LOCAL COMMUNITIES' RESPONSES TO STATE FISHES RESTORATION PROGRAM IN LAKE TANGANYIKA IN KIGOMA TANZANIA

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN NATURAL RESOURCE ASSESSMENT AND MANAGEMENT (MANRAM)

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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the Open University of Tanzania a dissertation entitled; "**Local Communities' Responses to State Fishes Restoration Program in Lake Tanganyika In Kigoma, Tanzania".** In the partial fulfilment of the requirements for the Masters of Arts in Natural Resources Assessment and Management (MANRAM).

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DECLARATION

I, **David Protas,** declare that, the work presented in this dissertation is original. It has never been presented to any other University or Institution. Where other people's works have been used, references have been provided. It is in this regard that I declare this work as originally mine. It is hereby presented in partial fulfilment of the requirement for the Degree of Master of Arts in Natural Resources Assessments and Management (MANRAM).

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Signature

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Date

DEDICATION

I dedicated this dissertation to my lovely wife Elizabeth Japhet Kumenya for her consistent encouragement. And my family and friends thank you for your unwavering support and encouragement throughout this endeavour.

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ABSTRACT

This study examined local communities' responses to the state's fish restoration program in Lake Tanganyika, Kigoma region. It focused on fourspecific objectivesnamely: assessing community perceptions of fish decline in Lake Tanganyika, identifying reasons for opposition to the annual fish ban, evaluating local strategies to mitigate economic impacts during the ban, and measuring acceptance of ecological outcomes related to the ban. Guided by Political Ecology theory, a descriptive survey design was employed to gather data from 120 respondents. Results indicated significant declines in fish catches attributed to illegal fishing, overfishing, and growing human populations. Despite high awareness of the fishing ban, skepticism about its effectiveness prevails, with many viewing it as a threat to their livelihoods rather than a conservation effort. Resistance stems from economic hardship, poor living standards, and food insecurity, exacerbated by a lack of community involvement in the ban's formulation and limited alternative livelihoods. While many accept the ecological need for the ban, insufficient community engagement and understanding impede compliance. The study emphasizes the need for improved participation, education, and government support to balance economic survival with sustainable fisheries management. Recommendations include establishing community governance and communication regarding fishing bans, providing alternative livelihoods, and enhancing monitoring and enforcement through local involvement to foster better compliance and ecological awareness.

Keywords: *Local Fishing Communities, State Restoration Program, Fishing Ban, Lake Tanganyika*

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LIST OF ABBREVIATIONS

AFS	American Fisheries Society
DPS	Directorate of Postgraduate Studies
EU	European Union
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GOB	Government of Bangladesh
HLPE	High-Level Panel of Experts
IFMP	Implementation of a Fisheries Management Plan
IUU	Illegal, Unreported, and Unregulated
LATAFIMA	Lake Tanganyika Fisheries Management
LTA	Lake Tanganyika Authority
LVFO	Lake Victoria Fisheries Organization
MAL	Ministry of Agriculture and Livestock
MANRAM	Master of Arts in Natural Resources Assessment and Management
MCS	Monitoring, Control and Surveillance
MPAs	Marine Protected Areas
NOAA	National Oceanic and Atmospheric Administration
SFRP	State Fish Restoration Program
SPSS	Statistical Package for the Social Sciences
SSF	Small-Scale Fisheries
UNDP	United Nations Development Programmed

URT	United Republic of Tanzania
US	United States
USFWS	U.S. Fish and Wildlife Service

CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter introduces the background of the research problem, the statement of the research problem, objectives of the study, and the research questions. It also highlights the significance of the study, and scope of the study.

1.2 Background to the Research Problem

The fishing industry plays a crucial role in global food production, serving as a primary source of protein and economic support for millions of people worldwide (Lauria *et al.,* 2018). An estimated 600 million individuals depend on fisheries for their livelihoods (FAO, 2022). The industry acts as a convergence point for both skilled and unskilled labour, resulting in escalating demand for fishery resources, which frequently outstrips supply. This imbalance has led to a significant issue of overfishing, with the Food and Agriculture Organization (FAO, 2022) reporting that nearly one-third of all monitored global fish stocks are overfished, while an additional 34.2 per cent to 60.3 per cent being classified as fully exploited.

Over the past several decades, global fish production for human consumption has surged, increasing from 67 per cent of total fish production in the 1960s to 88 per cent by 2016 (Gebremedhin, *et al.,* 2021). Projections indicate that demand for seafood is expected to rise from 157.4 million tons in 2020 to approximately 267.5 million tons by 2050 (Wang, *et al.,* 2023). This heightened demand is a primary driver of the overfishing crisis, which is well-documented through various reports of illegal fishing practices worldwide. Notably, China has emerged as a leader in

promoting illegal fishes activities, with Song and Barclay (2023) identifying it as the highest-ranked country among 152 nations engaged in such practices. The 2018 Global Illegal Fishing Index estimated that China captures approximately four million tons of juvenile or undersized fish annually, further exacerbating overfishing and depleting local fish stocks. Contributing factors include extensive coastlines, rich marine resources, a growing populace, industrialization, advanced fishing technologies, and insufficient fishing regulation (Zhang *et al.*, 2020).

Empirical studies highlight that the Mediterranean Sea is experiencing severe overfishing, with over 90 per cent of fish caught being utilized by EU countries (Demirel, *et al.*, 2020). Similarly, despite relatively effective management in the U.S., the challenges of overfishing persist, paralleling issues seen in other regions worldwide (Link, 2021). Notable research has been conducted in countries like Taiwan, Japan, Indonesia, Spain, and South Korea, contributing to a growing body of literature on the matter (Canyon, *et al.*, 2021; Thomas & Varma, 2022).

The West African coastal region suffers from some of the highest levels of illegal, unreported, and unregulated (IUU) fishing activities, with estimates suggesting that approximately 40 per cent of all fish caught in these waters are illegal catches by foreign fishers. Countries facing these challenges in this region include Benin, Cape Verde, Cameroon, Ghana, Gambia, Togo, Sierra Leone, Senegal, Nigeria, Mauritania, Liberia, Ivory Coast, Guinea-Bissau, and Guinea. Factors contributing to this crisis encompass weak fisheries management systems, poverty, low technology adoption, corruption, and ineffective institutions (Belhabib, *et al.*, 2019).

In Eastern African countries of Tanzania, Kenya Mozambique and Somalia the overfishing crisis dramatically affects both inland waterways and the Indian Ocean. The primary drivers are IUU fishing activities and deficiencies in Monitoring, Control and Surveillance (MCS) systems, which encompass inadequate legal frameworks, poor data collection and analysis, and insufficient surveillance mechanisms. The inland waters, including lakes and rivers, are also significantly affected by overfishing (Heidrich, *et al.*, 2023).

Tanzania particularly suffers from overfishing in Lake Victoria, which poses severe threats to local fish species. In Lake Nyasa, illegal gear is frequently used to catch small fish (Chavula, *et al.,* 2023). A study by Mitinje, *et al.* (2022) noted overfishing and illegal fish exploitation in Lake Babati, attributed largely to population growth. The authors suggested implementing physical boundaries, public awareness campaigns on existing bylaws, and regulatory reviews as potential remedies. Gayo (2021) found that 39 per cent of the respondents in his study of Hombolo Dam identified overfishing as a critical issue leading to declining fish stocks, primarily due to destructive fishing practices and increasing human populations.

Various reports document similar concerns in rivers, such as Musika, *et al., (*2021), who attributed the decline in fish catches in the Malagarasi River and Moyowosi-Kigosi Game Reserve wetlands to illegal fishing activities. Similarly, Mwakabungu (2021) identified the use of illegal fishing gear as a primary factor in the Rufiji River. The situation in Lake Tanganyika which does not differ from the previous cases reported above has drawn attention recently, with collaborative efforts among riparian countries aimed at implementing a periodic closure of the lake to restore fish

stocks. Despite extensive research addressing the overfishing and fish depletion crisis (Phiri, *et al.,* 2024; URT, 2022; FAO, 2024; Sarvala, *et al.,* 2008), there remains a significant research gap regarding the effectiveness of these restorative actions and the local communities' responses to state-led initiatives for fish stock restoration. Understanding these dynamics is crucial for developing comprehensive and sustainable fisheries management strategies suited to local contexts.

1.3 Statement of the Research Problem

Despite being one of the largest and deepest freshwater lakes in the world, Lake Tanganyika is currently facing significant ecological degradation (Phiri *et al.,* 2023; Russell, *et al.,* 2020). This lake provides critical resources for the surrounding communities, particularly those whose primary livelihoods depend on fishing (Makwinja, *et al.,* 2021). However, a multitude of challenges, including overfishing pollution, and climate change, have severely impacted the fish population, resulting in a decline in the local fishery industry and threatening the livelihoods of those who depend on it (Owen, 2024). To mitigate these impacts, the government of Tanzania and other riparian countries of Burundi, the Democratic Republic of Congo, and Zambia, have jointly implemented a three-month fish restoration program (starting on May 15th and concluding on August 15th, 2023) aimed at restoring fish stocks and supporting sustainable fisheries practices in Lake Tanganyika (URT, 2023).

Notwithstanding these initiatives, there is a significant knowledge gap in the literature regarding the effectiveness, sustainability, and socio-economic impacts of such restoration programs on local communities (Schiere, *et al.,* 2020). Specifically,

the local fishers who are directly affected by these programs may hold varying perspectives on their effectiveness, determinants of fish decline in Lake Tanganyika, and the perceived reasons for opposing the annual fish ban in Lake Tanganyika. Furthermore, strategies applied during the annual fishing ban and the acceptance of ecological outcomes before and after the closure of fishing activities in Lake Tanganyika are also unclear (Mshale, *et al.,* 2022). Therefore, it is crucial to explore how local communities in Kigoma respond to the state's fish restoration program in Lake Tanganyika.

1.4 Objectives of the Study

1.4.1 General Objectives

The general objective of this study was to explore the local communities' responses to the state fish restoration program in Lake Tanganyika in Kigoma Tanzania.

1.4.2 Specific Objectives

i. To assess community perceptions onthe determinants of fish decline in Lake Tanganyika
ii. To identify underlying reasons for fishing communities, oppose the annual fish ban in Lake Tanganyika
iii. To evaluate the effectiveness of the strategies employed by the local communities during the annual fishing ban to mitigate local economic impacts in Lake Tanganyika
iv. To measure the community's acceptance of ecological outcomes related to the fishing ban in Lake Tanganyika

1.4.3 Research Questions

i. What are the community perceptions regarding the specific determinants contributing to fish decline in Lake Tanganyika?

ii. What are the underlying reasons do fishing communities have for opposing the annual fish ban in Lake Tanganyika?

iii. How effective are the strategies employed by local communities during the annual fishing ban in mitigating local economic impacts in Lake Tanganyika?

iv. To what extent does the community accept the ecological outcomes associated with the fishing ban in Lake Tanganyika?

1.5 Significance of the Study

By addressing the specified research questions, this study has contributed critical knowledge regarding the socio-cultural and economic dynamics influencing the successful implementation of co-management approaches in Tanzania's fisheries sector. The insights derived from analysing community perceptions surrounding fish decline and opposition to fishing bans have elucidated the underlying societal tensions that can impede effective resource management.

This research has drawn attention to the specific experiences of local fishing communities, highlighting their expectations for involvement in decision-making processes. Moreover, by investigating the community-driven strategies employed during the annual fishing bans, this study has offered a comprehensive understanding of grassroots adaptations in response to externally imposed regulations. These contributions have enriched existing discourse by providing empirical evidence that underscores the necessity for collaborative frameworks that recognize and integrate

local knowledge systems and needs, ultimately fostering a more equitable and productive fisheries management environment.

The findings of this study have been particularly significant in the context of Tanzania's national fisheries policies, especially the 2015 National Fisheries Policy, which has aimed to ensure sustainable fisheries resource management while addressing economic challenges and promoting food security, poverty alleviation, and increased national income. The insights derived from this research inform policy-makers about the on-the-ground realities faced by fishing communities and the potential misalignments between policy intentions and community experiences.

This research has highlighted the necessity of ensuring that local voices are not merely included but actively shape the mission and vision of sustainable fisheries management in Tanzania. By emphasizing stakeholder harmony, the study has underscored the importance of fostering partnerships that align policy objectives with community aspirations, ultimately leading toward realizing the overarching goal of a sustainable and economically vibrant fisheries sector that significantly contributes to the national GDP.

This research has also been grounded in the principles of political ecology, examining the complex interplay between local community perceptions, resource management practices, and broader political and economic frameworks. Political ecology has provided a lens through which to analyse power dynamics, access to resources, and the socio-political factors that have influenced community responses to regulations such as fishing bans. By situating the analysis within this theoretical

framework, the study has explored how local fishing communities have navigated external pressures and institutional constraints while attempting to safeguard their livelihoods.

This approach has revealed the broader implications of governance structures and policy frameworks on local resource management practices, as well as the role of power relations in facilitating or hindering effective co-management. Such an exploration has contributed to the discourse surrounding political ecology by emphasizing the need for inclusive governance that recognizes and prioritizes the unique perspectives of marginalized fishing communities in Lake Tanganyika, thereby fostering more resilient and adaptive fisheries management strategies.

1.6 Scope of the Study

The political ecology of aquatic resource management encompasses an intricate interplay of historical, political, and socio-economic dimensions that shape the livelihoods of communities dependent on fishing. This complexity is evident when examining the multifaceted issues that arise within the fishing industry, such as access to resources, regulatory frameworks, and the impact of external economic pressures. In many cases, these issues reflect broader systemic inequities and challenges faced by riparian communities, including land tenure disputes, marginalization of local fishers, and the intrusion of industrial fishing practices.

While the vast array of structural problems cannot be completely addressed within the confines of a single study, it is crucial to highlight their significance as they resonate across various geographical and social contexts. By understanding these

interconnections, we may better grasp the implications of aquatic resource management policies on local communities. The research conducted in the context of the Lake Tanganyika region in Kigoma-Ujiji Municipalities serves to illustrate specific challenges that fishing communities encounter within their socio-political landscape. Local fishers often find themselves at the mercy of regulatory bodies and external market forces that dictate how they can exploit these natural resources. Issues such as inadequate representation in decision-making processes, ineffective governance, and economic disparities exacerbate vulnerability among fishers, limiting their ability to navigate and adapt to changing conditions.

Additionally, traditional practices and knowledge may clash with modern regulatory frameworks, leading to conflicts and enforcement challenges that further complicate the situation. By focusing on these structural issues faced by selected communities, the study aims to provide a nuanced understanding of the dynamics at play, allowing for a more targeted analysis of potential interventions. Though the findings of this study are primarily tailored to the selected communities along Lake Tanganyika, they carry implications that extend beyond localized contexts.

The insights gleaned from this investigation can serve as a reference point for other riparian communities wrestling with similar challenges in aquatic resource management. As the issues surrounding the fishing industry are often replicable, comparative analyses of other regions can offer valuable lessons for fostering sustainable practices and equitable resource governance. By acknowledging the underlying complexities and recognizing the varied historical and socio-economic factors influencing these communities, we can develop more effective policies and

frameworks that empower local fishers, promote environmental stewardship, and ultimately enhance the resilience of aquatic ecosystems.

1.7 Organisation of the Study Report

This report is structured into five chapters, beginning with an introduction in Chapter One, which outlines the historical context of the research problem and situates it within an empirical framework. This chapter analyses the magnitude of the issue on global, regional, national, and local scales, defining the research problem in the process. Additionally, it includes a statement of the problem, the study's objectives, the research question, significance of the study, and the scope of the investigation. Chapter Two presents a comprehensive review of relevant concepts, theories, and previous empirical studies related to the research topic, focusing particularly on literature from globally, African continent and Tanzania. The synthesis of theoretical and empirical insights reveals existing knowledge gaps that inform the conceptual framework guiding this study.

Chapter Three outlines the research methodology, detailing the geographical, ecological, and demographic context of the study area. This chapter also defines the methodological framework employed for the research. Chapter Four engages in a discussion of the study's findings about the research questions, starting with an overview of the respondent's socio-demographic characteristics before analysing the results according to the established research inquiries. The chapter concludes with a summary of the key findings. Finally, Chapter Five presents conclusions and recommendations derived from the study's key findings, encapsulating the overall contributions of the research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter present a brief review of the related literature. It starts with the presentation of the conceptual definitions of key terms used in the study which is followed by theoretical and empirical literature reviews which together define the gap on which conceptual framework is conceived.

2.2 Conceptual Definition of the Key Terms

Conceptual terms in research refer to the abstract ideas or constructs that guide a study and help in the formulation of hypotheses, research questions, and interpretations of data. These terms often represent variables or dimensions that are essential for understanding the underlying phenomena being studied.

2.2.1 Local Fishing Communities

According to Ross (2015), local fishing communities are defined as collective groups of individuals and families residing in rural coastal or riverine areas who share cultural practices, economic activities, and traditional knowledge focused on fishing. Often engaged in artisanal or small-scale fishing, they pass down skills from generation to generation and their livelihoods heavily depend on fishing due to limited access to other economic opportunities, with related activities such as boat-making and fish processing further enhancing their economic viability (Funge-Smith & Bennett, 2019). These communities not only provide a significant source of income for their membersthrough fishing but also play a critical role in the global fishing industry by contributing to local and international fish markets, underscoring

their economic and cultural significance as well as their reliance on sustainable practices for resource extraction. In this study, local communities were conceptualised as groups of individuals and families residing around the Lake Tanganyika shore and who engage in small-scale or artisanal fishing and related activities, relying on traditional knowledge and cultural practices to sustain their livelihoods while actively contributing to both local and wider fish markets.

2.2.2 Co-management

According to Pettigrew, (2009), co-management is described as a collaborative approach to managing resources, projects, or organizations in which multiple stakeholders—such as government, communities, and team members—share responsibilities and decision-making authority. This method fosters dispersed power and encourages the active involvement of all parties, ensuring that diverse interests and needs are addressed, which leads to improved morale, productivity, and outcomes (Lawler, 1992). Additionally, co-management resembles a joint venture as it involves collaboration on specific initiatives, with each participant contributing unique resources and expertise while sharing associated risks and rewards (Harrigan, 1985).

Consequently, co-management enhances communication, collaboration, and shared governance, ultimately supporting the long-term development and success of the endeavour. In this study, the term co-management was understood as a collaborative approach to managing resources, projects, or organizations where multiple parties share responsibilities, decision-making authority, and power to ensure the long-term development and success of the project, organization, or company, characterized by

participatory management, shared governance, and mutual benefit.

2.2.3 Political Ecology

The term Political Ecology has been defined differently by different authors. In general, it highlights the intricate relationship between social structures, power dynamics, and environmental change, emphasizing that environmental issues are shaped not only by natural forces but also by socio-political contexts. Blaikie and Brookfield (1987) critique dominant narratives by pointing out how capitalism and colonialism influence environmental outcomes, urging critical reflection on these contexts. Peet and Watts (1996) further stress the importance of examining power dynamics in environmental governance, suggesting that policies often reflect broader socio-economic interests.

Additionally, Watts (2017) and Robbins (2019) frame Political Ecology with a comprehensive understanding of how interconnected political, economic, and social factors influence environmental challenges. Accordingly, for this study, Political Ecology is defined as a critical framework that explores the complex interplay among social structures, power dynamics, and environmental issues, emphasizing the socio-political contexts and governance processes that shape environmental justice, resource use, and globalization's effects.

2.2.4 Fishing Ban

A fishing ban refers to the prohibition of fishing activities in specific areas or during particular times to protect fish populations and ecosystems. According to the Food and Agriculture Organization (FAO, 2016), fishing bans are implemented to manage

fisheries sustainably and conserve marine biodiversity. As noted by McCay and Creed (1990), these bans can serve as a crucial tool for replenishing fish stocks that have been overexploited. The Marine Stewardship Council (MSC, 2020) emphasizes that fishing bans can be part of broader conservation strategies that engage local communities and promote long-term ecological health. In this study, the term fishing ban was understood as a regulatory measure designed to balance ecological conservation with sustainable fishing practices.

2.2.5 State Fish Restoration Program

A State Fish Restoration Program (SFRP) refers to a comprehensive initiative aimed at conserving and restoring fish stocks and aquatic ecosystems within a specific state or region. According to the U.S. Fish and Wildlife Service (USFWS, 2019), an SFRP involves the implementation of measures to enhance fish habitats, manage fishing practices, and promote sustainable fishing industries. As noted by the National Oceanic and Atmospheric Administration (NOAA, 2017), SFRP programs typically focus on rebuilding depleted fish stocks, improving fish population dynamics, and mitigating the impacts of human activities on aquatic ecosystems.

The American Fisheries Society (AFS, 2015) highlights that SFRPs often involve collaborative efforts between government agencies, fishing industries, and stakeholders to develop and implement effective conservation and management strategies. In this study, the term was taken to mean a state-led initiative aimed at restoring and conserving fish populations and aquatic ecosystems through collaborative management and conservation practices.

2.3 Theoretical Literature Review

The term theoretical literature review means a comprehensive synthesis of existing theoretical concepts, frameworks, and models in a specific field, involving the critical evaluation of various theoretical perspectives and the identification of gaps and inconsistencies (Blandford, 2004). The major aim is to inform theory development, guide empirical research design, and enhance understanding of the theoretical landscape (Giddens, 1984; Habermas, 1984).

This study is grounded in the political ecology framework, which has its origins in political economy (Walker, 2005) and is defined as an integration of political economy with social sciences (Robbins, 2019). Peet and Watts (2004) articulate that political ecology extends beyond cultural ecology by incorporating external influences impacting local environmental practices (Brown & Purcell, 2005). This framework foregrounds key questions regarding resource accessibility and control, the explanations for these dynamics, and their implications for health and livelihoods (Paulson, et al., 2003). It is particularly concerned with issues of justice for marginalized groups, delving into exclusions, local political dynamics, and the unequal distribution of livelihoods (Blaikie, 2001; McCarthy, 2005).

Political ecology interrogates who benefits and who is burdened by socio-environmental conditions, examining power relations that sustain inequalities (Swyngedouw & Heynen, 2003). It serves a normative function by evaluating ethical dimensions, particularly in contexts involving marginalized fishing communities, merging concepts of environmental and fishing justice (Lee, 2009; Robbins, 2019;

Sovacool, 2021). Additionally, the framework has been effectively utilized in studying transitions in fishing technology (Bouzarovski, 2022; Bridge &Gailing, 2020; Cederlöf, 2021), emphasizing the interconnectedness between local practices and wider socio-political processes.

Scale is a critical, yet contentious, construct within political ecology, as exemplified by Marston's (2000) assertion that it arises from tensions between social structures and human agency. The concept of scale influences how legitimacy is conferred upon various social groups (Lee, 2009) and is interconnected with the social construction of cultural and political landscapes (Howitt, 2003). Political ecologists analyse the impacts of broader political-economic phenomena on local practices, specifically how fishing communities are affected by larger-scale actions (Brown & Purcell, 2005), and the framework has been particularly pertinent in rural studies within developing countries (McCarthy, 2005).

While the political ecology framework provides a multifaceted understanding through its interdisciplinary approach, integrating elements from various fields such as political science and sociology, it does have limitations. Its complexity and specific contextual focus can make it challenging to apply universally, necessitating nuanced knowledge of local histories and power dynamics for effective analysis. Despite these challenges, the political ecology framework remains relevant to exploring community responses to the state fish restoration program in Lake Tanganyika, as it allows for a deep understanding of the socio-political and environmental contexts influencing local livelihoods and ecological practices.

2.4 Empirical Literature Review

An empirical literature review is a systematic examination and synthesis of research studies that focus on empirical evidence related to a specific research question or topic (Hart, 1998). It involves analysing and summarizing findings from quantitative and/or qualitative studies, and assessing their methodologies, results, and relevance (Gough & Elbourne, 2011). The aim is to provide a comprehensive overview of what is known about a phenomenon based on actual data, identify trends, and highlight gaps in the existing research to inform future studies (Cooper, 2010). In this study, the review was done in line with the specific objectives addressed.

2.4.1 Community Perceptions Regarding Determinants of Fish Declines in Lakes

Fish populations are perceived to be in significant decline across the globe, a phenomenon attributed to a variety of complex and interrelated factors. Understanding these causes is vital for effective management and conservation strategies. Research has identified several key drivers that contribute to this alarming trend, ranging from human activities to ecological changes. For instance, Horowitz, *et al.,* (2018) highlight population growth as a major distal driver, alongside destructive fishing practices such as dynamite, chemical, and trawl fishing. The studies emphasize that these activities do not occur in isolation but interact with broader environmental issues, including pollution, mangrove cutting, and habitat encroachment.

According to Dey, et al., (2020), destructive fishing practices account for approximately 36 per cent of overall fish population declines. Overfishing by fishers was cited as the second most significant factor, contributing to 31 per cent of

declines, whereas impediments to fish movement caused by environmental barriers like barrages led to a 25 per cent reduction in populations. These figures underscore the pressing need for holistic approaches that consider multiple factors simultaneously to address the fish population crisis. Mendoza, *et al*., (2022) provide additional insights from the Mabato-Azufre region, where local respondents identified three main causes of declining fish catches: the introduction of invasive species, habitat loss, and increased water turbidity. The interplay between these factors creates a challenging environment for fish populations, complicating conservation efforts. The introduction of invasive species, for example, can disrupt local ecosystems, outcompeting native fish for resources and altering the food web dynamics that sustain aquatic life.

Further emphasizing the importance of local insights, Danquah, *et al.,* (2021) administered 200 questionnaires to assess community perceptions regarding fish declines. An overwhelming 82 per cent of respondents acknowledged a decline in fishing landings over recent years. Among these, 20 per cent attributed the decline primarily to overfishing, while 19 per cent pointed to inadequate management of domestic waste leading to pollution. Moreover, 15 per cent noted illegal fishing methods, particularly the use of harmful chemicals, as a significant concern. Economic factors also surfaced, with 12 per cent citing declining fish prices and 10 per cent identifying high input costs as barriers to sustaining their fishing activities.

The alarming effects of human activity on aquatic ecosystems extend beyond direct fishing practices. Arthington, *et al.,* (2016) explore how increasing human demands for water have spurred widespread degradation and biodiversity loss in both

freshwater and marine environments. The authors detail a variety of threatening activities, including catchment disturbances, deforestation, and the introduction of alien species, which collectively contribute to the violence of fish populations. Dudgeon, et al., (2006) further supports these claims by documenting the extensive habitat loss and fragmentation that aquatic species face due to such anthropogenic influences.

In a survey conducted by Larsen *et al.* (2018), 74 per cent of respondents reported a decline in fish catches compared to historical norms. Respondents cited several critical factors, including blast fishing (62 per cent) and cyanide fishing (41 per cent), which have devastating effects on fish populations and habitats. The phenomenon of 'outsiders,' or external fishers entering local waters, exacerbated local competition and resource depletion, with 17 per cent of respondents indicating this as a cause for concern.

Lotze *et al.* (2018) explored public perceptions of marine threats globally and identified a range of contributing factors, including pollution, habitat degradation, climate change, and biodiversity loss. These findings resonate with the challenges faced by local fishers, highlighting the need for broader awareness and concerted efforts to improve marine conservation. Additionally, Karnad *et al.* (2014) reported that 82.6 per cent of respondents in Tamil Nadu perceived a decline in fish catches, prompting shifts in fishing practices such as targeting new species and utilizing different fishing gear. This adaptability, while necessary, indicates how deeply the issue of fish decline affects communities reliant on these resources.

An analysis of the empirical literature reveals diverse perceptions regarding the determinants of fish decline, including overfishing, illegal fishing practices, water pollution, and the rise of invasive species. However, many studies lack a comprehensive perspective from local communities, particularly in localities like Lake Tanganyika, where the unique ecological and socio-economic context may yield different insights. As such, this review underscores the necessity of future research that incorporates local community perceptions to create targeted interventions addressing fish population decline.

While the empirical review is crucial it still lacks an in-depth exploration of the cultural, social, and economic dynamics that shape local community perceptions and responses to fish declines. Additionally, it does not address the historical context of fishing practices, the role of traditional ecological knowledge, and the influence of external stakeholders on local fishing practices and ecosystem management which together are relevant in defining the contexts in which local communities oppose fish restoration programs.

2.4.2 Reasons that Make Fishing Communities Oppose the Annual Fish Ban Programs

Fishing bans have become a contentious issue across many coastal communities worldwide, as evidenced by varying reactions from local populations in different countries. In Bangladesh, for instance, a sudden ban on small-scale coastal fisheries incited significant opposition among fishers. Islam, *et al.,* (2021) reported that many small-scale fishers organized protests in response to a government decision to impose a fishing ban during the critical breeding season of the Bay of Bengal from

May to July 2019. For these fishermen, fishing was not merely an occupation; it served as their primary livelihood. Consequently, they expressed fears of economic distress and food insecurity, emphasizing the importance of fishery resources in their daily lives. However, after 65 days of the ban, many local fishers reconsidered their initial opposition, congratulating the government upon witnessing the positive effects of the initiative on fish stock replenishment and overall marine health.

In contrast, a recent study by Macusi, *et al.*, (2023) in the Philippines showcased a different facet of community opposition to marine conservation efforts. Here, local communities in Davao Gulf manifested resistance to the establishment of marine protected areas (MPAs), which aimed to enhance fish populations through the temporary closure of fishing activities. The backlash was not rooted in a denial of the environmental benefits of such initiatives; rather, it stemmed from inadequate stakeholder consultations during the program's implementation. The communities felt marginalized and disregarded in the decision-making processes, leading to skepticism about the potential benefits of the MPAs. As such, the lack of a participatory approach ultimately contributed to the unfavourable perception of these protective measures.

Further expanding on the economic ramifications of fishing bans, the research conducted by Siddique, *et al.*, (2023) illuminated the extreme challenges faced by low-income fishermen in the wake of imposed fishing restrictions. Many respondents emphasized that temporary fishing bans exacerbated issues related to employment and income generation, placing considerable financial strain upon vulnerable households. This scenario underscores the necessity of evaluating the

socio-economic impacts of fishing bans and ensuring that affected communities are adequately supported, particularly those already grappling with poverty.

Similar sentiments were echoed in a study by Pamela (2013) in Zambia, which examined the implications of an annual fishing ban on fish marketers in the Chiwempala market in Chingola district. The study classified the periodic fishing ban as a population regulatory measure aimed at protecting critical breeding times for fish species, thus enabling long-term sustainability. However, the findings revealed disconnect between community awareness of the ban and their preparedness for its implementation. Despite acknowledging the need for such measures, many individuals felt unprepared and faced challenges in adapting to the abrupt cessation of fishing activities. Nyimbili (2009) supported this notion, suggesting that fishing bans can create an economic shock for fishers and traders alike, further increasing their vulnerability.

Kebe (2011) also highlighted the chronic unpreparedness of fishers for periodic fishing bans, noting that independent small-scale fishermen often faced significant financial hardships during enforced closures. The consistent trepidation among fishers about income loss during these periods can lead to increased illegal fishing activities as they seek alternative means to support their families (Food and Agricultural Organization of the United Nations, 2018). The endemic nature of these hardships raises questions about the adequacy of governmental support mechanisms designed to facilitate the transition during fishing bans, as outlined by MAL (2014), which emphasized the need for resources, manpower, and effective management.

Furthermore, Kapasa (2009) pointed out that the policies governing fishing bans have long-reaching implications for the social structures and economies of fishing communities. The loss of access to fisheries can engender substantial negative impacts, creating ripple effects throughout local economies (Muir, 2013). This notion finds support in the work of Chimba and Masuka (2014), who reported that a majority of fishers (59 per cent) indicated a negative impact from closed fishing seasons, contrasting with only 41 per cent who recognized positive effects. This discord underscores the complex nature of fishing bans and their reception among dependent communities.

Owusu *et al*. (2023) further investigated the factors contributing to noncompliance with closed fishing seasons, revealing key drivers such as a perceived lack of ecological effectiveness, inadequate enforcement of sanctions, and insufficient compensation for the income lost during bans. Together, these factors illustrate a pervasive distrust among fishers regarding the efficacy and fairness of such regulations, necessitating a re-evaluation of strategies employed by regulatory bodies to garner compliance and cooperation from fishing communities.

Through the empirical review of local responses to fishing bans, various factors leading to opposition have emerged. Dependence on fishing for subsistence, inadequate stakeholder engagement, and concerns about employment represent key challenges faced by fishers in various contexts. However, a notable gap arises in the literature concerning fishing bans on Lake Tanganyika, as well as a lack of comprehensive coverage of government support and community education regarding these policies.

Ultimately, this ongoing discourse underscores the critical importance of inclusive decision-making processes and robust governmental support structures as fundamental components of successful fishery management. Understanding that fishers and traders alike are deeply affected by fishing bans is crucial for developing effective, equitable policies that balance environmental sustainability with the socio-economic realities of communities dependent on these resources. Future research must strive to fill the existing gaps, particularly in underrepresented contexts such as Lake Tanganyika, to cultivate an inclusive future for fisheries management.

2.4.3 Effectiveness of Community Strategies to Mitigate Economic Impacts of the Annual Fishing Ban

The annual fish ban, which is often implemented to protect fish stocks and ensure sustainable fisheries, poses significant challenges to fishing communities globally. To mitigate these impacts, various strategies are employed by fisher folk to adapt to the temporary closure and maintain their livelihoods. According to Ma *et al.* (2022), a survey of 275 fishermen households revealed that a staggering 92 per cent of respondents adopted livelihood strategies that were not directly related to fishing, such as non-fishing employment, self-employment, public welfare, and retirement. This adaptation allows them to survive during the fishing ban period.

However, not all strategies employed by fishing communities during the fish ban are positive. On the contrary, the research conducted by Islam *et al.* (2021) on the coping strategies applied by fisheries during the annual fishing ban revealed that many of these strategies resulted in negative impacts on the daily lives of respondents. These strategies included buying food and meeting to minimize daily expenses, which were

taken from their savings, taking loans from commission agents (fish traders) or boat owners, and borrowing interest-free loans from relatives or microcredit from NGOs.

The study by Yasmin, *et al.* (2023) further highlights the coping strategies employed by hilsa fishers in a particular region. The findings suggest that 66 per cent of respondents engaged in diversified alternative income-generating activities, while 3.7 per cent resorted to illegal fishing practices. In addition, 21 per cent of fishers drew their savings to maintain daily expenditures, 2 per cent moved to other districts to seek alternative livelihood options, and 26 per cent reduced their meal frequency to adjust to the loss of income or reduced income during the ban.

Interestingly, Brillo, *et al.,* (2019) found that during the closed fishing season, 42 per cent of fisheries workers were drawn to other sources of livelihood to compensate for the loss of income. The coping strategies employed during this period were similar to those of non-fishing activities. Furthermore, the study on income-generating activities by Chimba and Masuka (2014) revealed that during the closed fishing season, 32.35 per cent of fish workers were engaged in agriculture, 23.53 per cent were not involved in any income-generating activities, 20.59 per cent traded in charcoal to earn a living, and 17.65 per cent hired themselves as casual workers, while 5.88 per cent ran small grocery shops.

The coping strategies employed by fishers during the closed season are diverse and varied across different regions. According to Ayisi, *et al.*, (2024), the strategies included reliance on savings, reduction in expenses, asking relatives for help, and other non-fishing activities. Yeboah (2022) also reported similar findings, with 20.8

per cent of respondents relying on savings, 18 per cent believing in God as their hope during this period, 14.90 per cent taking loans, 13.3 per cent depending on alternative livelihood activities, and 5.49 per cent reducing expenditures.

The empirical review indicates that fishing communities employ various strategies during the annual fish ban, including non-fishing activities (Cooper, 2010), reducing expenses (Islam, *et al.*, 2021), taking loans (Yasmin, *et al.*, 2023), using savings (Ma et al., 2022), engaging in illegal fishing practices (Brillo, et al., 2019), moving to other districts (Yasmin, *et al.*, 2023), and even praying (Yeboah, 2022). While these strategies can help fisherfolk adapt to the fish ban, they also come with significant social, economic, and environmental costs.

The review of existing literature highlights the need for policymakers and stakeholders to develop and implement effective interventions that support the livelihoods of fishers during the fish ban period. Moreover, the literature review suggests that the coping strategies employed by fishing communities during the fish ban are often influenced by factors such as the type of fishery, region, and cultural practices. Understanding these factors is crucial for developing context-specific solutions that can alleviate the impacts of the fish ban on fishing communities.

2.4.4 Community's Acceptance of Ecological Outcomes Related to the Fishing Ban

Community acceptance of ecological outcomes related to fishing bans is critical for the success of conservation initiatives aimed at protecting fish stocks and promoting sustainable fishing practices. This acceptance depends on how well fishing

communities recognize, understand, and support the ecological benefits that arise from these temporary closures, such as increased fish biomass, improved reproductive success, and enhanced ecosystem health (Sala, *et al.,* 2018). Research indicates that when communities witness positive ecological changes, such as the recovery of local fish stocks, their support for fishing bans tends to grow (McClanahan, *et al.*, 2017). Moreover, involving local fishers in decision-making processes enhances community acceptance by fostering a sense of ownership and agency, which can lead to greater compliance with fishing bans (Lee, *et al.,* 2018). However, acceptance varies based on socioeconomic factors and cultural beliefs, with communities experiencing economic hardships or perceived injustices potentially resisting such measures (Bennett, *et al.*, 2017).

The ecological outcomes of fishing closures are significant, influencing various aspects of aquatic ecosystems such as biodiversity, fish populations, water quality, and habitat recovery. Properly implemented closures can result in positive changes that foster sustainable fish populations and healthier aquatic habitats. Numerous studies have documented these ecological effects, illustrating both short-term challenges and long-term benefits. Understanding these dynamics is crucial for policymakers, fisheries management, and local communities that rely on fishing for their livelihoods.

One of the critical observations regarding fish populations post-closure is that these measures often lead to enhanced biodiversity and increased fish stocks. For instance, Macusi, *et al., (*2021) reported a decline in fish catch attributed to various factors such as illegal fishing practices, agricultural runoff, and overfishing. The study's

respondents overwhelmingly supported the implementation of fishing closures, with 78 per cent believing that such measures would help replenish fish stocks. These findings indicate a strong community belief in the efficacy of fishing closures as a tool for promoting ecological stability and sustainability.

Moreover, Larsen, *et al.*, (2018) highlighted that 74% of respondents indicated a noticeable decrease in fish catch due primarily to destructive fishing techniques such as blast and cyanide fishing. The researchers noted that perceptions of fish catch varied widely among different fishing communities depending on their fishing experience. Notably, long-time fishers were more likely to report decreases in catch compared to newer entrants in the domain. This indicates the complex interplay between fishing experiences, community practices, and ecological health, which often shapes perceptions about the effectiveness of closures.

In contrast, Yasmin, et al., (2023) found that 85.3 per cent of fishers perceived an increase in fish catches following the implementation of fishing bans. Importantly, many respondents noted resurgence in specific fish species, particularly catfish. This positive shift demonstrates the potential benefits of fishing closures in revitalizing fish populations, thereby supporting community livelihoods. Additionally, 72.4 per cent of fishers reported an increase in their average monthly incomes post-ban, underscoring the economic advantages that can accompany enhanced ecological conditions.

The potential for fishing bans to support ecological recovery is further reinforced by insights from Islam et al. (2021). In this study, 45 per cent of participants anticipated

that seasonal fishing bans would yield increased catches during subsequent fishing periods. This expectation illustrates a broader recognition among fishing communities that temporarily halting fishing activities can facilitate the recovery of fish stocks, leading to improved yields in the long run. However, dissenting voices were citing illegal fishing from neighbouring areas as a challenge to the effectiveness of these bans, highlighting the need for comprehensive management approaches.

Further bridging socio-economic and ecological perspectives, Ali *et al.* (2015) investigated the income fluctuations experienced by hilsa fishermen before and during fishing bans. They found that fishermen's monthly incomes dropped significantly during the ban, creating challenges for food security and increasing reliance on loans. This economic pressure can lead to negative coping strategies, such as borrowing at high interest rates. Such findings underscore the critical balance that needs to be struck between ecological sustainability and the livelihoods of fishing communities.

Chimba and Musuka (2014) addressed the duality of impact following fishing closures, reporting that 59 per cent of respondents viewed the ban positively, while 41 per cent reported negative impacts. This mixed perspective highlights the dilemma faced by local communities: while the ecological benefits of bans are increasingly recognized, the immediate economic hardships cannot be overlooked. Effective communication and support systems are essential in managing these transitions, ensuring that communities are not left to bear the financial burdens alone. Liu, *et al.*, (2023) conducted a longitudinal study on fish resources five years after a decade-long fishing ban in the Chishui River, revealing promising ecological

outcomes. The catch per unit effort (CPUE) increased significantly, with all examined species showing marked improvements in length and body weight. This empirical evidence supports the assertion that well-implemented fishing bans can lead to substantial ecological recovery over time, further reinforcing the necessity for such practices in conserving fish populations.

In summary, the empirical literature reviewed indicates that fishing closures yield generally positive outcomes for biodiversity, fish populations, and habitat recovery; however, local communities often experience mixed feelings, especially in the short term. The success of fishing bans hinges on the effective management of socio-economic impacts and the provision of alternative livelihoods, allowing communities to adapt and thrive despite the temporary closure of fishing activities. The findings from these studies illuminate the nuanced relationship between ecological outcomes and community perceptions in fishing contexts.

It is crucial to engage local communities in discussions about fishing closures and foster an understanding of the long-term benefits of these ecological measures. This study aims to explore the acceptance of ecological outcomes before and after fishing closures in Lake Tanganyika, contributing to the growing body of knowledge that supports sustainable fisheries management.

2.5 Research Gap

The theoretical and empirical literature underscores the significance of fishers' restoration programs as part of broader conservation efforts aimed at mitigating fish stock depletion, preserving biodiversity, and promoting ecosystem resilience. These

programs are typically initiated in response to scientific evidence of overfishing and unsustainable fishing practices that threaten the long-term health of aquatic ecosystems. While there is growing recognition of the importance of such programs as crucial conservation tools, research has primarily focused on aspects like periodic fishing bans and their effects on community livelihoods (Chibwe, 2019; Brillo *et al.*, 2019). However, a notable gap exists in the literature regarding local communities' responses to state-led fish restoration initiatives, with these interventions not having been comprehensively studied.

Understanding how local communities in Kigoma respond to the fishers' restoration program in Lake Tanganyika is critical. This involves assessing community perceptions of the factors contributing to fish decline in the region, examining the reasons behind opposition to the annual fishing ban, analysing strategies employed during the fishing ban to mitigate its impacts, and evaluating the acceptance of ecological outcomes before and after the closure of fishing activities. Addressing these gaps will yield valuable insights that can inform the design and implementation of fish restoration programs, ensuring that they align better with local needs and sustainable practices.

2.6 Conceptual Framework

This study utilizes a conceptual model developed from the political ecology framework to examine the underlying factors behind local fishing communities' resistance to comply with the instituted periodic fish ban in Lake Tanganyika (Figure 2.1).

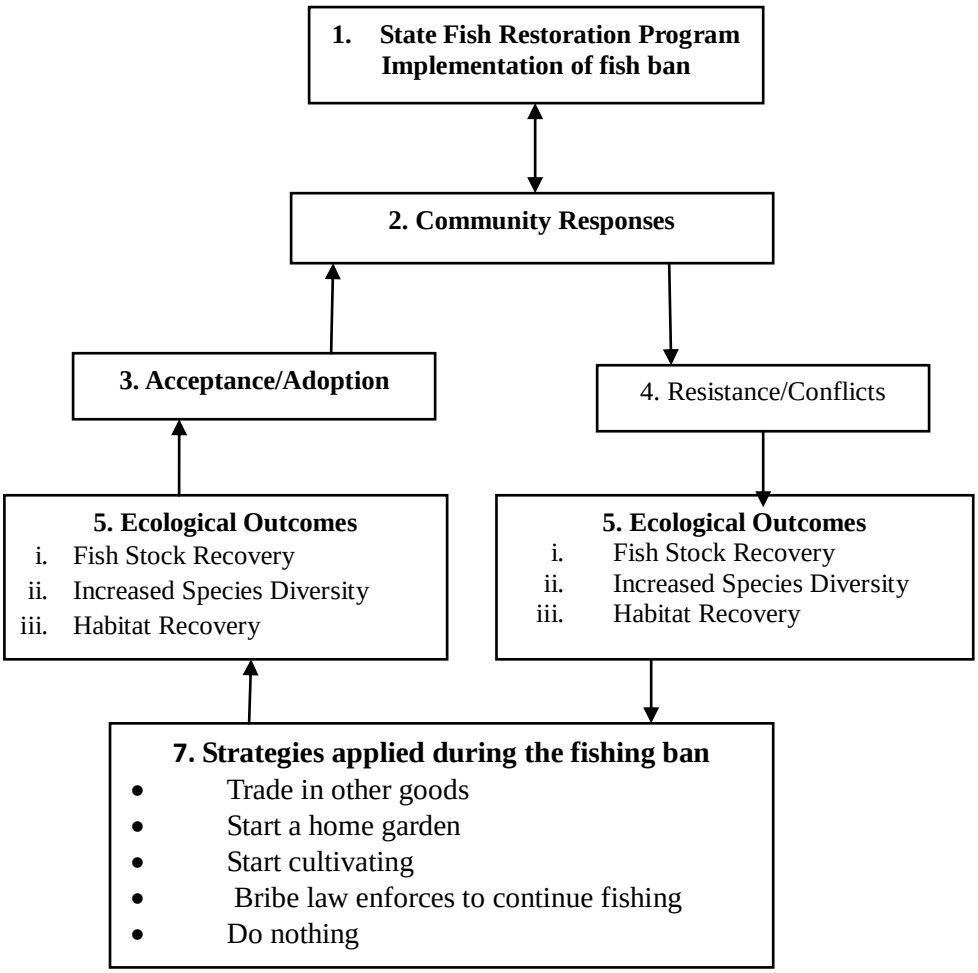

Figure 2.1: Conceptual Framework

In Figure 2.1, the declining fish catches in Lake Tanganyika is a function of different ecological, political and socio-economic trends and processes. The government intervention in the matter is associated with the institution of the restoration program of the periodic fish ban in the lake instituted to provide biological rest in the lake to enable the productiveness of fish stock.

The local community's response to this state restoration program of periodic closure of the lake in different ways where mostly resisted the program while others accepted the program. Ecological factors raised by local fishing communities who

oppose the program include loss of income increased demand for fish, the lake's primary source of employment, hardship of life and dependence on fishing as their livelihoods support. The government's political decision to close the lake came as a surprise because of its nature as a top-down decision taken with little consideration of the alternative livelihoods on the side of the fish folk. The decisions disentangle them from their livelihoods mainline leaving them with no alternatives for survival. Proper involvement in the decision-making of all stakeholders can reverse the situation.

On the side, the state program influenced by the agreement entered by riparian countries surrounding Lake Tanganyika called LATAFIMA with imitations after reopening the fish stock to be recovered, increased species diversity, and habitat recovery. The long-term sustainability targeted is fish population recovery, ecosystem health, diversified livelihoods, stable fish prices and sustainable fishing practices.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview

This chapter presents the methodology deployed by this study to accomplish the study. It provides the research design, the target population and sampling procedures, data collection methods and tools, data analysis techniques, validity and reliability of the data and ethical considerations of the study.

3.2 Research Philosophy

Research philosophy is essentially the outline of the beliefs and values that guide the design, data collection and analysis of the research. In essence, it is what the researcher perceives to be true, reality and knowledge. For that much, research choices regarding the method of inquiry, data collection and analysis should complement philosophical principles (Blackwell, 2018). This study employed pragmatism as its guiding philosophy. The philosophy favours the use of both qualitative and quantitative methods to analyse phenomena

3.3 Research Design

This study employed a descriptive survey design to identify and find the characteristics of the study population. The choice of the design was influenced by its ability to allow data collection from the sample that demonstrates the perceived values of the local fishing communities in the conservation and restoration of fishing resources in the study area.

3.4 The Study Area

This study was carried out in two wards of Kibirizi and Bangwe which are the two

wards situated at the shoreline of Lake Tanganyika. The two wards have high proportions of community members whose livelihoods depend on fishing activities (Figure 3.1)

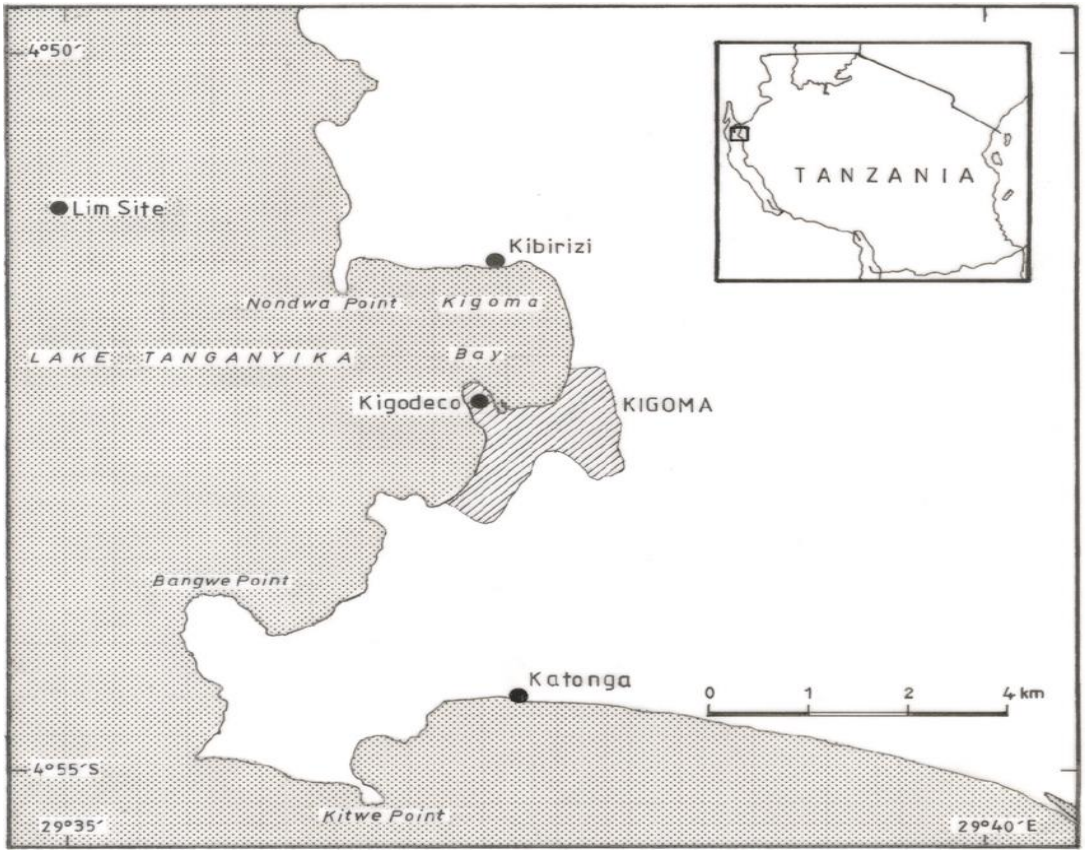

Figure 2.2: Map of Kigoma

Source Kigoma Municipal Council, 2024.

Kigoma-Ujiji District is one of the eight administrative districts of the Kigoma Region in Tanzania. The district covers an area of 92.7 km^2 (35.8 sq.). It is bordered to the west by Uvinza District in the southeast and to the north by Kigoma District. The western shore of Lake Tanganyika surrounds the district on the west. According to the 2022 census, the district has a total population of 215,458. Located at an elevation of no meters (0 feet) above sea level, Ujiji has a Tropical wet and dry or savanna climate (Classification: Aw). The district's yearly temperature is 23.46ºC

(74.23ºF) which is -0.76 per cent lower than Tanzania's averages. Ujiji typically receives about 194.14 millimetres (7.64 inches) of precipitation and has 220.51 rainy days (60.41 per cent of the time) annually.

The administrative structure of Ujiji-Kigoma Municipal comprises 10 wards—such as Ujiji, Mwandiga, and Kigoma which operate within the broader framework of the Kigoma Regional Authority. Economically, Ujiji-Kigoma Municipal Council thrives primarily due to its proximity to Lake Tanganyika, which supports extensive fishing activities that are vital for food security and commerce in the region. The fishing sector not only provides livelihoods but also plays a crucial role in the local diet, emphasizing fish as a primary source of protein. Additionally, agriculture remains a significant economic activity, with small-scale farmers cultivating crops such as cassava, maize, and beans, which contribute to both local consumption and markets (Ministry of Agriculture, Livestock, and Fisheries, 2023). The market centres in Ujiji and its surrounding wards facilitate trade and commerce, serving as essential hubs for economic interaction and growth.

The rationale for the choice of the study area is attributable to their popularity as important old landing sites. The three locations have a long history of fishing activities. 90 per cent of their livelihoods are delivered from fishing activities. Even the business activities conducted in localities are all connected to the fishing industry. The deliberate decision to close the lake has come as a shock and most inhabitants resisted vehemently. Therefore, given the nature of the occupant’s livelihoods and government decisions, the three sites seem to be ideal for this study.

3.5 Study Population

In this study, the study population comprised local communities whose livelihoods depend entirely on fishing activities. It involved government officials employed in fishing. The targeted population thus comprised the entire aggregation of respondents who meet the designated set of criteria. They comprised all adults within the age range of between 18 years and above both males and females from the sampled wards. These were important as they provided information on the traditional management of fishing and how evolutions in the state management of fishing activities in the lake have impacted them over time. The targets are also thought to have the requisite knowledge of the pros and cons of the state's decision to close fishing activities periodically.

3.6 Study Unity

In this study, the unit of study was the households of Fishermen and fishmongers. According to the 2022 National Population and Housing Report, a household refers to a person or group of persons who reside in the same homestead/compound but not necessarily in the same dwelling unit, have the same cooking arrangements, and are answerable to the same household head (URT, 2022). Household heads were the principal actors in this study.

3.7 Sample Size and Sampling Procedures

The sample frame was comprised of the Ujiji Kigoma Municipal Council in which the two sampled wards are located. The Kigoma Ujiji district map was used to delineate the boundaries of the study wards as curved out by the National Population and Housing census conducted in 2022. The source list from which the sample size

was established was obtained from the Kigoma – Ujiji district council from which a list of wards and their respective households were established. For that much, the source list from which the sample size was established comprise 10,395 which is the total number of households as per the 2022 population and housing census report. The researcher utilized a mathematical formula suggested by Yamane (1967) to determine the required sample size as presented here:

$$\square = \frac{\square}{\square + \square(\square)^{\square}}$$

Where e = margin acceptable error value. For this study, the confidence level is 95 per cent, which gives a margin error of 0.05. N is the total number of determined participants in the population and nis the number of selected participants.

$n = 10,395/1+10,395(0.05)^2$

$n = 10,395/1+10,395 \times 0.0025$

$n = 10,395/1+25.9875$

$n = 385$

Thus, the sample size for this study comprised 385 respondents. The distribution of the sample size in the study wards is shown in Table 3.1.

Table 3.1: Sample Size

Category	Sample Size
Fishermen and Fishing Communities	75
Local and Government officials	20
Environmental NGOs	15
Industry Stakeholders	10
Total	120

Source: Field Data, 2025

This study applied both probabilistic and non-probabilistic sampling techniques. Purposive sampling was used to select respondents from the government departments based on their knowledge and experiences with the fishing trends in Lake Tanganyika. This is designed to approach respondents capable of providing rich information on the subject matter. In the long run, the approach technique helped researchers to get information capable of capturing one's experience on the problem studied. Likewise, simple random sampling was used to sample respondents from the selected fishing communities in both Bangwe and Kibirizi wards. The use of simple random sampling ensured that every member of the study communities had ample chances of being selected to participate in the study. For that much, a table of random numbers was applied to achieve the purpose at hand.

3.8 Data Collection Methods

3.8.1 Sources of Data

Refers to the place, person, document, or system from which information is obtained for analysis, research, or decision-making. These were the range of approaches used in gathering the information which is used as a basis for inference and interpretation for explanation and prediction (Cohen et al, 2001). Therefore, the present study employs both primary and secondary data as a source of information. Secondary data is obtained from both published and unpublished reports relating to the study.

The type of data collected was focused on the past and present state fishing industry in the study area. Collected information was used to complement those already collected using the questionnaires and semi-structured interview schedules (especially for local fishermen and fishmongers who don't understand the English

language). By being additional to the primary data, the secondary data helped in situating the study in the proper historical perspectives.

3.8.2 Data Collection Instruments

According to Creswell (2014), data collectioninstrumentsis a tool or device used to gather, measure, and record information from respondents or sources during a research or study. The data collection methodsinclude surveys, questionnaires, interviews, observation while data collection tools include checklists, questionnaireform, interview guide and measurement devices, which facilitate the systematic collection of data across different contexts. The selection of appropriate data collection tools is crucial for addressing research questions effectively and ensuring the validity and reliability of the findings (Fink, 2013). In this study, several tools were employed to amass the kind of information used to produce this report. These included questionnaires, semi-structured interview schedules and documentary analysis.

Questionnaires: The researcher used a questionnaire as the principal data collection tool, which was administered to 35 randomly selected government officers, industrial stakeholders, and environmental NGOs. According to Blaikie (2010), a questionnaire is a self-administered tool designed so that respondents can complete it without external assistance, other than written instructions. Since these questionnaires were written in English, the officers were able to respond independently, without any assistance from the researcher. The main purpose of using a questionnaire was to provide respondents with the freedom to answer the items at their convenience. In this study, the questionnaires focused on assessing community perceptions regarding

the determinants of fish decline in Lake Tanganyika and the perceived reasons for opposing the annual fish ban. This method also facilitated the researcher in reaching a large number of respondents easily and economically, while making it relatively simple to analyse the answers provided.

Semi-structured interview schedules: In this study, the primary data collection method employed was a semi-structured interview schedule, which was administered to 75 heads of sampled households residing in the Kibirizi and Bangwe wards along the shores of Lake Tanganyika. This approach allowed for flexibility in responses while also ensuring that essential topics were covered during the interviews. Seventy-five of these sampled households participated in semi-structured interviews administered through a questionnaire due to language barriers, which facilitated effective communication and comprehension. The remaining ten households served as key informants and were engaged using unstructured interviews. This combination of interview formats enabled the researcher to gather nuanced and comprehensive data that encapsulated the diverse perspectives of the local community, particularly regarding their views on the state's fish restoration program and the associated impacts on their livelihoods (Cohen & Manion, 2000).

The semi-structured interview method proved advantageous as it not only captured a wide array of opinions and perceptions but also allowed respondents to elaborate on their thoughts freely. This was crucial for understanding the complex dynamics at play in the community's relationship with fishery resources and their sustainability. Moreover, the interactions fostered during these interviews provided deeper insights into the community's responses to external environmental policies, thereby

highlighting the necessity for inclusive and participatory approaches in resource management (Kumar, 2019). Overall, the semi-structured and unstructured interview methods afforded a rich qualitative dataset that enriched the study's findings and underscored the significance of integrating local knowledge into environmental and resource restoration initiatives (Brucker, 2014).

Documentary Review: The documentary review in this research entailed a meticulous examination of various documents, encompassing both written and non-written materials. According to Saunders *et al.* (2019), documentary review includes a wide array of resources such as notices, reports, and recordings, which can significantly enhance the understanding of research topics. In this study, critical documents from LATAFIMA, which relate to the agreements among riparian countries regarding the temporary ban on fishing activities in Lake Tanganyika for fish recovery, were thoroughly analyzed. Additionally, the "Convention on the Sustainable Management of Lake Tanganyika" was reviewed, revealing several articles that emphasize the principles of sustainable management for the lake's resources. This comprehensive documentary analysis provided a foundational understanding of the regulatory framework guiding the fishery sector and highlighted the collective commitment of riparian nations to address overfishing and environmental sustainability.

Moreover, the study obtained reliable and pertinent records from environmental NGOs, particularly the Friends of Lake Tanganyika, which focus on addressing a variety of environmental and social issues that impact the lake's ecosystem. These non-written materials, such as reports and firsthand accounts, were crucial for

capturing the current threats to fishing in Lake Tanganyika and the broader implications for local communities (Mwanamwenge, 2020). By integrating insights from both official documents and NGO reports, the research was able to present a well-rounded perspective on the challenges faced in managing the lake's fishery resources. This dual approach not only enhanced the depth of the analysis but also underscored the importance of collaborative efforts among stakeholders in formulating effective conservation strategies and policies.

3.9 Data Analysis

Data analysis is a comprehensive process encompassing various methods aimed at describing facts, detecting patterns, developing explanations, and testing hypotheses. It involves the systematic examination of collections of observations to answer raised questions, identify patterns, and derive meaningful insights from the data (Dunn, 2001). This process is crucial for researchers, as it translates raw data into usable knowledge that can inform decision-making and contribute to theory building. The importance of data analysis extends beyond mere number crunching; it is about weaving a narrative that aligns with the research objectives while maintaining rigour and accuracy.

In this study, both qualitative and quantitative data analyses were employed, enabling a holistic understanding of the research questions. Qualitative data emerged from in-depth interviews with key informants, where rigorous examination occurred every evening to ensure the relevance of the information collected to the research questions. This iterative approach allowed researchers to identify and address ambiguous aspects of the inquiry promptly, refining their questions based on trends

observed in previously filled questionnaires. Furthermore, the integration of field notes collected throughout the day facilitated a deeper understanding of the data by enabling researchers to classify and compare the opinions expressed by key informants, ultimately revealing underlying patterns in the information gathered.

Conversely, the quantitative data analysis involved the systematic cleaning and coding of collected data using tools such as Microsoft Excel and the Statistical Package for Social Sciences (SPSS). These tools helped generate frequency distributions and percentages, allowing researchers to visualize the data through charts, graphs, and tables. This visual representation is vital for conveying complex data in an accessible manner, facilitating better interpretation (Field, 2013). Through descriptive statistics, the data was analyzed not only to summarize findings but also to provide a framework for making informed recommendations aimed at mitigating negative impacts identified during the research.

The employment of cross-tabulation further enriched the analytical process, enabling comparisons between different datasets with the aid of SPSS and Excel. This approach allowed researchers to uncover relationships and interactions among variables, providing a solid foundation for actionable insights (Babbie, 2016). As such, the combination of qualitative and quantitative data analyses not only bolstered the overall findings but also underscored the importance of a comprehensive analytical approach in addressing multifaceted research questions. By integrating both methodologies, the study aimed to offer balanced and nuanced recommendations that respond to the complexities of the issue at hand.

3.10 Validity and Reliability of the Research Instruments

Validity refers to the extent to which a measuring instrument accurately reflects the concept it is intended to measure, ensuring both the determination and accuracy of the data gathered (Rahardja*et al.*, 2019). A critical aspect of achieving validity in research is the use of diverse methodologies to triangulate data, which involves comparing information collected through different tools or methods. This triangulation process not only enhances the robustness of the findings but also aims to minimize biases and discrepancies, thereby increasing the likelihood of obtaining valid information (Denzin, 1978). By employing a multi-faceted approach to data collection, researchers can gain richer insights into the phenomena under study and enhance the credibility of their results.

In addition to validity, reliability is another crucial factor in evaluating the quality of measuring instruments. Reliability refers to the consistency and stability of these instruments over time, highlighting their ability to produce similar results across various applications (Sürücü&Maslakci, 2020). For example, if a survey is administered multiple times under the same conditions, a reliable instrument would yield comparable results on each occasion. Ensuring reliability often necessitates rigorous pre-testing of data collection tools to identify any potential issues that could affect stability. This process of pre-testing informs researchers about the effectiveness of their instruments, allowing for necessary refinements before the actual data collection begins.

Furthermore, the continuous refinement of data collection tools during fieldwork plays a significant role in bolstering both validity and reliability. As researchers

engage in the data collection process, they may encounter unforeseen challenges or inconsistencies that require adjustments to their measuring instruments (Joppe, 2000). By addressing these issues in real time, researchers can enhance the trustworthiness of their findings, thereby ensuring that the information gathered is not only valid but also reliable. This iterative approach to data collection is essential for optimizing research quality and increasing the credibility of study outcomes.

Ultimately, the interplay between validity and reliability is fundamental in ensuring the overall quality of research findings. Valid instruments that yield consistent results provide a solid foundation for meaningful conclusions and informed decision-making (Creswell & Clark, 2017). By employing triangulation, pre-testing, and iterative refinement, the researcher effectively enhanced the validity and reliability of the data collection processes, which in turn contributed to a more accurate understanding of the research questions addressed.

3.11 Ethical Considerations

Ethics in research is a critical component that underscores adherence to the established standards, codes of ethics, and conduct defined by a specific profession or academic discipline (Bhattacherjee, 2012). These ethical guidelines serve multiple purposes, including protecting the rights and welfare of participants, ensuring integrity in the research process, and maintaining public trust in research findings. Ethical considerations encompass a wide range of issues, such as informed consent, confidentiality, and the responsible handling of data. By rigorously applying these ethical principles, researchers can navigate the complexities of their work while safeguarding the dignity and rights of participants involved in the study.

To uphold these ethical standards, the researcher in this study adhered to all guidelines and protocols outlined in the University prospectus. These protocols provide a framework for ethical behaviour during research, ensuring that all actions taken are by institutional expectations and legal requirements. Furthermore, securing research clearance letters is a vital step in demonstrating compliance with ethical standards. In this case, the researcher sought authorization from The Directorate of Postgraduate Studies (DPS) of the Open University of Tanzania. This formal permission is essential, as it serves to introduce the researcher to relevant regional and district authorities, establishing a recognized legitimacy for the research activities, while also fostering collaboration with local offices that may play a crucial role in the research context.

Obtaining the permit letter facilitates transparent communication between researchers and regulatory bodies, creating an atmosphere of trust and cooperation. This clearance not only legitimizes the researcher's presence in the field but also ensures that all ethical obligations towards participants and communities are honoured. By presenting the secured permit to the concerned officials in the respective offices, the researcher demonstrates respect for local governance and ethical research practices. Such procedures are indispensable in research, as they contribute to the overall integrity of the project and affirm the researcher's commitment to conducting an ethical study, which ultimately enhances the validity and credibility of the research outcomes.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Overview

This chapter presents the findings that were obtained from data collection in the two sampled wards located in Kigoma district. It starts with the presentation of the socio-demographic characteristics of the respondents followed by discussion of the study results basing on research questions. A summary of the key findings of the study is presented at the end of the chapter.

4.2 Socio-demographic Characteristics of the Respondents

The socio-demographic characteristics of respondents addressed in this study comprised variables such as age, sex, income level, education, marital status, and occupation. Such features were collected and analysed to assist the researcher in getting a general sense of the respondents' various behaviours, attitudes, or outcomes within a study population (Babbie (2014). As Findings regarding sex, age, occupation and education levels of the respondents are depicted in Table 4.1.

Table 4.1: Distribution of the Respondents by Age, Sex and Occupation

Data Set	N	Minimum	Maximum	Mean	Std. Deviation
Sex	120	1	2	1.58	.495
Age	120	1	5	2.08	.940
Occupation	120	1	4	1.75	.781
Education Level	120	1	7	2.83	1.616

Source: Field Data (2024)

Information presented in Table 4.1 denotes that the respondent comprised a diverse group with an average age of approximately 25.6 years, as indicated by the mean age of 2.08 derived from a scale of 1 to 5. As for occupation, was interesting to note that

respondents undertook different livelihoods activities around Lake Tanganyika. Occupation data indicated a variety of working statuses, with a mean of 1.75, reflecting a predominance of respondents engaged in self-employment. The cross-tabulation of the data in terms of occupation and age of the respondents reveals more information regarding the characteristics and features of the respondents (Table 4.2).

Table 4.2: Relationships between Age and Occupation of the Respondents

		Occupation				
		Fisherman	Business	Fish Trader	Farmer	**Total**
Age	Below 19yrs	13	14	10	0	37
	20-24	18	19	8	1	46
	25-29yrs	13	13	1	1	28
	30-34yrs	8	0	0	0	8
	35-39yrs	1	0	0	0	1
Total		53	46	19	2	120

Source: Field Data (2024)

The data denotes a significant insight into the livelihood pursuits of the sample population during the biological rest of Lake Tanganyika. It was found that the majority of the respondents (44.2 per cent) were fishermen which are a reflection that fishing had the dominant role in local livelihoods, particularly in the under-25 age group. The second most important livelihood category was business, were 38.3 per cent of all the respondents reported to undertake business activities. the youth aged 24 years or younger had a share of 67.4 per cent. This trend suggests a shift towards diversifying income sources among the youth.

Fish traders comprised a smaller portion of the population (only 15.8 per cent) of which the majority were again young people (79 per cent). The high concentration of the respondents in business and petty trades during this period of the biological rest

of the lake reveals an important shift in the livelihood activities as a coping strategy in a time when fishing was on halt. Also, it was a reflection of the time in which the study commenced. Data collection was done in time when the lake was already closed. As such respondents who happened to be around comprised those who were fully engaged in fishing-related activities of which petty trades and businesses seemed to dominate.

The concentration of the young population in these activities (businesses and petty trades) obeys the rule as stipulated in the theory of innovation by Schumpeter (1934) which articulates that the youth, due to their unique socio-psychological profiles and the contexts in which they operate, often demonstrate a significant propensity for risk-taking that underpins their roles as agents of innovation and change. In the context of this theory, it was thus not astonishing to see a higher concentration of youth in the businesses and petty trade activities as these businesses attract individuals who are ready to take risks. In the face of the forceful biological rest of Lake Tanganyika, it was obvious less engagement in fishing prompted many to seek alternative livelihood activities.

The gender distribution among the respondents was relatively balanced, with a slight male majority, as indicated by a mean gender value of 1.58. However, a closer examination of the data revealed a more nuanced picture, with female respondents making up approximately 58.3 per cent of the sample and male respondents accounting for 41.7 per cent. This distribution aligns with the national sex ratio and reflects the unique circumstances of this sample. Notably, the higher proportion of females may be attributed to the alternative livelihoods pursued by the respondents

after the banning of fishing activities, which led many to engage in petty trade and other related businesses. This discrepancy may also be influenced by traditional gender roles in the locality, where women often take on responsibilities related to household livelihood diversification, particularly during times of economic transition or uncertainty, such as those brought about by environmental regulations.

A closer examination of the data (Table 4.1) reveals a diverse educational landscape among the respondents. The mean score of 2.83, on a scale from 1 to 7, suggests that the majority of respondents have achieved secondary education, with only a small proportion having completed higher education. This finding is consistent with the demographic profile of the respondents, who are predominantly under the age of 30. Given the country's education trends, it is not surprising that this age group has primarily completed secondary education..1

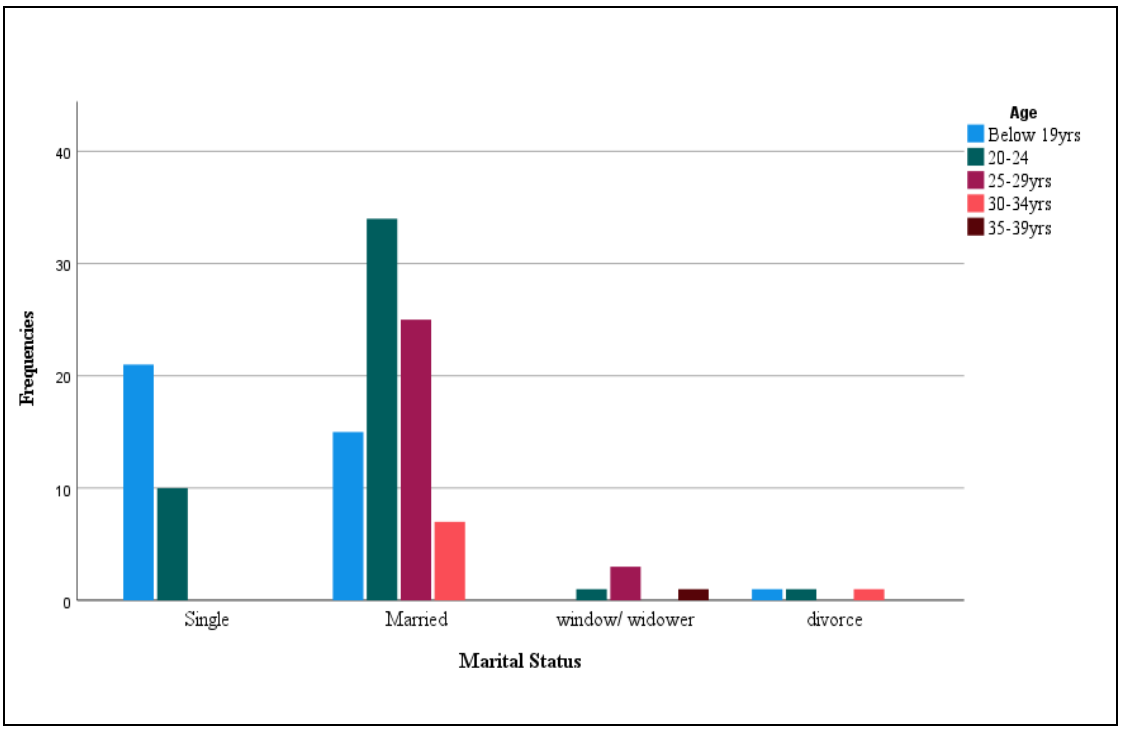

Figure 4.1: Marital Status and Household Size

Source: Field Data (2024)

The standard deviation of 1.616 underscores the significant variability in educational attainment among the respondents, spanning individuals with no formal education to those with university degrees. This disparity aligns with the current unemployment trends in the country, as it is not unexpected that the educational profiles of the respondents reflect the broader societal patterns. A cross-tabulation between marital status and household size was undertaken. Results of which are depicted in Figure 4.1.

Data in Figure 4.1 indicates that a significant proportion of individuals in the youngest age group (under 19 years) were single, aligning with societal norms for this demographic. As the age brackets progressed, particularly among those aged 20 to 29, there was a noticeable increase in the number of married individuals, suggesting that this age range was commonly associated with starting families.

Furthermore, the data highlights that many individuals in this group reported having children, reinforcing the notion that early adulthood is a pivotal time for family formation. The prevalence of divorced and widowed individuals remained low and sporadic across most age groups, indicating either a trend towards early marriages or a tendency to stay single after separation. The dwindling number of respondents for older age groups does not mean that the community had very few married individuals but rather the nature of the respondents encountered during the onsite data collection whose majority were young. Overall, the data emphasizes the trends of increasing marriage rates in young adults, alongside a low prevalence of divorce and widowhood among the surveyed populations.

A cross-examination of the relationships between marital status and household size reveals a correlation between marital status and household composition. The data indicates that respondents from smaller households (less than five members) are predominantly single, whereas the majority of married individuals reside in households comprising 5 to 9 members. This observation suggests that younger or economically less established individuals may experience constraints in their household sizes. The findings are consistent with cultural norms and economic stability that tend to favour larger family units.

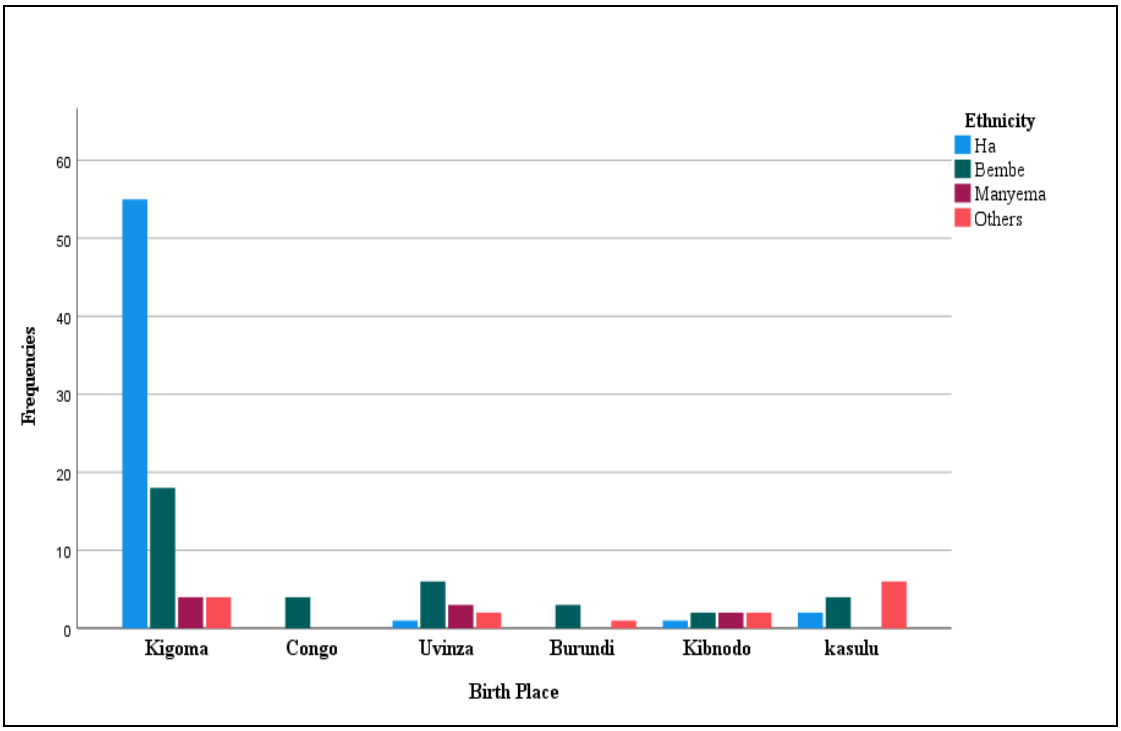

Figure 4.2: Ethnicity and Migratory Status of the Respondents

Source: Field Data (2024).

Notably, limited responses were recorded for larger households (10 to 14 members), and there were few instances of divorced or widowed individuals, indicating a socio-economic environment where divorce is relatively uncommon. This highlights the significant impact of economic factors on marital stability and family size,

underscoring the need for further research on the interplay between economic conditions and household dynamics. Ethnic diversity and migration status were other noted socio-demographic traits of the respondents (Figure 4.2).

As depicted in Figure 4.2 the data shows that the majority of respondents belong to the Ha, predominantly residing in Kigoma, with very few in other areas, indicating a potential regional concentration and limited migration. The Bembe group also has a notable presence, particularly in Uvinza and Kasulu, suggesting a more dispersed migratory pattern. The Manyema ethnic group is less represented overall, with some presence in Kibondo and Uvinza, while those identified as "Others" exhibit a varied distribution across multiple regions, including Kigoma and Kasulu. This ethnic diversity, coupled with localized concentrations, may be influenced by historical settlement patterns and socio-economic factors, highlighting how different communities interact with their environments and each other in the context of migration.

The socio-demographic findings of this study resonate well with existing studies on youth livelihoods and socioeconomic dynamics in the face of environmental change in other parts of the world. For instance, a similar trend towards increasing youth engagement in non-agricultural livelihoods, such as fishing, farming, and petty trade, was observed in a Malawian study by Mhone (2015), which highlighted the youth's propensity for risk-taking and adaptation in response to environmental stressors. Additionally, research by Njoh (2017) on the socioeconomic impacts of Lake Victoria's eutrophication in Tanzania found that local communities also exhibit a significant reliance on fishing and alternative livelihoods, with youth playing a prominent role in adapting to environmental degradation. Furthermore, the study's

findings on traditional gender roles, with a slight male majority but higher female participation in household livelihoods, are also supported by research by Tripp *et al.* (2009) on the socioeconomic dynamics of rural women in East Africa, who found that women often assume primary responsibility for income diversification and food security during times of economic uncertainty.

Additionally, research by Mbabazi and Sengooba (2014) on the socioeconomic dynamics of the Great Lakes region noted a strong ethnic identity and limited migration in some areas, as evident in the study's findings on the concentrated Ha population in Kigoma. Overall, these parallels between the study's findings and existing empirical works underscore the significance of considering demographic and socio-economic factors in understanding the livelihoods and adaptations of communities affected by environmental change.

4.3 State of the Respondents' Economic Status and Livelihood Activities

The respondents' economic status and livelihoods of the respondents demonstrated a complex interplay of factors, including income levels and access to resources. This multifaceted situation reflects the broader socio-economic landscape in which these individuals operate. Analysis of the data regarding respondents’ perception relating to the time spent in fishing and the importance of fishing in support of households is presented in Table 4.3 The descriptive statistics presented in Table 4.3 indicate that the majority of respondents did not primarily rely on fishing as their main source of income, as reflected by a mean score of 1.03. The results suggested that only a small fraction viewed fishing as their major income source. This observation was likely valid, given that most respondents were young, with ages ranging from 20 to 29

years.

Table 4.3: Perception of fishing in Livelihoods Support

Data Sets	N	Minimum	Maximum	Mean	Std. Deviation
Fishing as an income source	120	1	2	1.03	.180
Fishing Duration	120	1	5	1.62	.861
Fishing as a form of household security	120	1	5	4.32	1.077

Source: Field Data (2024).

Additionally, since data collection commenced during a period when the lake was in a biological rest phase, those who participated in the study were primarily engaged in activities other than fishing. Consequently, the average number of years spent in the fishing industry was reported at 1.62, with a standard deviation of 0.861. This finding indicates that most respondents had limited experience in fishing, with a significant number having been involved for only one to two years.

Together with limited time spent in fishing; respondents acknowledged that fishing provided a substantial sense of security for their households, with a high mean score of 4.32 on a scale of 1 to 5, where 5 likely signify strong agreement. The standard deviation of 1.077 however, implied some variability in the responses, though the overall trend suggested that many respondents perceived fishing as their solid economic or psychological stability for their families. This contrast between the data on income and household security indicates that while fishing might not be the primary source of income for most, it still plays a critical role in fostering a sense of safety and security in their households.

The above resembles empirical findings from various studies conducted within and outside the African continent. For instance, a study conducted on artisanal fisheries in West Africa by Adadey and Amoako (2018) found that fishing was a vital source of food security but not a primary means of income for most households, echoing the low mean score of 1.03 in Table 4.3. Similar patterns have also been observed in South Asia, where a study on fishers' livelihoods in Bangladesh illustrated that although income from fishing is modest, it contributes significantly to household food security and economic stability (Ahmed & Islam, 2015).

Furthermore, research conducted in a coastal community in Latin America indicated that the economic importance of fishing was often overshadowed by its social and cultural significance, which is also reflected in the high mean score of 4.32 for household security in the present study (Sanches & Silva, 2019). However, a notable difference lies in the relatively short duration of fishing experience among respondents in the present study, with a mean of 1.62 years, contrasting with the longer experience of fishers highlighted in many other studies. Overall, these findings underscore the complex and multifaceted nature of fishing livelihoods, emphasizing both the economic and social importance of fishing in support of households.

When the respondents were asked to share their experiences regarding the types of fish they typically caught in Lake Tanganyika before and after the fish ban, their responses yielded the insights presented in Figure 4.3. The frequency distribution of the types of fish caught indicates that the respondents enjoyed a diverse range of fishing experiences. The majority of respondents (36.3 per cent) reported catching

Migebuka (Lates stoppers) which emerged as the most commonly caught fish. Sardine followed closely behind as the second most reported catch, accounting for 34.5 per cent of the responses.

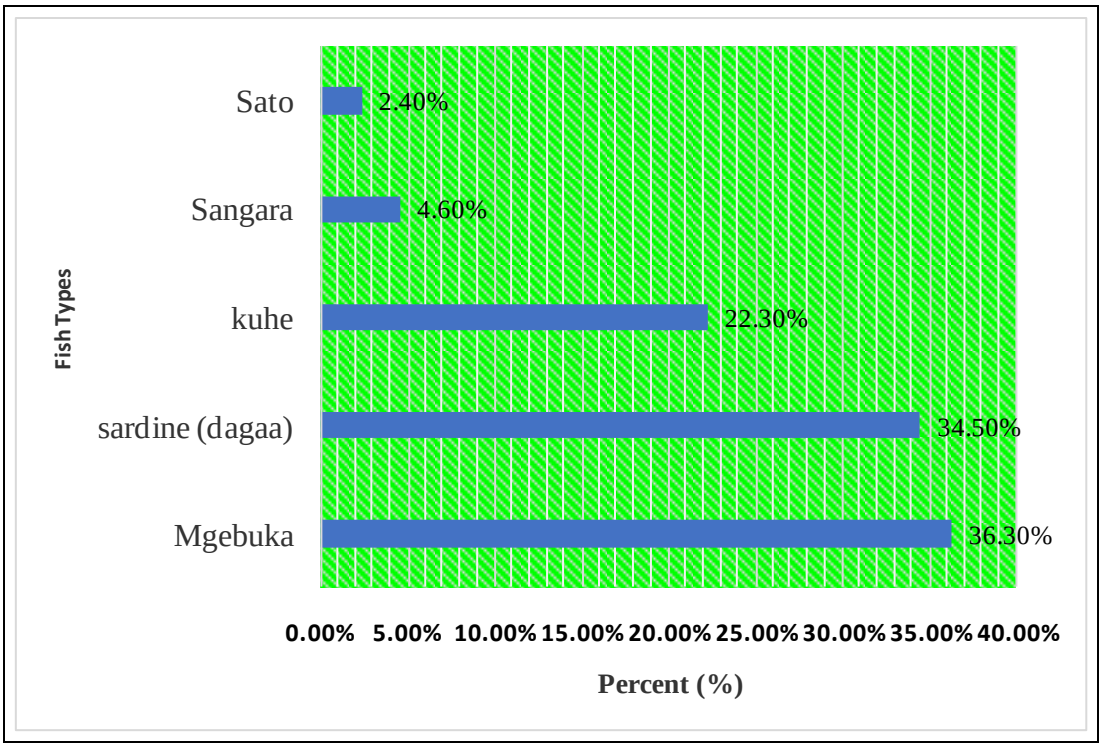

Figure 4.3: Distribution of Types of Fish Caught in the Study Locality

Source: Field Data (2024).

Together, the distributions of Migebuka and sardine (dagaa) represented approximately 70.8 per cent of the total responses, illustrating that these two fish were the primary sources of catch for the respondents. The remaining types of fish, including Kuhe, Sangara, and Sato, showed significantly lower frequencies, with Kuhe being the third most common type, comprising 22.3 per cent of the responses. The high frequency of Mgebuka and sardine (dagaa) relates to their abundance in the fishing areas or their ease of catch. The lower frequencies of kuhe, Sangara, and Sato indicated that these types of fish are less abundant or more challenging to catch. As

for the location where fish were caught analysis of the data indicated that a significant majority of respondents (57.5 per cent) fished and landed at Kibirizi village while 42.5 fished and landed at Bangwe. This distribution suggests a preference or reliance on Kibirizi as the primary fishing site, which could be attributed to factors such as accessibility, fish availability, or local knowledge. When the respondents were asked to comment on the average daily catches of fish before and after the fish ban was lifted, the results of the data analysis were as presented in Table 4.4.

Table 4.4: Daily Fish Catches

Data set	N	Minimum	Maximum	Mean	Std. Deviation
Daily catch (in kg) before ban	120	1	5	2.66	1.876
Daily catch (in kg) after the ban	120	1	4	2.34	1.008
Average income per month	120	1	4	2.55	.995

Source: Field Data (2024).

The descriptive statistics in Table 4.4 for the fishing data reveal significant insights into the impact of a fishing ban on daily catch and income. Before the ban, the average daily catch was 2.66 kg, with a wide range from 1 to 5 kg and a relatively high standard deviation of 1.876, indicating a substantial variability in the catches among the respondents. However, following the implementation of the fish ban, the average daily catch decreased to 2.34 kg, with a reduced range (1 to 4 kg) and a lower standard deviation of 1.008, suggesting a more uniform distribution of catches. Additionally, participants reported an average monthly income from fishing of 2.55 (on a scale of 1 to 4), reflecting sustained economic reliance on fishing despite the

decreased daily yields after the ban. Overall, the data indicates a decline in daily catch post-ban, which may affect livelihood sustainability among the fishing community, while also suggesting some adaptation to the regulatory changes. Overall, the data suggests that while the ban led to reduced daily catches that could jeopardize livelihood sustainability, it also points to a degree of adaptation within the community to the new regulatory environment.

The study results discussed above mirror findings from other regional studies of a similar nature. For instance, in Indonesia, fish bans resulted in an initial reduction of catches but ultimately led to a recovery in fish stocks and incomes over time (Garcia *et al.,* 2018). Conversely, a study in Ghana revealed that the imposition of fishing bans had more severe impacts on immediate livelihoods, with catch reductions leading to heightened poverty levels among fishing communities (Ababio & Agbo, 2020). Furthermore, research in the Philippines indicated that community involvement in the management of fishing restrictions significantly mitigated adverse socioeconomic impacts (Fabinyi *et al.,* 2019). Overall, while the community appears to be adapting to the changes, the impact of the ban on immediate economic well-being signals potential challenges ahead.

4.4 Community Perceptions on the Determinants of Fish Decline in Lake Tanganyika

The study sought to understand the local communities' perceptions regarding the decline in fish catches in Lake Tanganyika, which prompted the government to introduce annual fishing bans; Perception, as defined by Burn (2010), refers to the process by which individuals consciously or unconsciously register and evaluate

information from their internal or external environment. The analysis of responses revealed a significant perceived decline in fish catches, with a substantial 90.8 per cent of respondents reporting a yearly decrease, while only 2.5 per cent believed catches were increasing and 6.7 per cent perceived no change. This widespread consensus on declining fish populations may be indicative of underlying environmental concerns, such as overfishing or habitat degradation, which are commonly shared by experienced fishers, and may have been exacerbated by the introduction of Nile tilapia, a non-native species that has increased competition for resources, as noted by Ngobela*et al.* (2018).

In contrast, studies conducted in other parts of Lake Tanganyika have reported different outcomes, with Mfumbwa*et al.* (2020) finding that 54.5 per cent of respondents in the Democratic Republic of Congo perceived an increase in fish catches, attributed to fishing bans and habitat restoration measures, while research in Zambia by Mwale *et al.* (2015) indicated that 64.2 per cent believed catches were rising, correlating with regulatory improvements and ecological restoration. These discrepancies suggest a complex interplay of local ecological challenges and management practices, where the perceived decline in fishing catches in the current study reflects more severe regional issues such as overfishing and degradation of habitats, unlike the more favourable conditions reported in other regions of the lake.

To further elaborate on the perceived causes of the decline in fish catches, the results of the data analysis are illustrated in Figure 4.4, which presents responses to a multiple-choice question.

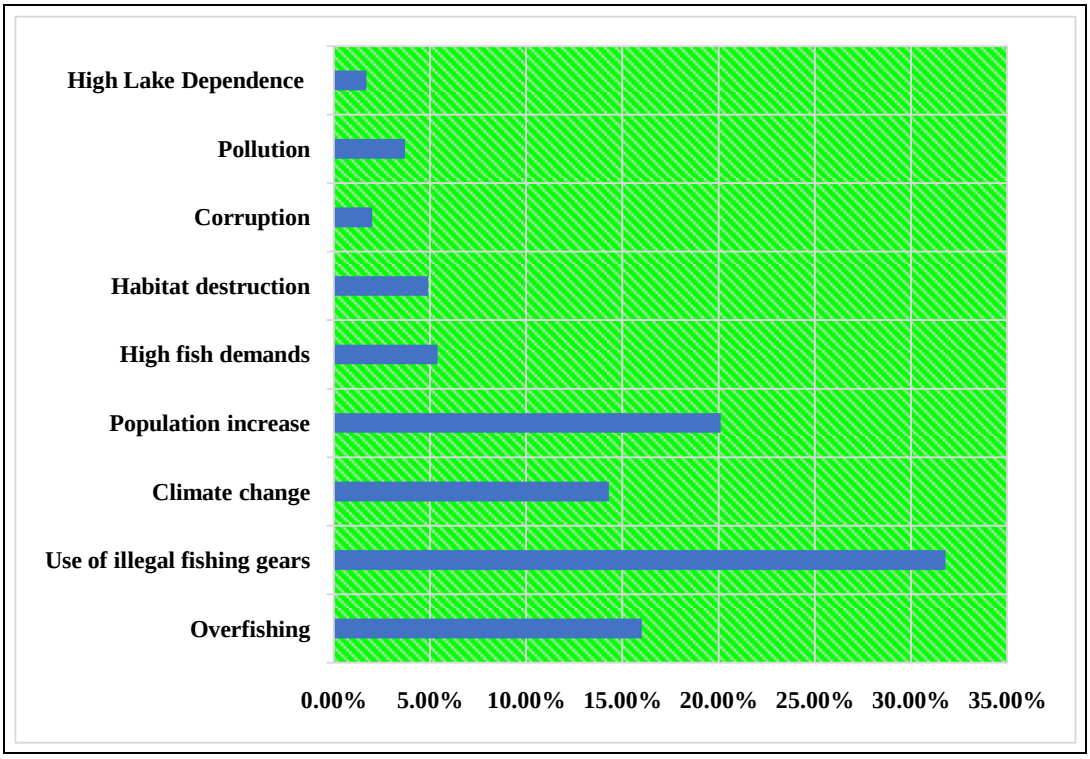

Figure 4.4: Respondents' Perception of the Cause behind Fish Catch Decline

Source: Field Data (2024).

Figure 4.4 highlights the various factors identified by respondents, providing a comprehensive overview of the community's perspectives regarding the underlying reasons for the observed decrease. Each response reflects the complexities of the issue and underscores the need for a multifaceted approach to addressing the challenges facing Lake Tanganyika's fishing industry.

The factors contributing to the declining trends of fish catches in Lake Tanganyika primarily include the use of illegal fishing gear (31.8 per cent) and overfishing (16 per cent), highlighting significant governance gaps and the effectiveness of conservation measures that may threaten the ecosystem's integrity. Additionally, 20.1 per cent of respondents pointed to population growth, reflecting the increased human

demand for resources that exacerbates pressure on fish stocks. Other socioeconomic influences complicating the issue include high fish demand (5.4 per cent), habitat destruction (4.9 per cent), and pollution (3.7 per cent).

Although corruption was reported by only a few respondents, it remains an important factor in the decline of fish catches, as noted by Benjaminsen and Ba (2009), who emphasize the challenges in empirically justifying its impact. Overall, the data indicates a complex interplay of immediate human behaviours and broader environmental and socioeconomic pressures, suggesting that effective interventions must address both local practices and systemic governance issues.

The ongoing decline in fish catches in the study area has prompted local authorities to implement a fishing ban as a management strategy. As defined by Mfumbwa*et al.* (2020), a fishing ban is a regulatory measure designed to restrict fishing activities in specific areas or timeframes, aimed at protecting fish populations and fostering ecosystem recovery. Such bans are essential for addressing overfishing, ensuring the sustainability of fish stocks, and allowing for the natural replenishment of aquatic ecosystems (Hilborn, *et al.*, 2004). The study found that 91.7 per cent of respondents were aware of this initiative; however, awareness does not guarantee compliance.

The ban's recent implementation (the first ban was instituted on May 15, 2024) raises concerns about the government's capacity to enforce and sustain such policies, especially in the absence of prior regulatory efforts, leading to community mistrust. Research supports the notion that awareness alone does not ensure adherence to fishing regulations. McCauley *et al.* (2015) emphasize that community compliance is

often contingent on trust in enforcement and the perceived legitimacy of regulations, while Sutinen and Kuperan (1999) highlight the importance of effective local governance and community engagement in decision-making processes. The recent nature of the fishing ban, combined with skepticism toward enforcement, echoes patterns seen in other regions where initial bans have failed due to insufficient stakeholder involvement and a lack of enforcement history (Berkes, 2009). This situation underscores the urgent need for stronger governance frameworks to promote compliance and enhance the credibility of conservation initiatives.

The full awareness of the policy on fish ban implementation indicated by the local communities was compounded by the misconception which surrounded the exercise itself. This could be one of the reasons behind the resistance of the policy in question. The results of the data analysis presented in Figure 4.5 gives a highlight in this matter.

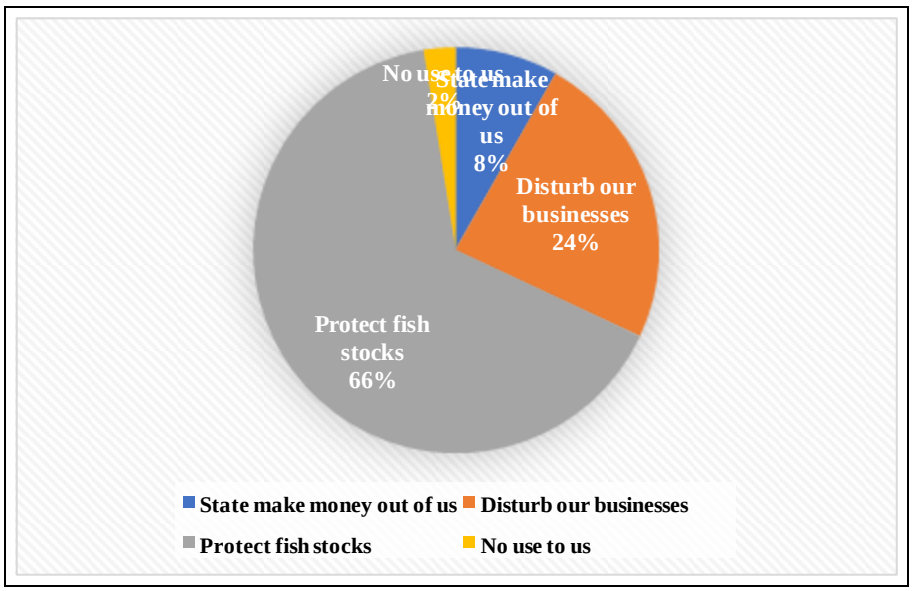

Figure 4.5: Respondents Perception on the Reasons for the State Fishing Ban Initiative

Source: Field Data (2024).

As detailed, in Figure 4.5, the data presented reveals a pronounced skepticism among respondents regarding the government's motivations behind the imposition of fish bans, with a striking 23.8 per cent believing the measure serves primarily as a means to restrict their roles as fish traders and fishermen. However, a majority of 65.6 per cent perceive the ban as a necessary conservation effort aimed at protecting fish stocks for future sustainability, reflecting a potential conflict between individual livelihoods and broader ecological concerns.

The relatively low percentage (2.5 per cent) of respondents who view the ban as purposeless suggests that most individuals recognize at least some rationale for the policy, but the high percentage of skepticism towards governmental intentions hints at a deeper mistrust which signals the distrust that could undermine compliance and engagement with conservation efforts. Such tendencies call for the need to improve communication and transparency between authorities and the community's economic concerns with ecological imperatives.

This study's findings bear resemblance to other empirical research focusing on community perceptions of environmental regulations and governmental motives. For instance, in a study by Safford and McCoul (2019), it was noted that local fishing communities often express scepticism towards fishery management policies, perceiving them as government overreach rather than genuine ecological measures. Similarly, research conducted by Charles *et al.* (2018) found that fishermen frequently feel marginalized and view conservation efforts as existential threats to their livelihoods, echoing the concerns reflected in the current data about government intentions. Additionally, Campbell and Baird (2021) highlighted the

importance of transparent communication between governmental bodies and local stakeholders, as failures in dialogue can exacerbate distrust and hinder effective policy implementation, reiterating the need for improved engagement strategies in light of the significant scepticism revealed in this study.

The sceptical nature of the respondents towards the state initiatives to institute a periodic ban on fishing in Lake Tanganyika which is still in its initial stage was also reflected in the respondent's perception of whether the fish ban had yielded tangible results. The descriptive statistics regarding the perception of whether the annual fishing ban improves fishing catch after being lifted reveal a mean score of 1.31 on a scale presumably ranging from 1 (no improvement) to 2 (improvement). This low mean suggests that, on average, respondents believe the ban has not significantly enhanced their fishing outcomes upon its removal.

The relatively narrow range (1 to 2) indicates limited variability in responses, with most individuals clustered around the lower end of the scale, reflecting a consensus that the ban's lifting does not lead to improved catches. The standard deviation of 0.464 is also modest, reinforcing that perceptions are closely aligned, yet potentially indicating a degree of dissatisfaction or scepticism within the fishing community regarding the effectiveness of the ban.

Collectively, this data points toward a critical need for re-evaluation of the fishing ban's objectives and outcomes to better address the concerns and realities faced by local fishers. Generally, the local community perceptions of fishing bans can significantly vary across contexts, echoing findings from other empirical studies. For

example, similar to the current data showing skepticism about the effectiveness of fishing bans (mean score of 1.31), a study by Yandle and Dewees (2007) indicated that many fishers in New Zealand perceived fishing restrictions as ineffective, leading to increased frustration. Conversely, research by Jentoft *et al.* (2012) found that in Norway, local communities reported increased fish stocks and improved catches post-ban, highlighting a positive perception associated with successful enforcement and community involvement.

However, in contrast, a study by Denny *et al.* (2020) in the Caribbean showed a mixed response; while some fishers recognized improvements in biodiversity, many expressed ongoing concerns about their livelihoods and the sustainability of fish populations. These comparative insights suggest that perceptions of fishing bans are context-dependent and influenced by factors such as compliance, community involvement, and observable ecological outcomes. For the local communities involved in this study, the overall perception of the effectiveness of the fish ban was negative maybe because it was still an innovation received with a lot of skepticism.

4.5 Reasons for the Local Community's Opposition to the Annual Fish Ban

The preceding presentation highlighted a predominantly negative perception among respondents regarding the state institution's implementation of the periodic annual fishing ban in and around Lake Tanganyika. This broad sentiment has significantly contributed to the local fishing communities' resistance to what they perceive as an imposed restriction on their livelihoods. An analysis of the data regarding this negativity uncovers various underlying reasons for this opposition (Figure 4.6).

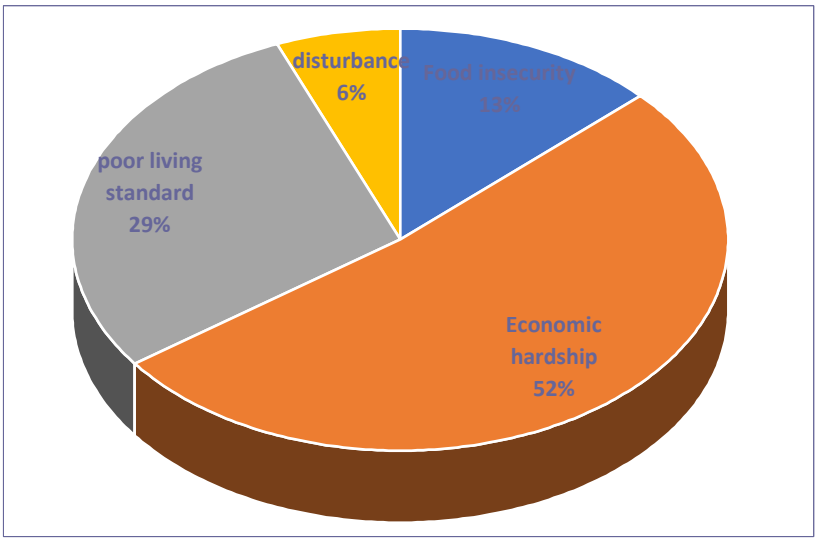

Figure 4.6: Respondents Perceived Reasons for Opposing the Fish ban in Lake Tanganyika

Source: Field Data (2024).

According to the respondent's perception (Figure 4.6), the commonly responded reason was economic hardships experienced by the local fishing folks. This factor was subscribed by 51.9 percent of all the respondents. This suggests that, for many individuals, fishing serves as a vital source of income and livelihood. In areas where alternative employment opportunities are scarce or non-existent, the suspension of fishing activities during the ban heavily impacted community members' ability to provide for themselves and their families.

The second factor identified was the poor living standards experienced by the local communities. This was mentioned as challenge by 29.0 percent of respondents. Many individuals living in poverty do not have adequate resources to meet their basic needs, including food, shelter, and healthcare. In such situations, the annual fishing ban appeared less like a necessary conservation tool and more like a punitive measure that exacerbated existing hardships. The poor living conditions and poverty

proliferation raised by the respondents could not be ascribed to the recent state initiatives of closing the lake for a certain period as this was just new. The community has been sailing in poverty even before the introduction of the fish ban. Evaluating the property ownership possessed by the local communities the study notes even before the closure of the lake the living standard was generally low.

The respondents' perception regarding the imposition of the annual fishing ban in Lake Tanganyika reveals a complex array of reasons for their opposition. According to the data analysis (Figure 4.6), the predominant concern was economic hardships experienced by the local fishing communities, with 51.9 per cent of the respondents citing financial struggles as a significant issue. This underscores the crucial role of fishing as a vital source of income and livelihood for many individuals in the area, where alternative employment opportunities are scarce or non-existent. The suspension of fishing activities during the ban severely impacted community members' ability to provide for themselves and their families, exacerbating existing economic woes.

Furthermore, 29.0 per cent of the respondents highlighted poor living standards as a key challenge, emphasizing the difficulties faced by individuals living in poverty, who often lack the resources to meet their basic needs, including food, shelter, and healthcare. In such situations, the annual fishing ban appeared less like a necessary conservation tool and more like a punitive measure that worsened their living conditions. Notably, the poor living conditions and poverty proliferation raised by the respondents were not new phenomena that could be attributed to the recent state initiative of closing the lake for a certain period. Rather, these issues were present in

the community before the introduction of the fish ban, as evidenced by the study's evaluation of property ownership and living standards, which revealed a persistent low socio-economic standing even before the closure of the lake. This historical context highlights the need for a more comprehensive and nuanced approach to addressing the complex socio-economic challenges faced by the local communities.

The common indicator of the state of poverty prevailing in the local community was associated with the analysis of the respondent's effect (Table 4.5).

Table 4.5: Distribution of the Respondents' Personal effects

		Properties owned					
		Mudhouse	Brickhouse	Motorboat	Traditional canoes	Motorcycle	Total
Occupation	Fisherman	1	26	19	41	12	53
	Business	2	31	14	24	3	43
	Fish Trader	2	6	2	9	0	18
	Farmer	0	2	1	0	0	2
Total		5	65	36	74	15	116

Source: Filed Data (2024).

The information depicted in Table 4.5 shows that although the majority owned brick houses with corrugated iron sheets, most of these houses were of low quality. The researcher was able to witness these through the field observations made in both Bangwe and Kibirizi. Although the two wards are within the Kigoma-Ujiji Municipal, most of the houses owned were very old and mostly dilapidated (Plate 4.1). Even the fishing activities conducted were done using traditional fishing canoes that were incapable of venturing beyond the lake shore. This might be the reason why the majority of the respondents were not able to see changes in the amount of fish caught because of the inability to venture beyond the shore. It should be

understood that Lake Tanganyika is the second deepest lake in the world after lake Baikal of Russia. The inability to undertake deep sea fishing could be one of the reasons behind not realizing the effect of the biological rest of the lake.

Figure 4.1: Nature of Local Community-Dwelling Structures in Kibirizi Ward

Figure 4.2: Types of Fishing Boats Pictured At The Kibirizi Landing Site

The third reason behind the opposition to the annual fish ban raised by the respondents was the issue of food insecurity. In a multiple-response question, this was raised as a concern by 13.0 per cent of all the respondents. For communities that rely heavily on fishing for their daily sustenance, the ban not only limited access to

food but also raised concerns about nutritional adequacy and food security. This was attested by the data on the occupation and livelihood sources. When the respondents were asked to comment on whether fishing was their sole source of livelihood and whether it provided household security the results of the descriptive analysis of the data were as provided in Table 4.6.

Table 4.6: Respondents Sources of Livelihoods

Data sets	N	Minimum	Maximum	Mean	Std. Deviation
Fishing as a source of income	120	1	2	1.03	.180
Years spent in fishing	120	1	5	1.62	.861
Fishing as a security source	120	1	5	4.32	1.077

Source: Field Data (2024)

A closer examination of the data presented in Table 4.6 reveals that the mean score for respondents' reliance on fishing as a source of income is 1.03, which is strikingly close to the minimum value of 1. This suggests that fishing may not be the primary income source for the majority of participants. However, the relatively high standard deviation of 0.180 indicates moderate variability in their responses, hinting at diverse perspectives and experiences within the sample. In contrast, the mean score for the perception of fishing as a source of household security stands at 4.32, indicative of a more substantial reliance on fishing for security, though still within the designated range of 1 to 5.

Notably, this response is accompanied by a higher standard deviation of 1.077, which implies more varied opinions on the role of fishing in household security. This variation may stem from various factors such as geographical location, duration of

fishing activity, and income levels. Furthermore, the relatively low standard deviation of 0.861 in the duration spent fishing suggests a narrower range of responses, indicating less variability in fishing habits among participants; however, the mean duration of 1.62 highlights that fishing experience is not widespread. While fishing is reported as an activity by many respondents, it is not their sole means of livelihood. Nonetheless, it remains a significant livelihood activity, and any restrictions imposed on fishing are likely to generate discontent within riparian communities.

The introduction of the annual fishing ban was perceived as a disruption by some respondents (6.1 per cent), demonstrating a broader dissatisfaction with the ban. Community members view such restrictions as intrusive, threatening their traditional ways of life. This sentiment underscores the cultural and social dimensions of fishing practices that extend beyond simple economic and nutritional concerns. Empirical studies echo these findings, revealing that fishing practices are deeply intertwined with cultural identity. For example, Baird et al. (2019) found that 15 per cent of fishermen in Southeast Asia regarded marine protected areas (MPAs) as disruptive to their traditions, highlighting a disconnect between conservation efforts and local customs.

Similarly, McCay and Sachs (2020) reported that 12 per cent of urban community members felt new fishing regulations undermined their cultural identity, illustrating how regulatory measures can alienate local populations. Hunt *et al.* (2021) further discovered that 20 per cent of Indigenous respondents in Atlantic Canada viewed government-imposed fishing quotas as challenges to their cultural heritage.

Collectively, these studies emphasize a trend wherein fishing regulations disrupt cultural practices, underscoring the necessity for policymakers to consider local traditions and identities when developing sustainable management strategies.

Several factors influence local communities' perception of the fishing ban as a disturbance. The timing of the ban coincided with a period when many community members felt ill-prepared for such a transition. A significant portion (25.4 per cent) reported having no immediate alternative sources of livelihood, highlighting a substantial reliance on fishing as a primary income source. The lack of viable alternatives led community members to perceive fishing bans as threats to their economic security, resulting in resistance to regulations that jeopardize their livelihoods—often directed at the government.

During a focused group discussion, respondents articulated their frustrations regarding the decision-making process surrounding the annual fishing ban. One participant remarked, "It feels like the community has no say in what happens to our fishing grounds. We're just told what to do and when to do it, without anyone asking us what we think or how it will affect us." Another participant added, "I think the biggest problem is that all the decisions are made by people who don't even live here. They don't understand how the ban impacts our livelihoods or our way of life. It's all top-down, with no consideration for our needs or concerns." A third participant emphasized, "We're not even invited to the table to discuss the ban or its implications. It's like they think the community has nothing to contribute, that we're just uninformed fishermen who don't know what's good for us. But we've been fishing these waters for generations and know what is sustainable. If only they would

listen to us and involve us in the decision-making process, maybe we could find a solution that works for everyone." (Personal communication with FGD, August 15, 2024).

These sentiments resonate with the concerns regarding the enforcement of regulations, which 6.5 per cent of respondents perceived as imposed and unsuitable for their local context. These points to a fundamental mismatch between the regulatory framework and the realities faced by local fishers, who may have adapted traditional practices that are more sustainable in their circumstances. Such misalignment contributes to an erosion of trust in regulatory bodies, fostering a perception that bans are unjustified or ineffective, thereby increasing resistance.

The study's findings on local communities' resistance to the fishing ban in Lake Tanganyika align with research by Berge, *et al.,* (2015), which indicated that a lack of involvement in the formulation and enforcement of regulations contributed to resistance among local fishers in the Lake Malawi fishery. This sentiment parallels the work of Salm and Kojis (2019), who documented similar patterns of resistance in other African fisheries, often resulting from regulatory frameworks that failed to account for local social, cultural, and economic contexts. Moreover, this study supports Sunde and Jensen's (2006) observation that providing alternative livelihoods for fishers is crucial when implementing regulations such as fishing bans. In contrast, Berge, *et al.,* (2015) found that local communities' resistance to regulations was more closely associated with concerns over enforcement, access to fishing grounds, and fish population management.

Additionally, this study diverges from Mbaru's (2013) findings, which demonstrated that community-led co-management approaches—featuring active participation from local fishers in decision-making—significantly improved compliance with conservation regulations in the Lake Victoria fishery. Therefore, enhancing community awareness of the benefits of sustainable fishing practices and engaging them in decision-making processes is essential to fostering a shared sense of stewardship for Lake Tanganyika’s resources, ultimately improving compliance and conservation outcomes.

4.6 Local Communities Coping Strategies to the Annual Fishing Ban in Lake Tanganyika

Despite the strong resistance from local communities regarding the implementation of the annual fish ban in Lake Tanganyika, data analysis indicates that the program was carried out as planned. When asked about the frequency of the fish ban, all respondents confirmed that this was the first occurrence for the current year, with the program officially launched on May 15, 2024. The data collection exercises coincided with the period when the lake was closed to fishing, offering a unique opportunity to investigate the coping strategies employed by the local communities during this time.

Respondents were invited to comment on their level of preparedness concerning household survival strategies during the biological rest period in Lake Tanganyika. Their responses are depicted in Table 4.7.

Table 4.7: Respondents Level of Preparations and Anticipation

Data set	N	Minimum	Maximum	Mean	Std. Deviation
Prior fish ban coping strategies ensure the household is food-secure	120	1	5	1.95	.798
On fish ban coping strategies employed ensure household food security	120	1	5	2.18	1.053

Source: Field Data (2024)

Analysis of the responses to the question highlighted a troubling trend regarding households' coping strategies during the annual fishing ban, wherein the mean score of 1.95 (SD = 0.798) underscored the inadequacy of food security despite employed strategies. This finding suggested that, while households may have attempted to adapt to the temporary loss of fishing resources, their efforts were insufficient in ensuring food security during such critical periods.

In comparison, the anticipation of the fishing ban yielded a higher mean score of 2.18 (SD = 1.053), indicating a more favourable perception of food security when households engaged in proactive measures. This observation mirrored trends identified in prior research, as Johnson *et al.* (2020) noted that anticipatory coping mechanisms were vital in strengthening food security frameworks among vulnerable communities facing resource limitations. By planning and implementing strategies before the ban, households may have felt a greater sense of control over their food security, leading to improved perceptions.

Conversely, the distinction between proactive and reactive coping strategies became evident when considering the lower mean score during the ban itself. Wang *et al.*

(2021) illuminated the inherent limitations of reactive strategies, which often left households scrambling for solutions in the face of immediate challenges—ultimately resulting in diminished food security outcomes. The data reinforced the premise that reliance on reactive measures may not suffice, particularly in times of resource scarcity when timely interventions are critical. Thus, while anticipatory strategies yielded a comparatively positive outlook, the significant disparity in perceived food security during the ban revealed an urgent need for the development and implementation of more effective and sustainable coping mechanisms. When asked to identify the common strategies they deployed, results of the data analysis were as illustrated in Figure 4.7.

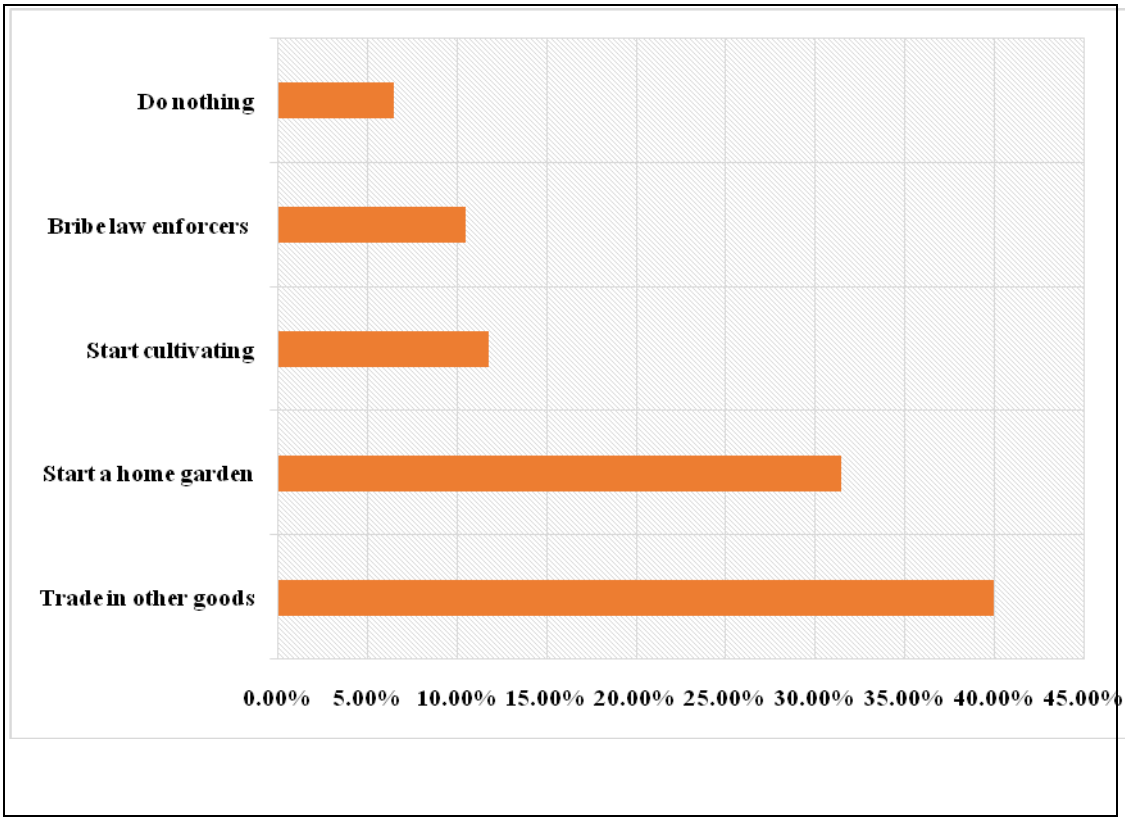

Figure 4.7: Local Communities' Livelihoods Strategies Deployed During the Fish Ban

Source: Field Data (2024)

The analysis of coping strategies employed by local communities during the fishing ban in Figure 4.7 reveals a diverse array of approaches aimed at maintaining food security and sustaining livelihoods in the face of resource restrictions. The commonly responded strategy was engagement in petty trades (39.9 per cent). This suggests that community members were actively seeking alternative sources of income and sustenance, indicating a proactive stance towards adapting to the changing circumstances. Trading in other goods may also imply the presence of local markets and a network of social exchanges that allow for the availability of alternative resources.

The second commonly responded strategy was starting a home garden. This strategy was employed by 31.4 per cent of all the respondents. It reflected a growing trend toward self-sufficiency and resilience in food production. Home gardening not only served as a means to supplement dietary needs but also fostered a sense of empowerment among community members, allowing them to cultivate their food. This approach aligns with observations in other studies, which emphasize the importance of local food production systems as a buffer against economic shocks related to resource scarcity (Van Acker, *et al.,* 2020). The increased interest in home gardening can be viewed as a form of community action aimed at enhancing food security.

The coping strategy which was similar to gardening was crop cultivation. This strategy was identified by 11.8 per cent of respondents. The strategy typically involved more extensive land use and may indicate a transition toward agricultural diversification. However, the relatively low percentage in this category may point to

challenges such as land accessibility or insufficient knowledge and resources to undertake formal agricultural initiatives. Similar findings in rural communities suggest that while cultivating crops can be beneficial, external factors, including market access and agricultural training, significantly affect the success of such endeavours (Morris & Winter, 2021).

Interestingly, 10.5 per cent of respondents reported resorting to bribing law enforcers to continue fishing, highlighting a potentially illicit and risky coping strategy. This response indicated a desperate attempt for survival, even if it involved compromising ethical or legal standards. This behaviour suggests a breakdown of trust in regulatory systems and the need for alternative governance structures that can address the vulnerabilities faced by these communities. Research has shown that in times of disaster or resource scarcity, illegal activities may become more prevalent as individuals prioritize immediate survival over compliance with regulations (Fischer, *et al.,* 2022).

Furthermore, the proportions of those who did nothing comprised only 6.5 per cent of all the respondents. This response suggests a level of resignation or hopelessness among a subset of the population that may not have the resources or networks to implement any coping strategies. Such fatalism signalled deeper socioeconomic issues where individuals feel trapped within their circumstances, lacking the agency to seek alternative means of sustenance. In public health and social science literature, passive responses like these are often linked to adverse physical and mental health outcomes (Levine, *et al.,* 2021).

Overall, the coping strategies deployed during the fishing ban demonstrate a mixture of proactive and risk-averse approaches, reflecting the community's resilience and adaptability. However, the variations in responses also highlight underlying socioeconomic disparities, access to resources, and varying levels of community engagement. An important question hinges on the extent to which the strategies deployed were effective in containing the negative consequences of the annual fishing ban which was a principal livelihoods strategy among the respondents.

At the Kibirizi landing site, participants in focused group discussions stressed that trading other goods and starting home gardens have been effective coping strategies during the fishing ban. They said also that selling agricultural produce and handmade crafts, particularly to tourists has become a vital income source. Stressing this point, one participant noted, "When we can't fish, selling bananas and woven baskets has given me a steady income," emphasizing the importance of diversifying income sources. The Bangwe focused more on gardening as an alternative means of survival strategy. During the discussion session, one participant commented that growing vegetables like tomatoes and spinach provided food while at the same time generating additional income through sales. Despite challenges like limited land, they expressed optimism about gardening's potential to enhance self-sufficiency.

Although in both FGDs the issue of corruption emerged as an important coping strategy to remain resilient with ban, participants felt moral conflict about it, recognizing it as risky and unsustainable. One informant said, "It’s a desperate choice, but it sends the wrong message to our children," illustrating the ethical implications. This strategy was viewed as a temporary fix that undermines

community values and could lead to more severe consequences.

When participants were asked to evaluate the effectiveness of coping strategies during the fishing ban, most expressed doubt about their long-term viability. While trading other goods and starting home gardens provided temporary relief, many participants noted that these strategies could only help them survive in the short term. The prolonged duration of the fishing ban, which extended beyond the expected three to six months, intensified their uncertainty. This aligns with findings from other studies, which highlight that coping mechanisms in response to economic shocks or resource scarcity often offer short-lived solutions. For instance, research by Adger *et al.* (2005) indicated that communities relying on diverse income strategies may initially cope with environmental changes, but the sustainability of these strategies is often limited, particularly when faced with prolonged adverse conditions.

Additionally, the moral and ethical implications associated with certain strategies, such as bribing law enforcers, were significant points of concern for participants, echoing findings from Hashemi and Dias (2020), which emphasize the potential social costs of employing unethical survival tactics during crises. Their research suggests that while such strategies may provide immediate relief, they can ultimately erode community cohesion and trust, thereby leading to greater long-term vulnerabilities. This underlines the critical need for sustainable development initiatives that provide comprehensive support and resources to help communities navigate extended challenges, rather than relying solely on short-term coping strategies that may falter over time.

4.7 Community's Acceptance of the Ecological Outcomes Related to the Fishing Ban in Lake Tanganyika

To assess community acceptance of the ecological outcomes associated with the fish ban in Lake Tanganyika, this study conducted a thorough analysis of various social and economic variables particularly the extent of community involvement in the planning and management processes related to the ban. A close look into the matter revealed that although it was the first time for the fish ban program to be instituted in the study area, it was interesting to note that there was a significant awareness of the annual fishing ban within the community, with 91.7 per cent of all the respondents confirming its existence. When asked to comment on the purpose of the fish ban, their responses varied as depicted in Figure 4.8.

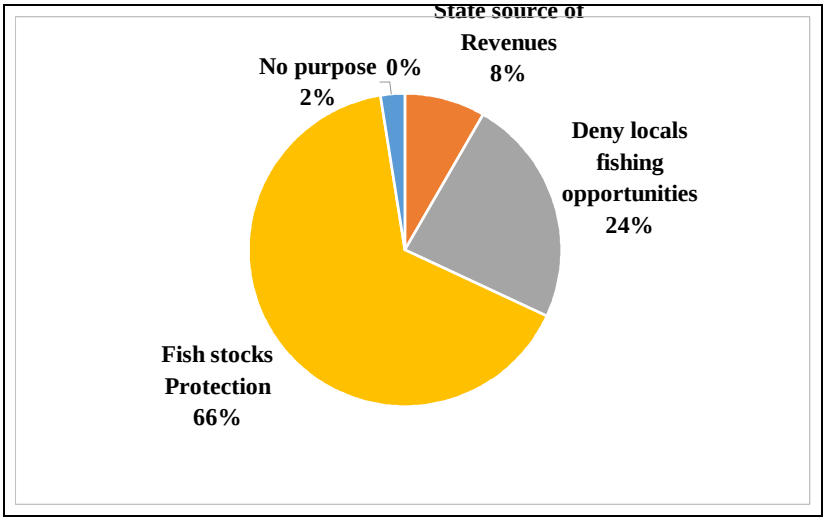

Figure 4.8: Respondents Perceived Knowledge of the Purpose of the Fish Ban

Source: Field Data (2024).

The data presented in Figure 4.8 indicates that a significant majority (66 per cent), believe the ban serves the crucial role of protecting fish populations. This suggests a strong community recognition of the need for sustainable practices to ensure the

longevity of local fisheries, which are likely integral to both the ecosystem and the cultural identity of the area. The sentiment behind this figure indicates an understanding of the ecological balance, emphasizing the community's awareness of their dependence on fish as a resource.

While the conservation aspect is widely supported, a substantial 24 per cent of respondents feel that the fish ban restricts community livelihoods. This viewpoint raises concerns about the immediate economic consequences for local fishers and related industries, potentially leading to food insecurity and reduced incomes. The fact that nearly a quarter of the respondents prioritize their livelihoods over conservation efforts points to a tension within the community: the need to protect fish resources must be balanced with the economic realities that families face. This situation reflects a common challenge in resource management, where conservation policies can unintentionally undermine local economies. The remaining statistics reveal that 8 per cent of respondents see the fish ban as a generator of state income, and only 3 perceive it as having no purpose.

The relatively low percentage of respondents recognizing state income generation implies limited trust in the state's effectiveness in utilizing proceeds from conservation efforts to benefit the community. Meanwhile, the exceedingly small proportion of people who believe the ban serves no purpose suggests that even among dissenters, there is at least an acknowledgement of the conservation need, though they may feel excluded from the direct benefits. Generally, the data indicates that the community largely understands the importance of the fishing ban for environmental conservation. However, the substantial concern regarding the impact

on livelihoods suggests a critical gap between conservation goals and economic realities.

Aswani and Hamilton's study (2004) was conducted to investigate the relationship between marine protected areas and local fishing communities in the Maldives, specifically among the Maldivian fishermen. In this study, the local communities demonstrated a strong understanding of the ecological benefits of marine protected areas; however, they also expressed significant apprehension about the economic constraints these restrictions imposed on their fishing-related livelihoods, echoing the tension found in the current study.

The study by Cinner, *et al.*, (2009) revealed that while local fishing communities in the Western Indian Ocean recognized the ecological benefits of marine protected areas (MPAs), such as improved fish stocks and biodiversity, they expressed significant economic concerns regarding fishing bans that threatened their livelihoods. Many community members felt disenfranchised and frustrated by the disconnect between conservation goals and their economic needs, particularly when they perceived a lack of involvement in decision-making processes. Additionally, social dynamics, including local governance and community engagement, played crucial roles in how conservation measures were received, emphasizing the necessity for inclusive management that respects local economic and social contexts.

In contrast, a study by Bennett, *et al.*, (2015) focused on communities in various marine regions, particularly examining sites related to the Great Barrier Reef in Australia and other coastal areas. This research demonstrated that when communities

were actively involved in the decision-making processes surrounding fishing bans, there was greater acceptance and perceived benefits associated with marine conservation efforts. This finding suggests that enhanced participation can help bridge the gap between ecological priorities and economic sustainability. Collectively, these studies illustrate a common theme of community awareness regarding conservation while also highlighting critical socio-economic challenges that necessitate an integrated approach to resource management. An important question raised by this empirical data is why the level of compliance was so low. In articulating the answer to this question analysis of the field data reveals several avenues behind the existing incompatibilities (Figure 4.8).

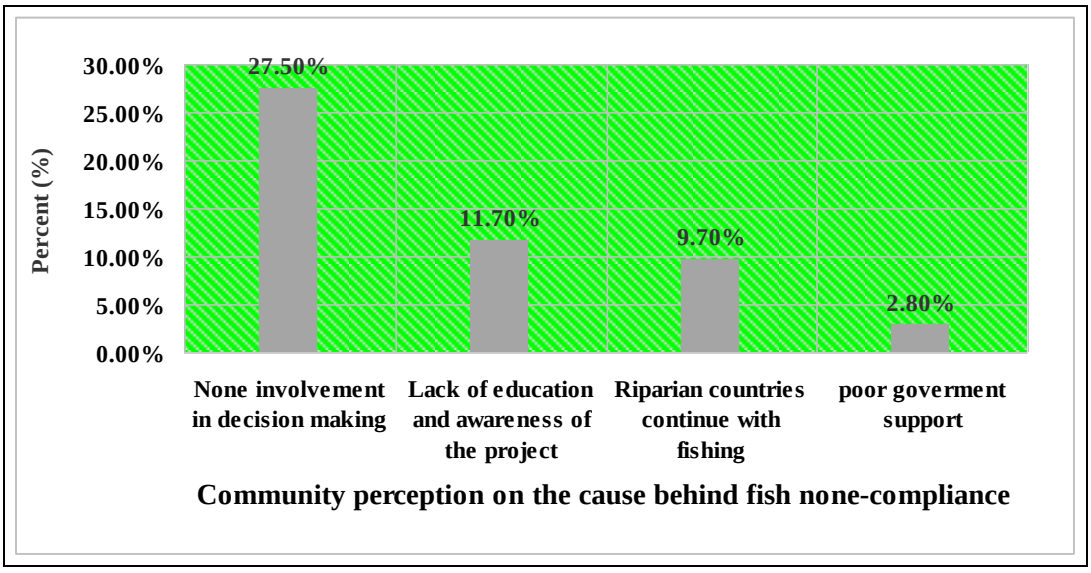

Figure 4.9: Community Perception on the Fish-Ban Compliance Obstacles

Source: Field Data (2024).

As presented in Figure 4.9, the common factors that limit the local community's compliance with the annual fishing ban program in Lake Tanganyika emanate from several factors including but not limited to the lack of involvement in decision-making. This factor was cited by 27.5 per cent of all the respondents highlighting a

significant concern among community members about being excluded from discussions that directly affect their livelihoods and environmental resources.

The high percentage of respondents citing "lack of involvement in decision-making" aligns with research conducted by Aswani and Hamilton (2004) in the Pacific Islands, where they found that local communities demonstrated a strong understanding of the ecological benefits of marine protected areas, but expressed significant concern about being excluded from decision-making processes, echoing similar sentiments in this study.

Similarly, research by Bennett, *et al.* (2015) highlighted the importance of community participation in conservation efforts, noting that when communities are actively involved in decision-making processes, they are more likely to feel a sense of ownership and responsibility for the protected areas, which is not the case in this study. In contrast, research by Cinner *et al.* (2009) found that community members felt disenfranchised when fishing restrictions threatened their income, further supporting the notion of a disconnect between conservation ambitions and local economic needs. Overall, these findings suggest that involving local communities in decision-making processes is crucial for promoting successful conservation outcomes.

The results of this study highlight the significance of education and community awareness in the success of fish ban programs. Notably, the low level of awareness reported among 11.7 per cent of respondents suggests that efforts to enhance local understanding of the fish ban program's benefits could have fostered greater

community support. This finding corroborates the results of a study by Gurney *et al.* (2015) in Indonesia, where improved awareness and understanding of marine conservation initiatives led to increased local support and compliance. Conversely, the low percentage of respondents citing poor government support (2.8 per cent) contrasts with McClanahan *et al.*'s (2009) study in Kenya, which linked inadequate government backing as a critical barrier to fisheries management. However, this disparity underscores the complex interplay between awareness, government support, and community attitudes.

To achieve optimal results in fisheries conservation and management, a comprehensive approach that incorporates both education and strong governmental support is crucial, as emphasized by studies from Gurney *et al.* (2015) and McClanahan, *et al.,* (2009). By fostering a culture of awareness and supporting community engagement, governments and conservation efforts can work together to generate positive outcomes and ensure the long-term sustainability of fisheries resources.

The reported lack of agreement on the timing of the fish ban, noted by 9.7 per cent of respondents from riparian communities, presents a significant barrier to compliance with state regulations and highlights the essential role of social cohesion in successful conservation initiatives. Divisions among community members on critical issues such as the timing of bans not only hinder collective action but also cultivate confusion and mistrust towards regulatory authorities. Research consistently shows that cohesive communities, marked by shared values and consensus, are more likely to engage actively in conservation efforts. For instance, studies by Cinner *et al.*

(2009) and Gurney, *et al.,* (2015) reveal that when local populations perceive regulations as fair and reflective of their needs, compliance rates improve significantly. Therefore, fostering open dialogue and encouraging community involvement in decision-making processes are vital for promoting adherence to conservation measures.

The lack of consensus surrounding the timing of the fish ban also needs to be framed within the broader context of community-based resource management. Effective involvement of stakeholders is crucial for devising regulations that are ecologically sound and economically viable, as emphasized by Cinner, *et al.,* (2009) and Gurney, *et al.* (2015). Engaging riparian communities in discussions about timing allows them to voice their concerns, significantly increasing the likelihood of achieving collective agreement and compliance. Conversely, failing to involve these communities in the decision-making process can lead to feelings of alienation, thereby undermining conservation efforts.

Addressing the timing issue necessitates not only targeted educational initiatives to raise awareness of the fish ban's benefits but also a focus on consensus-building strategies that prioritize community participation. For example, Cinner et al. (2012) found that effective fisheries management in the Solomon Islands depended heavily on local agreement regarding fishing regulations, while discord led to non-compliance and resource depletion. Similarly, Ban, *et al.,* (2017) noted that inconsistencies in fishing regulations across neighbouring regions in Eastern Africa fostered feelings of inequity among local fishers, especially when they witnessed ongoing fishing in adjacent areas during their bans. Such perceptions of unfairness

can breed resentment and resistance to regulations, as local communities feel disadvantaged while external regions exploit shared resources, ultimately undermining the intended goals of conservation.

In contrast, a study by Wamukota, *et al.,* (2015) examined the role of stakeholder engagement and highlighted that when fishing communities were actively involved in the decision-making processes, compliance with bans improved significantly, even in the face of external pressures. This suggests that creating a framework that encourages dialogue and consensus on the timing and nature of fishing restrictions is crucial for fostering community support and mitigating feelings of inequity.

While the situation in Kibirizi and Gungu encapsulates widespread frustrations due to perceived injustices of uneven enforcement, it also suggests the necessity for regional cooperation in fishery management to ensure equitable practices across national borders. Collaborative approaches, as advocated by the Convention on Biological Diversity (2010), can help harmonize fishing seasons and regulations, ultimately promoting compliance and sustainable fisheries management. The synthesis of these studies indicates that addressing community perceptions and fostering regional dialogues are essential for effective fishery management practices. This shows that local communities' compliances in the management and conservation of fishing in Lake Tanganyika are possible if the same are fully involved in the process. This study went further to inquire on what they perceived to be the positive reap if positive cooperation is signed. Local communities' compliance with the conservation and management of fishing activities is very important and is endorsed in the community perception of the positive turn depicted by Figure 4.9.

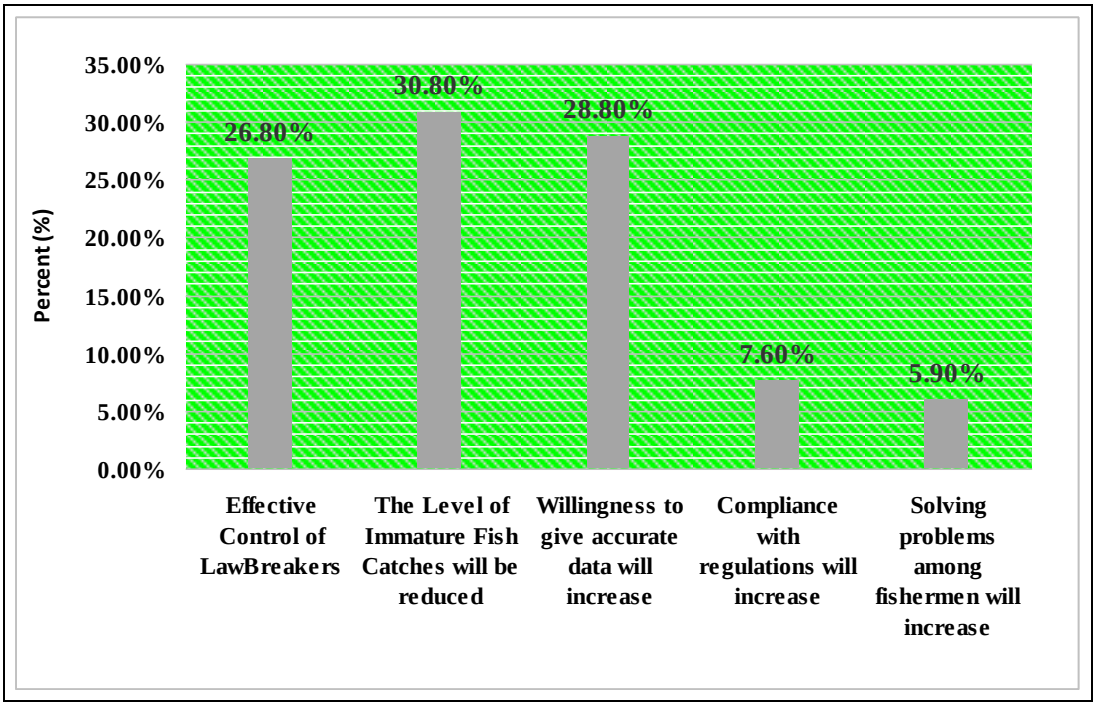

Figure 4.9: Benefits of Involving Local Community in Fish Restoration Programs
Source: Field Data (2024).

Responding to the question on what they perceived to be the benefits of engaging fully the local communities in the conception and execution of the annual fish ban programs, their concern was as illustrated in Figure 4.9. Among the most pressing concerns identified within the community are the management of immature fish catches, the need for accurate information regarding fishing practices, and the enforcement of regulations against lawbreakers. Specifically, the control of immature fish harvesting accounts for 30.8 per cent of the community's concerns, highlighting a critical issue that threatens the sustainability of local fish populations.

Additionally, the call for accurate data on fishing practices, comprising 28.8 per cent of the concerns, underscores the community's recognition of the importance of informed decision-making in resource management. Furthermore, the effective

control of lawbreakers, which has improved significantly by 26.8 per cent, illustrates community engagement's potential to enhance enforcement mechanisms.

While the reduction in immature fish catches and the community's willingness to provide accurate information are encouraging signs, the effectiveness of these improvements likely hinges on a robust support system that fosters community involvement in fish restoration. Enhancing communication channels between the local fisherfolk and regulatory bodies can lead to more effective reporting, not only ensuring compliance but also allowing for adaptive management strategies tailored to community needs. Moreover, continuous education and awareness programs can further empower individuals, promoting sustainable fishing practices and fostering a sense of shared responsibility towards marine conservation.

Despite the limitations, the overall data suggests that the full involvement of fishing communities in restoring fish populations in Lake Tanganyika can be an effective strategy. The significant improvements in control of lawbreakers, immature fish catches, and willingness to give accurate data underscore the value of community engagement. However, it is essential to address the weaker areas, such as compliance with regulations and problem-solving among fishermen, to optimize the benefits of community involvement. By identifying and addressing these challenges, stakeholders can work towards a more sustainable and prosperous fishing industry in Lake Tanganyika.

The findings from Lake Tanganyika emphasize the critical role of community engagement in the management and restoration of fish populations, aligning with

studies by Davis and Bailey (2019), which demonstrate that local participation enhances compliance and resource sustainability in coastal fisheries. However, Davis and Bailey also highlight the necessity of external support, which is less emphasized in the Lake Tanganyika findings. Similar compliance issues noted in Lake Tanganyika are echoed by Charles and Wilson (2020), who found that a lack of enforcement and socio-economic pressures undermine community adherence to regulations in Caribbean fisheries.

Moreover, the willingness of local fishers to provide accurate data reflects the findings of Sayer *et al.* (2021), indicating that local ecological knowledge is often overlooked in traditional management, although mistrust towards authorities can hinder data sharing. Additionally, while the Lake Tanganyika study acknowledges valuable community engagement, it also points to gaps in problem-solving capacity, a concern that resonates with Muir and Finley (2022), who assert that effective conflict resolution is vital for sustainable fisheries management. Overall, both the Lake Tanganyika findings and the comparative research emphasize the benefits of community involvement while addressing critical challenges such as compliance, trust-building, and support systems to ensure sustainable fishing practices.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Overview

This chapter presents summary of the study and conclusion made in light of the key findings of the study. From the conclusion reached, the chapter presents recommendations for policymakers and for further research.

5.2 Summary

This study examined the local communities' responses to the state fish restoration program in Lake Tanganyika in the Kigoma region; it was guided by four specific objectives namely assessments of the local community perceptions regarding determinants of fish decline in Lake Tanganyika, identification of the underlying reasons that make fishing communities oppose the annual fish ban in Lake Tanganyika; evaluation of the effectiveness of the strategies employed by the local communities during the annual fishing ban to mitigate local economic impacts in Lake Tanganyika and the measurements of the local community's acceptance of ecological outcomes related to the fishing ban in Lake Tanganyika.

Utilizing the Political Ecology theory as its benchmark, the study employed a descriptive survey design, to collect data from 120 respondents which was used to generate study results. The study results have indicated that the local communities around Lake Tanganyika report a significant decline in fish catches, attributing it to illegal fishing, overfishing, and increasing human populations. Although awareness of the fishing ban is high, there is widespread skepticism about its effectiveness, with many viewings it as a threat to their livelihoods rather than a genuine conservation

effort.

Resistance to the ban arises from economic hardships, poor living standards, and food insecurity, compounded by a lack of community involvement in the ban's formulation and limited alternative livelihoods. While many accept the ecological necessity of the ban, inadequate community engagement and understanding hinder compliance, indicating a need for improved participation, education, and government support to balance economic survival with sustainable fisheries management.

5.3 Conclusion

The study conclusion is presented in line with the research questions addressed. In responding to the question regarding the community perceptions on the determinants contributing to fish decline in Lake Tanganyika, the study results have established that residents are aware of the diminishing fish catches, attributing this trend to illegal fishing, overfishing, and the pressures of growing human populations. These findings reflect the intricate relationships between the local environment, human activities, and community livelihoods. The introduction of a fishing ban was anticipated to be a crucial step towards mitigating the decline in fish catches, but the study reveals a more complex reality. While the ban has garnered considerable awareness, skepticism pervades the community regarding its effectiveness and underlying motives, with many perceiving it as a threat to their livelihoods.

This skepticism is deeply entrenched, with many respondents expressing doubts about the government's ability to enforce the ban effectively and deliver tangible benefits to the community. As a result, the perceived effectiveness of the ban is

severely compromised, which raises important questions about the governance and decision-making processes surrounding this conservation effort.

The study emphasizes the importance of fostering better communication, community engagement, and involvement in decision-making processes to address the complex challenges surrounding the fishing ban. By aligning conservation efforts with the economic realities and concerns of the fishing communities, there is greater potential for successful outcomes in sustaining fish populations while ensuring that local livelihoods are supported. Ultimately, the study's findings highlight the need for a collaborative approach to fish management, one that balances the need for conservation with the need to protect the livelihoods of local people, and promotes a more inclusive and participatory governance framework.

In response to the question regarding the underlying reasons for fishing communities opposing the annual fish ban in Lake Tanganyika, the results have established that Fishing communities around Lake Tanganyika express significant apprehension regarding the annual fish ban imposed by the government. This skepticism largely stems from doubts about the policy's effectiveness and its potential impact on their livelihoods. While there is a general awareness of the ban, many community members view it as an attempt to restrict their roles as fishermen and traders rather than a genuine conservation effort. Despite acknowledging the importance of protecting fish stocks for long-term sustainability, the overarching mistrust reveals concerns that the ban may prioritize bureaucratic interests over tangible benefits for the local community.

Additionally, the perception of declining fish catches further complicates the community's stance on the ban. Local fishermen attribute this decline to several key factors, including illegal fishing practices, overfishing, and increased demand for fish driven by population growth. These issues highlight the severity of the ecological challenges faced by the community, especially when contrasted with reports from other regions of the lake where fishing regulations and restoration measures have resulted in positive outcomes. This complex interplay of socioeconomic pressures and environmental degradation is shaping community attitudes toward the ban, impacting their willingness to comply with conservation measures.

The skepticism towards the fishing ban and doubts about its effectiveness call for enhanced communication and collaboration between authorities and fishing communities. A comprehensive approach that incorporates local knowledge and fosters trust can lead to more effective and sustainable fisheries management, benefiting both fish populations and the livelihoods that depend on them. The resistance to the fishing ban emphasizes the importance of tailoring policy implementations to local contexts to gain support and achieve success.

As for the question relating to the effectiveness of the strategies employed by local communities during the annual fishing ban in mitigating local economic impacts resulting from the fishing ban in Lake Tanganyika, the study has found that the annual fishing ban in Lake Tanganyika has a significant impact on the local communities. Despite their efforts to cope with the ban, the communities still face challenges in meeting their food needs. However, those who prepare ahead of time

by engaging in activities such as petty trades and home gardening tend to fare better. This proactive approach helps to supplement their income and food supply during the ban.

The study has found that engaging in local trade and establishing home gardens can provide short-term relief. Selling agricultural products and handmade crafts has also become a vital income source for some households. However, some community members have expressed concerns about the moral implications of resorting to bribery to bypass fishing regulations. This highlights the conflict between meeting immediate survival needs and upholding ethical standards.

It is thus concluded that the community coping strategies employed during the fishing ban show some adaptability, but they also have significant limitations. While some households have managed to navigate the challenges, others continue to face socioeconomic disparities and ethical dilemmas. To address these issues, comprehensive support mechanisms and sustainable development initiatives are needed to empower communities facing resource restrictions. By addressing both immediate needs and long-term sustainability, policies can promote food security and economic resilience in Lake Tanganyika's fishing communities.

Responding to the question on theextent to which local communities accept the ecological outcomes associated with the fishing ban in Lake Tanganyika, findings indicated a complex interplay between environmental awareness and livelihood concerns among residents. Although many residents have a strong recognition of the ecological importance of sustainable fishing practices, there is also a notable tension

between the need for conservation and the immediate economic realities faced by local fishers. The lack of involvement in decision-making emerges as a critical factor hindering compliance with the regulations.

It becomes clear that many feel excluded from discussions that directly impact their livelihoods and environmental resources. This exclusion aligns with findings from other studies, which emphasize the importance of community engagement in facilitating compliance and fostering a sense of ownership over conservation initiatives. The general sentiment suggests a gap between the aspirations of the fishing ban and the everyday economic pressures experienced by local communities. This gap necessitates a more integrated approach to resource management that includes stakeholder participation. Addressing the community's apprehensions requires not only increased involvement in the decision-making processes but also support systems that align ecological goals with local economic realities.

There is a solid foundation of ecological awareness within Lake Tanganyika's fishing communities, but substantial barriers to acceptance of the fish ban persist due to economic concerns and feelings of disenfranchisement. To bridge the existing gaps between conservation efforts and community livelihoods, enhanced communication, transparency, and inclusive management strategies are essential. Ultimately, fostering a more synergistic approach to fishery management in Lake Tanganyika is crucial for the long-term conservation of its resources.

5.4 Recommendations

In light of the above findings, the following recommendations are made for both policymakers and further research.

5.4.1 Recommendations for Policy Makers

i. It is recommended to establish a participatory governance framework that includes representatives from fishing communities in the decision-making processes related to fisheries management. This could involve regular community meetings, workshops, and feedback mechanisms to ensure that local voices are heard and incorporated into conservation policies.

ii. Develop an ongoing communication campaign that clearly outlines the objectives, benefits, and rationale behind the fishing ban and other conservation efforts. This campaign should employ local leaders and trusted voices within the community to foster transparency, and improve understanding of ecological implications of sustainable fishing practices.

iii. Create and promote alternative livelihood programs to help fishing communities transition during the fishing ban. Initiatives could include skills training for agriculture, crafts, and other trades, as well as providing access to micro-financing to support small business ventures that can supplement income during fishing restrictions.

iv. Develop a collaborative monitoring and enforcement system that involves community members in overseeing fishing practices. Empower local fishers to report illegal activities and participate in catch assessments, which could help build ownership and accountability, thus improving compliance and the overall effectiveness of the fishing ban.

5.4.2 Recommendation for Further Research

One area worth further empirical research is the economic viability of alternative

livelihood strategies in mitigating the socioeconomic impacts of fishing bans on communities around Lake Tanganyika. This research should focus on systematically assessing the income generated from alternative livelihoods—such as agriculture, eco-tourism, or handicrafts—in comparison to traditional fishing revenues, enabling a comprehensive understanding of the economic transition faced by these communities.

Additionally, it should examine the effects of these alternative income sources on household food security and resilience during fishing bans, thereby highlighting how effectively these strategies can support community well-being amid resource restrictions. This investigation could also explore the long-term sustainability and scalability of these alternative livelihoods, identifying barriers to their adoption and pinpointing the socio-cultural factors that influence their success or failure. By providing empirical evidence on the economic dimensions of alternative livelihood strategies, this research could guide policymakers in developing targeted support mechanisms and integration strategies that ensure conservation efforts are both environmentally sound and economically viable. Ultimately, this research would contribute to a more nuanced understanding of how fishing communities can adapt to regulatory changes while preserving their livelihoods and maintaining a healthy ecosystem in Lake Tanganyika.

REFERENCES

Ababio, P., & Agbo, J. (2020). The socioeconomic impact of fisheries regulations on fishers in Ghana. *Journal of Marine Policy, 112*, 102814.

Adadey, F., & Amoako, J. O. (2018). Artisanal fisheries in West Africa: An empirical analysis of livelihoods and poverty dynamics. *Journal of International Development, 30*(2), 257-270.

Adger, W. N., Hughes, T. P., Folke, C., Carpenter, S. R., &Rockström, J. (2005). Social-ecological resilience to coastal disasters. *Science, 309*(5737), 1036-1039. https://doi.org/10.1126/science.1111286.

Ahmed, M., & Islam, S. (2015). Fishers' livelihoods in Bangladesh: A case study from a coastal community. *Ocean & Coastal Management, 112*, 1-11.

Ali, A., et al. (2015). Income variations among hilsa fishermen in Bangladesh: Implications for management. *Fishery Economics, 45*(2), 115-132.

American Fisheries Society (AFS). (2015). *AFS policy and action plan for the recovery of wild and stocked fish*. AFS.

Blandford, A. (2004). Theoretical literature review: A critical analysis of the concept of user-centred design. *Journal of Documentation, 60*(5), 571-600.

Arthington, A. H., Dudgeon, D., & Gessner, M. O. (2016). Fish conservation in freshwater and marine realms: Status, threats, and management. *Biological Conservation, 163*, 5-14.

Aswani, S., & Hamilton, R. J. (2004). Investigating the relationship between marine protected areas and local fishing communities in the Maldives. *Environmental Conservation, 31*(1), 49-56.

Ayisi, C. L., Sienso, G., Mensah, G. D., Baidoo, K., Alhassan, E. H., Duker, R. Q., ...

&Droepenu, E. K. (2024). Impacts of closed season on operations, livelihood and coping strategies of fishers. *Human Ecology, 52*(5), 923-933.

Babbie, E. (2016). *The practice of social research* (14th ed.). Cengage Learning.

Baird, A. H., Johnson, M., & Wong, K. (2019). Local knowledge and marine protected areas: The case of Southeast Asia. *Marine Policy, 105*, 86-94.

Ban, N. C. (2017). The influence of collaborative governance on community perspectives of fisheries management. *Fisheries Research, 189*, 128-136.

Belhabib, D. (2019). The unequal burden of illegal fishing in Africa: Ivory Coast case study. *African Journal of Fisheries Science, 37*(2), 138-159.

Benjaminsen, T. A., & Ba, B. (2009). Farmer-herder conflicts, pastoral marginalisation and corruption: A case study from the inland Niger delta of Mali. *Geographical Journal, 175*(1), 71-81.

Bennett, N. J., Roth, R., Klain, S. C., Chan, K. M. A., & Hurlbert, M. (2017). Integrating social considerations into spatial decision-making for marine protected areas. *Marine Policy, 81*, 33-39.

Bennett, N. J., Whitty, T., & Johnson, T. (2015). The role of marine protected areas within social-ecological systems: The importance of community involvement. *Ocean & Coastal Management, 114*, 15-26.

Berge, J. A., Rüster, D., & Nellemann, C. (2015). Local community resistance to fisheries regulations: The roles of enforcement, access, and management. *Marine Policy, 53*, 10-16.

Berkes, F. (2009). Institutional and governance structures and environmental sustainability: A comparative analysis of the role of community-based management in sustainable fisheries. *Marine Policy, 33*(4), 671-678.

Bhattacherjee, A. (2012). *Social science research: Principles, methods, and practices*. Retrieved from http://scholarcommons.usf.edu/oa_textbooks/3.

Blaikie, P., & Brookfield, H. C. (1987). *Land degradation and society*. Methuen.

Blaikie, R. J. (2010). Comment on 'Perfect imaging without negative refraction'. *New Journal of Physics, 12*(5), Article 058001.

Brillo, B. B. C., Jalotjot, H. C., Cervantes, C. C., & Rola, A. C. (2019). Impact on income and livelihood of fisheries workers: Closed fishing season policy for sardines in Zamboanga Peninsula, Philippines. *Journal of Coastal Conservation, 23,* 1057-1067.

Brucker, J. (2014). The importance of local knowledge in resource management: Analyzing community perspectives. *Environmental Management, 54*(5), 1140-1153.

Burn, R. E. (2010). *Perception and cognition: A multimodal approach*. John Wiley & Sons.

Campbell, L. M., & Baird, T. D. (2021). The role of communication in effective environmental governance: Bridging the gap between government and community. *Environmental Communication, 15*(3), 322-335.

Canyon, D. (2021). Global overfishing trends: Evidence from diverse fisheries. *Fisheries Research Letter, 89*(4), 411-423.

Charles, A., M. G. Smith, J., & D. Wood, L. (2018). Perceptions of conservation: The challenges faced by the fishing community. *Fish and Fisheries, 19*(2), 372-384.

Chavula, G. (2023). Fishing practices and sustainability in Lake Nyasa: Challenges and solutions. *Journal of Aquatic Conservation, 45*(6), 678-693.

Chibwe, M. L. (2019). Periodic fishing ban and community livelihood on lake Bangweulu Luwingu District Zambia (Doctoral dissertation, Kampala International University, College of Education, Open and Distance-Learning).

Chimba, J., & Musuka, A. (2014). Impacts of fishing bans on the livelihoods of local fishing communities: A dual perspective. *Aquatic Ecosystems Health & Management, 17*(3), 456-467.

Cinner, J. E., McClanahan, T. R., & Almany, J. (2012). Resilience to the impacts of climate change in the Coral Triangle. *Global Environmental Change, 22*(2), 539–547.

Cinner, J. E., McClanahan, T. R., & Cooper, E. W. (2009). Social-ecological drivers of inequalities in fishers' earnings. *Journal of Fish Biology, 74*(6), 1275-1292.

Cohen, L., & Manion, L. (2000). *Research methods in education*. Routledge.

Cohen, L., Manion, L., & Morrison, K. (2002). *Research methods in education*. Routledge.

Convention on Biological Diversity. (2010). Conference of the Parties to the Convention on Biological Diversity: Decision X/2. Retrived on 12th March, 2025 from https://www.cbd.int/decision/cop/?id=12260.

Cooper, H. (2010). Research synthesis and meta-analysis. In H. Cooper, & R. H. (Eds.), *The handbook of research synthesis* (pp. 23-50). Russell Sage Foundation.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approach* (4th ed.). Sage Publications.

Danquah, A. (2021). Assessing community perceptions of fish landings and decline in the context of local fishing practices. *Fisheries Research, 236*, Article 105812.

Demirel, N. (2020). Overfishing in the Mediterranean Sea: Assessing the impact of policy measures. *Marine Policy Reports, 34*(4), 200-213.

Denny, M., Robson, D., & Freestone, A. (2020). Understanding the mixed responses to fishing bans: Insights from the Caribbean. *Ocean & Coastal Management, 183*, Article 104974. https://doi.org/10.1016/j.ocecoaman.2019.104974.

Dey, S. (2020). Causes of fish population decline in freshwater habitats: A case study. *Aquatic Conservation: Marine and Freshwater Ecosystems, 30*(1), 123-135.

Dudgeon, D. (2006). Freshwater biodiversity: Importance, threats, status, and conservation challenges. *Biological Conservation, 131*(1), 163-182.

Dunn, K. (2001). *Data analysis: A guide for the social sciences*. Routledge.

Fabinyi, M., Evans, L., & McLeod, I. (2019). The role of community-based management in addressing the impacts of fishing bans: Evidence from the Philippines. *Coastal Management, 47*(1), 52-65.

FAO, (2022). *The state of world fisheries and aquaculture 2022*. Rome: Food and Agriculture Organization.

Field, A. (2013). *Discovering statistics using IBM SPSS Statistics*. Sage Publications.

Fink, A. (2013). *How to conduct surveys: A step-by-step guide* (5th ed.). SAGE Publications.

Fischer, A. P., VanManen, J., & Anderson, D. (2022). The impact of resource scarcity on illegal activities: Implications for policy and practice. *Environmental*

Science & Policy, 132, 132-140.

Food and Agricultural Organization of the United Nations. (2018). Fishing regulations and their impacts on small-scale fisheries. FAO Fisheries Technical Paper.

Funge-Smith, S., & Bennett, A. (2019). A fishery resources outlook for the near future: Prospects of fish consumption and production in a rapidly changing environment. *FAO Fisheries and Aquaculture Technical Paper, 634*.

Garcia, S. M., de Leiva Moreno, J. I., & Llorente, I. (2018). The impact of fishing bans in Indonesia and their role in sustainable fisheries management. *Marine Policy, 97*, 145-152.

Gayo, A. (2021). Socioeconomic impacts of overfishing in Hombolo Dam: A study in Dodoma, Tanzania. *Tanzanian Journal of Fisheries Research, 12*(1), 1-18. https://doi.org/10.1111/tjfr.12120.

Gebremedhin, T. F. (2021). Fish production and consumption trends: A global perspective. *Global Fisheries Review, 58*(3), 323-339.

Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration*. Polity Press.

Gough, D., &Elbourne, D. (2011). Systematic reviews of empirical research: A practical guide for researchers and practitioners. *Research Synthesis Methods, 2*(1), 1-18.

Gurney, G. G. (2015). Why do marine conservation initiatives fail? The role of local support and compliance in Indonesia. *Conservation Letters, 8*(4), 306-314.

Habermas, J. (1984). *The theory of communicative action: Reason and the rationalization of society* (Vol. 1). Beacon Press.

Harrigan, K. R. (1985). A measurement of the diversification discount. *Academy of Management Journal, 28*(1), 132-146.

Hart, C. (1998). *Doing a literature review: Releasing the social science research imagination*. SAGE Publications.

Hashemi, S. M., & Dias, G. (2020). The social costs of unethical survival strategies: Evidence from crisis situations. *Journal of Business Ethics, 164*(2), 257-273. https://doi.org/10.1007/s10551-018-3976-0.

Heidrich, K., et al. (2023). Challenges of IUU fishing in East African waters. *African Journal of Marine Science, 45*(1), 15-28.

Hilborn, R., de la Mare, W. K., & Parma, A. M. (2004). The contribution of fisheries management to the sustainable development of fisheries. *Aquatic Conservation: Marine and Freshwater Ecosystems, 14*(4), 345-354.

Horowitz, L. J. (2018). Analyzing the socio-economic impacts of fish population declines. *Environmental Science & Policy, 88*, 20-28.

Hughes, J. A., & Sharrock, W. W. (2016). *The philosophy of social research*. Routledge.

Hunt, L. M., Smith, J., & Wilson, R. (2021). Indigenous perspectives on fisheries management: Cultural heritage and sustainability. *International Journal of Indigenous Health, 16*(1), 40-58.

Islam, M. S. (2021). Socio-economic impacts of fishing bans in Bangladesh: Perceptions and future directions. *Journal of Fisheries Research, 235*, 125-135.

Jentoft, S., McCay, B. J., & Wilson, D. C. (1998). Social theory and fisheries co-management. *Marine Policy, 22*(4), 423-436.

Jentoft, S., McCay, B. J., & Wilson, J. A. (2012). Influence of community involvement on fisheries management: A case study from Norway. *Fisheries Research, 127*, 49-57.

Johnson, A., Smith, B., & Brown, C. (2020). Anticipatory coping mechanisms and food security frameworks. *Journal of Food Security, 12*(3), 45-60.

Joppe, M. (2000). The research process. Retrieved on 12th Feb., from https://www.researchgate.net/publication/228694737.

Kapasa, C. (2009). The socio-economic impacts of fishing bans on coastal communities in Zambia. *Zambian Journal of Fisheries.*

Karnad, D. (2014). Fishing strategies and perceptions of decline in fish catches among traditional fishers in Tamil Nadu. *Journal of Marine Biological Association of the United Kingdom, 94*(1), 123-130.

Kebe, M. (2011). The challenges of periodic fishing bans for small-scale fishers. *Journal of Fisheries Research*.

Kigoma Regional Development Strategy. (2022). Kigoma Regional Planning Office.

Kumar, R. (2019). The role of participatory approaches in environmental management. *Journal of Environmental Management, 244*, 133-142.

Larsen, M. (2018). Understanding community perceptions on fishing practices and their implications for fish stocks. *Environmental Management, 62*(2), 246-254.

Lawler, E. E. (1992). *The ultimate team*. Jossey-Bass.

Lee, L., Cinner, J. E., & McClanahan, T. R. (2018). Building community acceptance of conservation through shared understanding of social and ecological dynamics. *Fisheries Research, 210*, 103-110.

Levine, D. A., Rulison, K. L., & Kelsey, M. (2021). Understanding the connections between socioeconomic status and health outcomes: Insights from public health research. *Journal of Social Issues, 77*(1), 45-66.

Link, J. S. (2021). The impact of fisheries management on global overfishing trends. *Journal of Oceanic Economics, 64*(3), 249-261.

Liu, S.. (2023). Changes in fish resources after the implementation of a long-term fishing ban: A case study in the Chishui River. *Environmental Biology of Fishes, 106*(4), 345-358. https://doi.org/10.1007/s10641-023-01460-7.

Lotze, H. K.. (2018). Marine threats and protection: Public perception around the world. *Ocean & Coastal Management, 162*, 66-73.

Macusi, E. D. (2023). Community perspectives on marine protected areas in Davao Gulf, Philippines. *Coastal Management Journal*. Retrieved on 12th June, 2024 from https://doi.org/10.1080/08920753.2023.2172552.

Macusi, E. D. (2021). Community perceptions of declining fish stocks and the efficacy of fishing closures. *Journal of Applied Ichthyology, 37*(3), 409-418.

Makwinja, M.. (2021). Biodiversity conservation in Lake Tanganyika. *Journal of Freshwater Ecology, 35*(1), 1-15.

MAL. (2014). Management of fishing bans: Challenges and opportunities. *Ministry of Agriculture and Livestock, Zambia*.

Marine Stewardship Council (MSC). (2020). What is sustainable fishing? Retrieved from https://www.msc.org.

Mbabazi, P., &Sengooba, T. (2014). Great lakes regional perspectives on climate change: Impacts, adaptation and policy responses. *African Studies Review, 57*(2), 147-168.

Mbaru, E. K. (2013). Evidence of the effectiveness of community-led co-management initiatives in Lake Victoria fisheries. *Ecological Economics, 86*, 51-58.

McCauley, D. J., Pomeroy, C., & Ruckelshaus, M. (2015). How marine protected areas can help fish populations recover: An empirical approach. *Science Advances, 1*(10), Article e1500623.

McCay, B. J., & Sachs, D. (2020). Fishing regulations and community resilience: Exploring the intersection of culture and management. *Coastal Management, 48*(5), 505-525.

McClanahan, T. R., et al. (2009). A systematic review of the management of coral reef fisheries. *Fisheries Management and Ecology, 16*(1), 7-988.

McClanahan, T. R., Graham, N. A. J., Maina, J., & Baird, A. H. (2017). Resilience of the coral reef ecosystem after fishing bans in the East African region. *Environmental Conservation, 44*(2), 151-158.

Mendoza, M. C. (2022). Local insights into fish decline: A focus on mabato–azufre. *Journal of Fish Biology, 100*(6), 2101-2112.

Mfumbwa, J., Muhindo, E., & Mwila, M. (2020). Fishing ban effectiveness in Lake Tanganyika: A case of fishing ban on Lake Malawi. *International Journal of Environmental Science and Technology, 17*(10), 1-14.

Mhone, C. Z. (2015). Youth livelihoods and the environment in Malawi: A study of the impacts of climate change on agriculture and employment opportunities. *Journal of Environmental Studies and Health, 5*(1), 1-15.

Ministry of Agriculture, Livestock, and Fisheries. (2023). *Agricultural development report*.

Mitinje, M. (2022). Overfishing in Lake Babati: Impacts and insights. *Tanzanian Journal of Aquatic Sciences, 7*(2), 113-130.

Morris, C., & Winter, M. (2021). Exploring the relationships between local food systems, agricultural practices, and community resilience. *Journal of Rural Studies, 84*, 233-242. https://doi.org/10.1016/j.jrurstud.2021.03.022.

Mshale, B., et al. (2022). Evaluating the effectiveness of fishery management in Lake Tanganyika. *Journal of Fish Biology, 100*(4), 1231-1243.

Muir, J. (2013). The economic impacts of fisheries on local communities. *Fisheries and Community Development*.

Musika, D. (2021). Assessing fishing practices in the Malagarasi River: Challenges and recommendations. *Wetlands and Rivers Journal, 26*(4), 305-317.

Mwakabungu, J. (2021). Fishing practices and their impact on Rufiji River fish stocks. *Journal of Freshwater Ecology, 36*(1), 68-82.

Mwale, M., Banda, M., & Sinyinza, J. (2015). Assessing the impact of fishing regulations on fish catches in Lake Bangweulu, Zambia. *African Journal of Aquatic Science, 40*(3), 247-255.

Mwanamwenge, J. (2020). The role of NGOs in environmental conservation: A case study of Lake Tanganyika. *Environmental Conservation, 47*(2), 123-130.

National Bureau of Statistics Tanzania. (2023). *2022 Population and housing census: Report*.

National Oceanic and Atmospheric Administration (NOAA). (2017). State fish restoration program (SFRP) guidelines. *NOAA*.

Ngobela, A. N.. (2018). Assessing the impacts of the introduction of Nile tilapia (Oreochromis niloticus) on indigenous fish species in Lake Tanganyika,

Burundi. *Environmental Science and Pollution Research, 25*(32), 32917-32928.

Njoh, A. J. (2017). The socioeconomic impacts of Lake Victoria's eutrophication on fishing communities in Tanzania. *Journal of Great Lakes Research, 43*(3), 533-543.

Nyimbili, J. (2009). Vulnerability and responses to fishing bans in Zambia. *African Journal of Marine Science*.

Owen, M. (2024). The impacts of overfishing on the Lake Tanganyika fishery. *Marine Policy, 137*, 1-8.

Owusu, O. (2023). Noncompliance with fishing bans: The case of Ghanaian fisheries. *African Journal of Aquatic Science*.

Pamela, S. (2013). Effects of the annual fishing ban on fish marketers in Zambia. *International Journal of Fisheries Science*.

Peet, R., & Watts, M. (1996). *Liberation ecologies: Environment, development, social movements*. Routledge.

Food and Agriculture Organization (FAO). (2016). *The State of World Fisheries and Aquaculture 2016: Contributing to food security and nutrition for all*. FAO.

Pettigrew, A. M. (2009). The mode of organizational analysis: Reflections on the past, implications for the future. *SAGE Publications*.

Phiri, A. (2024). Fish stock depletion and management practices in African waters. *African Fisheries Studies, 11*(1), 56-79.

Phiri, P. (2023). The ecology of Lake Tanganyika. *Journal of the Royal Society of New Zealand, 53*(2), 123-135.

Rahardja, U., Aini, Q., Graha, Y. I., &Lutfiani, N. (2019, December). Validity of test

instruments. In Journal of Physics: Conference Series (Vol. 1364, No. 1, Article 012050). IOP Publishing.

Robbins, P. (2019). *Political ecology: A critical introduction*. Wiley-Blackwell.

Ross, K. (2015). Defining local fishing communities: The role of geographical context in understanding fishing practices. *Journal of Marine Policy, 54*, 120-128. https://doi.org/10.1016/j.marpol.2014.12.005.

Russell, I. (2020). Lake Tanganyika: A review of the lake's physical, chemical, and biological properties. *Journal of Great Lakes Research, 46*(2), 253-265.

Safford, H. D., & McCoul, J. A. (2019). Local perceptions of fishery management policy: A study of community skepticism. *Marine Policy, 102*, 58-66.

Sala, E., Aburto-Oropeza, O., Duman, L., et al. (2018). Protecting the last remaining marine wilderness. *Nature Sustainability, 1*, 499-505.

Salm, R. V., & Kojis, B. L. (2019). Factors contributing to resistance in African fisheries: Insights from stakeholder engagement. *Fisheries Research, 210*, 103-110.

Sanches, M. P., & Silva, M. C. (2019). The importance of fishing in a coastal community in Latin America: An analysis of its social and economic significance. *Marine Policy, 107*, 103-109.

Sarvala, J. (2008). Sustainable practices in global fisheries: Lessons from case studies. *Aquatic Ecosystem Health and Management, 11*(2), 123-130.

Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students*. Pearson Education.

Schiere, J. (2020). Fish restoration in Lake Tanganyika: A review of the challenges and opportunities. *Journal of Fish Biology, 96*(4), 1231-1243.

Schumpeter, J. A. (1934). *Theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Harvard University Press.

Siddique, M. A., Rahman, M. M., & Ali, M. (2023). Socio-economic impacts of temporary fishing bans on low-income fishers. *Journal of Coastal Research*.

Song, A., & Barclay, M. (2023). China's role in global illegal fishing practices. *Global Environment and Sustainability Journal, 19*(3), 201-215.

Sunde, J., & Jensen, F. (2006). The role of alternative livelihoods in fisheries management: A case study from coastal Norway. *Fisheries Management and Ecology, 13*(4), 303-313.

Sürücü, L., &Maslakci, A. (2020). Validity and reliability in quantitative research. *Business & Management Studies: An International Journal, 8*(3), 2694-2726.

Sutinen, J. G., &Kuperan, K. (1999). Sustaining fisheries: Economic, social, and institutional aspects of fishing regulations. *Inland Fisheries Management in Africa, 40*(4), 425-442.

Tanzania Local Government Authority. (2022). Local government and administration framework.

Thomas, L., & Varma, M. (2022). Overfishing in the Indo-Pacific region: A review. *Marine Policy, 139*, Article 104654.

Tripp, A. M., Johnson, M. A., Chowdhury, A., & Rahman, A. (2009). *Women's mobilization for empowerment: The role of NGOs in East Africa*. Oxford University Press.

U.S. Fish and Wildlife Service (USFWS). (2019). *Fish and wildlife service's fish restoration program*. USFWS.

URT. (2022). *Tanzania national fisheries report 2022*. Dodoma: United Republic of

Tanzania.

Van Acker, R., De Baerdemaeker, J., & Van Langenhove, H. (2020). The role of local food systems in promoting food security and sustainability: A review. *Sustainability, 12*(15), Article 6100.

Wamukota, A. (2015). The influence of engagement on compliance with community-based fisheries management: Evidence from marine conservation areas in Tanzania. *Marine Policy, 58*, 147-153.

Wang, D., Lee, R., & Zhang, H. (2021). The impact of reactive strategies on food security: An analysis of vulnerable communities. *International Journal of Environmental Research and Public Health, 18*(4), Article 1842.

Wang, J. (2023). Future projections of global seafood demand. *Journal of Marine Policy and Economics, 47*, 115-125.

Watts, M. (2017). *Silent violence: Global structures and local meanings in Latin American peasantry*. Routledge.

Yandle, T., & Dewees, C. (2007). The effectiveness of fishing restrictions: A study of New Zealand fishers' perceptions. *Marine Policy, 31*(5), 337-346.

Yasmin, S. (2023). Ecological impacts of fishing bans on hilsa fishers: A community-based approach. *Fisheries Management and Ecology, 30*(2), 105-115.

Yeboah, E. N. (2022). Socioeconomic implications of closed fishing season in the marine artisanal sector: A case study of Elmina and Apam in the Central Region of Ghana (Doctoral dissertation, University of Cape Coast).

Zhang, X. (2020). The drivers of overfishing in China: A comprehensive analysis. *Asian Fisheries Science, 33*(1), 77-94.

APPENDICES

APPENDIX I: QUESTIONNAIRES

My name is *David Protas.* I am a master's student at The Open University of Tanzania. I am interested in finding out the reasons behind the staged resistance by the local fishing communities and how the fishing ban influences the livelihoods of the fishing communities in Kigoma Municipality. I would appreciate it if you could be willing to corporate with this interview. Whatever answers you will give out in this interview will be held with high confidentiality and will be used only for the purpose of research.

PART 1: General Information

1. Gender 1= Male ( ) 2=Female ( ) 2. Age: _____ years

3. Occupation:……4. Highest Education Level attained:……..….

5. Marital Status: ……6. Household Size: …… 7. Religious Affiliation: …….

8. Ethnicity (Kabila): …… 9. Birth Place (District): ……..

PART 2: CONTRIBUTION OF FISHING ACTIVITIES TO THE LIVELIHOODS

10. Does Fishing form your major source of income? 1= Yes [ ] 2= No [ ]

11. How many years have you spent in fishing? (State):

……..

12. Fishing provides security to my household

1= strongly disagree 2= Disagree 4= I don't know 3= Agree

5= strongly agree

13. What kind of fish do you always catch? (Mention Three common ones):

……..……

14. In which particular location do you fish in Lake Tanganyika (onshore/offshore):……..……

15. On average what is your daily catch (in kg): ……..

16. On average what is your average income per month you get from fishing?

1= Less than 100,000/= [ ] 2= Between 100,000/= and 500, 000/= [ ]

3= Between 500,000/= and 1,000,000/= [ ] 4= Above 1,000,000/= [ ]

17. Which among the following are the properties you own by now

1= Mud house thatched with grasses 2= Modern house with a corrugated Iron sheet

3= A Motor fishing boat [ ] 4= Fishing canoes (ngalawa) [ ]

5= Car/Truck [ ] 6= Motorcycle 7= TV set [ ]

8=Others (Mention):…… ……

18. Using your experiences of being here for a long time what would you comment about fishing catch?

1= Fishing catch has increased [ ] 2= Fishing catch has declined every year [ ]

3= There is no difference in the amount caught [ ]

19. Using your experience of doing this business for a long time, what do you perceive to be the cause behind the fish catch decline? (mention at least three reasons)

1= …….

2= …….

3= …….

PART 3: COMMUNITY'S PERCEIVED NEGATIVE CONSEQUENCES OF FISH BAN ON LAKE TANGANYIKA

20. Are you aware that there is an annual fishing ban? 1= Yes [ ] 2= No [ ]

21. In your opinion what is the fish ban for?

1= for the government to make money out of us. [ ]

2= to stop us from being fish traders and fishermen [ ]

3 To protect fish stocks for the future [ ]

4=It has no purpose at all [ ]

5= others (specify): ……

22. Using your experience of the locality, how many times has the government carried out the fishing ban in this lake?..... when was the first ban instituted? ……

23. How has the Annual Fishing Ban influenced your usual way of living?.....

……

……

24. What coping strategies do fishers apply during the annual fishing ban to reduce the impact of the ban on their livelihoods?

1= Trade in other goods [ ] 2= Start a home garden [ ] 3= Start cultivating [ ]

4= Bribe law enforcers to continue fishing [ ] 5= Do nothing[ ]

Does the annual fishing ban improve your fishing catch after been lifted?

1= Yes [ ] 2= No [ ]

25. In case the Annual Fishing Ban does not increase your household food security,

what could be the reasons?

1= ……

2=……

3= ……

26. In the case that the AFB has increased household food security, what could be the reasons? (Indicate the 3 most important ones)

1= ……

2= ……

3= ……

27. My household's coping strategies during the annual fishing ban ensure that my household is food-secure

1= Strongly disagree [ ] 2=Disagree [ ] 3=Neutral [ ] 4=Agree [ ]

5= Strongly agree[ ]

28. In anticipation of the annual fishing ban, the coping strategies employed ensures that my household is food secure.

Strongly disagree [ ] Disagree [ ]Neutral [ ] Agree [ ] Strongly agree[ ]

29. In your opinion, what three reasons would you advance to explain why local fishing communities strongly oppose the annual fishing ban in Lake Tanganyika?

1……

2= ……..

3= ……

PART 4: COMMUNITY PARTICIPATION IN FISH RESTORATION IN LAKE

TANGANYIKA

30. Does the government involve you in the decision to ban fishing in the lake?

1= Yes 2= No

31. If the answer is Yes, in which areas have you participated in the formulation and execution of the annual fish ban in Lake Tanganyika? (Mention Three ways only)

1. ……
2. ……
3. ……

32. What opportunities do you perceive are available if the local community is involved directly formulation and execution of the annual fish ban in Lake Tanganyika?

……

……

34. What do you perceive as the obstacles or limitations behind the involvement of fishing communities in the execution of the annual fishing ban here

……

……

35. In terms of the constitutional framework governing community rights in decision-making; how does the community mechanism operate regarding the management of fishing in Lake Tanganyika?

……

……

36. Generally, why are the local fishing communities opposing programs for periodic closures of fishing in the lake?

……

37. Which among the following are your opinions about the state's decision to give full mandate of regulating fishing in Lake Tanganyika?

1= Effective Control of LawBreakers [ ]

2= The Level of Immature Fish Catches will be reduced [ ]

3= Willingness to give accurate data will increase [ ]

4= Compliance with regulations will increase [ ]

5= Solving problems among fishermen will increase [ ]

38. Which among the following are the factors contributing to fishermen resisting the annual fish ban in Lake Tanganyika?

1= Fishermen have no say in management

2= Fishermen’s knowledge is not used to formulate management measures

3= Fisheries regulations don’t suit local conditions

4= Insufficient penalties

5= Fishermen are not free to report law breakers

6= No sense of conservation

END

Appendix 2: QUESTIONS FOR UNSTRUCTURED INTERVIEW

(FOR KEY INFORMANTS ONLY)

My name is *David Protas.* I am a master's student at The Open University of Tanzania. I am interested in finding out the reasons behind the staged resistance by the local fishing communities and how the fishing ban influences the livelihoods of the fishing communities in Kigoma Municipality. I would appreciate it if you could be willing to corporate with this interview. Whatever answers you will give out in this interview will be held with high confidentiality and will be used only for the purpose of research.

1. What kind of fishing gear do people use here? Why
2. Where do you fish and why do you fish there?
3. What do you catch and how much do you catch daily in terms of kilograms?
4. On average how much do you earn per month from selling fish caught?
5. How deep do you fish and how far from the lake shore?
6. Has there been any pressure on fishing in general in this locality?
7. Do you do any other work other than fishing?
8. What would you comment about community resistance to the periodic fish ban in Lake Tanganyika? Why are they opposing this noble and scientific measure?
9. In terms of the constitutional framework governing community rights in decision-making; how does the community mechanism operate regarding the management of fishing in Lake Tanganyika?
10. What strategies do local fishers carry out to remain resilient to the law during the fishing ban in this locality?

END

Appendices 3: Research Clearance letters

THE OPEN UNIVERSITY OF TANZANIA

DIRECTORATE OF POSTGRADUATE STUDIES

P.O. Box 23409
Dar es Salaam, Tanzania
http://www.openuniversity.ac.tz

Tel: 255-22-2668992/2668445
ext.2101
Fax: 255-22-2668759
E-mail: dpgs@out.ac.tz

Our Ref: PG 202187149

2nd May, 2024

Regional Administrative Secretary (RAS)
BOX 125,
KIGOMA

RE: RESEARCH CLEARANCE

The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007. In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research. To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania.

With this brief background, the purpose of this letter is to introduce to you **Mr.** David Protas with registration number **PG202187149** Pursuing **Master Degree in Natural Resources Assessments and Management (MANRAM).** We here by grant this clearance to conduct a research titled **"Determinants of local communities resistance to state fishing restoration program in Lake Tanganyika in Kigoma, Tanzania"** He will collect data at your area from **5th May, 2024 to 4th August, 2024.** The candidate will solicit information from the fishing local communities located along Lake Tanganyika in Kigoma Municipality.

I therefore kindly request that you assist him to get access to and necessary assistance that will enable him get requested information that will enable him accomplish this noble and important stage of his academic life. In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam.Tel: 022-2-2668820.We lastly thank you

1

in advance for your assumed cooperation and facilitation of this research academic activity.
Yours,

THE OPEN UNIVERSITY OF TANZANIA

Prof. Magreth Bushesha

DIRECTOR OF POSTGRADUATE STUDIES

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE

REGIONAL AND LOCAL GOVERNMENT ADMINISTRATION

KIGOMA UJIJI MUNICIPAL COUNCIL

In reply please quote:
Ref. No. T.40/15/VOL III/220

Date: 25th June, 2024

Deputy Vice Chancellor,
Open University of Tanzania,
P. O. Box 23409,
DAR ES SALAAM.

RE: APPROVAL FOR RESEARCH CLEARANCE FOR YOUR STUDENT NAMELY MR. DAVID PROTAS

Please refer to the heading.

2. Also refer to your letter with Ref. No. OUT/PG202187149 dated 18th June, 2024 in respect to the above heading.

3. The **approval is hereby given** as for your above named student to conduct his research studies scheduled to be undertaken from 18th June, 2024 to 31st July, 2024 at Kigoma Municipal.

4. Thank you for cooperation.

Idrisa M. Naumanga
For: MUNICIPAL DIRECTOR
KIGOMA UJIJI

For: MUNICIPAL DIRECTOR
KIGOMA/UJIJI

Director Office Kigoma Ujiji Municipal Council P.O.Box 44, KIGOMA, Email:- municipal@kigomaujijimc.go.tz