gap in the literature.

Albert et al., (2007) looked into the challenges to using research evidence in health policymaking. The researchers discovered that a number of issues hampered health policymakers' use of research findings. Limited access to information, a lack of clarity on the usefulness of research, the time-consuming nature of the process, disbelief in research, competency concerns over research methodology, misguided priorities, and a lack of responsibility are some of these factors.

In a systematic review-based study in Canada, Squires et al. (2011) studied the factors that influence nurses' use of research. The researcher used 12 online bibliographic databases and conducted a large-scale, systematic review of research utilization tools. He searched specialist journals as well as ancestry.com. To investigate the link between individual characteristics and nurses' utilization of research, the researcher employed randomized controlled trials, clinical trials, and observational studies. The findings revealed that, at a 5% level of significance, the use of research findings was positively and substantially related to nurses' beliefs and attitudes, information seeking behavior, education, and professional qualifications.

Fahad et al. (2018) explored the association between personal traits and research findings utilization in the Pakistani province of Khyber Pakhtunkhwa (KPK). At a 5% level of significance, the researchers discovered a positive and significant relationship between age and the use of research information. Education was also found to have a significant impact on the usage of scholarly content transmitted on radio, according to the study. A study by Yaseen, Shiwei, Wen, and Hassan (2015) found a favorable association between the utilization of research findings and the educational level of the users in Pakistan.

Ofi, Sowunmi, Edet, and Anarado (2008) explored perceived barriers to applying research findings in Nigeria. Half of the respondents were enthusiastic about research and the use of research evidence in their practice, according to the survey's findings. At a 5% level of significance, the results also showed that education had a substantial impact on the nurses' knowledge base. One of the most major barriers preventing nurses' adoption of research findings, according to the study, is their incapacity to read research reports and statistics. The strength of these studies was that they were crucial in establishing a link between educational attainment and the application of research findings. The study, however, did not look at the impact of other socioeconomic characteristics on the use of research findings. This is a void that the study attempted to fill.

In another study by Oduwaiye, Owolabi and Onasanya (2009) found that 72% of the respondents did not engage in development of research for utilization by larger society but were more interested in career advancement. The Framework for Agricultural Research in Africa (2006) conducted a similar study and found that agricultural research findings were underutilized by the end users, farmers. These studies were successful because they were able to identify a variety of factors that influence how research findings are implemented.

Inadequate public investment in agriculture, a scarcity of well-trained researchers, inadequate research infrastructures, and poor management of agricultural research and development institutions have all been recognized as bottlenecks to the adoption of research findings. The studies' flaw was that they didn't go any further in linking the influence of socioeconomic factors on the end consumers who benefited from the research. This was a void that this study filled.

Abdelgadir (2012) investigated the barriers to mental health treatment use at the research, policy, and facility levels in a recent study done in Khartoum, Sudan. According to the findings, a family's socioeconomic situation, treatment expenses, and family burdens all influenced the use of mental health services and research. Limited exposure, unwillingness to use research, lack of knowledge, poor training, and a lack of research experience were all identified to be barriers to the application of educational research findings in a study conducted in Botswana by Adedoyin (2015). In their study, Ritchie et al. (2016) looked into the main barriers to the use of research evidence in Kosovo, Myanmar, Uganda, Malawi, and Tanzania. According to the study, the most major impediments to using research evidence include cultural practices, beliefs, a lack of training capacity, insufficient time, and a lack of defined regulations. These studies were notable for shedding light on the relationship between the use of research findings and characteristics such as beliefs, cultural practices, and family socioeconomic position. However, these studies did not look into the relationship between the use of research findings and other socioeconomic characteristics such the users' age, gender, or marital status. This was the gap that the research attempted to close.

Mugwe, Mairura, Kimaru, Mucheru-Kuna, and Mugendi (2012) conducted a study in Kenya to investigate the factors that influence small-scale farmers in the Central Province's adoption and application of soil fertility management practices and research knowledge. Farmers' use

of soil fertility management practices and research was influenced by factors such as age, income, employment, household size, membership in agricultural organizations, and access to extension services, according to the study. In Kenya's central highlands, Kimaru et al. (2012) investigated the impact of education levels on the distribution of information regarding soil fertility management. The results revealed a favorable and significant link between educational attainment and information access. Finally, the researchers discovered that the type of communication utilized in the transfer of soil fertility study knowledge to end users is affected by the level of education.

Waithaka, Thomton, Shepherd, and Ndiwa (2007) examined the factors that influence small-scale farmers' fertilizer and manure information use in Vihiga County. The use of fertilizer and manure information was shown to be mostly influenced by household size. In their recommendations, the scholars noted that the effective use of research information could be enhanced by promoting farmers' education on the latest research information pertaining to fertilizers and manure. Additionally, Wanjiru, Kabara and Milimo (2016) found that utilization of research findings among physiotherapists in Moi Teaching Referal Hospital was affected by lack of information resources, poor implementation, poor organization, inadequate resources and insufficient time. However, the study found that awareness of research and confidence in evidence-based practice were significantly high. Although these studies demonstrated the link between utilization of research findings and socio-economic characteristics, factors relating to age, occupation, income level, number of dependents and marital status were not addressed. This was a void that this study sought to fill.

According to this evaluation of the literature, the bulk of studies have focused on domains other than fisheries and environmental management. The majority of the studies were focused on agriculture and nursing. It's also clear that no research has looked at the impact of socioeconomic factors on the application of research findings in Kisumu City's environmental and fishery management. As a result, it was discovered that a knowledge gap existed. This study looked into the impact of socioeconomic factors on the application of research findings in environmental and fishery management.

2.3 Influence of Dissemination Channels on the Utilization of Research Findings

Several research have been carried out to see how dissemination channels affect the usage of scientific evidence. For example, Miles and Huberman (1994) looked into the current state of research use in the United States. Despite the accumulation of replicable research findings for bridging the gap between theory and practice, the study found that the gap between social problems and social science's ability to provide credible, dependable, and usable responses remained a barrier. Trostle, Bronfaman, and Langer (1999) showed that formal communication channels and mass media played a substantial influence in the dissemination of research findings and the formation of consensus in another study conducted in Mexico.

Scullion (2002) in a study in USA investigating effective research dissemination strategies in nursing practices found identified the source, the nature of the message, medium and target groups as crucial elements in the dissemination that require careful consideration. Lashgarara, Mirdamadi, and Hoessini (2011) discovered that radios, televisions, audio cassettes, workshops, and scientific visits were the most efficient dissemination channels employed to support the development of food security in Iranian rural families. The employment of printed media as a means of delivering information to rural families was also discovered to be effective. The strength of these studies were that they were able to demonstrate that many research findings have been generated to solve the various societal problems. However,

despite the availability of avenues through which research findings might be disseminated, these studies were unable to illustrate why the numerous research discoveries generated are not utilized to solve various problems. This research filled a gap in knowledge of how the different avenues available for disseminating research findings are used to enhance uptake.

Walugembe, Kiwanuka, Matovu, Rutebemberwa, and Reichebach (2015) investigated how research findings are used in Bangladeshi health policymaking and practice. Despite the development and collection of huge amounts of research data, the study's findings revealed that research evidence is still not being translated into policies and practices. The researchers also discovered a variety of strategies for improving research findings' dissemination in policy and practice. These strategies entailed the use of research dissemination workshops, publishing of scientific papers, development of policy briefs, and the usage of advocacy groups.

Garnert et al. (1998) investigated the level of research findings implementation in developing nations. According to the conclusions of the study, one of the greatest hurdles to the implementation of evidence-based procedures is a lack of financial resources. The researchers stressed the necessity of choosing the right distribution channel for boosting the translation of research results into policy and practice in their suggestions. According to Hill, Enock, and Brogan (1999), translating research findings into policy and practice in poor nations necessitates a well-organized process that includes workshops and published work.

Freshwater fisheries in Africa, according to Ogutu-ohwayo and Balirwa (2006), are vital sources of cash and protein for the continent's inhabitants, as well as a biodiversity stock. The conclusions of the study depicted the experiences of eight significant lakes (Baringo, Chad, Kariba, Malawi, Naivasha, Nakuru, Tanganyika and Victoria). The findings revealed a lack of awareness to create effective management actions due to limited accessibility, scientific

information utilization, poor dissemination of research findings, poor information management, unharmonized fisheries laws and regulations, inadequate enforcement of existing laws and regulations, weak institutions, and insufficient funds for implementation. The strength of these research findings is that they might show that a large number of research findings have been developed to aid in the resolution of social issues.The researches further demonstrated that proper dissemination of research findings is a challenges. This study did not delve deeper into the various routes for disseminating research findings and their effects on their use. This study filled a void in the sector.

Kaino et al., (2014) investigated how information communication and technology (ICT) studies were transmitted and used at three South African universities. The most significant hurdles to the use of research findings, according to the survey, were difficulties in effectively disseminating research information. The experts stressed the importance of developing policies and procedures for monitoring research outputs and increasing research dissemination in their recommendations.

In a recent study in Ado-Ekiti, Ekiti-State, Nigeria, Familusi and Owoeye (2014) discovered that radio is the most essential instrument for information dissemination. This is because radio can reach a large number of people regardless of their location. Radio was regarded an excellent platform for spreading awareness of sociopolitical and economic issues, as well as helping people to be appropriately informed about government programs and activities, due to its extensive reach. In addition, the study discovered that receiving information via radio, television, or mobile phone was not as expensive as receiving information via other channels such as the Internet, satellite, or cable television.

Farmers in Oyo State, Nigeria, used radio programs to promote agricultural commodities, according to Oyeyinka, Bello, and Ayinde (2014). According to the study, the majority of farmers depended on radio agriculture programs for market information. It was also observed that there was a substantial link between the use of radio programs and the farmers' primary occupation and educational level, at a 5% level of significance. The statistics, on the other hand, revealed that there was no statistically significant link between the farmers' age and marital status and their radio listening habits. Furthermore, the study's findings demonstrated a positive and significant relationship between farmers' level of awareness and their intake of radio programs at a 5% level of significance.

Musa, Githeko, and Elsiddig (2013) looked into the constraints of using information and communication technologies to reach Sudanese farmers with agricultural knowledge. The study also wanted to see how much ICT usage changed how agricultural information was distributed to farmers. The study also looked into socioeconomic issues, as well as cultural and technical barriers, that affect ICT use. Print media was found to be the most common means of dissemination (30%), followed by radio (20%), and television (20%), according to the study (15 percent). Farmers preferred radio (21.9 percent), followed by print media (15.33 percent), and finally television (15.33 percent). The studies also revealed that social, technological, and cultural factors influenced the adoption of ICT distribution channels. Furthermore, at a 5% level of significance, the study identified strong links between socioeconomic, cultural, and technological factors and the usage of ICT in the dissemination of agricultural information. The strength of these studies was that they were able to demonstrate the popular method of dissemination of research findings to solve the societal problems. However the weakness in these studies were they were not linking the

dissemination channels and how the research findings are utilised. This was a gap which this study addressed.

Asaba *et al*., (2006) noted that for Kenya and Uganda, agricultural information was found to be key component in improving small scale agriculture. This is because agricultural production leads to improvement in food security and national economy for the countries. The authors noted that agricultural information in the two countries is disseminated through internet, mobile phone, fax and radio. In addition, the scholars asserted that for the success of the dissemination process, there needs to be good partnership between producers and consumers of information. This was a strength in this study, however the weakness is it was not able to demonstrate to what extent the channel influence the utilization of research generated. This was a gap which this study addressed.

A study by Mbigidde (2011) observed that the flow and sharing of agricultural information in the Kenyan tea sub-sector is poor and lacking. The author established that this poor dissemination of agricultural information was a result of bureaucracies in the flow of information among the produces of the information. Tea production in the country has been found to be hampered by a lack of agricultural knowledge. In a separate study, Onyango, Wegulo, and Shivoga (2011) discovered that low adoption and utilization of research findings for sustainable management of the Lake Naivasha Basin were hampered by stakeholders' lack of access to research information, the use of technical language in research information, and end users' low levels of education.

To optimize the use of research findings, the researchers advised that a stakeholder advisory board be formed to manage the research evidence generated. The strength of these studies were that they where able to demonstrate sharing research information is very important to solve societal problems and the studies demonstrated formation of stakeholder board to

manage the research information was very important. However the weakness in these studies, they were not linking the dissemination channels and how the research findings are utilised. This was a gap that this study sought to fill in order to better understand dissemination channels and how they effect the usage of research findings.

Koskei, Langat, Koskei, and Oyugi (2013) discovered that access to research knowledge leads to an increase in tea yield in a case study of Bomet County. Income, education level, household size, and marital status all influenced access to research materials, according to the study. Mwombe et al. (2014) investigated the use of information and communication technologies (ICTs) in banana production and marketing in Kenya's Gatanga District. According to the scholar, the most extensively used ICTs for getting information about banana production and marketing were radio, television, and mobile phones. Computers, internet services, and video cassettes were the least accessible and used ICTs. Smallholder banana farmers' use of ICT tools as a source of agricultural information was influenced by socioeconomic factors such as age, gender, income, and the volume of bananas grown. The adoption of ICT technologies was found to be influenced by low levels of education and distance from an internet connection.

Odini (2014) looked into how women farmers in Kenya's Vihiga County obtain and use information in order to ensure their family's food security. Existing information systems and services typically fail to meet the information demands of women farmers due to a lack of communication and information infrastructure, low levels of education, a lack of acceptable information services, and a lack of technical competency abilities. The merit of these studies was that they showed how different channels had varying capacity for disseminating research findings information to users. The studies, on the other hand, were lacking in showing how the channels are used in the accessibility and application of research findings. That was the

impetus for this examination of the relationship between dissemination pathways and the application of research findings.

In a study conducted in Kisumu County, Karanja et al. (1997) discovered that car washers were exposed to Lake Victoria water with scistosoma mansoni for several hours each day. These persons had a significant proportion of eggs in their feces, according to the study (mean SD=1.469 1.581 eggs per gram of feces). Odiere et al. (2011) found a similar pattern in the prevalence and distribution of schistosome and soil-transmitted helminth among Kisumu County children. The highest levels of schistosoma mansoni and soil-transmitted helminth were found in schools near Lake Victoria and the River Nyamasaria. The study demonstrated that this was a health priority and highlighted the need for routine deworming. In a study by Odhiambo *et al*., (2014), it was found that a majority of residents around Lake Victoria had information about schistosomasiasis but very few had the correct knowledge about it. The study recommended public health education to raise awareness for prevention, control and elimination.

From these studies they had strength in the sense that they were able to demonstrate what was affecting the population healthwise in that area, however the weakness in this studies were these studies were not being used by the affected population to improve their health conditions. This was a gap which this study addressed by studing the dissemination channels and how they affect the utilization of research findings generated.

Ondenge et al., (2014) looked into how information about the Kisumu breastfeeding study was disseminated and received input from the community. The goal of the study was to examine how the Kisumu Breastfeeding Study findings were disseminated and how the community reacted to them (KiBS). According to the findings, respondents had a thorough comprehension of research and had specific expectations from the process. The studies also

suggested that the communities wanted information from reputable sources, ideally the lead investigator. Furthermore, it was discovered that sharing research findings with members of the local community was necessary and advantageous to the researchers' long-term working relationships and, more crucially, the successful implementation of study findings when suitable. These findings emphasize the relevance of dissemination channels in the utilization of research findings in policy and practice. The above literature analysis demonstrates that research findings exist, as well as the mechanisms via which they are disseminated. It was also discovered that the majority of research findings in the subject of channels of diffusion and usage are focused on the health sciences. There is very little or none in the field of environmental science, and this was a vacuum that this study aimed to fill by establishing how different distribution channels affect the usage of research findings in this sector.

2.4 Influence of Policy Issues on the Utilization of Research Findings

The problem of the environment degradation can be traced back to 1898 in the USA when Pinchot was appointed as the head of Forestry Division of the department of Agriculture and in 1905 after a pull and push between the Department of Agriculture and Department of Interior, where congress decided to put all Forest reserve under Department of Agriculture. Conservation, according to Pinchot meant the use of all natural resources for the human benefit, He stated further that " The object of our policy is not to preserve the forest because they are beautiful.....or because they are refuge for wild creatures of the wilderness.....but the making of a prosperus home.....every other consideration becomes secondary" (Smith, 2016). Several events in the United States in the 1960s brought environmental issues to the attention of the entire country, including policymakers. Carson (1962) published a book on silent spring focusing public attention on pollution in the environment with its description of impact of chemicals on environment and its ecosystem. A series of serious events occurred, raising public awareness about environmental issues. A sailor dropped a cigarette into

Cleveland's Cuyahoga River in the summer of 1969, causing it to erupt in flames (Johnson, 1969). Second, on January 28, 1969, a union oil company oil-drilling platform in the Santa Barbara channel exploded, spreading hundreds of thousands of litres of crude oil over Santa Barbara's beach and other settlements, causing environmental damage (Johnson, 1969). As a result of that by late 1960s and early 1970s the environment issues had become a hot political topic in the USA (Graham, 1970). Politicians from all political divide claimed that time to be in support of protecting the environment came together to advocate for save environment (Graham, 1970). The strength of these early studies was that environment degradation started receiving attention very eary but the weakness were policies were not in place to promote the utilization of research findings to reverse environmental degradation.

President Richard Nixon signed the first National Environmental Policy Act on January 1, 1970, declaring that "1970 must be the year in which America repays its debts to the past by restoring the purity of its air, water, and living environment" (Mackenthum, 1991). By the late 1970s early 1980s during Ronald Reagan’s administration policymakers and environmentalist became increasingly frustrated with slow pace of progress and complained from regulated industry and local Government where environment was not given attention it deserved (Durant, 1992; Vig and kraft, 1984).

Ronald Reagan was viewed as antienvironmentalist (Vig and kraft, 1984). Almost all of the initial environmental laws remain in force todate despite nearly five decades of critism and experimentation with such alternatives at both the national and state levels. There has been no agreement on how to modify the key environmental statutes, despite some minor triumphs with modifications to the Clean Air Act of 1990, the Safe Drinking Water Act of 1996, and the Pesticide Control Policy of 1996. Democrats, Republicans, Environmentalist and business groups have fought for much of this time, with some of the fiercest battle taking place during

the Clinton adminstration in the 1990s, the Bush adminstration in the 2000s and the Obama adminstration (Eisner, 2007). As these environmental politics continued more pressing emerging challenges were playing out in the USA and the rest of the world which need urgent policy intervention to use the environment in a sustainable way. Many scientists believe that environmental problems are primarily caused by a lack of scientific knowledge about natural ecosystem structure, the application of technology, or a failure to adopt an ecosystem perspective that emphasizes the interrelationships among components of complex environmental, ecosystem, and economic systems (Meadow & Randers, 2004). They continue to state that it point to failure to put such knowledge to good utilization both in Government and private sector.

The study's strength was that it proved that environmental policy exists that is supposed to address environmental degradation that is occurring in the United States and around the world and that requires intervention. These studies had a flaw in that they did not show the availability of policies, facilitators, or barriers that influence the use of research findings. This study filled a void in the sector.

According to a study by Kathy and Micheal (2008), efficient methods for disseminating and utilizing research findings have gained little attention. From the studies in the USA it demonstrate that environmental challenges exist and need attention. Still in USA billion of dollars have been invested in research on energy technologies, climate change and other kind of environmental research. There has been no shortage of recommendations for additional spending (Lubchenco, 1998). From this information research findings do exist which need to be used to tackle the challenges facing the environment. The question is why are the researches which have been generated not being utilised to solve the environmental problems? Does policies exist which specifically guide the utilization of generated

environmental research findings to solve the environmental problems so that its resources can be used in a sustainable way. This study's strength is that it shows that billions of dollars have been spent on research to address environmental concerns; nevertheless, it has a drawback in that it ignores the policies, facilitators, and barriers that influence how research findings are used. This research filled a void in the literature.

The majority of the literature on the application of research findings in Canada was primarily in the subject of health science. In a study by Jon and Donald (2005), he stated that use of research findings on policy making should eventually lead to desired outcome such use of more research findings which leads to health gain. The authors went further to state that policy decision are normally political decision and political decisions are normally a balance act between competing interests in the country. It is not whether suitable evidence was available and used that determines whether a policy decision is adopted, but rather if the policy can be supported by the majority of citizens in that country. In the United Kingdom, a study by Emma (2002) found that research was motivated by the desire to influence policy in the field of international development and highlighting policymakers' lack of use of cutting-edge knowledge.

According to researchers, a lack of supply or access to crucial research information, a lack of understanding of the policy process by researchers, and unrealistic assumptions were some of the reasons for rejecting study findings. Ineffective research communication, bureaucratic processes, insufficient capacity among policymakers, politicization of research, gaps in understanding between researchers, policymakers, and the general public, time lag between dissemination of research and policy impact, and the dismissal of research as unimportant are among the others.

According to Monique and Rob (2006) in the United Kingdom, the primary barrier to decision makers embracing research findings is a lack of appreciation for the essential contribution that research findings may make to legislation and program creation. The study also discovered that diffusion within the academic community limited decision-makers' and practitioners' access. Researchers, policymakers, decision makers, and donor agencies, according to the experts, must all work together to overcome the obstacle to research findings being used. The strength of these studies though in the field of health science, on the other hand, indicated that there was a mismatch between researchers and policymakers, which has an impact on the use of research findings. These studies had a flaw in that they did not go further to identify the facilitators and barriers to using scientific findings to tackle societal problems.This was a gap which this research addressed this time in Environmental Science.

Despite nearly 40 years of research on evidence-based policy (EBP) and a constant drive for both policymakers and academia to improve research adoption in policy making, barriers to the use of evidence from research remained persistent, according to a recent study by Kathryn et al., (2014) in the UK. According to a Canadian study by Robert et al., the use of scientific evidence can lead to enhanced citizen health (2018). The researchers discovered, however, that translating and simplifying research into real influence in people's lives necessitates behaviors beyond those often associated with knowledge development.

Makkar (2018) did a study in Australia that yielded a variety of interesting findings about health policy and research. To begin, the authors discovered that more effective usage of research findings can help health policymaking, which in turn benefits the community that the study is intended to serve in the long term. Second, it was shown that in diverse policy settings, improving individual and organizational capacity for using research is always necessary, but little is known about which approaches work best in which scenarios to

improve the use of research findings. A review of recent and earlier studies demonstrates that a wide range of research findings have been produced all over the world, but that they must be effectively applied. Furthermore, many research leave open questions about whether or not policies exist to guide the utilization of study findings, particularly in the field of environmental science. There was a hole in the system that needed to be filled. This study looked into the policies that function as both barriers and facilitators to the use of environmental research findings.

Majdzadeh, Yazdizadeh, Nedjat, Gholami, and Ahghari (2011) examined how policymakers in Iran's health system deal with the challenges of using research findings in decision-making. Purposive sampling was used to choose the study's thirteen participants. In-depth interviews and focus-group discussions were used to elicit feedback from these participants. The data was analyzed using theme analysis by the researchers. According to the findings, using research evidence in Iran's health system has three sorts of limitations: decision-makers' characteristics, decision-making environment, and research system.

Limitations connected to decision-makers' characteristics were recognized as the reward and incentive structure, understanding and attitude toward evidence-based policymaking, and lack of faith in domestic evidence. Organizational values, limited views in decisions, the impact of non-technical concerns, the capabilities of the policy implementation environment, and hostility to innovation are all challenges in the decision-making environment. Lack of systematic health research prioritizing, budget limits, and insufficient communication between knowledge suppliers and decision-makers are all examples of research system limitations. Despite the fact that this study made significant findings in identifying major policy concerns that serve as obstacles to the implementation of research findings, the key question remains if such results can be replicated in the Kenyan setting, particularly among

the Lake Victoria fisherfolk. Walsh, Dicks, and Sutherland (2015) looked into the impact of scientific evidence on policy recommendations made by conservation practitioners. The researchers intended to see if conservationists in the field of bird management were willing to use relevant scientific material to help them make management decisions. In so doing, the researchers were able to assess whether limited utilization of research findings in policymaking could be attributed to lack of access scientific evidence or whether it was merely as a result of the policymakers' inability to incorporate evidence into their policy-making decisions. Data was collected from ninety-two conservation managers in Australia, New Zealand, and the United Kingdom using online surveys.

According to the study's findings, each participant's likelihood of using 45.7 percent of effective interventions increased after accessing scientific material. In other words, when conservation managers had access to scientific knowledge, they were more inclined to accept beneficial initiatives and reject ineffective ones. These results also demonstrate that lack of accessibility to research findings is a major challenge facing policymakers as far as making policy decisions is concerned. Although Walsh et al., (2015) recognize that one of the major barriers to policymakers using research findings is a lack of access to research evidence, it is important to see if the same findings can be observed in the Kenyan context with policymakers involved in fisherfolk activities as the subjects.

Based on a vast number of scientific research findings suggesting the effects of climate change are severe, Jantarasami, Lawler, and Thomas (2010) performed a study to assess the key hurdles to climate change adaptation in the United States. The research focused on major policymakers in the United States, such as the National Park Service and the US Forest Service. The survey comprised 32 managers and agency employees who worked with either of the policymakers. Semi-structured interview questions were used to collect information

from these participants. According to the findings, the primary institutional hurdles to climate change policymaking decisions are ambiguous superior mandates, bureaucratic norms and processes, and processed-oriented environmental regulations. This research helped to discover some of the main obstacles that policymakers face during the decision-making process. The critical question is if the same results may be observed in Kenyan contexts, notably among fisherfolks surrounding Lake Victoria.

Choi et al. (2015) conducted study to assess methods for bridging the science-policy divide. The study included an online survey with a sample of high-ranking scientists and officials as part of its methodology. University presidents, teachers, and government leaders were among the participants. A total of 121 people took part in the survey. The results of the study showed the top strategy that could facilitate the utilization of research findings was conducting research that focuses on policy questions. Other strategies that were found to be effective in promoting the uptake of evidence in policymaking decisions included; holding science policy forums, policy briefs and using information technologies such as web-based portals. This study made a significant contribution to the discovery of factors that make it easier to use research evidence in policy decisions. Due to the fact that the study was limited to China and Canada, it was required to report on whether the results could be replicated in Kenya. The study's goal was to close this gap in the context.

Uneke, Ezeoha, Ndukwe, and Oyibo (2012) investigated the impact of capacity building on the acceptance of research findings by policymakers in Nigeria. As part of their research, the researchers hosted a one-day training session for policymakers, researchers, and other stakeholders in the southeastern Nigerian health system. A total of 87 policymakers attended the training program. The post-training assessment revealed significant gains in policymakers' knowledge, comprehension of the health policymaking process, and use of

evidence when compared to before the workshop. Through focus group discussions a number of strategies that could aid in bridging the gap between policymakers and researchers were identified. These enabling factors included; encouraging dialogue between researchers and policymakers, institutionalizing research grants, stressing on the need to concentrate on the core needs of policymakers, and commissioning research in government ministries. Although this study contributed to the uncovering of the key facilitators of utilizing research findings by policymakers, of key concern was whether the findings obtained could be mirrored to the Kenyan context particularly the policymakers who deal with the activities of fisherfolk around Lake Victoria.

In order to establish policy, Mwendera et al. (2016) assessed facilitating attributes and hurdles to malaria research in Malawi. In-depth interviews with thirty-nine informants, including researchers, program managers, and other relevant stakeholders, were conducted as part of the study's qualitative approach. These informants were selected for participation in the study through purposive and snowballing sampling. The findings showed that global efforts played a crucial role in advancing the utilization of research findings by policymakers. Other factors identified by the study included; availability of researcher, as well as diversity among local researchers and stakeholders promoting the utilization of researcher evidence.

The study also revealed a number of barriers to putting research findings into practice. Politics, poor communication between policymakers and academics, a lack of collaboration among researchers, and possible bias owing to fund-driven research were all noted as barriers. The findings of this study were significant in elucidating some of the primary facilitators and barriers to policymakers' use of research. However, these findings still presented a research gap because it was not clear whether the findings could be replicated in the Kenyan context especially the fisherfolk around Lake Victoria.

Rose et al., (2018) conducted a study to explore global variations and barriers in research consumption in order to better understand why environmental conservation policies are less informed by research evidence. For the study, the researchers undertook a worldwide search to find 758 policy practitioner, and research professionals from 68 countries. According to the study's findings, one of the most significant barriers to the use of research findings is the prioritization of environmental problems. According to the study, impediments connected with conservation's low priority were shown to be more severe.

As a result of these findings, it is clear that persuading the general public of the necessity of environmental protection is a significant facilitator for incorporating research evidence into policies. Although the findings of this study were useful in improving our understanding of significant barriers and facilitators in the application of research findings, the conclusions were too generic because they were based on a global survey. In other words, to examine whether the results were still applicable to the specific case of Kenya is an area that needed to be addressed. Consequently, undertaking this study was a step towards bridging this gap.

Another study was undertaken by Gill et al., (2017) to assess capacity deficiencies that hamper the functioning of marine protected areas (MPAs) around the world. Building a global database of management and fish population data, which included MPA management processes, MPA effects on fish species populations, and links between management processes and natural ecosystem effects on fish species populations, was part of the project. According to the research, many MPAs failed to fulfill minimum standards for effective and fair fish population management processes, with the most important limitation being a lack of human and financial resources. Extrapolating these findings to policymaking, it could be claimed that MPAs with insufficient human and financial resources were more likely to deliver sub-optimal outcomes in terms of evidence assimilation.

Many Sub-Sahara African countries' National Health Research Systems (NHRS) exist more in principle than in practice, according to a study done in Zambia by Chanda-Kapata, Campbell, and Zarowsky (2012). The ability of the health-care system to achieve its goals is hampered by a lack of attention to detail (NHRS). A weak NHRS reduces research coordination and harmonization; prevents stakeholders from participating in the research process, leading to unethical research practices; and reinforces the divide between researchers and policymakers, with the latter refusing to demand or access research findings information.

Health policy and system research and analysis (HPSR+A) is vital to health systems, according to Uzochukwu et al., (2016), however HPSR+A capabilities in low and middle income countries are limited. The authors discovered that academicians in Nigeria were unfamiliar with HPSRA+A, field, and funding during their inquiry. Most politicians appeared uninterested in going through the rigors of reading entire research studies, and they were also unaware of the resources available to inform their policy decisions. Nigerians should document, exchange, and encourage the application of indigenous knowledge in environmental protection and conservation, according to Nigerian National Policy on Environment (Federal Republic of Nigeria, 2016). Despite the fact that this is a policy state, no action has been taken to implement it. Factors that act as barriers and facilitators to the use of research findings in environmental management are not well examined, according to the studies. This research aims to fill that knowledge gap.

In a study conducted in Uganda, Mutatina et al. (2017) discovered that the majority of stakeholders are becoming increasingly concerned about making research useful in the policy-making process. However, there is very little research that links the creation of research by students at a higher education institution to its application in society. According to the study, 22 research instances were cited in policy documents, accounting for 0.5 percent

of the total 4230 citations and 16 out of 1172 dissertations, or 1.4 percent. The researchers also discovered that research was mostly utilized to frame the problem or choose an intervention, and that it was mostly used symbolically to explain techniques that had already been chosen.

The Ugandan National Environment Management Policy, states that the long-term management of environmental resources, as well as the need to anticipate new and emerging difficulties, needs the provision of timely, accurate, and up-to-date data (The Republic of Uganda, 2014). To achieve this objective, the policy notes that research evidence should be collected, analysed, stored and disseminated on continous basis, reliable information relating to environmental management issues and resources. This is encouraging because information is disseminated to the society/audience who need it. However, the policy document has gaps where it does not specify how the information should be utilized by the audience. In the same document, there was no clear policy information/statement on the utilization of the environmental research findings generated. This was a gap which this study explored.

In Rwanda, the National Environment and climate change Policy of 2018 is still at the draft stage, however the policy document states that the Government should come up with identification and implemention incentives strategies for private sector, research institutions to undertake research, develop affordable appropriate adaptation and mitigation technologies (Government of Rwanda, 2018). Raising awareness on the use of green technologies and practices in that country. There is no clear declaration in this draft policy document on how to promote the use of generated environmental research findings to improve environmental sustainability. In Burundi, the government's Vision Burundi 2025 manifesto states that the government will implement environmental policies aggressively in order to secure the long-term management of natural resources (Burundi Government, 2011). It is unclear in the

document how the government would promote the use of research findings. This policy draft document demonstrate that Burundi is still far from even developing document which deals with environmental challenges facing that country.

Kenya's National Environmental Policy (2013) was designed to address many of the country's environmental issues, as well as how to safely exploit natural resources (GoK, 2013). This policy's section on research, education, and monitoring is critical. Scientific research technologies and developments, according to the section, are critical to sound environmental management. Environmental research and monitoring generate high-quality data that helps the country make better environmental decisions. The government should adopt a national data and information management policy on environmental and biological resources, according to the document's policy statement.

The government should document, distribute, and encourage the application of indigenous knowledge in environmental protection and conservation, according to the policy statement on education, communication, and awareness. These are some fascinating policy pronouncements that have yet to be implemented. However, the policy statement has had no policy on promoting the utilization of research findings which have been generated. This was a gap in the policy statement which this research addressed. From the studies its clear that policy barriers and facilitor of utilization of research findings exits and that was a gap which this research handled.

2.5 Theoretical Framework

This study was guided by Roger's Diffusion of Innovation Theory and Carol Weiss Theory of Change of Utilization of research findings. The selection of the two theories were informed by the purpose of the study and variables under investigation. Rogers' theory was used to describe the relationship between socioeconomic conditions, communication channels, and

the applicability of study findings while the theory of change was found ideal for assessing policy and its impact on utilization of research findings in the management of environment and fisheries.

2.5.1 Rogers Diffusion Innovation Theory

One of the theories on which this study was based was Rogers' Innovation Diffusion Theory. The theory is concerned with how new ideas, processes and technologies are adopted by populations. An idea, practice, or endeavour that is seen as novel by an individual or other units of adoption is deemed innovative, according to Rogers (2003). Adoption, according to the theory, is a method or technology that individuals in a certain location or social system perceive as new or unfamiliar (Dearing & Cox, 2018). According to this concept, an invention could have been created a long time ago, but if people see it as new, it could still be considered an innovation. Diffusion, according to Roger, is the process by which an innovation is communicated to members of a social system over time via certain paths. The spread of innovation information from one person to another through time is referred to as diffusion. According to Rogers, diffusion is a sort of communication involving an innovation, two or more units of adoption, and a communication path.

The social system, communication routes, innovation traits, and adopter characteristics have all been connected to innovation adoption (Zhang et al, 2015). The method via which people acquire knowledge about the innovation is referred to as the communication channel, and the attributes are the user-perceived benefits, compatibility, complexity, trialability, and observability (Neuhauser & Kreps, 2010). Compatibility refers to how well an innovation fits into the existing technological and social environment, whereas complexity refers to how difficult an invention is to comprehend, implement, and apply. Trialability relates to an invention's ability to be put to the test without a full commitment and with a small expenditure, whereas observability refers to how visible the benefits of an innovation are to

potential adopters (Baumgartner & Jones, 2009). The social system, according to Roger's theory, is one of the determinants of innovation spread. According to Rogers' theory (Rogers, 2003), a social system is "a collection of interacting units engaged in cooperative problem solving to attain a common goal." A social system is made up of a border that allows for the diffusion of innovations. According to Rogers, the structure of a social system influences people's attitudes and beliefs about innovation, as well as the rate at which ideas are adopted. In addition, Rogers divides people into five groups based on their views toward innovation: innovators, early adopters, earlier majority, later majority, and laggards.

Roger's theory was chosen for this study because it investigated into socio-economic factors and channels of communication as predictors of research findings being used in environmental and fisheries management. Because they contain new ideas or procedures of doing things, research findings were classified as innovations. Doing things in the context of this study entailed tackling environmental and fishery issues.

Because it entailed the movement and use of knowledge, the ability of fishermen to obtain study findings and use them to manage their environment and fisheries was referred to as diffusion. This research was founded on the assumption that socioeconomic conditions and communication routes influence how fisherfolk use research findings. Communication channels, adopter traits, and social systems all play a role in innovation adoption, according to the hypothesis. As a result, it's thought to be perfect for evaluating the relationship between socioeconomic issues, dissemination channels, and research findings' applications in environmental and fishery management.

2.5.2 The Theory of Change

The study was also informed by Theory of Change (ToC) developed by Carol Weiss and others. It is a hypothesis of how and why an initiative succeeds, according to Weiss (1995).

Weiss goes on to say that when the evaluation of programs/initiatives is based on a theory, the likelihood of success increases. ToC is defined by Msila and Setlhako (2013) as a systematic and cumulative analysis of the relationships between an initiative's activities, outputs, and settings. According to this concept, the first stage in any study or evaluation is to look at the planned results, the activities that will be used to accomplish those outcomes, and the contextual elements that may affect activity implementation and the likelihood of achieving desired outcomes. Connell and Kubisch (2012) claim that a theory of change contains five components: inputs, actions, outputs, outcomes, and influence. Thus, the theory of change describes how the actions carried out by an intervention, such as a project, program, or policy, contribute to a chain of outcomes that lead to the desired or observed impacts or outcomes. The theory of change method can also be used to assess the effectiveness of treatments.

Since 1990s the theory of change has been used by many organisations to analyse programmes and initiatives that lead to social change (Msila & Setlhako, 2013). The strength of the theory lies in its ability to help in understanding and assessing impacts in hard to measure areas such as capacity building, governance policies and application of research, by demonstrating achievement of outcomes (Wollmann, 2016). The theory of change has also been used to policy and the implementation of study findings. The term "research usage" refers to any use of scientific research (results) (Bailey and Mouton, 2005). It refers to the use of research for commercial or economic purposes, as well as a persuasive or political tool to explain a position or practice. As a result, the findings of the research can be applied to economic, social, and political issues. The findings of research are used in a variety of fields, including agriculture, economics, engineering and technology, the environment, and social sciences (Armitage et al., 2008). It is used to inform policy at the organizational, institutional,

and system levels, as well as to improve practice on the ground, in the field of health research, for example. Research and development (R&D) efforts in engineering are a part of the technology transfer process, which is a part of the innovation process (James, 2011).

In addition, research has been used to help with the conceptualization, development, implementation, and evaluation of social interventions, processes, and practices, as well as to inform policy-making (Msila & , Setlhako, 2013). Wollmann (2016) claims that research is crucial in policymaking because it provides a background of empirical generalizations and ideas that enter policy conversations. This is in line with Smisman's (2015) argument that policymakers are less likely to adopt research findings that are not related to an issue that they have already identified or recognized.

The Theory of Change was chosen because it was suitable for evaluating the impact of policy issues on the adoption of research findings in environmental management. This evaluation was viewed as an evaluation exercise, which is one of the theory's pillars. The study was also able to identify the initiative's actions, outcomes, and contexts after adopting the theory. In the context of the study the policies was the intervention, and was examined with regard to available, users awareness of them, funding, mechanism for ensuring policy implemented, monitoring, tecnical issues format, communication channels, leadership. Use of the research findings were the activities while a well managed environment was the outcome.

2.6 Conceptual Framework

This study conceptualized a situation in which utilization of research findings in the management of Environment and Fisheries sustainably within Lake Victoria basin (dependent variable) is a function of Socioeconomic factors, dissemination channel and policy issues (Independent variables). The extent to which these variables interact for the benefit of sustainable management of resources is, however, mitigated by government policies,

availability of extension services, capacity and training of stakeholders, their attitude, availability of resources, and enforcement of law as well as accessibility to appropriate methodologies for translating research findings/theories into practice.

The research objectives of this study are mapped in a schematic diagram shown in Figure 2.1 The conceptual framework depicts the relationship between the study's variables of interest. Rogers Diffusion Innovation Theory and The Theory of Change ties closely with the study of Socioeconomic factors, dissemination channels and policy issues (Independent variable) on one hand, and utilization of research findings for management of Environmental and Fisheries (Dependent variable). The dependent variable on Utilization of research findings in the management of Environment and Fisheries are level of awareness, accessibility and application of research findings.

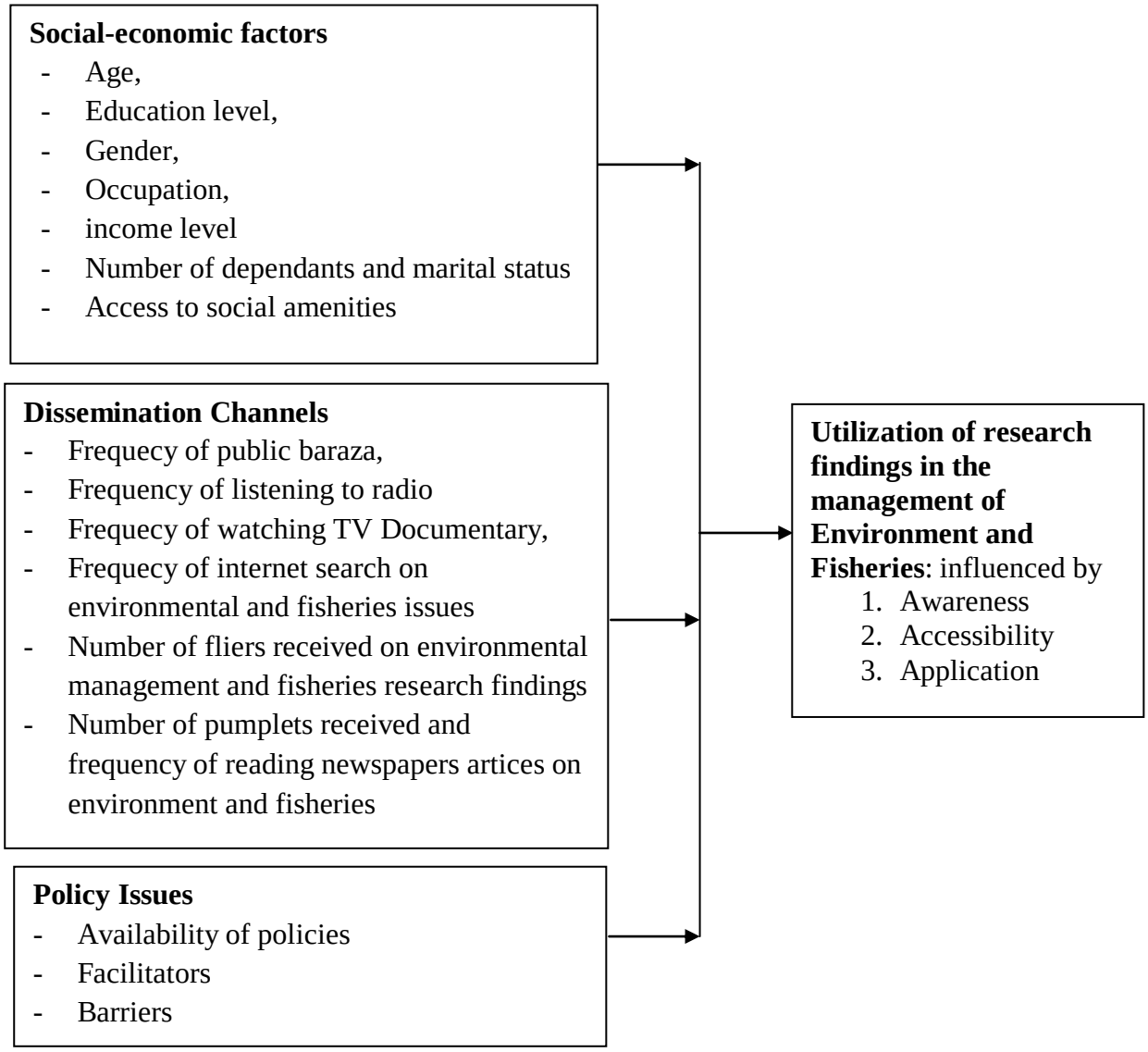

Figure 2.1: Conceptual Framework

(Source: Researcher, 2019)

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the road map that was used to ensure data for the study was collected in an efficient manner. In this chapter, detailed information pertaining to the study area, research design, population, data collection methods, reliability and validity tests as well as data analysis techniques are presented. The rationale for choosing various methodologies is also highlighted.

3.2 Study Area

3.2.1 Location

This study was done in Kisumu City which is situated between longitudes 34^0 35´ 30´´ E and34^0 52´ 0´´ E and latitudes 0^0 1´ 0´´ N to 0^0 10´ 0´´S. Kisumu City comprises of 36 sub locations namely; Kanyawegi, Kogony, Nyalenda A, Nyalenda B, Chiga, Dago, Bandari, Bora A, Bora B, Kanyakwar, Kasule, Korando A, Korando B, Sunga, Buoye, Wathorego, Manyatta A, Marera, Migosi, Nyahera, Okok, Osiri, Kadero, Newa, Nyalunya, Nyawita, Ojola, South Kapuonja, North Kapuonja, East Karateng, West Karateng, Lower Kadongo, Konya, Got Nyabondo and Kaloleni. The surface area of Kisumu City is 351.5 Km^2 (Government of Kenya, 2009). Out of the 36 sub-locations, the study focused on Nyalenda B, Kanyawegi and Kogony. The three study areas were selected because they experienced high population growth which lead to more socioeconomic activities such as fishing, industries, airport, railways and the nearness to the lake encouraged more environmental degradation that requires urgent intervention. The other sub-locations within Kisumu City were slightly far from the lake and were not experincing such kind of environmental degradation. (Figure 3.1).

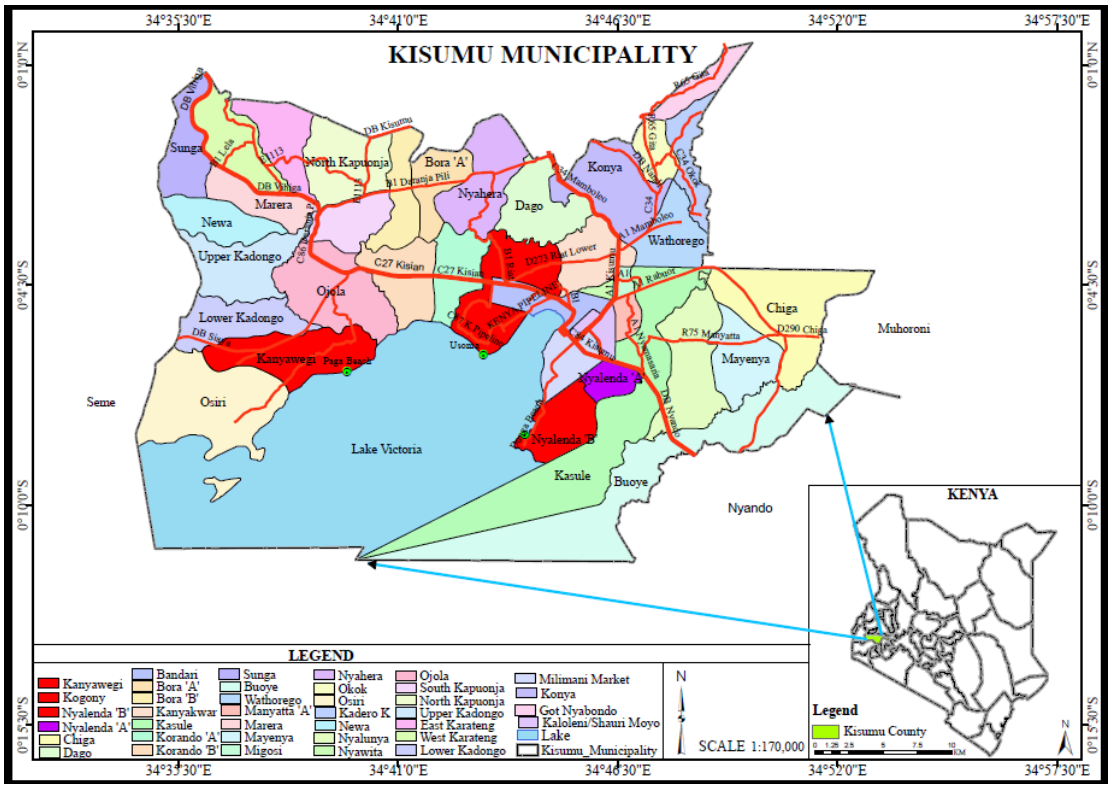

Figure 3.1: Map Showing the Study Area

(Source: Researcher, 2019)

3.2.2 Climate

Kisumu city receives between 1200 and 1300 millimeters of rain every year. The rainfall mainly falls in two seasons and the temperature range between 20^0C and 35^0C. Kisumu City is warm throughout the year and experiences a mean annual temperature of 23^0C. This type of climate is favorable for a range of agricultural activities such as sugar cane and rice farming. The locations in which the study was done, West and Central Kisumu, focused on; are typically characterized by small-scale farming activities and fishing (Osumo, 2001).

3.2.3 Human Population

Kisumu City has a population of approximately 398,060 people distributed and about 96, 910 households. The population density of Kisumu City is 1132.47 people/km^2(Government of Kenya, 2009). A majority of Kisumu residents depend on fisheries and rain fed small scale farming as their main sources of livelihood (Ogwang, Nyeko & Mbilinyi, 2009). Rapid

population growth in the study areas has placed enormous pressure on natural and environmental resources such as fisheries, forest, water and land as evident in the study area site.

One of the sampling units was Nyalenda B Sub-Location which houses Dunga beach. This location is roughly 2 to 3 kilometers from the town center, is situated at a height of 1140 meters above the water's surface, and occupies 4.7 square kilometers. This area is urban and densely populated (32,430) and as a result, human activities have a significant effect on the lake (Government of Kenya, 2009). In this location, pollution of the lake is taking place with clear evident seen on the water close to the shore. The second sampling unit was Kogony Sub-Location which houses Usoma beach. This location is about 6 km from the town center, altitude is 1140m above sea level and covers 11.8 Sq Km^2. The area is peri-urban and is not as populated (19,625) as Nyalenda B (Government of Kenya, 2009). However heavy Sand harvesting is a common activity in this area and this causes serious degradation of the surrounding. The third sampling unit was Kanyawegi Sub-Location which houses Paga beach. This location is about 17 km from the town center, with an altitude is 1120m above sea level and covers 17.4 Km^2. The area is rural and less populated (6529). This place is mainly a landing beach for the fish from the lake.

3.3 Research Design

This study employed a cross-sectional research approach. A cross-sectional design enables a high-quality description of a phenomenon occurring within a population at a specific period (Bryman, 2016). For a variety of reasons, a cross-sectional design was suited for this investigation. To begin, the goal of this research was to look into the factors that influence the use of research findings and policy implications in Kisumu City's environmental management. Therefore, the data collection exercise sought to bring varied responses from

different sections of the target population, which had to be studied at the same time. Additionally, the population of the study was divided into various segments based on the demographic characteristics of the participants such as gender, education level and age. As a result of the responses received from diverse sub-groups of the population, a cross-sectional design would enable the researcher to construct a representative picture of the target population at one fixed point in time.

3.4 Population of the Study

A population denotes the total number of elements under investigation in a given study (Bryman, 2016). For this study, the target population comprised of 15,179 households from the three Kisumu sub-locations; Nyalenda B, Kanyawegi and Kogoni (Government of Kenya, 2009). Additionally, the study targeted all key policymakers involved in the conservation efforts of Lake Victoria in Kisumu City.

3.5 Sample Size and Sampling Procedure

The sample size for the household survey was calculated using Mugenda & Mugenda's formula (2003) as shown below:

$n=Z^2pq/d^2$

where:

n=the desired minimum sample size (if the target population > 10,000)

z=the standard normal deviation at the required confidence level

p=the proportion in the target population estimated to have characteristic measured

q=1-p

d=the level of statistical significance set

$n= (1.96)^2(0.50)(0.50)/(0.05)^2 =384$

Calculations for samples were as follow;

Nyalenda B=8561/15179 X 384 = 217, Kanyawegi = 1454/15179 X 384 = 37

Kogony = 5164/15179 X 384 = 131

Stratified random sampling was utilized in order to ensure the sample was sufficiently representative of the target population. The stratified random sampling approach was implemented based on the three sub-locations (Nyalenda B, Kanyawegi and Kogony) upon which the focus of the study rested. The three sub-locations formed the strata. The size of each stratum was derived as shown in Table 3.1. Within each stratum, households were selected randomly.

Table 3.1: Sample Distribution

Strata	Population Sampling Units	Household Population	Sample Size
Nyalenda B	32,430	8561	217
Kanyawegi	6529	1454	37
Kogony	19,625	5164	131
Total	58, 584	15,179	384

Purposive sampling was also applied in the study. According to Mugenda and Mugenda (2003), purposive sampling technique refers to where a researcher targets a group of people believed to have an idea or are knowledgeable on some issues and picked for that unique purpose. This approach was used to sample nine key informants who were not fisher folks but knowledgeable about the situation within LVB. These included one for each group; fishery officer, Kenya Wildlife Services (KWS), agricultural officer, area chief, leader of Beach Management Unit (BMU), Community-Based Organizations (CBOs) and Non-Governmental Organizations (NGOs) and Minister of Fisheries in Kisumu County Government. Purpose sampling was also used to select 11 key policymaker regarding the availability of policies guiding the utilization of environmental research findings. These policymakers belonged to

either the National or the County Government. At the national level participants were selected from; Kenya Institute of Public Policy Research and Analysis (KIPPRA), Ministry of Education, National Commission for Science, Technology and Innovation, Ministry of Environment, Ministry of Health, National Assembly and National Environment Management Authority (NEMA). At the County level the respondents were selected from Ministry of Environment, Lake Victoria Basin Commission, Ministry of Health, County Assembly, Lake Victoria Environmental Management Project (LVEMP) and NEMA.

3.6 Data Collection Methods

The study used primary data. The use of primary data provided original raw evidence on the interplay between the study variables. Three methods were used to collect the data; questionnaire, semi-structured interviews and focus group discussions. The nature of the data collected was both quantitative and qualitative. Quantitative data was gathered using questionnaires while the qualitative data was collected via interviews. The questionnaire was administered by the researcher with the help of well-trained research assistants. The first section of the questionnaire comprised of a mixture of close-ended and open-ended questions that asked basic demographic information of the respondents. The remaining questions aimed at exploring the influence of socioeconomic factors and dissemination channels on the utilization of research findings in environmental management among the fisherfolk around Lake Victoria. A semi-structured interview guide was used to gain the opinion of 11 policymakers in regards to the subject of the research. The study further targeted 9 key informants including; a fisheries officer, agricultural officers, area chief, Kenya Wildlife Service officers, Kenya Marines Research officers, county representative, national government representative, NGO leader and CBO leader. The interview guide identified the list of questions to be asked during the interview process with the policymakers. In particular, the interview guide consisted of 10 questions with additional probing questions. Each

interview ranged from 60 to 120 minutes in length. In addition, for each interview notes were taken to summarize the participants' key responses. The third dimension was added by conducting focus group discussions with the fisherfolk in the study area. In each of the three study locations, three focus group talks were held. Each focus group consisted of ten participants who worked in the fishing industry. The focus group sessions drew together a total of 90 people. In addition, the questions aimed to elicit information about the impact of socioeconomic factors and dissemination channels on the use of research findings in environmental management for each focus group.

3.7 Reliability and Validity

The ability of a research instrument to produce consistent results after repeated use is referred to as reliability (Kothari, 2008). The questionnaire was pretested to determine its reliability. The pre-testing in Nyawuare involved a pilot study of 20 people randomly selected from research sites that possessed similar characteristics as those targeted by the study and one for policymaker in Homabay. A test interview was also initiated during the pilot study to determine the reliability of the interview guide. Cronbach's alpha was calculated to determine the reliability of the questionnaire data derived from the pilot study. For all the questionnaire items, the Cronbach's alpha was 0.8 which signified excellent reliability. According to Orodho (2004), a correlation coefficient of about 0.8 was judged high enough for the instruments to be accepted as reliable for the study. Validity refers to a research instrument's ability to measure precisely what it was designed to assess (Serem et al. 2013). To ensure that the questionnaire and interview guide were genuine, the researcher sought the advice of experts in the fields, notably university faculty members. The expert opinion was incorporated in the research instrument design process resulting in a valid questionnaire and interview guide.

3.8 Data Analysis

The questionnaire data derived from the close-ended questions was coded and entered into Statistical Package for Social Scientists software for analysis. Both descriptive and inferential statistical analyses were employed. The descriptive statistics obtained included means and frequencies. On the other hand, inferential statistics encompassed the Chi-square test. In assessing the influence of socioeconomic factors and dissemination channels on the utilization of research findings, the researcher employed the economic assumption of ceteris paribus. Ceteris paribus is an economic principle that when invoked, implies, all other variables with the exception of the variables under evaluation are held constant (Arnold, 2010). Applying this notion was necessary as it was assumed that there were multiple socioeconomic factors and dissemination channels that influenced the utilization of research findings.

In light of such multiplicty of factors, there was a high possibility of multicollinear relationships among the socioeconomic factors and dissemination channels which would cause bias in the relationship the study was seeking to draw between the outcome variable and each of the independent variables. Therefore, the Chi-square test involved assessing the association between the outcome variable and each socioeconomic factor and dissemination channel which would cause bias in the relationship the study was seeking to draw between the outcome variable and each of the independent variables. Also, the Chi-square test involved assessing the association between the outcome variable and each socioeconomic factor and dissemination channel. Further analysis was conducted using regression. Regression was selected because constructs like access to social amenities, use of dissemination channels and research findings were continuous data. The procedure was also chosen because it is ideal for establishing causal relationships between variables and explaining the power of each factors in accounting for variations in the outcome (Tabachnick

& Fidell, 2013) . Data from the open-ended questionnaire sections and interviews was analyzed using content analysis. In this regard, the notes from the interviews and focus group discussions were typed, read and color-coded to pinpoint themes. Reading of the data entailed four iterations. Specifically, the data was read for the first time to gain a general idea about the content. The data was read for the second time in a bid to identify themes. The third reading was done to identify latent themes while in the fourth reading the researcher sought to check the identified themes.

3.9 Research Ethics

Prior to beginning the data collection process, the researcher obtained Ethics Review Committee permission to ensure that the research was both safe and ethical (Appendix VI). The researcher also asked the local authorities for permission to perform the study in the study region. Furthermore, because the study involved human volunteers, there were ethical considerations. The ethical implications revolved around the potential risks of causing harm to the participants physicially, psychologically, socially or economically (Serem et al., 2013). In addressing these ethical issues, the researcher ensured that he had obtained informed consent from the participants. The informed consent method includes clearly revealing the study's objective and advantages to participants, as well as eliciting declarations indicating their willing participation in the study. The people who were allowed to take part in the study had to be adults and of sound mind. Furthermore, the researcher went to great lengths to ensure that the data acquired from the responders was kept confidential. The hard copy of the data collected and analyzed was kept in a lock and key cabinet, while the soft copies on the computer were secured by a password known only to the researcher.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents findings derived from the statistical analysis of the data collected in the study. The chapter begins with an overview of the response rate to the questionnaires used in the collection of data from the local households targeted by the study. Next, demographic profiles of the local households who took part in the study are presented. This coverage is then followed by descriptive statistics (frequencies and mean scores) depicting the manifestation of the study's variables of interest. The next section presents the results of the inferential statistical tests used to evaluate the first two objectives of the study. Chi-square test featured as the key inferential statistical test for this study. Finally, a brief discussion around the link between the key findings and previous empirical studies is presented.

4.2 Response Rate

A survey questionnaire was one of the research instruments utilized in the study to assess determinants of utilization of research findings in environmental management among the fisherfolk in Kisumu City. As a result, determining the survey response rate was critical in ensuring that the results provided from data analysis were representative of the study's target sample. This was accomplished by calculating the questionnaire's response rate. A response rate is the proportion of participants to a research instrument to all the targeted participants in a survey, expressed as a percentage (Baruch & Holton, 2008). Table 4.1 shows detailed information about the study's response rate to the questionnaire.

Table 4.1: Response Rate

Questionnaires	Respondents
Questionnaires Distributed	384
Questionnaires Returned and Usable	384
Response Rate	100%

Table 4.1 shows that all the 384 questionnaires used in collecting data from the local households were completed and returned. This yielded a response rate of 100%. Bell,Bryman and Harley (2015) suggested that a response rate of 50% generates satisfactory statistical results; a rate of 60% is good enough and that which is at least 70% is excellent. Following these suggestions, the response rate obtained for this study was considered excellent in regards to generalizability of the results. The excellent response rate was attributable to the active involvement of the researcher in the distribution of the questionnaires to the respondents. In so doing, the researcher was able to explain the value of the study to the respondents and the benefits of their participation.

4.3 Demographic Information

This section presents the results obtained from the questionnaires in regards to the demographic characteristics of the local households that took part in the study. For the scope of this study, the background information covered the following elements; gender, marital status, age, occupation, number of dependents, highest education level and number of years stayed in the region. Frequencies and percentages were used to summarize the background information of the respondents.

4.3.1 Gender

The respondents were asked to indicate the gender to which they belonged. The two categories considered included male and female. Table 4.2 shows the frequency distribution of the respondents by gender

Table 4.2: Distribution of Respondents by Gender

Gender	Frequency	Percentage (%)
Male	210	54.7
Female	174	45.3
Total	384	**100.00**

Table 4.2 shows that a majority of the respondents (54.7%) were male. These results indicate that both genders were not fairly represented in the study. Therefore, the findings generated as to the effect of key determinants to the utilization of research findings among the fisherfolk in Kisumu City may have been hampered by gender bias. This was due to the fact that most socioeconomic activities around the study area are dominated by male. The results further corroborate the findings by Lwenya, Mbilingi, Luomba and Yongo (2009) where male dominate the fish production activities in the Lake Victoria Basin.

4.3.2 Marital Status

The participants were asked to report on their marital status. For simplified results, the following categories were used; single, married, separated and divorced. Table 4.3 presents the distribution of the respondents by marital status.

Table 1.3: Distribution of Respondents by Marital Status

Marital Status	Frequency	Percentage (%)
Single	99	25.8
Married	275	71.6
Separated	3	0.8
Divorced	2	0.5
Widow/Widower	5	1.3
Total	384	**100.00**

As shown in Table 4.3, the majority of respondents (71.6%) were married, this cohort of respondents was closely followed by those that were single (25.8%). It is also clear that only

a few respondents (0.5%) were divorced. This is a reflection of the culture of the community which is found around the study area which value marriage. This finding is in line with research findings by Luomba (2007) who noted that the marital status of fisherfolk is the same as in other communities, were married people constitute the majority. Single persons are more likely than married people to engage in pro-environmental action, according to a study by Chen et al. (2011). As a result, marital status was a crucial variable in the study since it allowed the researcher to see if there was a substantial difference in how married and unmarried fisherfolk in Kisumu City used research findings.

4.3.3 Age

The respondents were requested to indicate their age. The participants responses were summarized using frequencies and percentages. Table 4.4 illustrates the age distribution of the respondents.

Table 4.4: Distribution of Respondents by Age

Age (Years)	Frequency	Percentage (%)
18-25	108	28.10
26-35	143	37.20
36-45	64	16.70
Over 45	69	18.00
Total	**384**	**100.00**

Table 4.4 reveals that a majority of respondents (37.2%) fell in the 26-35 years age group. This group of respondents was followed by those aged between 18 and 25 years. It is also apparent from the results that the least concentration of respondents was in the age bracket of 36 to 45 years (16.7%), which was closely followed by a cohort of respondents aged over 45 years. The age group between 18 years and 35 years which is the majority in the study area is composed of young population which is energetic and critical in conservation of

environmental resources. These results confirm findings by Omwega(2006) that a majority of fisherfolk around Lake Victoria is below 45 years. Age represents a crucial factor as pertains to the conservation of environmental resources. Gregory and Di Leo (2003) in their study established this concept in their study where they found that age was positively related to water conservation behavior. Therefore, it was argued that age might have been an influential factor in the utilization of research findings among fisherfolk in Kisumu City.

4.3.4 Occupation

The study also sought to find out the occupation of the respondents. In this regard, they were asked to indicate whether their occupation was in line with fishing activities. The results are as shown in Table 4.5.

Table 4.5: Distribution of Respondents by Occupation

Occupation	Frequency	Percentage (%)
Related to fishing	201	52.34
Not related to fishing	183	47.66
Total	**384**	**100.00**

As evident in Table 4.5, more than half of the respondents (52.34%) participated in occupations that had direct relations with fishing. As it would be anticipated, these results confirm that indeed the main occupation of people living around Lake Victoria is associated with fishing. As most of the respondents where near Lake victoria most of the activities were boat making, fishing, repair of fishing nets, buying and selling of fish, repair of motor boats and many other. People's occupational status, according to Ebreo and Vining (2001), may signify disparities in social classes, which influence their pro-environmental behavior. Therefore, because these results indicate that there are occupational differences for people living in Kisumu City, then there are underlying differences in social class among these

people. In this context, occupation was seen to be a deciding factor in how study findings were used in environmental management.

4.3.5 Number of Dependents

The participants were asked to report on the number of dependents in their households. The responses were summarized using frequencies and percentages. Table 4.6 displays the results.

Table 4.6: Distribution of Respondents by Household Size

Household size	Frequency	Percentage (%)
4 and below	179	46.6
5-9	151	39.3
10-14	42	10.9
15 and above	12	3.1
Total	**384**	**100.00**

Table 4.6 shows that a majority of respondents (46.6%) had either four dependants or less. It is also apparent that only 3.1% had at least 15 dependents. These results demonstrated that the fisherfolk in Kisumu City had small household sizes. This was a positive development as they were having family size they can manage. Individuals from small homes are more likely to engage in pro-environmental practices, according to Gilg and Barr (2006). As a result, it was suggested that the number of dependents or household size is a likely factor of research use in environmental and fisheries management among Kisumu City fisherfolks.

4.3.6 Highest Education Level

The respondents were further requested to indicate their highest level of education. Five categories of educational attainment were considered in the study; no formal education, primary qualification, secondary qualification, post-secondary qualification and university qualification. The results are as shown in Table 4.7.

Table 4.7: Distribution of Respondents by Education Level

Level of Education	Frequency	Percentage (%)
None	16	4.1
Primary	170	44.3
Secondary	122	31.8
Post-secondary	65	16.9
University	11	2.9
Total	**384**	**100.00**

Table 4.7 reveals that a majority of the respondents (44.3%) only had a primary school certificate as their highest qualification. Following this group of respondents was the set of participants (31.8%) with only a secondary's level of education. Only a few respondents (2.9%) had a university's level of education. These results imply that a majority of fisherfolk in Kisumu has some basic form of education which is very critical in utilization of research findings for conservation of environment. Vicente-Molina et al. (2013) discovered that formal education had an impact on pro-environmental behavior. As a result, variations in fisherfolk education levels in Kisumu can be linked to the region's use of research findings in environmental management.

4.3.7 Number of Years Stayed in the Region

The respondents were asked to indicate the number of years they had stayed in the region. The participants responses were summarized using frequencies and percentages. Table 4.8 displays the results.

Table 4.8: Number of Years Stayed in the Region

Length of Stay	Frequency	Percentage (%)
Less than a year	32	8.3
1-4 years	72	18.8
5-9 years	76	19.8
10 years and above	198	53.1
Total	**384**	**100.00**

Table 4.8 shows that a majority of respondents (53.1%) had stayed in the region for more than 10 years, 19.8% stayed for a period ranging 5 to 3 years, while 18% had lived in the region for a period ranging 1 to 4 year. The results also show that 8.3% had lived in the region for less than a year. On the basis of these results, it can be argued that most respondents had lived in the region long enough thus were well positioned to respond to the questionnaires issued and had deep understanding of challenges facing the lake victoria ecosystem and this is very useful in utilization of research findings.

4.4 Manifestation of Study Variables

This section presents findings on the descriptive statistical analysis of the study variables assessed through the questionnaire, interview with key informants and focus group discussion. The variables considered in this section are; socioeconomic factors, research dissemination channels and utilization of research findings. Among the descriptive statistics utilized were mean and standard deviation.

4.4.1 Socioeconomic Factors

The first objective of the study was to investigate the influence of socioeconomic factors on the utilization of research findings in environmental and fisheries management in Kisumu City. A mix of open-ended and closed-ended questions were used to elicit responses from the respondents in order to acquire a better picture of the households' socioeconomic activities.

Respondents were given a series of indicators showing accessibility to social amenities and asked to rank them on a 5-point Likert scale in order to measure the socialeconomic aspects. The scale went from 1 (Not Available) to 5 (Very Good). The mean and standard deviation were used to analyze the responses to the question. The results of the analysis are presented in Table 4.9.

Table 4.9: Access to Social Amenities

Factor	Mean	Std. Deviation
Electricity	2.89	1.08
Clean Water	2.53	0.86
Sanitary facilities (toilets etc)	2.04	0.92
Education	2.62	0.76
Roads	1.64	0.89
Housing	2.27	0.76
Health facilities	1.88	0.94
Security	2.17	0.97
Places of worship (churches, mosques etc)	3.28	0.83
Overall Mean Score	**2.37**	**0.89**

Table 4.9 shows the overall mean score for all the items was 2.37. Based on the 5-Likert scale this score was close to "poor". This had the implication that access to social amenities by the fisherfolk in Kisumu City was poor. Further inspection of the results reveals that the places of worship such as churches and mosques had the highest mean score of 3.28. This implied that access to these places of worship was average. Roads scored the lowest mean score of 1.64, according to the findings. This score was close to the "poor' rating on the Likert scale. This was an indication that the fisherfolk in Kisumu City had poor access to roads. Generally the respondents had poor access to socio amenties and this had effects on utilization of research findings. It is also evident in Table 4.9 that education and housing had the least standard deviations of 0.76. This implied that there was a general consensus that access to education and housing was average and poor respectively.

The respondents were then asked to identify some of the social or cultural activities that they believed were harmful to the environment and fisheries in an open-ended questionnaire. The participants gave varied responses, however, it emerged that most households (3.39%) farmed along the lakeshores. On the other hand, about 57.29% of the participants reported they were not aware of any cultural practice that impacted the environment and fisheries. Nutrient runoff from agricultural and industrial operations was thought to have a negative

influence on the lake and fishery. This was evident from the focus group discusions where the respondents stated that surrounding industries are polluting the lake and is affecting fisheries.

As pertains to economic activities, the households were first presented with an open-ended question that asked, "What other economic activities are you engaged in apart from your main occupation?" The participants gave varied responses, however, it emerged that a majority (65.10%) did not engage in economic activities other than their main occupation. As for those who indicated that they engaged in part-time activities, a majority (50.38%) indicated that they practiced small-scale businesses although they did not provide more specifications on the exact nature of the businesses. This implied that most respondent had specific activities which they specialized on such as boat making, repair of nets, repair of boats, fish mongers and many others. This finding confirms Muyodi, Mwanuzi and Kapiyo (2011) who established that most of the households around Lake Victoria engaged in various income generating activities other than fishing. The respondents were further asked to provide an estimate of their average monthly income from various economic activities they engaged in. These results were summarized using frequencies and are presented in Table 4.10.

Table4.10: Average Monthly Income Estimate from Economic Activities

Income Level (Ksh)	Frequency	Percentage (%)
10, 000 and below	169	67.6
10, 001-20, 000	31	12.4
20, 001-30, 000	9	5.6
Above 30, 000	36	14.4
Total	**250**	**100.00**

Table 4.10 shows that a majority of households (67.6%) who engaged in part-time economic activities generated an average monthly of either Ksh. 10, 000 or less. Only 14.4 percent of households generated an average monthly revenue of at least Ksh. 30, 000 from their part-time enterprises, according to the data. The findings revealed that the majority of the

respondents were poor and lived on a shoestring budget. The participants were also asked to report on how consistent their income was.The results are shown in Table 4.11.

Table 4.11: Frequency of Income Payment

Payment	Frequency	Percentage (%)
Monthly	114	29.69
Weekly	31	8.07
Daily	239	62.24
Total	**384**	**100.00**

Table 4.11 shows that more than half of the households (62.24%) received their income on a daily basis. On the other hand, only 8.07% of the households received their income on a weekly basis. These findings suggest that the majority of fisherfolks in Kisumu City are either cash-strapped or have insufficient income to get by on a daily basis. This research validates Violet and Atieno's (2011) conclusions that the fisherfolk living around Lake Victoria in Kenya and Tanzania are poor. Respondents were asked whether their income was sufficient to meet basic life necessities such like food, shelter, clothes, medication, and fees in order to analyze the economic status of the fisherfolks in Kisumu City. The results are as displayed in Table 4.12.

Table 4.12: Adequacy of Income

Length of Stay	Frequency	Percentage (%)
Adequate	49	12.8
Not adequate	335	87.2
Total	**384**	**100.00**

Table 4.12 shows that most of the households (87.2%) did not consider their income to be sufficient enough in meeting their basic needs. This further confirms that most households that practice fishing in Kisumu City do not earn a regular income that can sustain their basic and immediate needs. This findings which demonstrate that income levels are low and not

enough to meet the basic needs of the respondents is critical to the utilization of research findings.

4.4.2 Methods of Disseminating Environmental and Fisheries Research Findings

The study sought to assess the influence of channels of disseminating research findings on the utilization of research evidence in environmental and fisheries in management of environment in Kisumu city. The channels of disseminating environmental and fisheries research evidence constituted one of the study's independent variables. To understand more about these channels the research participants were asked a series of questions. The first question asked them to indicate the sources from which they obtained research evidence. The responses from the participants are summarized in Table 4.13.

Table 4.13: Source of Research Information

Source	Frequency	Percentage (%)
Government offices	57	14.84
NGOs	78	20.31
Chiefs	46	12.00
Research institutions	33	8.59
Neighbors and friends	70	18.23
Radio	88	22.92
School	1	0.26
No idea	11	2.86
Total	**384**	**100.00**

Table 4.13 shows that a majority of households (22.92%) sought research findings on environmental and fisheries management through the radio. This was followed by (20.31%) indicated that they sought the research findings from NGOs. The results also reveal that schools were the least place (0.3%) where the households obtained research information. Additionally, the research participants were asked to indicate how frequently they used various sources of research information. This was assessed on a 5-point Likert scale ranging

from 1 to 5 where 1 represented "Never" and 5 denoted "Very often". The mean and standard deviation were used to analyze the data as shown in Table 4.14.

Table 4.14: Frequency of Using Various Research Dissemination Channels

Source	Mean	Percentage (%)	Std. Deviation
Public barazas	2.55	15.80	1.26
Radio	3.77	23.36	1.19
Television	2.76	17.10	1.41
Internet	1.97	12.21	1.27
Fliers	1.43	8.86	0.84
Pamphlets	1.49	9.23	0.84
Newspapers	2.17	13.44	0.84
Overall Mean Score	**2.31**	**100**	

The results in Table 4.14 show that the overall mean score for the frequency of using various sources of research findings was 2.31. Based on the 5 point Likert scale the overall mean score fell close to the "Occasionally" rating. This implied that households in Kisumu City accessed various sources of research findings on environmental and fisheries management were occasionally. Another key finding observable in Table 15 is that there were mixed outcomes in regard to the usage of various sources of research findings. The results show a high ranking for radio (*M*=3.77), Television (*M*=2.76) and public barazas (*M*=2.55). This means that these sources of information are among the most frequently used. Fliers had the lowest mean score of 1.43. This was an indication that fliers are rarely used as a source of research findings on environmental and fisheries management in Kisumu City. This findings which demonstrated that radio was the most popular means of accessing research finding was due to the fact that its cheap and most households can afford it. This finding supports the recommendations of (Mwanuzi et al., 2005; Wandiga et al., 2006; Kerstin et al., 2002), who stated that increasing access to research findings and raising awareness about it will lead to more people understanding what is affecting our environment and developing appropriate

solutions. The results also reveal that television was associated with the highest standard deviation as indicated by a score of 1.41. This implies that generally there was a lack of unanimity across the households that television is occasionally used as a source of research findings on environmental and fisheries management. Pamphlets and newspapers, on the other hand, had the lowest standard deviation of 0.84. This indicates that the majority of the households agreed that pamphlets and newspapers are rarely used as sources of study findings on environmental management. This is most likely due to the high expense of producing pamphlets and newspapers, which are considered expensive by most households.

4.4.3 Utilization of Research Finding

Utilization of research findings management represented the study's dependent variable. The variable was operationalized into four construct namely; access to environmental management research findings, access to fisheries research findings, utilization of research findings in environmental management and utilization of research findngs in fisheries. The results of the examination of the participants' (households') responses to these dimensions are presented in this section.

In a bid to understand the state of research utilization among the households in Kisumu, the respondents were posed with a question asking them if they had access to research addressing environmental management. The participants responses were summarized using frequencies and percentages. The results are presented in Table 4.15.

Table 4.15: Access to Research on Environmental Management

Access?	Frequency	Percentage
Yes	184	47.92
No	200	52.08
Total	**384**	**100.00**

The results in Table 4.15 reveal that a majority of the households (52.08%) did not have access to research findings on environmental management. The remaining respondents who had access to such information were asked to indicate how often they applied the findings in environmental management. This was assessed using a 5-point Likert scale where 1 represented "Never" and 5 denoted "Very frequently". The mean and standard deviation were used to assess the responses to the question as shown in Table 4.16.

Table 4.16: Utilization of Research Findings in Environmental Management

Utilization	Mean	Std. Deviation
Control of water pollution	2.84	1.29
Chemicals used in farming activities	2.56	1.10
Control of pest using pesticides	2.75	1.09
Disposal of refuse	3.39	1.32
Ensuring water quality is good	3.18	1.32
Construction of toilet facilities	3.05	1.15
Development of policies and practices that protect the environment	2.46	1.13
Development of environmental awareness campaigns	2.39	1.15
Overall Mean Score	**2.83**	

As evident in Table 4.16, the overall average score for the usage of research findings in the management of different environmental areas was 2.83. With respect to the 5-point Likert scale, this overall mean score was close to the "Occasionally" rating. Therefore, this finding means that utilization of research findings in environmental management among households in Kisumu City was on an occasional basis. On other hand the findings demonstrated that usage of research findings was very low. It is also noticeable from Table 4.16 that participants ranked various areas in which the research findings were used differently. For instance, the use of research findings in the management of refuse disposal had the highest ranking (M=3.39). This signified that most households in Kisumu City use research findings

to manage refuse disposal occasionally. The application of research findings in the development of environmental awareness initiatives, on the other hand, received the lowest score (M=2.39). This had the implication that most households in Kisumu City rarely utilize research findings for the purpose of developing environmental awareness campaigns. These finding demonstrate that probably with the rate at which Kisumu City has challenge with refuse disposal many respondents who have access to research findings have resorted to using it to address challenges of refuse disposal.

With respect to variability of the participants' responses, Table 4.16 shows that the use of research findings for control of pests had the least standard deviation of 1.09. This suggested that there was a high level of agreement among the participants that the research findings were indeed used occasionally to manage pests. Conversely, the use of research findings in the management of refuse disposal and water quality had the highest standard deviation of 1.32. This suggested that there was a lack of unanimity among the households that research findings were occasionally used in the managing refuse disposal and maintenance of water quality. This findings overally demonstrate that research findings are not used to solve the environmental problem. This may explain why the environment continues to deteriorate, and studies by (Ochola, 2006; John et al., 2010; Ngodhe et al., 2016) have found that key land degradation issues such as increased soil erosion, agro-chemical pollution, salinization, and loss of land cover pose a threat to the ecosystem.

The respondents were further asked if they had access to research findings on fisheries. The participants' responses were summarized using frequencies and percentages. Table 4.17 presents the results.

Table 4.17:Access to Research Findings on Fisheries

Access?	Percentage (%)
Yes	36.20
No	63.80
Total	**100**

As evident in Table 4.17, more than half of the households (63.80%) did not have access to research findings on fisheries. The remainder who had access to such information were asked to indicate how often they applied the findings in fisheries management. This was assessed using a 5-point Likert scale where 1 represented "Never" and 5 denoted "Very frequently". The responses to the question were analyzed using mean and standard deviation as shown in Table 4.18.

Table 4.18: Utilization of Research Findings on Fisheries

Statement	Mean	Std. Deviation
Use of fishing gears and techniques	2.59	1.28
Management of fish breeding grounds	2.45	1.19
Sedimentation of the Lake	2.30	1.13
Pollution of fish habitat	2.62	1.23
Reduction of fish population	2.61	1.16
Extinction of fish species	2.52	1.23
Over fishing	2.46	1.25
Post harvest facilities/techniques	2.49	1.43
Overall Mean Score	**2.18**	

Table 4.18 depicts that the overall mean score for the items the utilization of research findings on fisheries was 2.18. This average score fell slightly above the "rarely" rating on the 5-point Likert scale. This mean score was an indication that research findings were rarely utilized in management of fisheries by the fisherfolk in Kisumu City. Moreover, Table 4.18

illustrates that the participants ranked the frequency of using research findings in various fisheries' aspects differently. The mean item scores were highest for the statement "Pollution of fish habitat" with an an average score of 2.62. This finding was an indication that fisherfolk in Kisumu City use research findings frequently too in managing pollution of fish habitat. This was probably a source of concern to the respondents as they have been witnessing the pollution of the lake with surrounding industries and that has an impact on the lake ecosystem. This concurs with the study of Mailu, (2001) which demonstrated that degradation of the environment has been wittnessed and contributed to increased conflicts over resources.

The second top ranked item was the statement, "Reduction of fish population " with a mean score of 2.61. This has the implication that fisherfolk in Kisumu City occasionally use research findings in matters pertaining to management of fish population. The statement, "Sedimentation of the lake" recorded the lowest mean score of 2.30. This finding suggested that the fisherfolk in Kisumu City rarely use research findings in managing sedimentation of the lake. This data can also be read to suggest that as the fish population declines, the price of fish in the market rises, and they must be creative in order to manage the issue of fish reduction in the lake, therefore the interest in research that addresses the issue.

With respect to variability of the participants' responses, Table 19 shows that the statement, "Sedimentation of the lake" had the lowest standard deviation as indicated by a score of 1.13. This finding suggested that there was high level of agreement among participants that research findings were rarely used in dealing with sedimentation of the lake. Conversely, the statement, "Post harvest facilities/techniques" had the highest standard deviation of 1.45. This indicated that there was a lack of agreement among the participants that the use of research findings in post-harvest activities is uncommon. This findings demonstate low usage of

research findings to solve the fisheries on issue of value chain addition problem affecting the lake and this might probably explain why the fish stock is in the decrease in the lake as more fish is harvested but not handled properly before selling. This is in agreement with the study by (LVFO (2008; Joyce et al., 2009; Kayanda et al., 2009), who stated that informing and educating fishing communities about the dangers of illegal fishing was considered an option for controlling fishing efforts, and that it was believed that these actions would result in a decrease in illegal fishing and a decrease in the catching of undersized fish. This will eventually lead to the capture of fish of the proper size, which may then be used to improve the value chain.

4.5 Test of Research Objectives

The broad objective of this study was to establish the key determinants in the utilization of research findings and policy implications in environment and fisheries management in Kisumu City. In addressing this goal three specific objectives were formulated. Each objective was evaluated using a suitable statistical tool or technique. Following the evaluation of the objectives, the outcomes are presented in this part.

4.5.1 Influence of Socioeconomic Factors on the Utilization of Research Findings

The first objective of this study sought to determine the influence of socioeconomic factors on the utilization of research findings in environmental and fisheries management in Kisumu City. For broader insights, demographic characteristics were also covered under this objective. Collectively, the factors included; age, gender, education, occupation, marital status, household size, number of years stayed in the region, accessibility to social amenities such as electricity, clean water, sanitation facilities, education, roads, housing, health facilities and places of worship. In assessing this objective, it was hypothesized that there was no relationship between each of these socioeconomic factors and each of the constructs of utilization of research findings. The four constructs of utilization of research findings

included; access to research findings on environment, access to research findings on fisheries, utilization of research findings in environment management and utilization of research findings in fisheries management. Pearson Chi-square test of association at 5% level of significance was used to evaluate the relationships. This analysis was premised on the ceteris paribus principle where the impact of each socioeconomic factor on the utilization of research findings was assessed while holding other possible influential socioeconomic factors constant. This section presents results of the test.

Table 4.19: Chi-square Test results for Socio-economic Factors and Access to Environmental Research Findings

Socio-economic factors	n	Pearsons' χ2-value	df	p-value
Gender	384	4.999	1	.025*
Marital status	383	7.351	4	.118
Occupation	382	4.154	1	.843
Number of dependants	377	18.329	3	.000*
Income	355	.044	1	.834
Age	384	8.442	3	.038*
Education level	384	11.452	4	.022*
Access to electricity	378	54.355	4	.000*
Access to Water	380	36.276	4	.000*
Sanitary facilities	380	5.242	4	.263
Access to education	380	8.544	4	.074
Roads	380	16.259	4	.003*
Housing	377	16.117	4	.003*
Access to health facilities	379	16.210	4	.003*
Security	377	9.148	4	.058
Access to places of worship	378	43.690	4	.000*

* Significant at .05 level

Table 4.19 above shows that the association between socio-economic factors and access to environmental management research findings were statistically significant as indicated by the following; Gender (X^2 (1, n = 384) = 4.999, p < .05), Number of dependants (X^2 (3, n = 377) = 18.329, p < .05), Age (X^2 (3, n = 384) = 8.442, p < .05), Education level (X^2 (4, n = 384) = 11.452, p < .05), Access electricity (X^2 (4, n = 378) = 54.355, p < .05), Access to water (X^2 (4,

n = 380) = 36.276, p < .05), Roads (X^2 (4, n = 380) = 16.259, p < .05), Housing (X^2 (4, n = 377) = 16.117, p < .05), Access to health facilities (X^2 (4, n = 379) = 16.210, p < .05), Access to place of worship (X^2 (4, n = 378) = 43.690, p < .05). On the other hand, the association between the following socioeconomic factors and access to environmental research findings were found to be not statistically significant; Marital status (X^2 (4, n = 383) = 7.351, p > .05), Occupation (X^2 (1, n = 382) = 4.154, p > .05), Income (X^2 (1, n = 355) = 0.044, p > .05), Sanitary facilities (X^2 (4, n = 380) = 5.242, p > .05), Access to Education (X^2 (4, n = 380) = 8.544, p > .05) and Security (X^2 (4, n = 377) = 9.148, p > .05). Generally, these results suggested that gender, number of dependants, age, level of education, access to electricity, access to water, roads, housing access to health facilties and place of worship influenced access to environmental research findings. While marital status, occupation, income, sanitary facilities, access to education and security does not influence access to environmental research findings. This findings is in agreement with the study of Mugwe *et al*., 2012 which states that age, number of dependants influence utilization of research findings. This is also in agreement with the study of Kimaru *et al*., (2012) which stated that education level utilization of research findings. Table 4.20 displays the results of Socioe-conomic factors and access to fisheries research findings.

Table 4.20: Chi-square Test results for Socio-economic Factors and Access to Fisheries Research findings

Socio-economic factors	n	Pearsons' χ2-value	df	p-value
Gender	383	1.409	1	.235
Marital status	382	4.289	4	.368
Occupation	380	4.555	1	.804
Number of dependants	376	30.978	3	.000*
Income	354	3.649	1	.056
Age	383	8.861	3	.031*
Education level	383	6.319	4	.177
Access to electricity	377	36.617	4	.000*
Access to Water	379	29.732	4	.000*
Sanitary facilities	379	.854	4	.931
Access to education	379	6.373	4	.173
Roads	379	9.705	4	.046*
Housing	376	4.650	4	.325
Access to health facilities	378	11.544	4	.021*
Security	376	13.400	4	.009*
Access to places of worship	377	30.948	4	.000*

* Significant at .05 level

Table 4.20 shows that the association between socio-economic factors and access to fisheries research findings were statistically significant as indicated by the following; Number of dependants (X^2 (3, n = 376) = 30.978, p < .05), Age (X^2 (3, n = 383) = 8.861, p < .05), Access electricity (X^2 (4, n = 377) = 36.617, p < .05), Access to water (X^2 (4, n = 379) = 29.732, p < .05), Roads (X^2 (4, n = 379) = 9.705, p < .05), Access to health facilities (X^2 (4, n = 378) = 11.544, p < .05), Security (X^2 (4, n = 376) = 13.400, p < .05) Access to place of worship (X^2 (4, n = 377) = 30.948, p < .05). On the other hand, the association between the following socioeconomic factors and access to fisheries research findings were found to be not statistically significant were as follow; Gender (X^2 (1, n = 383) = 1.409, p > .05), Marital status (X^2 (4, n = 382) = 4.289, p > .05) Occupation (X^2 (1, n = 380) = 4.555, p > .05), Income (X^2 (1, n = 354) = 3.649, p > .05), Education level (X^2 (4, n = 383) = 6.319, p > .05), Sanitary facilities (X^2 (4, n = 379) = 0.854, p > .05), Access to Education (X^2 (4, n = 379) =

6.373, p > .05) and Housing (X^2 (4, n = 376) = 4.650, p > .05). Generally, these results suggested that number of dependants, age, access to electricity, access to water, roads, access to health facilties, security and place of worship influenced access to fisheries research findings. While gender, marital status, occupation, income, Education level, sanitary facilities, access to education and housing does not influence access to fisheries research findings.

Table 4.21: Chi-square Test results for Socio-economic Factors and Utilization of Environmental Research findings

Socio-economic factors	n	Pearsons' χ2-value	df	p-value
Gender	203	.037	1	.847
Marital status	203	1.829	3	.609
Occupation	381	5.659	1	.685
Number of dependants	196	2.759	3	.430
Income	195	.724	1	.395
Age	203	1.668	4	.644
Education level	203	7.990	4	.092
Access to electricity	201	3.693	4	.449
Access to Water	201	10.223	4	.037
Sanitary facilities	201	3.082	4	.544
Access to education	202	.966	4	.915
Roads	202	9.009	4	.061
Housing	200	2.736	4	.603
Access to health facilities	201	9.554	4	.049*
Security	200	3.515	4	.476
Access to places of worship	220	5.457	4	.244

* Significant at .05 level

Table 4.21 shows that the association between socio-economic factors and utilization of environmental research findings was statistically significant as indicated by the following Access to health facilities (X^2 (4, n = 201) = 9.554, p < .05). On the other hand, the association between the following socioeconomic factors and Utilization of Environmental research findings were found to be not statistically significant were as follow; Gender (X^2 (1, n = 203) = 0.037, p > .05), Marital status (X^2 (3, n = 203) = 1.829, p > .05) Occupation (X^2 (1, n = 381) = 5.659, p > .05), Number of dependants (X^2 (3, n = 196) = 2.759, p > .05) Income

(X^2 (1, n = 195) = 0.724, p > .05), Age (X^2 (4, n = 203) = 1.668, p > .05), Education level (X^2 (4, n = 203) = 7.990, p > .05), Access to Electricity (X^2 (4, n = 201) = 3.693, p > .05), Access to water (X^2 (4, n = 201) = 10.223, p > .05), Sanitary facilities (X^2 (4, n = 201) = 3.082, p > .05), Access to Education (X^2 (4, n = 202) = 0.966, p > .05), Roads (X^2 (4, n = 202) = 9.009, p > .05), Housing (X^2 (4, n = 200) = 2.736, p > .05), Security (X^2 (4, n = 200) = 3.515, p > .05) and Access to place of worship (X^2 (4, n = 220) = 5.457, p > .05). Generally, these results suggested that access to health facilties influence utilization of environmental research findings. While gender, marital status, occupation, number of dependants, income, age, education level, access to electricity, access to water, sanitary facilities, access to education, roads, housing, security and place of worship does not influence utilization of environmental research findings.

Table 4.22: Chi-square Test results for Socio-economic Factor and Utilization of Fisheries Research Findings

Socio-economic factors	n	Pearsons' χ2-value	df	p-value
Gender	191	.464	1	.496
Marital status	191	2.206	3	.531
Occupation	384	19.498	1	.077
Number of dependents	186	5.842	3	.120
Income	185	2.313	1	.128
Age	191	1.142	4	.767
Education level	191	11.703	4	.020*
Access to electricity	189	6.112	4	.191
Access to Water	189	15.222	4	.004*
Sanitary facilities	189	8.251	4	.083
Access to education	190	1.225	4	.874
Roads	190	8.752	4	.068
Housing	188	4.382	4	.357
Access to health facilities	189	10.052	4	.040*
Security	188	5.149	4	.272
Access to places of worship	188	4.420	4	.352

* Significant at .05 level

Table 4.22 shows that the association between socio-economic factors and utilization of fisheries research findings were statistically significant as indicated by the following; Education level (X^2 (4, n = 191) = 11.703, p < .05), Access to water (X^2 (4, n = 189) = 15.222, p < .05), Access to health facilities (X^2 (4, n = 189) = 10.052, p < .05). On the other hand, the association between the following socioeconomic factors and Utilization of fisheries research findings were found to be not statistically significant were as follow; Gender (X^2 (1, n = 191) = 0.464, p > .05), Marital status (X^2 (3, n = 191) = 2.206, p > .05), Occupation (X^2 (1, n = 384) = 19.498, p > .05), Number of dependants (X^2 (3, n = 186) = 5.842, p > .05), Income (X^2 (1, n = 185) = 2.313, p > .05), Age (X^2 (4, n = 191) = 1.142, p > .05), Access to Electricity (X^2 (4, n = 189) = 6.112, p > .05), Sanitary facilities (X^2 (4, n = 189) = 8.251, p > .05), Access to Education (X^2 (4, n = 190) = 1.225, p > .05), Roads (X^2 (4, n = 190) = 8.752, p > .05), Housing (X^2 (4, n = 188) = 4.382, p > .05), Security (X^2 (4, n = 188) = 5.149, p > .05) and Access to place of worship (X^2 (4, n = 188) = 4.420, p > .05). Generally, these results suggested that education level, access to water and access to health facilties influence utilization of fisheries research findings. While gender, marital status, occupation, number of dependants, income, age, access to electricity, sanitary facilities, access to education, roads, housing, security and place of worship does not influence utilization of fisheries research findings.

Generally, the study reveals contrasting results with respect to a stream of research conducted previously. For instance, the results contrast the findings by Fahad *et al*., (2018) who found there was a positive and significant relationship between age and utilization of research findings. The results also contrast the findings by Yaseen *et al*., (2015) who in their study revealed a positive and significant relationship between education level and utilization of research evidence. In addition, the results differ from the findings established by Mugwe *et*

al., (2012) who found that utilization of research information on agricultural management practices among small-scale farmers in Central Provinces was influenced by socioeconomic factors such as age, income, occupation and household size.

Based on the interviews with the key informants, access to clean water also emerged as one of the key socio-economic factors influencing the utilization of research findings. A majority of the respondents (7) described how their experiences of trying to access clean water birthed their readiness to behave in pro-environmental ways. The following comments highlight these finding:

> *"I think access to clean water is a big problem in the region in as much as we are close to the lake. The water from the lake is polluted so we cannot use it directly for consumption. We have to find ways to collect, preserve and make it fit for our consumption. This in turn implies we have to be always on the look out for new information of how to make the water safe for consumption."Key Informant 002.*

Another key informant commented the following:

> *"The fact that many of us have poor access to clean water, means we have to take our own initiative to avoid harm to the few natural resources that provide us with the clean water. As a result, we tend to explore new knowledge and ideas that could help us reduce or avoid environmental damage to the resources." Key Informant 005.*

Echoing similar sentiments, one of the key informants noted that:

> *"The water hyancinth in the lake is such a prolem to us. It makes the water unsafe for drinking. We are always seeking for ways to recover and restore the lake for from the damage caused by the water hyancinth. Therefore, I think since people have poor access to clean water makes them more eager to learn how they could reduce the impact of the water hyancinth."Key Informant 003.*

Based on the interviews with the key informants and focus group disccussions it is thus clear that access to clean water by the fishingfolk in Kisumu is a key influential factor in their engagement in pro-environmental behavior such as the utilization of research findings or new information in environmental management. A majority of the focus group participants (53.3%) also identified access to clean water as one of the key factors that drove them to engage in pro-environmental practices. One of the participant said:

> *"It is surprising that we are close to the lake, but still face challenges in getting clean water. The water from the lake is usually polluted by the many activities that happen around the lake such as car washing. Personally, I'm interested in information or ideas that would help us as a community to make the best use of the lake economically while at the same time ensuring that we have clean water"*

According to key informant interviews and focus group discussions, fishingfolk in Kisumu city access to clean water is a key influencing element in their engagement in pro-environmental behavior such as the use of research findings or new information in environmental management. The challenge of access to clean water in the region is also evident from the photos during the research period. Plate 1 shows a restaurant in its construction stage at Dunga Beach.

Plate 1: A Restaurant under Construction on a Riparian Section of Dunga Beach
Source: Field data (2016)

What is striking about the photo is that the restaurant is being built on a riparian land. The photo also shows the proposed location of the restaurant's toilet which is a few meters above the water level of the lake. Plate 2 shows a photo of the same restaurant after completion.

Plate 2: Restaurant in Operation on a Riparian Section of Dunga Beach
Source: Field Data (2016)

Construction of the restaurant on riparian land reflects one of haphazard activities of the fishingfolk that hampers their access to clean water. The garbage and human waste from the restaurant is likely to be discharged into the lake. Compounded by the garbage from the surrounding markets and informal settlements, the location of the restuarant only serves to worsen the pollution of the lake.

Further analysis was done by regressing access to social amenities index, the estimate monthly income of the fisherfolks households heads and utilization of research findings index. The result of the regression test are summarized in Table 4.23 below.

Table 4.23: Regression Test of Socio-economic factors and utilization of research finding

Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t-value**	**p-value**
	B	**Std. Error**	**Beta**		
Constant	1.821	.340		5.352	.000
Socio-Factors	.143	.131	.090	1.093	.276
Economic factor	5.535E-006	.000	.198	2.402	.017
$R = .187$, $R^2 = .035$, R^2 Adjusted = .095, $F(2, 161) = 2.924$, $p = .057$					

The regression output in Table 4.23 above show that the relationship between the fisher folks socio-economic status and utilization of research findings was positive (r = .187. The results further show that socio-economic status accounted for 3.5% (R^2 = .035) of the variation in utilization of research findings. The beta coefficient show that income (β = .198, p < .05) is a significant determinant of utilization of research findings but social factors (β = .131, p .05) are not. This was in agreement with Mugwe *et al*., (2012) which stated that age, income, occupation influence the utilization of research findings. Iqbal *et al*., (1999) also found that socioeconomic factors such as extension contact, education, farm size, credit availability, use of fertilizer, low land area which affect utilization of research findings. This also concurs with the finds of Musaba, (2010) which states that income and education influence utilization of research findings.

4.5.2 Influence of Dissemination Channels on the Utilization of Research Findings

The study's second objective was to see if dissemination channels had an impact on how research findings were used by fisherfolks in Kisumu City. A number of channels used to disseminate research were considered including public barazas, radio, television, the Internet, fliers, pamphlets and newspapers. In investigating this objective, it was hypothesized that no statistically significant relationship existed between the channels and each of the constructs of utilization of research findings. The four constructs of utilization of research findings included; access to research findings on environment, accss to research findings on fisheries, utilization of research findings in environment management and utilization of research findings in fisheries management. This postulation was tested using the Chi-square test of association at 5% level of significance. It's also worth noting that the study followed the ceteris paribus principle, which meant that the influence of each distribution channel was evaluated while other potentially influential channels were kept constant. Table 4.24 shows

the Chi-Square test of association at 5% level significant dissemination channels and access to environmental research findings.

Table 4.24: Chi-square Test Results for dissemination Channels and Access to Environmental Research Findings.

Channel	n	Pearsons' χ2-value	df	p-value
Public barazas	374	2.172	4	.704
Radio	381	29.075	4	.000*
Television	376	66.334	4	.000*
Internet/Social media	378	45.639	4	.000*
Fliers	377	32.623	4	.000*
Pamphlets	376	54.633	4	.000*
Newspapers	376	86.765	4	.000*

* Significant at .05 level

Table 25 shows that the association between dissemination channels and access to environmental management research findings were statistically significant as indicated by the following; Radio (X^2 (4, n = 381) = 29.075, p < .05), Television (X^2 (4, n = 376) = 66.334, p < .05), Internet/Social media (X^2 (4, n = 378) = 45.639, p < .05), Fliers (X^2 (4, n = 377) = 32.623, p < .05), Pamphlets (X^2 (4, n = 376) = 54.633, p < .05), Newspaper (X^2 (4, n = 376) = 86.765, p < .05*).* On the other hand, the association between the following dissemination channel and access to environmental research findings was found to be not statistically significant Public baraza (X^2 (4, n = 374) = 2.172, p > .05). Generally, these results suggested that radio, television, internet/social media, fliers, pamphlets, newspapers influence access to environmental research findings. While public baraza does not influence access to environmental research findings. This findings were in agreement with Asaba et al.(2006) and Koskei et al (2013) which stated that access to research information led to its utilization and improve productivity Table 4.25 displays the results of Socioeconomic factors and access to fisheries research findings.

Table 4.25: Chi-square Test Results for Dissemination Channels and Access to Fisheries Research findings

Communication Channels	n	Pearsons' χ2-value	df	p-value
Public barazas	373	12.801	4	.012*
Radio	380	18.655	4	.000*
Television	375	54.466	4	.000*
Internet/Social media	377	21.761	4	.000*
Fliers	376	17.365	4	.000*
Pamphlets	375	40.505	4	.000*
Newspapers	375	52.451	4	.000*

* Significant at .05 level

Table 4.25 shows that the association between dissemination channels and access to fisheries research findings were statistically significant as indicated by the following; Public Baraza (X^2 (4, n = 373) = 12.801, p < .05), Radio (X^2 (4, n = 380) = 18.655, p < .05), Television (X^2 (4, n = 375) = 54.466, p < .05), Internet/Social media (X^2 (4, n = 377) = 21.761, p < .05), Fliers (X^2 (4, n = 376) = 17.365, p < .05), Pamphlets (X^2 (4, n = 375) = 40.505, p < .05), Newspaper (X^2 (4, n = 375) = 52.451, p < .05*).* Generally, these results suggested that public baraza, radio, television, internet/social media, fliers, pamphlets, newspapers influence access to fisheries research findings. This was in line with research (Ifukor 2013; Chemezie 2016; Musa, Githeko, and Elsiddig 2013), which found that radio was the most popular mode of communication among farmers, followed by print media, and finally television. The result of the association between dissemination channels and use of environmental research findings is shown in Table 4.26.

Table 4.26: Chi-square Test Results for dissemination Channels and Utilization of Environmental Research findings

Communication Channels	n	Pearsons' χ2-value	df	p-value
Public barazas	197	7.847	4	.097
Radio	202	1.818	4	.769
Television	199	13.162	4	.011
Internet/Social media	199	.794	4	.939
Fliers	199	4.822	4	.306
Pamphlets	197	3.810	4	.432
Newspapers	197	.710	4	.950

* Significant at .05 level

From the findings the association between dissemination channels and utilization of environmental research findings were not statistically significant as indicated by the following; Public baraza (X^2 (4, n = 197) = 7.847, p > .05), Radio (X^2 (4, n = 202) = 1.818, p > .05), Television (X^2 (4, n = 199) = 13.162, p > .05), Internet/Social media (X^2 (4, n = 199) = 0.794, p > .05), Fliers (X^2 (4, n = 199) = 4.822, p > .05), Pamphlets (X^2 (4, n = 197) = 3.810, p > .05), Newspaper (X^2 (4, n = 197) = 0.710, p > .05*)*. Generally, these results suggested that public baraza, radio, television, internet/social media, fliers, pamphlets, newspapers had no influence on utilization of environmental research findings.

Table 4.27shows the result of association between dissemination channels and utilization of fisheries research findings.

Table 4.27: Chi-square Test Results dissemination channels and utilization of fisheries research findings.

Communication Channels	n	Pearsons' χ2-value	df	p-value
Public barazas	186	8.056	4	.090
Radio	190	2.388	4	.665
Television	187	15.156	4	.004*
Internet/Social media	188	5.995	4	.200
Fliers	188	4.214	4	.378
Pamphlets	186	8.788	4	.067
Newspapers	186	8.286	4	.082

* Significant at .05 level

From the findings the association between dissemination channels and utilization of fisheries research findings were statistically significant for television (X^2 (4, n = 187) = 15.156, p < .05) and not statistical significant as indicated by the following; Public baraza (X^2 (4, n = 186) = 8.056, p > .05), Radio (X^2 (4, n = 190) = 2.388, p > .05), Internet/Social media (X^2 (4, n = 188) = 5.995, p > .05), Fliers (X^2 (4, n = 188) = 4.214, p > .05), Pamphlets (X^2 (4, n = 186) = 8.788, p > .05), Newspaper (X^2 (4, n = 186) = 8.286, p > .05*)*. Generally, these results suggested that television influence the utilization of fisheries research finding while public baraza, radio, internet/social media, fliers, pamphlets, newspapers had no influence on utilization of fisheries research findings.

The use of television for dissemninating research evidence on environmental management was also apparent from the interviews conducted with the key informants. Out of the nine key informants, five claimed that the use of television helped to promote new knowledge and information on environmental management among the fishingfolk in Kisumu City. The following comments by the key informants point to the prominent use of television as a dissemination channel for research findings and new knowledge:

> *"I think the fishermen around here tend to take TV content more seriously than other media channels. Therefore, I think the use of TVs do contribute significantly to the use of new knowledge on how to conserve the environment better."Key Informant 004.*

> *"People around here use radios and TVs in accessing information. I don't think many people rely that much on the Internet as a source of information." Key Informant 002.*

> *"I think people in this region still tend to rely on the traditional media channels such as radios and TVs. Very few people depend on the Internet and it's mostly the young people." Key Informant 005.*

In relation to the nine focus group discussions conducted, more than half of the participants (54.44%) identified television as their most preferred form of accessing new knowledge. A total of 44.44% focus group participants indicated they still relied on radio for receiving new information. This presented an interesting finding given the fact that radio provides the broadest and most powerful media for disseminating information. However, as one of the focus group intereviews interviewers said:

> *"I prefer TV because I am able to see images of how the environment has been damaged. Such images encourage me to make the environment a better place. "*

These results imply that television is the most effective means of disseminating research findings on environmental management to the fisherfolk in Kisumu City. Compared to previous empirical studies, this finding is incongruent with Familusi and Owoeye (2014) and Oyeyinka *et al*., (2014) who noted that the radio was the most important instrument for research information dissemination in Nigeria. Moreover, the findings contrast those by Musa *et al.,* (2013) who established that print media served as the most common and effective channel for disseminating information to Sudanese farmers.

Further analysis was done to determine the influence of dissemination Channels on utilization of research findings by regressing Channels of disseminating information index on that of utilization of research findings. Table 4.28 presents the results of the regression.

Table 4.28: Regression Test

Model	Unstandardized Coefficients		Standardized Coefficients	t-value	p-value
	B	Std. Error	Beta		
Constant	2.080	.265		7.848	.000
Information dissemination channels use	.112	.102	.080	1.099	.273
$R = .080$, $R^2 = .006$, $F(2, 161) = 1.207$, $p = .273$					

The results reveal that the relationship between the fisher folks use of Information dissemination channels and utilization of research findings was positive (r = .080. The results further reveal that Information dissemination channels usage explained 0.6% (R^2 = .006) variability in utilization of research findings. The beta coefficient indicated that Information dissemination channels (β = .080, p > .05) was not a significant determinant of utilization of research. This additional test demonstrates that research findings are still underutilized, despite the fact that avenues of dissemination exist to distribute research findings. This is in conformity with the results of (Michael et al., 2007), who indicate that research findings are not being utilised to the extent that they should be.

4.5.3 Policy Issues that Act as Barriers and Facilitators in the Utilization of Research Findings

The third objective of the study sought to assess the policy issues that act as facilitators and barriers to the utilization of research findings. For this objective, the researcher focused on the category of participants that were primarily involved in the role of making policy decisions. These participants worked with publicly funded or private policy programs and data from this cohort was gathered via in-depth interviews. An interview guide was used with all the eleven policymakers that had been targeted in the study to ensure that crucial issues that needed to be discussed were not omitted. Analysis of the data collected for this objective revealed a number of discoveries. Reported in this section are the key findings derived from

the responses to the interview questions and themes that emerged across the study participants. Figure 4.1 shows distribution of the policymakers based on whether their institutions had policies that promoted utilization of research findings.

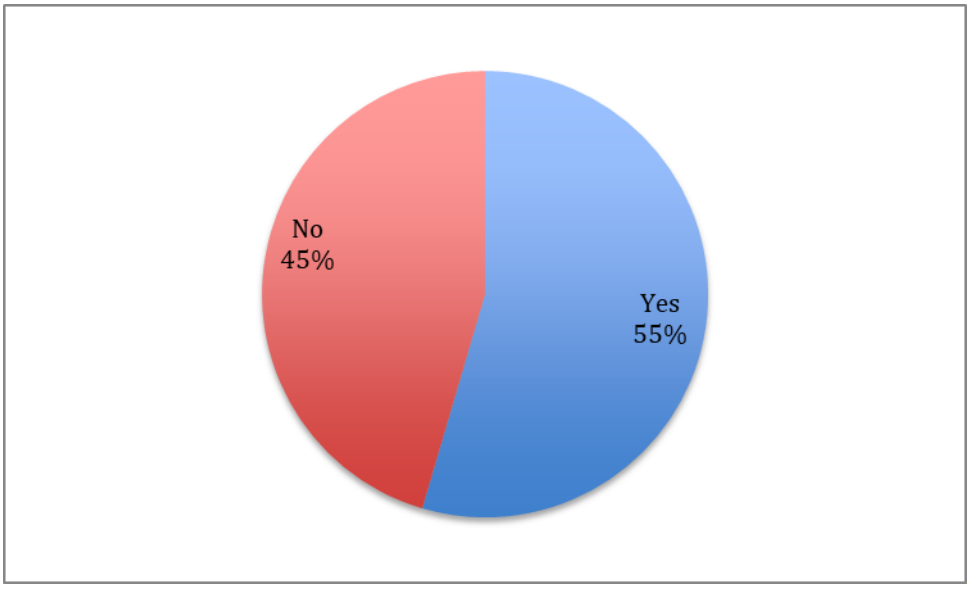

Figure 4.1: Availability of Policies that Promote Utilization of Research Findings

The participants were asked to indicate whether their respective institutions had policies in place that encourage policymakers to use research findings in their decision-making. Six (54.55%) reported that their institutions did have such policies and the rest indicated that the policies were not present in their institutions. A majority of the participants stated that the functions of their institutions were guided by the Science, Technology and Innovation Act of 2013 which requires any research, findings and information carried out by researchers or institutions be made for use in the public interest. The following verbatim quotes highlight the existence of such policies.

> *"There is the Science, Technology and Innovation Act of 2013 which demands dissemination of research evidence to the public and for their interest" Policymaker 003*

> *"Policies are there. For instance, the Science, Technology and Innaovation Act promotes the adoption and application of scientific knowledge for the attainment of national goals" Policymaker 004.*

One policymaker stated that the existence of the National Environment Policy of 2013 promoted the utilization of research findings in policymaking. In particular, the respondent claimed that:

> *"The National Environment Policy, 2013 provides a sound framework for intergrating sustainable practices such as research information in the management of natural resources." Policymaker 005.*

The comments were an indication that a majority of policymaking bodies and institutions involved in the activities of fisherfolk around Lake Victoria have policies that are geared towards promoting the uptake of research findings they generate. This also meant that, while there are policies in place to encourage the use of scientific evidence, they are ineffective.

Of the 55% respondents who stated that policy exist for utilization of research finding; 83% stated that financial constrain and lack of political good led to poor utilization of research findings. The participants were asked to report on various challenges they faced with respect to utilizing research findings. The lack of appropriate financial backing and resources to develop policies and initiatives geared to improve the usage of research findings was one of the most prevalent difficulties that emerged from the participants' comments. This is highlighted by various comments made by the participants. One participant noted:

> *"The economy affects the amount of resources we allocate to various organizational activities. In light of the current economic environment, a lot of cuts are made in our budget and these often encompass restrictions made available for programs geared towards quality assurance and compliance" Policymaker 001.*

Another participant commented that:

> *"The biggest challenge is financial constraints. Often there are no sufficient funds to support activities geared at promoting utilization of research findings" Policymaker 004.*

In highlighting the challenge of insufficient funding another participant expressed that:

> *"We have a limited budget for field research work or investigation from time to time on various issues" Policymaker 008.*

Noting the lack of enough financial backing to promote the use of research findings another participant further commented that:

> *"Funding. You may have good data but no money to implement it." Policymaker 009.*

Based on the responses, it appears that the general perception was that limited funding was one of the most significant hurdles to the efficient application of research findings relating to the fisherfolk around Lake Victoria. This finding is in line with those of El-Jardali, Ataya, Jamal and Jaafar (2012) who found barriers to formulation and utilization of research findings includeThe inability of policymakers to think strategically, the constant need to make quick judgments, limited financial resources, and a lack of qualified and trained human resources have all been cited as key weaknesses.:. Related to this challenge was the misappropriation of funds where scientists and researchers use funds for the wrong intentions. As one participant put it:

> *"Some researchers use research funds as a cash cow and for career progression as opposed to channeling the funds to solve environmental problems facing our society." Policymaker 008.*

This finding corroborates the study by Datta et al. (2011) which found that policymakers could be driven by personal factors including their own professional ambitions and ethical stance.

The inability to build greater contact, relationships, or collaboration between policymakers and practitioners also impacted the use of research findings, according to the participants' comments. This was apparent from a number of comments made by the participants. For instance, one participant commented that:

> *"There is no established process for advising the government to have policies in the use of our research findings." Policymaker004.*

Another respondent expressed that:

> *"There is a lack of proper systems and channels to discuss our research findings within the government. This makes it appear as if the government and practitioners do not rely on institutions like ours for implementing their various policies." Policymaker 005.*

Another respondent echoing similar views commented that:

> *"We lack a formal process or procedure that allows us to dialogue with the government on the way forward based on the research findings we generate." Policymaker 007.*

Generally, these comments indicate that one of the pertinent policy issues impeding the utilization of research findings pertaining to the fisherfolk around Lake Victoria relates to the lack of an effective knowledge transfer channel between policymakers and practitioners. This conclusion also demonstrates the lack of clarity and unanimity among most policymakers regarding who and how research findings should be applied. This conclusion supports Uzochukwu et al. (2016) findings in their study on the analysis of health policies and systems in Nigeria, which indicated that policymakers were unaware of the availability of research findings that could guide policymaking or where to find them.

Another consistent theme observed across the in-depth interviews was lack of clarity on research findings. It was discovered that, while researchers and scientists may produce study findings, the information may not be presented in an easy-to-read or persuasive way for policymakers. In other words, researchers may succeed in providing clear evidence of a problem that may not be in the best position to offer solutions to policymakers. As one participant stated;

> *"Some researchers do research just for the sake of doing it without a clear focus on what environmental problem they are seeking to address." Participant 009.*

This problem is a manifestation of poor communication between researchers and policymakers involved in the activities of fisherfolk around Lake Victoria. Furthermore, Walsh et al. (2015) found that poor communication between policymakers and researchers

manifests itself in a variety of ways, including a lack of access to scientific journals, overlapping demands, and the presenting of research findings in unusable formats.

Another problem that had a significant impact on the use of research findings in policymaking for the fisherfolk around Lake Victoria was a lack of effective leadership. Several interviewees mentioned a lack of a strong leader who could push for the full adoption of research findings into actionable policies and persuade other officials to do the same. One interviewee noted:

> *"My concern is that there is lack of strong leadership in the Ministry of Environment. Lack of a strong leadership means translates to lack of guidance on how to manage the implementation of adoption of research findings. I think a strong leader would also influence other policymakers and that would promote the utilization of research findings. But at present, we do not have that, so that is a shortcoming." Participant 002.*

Another participant commented that:

> *"Strong leadership is lacking. If it were there, more resources would be allocated to address various environment conservation areas. Of course this would have to come with political leaders with political clout capable of convincing other political leaders to see the environmental problem and the need for policy problem. For instance, when the occupants of the ministry of environment were compared with the late John Michuki he came out as the most effective and efficient minister who was able to drive the agenda of environment very effectively. He was able to mobilize resources towards the ministry of environment and it was during his time that Nairobi river was cleaned."Policymaker 008.*

One of the impediments to the utilization of research findings in policymaking has been the government's lack of goodwill. One of the participants acknowledged the following;

> *"There is lack of good will from the government and this is often reflected in the amount of resources we receive. We receive very little funds from the government. With insufficient funds, it becomes difficult to recruit adequate personnel, conduct actual research, and even disseminate our research findings." Policymaker 011.*

Another important aspect that has been linked to the use of research findings is time. The participants' comments suggested that a major impediment to using study findings was a lack of time. One of the participants noted that:

> *"Sometimes we do not have enough time to appraise the research findings we get and certainly this causes a ripple effect on how we use such evidence" Participant 005.*

Another respondent expressing similar sentiments commented that:

> *"Sieving through research articles and related materials is a time-consuming process. As a result, we tend not to prioritize the use of such evidence and jump right to decision-making. " Policymaker 010.*

These responses demonstrate that policymakers don't have enough time to discover the proper research papers to synthesis evidence for use in decision-making. This finding is in line with findings from an Australian survey of local government policymakers, who identified time as a barrier to implementing research findings (Fazey et al., 2013).

The policymakers were also asked to report on some of the tactics that may be undertaken in order to overcome the hurdles to the use of research findings concerning Lake Victoria's fisherfolk. Participants' responses suggested that adopting innovative interactive techniques to communicating evidence is critical to facilitating the application of research findings for policymaking. One of the interviewees commented the following:

> *"Public participation, use of workshops, website publications, and use of radio are some of the channels we could use to promote the utilization of research findings in policy making." Policymaker 003.*

Another participant mentioned that:

> *"To promote the use of research findings, we can develop curriculums to train social media managers and bloggers to disseminate research findings. Social media will allow us to reach many young people." Policymaker 007.*

These findings are consistent with those of Ryan and Sfar-Gandoura (2018), who discovered that research users want to participate with and understand clinical research, and that using social media to disseminate research findings is a good approach to do so. Additionally, the findings are consistent with Thomas, Newman and Oliver (2013) who established that presentation of research findings in clear format and through tailored dissemination channels promotes the utilization of such evidence in practice. The findings are also consistent with

those of Liverani et al. (2013), who found that adopting interactive ways for presenting research findings was one of the enhancers of evidence usage in policymaking.

It also emerged that one of the ways to improve utilization of research findings was through holding breakfast meetings with the relevant stakeholders. This was viewed as a way of enhancing trust, interaction and collaboration between researchers and policymakers. As one of the participants commented:

> *"Holding breakfast meetings with stakeholders who are affected and those who participate in taskforces which are appointed by the Government is a step in the right direction. Such meetings should also involve stakeholders from researcher to respondents who are consumers of research findings. These meetings are very important since they encourage dissemination and utilization of research findings. As such, collaboration with other organizations of like-minded people who have an interest in supporting the utilization of research findings is also encouraged."Policymaker 009.*

Another enabler of research utilization identified was dissemination of research findings on public events and holidays such as World Environment Day, World Wetland Day, World Fishery Day, and Lake Victoria Day. During these occasions, a lot of research findings are shared with members of the public. As one policymaker stated:

> *"Public events allow us to meet with numerous members of the public and that enables us to share our research findings with them. In the long run, using research findings into policymaking becomes much easier as many people are familiar with the evidence-based- policies." Policymaker 004.*

These findings are supported by the results of a study conducted by Walugembe et al. (2015) on the use of research findings in health policy and practice, in which he revealed that activities implemented to promote research utilization included conducting dissemination workshops, publishing scientific papers, developing policy briefs, providing technical assistance to policymakers, and program in health policy and practice. Allocation of more funds to support the uptake of research findings was also identified as a facilitator. More resources imply recruitment of enough human resources, conduction of more research and dissemination of more research findings. Lastly, the policymakers reported that development

of research policy with a clear framework would encourage the implementation of research findings. This would ensure that organizational processes and mechanisms promote or compel decision-makers to think about and utilize research findings. This is highlighted by one of the participants who claimed that;

> *"Supportive research policies and legislative laws need to be reviewed to accommodate research innovation and research findings to encourage their utilization." Policymaker 002.*

This finding agrees with Thomas et al. (2013), who discovered that organizational processes and systems encourage the use of research findings in decision-making.

4.6 Chapter Summary

This chapter presented results obtained from the analysis of the participants' data. A series of statistical techniques were used in summarizing the data and comprised of tools such as mean, frequencies, standard deviation and Chi-square test. The results generally reflected mixed outcomes among the respondents with respect to various indicators used in the operationalization of the study's variables; socioeconomic factors, dissemination channels and policy issues. The important findings, conclusion, and recommendations are summarized in the next chapter.

CHAPTER FIVE

SUMMARY OF KEY FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the key findings and conclusions of the study. In addition, implications of the findings and limitations are discussed. Lastly, the chapter highlights suggestions for further areas of research.

5.2 Summary of the Key Findings

The main objective of this study was to investigate the determinants of utilizing research findings and policy implications in environmental management among the fisherfolk in Kisumu City. This objective was further simplified into three specific objectives. The first objective sought to establish the influence of socioeconomic factors on the utilization of research findings. The second objective aimed at investigating the influence of dissemination channels on the utilization of research findings. Lastly, the third objective sought to investigate key policy issues that act as barriers and facilitators in the utilization of research findings among the fisherfolk in Kisumu City.

The relationship between socioeconomic characteristics and research findings utilization was assessed using the Chi-square test of association. Demographic characteristics were also inspected whether they had any influence on research utilization. The results indicated that at 5% level of significance, household size, level of education and access to clean water had a significant association with the access and utilization of research findings pertaining to environmental and fishery management by the fisherfolk.

The second objective was also assessed through a Chi-square test. While evaluating this objective, it was hypothesized that various research dissemination channels such as television, radio, newspapers and pamphlets were not related to the utilization of the research

evidence by the fisherfolk in Kisumu. The results showed that television, radio, the Internet, fliers, pamphlets and newspapers had a significant association with the access and utilization of research findings on environmental and fishery management by the fisherfolk in Kisumu City. A non-significant association was found between public barazas and the access and utilization of research findings by the fisherfolk. In general, these findings suggested that dissemination channels had a significant impact on the use of research findings in environmental management for Kisumu City's fisherfolk.

A content analysis of the data obtained from the interviews with important policy informants was used to assess the third objective. According to the findings, the majority of policymaking institutions have policies in place to encourage the use of research evidence. As pertains to barriers, financial backing and resources to implement interventions that enhance the utilization of research findings is lacking. Another key barrier identified from the interview was that there was the lack of collaboration between the policymakers and practitioners. In regards to facilitators, it emerged that adopting new interactive approaches such as websites, convening workshops, social media and blogging for disseminating could improve the utilization of research findings. Other enablers identified included; regular meetings between policymakers and practitioners, dissemination of research findings on public events and holiday and allocation of more funds to support interventions aimed at improving use of research.

5.3 Conclusion

The empirical findings of this study reasserted the underlying importance of socioeconomic factors in the effort to become environmentally sustainable. The findings revealed that education, the number of dependents, and access to clean water are all major drivers of increased research consumption. The data show that education is still the most important

factor in environmental improvement and conservation. In addition, the findings imply that improving the living conditions of the fisherfolk through effective provision of public goods can motivate them to engage in proenvironmental actions which can increase their uptake of research findings on conservation of natural resources.

The disconnect between research and policy might have a negative impact on environmental practices. The findings of this study revealed that in the dissemination and utilization of research evidence, a number of interacting factors relating to persons, organizations, the nature of research, and the type of communication channels are all involved. The findings of the study demonstrated that effective collaborations need all the stakeholders including the researchers, policymakers and practitioners to change the manner in which they engage with one another. These stakeholders, in particular, must play a more active role in the dissemination and application of research findings.

5.4 Recommendations

In terms of policy, funding agencies for environmental management research should require dissemination strategies for every research that has practical significance. These strategies should be of high quality, elucidating what is known about efficient information dissemination and utilization. In the same light, funding agencies should require rigorous impact evaluations of research projects through monitoring and evaluation programs in order to ensure researchers produce quality evidence that is feasible in terms of implementation. To accomplish this, the funding agencies should improve the amount of funds allocated for the purpose of disseminating and utilizing research evidence. Research funding agencies should also consider the factors that improve prospects of research utilization to guide the manner in which they support and reward research collaboration. Earmarking funds for communications activities such as policy briefs is necessary, but not sufficient. Research funders need to

support the development of strategies that underwrite long-term relationship building among decision-makers, researchers and the civil society organizations.

When policymakers have worked closely with academics at all stages of the assessment process and have benefited from feedback from the field to address unanticipated implementation hurdles, they are more likely to incorporate evidence in their decisions. As a result, researchers and politicians can work together to disseminate the lessons learned from research initiatives and their evaluations to other policymakers, allowing them to benefit from both perspectives. Evidence-based decision-making at policy organizations can be aided by such a collaborative process. Good political will is required for this to be effective. The use of research findings is not confined to the policymaking elite but has immediate implications for individuals who are affected by policy. The fisherfolk in this scenario. As a result, a research strategy should include efforts to strengthen affected communities' capacity to understand research findings and demand action, particularly from policy advocacy organizations.

5.5 Limitations of the Study

Although this study provided potential insight into the determinants of research utilization and policy implications in environmental management among the fisherfolk in Kisumu City, it was also associated with a number of limitations. A primary limitation of this study stems from the reality that other factors could have influenced the decisions by the fisherfolk to utilize research findings in environmental management such as politics. While these other potentially influential factors may have contributed to the utilization of research findings among the fisherfolk, this study focused exclusively on socioeconomic factors, research information distribution channels and policy issues.

The study’s scope was limited to the potential relationship that exists among variables of interest concerning the fisherfolk in Kisumu City, Kenya. Consequently, generalization of the

results to the fisherfolk in other Kenyan regions was limited. In the same light, the results are only limited to the fishing sector. In other words, the study did not address other areas such as crop and livestock farming.

Despite the fact that the questionnaires received a 100% response rate, there were missing values in the data set because some respondents did not respond to certain questionnaire items. In quantitative studies, missing data can have major consequences, including lower statistical power, greater standard errors, diminished generalizability of findings, and skewed conclusions (Dong & Peng, 2013). The missing data was handled by the researcher by removing any cases with missing values from statistical analysis; this process is known as listwise deletion. Reduced sample size is a major concern for researchers when deleting cases with missing data, which can lead to erroneous estimates or statistically significant discoveries. Therefore, the missing data may have led to biased findings.

5.6 Suggestions for Further Research

Future research should investigate the influence of factors other than socioeconomic factors, information distribution channels and policy issues on the utilization of research findings among the fisherfolk in Kisumu City. Secondly, future researchers should replicate the study in fishing communities in other parts of Kenya and in other agricultural sectors such a crop and livestock farming. In an effort to reduce the frequency of missing data, future studies should increase incentives for respondents' participation in and survey instrument completion. Such incentives may include money or donations. Additionally, allowing a relatively large time period for the respondents to fill the questionnaires without rushing could minimize the frequency of missing data.

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APPENDICES

Appendix I:Letter of Introduction

Dear Sir/Madam,

I am Godfrey Onyango, a post graduate student at Maseno University. I am conducting a research titled *Determinants of utilization of research findings and policy implication on environmental management among fisherfolks in kisumu city, kenya.* Many research information have been generated and despite that the LVB still experience degradation. The purpose of this study is to investigate why the disconect? The information generated will be used to develop/advice policymakers on the best way to disseminate research findings to reverse the trends of environmental degradation. I believe you have knowledge that can make a big contribution to its success. As a result, I respectfully urge that you participate in the study by completing this questionnaire. I want to reassure you that any information you provide will be kept fully private and used solely for the purposes of this research. You are free to ask any questions and take part in this study. You may still reach me at 0721986544 if you have any questions.

Thank you.

Godfrey O Onyango

Appendix II: Research Questionnaire

Instructions

Please enter the answer in the provided space or mark the appropriate cell with a tick.

Section A: Characteristics of Respondents

1. Gender Male ( ) Female ( )
2. Marital status Single ( ) Married ( ) Separated ( ) Divorced ( )
3. Age in Years ……
4. Occupation ……..
5. Number of Dependants .....
6. Highest level of education No formal education ( ) Primary school ( ) Secondary school ( ) Post secondary school college ( ) University ( )
7. How long (**in years)** have you stayed in the area Less than a year ( ) 1 – 4 years ( ) 5 – 9 years ( ) 10 years and above ( )

Section B: Socio-economic Factors

Social

1. Rate your access to the following social amenities. Use the given scale

Scale: Not available (NA), poor (PO) average (AV), good (GO) and Very Good (VG)

Amenity	**VG**	**GO**	**AV**	**PO**	**NA**
Electricity					
Clean Water					
Sanitary facilities (toilets etc)					
Education					
Roads					
Housing					
Health facilities					
Security					
Places of worship (churches, mosques etc)					
Others (specify)					

2. List (at most three) traditions/cultural practices of your community that affect:

i. Your environment …….

.....

…….....…….....

ii. Fisheries…….....

....

....

Economic

1. What is you main source of income .....

……...

2. What other economic activities are you engaged in .....

……..

3. Please give an estimate in Kenya Shillings of average monthly income from the sources listed below

No.	Source of Income	Monthly estimate in Kenya Shillings
a.	Business	
b.	Employment	
c.	Farming (crops & livestock)	
d.	Investment (rent, shares etc)	
e.	Others (specify)	

4. How regular is income from these sources? .....

……

5. Rate the adequacy of the income to your basic needs in life (food, shelter, clothing, medication, school fees etc) Not adequate ( ) Adequate ( )

Section C: Methods of Dissemination Environmental and Fisheries Research Findings

1. Where do you get Research findings that you use to address issues related to:

i. Environment; Government offices ( ) NGOs ( ) Chief ( ) Research Institutions ( ) Neigbours/Friends ( ) others (specify) ……

ii. Fisheries; Government offices ( ) NGOs ( ) Chief ( ) Research Institutions ( ) Neigbours/Friends ( ) others (specify) ……

2. Below are channels of disseminating information, how frequently do you use them to access research findings. Use the given scale: Never, Rarely, Occasionally, Often, Very Often

Channel	Very Often	Often	Occasionally	Rarely	Never
Public baraza					
Radio					
Television					
Internet					
Fliers					
Pamphlets					
Newspapers					
Others (specify)					

3. What are the 2 major challenges in accessing Research findings

……..……..……

4. Suggest 2 ways of improving your access to research findings

…….

Section E: Utilization of Environmental and Fisheries Research Findings

Opening items

1. Have you been accessing research in the following areas;

   Environment Yes ( ) No ( )

   Fisheries Yes ( ) No ( )

2. If the answer to item 1 is "YES", do you apply it to manage

   i. Your Environment Yes ( ) No ( )

   ii. Fisheries Yes ( ) No ( )

3. If the answer to item 2 is YES, have you been applying the findings in the management of the following;

Application area	Very frequently	Frequently	Occasionally	Rarely	Never
Environment					

Control of Water pollution through oil spillages					
Chemicals used in farming activities e.g. fertilizers					
Control of pest using pesticides					
Disposal of refuse					
Ensuring water quality is good					
Construction of toilet facilities					
Development of policies and practices that protect the environment					
Development of environmental awareness campaigns					
Fisheries					
Use of fishing gears and techniques					
Management of fish breeding grounds					
Sedimentation of the Lake					
Pollution of fish habitat					
Reduction of fish population					
Extinction of fish species					
Over fishing					
Post harvest facilities/ techniques					

3. If the answer to item 2 is NO what prevents you from applying the environmental and fisheries research findings?.....

…….

4. State the major challenges that you face when utilizing environment and fisheries research findings ……..

……

…….....

5. In your view, what needs to be done to improve utilization of environment and fisheries research findings …….

……...……

Appendix III: Key Informant Interview Guide

Introduction from the researcher and give background information on the research (who, why What is the study's purpose, and what is the study's consent?)

1) Seek respondents personal details (organization, position, period in station)
2) Short discussion on LVB environment with respect to degradation, management (players), research and its utilization.
3) Short discussion on LVB fisheries with respect to water quality, fish species, fishing effort, fishing gears, management (players), research and its utilization.
4) Discuss socioeconomic factors influencing the utilization of research findings among the fisher folks (boat builders, shop owners, fish processors etc)
    - Social factors; Education, age, access to social amenities, traditions and cultues
    - Economic factors; sources of income, monthly income, regularity of income, asset
5) Discuss utilization of research findings with respect to conservation of LVB with reference to controlling pollution, use of chemical in Agriculture (pesticide and fertilizers), disposal of refuse, ensuring water sources are clean and development of awareness programmes and efective implementation.
6) Examine the influence of socioeconomic factors on utilization of research findings by the fisherfolks.
7) Dissemination channels of the environmental and fisheries research findings to the fishersfolks (identify the channel, frequency of use, strength and weakness, challenges and way forward)
8) Examine the relationship between dissemination channels and utilization of research findings.

9) Discuss water quality with respect to BOD, pH, Temperature, Turbidity and its effect on the fishing effort of the fisher folks (fish volume, time taken, distance and fishing gears)
10) Way forward, suggestions interms of
    - Environmental (challenges, suggested remedies)
    - Fisheries (challenges, suggested remedies)

Appendix IV: In-depth Interview Guides For Policymakers

Assess the availability of policies guiding the utilization of research findings. This will be from the following key institutions policymakers;

a) KIPPRA (National)
b) Ministry of Education – Deputy Director, Research Science and Technology (National)
c) NACOSTI – Director, Technical Schedule (National)
d) Ministry of Environment (National/County)
e) Lake Victoria Basin Commission – Kisumu
f) Ministry of Health HQ – Nairobi (National/County)
g) National Assembly – Nairobi (National)
h) County Assemblies – Kisumu (County)
i) LEVEMP-Kisumu
j) NEMA-National/County
k) KEMRI -Kisumu

***We are witnessing continuous environment degradation besides the many researches which have been generated to solving various environmental challenges*.**

PART A;

1) National level; are there policies inplace that promote the utilization of research findings?

a) Yes ( ) or No ( )

i) If **Yes** please state the policy.....

.....

.....

ii) Specify how the policies used in promoting the **Utilization** of research findings?

.....

.....

.....

iii) Are their success cases/story of policies being used in promoting the utilization of research findings; **Yes ( ) No ( )**

If **Yes** to what extend are policies utilized

.....

.....

.....

iv) Are there **challenges facing the application of policies in the application of the findings of the research** in the following area(s)? Yes ( ) No ( )

If **Yes** specify

- **Technical**.....
  ……
  ……
  ……

- **Economic**.....
  .....
  .....
  .....

- **Dissemination**.....
  .....
  .....
  .....

v) What **strategies** have been put in place to mitigate the challenges affecting the utilization of research findings?

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

vi) What have been done to **overcome the challenges** facing the application of policies in the utilization of the research findings in the following area?

- **Technical**.....
  .....
  .....
  .....
- **Economic**.....
  .....
  .....
  .....

- **Dissemination**.....
  .....
  .....
  .....

vii) In addition to what is in place in your view what can be done **to improve the utilization** of research findings?

.....

.....

.....

.....

viii) Is/are there any other issue relevant to utilization of the research findings that you would like to share?

.....

.....

.....

.....

PART B;

1) County level; are there policies inplace that promote the utilization of research findings?

a) Yes ( ) or No ( )

i) If **Yes**please state the policy.....

.....

.....

.....

ii) How are the policies used in promoting the **Utilization** of research findings?

.....

.....

.....

.....

iii) Are their success cases/story of policies being used in promoting the utilization of research findings; **Yes ( ) No ( )**

If **Yes** to what extend are policies utilized

.....

.....

.....

.....

iv) Are there **challenges facing the application of policies in the utilization** of the research findings in the following area(s) ? Yes ( ) or No ( )

If **Yes** specify

- **Technical.....**

  .....

  .....

  .....

- **Economic.....**

  .....

  .....

  .....

- **Dissemination.....**

  .....

  .....

  .....

v) What **strategies** have been put in place to mitigate the challenges affecting the utilization of research findings?

.....

.....

.....

.....

vi) What have been done to **overcome the challenges** facing the application of policies in the utilization of the research findings in the following area?

- **Technical.....**

  .....

  .....

  .....

- **Economic.....**

  .....

.....

.....

- **Dissemination**.....

.....

.....

.....

vii) In addition to what is in place in your view what can be done to improve the utilization of research findings?

.....

.....

.....

.....

viii) Is/are there any other issue relevant to utilization of the research findings that you would like to share?

.....

.....

.....

.....

3) If answer to PART A OR PART B is No;

i) Why are the policies not in place?

.....

.....

.....

.....

ii) How do you promote the utilization of the research findings without the policies in place?

.....

.....

.....

.....

iii) What would you recommend to be done to ensure that the policies in the utilization of research findings are in place?.....

.....

.....

.....
.....

iv) What would you recommend to be done to promote the application of the policies in the Utilization of research findings?.....
.....
.....
.....
.....

v) Is/are there any relevant issue(s) affecting the utilization of research findings that you can share?.....
.....
.....
.....
.....

Appendix V: Interview Guide for Focus Group Discussion

1) Introduction from the researcher and give background information on the research (who, why What is the study's purpose, and what is the study's consent?)
2) What is the state of LVB environment with respect to degradation, management (players), research and its utilization?
3) What is the state of LVB fisheries with respect to water quality, fish species, fishing effort, fishing gears, management (players), research and its utilization?
4) What socioeconomic factors influencing the utilization of research findings among the fisher folks (boat builders, shop owners, fish processors etc) with respect to the following?
   - Social factors; Education, age, access to social amenities, traditions and cultues
   - Economic factors; sources of income, monthly income, regularity of income, asset
5) What are the challenges of utilization of research findings with respect to conservation of LVB and Fisheries?
6) What dissemination channels are used to relay environmental and fisheries research findings to the fishersfolks? What are the challenges of these channels? What is your advice for the best way forward?
7) Water quality with respect to BOD, pH, Temperature, Turbidity has an effect on the fishing effort of the fisher folks (fish volume, time taken, distance and fishing gears). Do you think that is true? Please discuss.
8) What is your suggestions for the way forward interms of the following?
   - Environmental (challenges, suggested remedies)
   - Fisheries (challenges, suggested remedies)

Appendix VI: Consent Form

I ..... of ID number ..... understand and has been informed by **Godfrey Otieno Onyango** who is a postgraduate student at Maseno University Kenya that he is carrying out a social survey in Nyalenda B, kanyawegi, and Kogony in Kisumu Municipality. The title of his research is *Determinants of utilization of research findings and policy implication on environmental management in kisumu city, Kenya.* He has explained to me the impotance of the research to the area, researchers, residents of the study area and beyond, and lastly the policy makers. He has provided me with his contacts and that of Maseno University Ethics Review Committee. I am participating voluntarily. I have given permission for my interview with the above as he deems fit and at his sole discretion and agree to be tape-recorded. I also agree to the usage of any information/material concerning me which has been collected by the researchers to promote further research on environmental health, compiling documentaries, educational purposes, challenges of the residents of research area, and dissemination of the information through publication and documentaries. I understand that I have the right to withdraw from the study at any time, without penalty, whether before or after it begins. I understand that I have two weeks following the interview to withdraw my consent for the data to be used, after which the information will be deleted. I realize that extracts from my interview and information acquired may be used in the thesis and other publications. I agree to quotation/publication of extracts from my interview or for use in documentaries.

Signed……. Date…….

Thumb Print

Contacts: Godfrey Onyango 0721986544, Maseno University Ethics Review Committee +25457351622 Ext. 3050, Email: muerc-secretariate@maseno.ac.ke

Appendix VII: Research Permit

MASENO UNIVERSITY ETHICS REVIEW COMMITTEE

Tel: +254 057 351 622 Ext: 3050
Fax: +254 057 351 221

Private Bag – 40105, Maseno, Kenya
Email: muerc-secretariate@maseno.ac.ke

FROM: Secretary - MUERC

DATE: 13th October, 2016

TO: Godfrey Otieno Onyango
PG/PHD/NS/00111/2013
Department of Environmental Sciences
School of Environment and Earth Sciences
Maseno University
P.O. Box, Private Bag, Maseno, Kenya

REF: MSU/DRPI/MUERC/00276/16

RE: Analysis of the Utilization of Environmental and Fisheries Research Findings among Fish Folks in Kisumu Municipality, Kenya. Proposal Reference Number: MSU/DRPI/MUERC/00276/16

This is to inform you that the Maseno University Ethics Review Committee (MUERC) determined that the ethics issues raised at the initial review were adequately addressed in the revised proposal. Consequently, the study is granted approval for implementation effective this 13th day of October, 2016 for a period of one (1) year.

Please note that authorization to conduct this study will automatically expire on 12th October, 2017. If you plan to continue with the study beyond this date, please submit an application for continuation approval to the MUERC Secretariat by 13th September, 2017.

Approval for continuation of the study will be subject to successful submission of an annual progress report that is to reach the MUERC Secretariat by 13th September, 2017.

Please note that any unanticipated problems resulting from the conduct of this study must be reported to MUERC. You are required to submit any proposed changes to this study to MUERC for review and approval prior to initiation. Please advice MUERC when the study is completed or discontinued.

Thank you.

DIRECTORATE OF RESEARCH PUBLICATION & CONSULTANCIES 13 OCT 2016 MASENO UNIVERSITY

Yours faithfully,

Dr. Bonuke Anyona,
Secretary,
Maseno University Ethics Review Committee.

Cc: Chairman,
Maseno University Ethics Review Committee.

Appendix VIII:Thematic Research Areas and their Relevance to Lake Victoria Basin

Key Thematic Research areas	Number of Research	Relevance of Research to Development in LVB
Policies	13	Relevant to use of LVB resources and the larger EAC
Biodiversity of Lake Victoria	22	Relevant to scientific community
Impact of Human Activities	24	Relevant to communities living around LVB
Conservation issues and challenges facing LVB	160	Relevant to communities and scientific researchers
Agriculture and Forestry issues	52	Relevant to communities and scientific researchers
Socio-economic activities	46	Very relevant to all the communities within LVB
Climate change impact and Adaptation	7	Very relevant to all communities Larger EAC
Water Budget	4	Very relevant to the larger EAC, it affect development
Cultural issues of communities around LVB	5	Very important since affect utilization of LVB
Water quality	6	Very important since has direct effect on health of communities within LVB
Fishing gears	1	Very important since affect breeding of fish.
Land use issues within LVB	30	Very important since have effect on conflict issues related to change of land use and conservation of riparian areas.
Pollution/heavy metals	9	Very relevant since has direct bearing on human health.
Macro-invertebrates	3	Very relevant since has bearing on stability of LVB ecosystem.
Birds species/Breeding	3	Relevant to Tourism industry since attract those interested in it.
Different species of Fish distribution/weight/length/diet/breeding	10	Very relevant to Fishing industries and the surrounding communities.
Sanitation issues	1	Very relevant to the communities within LVB since has bearing on health.
Knowledge management	9	Very relevant since has bearing on management of LVB resources.
Total	**405**	

Appendix IX: Photo of FGD at Usoma Beach

(Source: Researcher 2016**)**

Appendix X: Photo of FGD at Dunga Beach

(Source: Researcher, 2016**)**