P.O.Box 236, Tororo
Gen:+256-454448842
Dir: +256-454448864
Mob: +256-782999874
Fax: +256-454436517
Email:ar@acadreg.busitema.ac.ug
Website:www.busitema.ac.ug

BUSITEMA UNIVERSITY

FACULTY OF NATURAL RESOURCES AND ENVIRONMENTAL SCIENCES

NAMASAGALI CAMPUS

ASSESSMENT OF THE SOCIO-ECONOMIC EFFECTS OF ILLEGAL FISHING ON FISHING COMMUNITIES SURROUNDING KAGWARA LANDING SITE, LAKE KYOGA, SERERE DISTRICT

BY

AKELLO EUNICE

BU/UP/2022/1210

RESEARCH PROJECT SUBMITTED TO THE FACULTY OF NATURAL RESOURCES AND ENVIRONMENTAL SCIENCES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE BACHELORS DEGREE IN FISHERIES AND WATER RESOUCE MANAGEMENT OF BUSITEMA UNIVERSITY

JULY 2025

DECLARATION

I AKELLO EUNICE declare that this research project submitted to Busitema University Faculty of Natural Resources and Environmental Sciences is my original research and has never been submitted to any university for the award of a degree.

Signature

……..

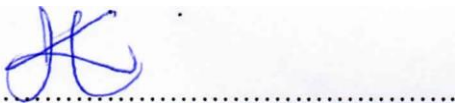
AKELLO EUNICE

BU/UP/2022/1210

DATE 6th August, 2025

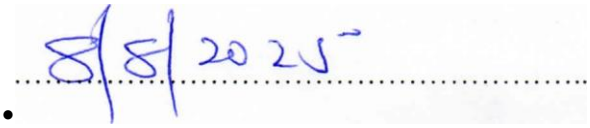
APPROVAL

This is to certify that my research project titled "Assessment of Socio-Economic Effects of Illegal Fishing On the Fishing Communities Surrounding Lake Kyoga, Kagwara Landing site Serere District" was under my supervision and submitted to the Faculty of Natural Resources and Environmental Sciences.

Signature 

.....

Kisu-Kisira Henry



Date•

DEDICATION

I dedicate this research project to my parents Mr. Moses and Ruth Ebwongu, brothers and sisters, my son Elishamah and friends Rose, Winny and Shakira thank you for your prayers and support during my course. May God bless you so much.

ACKNOWLEDGEMENT

I thank the Almighty God for blessing me with knowledge and wisdom during my period of study at Busitema University. Although, it was not easy, God stood with me.

I also thank my supervisor Mr. Kisu-Kisira Henry for his guidance that enabled the completion of this research project.

Finally, I thank my parents, friends, classmates, and other family members for standing with me during my university studies.

TABLE OF CONTENTS

DECLARATION ii
APPROVAL ..... **Error! Bookmark not defined.**
DEDICATION iv
ACKNOWLEDGEMENT v
LIST OF FIGURES viii
LIST OF ABBREVIATIONS ix
ABSTRACT x
CHAPTER ONE: INTRODUCTION 1
1.1 Background of the study 1
1.2 Problem Statement 3
1.3 Objectives of the Study 4
CHAPTER TWO: LITERATURE REVIEW 8
2.1 Introduction 8
2.2 Illegal fishing activities on Lake Kyoga 8
2.3 Social effects of illegal fishing activities on the fishing communities 10
2.4 Economic effects of illegal fishing activities on the fishing communities 11
2.5 Legal and institutional framework necessary to address illegal fishing activities 13
CHAPTER THREE: METHODOLOGY 15
3.1 Introduction 15
3.2 Research design 15
3.3 Research approaches 15
3.4 Description of the geographical area 15
3.5 Description of the study population 16
3.7.1 Data types 17
3.7.2 Data Collection Methods 17
3.8 Data processing and Data analysis 18
3.8.1 Data processing 18
3.8.2 Data analysis 18
3.9 Ethical consideration 19
CHAPTER FOUR: FINDINGS 20

4.3 Status of illegal fishing in Kagwara landing site 21
4.3.1 The fishing gears commonly used at the landing site 21
4.4.2 Crosstabulation for fishing gears against the nature /method of illegal 21
4.4 The socio-economic impacts of illegal fishing to the fishing communities surrounding Kagwara landingsite, Serere district 23
4.4.1 Categories affected by illegal fishing 23
4.5 The strategies for combating illegal fishing in Kagwara landing site Serere district 27
CHAPTER FIVE: DISCUSSION 28
5.1 Introduction 28
5.2 Social demographic characteristics 28
5.3 The status of the fishing activities in Kagwara landing site 28
5.4 Challenges leading to illegal fishing 29
5.5 The socio-economic impacts of illegal fishing to the fishing communities surrounding Kagwara landingsite, Serere district 29
5.6 The strategies for combating illegal fishing in Kagwara landing site Serere district 31
CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS 32
6.1 Introduction 32
6.2 Conclusion 32
6.3 Recommendations 32
REFERENCES 34
APPENDICES 36
Appendix. 1. Questionnaire for respondents 36
Appendix. 2. Interview Guide for respondents 49
Appendix. 3. Field Photos 54

LIST OF FIGURES

Figure 1; Conceptual framework for IUU fishing activities at Kagwara landing site, Serere district 6
Figure 2. A map showing Serere district and Kagwara landing site area 16
Figure 3. The fishing gears mostly used at Kagwara landing site..... 21
Figure 4. Graph showing the challenges leading to illegal fishing 23
Figure 5. Categories most affected by illegal fishing 24
Figure 6. Fish species affected by illegal fishing 25
Figure 7.Fish catch data for the various species 2024 (kilograms)..... 25
Figure 8. Fish catch data for the various species 2025 (kilograms) 26
Figure 9. **Strategies for combating illegal fishing**..... 27
Figure 10. During weighing of fish at Kagwara
Figure 11. Burning of illegal fishing gears (sein nets) 54
Figure 12Meeting with the community Figure 13. Observation of the fishing gears used at the landing..... 54
Figure 14.Weighing of Nile perch Figure 15Inspection of fish caught by soldiers during enforcement 55
Figure 16Meeting with the stakeholders Figure 17Observation of the types of boats used ... 55

LIST OF ABBREVIATIONS

Abbreviation	**Word in full**
BMU	Beach Management Unit
FAO	Food and Agricultural Organization
UPDF-FPU	Uganda People's Defense Force –Fisheries Protection Unit
IUU	Illegal, unreported and unregulated fishing

ABSTRACT

The study was conducted at Kagwara fish landing site in Serere district. The objectives of the study were to assess the impacts of illegal fishing on the fishing communities surrounding Kagwara landing site, Lake Kyoga in Serere district. The specific objectives were to evaluate the status of fishing activities at Kagwara landing site, Lake Kyoga, the social-economic effects of illegal fishing activities on the fishing communities surrounding Kagwara landing site, and to suggest strategies of making fishing at Kagwara landing site, more sustainable.

The study used a descriptive research design that allowed to answer the question "why" and quantitative approach. The sample population was 65 people comprising fishermen, boat owners, fish buyers and sellers at Kagwara landing site. The data was collected using questionnaires, observation and review of documents specific to fishing in Serere district. These included journals, websites, district reports and books. The data was entered in Microsoft Excel and imported into Statistical Programme for Social Scientists version 16 to analyze descriptive and inferential statistics such as pearson chi-square test at 95% confidence interval.

The study found out that there were more men than women involved in the fishing activities and practices. The men involved in fishing were mostly married adults who had attained primary level education. The study found out that illegal fishing was done at Kagwara landing site through the use of authorized fishing gears used to target different fish types. The undersized gillnets and the illegal gears were used in restricted zones of the lake to target specific fish species. Nile perch was the most affected fish species followed by Nile tilapia and silver fish (mukene). These fish types were targeted due to high prices paid for them by buyers within and outside Serere district. The major cause of illegal fishing was poverty, lack of alternative sources of income and livelihood, inadequate government support to buy appropriate fishing equipment and gears, corruption and enforcements. Most of the community have been sensitized on illegal fishing and its impacts to the environment. The most affected are the households (local community) surrounding the landing site leading to food insecurity, loss of lives, reduced standards of living.

The most recommended strategy is to: empower women to participate in the fishing activities; provide training to the fishing communities to improve their capacity; get alternative sources of livelihood in decision making so as to come up with proper decisions in sustainable fisheries management; provide more government support to fishing communities to enable them obtain improved fishing gears, access engines; sensitize stakeholders on sustainable fishing practices; intensify enforcements to curb illegal fishing practices at community levels and even other surrounding areas

CHAPTER ONE: INTRODUCTION

This chapter presents the background of the study, problem statement, objectives of research, questions of the research, justification and conceptual framework.

1.1 Background of the study

Globally, fisheries contribute significantly to food security, employment and local economies more significantly in developing countries (FAO, 2020)**.** Illegal, unreported and unregulated (IUU) fishing activities are amongst the most serious and persisting global concerns that negatively impact the environment (e.g., harm to marine and inland fishery resources, associated species, ecosystems, habitats, biodiversity), economy (e.g., losses to local food supply and unfair competition among fisheries subsectors) and livelihoods (e.g. contributes to food insecurity, malnutrition and poverty). For example, (IUU) fishing costed the global economy up to $23billion a year (FAO, 2014). Illegal, unreported, and unregulated (IUU) fishing is a pervasive global problem, accounting for up to a third of the world's total fishery harvests and costing the global economy an estimated $26-$50 billion annually. Illegal, unreported, and unregulated (IUU) fishing encompasses a range of activities that violate national and international laws, including fishing without licenses, failing to report catches, exceeding quotas, using prohibited gear, and fishing in closed areas or during closed seasons. These illicit activities undermine sustainable fisheries, threaten food security, harm vulnerable communities and ecosystems, and destabilize maritime states. IUU fishing is also linked to forced labor, human rights abuses, and transnational organized crimes like money laundering and corruption.

According to FAO (2020) IUU fishing accounted for up to 20% of the global fish catch, equivalent to about 26 million tonnes of fish every year. In Africa, IUU fishing disproportionately affects countries in the Global South, especially in West Africa. It's estimated that 48.9% of all IUU fishing offenses occur in Africa, leading to illicit financial flows of up to $11.49 billion originating from the continent. West Africa is the most affected sub-region, accounting for 40% of global IUU fishing and losses of up to $9.4 billion in illicit financial flows. These losses include missed revenue from taxes, licensing, and landing fees. The Chinese commercial fishing fleet is responsible for more IUU fishing in Africa than any other nation. IUU fishing in Africa exacerbates

food insecurity, undermines stock management efforts, destroys marine habitats, and degrades coastal environments (FAO,2020).

In East Africa, IUU fishing has reached critical proportions, affecting the livelihoods of millions and threatening the sustainability of aquatic resources. A quarter of fish caught in East African waters are caught illegally, threatening marine life and the blue economy. Up to $142.8 million in potential income is lost to IUU fishing each year in the South-West Indian Ocean. Government-backed distance trawler fleets, particularly those from China, are implicated in illegal activities that deplete stocks, interrupt breeding cycles, and pollute coastlines. This has led to a 30% decline in subsistence fisheries production in Mozambique over the past 25 years, with the country losing an estimated $70 million in revenue annually. Illegal fishing and human rights abuses are commonplace on Chinese vessels in the southwest Indian Ocean, including shark finning, capture of vulnerable marine animals, and abusive working conditions. IUU fishing practices contribute to overfishing, habitat degradation, and the depletion of fish stocks. This has repercussions not only for biodiversity but also for food security in the region (FAO,2024)

In Uganda, Illegal fishing persists in Uganda despite military deployment to enforce legal fishing practices. In 2023, 25% of all fishing gear on Lake Victoria and Kyoga were illegal and Uganda's capture fisheries yield was estimated at about 300,000 to 400,000 tonnes annually. The primary species included Nile perch, tilapia, and other freshwater fish, primarily harvested from Lakes Victoria, Kyoga, and Albert. Uganda is estimated to lose close to $1.4 billion (Shs 5 trillion) annually in potential revenue from Nile Perch fisheries criminalities for example using illegal fishing gears, fishing without license, fishing in gazzetted fishing grounds. This revenue loss is attributed to illicit gutting of Nile Perch for its swim bladder, the Nile Perch by-catch in silverfish, and the smuggling of juvenile Nile Perch. Between June 2023 and June 2024, the fisheries enforcement team impounded hundreds of illegal small-mesh nets and immature fish worth $15.8 million (Shs 57.8 billion). A significant percentage of fishermen and vessels operate illegally, with a 2023 audit showing that 76% of fishing vessels and fishermen on Uganda's water bodies are unlicensed. Illegal fishing gear on Lake Victoria stood at 25% despite enforcement efforts, contributing to the decline in fish populations (MAAIF,2023). The FAO reports that illegal, unreported, and unregulated (IUU) fishing remains a significant challenge in Uganda, particularly

on major water bodies like Lake Victoria and Lake Kyoga (FAO,2024). Uganda loses substantial revenue due to IUU fishing, which undermines legitimate fishing operations and threatens the livelihoods of local communities' dependent on fishing (FAO,2024).

In Kagwara, The Fisheries Protection Unit (FPU) recorded a rise in illegal fishing activities, with at least seven illegal boats with fishing gear impounded daily in Kagwara landing site fishing ground. Illegal fishing is common in landing sites like Opiya, Asinge, and Kateng to Kagwara in Kadungulu sub-county. Fishermen are forced to engage in illegal fishing due to high poverty levels and the unaffordable cost of recommended boats of twenty-eight feet above and fishing gear in some landing sites by government bordering Kagwara landing site. Fishermen in Serere District have accused UPDF marine officers from the FPU of reselling intercepted illegal fishing gear. In May 2024, illegal fishing gear worth Shs31 million was destroyed in Serere. Fishermen using recommended gear have clashed with those using illegal nets. The FPU at Kagwara landing site in Serere district burnt over 6,678 pieces of illegal fishing gear worth Shs 600 million that were impounded during a three-month operation on Lake Kyoga Kagwara landing site (Daily monitor news). Illegal fishing is contributing to the decline of fish population and food insecurity in Lake Kyoga.

1.2 Problem Statement

Kagwara landing site on Lake Kyoga is one of the major fishing areas in Uganda that sustains many local fishing communities. Unfortunately, this landing site has over the past years suffered from rampant illegal fishing activities. In August 2020, the FPU was arresting up to seven condemned boats at Kagwara landing site every day after lifting the ban on fishing on Lake Kyoga (URN, 2020). In July 2023 according to the Cooperator news, 600 million Ugandan shillings worth of illegal fishing gear amounting 6,678 pieces of illegal gear was destroyed by the Fisheries Protection Unit (FPU), (Cooperator, 2023). In August 2023, at Kagwara landing site, three people lost lives when they went fishing using condemned fishing boat and illegal fishing gear (URN, 2023). According to Eninu in 2022, in the same area of Kagwara landing site on Lake Kyoga, six fishermen lost their lives due to use of condemned fishing boats. These incidents of lost lives due to persistent use of condemned boats has affected the fishing communities who derive their livelihoods from fishing. Illegal fishing activities have continued since 2019 despite the

governments implementation of rigorous regulations to oversee fishing activities including closure of landing sites according to Bernard Odikor the LC3 chairperson of Kagwara town council (URN, 2023). It is unknown how the increased illegal fishing activities at the Kagwara landing site on Lake Kyoga affect the social and economic situation of the fishing communities. Despite the existence of relevant policy and law, these illegal activities still continue relentlessly and negatively impact the social and economic conditions of the fishing communities around the Kagwara landing site. Therefore, this study was undertaken to understand the social and economic conditions of the local communities around Kagwara landing site arising from the illegal fishing activities on this part of Lake Kyoga.

1.3 Objectives of the Study

1.3.1 Main objective of the study

The main objective of the study was to assess the social-economic effects of illegal fishing on local communities surrounding Kagwara landing site on Lake Kyoga in Serere district.

1.3.2 Specific objectives

1.To evaluate the status of fishing activities at Kagwara landing site, Lake Kyoga.

2.To evaluate the social-economic effects of illegal fishing activities on the fishing communities surrounding Kagwara landing site, Lake Kyoga.

3.To suggest strategies of making fishing at Kagwara landing site, Lake Kyoga more sustainable.

1.4 Research Questions

1.4.1 Main Research Question

What are the social and economic effects of illegal fishing activities on local communities surrounding Kagwara landing site, Serere district?

1.4.2 Specific research questions

1.What is the status of fishing activities at Kagwara landing site, Lake Kyoga?

2.What are the social-economic effects of illegal fishing activities on the fishing communities surrounding Kagwara landing site, Lake Kyoga?

3. What strategies are needed to make fishing at Kagwara landing site, Lake Kyoga more sustainable?

1.5 Justification of the study

Fishing is a major source of livelihood and in some cases it's the only livelihood for fishing communities. Besides livelihoods, it also offers food security for the fishing communities. Therefore, there is need to ensure that fisheries resources that support local communities are managed sustainably.

1.6 Significance of the study

The study contributes to the existing literature on effects of illegal fishing on local communities surrounding landing sites in Lake Kyoga. It informs policy makers in Central and Local government on the challenges local fishing communities face regarding fisheries resources management. It provides information that can be used by other researchers in academia interested in studying aspects of social and economic effects on illegal fishing on local communities.

1.7 Conceptual framework

This conceptual framework explored the relationship between illegal fishing activities and their socio-economic impacts on fishing communities at Kagwara landing site, Lake Kyoga, Serere district. It looked at the present situation, intervention and sustainable fishing activities at Kagwara landing site in the future.

It is built around the idea that IUU fishing activities impact the socio-economic status of local communities. It looks at the relationship between independent variables (unsustainable fishing activities and resultant effects) and dependent variables (socio-economic outcomes on the local communities like livelihood, incomes, food security and poor nutrition, limited community conflicts, poverty levels, reduced fish catches, overfishing, abuse of breeding grounds, reduced fish stocks, establishment of alternative livelihoods, conservation of biodiversity, etc.).

The framework (figure1), guided the study in assessing the existing IUU fishing activities at Kagwara landing site and how they influence socio-economic outcomes of local communities and what can be done to improve the system.

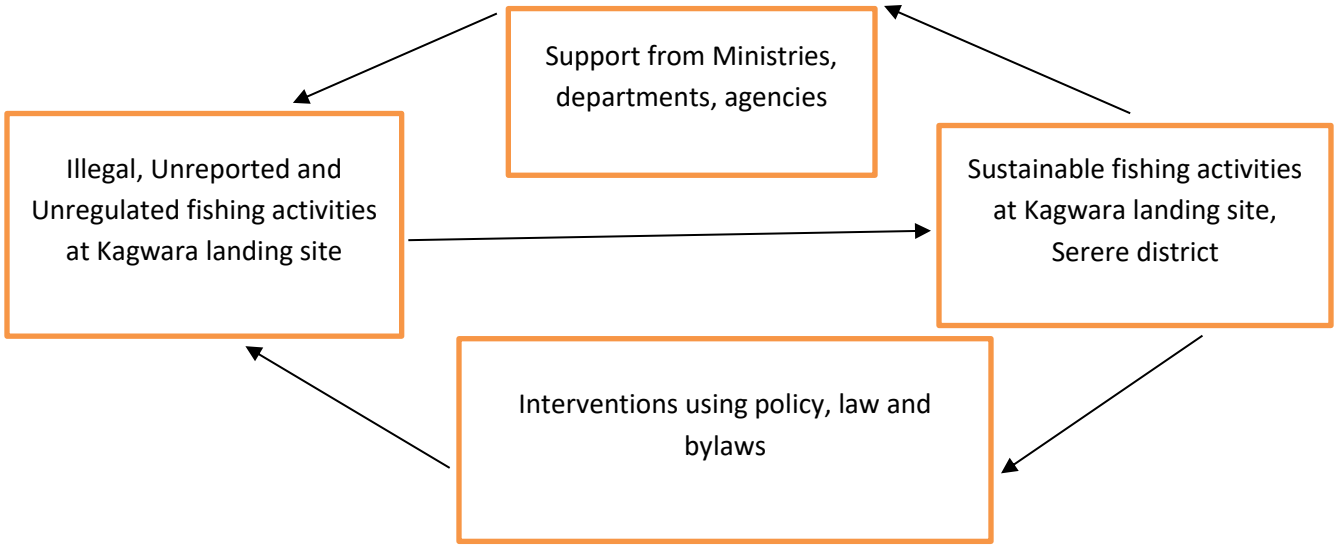


Figure 1; Conceptual framework for IUU fishing activities at Kagwara landing site, Serere district

Independent Variables

Demographic characteristics or variables

- Which gender is involved in illegal fishing activities?
- What are their age ranges: youth, middle age or elderly?
- What is their level of education, etc.?
- Where do they live: municipality or district?
- What are their income levels?

Inputs

- What types of gear is used?
- Where is this gear sourced or bought from

Outputs

- How much fish do you catch?
- Do you also catch the immature fish or by catch?
- Where do you sell your caught fish?

Intervening Factors or Variables

- Policies, laws governing wild capture fisheries in Uganda
- Bylaws governing wild capture fisheries in Serere district

- Sensitization through trainings and awareness creation
- Support from government agencies like the ministries, departments and agencies and local government.
- Support from non-governmental organizations, community-based organizations
- Access to credit to buy inputs and market support

Dependent Variable

- Illegal, unreported and unregulated fishing activities in Kagwara landing site, Lake Kyoga, Serere district

Relationship

- Does IUU influence fishing productivity at Kagwara landing site?
- Does IUU influence fishermen livelihoods, incomes, catch, food security, nutrition?
- Does availability of approved inputs influence fishing activities at Kagwara landing site?
- Does access to credit for fishing inputs like gear, boats influence fishing activities at Kagwara landing site?

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents literature on the study the socioeconomic impacts of illegal fishing on the fishing community surrounding Lake Kyoga Kagwara landing site, Serere district.

2.2 Illegal fishing activities on Lake Kyoga

In Uganda, the water bodies are under open-access fishing that encourages too many people to take up fishing, and the result is overfishing of the stocks (Ogbuafor & Gray 2024). This form of management encourages different fishing gears to be used thus promoting illegal fishing in Ugandan lakes. Illegal fishing significantly impacts several fish species, particularly those that are commercially valuable. Lake Victoria as well as lake Kyoga, which hosts a diverse fish population, has seen declines in species such as Nile perch (*Lates niloticus*) and tilapia (*Oreochromis spp*.) due to illegal fishing practices (Mwanja *et al*., 2017). According to a study by Ogutu-Ohwayo (1990), the overexploitation of these species through illegal nets and unsustainable fishing techniques has led to drastic population reductions, threatening the ecological balance of the lake. Illegal fishing practices, including the use of recommended fishing gears like seine nets, castnets, overfishing, fishing in closed areas and closed seasons have resulted to the depletion of fish stocks hence reduced catch in Lake Kyoga.

Illegal fishing – defined here as the intentional disregard of fishery regulations – occurs all around the world, in fisheries of all sizes, and with all types of target species. Many countries and international bodies (e.g., the Food and Agriculture Organization of the United Nations) have recognized illegal fishing as an important problem threatening fishery sustainability (FAO, 2002; Pitcher *et al*., 2008; Agnew *et al*., 2009; Le Manach *et al*., 2012). In some small-scale fisheries and low-governance areas it is among the most significant issues faced by fisheries that are often

already stressed by over-harvesting, pollution, and other anthropogenic impacts (Sumaila *et al*., 2006; Hauck, 2008; Österblom *et al*., 2011). These fisheries generally have the least capacity to address illegal fishing.

Illegal fishing often occurs in communities dealing with poverty; fishers violate rules in an effort to meet the basic needs of their families (de la Torre-Castro, 2006). Poverty has been linked to a set of cognitive processes that have come to collectively be known as the "scarcity mindset," wherein (among other effects) the mental processes necessary to consider and value one's own long-term needs are impeded by the immediate and pressing drive to meet one's short-term needs (Shah *et al*., 2012; Mani *et al*., 2013; Mullainathan and Shafir, 2013). Experimental results suggest that the "scarcity mindset" causes people to make sub-optimal or irrational decisions. When individuals are in the scarcity mindset, they likely do not have the mental bandwidth to engage in efforts to conserve fish stocks, even if such efforts could generate higher yields in a few years.

At global level, there are now concerns regarding over fishing. According to Erceg 2006, several authors have indicated that there has been a steady decline in fish catch in recent decades; and several articles have pointed out IUU fishing as the main cause owing to the fact that it impairs conservation and management measures, and threatens the existence of targeted species and their ecosystem. These scholarly contributions have heightened the concerns at international level. These concerns over the period prompted Regional Fishery Management Organizations (RFMOs) to develop approaches to combat IUU even though the approaches have generally failed. These failures have created acute need to initiate new approaches such as increasing the control of coastal

states (Erceg, 2006) through cooperation, collaboration and coordination over their maritime jurisdiction.

Among other challenges that DFR management has been grappling with is the explosion of the Nile Perch in 1980s following its introduction decades earlier. This explosion led to a boom in Nile perch export market, leading to an influx of people who were not traditionally fishermen to cash in on the "lucrative" industry (Othina, 1999). The resulting competition pushed fishermen to resort to the use of destructive fishing methods to sustain their levels of livelihood and food requirements. The use of poison, which led to a ban on fishing and the export of fish in March 1999 (Ntiba *et al*, 2001), was probably largely due to these rent – seekers. Inland fisheries are even more vulnerable to IUU due to the ease of access, increased unemployment and human population pressure. Illegal fishing comprises of all forms of unauthorized harvest of fish and fisheries resources. This practice is a matter of great concern especially in the inshore and coastal areas, where small-scale fisheries operate (Bene *et al*. 2007; Salas *et al*. 2007; FAO 2016).

2.3 Social effects of illegal fishing activities on the fishing communities

According to a study by (Aben *et al*.,2021), illegal fishing has reduced availability of important fish species, directly affecting local fishermen's catch and income. This depletion not only threatens the immediate earnings of fishermen but also affects the food security of the communities relying on fish as the main source of proteins and food source. Further, IUU fishing activities do not only pose economic threat, but also pose threat to food security. Fishery is an important source of food and livelihood for many people around the globe. About one billion people depend on fish and fisheries products for both protein and a means of livelihood (Tidwell and Allan, 2001). The

high dependency of people on fish in particular the developing countries is due to the fact that it provides a cheaper source of protein, as many people cannot afford alternative protein sources due to poverty. Hence, any decline in fish supply will make these people vulnerable (Kent, 2003).

2.4 Economic effects of illegal fishing activities on the fishing communities

Illegal Unreported and Unregulated fishing (IUU) is a widespread practice that has attracted attention globally due to its undermining nature to both national and international fisheries management efforts (Stokke, 2009). Illegal fishing has existed from ages, but in recent decades there has been a sharp rise in the practice due to several factors including significant technological progress in motorization, refrigeration, improved gear and new forms of stocks detection (Coelhoet al, 2008). Illegal Unreported and Unregulated fishing IUU fishing is undertaken by all kinds of vessels, and it is mostly driven by the economic benefits enjoyed by the doers (Schmidt, 2005). To that end, Schmidt (2005) argued that implementing measures that will reduce the net benefits of IUU fishing on one hand, but increase cost of engaging in the act on the other hand.

Interventions to address social and economic effects of illegal fishing

Illegal fishing is a complex issue, driven by an interacting array of economic, institutional and social factors (Gallic and Cox, 2006; Hauck, 2008). Historically, policy makers and fishery managers have attempted to deter illegal fishing by imposing sanctions on offenders and by strengthening monitoring and enforcement programs (Sumaila *et al*., 2006; Hauck, 2008; Arias and Sutton, 2013) which increases the cost of illegal behavior or reduces the costs of legal behavior (Kuperan and Sutinen, 1998; Sumaila *et al*., 2006). The theory of compliance underlying this approach posits that all individuals are rational decision-makers who aim to maximize their utility,

and that individual actors break the rules only when the benefits of doing so outweigh the costs (Becker, 1968; Branch et al., 2006; Sumaila *et al*., 2006; Keane *et al*., 2008). This concept was adopted from classical economic theory, and serves as the basis for the deterrence model. Researchers have focused on finding the optimal level of fines or sanctions that should be imposed, given a certain probability of detection (e.g., Sumaila *et al*., 2006), to reduce the prevalence of illegal behavior. Several other aspects of fishery management are already based on an understanding of human motivation and behavior. For example, fisheries observers are used on board many commercial fishing vessels not only to record catch data, including illegal take, but also to serve as a constant disincentive to engaging in illegal behaviors (Pramod et a*l*., 2014). Participatory, community-based resource science and management can increase compliance by increasing the perceived validity of regulations (Ostrom, 1990; Hønneland, 2000; Nielsen, 2003; Hauck and Kroese, 2006; Tyler, 2006; Viteri and Chávez, 2007). This can be an especially effective means of improving compliance in small-scale and low governance settings (Hauck, 2008; Worm *et al*., 2009). Thus, fisheries managers are increasingly engaging fishermen in their science and management processes so that they are more likely to understand the importance of maintaining catch limits (Hartley and Robertson, 2006; Armstrong *et al*., 2013).

Participatory processes in which fishermen co-create the regulations may be even more effective (Ostrom, 1990; Hatcher *et al*., 2000; Keane *et al*., 2008; Karr *et al*., 2017). If fishers are included in the process of collecting data and/or designing the regulations, an education campaign that highlights this role and the value of their input may significantly increase the perceived legitimacy of the management system and instill a sense of ownership in it. The fisheries sector provides employment and livelihood for about half a million people, and contributes significantly to the

Sierra Leone economy. The country's annual fish export, license fees, and the domestic revenue of the sector contribute greatly to the total revenue. In 2013, the fisheries sector contributed about 10.2% to the country's GDP (UNDP, 2014)

2.5 Legal and institutional framework necessary to address illegal fishing activities

Various authors have talked about the prospect of ending illegal fishing. Addressing illegal fishing in Uganda requires a multi-faceted strategy. For example, Mugisha *et al*., 2018 suggested strengthening governance and regulatory frameworks would be essential to improve enforcement and compliance. Also, community engagement and education programs can empower local fishers to adopt sustainable practices and discourage illegal activities (Béné *et al.*, 2016). Some studies like that of (Karanja *et al*., 2019) identified the use of technology, such as satellite monitoring and data collection systems, can enhance surveillance of fishing activities. This measure is although expensive to adopt since it requires many resources. Additionally, fostering partnerships among government, non-governmental organizations, and local communities can facilitate collaborative efforts to combat illegal fishing and promote sustainable fisheries management.

Sustainable Development Goal (SDG) 14, also known as "Life Below Water," aims to conserve and sustainably use the oceans, seas, and marine resources for sustainable development; essentially, it focuses on protecting and responsibly managing the health of our planet's aquatic ecosystems for the benefit of current and future generations.

Fisheries contribute significantly to global food security, livelihoods and the economy. However, if not sustainably managed, fishing can damage fish habitats, reduce biodiversity and impair the

functioning of ecosystems with negative repercussions for sustainable social and economic development. To achieve a healthy balance, fish stocks must be maintained within biologically sustainable limits—at or above the abundance level that can produce the maximum sustainable yield. Based on an analysis of assessed stocks, the proportion of world marine fish stocks within biologically sustainable levels declined from 90 per cent in 1974 to 69 per cent in 2013 and appears to have stabilized over the last few years (UNSD 2016).

Legal frameworks are essential for supporting sustainable food and agriculture production and the effective management, sustainable use of natural resources, including fisheries and aquaculture. Sound national legal frameworks give effect to international instruments, underpin the rule of law and ultimately contribute to, and are key to enabling action towards achieving sustainable development. The business of natural resource extraction and use and the related supply value chain involves a multiplicity of actors with different interests and roles to play, thus creating a web of complex relations inter se and between the management and regulatory authority and other actors, collectively and individually. National laws for the management of natural resource extraction and use, including fisheries and aquaculture legal frameworks, govern these complex relations by articulating the rights and responsibilities of the actors, how they can interact with one another in the context of fisheries and aquaculture activities. They enable further regulation, facilitate implementation of international legally binding agreements and voluntary instruments, and ensure compliance and enforcement. (FAO 2021).

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter presents the research design, research approaches, description of the study area, description of the target population, sampling strategies and sampling size, data types., data collection methods, data analysis and ethical consideration.

3.2 Research design

The study employed a descriptive research design. This design was chosen because it helps explain the "what are the effects of illegal fishing on local communities surrounding Kagwara landing site, Lake Kyoga. It provides knowledge on the status of illegal fishing at Kagwara landing site.

3.3 Research approaches

The study employed both quantitative and qualitative research approaches. The quantitative approach was employed to generate data from the fishermen, and other community members. While the qualitative approach was used to generate data from the technical people and other key informants.

3.4 Description of the geographical area

Serere district is located in Eastern region in Uganda, Teso sub region. Serere district headquarters is located approximately 35 kilometres (22mi) South of Soroti, the largest town in the sub region. This lies approximately 117kilometers (73mi), by road, northwest of Mbale the nearest city. It lies within latitude 1.5933^0 N; longitudes 33.4086^0 E. It is located in Kagwara cell B, Kagwara central ward, Kagwara Town Council, Kasilo County, Serere district in Uganda (see figure 1). Kagwara landing site is located in one of the pennisulars in the East of Lake Kyoga (see figure 2)

Figure 2. A map showing Serere district and Kagwara landing site area

3.5 Description of the study population

The population of Serere district was 85,903 in 2024 (National Population and Housing Census, 2024). The population of Kagwara landing site was 1300 (NPHC,2024). Of this population of Kagwara landing site approximately 300 included fishermen, boat owners, fishmongers and other people are involved in fishing activities (Serere Fisheries statistics 2024).

3.6 Sampling size and Sampling procedures

3.6.1 Sampling size

From a total of 300 fishermen, boat owners, fish processors, fish sellers, fish buyers and others that made the target population, the selected sample was computed using Yamane's formula (Yamane, 1967).

- $n = \frac{N}{1+Ne^2} = \frac{100}{1+100\ x\ 0.05^2} = \frac{100}{1+0.25} = 80$

Where: n = sample size, N = population size (100), e = level of precision (0.05)

3.6.2 Sampling procedure

The researcher employed a systematic random sampling to select respondents from amongst the fishermen and local communities. The technical people like the District Fisheries Officers, District, Local Councillors LC1 and others were purposively selected.

3.7 Data types and Data Collection methods

3.7.1 Data types

Primary data was generated through the administering of a semi-structured questionnaire, interview guide and observation. The Secondary data was generated by desk review of district development plans, district statistical abstracts, district fisheries reports, journals, national development plan, state of environment reports, newspapers, etc.

3.7.2 Data Collection Methods

3.7.2.1 Questionnaire

A semi structured questionnaire was developed and used in interviewing the fishermen and local communities. The questionnaire was pretested to ensure validity and reliability of data. The developed questionnaires were piloted on 10 respondents to identify any errors and omissions. Questions that will not be clear will be revised and improved upon. During the interview, questions in English will be translated into Ateso for easy understanding by the respondents because the fishers mostly use Ateso for communicating.

3.7.2.2 Interview guide

An interview guide was developed to collect information from the technical people and key informants. The guide helped fill gaps in information from the administered questionnaires. The interview guide was mostly open ended questions.

3.7.2.3 Observation

This involved observing the daily catch, gears used and the various changes in the livelihood where fishing community is settled to identify the effects of illegal fishing. The daily activities for example the daily catches, weighing in the landing site, the size of the fish landed, the gears used for harvesting and boats used for fishing will also be observed and recorded. Photographs were taken to show in detail the activities occurring at the landing site.

3.8 Data processing and Data analysis

3.8.1 Data processing

Data was processed by checking for accuracy, consistence and validity. This was followed by coding, editing, grouping of similar data, categorizing of data and summarizing. Data processing was done using Microsoft excel and later imported into SPSS (statistical package for the social sciences) or STATA for analysis.

3.8.2 Data analysis

The collected data was subjected to descriptive statistics and presented using summary tables, bar graphs and pie charts. It was also being analyzed for inferential statistics to find out the relationships between independent and dependent variables using Pearson chi-square test at 95% confidence level. A cross tabulation of socio-economic impacts and illegal fishing methods was conducted and the results displayed in the R-software.

3.9 Ethical consideration

These involved informing the local leaders in the landing site and nearby villages of intent to conduct research. It also involved presenting my University Identity Card and introduction letter from university to the local leaders and technical people. Before interviewing the respondents, consent was sought first. The respondents were assured that the purpose of the study was purely academic and their identity will be kept confidential and the information given. High discipline and conduct was observed protect the name of the University.

CHAPTER FOUR: FINDINGS

4.1 Introduction

This chapter presents the findings from the study. These were the social demographic characteristics of the population, status of fishing at Kagwara landing site, challenges of illegal fishing,

4.2 Social demographic Characteristics data)

From Table 1, there were more males (67.7%) (44 individuals), while females made up 32.3% (21 individuals) who participated in the study. This showed that there was a significant gender imbalance, with more than twice as many males as females in the group. Majority of the respondents were adults (96.9%) and young respondents (18 years and below) were very few (3.1%).

Table 1 Social demographic characteristics of the respondents

	Frequency	**Percentage (%)**
Gender		
Male	44	67.7
Female	21	32.3
Total	65	**100**
Age group (years)		
18 and below	2	3.1
19-40	32	49.2
41 above	31	47.7
Total	65	**100**
Education Level		
Primary	40	61.5
Secondary	20	30.8
Tertiary	5	7.7
Total	65	**100**
Marital status		
Single	10	15.4
Married	33	50.8
Divorced	15	23.1
Widowed	7	10.8
Total	65	**100**

The population was largely adult and most of them attained primary education (61.5%). Most of these adults were married (50.8%) as shown in table 1 below.

4.3 Status of illegal fishing in Kagwara landing site

4.3.1 The fishing gears commonly used at the landing site

The majority of the fisher folks used gillnets to harvest fish (45%). However, they also used illegal fishing gears with cast nets (6%) and seine nets (6%) being lowest nets used and monofilament nets being highest illegal fishing gears (20%) as shown in figure 3 below.

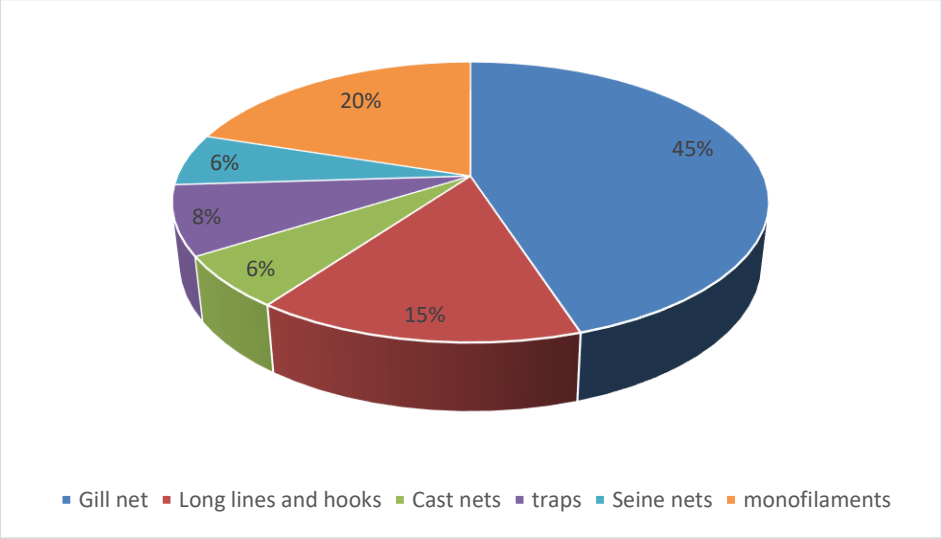


Figure 3. The fishing gears mostly used at Kagwara landing site

4.4.2 Crosstabulation for fishing gears against the nature /method of illegal

Gill nets (n = 29) and long lines/hooks (n = 10) are used mostly in illegal fishing involving undersized nets and hooks. Monofilaments (n = 13), traps (n = 5), and seine nets (n = 4) are used mostly for fishing in restricted zones like at the shoreline, gazetted breeding areas to catch. Cast nets (n = 4) are used in both types of illegal fishing equally. This indicates that there are illegal fishing practices though using specific gears especially un-recommended gear sizes of gillnets of

less than seven inches recommended by the Fisheries and Aquaculture Act of Uganda **2022** as seen in table 2 below

Table 2 Cross tabulation of the fishing gears against the nature of illegal fishing

Fishing gears * Type of illegal fishing				
Nature of illegal fishing		Use of undersized nets	Fishing in restricted zones	Total
Gears used for fishing	Gill net	29	0	29
	Long lines and hooks	10	0	10
	Cast nets	2	2	4
	Traps	0	5	5
	Seine nets	0	4	4
	monofilaments	0	13	13
Total		41	24	65

Chi-Square Tests			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	60.706[a]	5	.000
Likelihood Ratio	80.066	5	.000
Linear-by-Linear Association	54.512	1	.000
N of Valid Cases	65		
a. 8 cells (66.7%) have expected count less than 5. The minimum expected count is 1.48.			

The pearson chi-square test results of 0.000 was lower than 0.050. This showed that there was significance in explaining the relationship between the fishing gears and nature of illegal fishing.

4.3 Challenges leading to illegal fishing

According to figure 4, the main cause of illegal fishing in Kagwara fishing area is the poverty /lack of alternative sources (43%) for survival by most fishers in the area. For example, loss of agriculture and livestock rearing has made these fishers resort to illegal fishing as their main economic activity to generate income and food especially proteins. The second challenge was inadequate government support (23%) as they faced a problem of sudds (floating islands) which

continuously destroyed their fishing gears from the lake. Unfortunately, government did not facilitate the removal of the floating vegetation from the lake as well as providing subsidies and loans for purchasing the recommended fishing gears. Hence fishers are forced to buy the cheap gears and carryout illegal fishing. The third challenge was corruption(12%) and poor enforcement (12%), while lack of awareness (9%) was the lowest cited challenge by of the respondents .

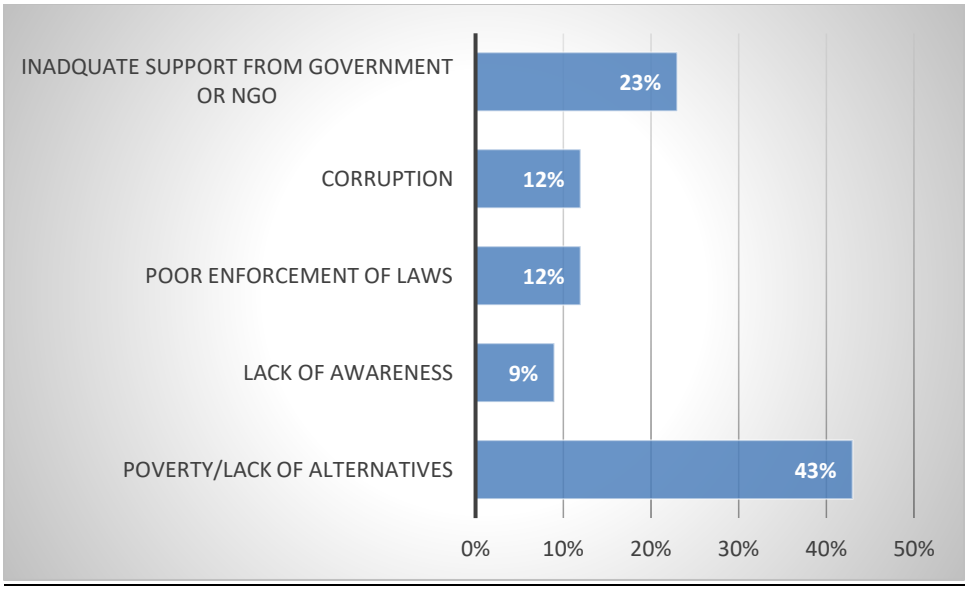


Figure 4. Graph showing the challenges leading to illegal fishing

4.4 The socio-economic impacts of illegal fishing to the fishing communities surrounding Kagwara landingsite, Serere district

4.4.1 Categories affected by illegal fishing

According to figure 5, the local communities at household level (77%) was the category most affected by illegal fishing. They experienced loss of lives due to drowning while using illegal fishing gears like monofilaments nets, attacks from crocodiles while foot fishing, their families suffered food insecurity due to reduced fish catches got from use of illegal gears, had poor standards of living and experienced domestic violence. The second most affected category was of fish traders (19%) especially those who took fish using refrigerated trucks to the factoriesand fish sellers who came from outside Serere to failed to get fish to buy due to low catches. The third

most affected category was boatowners (3%) since most of them participated in the illegal fishing activities for example using monofilament nets they often got arrested. The other affected category were government entities (2%) who had to enforce legal fishing practices.

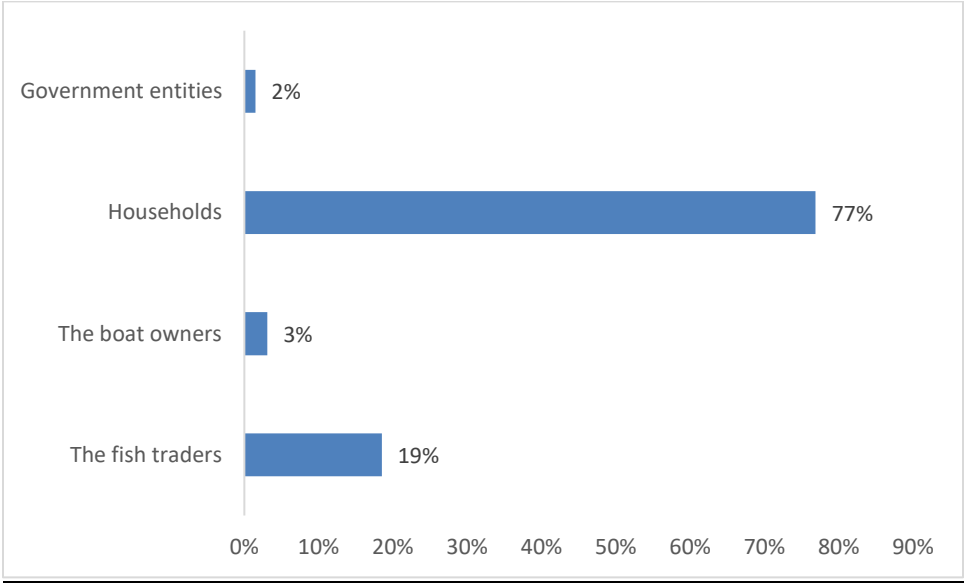


Figure 5. Categories most affected by illegal fishing

4.4.2. Fish species highly affected

The fish species most affected by illegal fishing were Nile perch (Lates niloticus) 60%, Nile tilapia (Oreochromis niloticus) 28% and silver fish (Rastreneobola argentea) 12% in the area (figure 6).

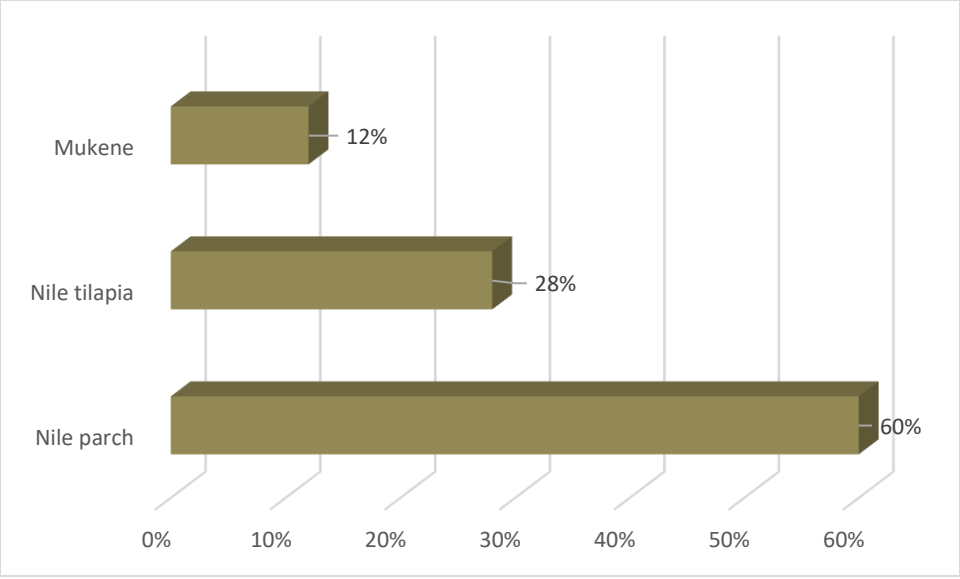


Figure 6. Fish species affected by illegal fishing

4.4.3 Comparison for the catches for 2024 and 2025 at Kagwara landing site

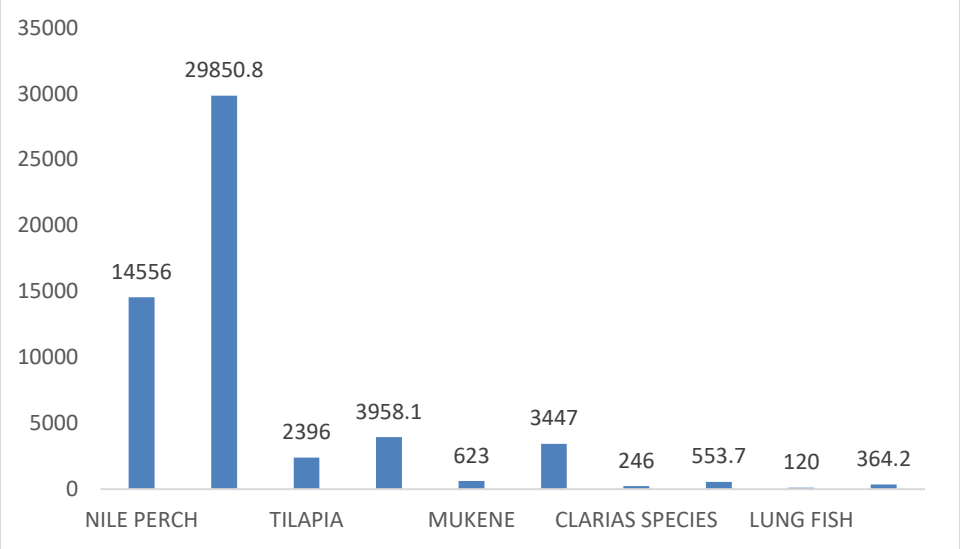


Figure 7.Fish catch data for the various species 2024 (kilograms)

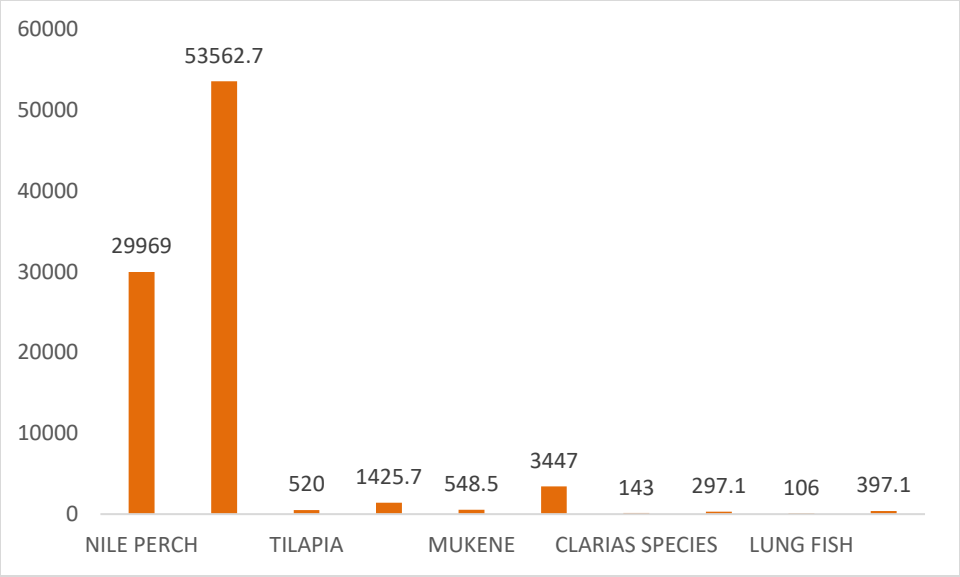


Figure 8. Fish catch data for the various species 2025 (kilograms)

From figure 6 and figure 7, there was a general increase in weight for the Nile perch and protopterus species and a decrease in the weights for Nile tilapia, silver fish and clarias species in the two years of 2024 and 2025.

4.5 The strategies for combating illegal fishing in Kagwara landing site Serere district

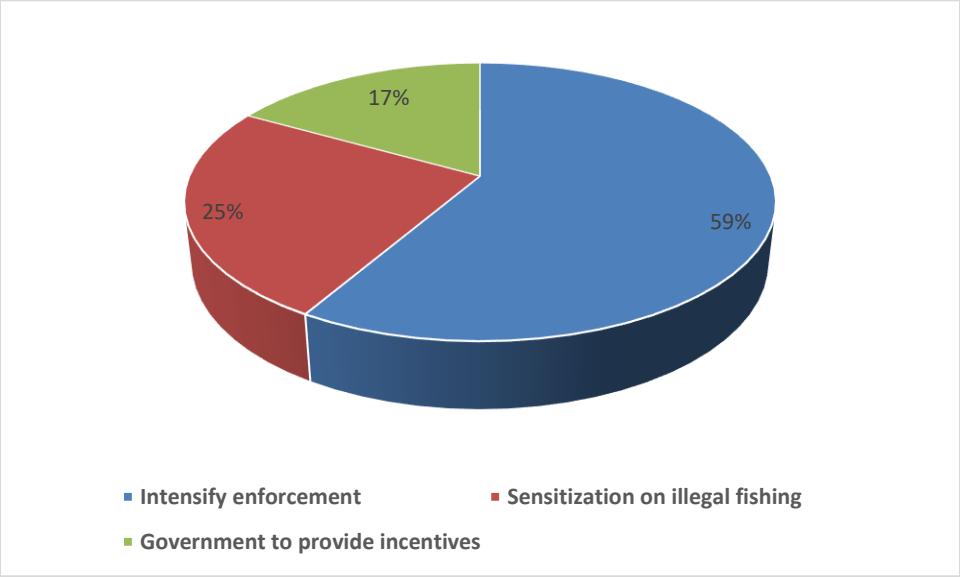


Figure 9. ***Strategies for combating illegal fishing***

According to figure 7, the major possible suggestion by the respondents to combat illegal fishing was intensified enforcement (59%) by the stakeholders. The stakeholders who included the fisheries protection unit, fisheries officers, beach management units (BMU) and the community members were willing to adapt to responsible fisheries management. The second suggested intervention was provision of incentives by government such as loans to buy fishing gears, boats and engines to access the fishing grounds (25%). The third suggested intervention was sensitization on illegal fishing (17%).

CHAPTER FIVE: DISCUSSION

5.1 Introduction

The chapter presents the discussion of the findings based on the objectives of the study. It includes the social demographic characteristics, status of the fishing activities in Kagwara landing site, challenges leading to illegal fishing gears, the socio-economic impacts of illegal fishing to the fishing communities surrounding Kagwara landingsite, Serere district and the strategies for combating illegal fishing in Kagwara landing site Serere district.

5.2 Social demographic characteristics

There were twice more males (67.7%) than females (32.3%) who participated in the study. This is because most of the fishing activities such as actual fishing, net making, boat building was done by males while activities such as fish processing and trading was done by females. The majority of the respondents were adults (96.9%) and young respondents (18 years and below) were few (3.1%). Hence the population involved in fishing was largely adult who were able to make their own decisions in the fishing activity. Most of the respondents had attained primary education (61.5%) and most of them are married (50.8%).

5.3 The status of the fishing activities in Kagwara landing site

The majority of the fisher folks used undersized gillnets to harvest undersized fish (45%) of less than six and seven inches which target younger fish for Tilapia and Nile perch according to the fisheries and aquaculture Act 2022. These are used in fishing grounds while some fisher folks use the monofilaments (20%), castnets (6%) and seinets (6%) to harvest fish at the restricted grounds such as the shoreline and close to the gazette breeding grounds. Cast nets are used to harvest fish in both the restricted zones and as an illegal fishing gear though enforcements are being done to curb illegal fishing according to the study.

5.4 Challenges leading to illegal fishing

The main cause of illegal fishing in Kagwara fishing area is the poverty and lack of alternative sources (43%) for survival by most fishers in the area. For example agriculture,livestock rearing which has made these fishers to resort to illegal fishing since fishing is the only main economic activity done to generate income and food especially proteins. The second main challenge is inadequate government support (23%). Government support is urgently needed to assist in the elinination of sudds (floating vegetation moving on the lake). The floating vegetation continuously destroy their fishing gears. This problem is caused by failure to respect the recommended buffer zone along the shores. Most times the fishermen cultivate beyond the recommended 100m buffer along the lake shores. Government is also required to provide subsidies and loans for purchasing the recommended fishing gears hence fishers. The lack of this support forces the fishers to buy the cheap gears used in illegal fishing. The challenge of corruption was low (12%) because fishers used their own income to invest in fishing, purchase boats and nets and pay for labour. It was only the illegal fishers who used it to pay for their wayout when caught by the law enforcers. Poor enforcement (12%) and sensitization of the public on illegal fishing (9%) were low although some stakeholders such as the fisheries protection unit, beach management units, fisheries staff and non governemt organisations such as GIZ were taking effort to curb illegal fishing and sensitize the public on the impacts of illegal fishing in the Kagwara landing site fishery.

5.5 The socio-economic impacts of illegal fishing to the fishing communities surrounding Kagwara landingsite, Serere district

According to the study illegal fishing has affected the local fishing community at household levels (77%) from loss of lives by drowning of illegal fishers running away from arrest by the fisheries protection unit, attacks from aquatic wild animals like crocodiles, food insecurity due to low catches due to use of illegal fishing gear, poor standards of living and domestic violence. The low

fish catches affected fish traders (19%) especially those with refrigerated trucks that took fish to the factories those who came from outside Serere to buy fish. Most times these failed to find enough fish to buy. The boat owners (3%) especially those who participated in illegal fishing were always arrested and their boats destroyed by the fisheries protection unit. The fishers also suffered impact from government (2%) due to inadequate support in terms of loans and subsidies, low enforcement and political interference.

The fish species most affected by illegal fishing were Nile perch (Lates niloticus) 60%, Nile tilapia (Oreochromis niloticus) 28% and silver fish (Rastreneobola argentea) 12% in the area. Nile perch was most affected because it's the most targeted fish species and more economic value, followed by Nile tilapia while silver fish was least affected. Silver fish was least affected because it was harvested using lampara nets and it has seasons for fishing controlled by nature (the moon). Other fish species (Clarias spp, Protopterus spp) were captured for home consumption by the foot fishers using traps and sometimes as by catch from fishing Nile perch and Nile tilapia.

Generally, there was an increase in weight for the Nile perch and Protopterus species and a decrease in the weights for Nile tilapia, silver fish and Clarias species in the two years. The increase in the weight and number of Nile perch is due intensified enforcements that government and other stakeholders especially UPDF-FPU put in place to protect Nile perch fishery, the increase in the water levels and the floating sudds that limit the fishers from accessing the lake more than four times a week. The reduction in the weights for Nile tilapia is because most illegal fishers use undersized gillnets which even harvest small fish, they also target shorelines which are habitats

for Nile tilapia species reducing the mature fish which breed to increase their numbers harvested and increased weight.

5.6 The strategies for combating illegal fishing in Kagwara landing site Serere district

The major possible suggestion by the respondents to combat illegal fishing was intensified enforcement (59%) by the stakeholders like the fisheries protection unit, fisheries officers, BMU, and the community members. To achieve responsible fisheries management, it is better the local communities are involved in the management process to gain their buy and adoption in the process. . Furthermore, to easily get government support and provision of incentives and loans to buy fishing gears, boats, and engines to the fishers, they should be encouraged to organise themselves in groups. Through these groups, the government agencies and technical fisheries people could use them for sensitization on responsible fisheries management.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the conclusion to the study and recommendations from the findings on the study.

6.2 Conclusion

The study found out that there are more men involved in the fishing activities and practices, more adults are involved in fishing with most of them who attained primary education. It also found out that illegal fishing is done in Kagwara landing site but through use of authorised fishing gears though they are used to target undersized gillnets and the illegal gears are used in restricted zones of the lake to target specific fish species. Nile perch is the most affected fish species followed by Nile tilapia and mukene since its targeted due to high prices that paid for it and increased demand by the markets outside Serere and within Serere. The major cause of illegal fishing is poverty and lack of alternative sources of income and livelihood followed by inadequate government support, corruption and enforcements. Most of the community have been sensitized on illegal fishing and its impacts to the environment (sustainable fishery). The most affected are the households surrounding the landing site leading to food insecurity, loss of lives, reduced standards of living. The most recommended strategy to combat illegal fishing is to intensify fisheries enforcement by stakeholders and provide support by government**.**

6.3 Recommendations

The recommendations made include the following:

1. Empower women to participate in the fishing activities.

2. Provide training to the fishing communities to improve their capacity.

3. Get alternative sources of livelihood in decision making so as to come up with proper decisions in sustainable fisheries management.

4. Provide more government support to fishing communities to enable them obtain improved fishing gears, access engines.

5. Sensitize stakeholders on sustainable fishing practices.

6. Intensify enforcements to curb illegal fishing practices at community levels and even other surrounding areas.

REFERENCES

Agricultural Development Project, (1988). Report on the survey of Lake Kyoga 1986 – 1988. Copenhagen, Denmark: Danish Rural Development Consultants.

Aquatic Science (Vol. 38, Issue SUPPL.1, pp. 1–14). https://doi.org/10.2989/16085914.2013.795886 Ogutu-Ohwayo, R., Twongo, T., Wandera, S. B., & Balirwa, J. B. (1995).

Between the Army and the Deep Blue Lake: Why Illegal Fishing Persists in Uganda Despite Military Deployment | Pulitzer Center

Cooperator News. (2023). FPU burns Shs 600mln illegal shing gear on L. Kyoga. 12th July 2023. Eastern Environment. https://cooperator news/

Cowx, I. G., & Ogutu-Owhayo, R. (2019). Towards sustainable fisheries and aquaculture management in the African great lakes. Fisheries Management and Ecology, 26(5), 397–405.

Islam, M. M., Begum, A., Rahman, S. M. A., & Ulla, H. (2021). Seasonal Fishery Closure in the Northern Bay of Bengal Causes Immediate but Contrasting Ecological and Socioeconomic Impacts. Frontiers in Marine Science, 8(September), 1–13.

Lemma, B. (2019). Livelihood Functions of Capture Fisheries

Mhagama, F.L., Musiba, M.J., Salehe, M.A., Luomba, J., Mlahagwa, E., Mashafi, C., Kashindye, B.B. and Mrosso, H.D., 2018. The socio-economic implications of illegal fishing practices in Lake Victoria: a case study of three Villages in Tanzania. *African Journal of Tropical Hydrobiology and Fisheries*, *16*(1), pp.72-77.

Mulokozi, J. (2025). Attitudes and practices of fishermen towards sustainable fisheries management in Lake Kyoga: A case study of Kagwara Landing site. Direct Research Journal of Agriculture and Food Science, 13(1), 103–117. https://doi.org/10.26765/DRJAFS15521390 [6].

NaFiRRi. (2007). A study on stock enhancement/ restocking of the Kyoga basin lakes. 22 | P a g e http://hdl.handle.net/1834/35341 Nyboer, E. A., Musinguzi, L., Natugonza, V., Cooke, S. J., Young

Northridge, S., 2009. Fishing industry, effects of. In *Encyclopedia of marine mammals* (pp. 443-447). Academic Press.

Ogbuafor, N. O. and Gray. T.2024. Unregulated Open-Access versus Regulated Open-Access Fishing: Stakeholders Perceptions in Sierra Leone. *9*(7), 282

Ogutu-Ohwayo, R., Twongo, T., Wandera, S. B., & Balirwa, J. B. (1995). Suggestions to Set Mesh Size Limits and Restrict the Fishing Methods and the Types of Fishing Gears on Lakes Victoria and Kyoga. Proceedings of the Second EEC Regional Seminar on Recent Trends of Research on Lake Victoria Fisheries, 139–152.

Ogutu-Ohwayo, R., Odongkara, K., Okello, W., Mbabazi, D., Wandera, S. B., Ndawula, L. M., & Natugonza, V. (2013). Variations and changes in habitat, productivity, composition of aquatic biota and fisheries of the Kyoga lake system: lessons for management. In African Journal of

Panjarat, S., & Bennett, N. (2012). Responses of Fishers to a 25-year Seasonal Closed Measure on the Andaman Coast of Thailand. January, 21.

Sastry, K.V.R., 1957. Interim report to the Government of Uganda on improvement of fisheries statistics. FAO/58/1/88. Rome: FAO.

Ssempijja, D. (2016). a Syllabus in Fishing Technology for Makerere University Students. http://www.unuftp.is/static/fellows/document/drake16prf.pdf Temesgen, M., Getahun, A., &

SOFIA. (2022). 29 June, 2022.

SDG 14 – Life below water – aims to conserve and sustainably use the oceans, seas, and marine resources for sustainable development.

Temesgen, M., Getahun, A., & Lemma, B. (2019). Livelihood Functions of Capture Fisheries in Sub-Saharan Africa: Food Security, Nutritional, and Economic Implications. Reviews in Fisheries Science and Aquaculture, 27(2), 215–225.

Twongo, T., Bugenyi, F., & Wanda, F. (2009). The potential for further proliferation of water hyacinth in Lakes Victoria, Kyoga nad Kwania and some urgent aspects for research'. African Journal of Tropical Hydrobiology and Fisheries, 6(1), 1–10. https://doi.org/10.4314/ajthf.v6i1.45928 Wanyama, R., Valtysson, H. T., & Ármannsson, H. (2012).

Uganda Radio Network. (2020). Unregistered Fishermen in Serere Resort to Illegal Fishing. https://ugandaradionetwork. net/story/ 06th August 2020. Serere Eastern Region Uganda

Uganda Radio Network. (2023). Fishermen Spend Days in Search of Colleagues in Kagwara. https://ugandaradionetwork. net/story/ 23rd August 2023. Serere Eastern Region Uganda

Winfield, I. J. (2012). REVIEW OF THE STATE OF THE WORLD FISHERY RESOURCES: INLAND FISHERIES - Edited by R. Welcomme. In Journal of Fish Biology (Vol. 81, Issue 6). https://doi.org/10.1111/j.1095-8649.2012.03467.x Zhang, A., Luo, W., Wang, J., & Zhou, Z. (2021). The time-area fishing closure impact

Worthington, E.B., 1929. A report on the fishing survey of Lakes Albert and Kyoga. London, Crown Agents for the Colonies.

APPENDICES

Appendix. 1. Questionnaire for respondents

FACULTY OF NATURAL RESOURCE AND ENVIRONMENTAL SCIENCE

DEPARTMENT OF FISHERIES AND WATER RESOURCES MANAGEMENT

NAMASAGALI CAMPUS

QUESTIONNAIRE **ID NO: ……**

Dear respondent,

I am Akello Eunice a student of Busitema University pursuing a Bachelor of Science degree in Fisheries and Water Resources Management, carrying out an academic study on "**Assess the socio-economic effects of illegal fishing on fishing communities surrounding Kagwara Landing Site, Lake Kyoga, Serere District"**.

You have been purposely selected to voluntarily participate in this study and you are kindly requested to freely and objectively respond to the listed questions. Be assured that the information you give out will be treated with utmost confidentiality. This study is strictly for academic purposes. Your identity will be kept confidential.

Instructions

- Read the questions carefully and ask for clarity on any question that troubles you.
- Please tick in the box where necessary.
- Write your response in the space provided.

Section A: Bio data

1.Name: …….... (**Optional**)

2. Gender: (1). Male (2). (3) Female

3. Age Group

(1). 18 and below. (2). 19 – 25. (3). 26 – 30. (4). 31- 40. (5). 41 – 50 (6). Above 50

4. Education Level

(1). Primary (2). Secondary (3). Tertiary (4). Others. If others specify……

5. Marital status

(1). Single (2). Married (3). Divorced (4). widowed (5). Others specify……..……

6. Employment

1. Not employed 2. Self-employed 3. Employed 4. Others specify……

7. Income level per month in Ugandan Shs.

1). Below 50,000 2). 50,000 – 150,000 3). 160,000 -300,000 (4). 310,000 – 500,000 5). Above 500,000

8. Occupation:

1). Fisherman 2). Boat owner 3). Civil servant 4) Fish trader 5). 6) FPU soldier. 7). Fish processor 8. Other (specify): _____

9. Years of experience during fishing in wild capture fisheries (if applicable): _____

Section B: Status of illegal fishing activities at Kagwara landing site, Lake Kyoga

10. Are you aware of illegal fishing activities around Kagwara Landing Site?

[ ] Yes

[ ] No

11. What types of illegal fishing practices are common in your area? (Select all that apply)

[ ] Use of undersized nets

[ ] Fishing during closed seasons

[ ] Use of poisons or chemicals

[ ] Fishing in restricted zones

[ ] Other (specify): _____

12. Who mostly engages in illegal fishing?

[ ] Local residents

[ ] Outsiders

[ ] Both

[ ] Don't know

13. Are you currently involved in fishing activities?

[ ] Yes

[ ] No

14. If yes, what type of fishing gear do you use? (Select all that apply)

[ ] Gill nets

[ ] Long lines

[] Castnets

[ ] Traps

[] Seinenets

[ ] Hooks

[ ] Other (specify): _____

15.What gear sizes do most fishers use during fishing activity?

[] Inch 4 and below

[] Inch six

[] Inch seven above

[] None of the above

16. What is your average number of fishing trips per week?

[ ] 1–2

[ ] 3–5

[ ] More than 5

17. How would you describe the fish catch over the past year?

[ ] Increased

[ ] Decreased

[ ] Remained the same

[ ] Don’t know

18. What are the most commonly caught fish species?

[] Nile perch

[] Nile Tilapia

[] Silver fish

[] Clarias spp

[] Protopterus Spp

[] Haplochromines

19. How do you rate the current fish stock in Lake Kyoga?

[ ] Abundant

[ ] Moderate

[ ] Declining

[ ] Very low

20. What factors have affected fishing activities in the past year? (Select all that apply)

[ ] Overfishing

[ ] Seasonal changes

[ ] Illegal fishing methods

[ ] Government restrictions

[ ] Political interference

[ ] Other (specify): _____

21. Are you aware of illegal fishing activities around Kagwara Landing Site?

[ ] Yes

[ ] No

22. What types of illegal fishing practices are common in your area? (Select all that apply)

[ ] Use of undersized nets

[ ] Fishing during closed seasons

[ ] Use of poisons or chemicals

[ ] Fishing in restricted zones

[ ] Other (specify): _____

23. Who mostly engages in illegal fishing?

[ ] Local residents

[ ] Outsiders

[ ] Both

[ ] Don’t know

Section C: Challenges to illegal fishing activities on fishing communities at Kagwara landing site, Lake Kyoga

24. What are the main challenges preventing sustainable fishing at Kagwara Landing Site? (Select all that apply)

[ ] Poverty/lack of alternatives

[ ] Lack of awareness

[ ] Poor enforcement of laws

[ ] Corruption

[ ] Inadequate support from government or NGOs

[ ] Other (specify): _____

25.Do you think illegal fishing is beneficial to the government and the community?

[] No

[] Yes

26. If yes in what ways have people benefited?

[] Obtained food /fish

[] Gained money or revenue

[] Improved status of living

27.Who are the people encouraging illegal fishing mostly?

[] Politicians

[] local community members

[] Civil servants

[] The army

28. Who are the people involved in illegal fishing activities by gender?

[] Male

[] Female

29.Where do these people obtain illegal fishing gears?

[] Buying from outside Serere district

[] Making them locally

[] Through the fish traders bringing for the local fishers

30. What challenges do you face in fishing at Kagwara Landing Site?

[] Food insecurity

[] Illegal fishing

[] Poverty

[] Reduced fish catch

[] If others specify----------

Section D: Impacts of illegal fishing on fishing communities at Kagwara landing site, Lake Kyoga

31. Is fishing your main source of income?

[ ] Yes

[ ] No

32. If yes, how have you benefited from fishing activities? Specify----------

33. Do you have alternative sources of income?

[ ] Yes

[] No

If yes, specify: _____

34.Do you think illegal fishing is beneficial to the government and the community?

[] No

[] Yes

35. If yes in what ways have people benefited?

[] Obtained food /fish

[] Gained money or revenue

[] Improved status of living

36.Who are the people mostly affected by illegal fishing activities?

[] The local fishing community

[] The fish traders

[] The boat owners

[] Households

[] Government entities

[] All the above

37.How has the illegal fishing affected the fishing community around Kagwara landing site?

[] Loss of income/revenue

[] Lack of enough food / fish for the households

[] Loss of lives

[] If others specify----------

40.How many households do you think is affected by the illegal fishing activities monthly in Kagwara?

[] 10 below

[] More than 100

[] None

41.How much fish do you catch per fishing day /week?

[] 5kgs below

[] More than 5

[] No fish

42.When using illegal fishing gears, what fish sizes do the illegal fishers harvest?

[] Mature and recommended fish slot sizes

[] Immature and un recommended

43.What fish species is mostly affected by illegal fishing activities?

[] Nile perch

[] Tilapia

[] Mukene

[] If others specify----------

44.Where is the illegally harvested fish sold or who are the buyers?

[] Outside Serere

[] Locally

45. What do you think are the major economic risks of illegal fishing to your community?

Section E: Interventions and Mitigation measures against illegal fishing activities at Kagwara landing site, Lake Kyoga

46. Is your community doing anything to fight illegal fishing?

[ ] Yes

[ ] No

[ ] Don't know

47. How effective are current efforts to stop illegal fishing?

[ ] Very effective

[ ] Somehow effective

48. Are you aware of any fishing regulations or policies in place?

[ ] Yes

[ ] No

49. Who enforces fisheries laws and regulations in this area? (Select all that apply)

[ ] Local Government

[ ] Beach Management Units (BMUs)

[ ] Fisheries Officers

[ ] Uganda Police/Army

[ ] Other (specify): ____

50. Do you think the current fisheries regulations are effective?

[ ] Yes

[ ] No

[ ] Not sure

Please explain your answer: _____

51. Who should be responsible for reducing illegal fishing? (Select all that apply)

[ ] Local government

[ ] Beach Management Units (BMUs)

[ ] Fisher folk themselves

[ ] Uganda Police or Army

[ ] Other: _____

52. What support do you think is most important to make fishing more sustainable at Kagwara? (Select up to 3)

[ ] Access to better fishing gear

[ ] Alternative income opportunities

[ ] Education and training

[ ] Stronger enforcement of rules

[ ] Support from NGOs or government

[ ] Improved market access

[ ] Other (specify): _____

53. What strategies do you suggest should be implemented to ensure long-term sustainability of fishing at Kagwara Landing Site?

[] Intensified enforcement

[] Sensitizations on illegal fishing

[] Government to provide incentives

[] If others specify----------

54. Would you be willing to participate in community efforts (e.g., clean-ups, training, BMU meetings) to support sustainable fishing?

[ ] Yes

[ ] No

55. Any additional comments or suggestions on making fishing more sustainable? Write here----------

56. What recommendations would you give to improve fishing activities at Kagwara Landing Site?

[] Improving fish handling facilities

[] Educating and training fisher folks

[] Enforcement

[] If others specify----------

57. What support would you need to improve your income despite illegal fishing practices?

[] Security

[] Government incentives

[] Training and education

[] If others specify----------

58. What solutions do you suggest to reduce illegal fishing at Kagwara Landing Site?

---

59. Do you understand what sustainable fishing means?

[ ] Yes

[ ] No

60. Have you ever received training or education on sustainable fishing methods?

[ ] Yes

[ ] No

61. Which of the following practices do you believe would help make fishing more sustainable at Kagwara? (Select all that apply)

[ ] Using recommended fishing gear

[ ] Observing closed fishing seasons

[ ] Avoiding juvenile fish

[ ] Protecting breeding areas

[ ] Participating in BMU/community regulation

[ ] Reporting illegal fishing [ ] Other (specify): _____

62. Would you be willing to adopt sustainable fishing practices if provided with training and support?

[ ] Yes

[ ] No

[ ] Maybe

Thank you very much for your time and participation

Appendix. 2. Interview Guide for respondents

FACULTY OF NATURAL RESOURCE AND ENVIRONMENTAL SCIENCE

DEPARTMENT OF FISHERIES AND WATER RESOURCES MANAGEMENT

NAMASAGALI CAMPUS

INTERVIEW GUIDE **ID NO: ……**

Dear respondent,

I am Akello Eunice a student of Busitema University pursuing a Bachelor of Science degree in Fisheries and Water Resources Management, carrying out an academic study on "**Assess the socio-economic effects of illegal fishing on fishing communities surrounding Kagwara Landing Site, Lake Kyoga, Serere District"**.

You have been purposely selected to voluntarily participate in this study and you are kindly requested to freely and objectively respond to the listed questions. Be assured that the information you give out will be treated with utmost confidentiality. This study is strictly for academic purposes. Your identity will be kept confidential.

Instructions

- Read the questions carefully and ask for clarity on any question that troubles you.
- Please tick in the box where necessary.
- Write your response in the space provided.

Section A: Bio data

1. Name (optional):

2. Age:

3. Gender:

4. Level of education:

5. Occupation:

6. Years living/working in this area:

7. Household size:

Section B: Status of illegal Fishing Activities at Kagwara landing site Serere district.

1. How long have you been engaged in fishing or fish-related activities?
   [] 1 year below []2 years [] More than 2 years

2. What types of fishing methods do you use or are commonly used in this area?

   [] Seining [] Gill netting [] Traps [] Use of hooks
3. Are you aware of fishing regulations governing Lake Kyoga?
   [] Yes [] No [] Don't know

4. What are the most common types of illegal fishing methods practiced in this area?

   [] Seining [] Use of cast nets [] Undersized gillnets [] Fishing without license [] Monofilaments

5. What, in your opinion, drives people to engage in illegal fishing?

[] Poverty [] Ignorance [] Lack of capital [] If others specify

Section C: Challenges to illegal fishing activities on fishing communities at Kagwara landing site, Lake Kyoga

6.What are the main challenges preventing sustainable fishing at Kagwara Landing Site? (Select all that apply)

[ ] Poverty/lack of alternatives

[ ] Lack of awareness

[ ] Poor enforcement of laws

[ ] Corruption

[ ] Inadequate support from government or NGOs

[ ] Other (specify): _____

7. Do you think illegal fishing is beneficial to the government and the community?

   [] No

[] Yes

8. If yes in what ways have people benefited?

   [] Obtained food /fish

   [] Gained money or revenue

   [] Improved status of living

9. Who are the people encouraging illegal fishing mostly?

   [] Politicians

   [] local community members

   [] Civil servants

   [] The army

10. Who are the people involved in illegal fishing activities by gender?

    [] Male

    [] Female

11. Where do these people obtain illegal fishing gears?

    [] Buying from outside Serere district

    [] Making them locally

    [] Through the fish traders bringing for the local fishers

12. What challenges do you face in fishing at Kagwara Landing Site?

    [] Food insecurity

    [] Illegal fishing

    [] Poverty

    [] Reduced fish catch

    [] If others specify----------

Section D: Impacts of Illegal Fishing activities on the communities at Kagwara landing site, Serere district, Lake Kyoga

13.How has illegal fishing affected your income or the income of people in this community?

[] Reduced catch for sale [] Loss of gears during operations [] lack of food [] If others specify

14.Have you observed any changes in fish availability or size over time? Please explain.

15. How does illegal fishing affect fish prices and the local market?

[] Reduces catches [] Undersized fish locally [] Increased cost of doing business

16. Has illegal fishing influenced access to fishing gear or increased the cost of doing business?

[] Influenced access to fishing gear [] Increased cost of doing business

17. What other income-generating activities are available to people in this community?

[] Farming [] Trading [] Transportation [] If others specify

18. How has illegal fishing influenced relationships among community members? Please explain

19. Are there any conflicts related to fishing practices in this area? If yes, describe them.

20. Has illegal fishing led to tensions with government authorities or enforcement officers?

[] Yes [] No

21. What are the effects of illegal fishing on youth and women in the community?

[] Early marriages [] Domestic violence [] Poverty [] food insecurity [] loss of lives

22. Has illegal fishing affected access to community services like health care, education, or housing?

[] yes [] No

If yes explain how

Section E: Interventions and Mitigation measures against illegal fishing activities at Kagwara landing site, Lake Kyoga

1. Are there any local initiatives to combat illegal fishing? If yes, how effective are they?
   [] Yes No []
2. What role does the Beach Management Unit (BMU) play in regulating fishing here?
   [] Enforcement [] Fish catch data collection [] Sensitizing the fishing communities

3. How effective are government policies and enforcement measures in curbing illegal fishing?
   [] very effective [] moderately [] Not effective

4. What support or training do fishermen need to transition to legal and sustainable fishing?

[] Training on sustainable fisheries [] Incentives [] Security

5. What suggestions would you give to reduce illegal fishing in this area? Specify
6. What do you think the future of fishing in Kagwara looks like? Specify

7. Is there anything else you'd like to share regarding illegal fishing or its effects? Specify

Thank you very much for your time and participation

Appendix. 3. Field Photos

Figure 10. During weighing of fish at Kagwara landingsite

Figure 11. Burning of illegal fishing gears (sein nets)

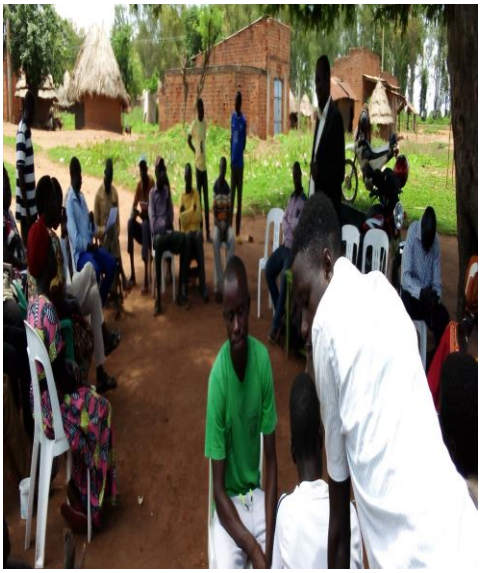


Figure 12Meeting with the community landing

Figure 13. Observation of the fishing gears used at the

Figure 14.Weighing of Nile perch

Figure 15Inspection of fish caught by soldiers during enforcement

Figure 16Meeting with the stakeholders

Figure 17Observation of the types of boats used